MOTT MACDONALD

A41 North Corridor Study

Preferred Options Report

February 2019

Mott MacDonald
Ground floor
Royal Liver Building
Pier Head
Liverpool L3 1JH
United Kingdom

T +44 (0)151 482 9910
F +44 (0)151 236 2985
mottmac.com

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Contents

1 Introduction

Mott MacDonald have been commissioned by Wirral Council to develop phased packages of transport improvements to help aid the regeneration of Birkenhead and the surrounding areas.

Birkenhead is at the forefront of Wirral Council's efforts to stimulate new economic and social development, and there is a growing momentum for this positive change to happen in and around the town. The planning for significant redevelopment is progressing – in particular:

- The Wirral Growth Company's plans for a mixed-use development centred on Europa Boulevard and Conway Park rail station. Bringing forward a new employment zone and reconfiguring and improving the retail offer on the north side of the town centre including plans for Birkenhead Market;
- The Woodside area which has considerable potential for another mixed-use development with excellent views of the Liverpool waterfront, and links back to Hamilton Square and the town centre. Masterplanning is at an early stage, but the land-use focus could be more upon residential, leisure and tourism, with the unique feature of the Mersey Ferry terminal as a key focus; and
- Land south of Birkenhead (Hind Street) - This area is likely to become a major mixed-use development bringing new housing and jobs and improving the permeability of the south side of the town.

In addition, just to the north east of the town centre is Wirral Waters- part of the Mersey Waters Enterprise Zone and the subject of another transport feasibility study. This, in turn, is increasing in momentum with early phases of new development complete, and the next phases in the advanced stages of planning and expected to be on-site in the near future. Birkenhead and surrounding areas are therefore very likely to experience a dramatic increase in activity with new employment areas, places to live and places of entertainment.

This study is targeted at helping to realise a reconfiguration of Birkenhead's transport system, with a particular emphasis on facilitating access into the area by more sustainable modes, and removing significant barriers to movement. Following consultation with multiple partners and stakeholders, and with reference to the 'A41 North Corridor Study – Options Identification, Appraisal and Selection' report', the long list of potential improvement schemes was reviewed to identify the preferred schemes. These schemes are described in detail in this report which should be read in conjunction with the **'A41 North Corridor Study: Preferred Options Scheme Drawings'** report issued in October 2018. The schemes have been grouped into packages of works for three main phases, as summarised below, with further details in the following sections.

1.1 Summary of Schemes, Packaging and Phasing

Phase 1 schemes are anticipated for delivery between 0-5 years of the publication of the final strategy. These schemes are as follows:

- **Phase 1 Schemes:**
  - Wirral Rail Line Enhancements
    - Station facilities and waiting environment enhancements
    - Wirral line park and ride enhancements
    - Green Lane station refurbishment
    - Birkenhead Central station: new forecourt and eastern access route
    - Improvements to bus infrastructure at Birkenhead Park and Conway Park stations
    - Hamilton Square station bus / rail interchange improvements
    - Birkenhead North station bus / rail interchange improvements
    - Birkenhead Central stations bus / rail interchange improvements
  - Birkenhead Town Centre Gateways
    - A41 Chester Road / A552 Borough Road highway realignment (Phase 1)
    - A41 Chester Road / Ivy Street junction improvement
    - Signage improvement to Birkenhead Priory
    - Electric charging points across borough
    - Signage and better entrance to retail core
    - Birkenhead local access road improvements
    - Road safety improvements at Whetstone Lane / Borough Road
  - Birkenhead Town Centre Streetscape
    - Improved public realm in retail core
    - Improved public realm Argyle Street
    - Cleveland Street / Market Street / Price Street public realm
    - Improved public realm Conway Street
    - Improved pedestrian crossing facilities along Argyle Street
    - Conway Park station and Birkenhead Market improved pedestrian route
    - Improved public realm Conway Park and Europa Boulevard
  - Regenerating Woodside and Hamilton Square
    - Hamilton Square and Hamilton Street improvements
  - World Class Public Transport
    - Relocation of Birkenhead bus station
  - A41 Site Access Improvements
    - A41 site access improvements Phase 1
- **Phase 2 Schemes**
  - Birkenhead Town Centre Streetscape
    - A41 Chester Road / A552 Borough Road highway realignment (Phase 2)
    - Pedestrian overbridge of Borough Road at Whetstone Lane
  - Regenerating Woodside and Hamilton Square
    - Access road to Rosebrae development site
  - A41 Site Access Improvements
    - A41 site access improvements Phase 2
  - A41 Sustainable Connectivity
    - Birkenhead Green Corridor
    - Riverside Green Link
- Phase 3 Schemes
  - Cross River Strategy
    - Queensway Tunnel

- Scheme 2: Wirral Line Connectivity

1.2 Document Structure

Following this introductory section, the report is structured into the following sections:

- Sections 2 – 4 respectively present details of the preferred options which have been packaged into three overall phases of implementation. Each scheme has been provided with an outline budget cost, and for many schemes a concept design has also been developed. However, many of the schemes have a variety of design solutions (such as public realm improvements), and will therefore be subject to more detailed design and costing as the improvement packages move forward;
- Section 5 presents a general risk register for the delivery of the schemes as a whole;
- Section 6 provides a review of the various options available for the transit mode referred to in the scheme identification;
- Section 7 presents a review of likely social and economic impacts of the schemes, in particular those not modellable at this level by the traffic modelling tools discussed in Section 8;
- Section 8 presents an assessment of the likely traffic impact of the schemes utilising Wirral and Merseyside strategic traffic models. Interestingly, many parts of Birkenhead have an oversupply of highway capacity – which may be considered a part of the existing baseline issue in the town as it creates barriers to pedestrian and cycle movement and access for new development. However removing the oversupply can have a negative impact on traffic capacity, and the impact of this is discussed in this section;
- Section 9 provides a discussion on funding opportunities to help bring forward the schemes; and
- Section 10 provides final conclusions in relation to the study and notes the next steps on the road to delivery.

This A41 North Corridor Study has been prepared in parallel to a similar study to help bring forward development at Wirral Waters. In part, the improvement schemes have been designed to work in coordination between the two redevelopment areas so that transport benefits can be maximised.

2 Preferred Schemes and Phasing: Phase 1

This chapter provides a summary of the details of the schemes suggested to be included in the first phase of the A41 North Corridor Transport Strategy. The section includes a description of the scheme, potential risks directly associated with the particular scheme, and a budget estimate for the delivery of the scheme. This section is to be read alongside the earlier report 'A41 North Corridor Study: Preferred Options Scheme Drawings' issued in October 2018.

2.1 Wirral Line Enhancements

This package will introduce several measures that will enhance the Wirral Line - part of the Merseyrail network. The schemes proposed will enhance station facilities and accessibility, provide Park & Ride opportunities, and foster greater interchange with other public transport modes. The aims of this package will be to raise rail patronage along the Merseyrail network and consequently reduce car usage within Wirral, particularly along the A41 North Corridor. This will be achieved through increasing the attractiveness of rail travel, by delivering an improved standard of service along the Wirral Line. It should be noted that from 2020 there will be new state of the art rolling stock on the Merseyrail network which will bring benefits such as increased capacity, reduced journey times and improved accessibility.

2.1.1 Scheme 1: Station facilities and waiting environment enhancements

No scheme drawing

2.1.1.1 Scheme description

The purpose of this scheme is to encourage greater use of rail for all trip purposes by improving the experience, ease of access, and comfort of the wait associated with the mode at rail stations. In particular, the scheme would seek to deliver for all rail stations across Wirral (subject to an audit of need):

- New and improved waiting shelters with enhanced seating, CCTV and heating units;
- Automatic Ticket Machines at all stations with no staff presence (and ultimately at all stations), at which a full range of tickets may be purchased;
- Enhanced retail units at stations with a sufficient potential demand, to include newspapers, food and drink;
- Upgraded information boards and screens; and
- Secure cycle parking. This is already available at most Merseyrail stations but should be extended to all including Borderlands line stations between Bidston and Wrexham. An audit would be required to review the capacity of cycle parking at stations as it is noted that cycle parking is fully utilised at some.

It is hoped that by improving the experience of rail users at stations across the network, more of the travelling public will choose this mode over the private car, thereby reducing traffic congestion and air quality issues across the borough.

2.1.1.2 Scheme risk review

- The scheme requires co-ordination with the station owner (Network Rail), Station Facilities Owner (Merseyrail) and other interested parties including Merseytravel. All of these have their own maintenance and upgrade programmes which will require alignment to ensure no repeat or abortive work.

2.1.1.3 Scheme budget estimate

£10-£20m

2.1.2 Scheme 2: Wirral line Park & Ride enhancements

No scheme drawing

2.1.2.1 Scheme description

This scheme proposes to deliver new and increased parking capacity at several key stations across the borough with the aim of increasing the accessibility of stations for those outside immediate walking or cycling distance, and thereby reducing the number of journeys within the borough made entirely by private car. Whilst it is understood that it will not be possible or desirable for all stations on the borough's rail network to have large car parks, a number of stations are located at key strategic locations with the potential to intercept car journeys and convert these to rail journeys. These include existing Park & Ride sites such as Hooton, Birkenhead North and Spital, and stations without large car parks but with good accessibility to the strategic road network and large potential P&R catchments such as Upton and Heswall. A particular focus on upgrading Park & Ride capacity on the Chester line has the potential to reduce vehicle trips on the busy A41 North Corridor and help to alleviate congestion.

The scheme would include the purchasing or other acquisition of land adjacent to the station in question, the conversion of this land to car parking using decking and other capacity increasing techniques if warranted by demand, and the upgrading of connections including road signage and pedestrian walkways between the car park and the station platforms. It would be preceded by a comprehensive study to identify the most appropriate locations for enhanced Park & Ride provision including survey and market research work.

2.1.2.2 Scheme risk review

The aim of the scheme is to reduce the amount of private car miles overall. There is a risk that creating new Park and Ride capacity will abstract users off existing public transport services, or those that currently walk and cycle, rather than users that currently drive for their entire journey. This risks increasing overall car mileage and careful consideration must be given to the location of the new and expanded sites as a result.

2.1.2.3 Scheme budget estimate

£1m-£3m

2.1.3 Scheme 3: Green Lane station refurbishment

No scheme drawing

2.1.3.1 Scheme description

Green Lane rail station currently requires some refurbishment. Whilst it has recently had work undertaken to improve the on-platform waiting environment, the station concourse, stairs and exterior are in need of significant improvements to create an attractive public transport experience. In addition, disabled access at the station is difficult, and the platform area is dark and gloomy especially at night and in inclement weather.

The scheme would involve the installation of upgraded disabled facilities, enhanced lighting, a new ticket counter and two new seated waiting areas. It would also involve a refurbishment of the stairway and exterior of the station, as well as the parking area to the front. The aim of this is to create a more attractive public transport offer for new and existing passengers and thereby reduce the number of private car trips made within the borough.

2.1.3.2 Scheme risk review

The scheme requires co-ordination with the station owner (Network Rail), Station Facilities Owner (Merseyrail) and other interested parties including Merseytravel. All of these have their own maintenance and upgrade programmes which will require alignment to ensure no repeat or abortive work.

2.1.3.3 Scheme budget estimate

£3m-£10m

2.1.4 Scheme 4: Birkenhead Central: new forecourt and eastern access route

Drawing No. 392148-MMD-00-XX-DR-C-0005

2.1.4.1 Scheme description

The redevelopment of land south of Birkenhead town centre will open up many opportunities to improve the linkage of the town centre with residential areas to the south. Birkenhead Central rail station is one of the most popular entry points to the town for workers and shoppers, but it suffers from a number of operational issues, including:

- Poor interchange with bus services due to the space constrained nature of Argyle Street South outside the station;
- No car parking, pick-up or drop-off facilities. Again, adding to the poor traffic environment outside the station;
- Only limited secure cycle parking; and
- A large highway gyratory situated between the station and the town centre, which is a significant barrier to pedestrian movement.

To the east of the existing station, the land was formerly occupied by a number of substantial gas storage containers, but these have now been cleared. This land is now expected to form part of the Hind Street regeneration area, and consequently there will be a unique opportunity to significantly improve access to Birkenhead station. This scheme could potentially comprise the following:

- The removal of a derelict rail storage shed to the east of the station;
- The creation of a second pedestrian access to the station from the east;
- Provision of a new station forecourt to the east, and south of Hind Street. The forecourt could allow a turnaround for buses, pick-up and drop-off and possibly car parking.

This scheme is also linked and coordinated with other schemes in the Phase 1 and 2 improvements described in this report, which in combination could have a dramatic influence on the usage of Birkenhead Central station.

2.1.4.2 Scheme risk review

The following could be considered risks for this particular scheme:

- Land required for the scheme is not available;
- Other complimentary improvement schemes do not come forward, consequently reducing the overall benefits of this scheme.

2.1.4.3 Scheme budget estimate

£3m-£10m

2.1.5 Schemes 5 and 7: Improvements to bus infrastructure at Birkenhead Park, Conway Park and Birkenhead North

No scheme drawing

2.1.5.1 Scheme description

This scheme would deliver new bus interchange facilities at Birkenhead Park, Conway Park, and Birkenhead North stations to improve access to the railway stations and encourage multi-modal journeys. In particular, it is hoped that bus services might act as feeder services for the railway particularly for longer distance cross-river trips or journeys to and from New Brighton and West Kirby. Conversely, providing enhanced bus interchange at these locations has the potential to provide enhanced access to areas of Birkenhead not well served by rail including the central area of Wirral Waters, the area to the south of Birkenhead Park including Claughton and Oxton, and areas to the north including Seacombe. In the short term, this could greatly enhance the accessibility of both Wirral Waters and the A41 North Corridor regeneration area by public transport from places such as Liverpool City Centre.

The scheme would include the replacement of existing bus provision at the stations with enhanced bus stopping facilities in easy reach of the station entrances and providing shelter, seating and information on interchange and upcoming services via Real Time Information. Signage would also be improved with mutual signage between bus and rail areas. Through-timetables (showing both legs of the journey plus suggested interchanges) could also be constructed and displayed for journeys involving interchange between, for instance, Wirral Waters and Liverpool City Centre.

2.1.5.2 Scheme risk review

This scheme is designed to build on existing service provision to increase the attractiveness of public transport and attempt to overcome the long-understood reluctance to interchange particularly between modes. Unless marketing and ticketing options adopt a similarly unified approach across modes, any improvements made in this area will be of limited impact.

2.1.5.3 Scheme budget estimate

£3m-£10m

2.1.6 Scheme 6: Hamilton Square bus / rail interchange improvements

Drawing No. 392148-MMD-00-XX-DR-C-0004

2.1.6.1 Scheme description

In this scheme, works would be implemented outside Hamilton Square rail station on Hamilton Street to improve passenger interchange between rail and bus. The works are primarily planned to comprise of:

- Allowing two-way bus routing on Hamilton Street outside of the station. This will allow greater flexibility in bus routing, plus shorter walk distances for passengers;
- Improved waiting environment for passengers;
- Public realm works to the footway and carriageway; and
- Taxi ranking facilities.

Again, this scheme can be coordinated with other schemes to help maximise transport benefits.

2.1.6.2 Scheme risk review

Risks associated with this scheme are:

- Consultation with adjacent businesses and landowners will be needed on the scheme;
- An amended traffic order would be required to manage Hamilton Street.

2.1.6.3 Scheme budget estimate

£1m-£3m

2.1.7 Scheme 8: Birkenhead Central bus / rail interchange improvements

No scheme drawing

2.1.7.1 Scheme description

This scheme would deliver new bus interchange facilities at Birkenhead Central station to improve access to the railway station and encourage multi-modal journeys. In particular, it is hoped that bus services might act as feeder services for the railway particularly for longer distance cross-river trips or journeys to and from Chester and Ellesmere Port. Conversely, providing enhanced bus interchange at these locations has the potential to provide enhanced access to areas of Birkenhead not well served by rail including the Tranmere and Prenton areas of Birkenhead to the south, the Oxton and Claughton areas to the west, and the industrial areas of the A41 North Corridor including Cammell Laird's shipyards. In the short term, this could greatly enhance the accessibility of the A41 North Corridor regeneration area by public transport from places such as Liverpool City Centre and Chester.

The scheme would include the replacement of existing bus provision at the station with enhanced bus stopping facilities in easy reach of the station entrances and providing shelter, seating and information on interchange and upcoming services via Real Time Information. Signage would also be improved with mutual signage between bus and rail areas. Through-timetables could also be constructed and displayed for journeys involving interchange between, for instance, St Catherine's Hospital and Liverpool City Centre.

2.1.7.2 Scheme risk review

This scheme is designed to build on existing service provision to increase the attractiveness of public transport and attempt to overcome the long-understood reluctance to interchange particularly between modes. Unless marketing and ticketing options adopt a similarly unified approach across modes, any improvements made in this area will be of limited impact.

2.1.7.3 Scheme budget estimate

£1m-£3m

2.2 Birkenhead Town Centre Gateways

This is a package of infrastructure improvements to support the regeneration of Birkenhead Town Centre through the improvement of the gateway road arrival points in the town centre. This includes addressing a number of junctions that experience capacity problems and increase signposting and wayfinding into Birkenhead town centre. This package will enable more efficient traffic movements and will facilitate improved access to land in need of redevelopment, improve accessibility to the town centre, and create a more efficient and safer road layout and improved visual approach to Birkenhead.

2.2.1 Scheme 9: A41 Chester Street highway realignment (Phase 1)

Drawing No. 392148-MMD-00-XX-DR-C-0005A

2.2.1.1 Scheme description

This scheme would improve the A41 Chester Street highway alignment to increase capacity and connectivity along the A41 North Corridor, and to remove the northbound underpass. This would be undertaken in conjunction with Scheme 25: A41 / A552 / Flyovers remodelling – Phase 1 and would involve a removal of the mainline route between Chester Street and New Chester Road to the south, instead requiring this move to be completed via a signalised junction. The mainline flow would instead connect New Chester Road with a new roundabout serving the Queensway Tunnel, and new at-grade links to both Conway Street and Borough Road's junctions with Argyle Street, better reflecting the bulk of demand.

The aim of the scheme is to remove a potential bottleneck on the approach to the A41 North Corridor development sites and eliminate a land hungry and pedestrian / cycle unfriendly underpass from the network, instead restoring at-grade operations. The scheme forms part of the wider phase 1 temporary arrangement following the removal of the flyovers as detailed in Scheme 25 below.

2.2.1.2 Scheme risk review

This scheme is designed to integrate with the wider phase 1 scheme described later as Scheme 25. As such, its deliverability is linked intrinsically with this larger scheme and it may therefore not be feasible in isolation without a significant redesign, consultation and traffic mitigation plan.

2.2.1.3 Scheme budget estimate

£3m-£10m

2.2.2 Scheme 10: A41 Chester Street junction improvements

Drawing No. 392148-MMD-00-XX-DR-C-0004

Scheme description

This scheme is associated with the removal of the Birkenhead flyovers, and will reconfigure the Chester Road / Ivy Street junction to be suitable for the new traffic arrangement.

The scheme offers the opportunity to improve pedestrian crossing facilities through the junction to better link the town centre with the riverfront and Birkenhead Priory. The scheme would also incorporate improved landscaping around the junction.

Scheme risk review

Potential risks for this particular scheme could be as follows:

- The scheme facilitates the reconfiguration of the Birkenhead flyovers and therefore is linked to the delivery of the scheme;
- Consultation will be required with local residents and businesses as the scheme will need changes to access and circulation.

Scheme budget estimate

£1m-£3m

2.2.3 Scheme 11: Signage improvement to Birkenhead Priory

Drawing No. 392148-MMD-00-XX-DR-C-0006

Scheme description

Birkenhead Priory is a hidden treasure tucked away just north of the Cammell Laird shipyard, and hidden by the industrial area to the east of Birkenhead town centre.

The removal of the Birkenhead flyovers will offer an excellent opportunity to reconnect this area back with the town centre, and the new development areas being planned in the locality.

In the first instance, a signage strategy and interpretation boards could be used to link the Priory with local destinations (the town centre, Hamilton Square and Woodside). Later, the scheme could be enhanced with improved walk routes and landscaping.

Scheme risk review

No specific risks known.

Scheme budget estimate

£100k

2.2.4 Scheme 12: Electric charging points across borough

No scheme drawing

2.2.4.1 Scheme description

This scheme would provide electric charging points across Wirral to improve the infrastructure available for electric vehicles. This could make use of national schemes such as the Government's 'On-street Residential Charge-point Scheme'. It could be delivered directly by Wirral Council within their off-street car parks and in other public areas, or could be delivered in part by developers as a result of the inclusion of charge-points as planning conditions for new homes. The aim would be to create a comprehensive network of publicly available charge-points across the borough with associated ancillary technology including an app and website to show the location of nearest facilities.

2.2.4.2 Scheme risk review

Investments in new technology such as this include an inherent risk that they will quickly be overtaken by further advancements, for instance as a result of future advances in hydrogen power. However, the cost of the infrastructure is reducing at the same time as its reach increases and it is therefore likely that battery charging of electric vehicles will form an important part of the borough's future transport network.

2.2.4.3 Scheme budget estimate

£3m-£10m

2.2.5 Scheme 13: Signage and better entrance to retail core

No scheme drawing

2.2.5.1 Scheme description

This scheme would improve the quality of pedestrian and cycle signage to Birkenhead Town Centre from key gateways including Birkenhead Bus Station, Conway Park and Birkenhead Central rail stations, the Borough Road / Whetstone Lane junction and the Claughton Road / Exmouth Street junction.

2.2.5.2 Scheme risk review

No specific risks known.

2.2.5.3 Scheme budget estimate

£100k

2.2.6 Scheme 14: Birkenhead local access road improvements

No scheme drawing

2.2.6.1 Scheme description

This scheme would provide a package of small-scale local access road improvements, enhancing surface quality, removing potential safety risks, and upgrading footways and public realm. The aim of the scheme is to improve access and movement along these links and provide a higher quality experience for all users including pedestrians and cyclists.

2.2.6.2 Scheme risk review

The main risk associated with this scheme is in the encouragement and inducement of additional traffic to use these minor links which may often be residential and unsuitable in nature. Careful consideration of traffic calming and pedestrian safety treatments will be required in order to ensure that these upgraded links do not become attractive options for through-traffic.

2.2.6.3 Scheme budget estimate

£1m-£3m

2.2.7 Scheme 15: Road safety improvements at Whetstone Lane / Borough Road

No scheme drawing

2.2.7.1 Scheme description

The junction of Whetstone Lane and Borough Road is a major cause for concern in terms of pedestrian safety. It is a key gateway to Birkenhead Town Centre and a major node for footfall between the residential areas to the south of the town (including Tranmere) and the retail core. This scheme will address these safety issues by reducing the width of the carriageway (potentially taking out traffic lanes), removing the central island refuges and installing 'all red'

pedestrian phases with enhanced super-crossings, removing left-turn filter lanes and guard rail and increasing pedestrian green time.

The scheme would involve a significant design stage and would require junction modelling to arrive at an optimum solution which avoids traffic congestion or excessive queuing. In principal, however, the scheme is designed to re-balance priority in favour of the pedestrian and an increase in overall traffic delay at the junction is therefore to be expected.

2.2.7.2 Scheme risk review

A scheme of this nature risks increasing the volume of queuing traffic and congestion at the junction if not modelled and planned out meticulously. The risks associated with this are:

- Reduce air quality as a result of increased volumes of stationary traffic;
- Increased delay at the junction for private vehicles and the social costs associated with this;
- Potential introduction of additional traffic in alternative locations as a result of drivers re-routing to avoid the remodelled junction.

2.2.7.3 Scheme budget estimate

£1m-£3m

2.3 Birkenhead Town Centre Streetscape

This package will provide options to join together the disparate parts of Birkenhead Town Centre through an improved active travel public realm. An improved streetscape would increase movement between the retail and commercial/office areas through creating a pedestrian and cycle friendly environment. This package will introduce a range of public realm improvements that will encourage more walking and cycling activity in the area. The package will support the town centre to provide a more attractive retail offer to residents and visitors, and also enhance the public realm between commercial and retail cores.

2.3.1 Scheme 16: Improved public realm in retail core

No scheme drawing

2.3.1.1 Scheme description

The existing pedestrianised area within the retail core of Birkenhead (including the Grange Precinct, Birkenhead Market and the area surrounding the Pyramids Shopping Centre) is now many years old and is beginning to look tired and unattractive to potential users, particularly on Grange Road itself which has loose bricks, uneven flagging and a distinctly old fashioned appearance. The scheme would seek to refurbish the entire area providing new surfacing, fresh planting and with a complimentary signage and access strategy to improve the environment around the retail core and stimulate use. The aim would be to increase footfall in this important location and improve connectivity to the various segments and neighbourhoods of the town centre, removing severance wherever possible.

The scheme is tied to a potential remodelling and refurbishment of Birkenhead Market proposed by Wirral Growth Company and should be programmed in conjunction with this scheme.

2.3.1.2 Scheme risk review

A key risk associated with this scheme is that there is, as yet, no firm consensus on the future direction and role of Birkenhead Town Centre in the context of Wirral Waters, the A41 regeneration area and an expanded City Regional centre in Liverpool. It will be important to understand the future role of Birkenhead as an employment and /or retail centre before a decision can be made on the size and scope of the refurbishment proposals, to avoid unnecessary or poorly targeted work.

2.3.1.3 Scheme budget estimate

£1m-£3m

2.3.2 Scheme 17: Improved public realm Argyle Street

Drawing No. 392148-MMD-00-XX-DR-C-0003 and 0004

2.3.2.1 Scheme description

Argyle Street already has significant activity along its length, and has the potential to be used even more. Uses to either side are made up of bars and other entertainment venues, commercial businesses and residential apartments. There is therefore much demand for road crossings.

The street itself is also relatively heavily trafficked, with traffic volumes approximately equivalent to the parallel Chester Street. In addition, the street is very well used by bus services.

With the Woodside and Wirral Waters schemes coming forward, there is the likely potential that the street will see an increase pedestrian and traffic movements. However, should traffic become over dominating it will have a negative impact to both new businesses coming into the area, and also the type of business.

This scheme would seek to achieve a balance between the requirement (if any) for through traffic movements, and improving the environment for walking and cycling. As has been the case in other towns, a well-planned, designed and delivered public realm and traffic management scheme can have a dramatic positive influence on economic activity of an area. At this time, the scheme is seen as extending from Hamilton Square to Conway Street. However, it would coordinate with other improvement schemes to help achieve an overall area wide benefit.

2.3.2.2 Scheme risk review

Particular risks associated with this scheme could include:

- Inclusive consultation will be required with local residents, businesses and community representatives (such as disability groups) to gain buy-in to the scheme;
- A scheme not suitable for the future operation of the street may introduce road safety issues;
- Appropriate materials will need to be used to avoid a maintenance liability for the Council.

2.3.2.3 Scheme budget estimate

£1m-£3m

2.3.3 Scheme 18: Cleveland Street / Market Street / Price Street public realm

Drawing No. 392148-MMD-00-XX-DR-C-0003 and 0004

2.3.3.1 Scheme description

Cleveland Street, Market Street and Price Street are all east / west roads running perpendicular to Argyle Street and Chester Street. Each of the streets has a slightly different function and use which could change in the future as new development comes forward and new populations are established. For example, Price Street and Cleveland Street intersect with the Hamilton Square conservation area, but are also well trafficked streets. Conversely, Market Street is much less trafficked but has a parade of shops with great regeneration potential between Hamilton Street and Argyle Street.

This scheme would seek to introduce public realm improvements on each of the streets suitable for their function and form. For example, Cleveland Street and Market Street could see improvements to landscaping and tree planting to better connect it with Hamilton Square and Market Street improvements to footway and carriageway surfacing. All of the schemes would need to coordinate with the Argyle Street scheme which will be central to the improvement area.

Also important to the east / west streets will be facilitating ease of walking and cycling between residential, commercial, retail and education facilities. Linking with other planned Green infrastructure and the emerging plans for the Wirral Growth Company around Conway Park.

2.3.3.2 Scheme risk review

Possible risks with this project could include:

- Consultation will be required with businesses and residents adjacent to the scheme;
- Individual improvement schemes will need to coordinate with other schemes in the area.

2.3.3.3 Scheme budget estimate

£1m-£3m

2.3.4 Scheme 19: Improved public realm Conway Street

Drawing No. 392148-MMD-00-XX-DR-C-0003

2.3.4.1 Scheme description

Similar to Argyle Street, Conway Street experiences relatively high traffic flows, but is also a key pedestrian route in Birkenhead – both along its length and also north / south at certain junctions. Conway Street is also home to Birkenhead bus station and therefore accommodates large volumes of buses. The street also changes in nature as it skirts the northern boundary of the town centre – to the west, the road is single carriageway with a relatively open aspect to either side, whereas to the east, the road is a dual (2) carriageway with extensive use of guard railing.

Europa Boulevard, approximately opposite the bus station, is planned to be the main access spine for the early phase of Wirral Growth Company's redevelopment initiative. This boulevard would likely be subject to highway and public realm improvements. In addition, the redevelopment scheme may extend across Conway Street to help create / develop a new retail / leisure extension to the south of the street.

This scheme would therefore seek to upgrade Conway Street so that it is more suitable for pedestrian crossings, and that it is more consistent in nature along its length. Measures could include:

- Carriageway narrowing to widen footways, create on-street parking bays and reduce road crossing widths;
- Removal of guard railing and general street decluttering;
- Improved surfacing on footways; and
- New landscaping, and if possible tree planting.

2.3.4.2 Scheme risk review

Particular risks that could be associated with this scheme include the following:

- Coordination will be required with other improvement schemes in the area to ensure consistency of measures and materials;
- Consultation with stakeholders may be required to ensure buy in to the scheme.

2.3.4.3 Scheme budget estimate

£1m-£3m

2.3.5 Scheme 20: Improved pedestrian crossing facilities along Argyle Street

Drawing No. 392148-MMD-00-XX-DR-C-0003 and 0004

2.3.5.1 Scheme description

This scheme is linked with Schemes 17 and 18 to improve the environment on Argyle Street. The scheme will specifically help pick up north / south and east / west pedestrian desire lines along and across Argyle Street which may be currently lacking – such as at Market Street.

Crossing types could be mix of uncontrolled (dropped crossings and refuge islands), or controlled (such as zebra crossings).

2.3.5.2 Scheme risk review

Risks associated with this scheme could be:

- The scheme will need to coordinate with both other improvement schemes in the area and also new development / zones of activity to help ensure the optimum pedestrian environment is achieved on and around Argyle Street.

2.3.5.3 Scheme budget estimate

£100k

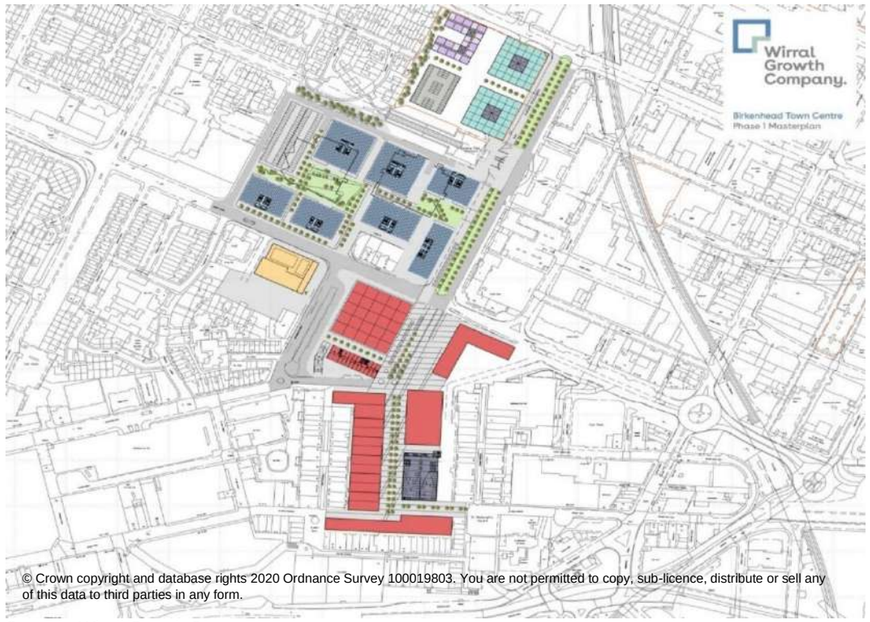
2.3.6 Scheme 21: Conway Park and Birkenhead Market improved walk route

No scheme drawing

2.3.6.1 Scheme description

One of the early projects under development by the Wirral Growth Company is the mixed-use development that is centred around the Conway Park rail station – see image below.

Figure 1: Birkenhead Civic Hub Scheme



Source: Wirral Growth Company

In its entirety, this scheme could provide new commercial, leisure and residential uses to the north of Conwy Street and an improved retail extension (including a new indoor market) to the south. An important part of this will be a high quality pedestrian route to connect the various elements of the scheme, and to ensure that Conway Street is not a barrier to movement.

The Conway Park scheme will create a significant increase in activity in this area of Birkenhead, and will attract trips from all directions. This scheme will therefore need to coordinate well with other transport schemes being promoted within this report to ensure overall benefits are being maximised.

Closely aligned to the proposed Wirral Growth Company scheme to improve the environment around Conway Park station on Europa Boulevard and to refurbish Birkenhead Market, this scheme would provide an improved route around Conway Park connecting to Birkenhead Market, to attract increased footfall into the retail core, and to provide improved access to new development north of Conway Park. The scheme would greatly improve the quality of public realm and signage on Europa Boulevard and would install new high quality crossing facilities over Conway Street to improve integration with the bus station and wider town centre. Much of the walk route would be provided in a traffic-free environment and consideration could be given to creating sheltered safe-spaces on the route with enhanced lighting and CCTV coverage to help to remove the perception of isolation and danger.

2.3.6.2 Scheme risk review

As discussed above, the scheme will need to coordinate with other initiatives in the area.

The scheme will need to closely align with related schemes to improve public realm on Europa Boulevard, and the aspirations of Wirral Growth Company to create office space and enhanced activity to the north of Conway Park.

2.3.6.3 Scheme budget estimate

No budget required by Wirral Council as the works will be undertaken by other parties as part of the wider Civic Hub scheme.

2.3.7 Scheme 22: Improved public realm Conway Park and Europa Boulevard

Drawing No. 392148-MMD-00-XX-DR-C-0003

2.3.7.1 Scheme description

To complement the improved walking route between Conway Park and Birkenhead Market, a number of public realm improvements are proposed for Europa Boulevard itself. These will include significant tree planting and other greening alongside work to improve the quality of footways and reduce traffic dominance on what will become a key pedestrian desire line.

2.3.7.2 Scheme risk review

Should the Wirral Growth Company scheme not proceed as currently being envisaged, an alternative improvement strategy may need to be prepared.

2.3.7.3 Scheme budget estimate

Work to be undertaken by Wirral Growth Company as part of the wider Civic Hub scheme.

2.4 Regenerating Woodside and Hamilton Square

This package includes a series of schemes focused on regenerating the Woodside and Hamilton Square areas of Birkenhead. The area has several key features such as Hamilton Square and the waterfront. This package provides a series of public realm and highway enhancements focused on driving the regeneration of the area. The aim of this package is to serve as a catalyst for the regeneration of Woodside and Hamilton Square. The schemes included in the package aim to increase footfall into the area and attract inward investment. The schemes focus on enriching the existing assets such as Hamilton Square and the waterfront which will serve as a catalyst for area's regeneration.

2.4.1 Scheme 23: Hamilton Square and Hamilton Street improvements

Drawing No. 392148-MMD-00-XX-DR-C-0004

2.4.1.1 Scheme description

Hamilton Square and its surrounding architecture is potentially one of Wirral's greatest assets, and should be at the heart of a thriving community, containing a wide range of land-uses. However, at present activity is low around the Square and the area is recognised as not meeting its potential.

A previous initiative to help bring activity into the area focused around removing the road closure on Hamilton Street between the Town Hall and the Cenotaph. The road closure would allow traffic to pass through this space, but the space would have a public realm treatment in keeping with the surroundings. However, objections were received to this initiative and it has since not been progressed.

But, bringing activity back into the locality is still seen as key to helping support the future wellbeing of the Square and the adjacent areas. To this end, this scheme includes the following proposals:

- Removal of the two large mini roundabouts on the east side of the Square, to be replaced with a more informal space shared between pedestrians and vehicles;
- Removal of the road closure between Duncan Street and Hamilton Square;
- Conversion of Duncan Street to two-way traffic for its full length;
- Conversion of Hamilton Street to two-way traffic between Hamilton Square and Hinson Street;
- Conversion of Hinson Street to two-way traffic between Argyle Street and Hamilton Street;
- Improved landscaping, including tree planting where possible;
- Road narrowing via creation of sheltered on-street parking bays and uncontrolled pedestrian crossings;
- Improved public realm, including street furniture and footway resurfacing; and
- New and repositioned bus stops and waiting facilities to take advantage of the new street circulation and passenger destinations.

This scheme will therefore not only seek to improve the accessibility of Hamilton Square, but also Hamilton Street which currently has low permeability, but is home to several large employers.

The scheme will also need to coordinate with other initiatives being proposed by this package of works, including:

- Argyle Street public realm improvements;
- Market Street enhancement; and
- Works outside of Hamilton Square station.

In their entirety, the schemes should bring a dramatic positive benefit to the Birkenhead area.

2.4.1.2 Scheme risk review

Risks that could be associated with this particular scheme could be:

- Other schemes do not proceed, reducing the overall benefit of this scheme;
- Consultation would be would be required with local residents, businesses and stakeholders to help ensure buy-in to the scheme;
- Changes would be required to traffic regulation orders which would be subject to advertisement.

2.4.1.3 Scheme budget estimate

£3m-£10m

2.5 World Class Public Transport

This package contains a series of schemes that are focused on improving public transport across Wirral including the A41 North Corridor area, with one of these identified for delivery as part of Phase 1. There are a number of bus related measures that include integrated ticketing and greater connectivity with other modes. The package also includes aspirations to develop a mass transport solution to provide a feeder service/"last mile solution" to the existing Merseyrail network to better access the areas the current network fails to serve and better connect key parts of Birkenhead Town Centre and Wirral Waters. The objectives of this package are to increase public transport patronage and develop a 'world class' public transport network in Wirral that encourages multi-modal trips with integrated ticketing. This aims to reduce dependence on the car and provide public transport that will meet future demand generated by development.

2.5.1 Scheme 24: Relocation of Birkenhead bus station

No scheme drawing

2.5.1.1 Scheme description

As part of proposals to improve the route between Conway Park station and Birkenhead Town Centre, and to provide additional space with which to extend the town centre offer including the Market, it is currently proposed to relocate the bus station to a more suitable location.

Whilst no preferred site has been agreed for the relocated facility, a number of options have presented themselves including on land adjacent to St Werburgh's Church and currently occupied by the defunct Central Hotel – this would provide enhanced interchange with Birkenhead Central station; or on land adjacent to Birkenhead Central as part of the Hind Street development – this would create excellent bus rail interchange but would potentially increase remoteness from the retail core.

The scheme would closely align with work to remove the severance of the Argyle Street / A552 junction which could potentially be remodelled to include pedestrian super-crossings. It would also obviate the need for enhanced bus interchange at Birkenhead Central itself, tying into a remodelling of the station as part of the Hind Street development. There is also the potential to replace the bus station with a series of bus super-stops around the town centre, however this option runs the risk of eliminating interchange capability within the network and is therefore not a preferred choice at this early stage of development.

2.5.1.2 Scheme risk review

Although remote from the rail stations and peripheral to the retail core at present, Birkenhead Bus Station is easily accessible from the strategic road network via the A553 Conway Street with access also provided from Claughton Road. Relocation runs the risk of reducing the accessibility of the bus station for certain key routes and also, depending on its ultimate location, reducing the accessibility of the facility for pedestrians and town centre users.

2.5.1.3 Scheme budget estimate

£10m-£20m

2.6 A41 Site Access Improvements

The area of land in question is planned to be subject to a detailed land-use and movement masterplan, which will identify a grid and hierarchy of streets and will consider access by all modes.

This plan will therefore propose connections to all adjacent roads (including the A41), whilst being cognisant of the plans being developed to also aid the wider regeneration of Birkenhead. As such, close coordination between schemes will be of the greatest importance to ensure an appropriate balance of movement and interaction is achieved. For example, ease of pedestrian and cycle permeability, or avoiding inappropriate through traffic on sensitive streets.

This intervention provides a series of schemes focused on improving access along the A41 to key employment and development sites, and from the south into Birkenhead Town Centre. The package consists of several schemes aimed at increasing capacity, improving pedestrian connectivity and altering the existing road network to enhance the area. In particular, the schemes suggested to accomplish the aims of this package are as follows:

2.6.1 Scheme 25: A41 / A552 / Flyovers remodelling – Phase 1

Drawing No. 392148-MMD-00-XX-DR-C-0005A

2.6.1.1 Scheme description

This scheme forms the first phase of the intervention which is likely to have the most significant and wide reaching transport impacts being proposed as part of this study.

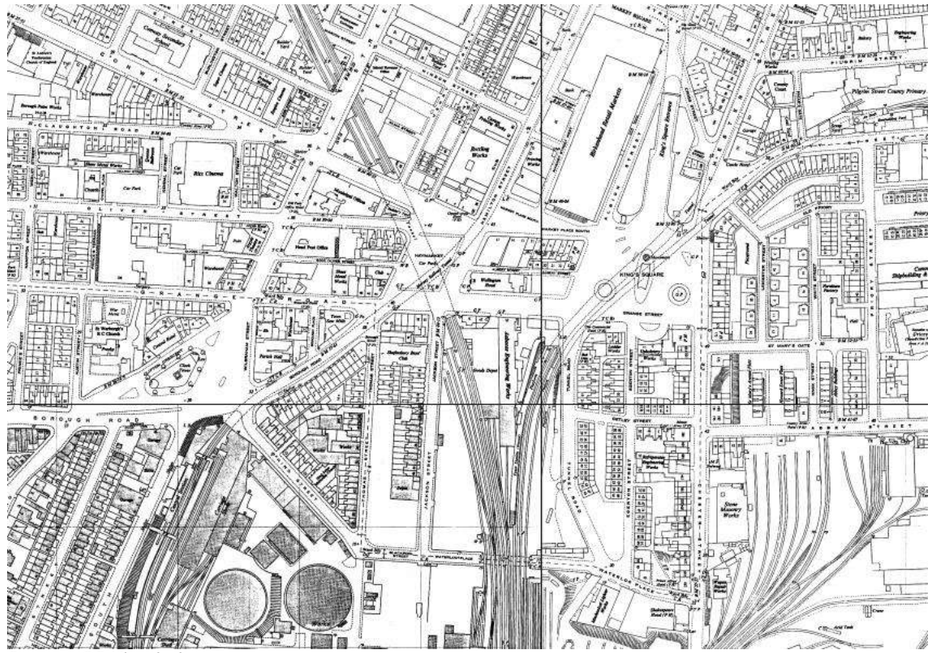
At the heart of the scheme is the removal of the elevated highway flyovers to the south of Birkenhead town centre. The flyovers themselves are basically made up of two structures: one structure (owned by Merseytravel) gives access to the Queensway Tunnel from the A41 New Chester Road and the A552 Borough Road; and the second structure (owned by Wirral Council) gives direct linkage between New Chester Road and Borough Road. Also associated with the flyovers are a range of other free-flowing highway links – including an underpass to Chester Street.

The flyovers and associated access roads have a range social and accessibility issues which this scheme seeks to begin to solve, including:

- Creating a significant barrier to north / south and east / west pedestrian and cycle movements;
- Attracting large volumes of traffic into the centre of Birkenhead which does not have a destination in the local area – i.e. Liverpool or further afield;
- Virtually landlocking large tracts of brownfield potential development land to the south of the flyovers;
- Sterilising land below the flyovers; and
- Creating a vista not conducive for new urban developments.

For information, the below image gives the historical street pattern of Birkenhead before the flyovers were constructed. From this it can be seen that access to the Queensway Tunnel was somewhat convoluted and restricted, but the streets were generally laid out in a grid, and access to land south of the town centre was much more direct.

Figure 2: Historical Street Pattern of Birkenhead



Source: OS Historical

The access routes to the flyovers are however regionally important and are currently necessary to the day-to-day functioning of the Wirral. So, when the flyovers are removed, vehicles will still need to be able to access the Queensway Tunnel and travel between Borough Road and Chester Road.

A significant short term benefit of the scheme is that buses will be able to turn right on exiting the Birkenhead portal of the tunnel, and hence giving almost direct access to Conway Street and the bus station.

This scheme gives an interim construction arrangement which indicates how the streets could function whilst the flyovers are being removed. Key to this could be the use of the historic streets of Borough Road East and Tunnel Road, however it is noted that highway capacity will be significantly reduced during the interim construction period.

2.6.1.2 Scheme risk review

Key risks associated with this particular scheme can be summarised as follows:

- Funding will need to be secured and in place for the final access scheme as this scheme will not serve the economic or operational needs of the Wirral beyond temporary short term;
- Significant consultation will be required with the public, commercial businesses and stakeholders to help ensure the final benefits of the scheme can be realised;
- Detailed investigation will be required to determine the optimum method of traffic management during demolition and reconstruction;

- Capacity of the Kingsway Tunnel may need to be reviewed to accommodate additional traffic demand.

2.6.1.3 Scheme budget estimate

£10m-£20m

2.6.2 Scheme 26: Other A41 Site Access Improvement Schemes – Phase 1

No scheme drawing

2.6.2.1 Scheme description

Associated with the removal of the flyovers to the south of Birkenhead town centre, would also be complimentary works to provide appropriate site access arrangements to currently undeveloped or underutilised land. Particularly the significant area of brownfield land between Green Lane and Birkenhead Central rail stations.

- *Queensway Toll Plaza Re-modelling / Removal:* This scheme would aim to increase Queensway's capacity through remodelling/removing the toll plaza in Wirral and instead utilising ANPR technology to administer and enforce the toll system as currently occurs on the Mersey Gateway Bridge.
- *Green Lane Roundabout capacity improvements:* This scheme would comprise a series of improvements to the Green Lane / A41 roundabout to increase capacity, flow and journey time reliability of the A41 Strategic Corridor. Journey times on the A41 during peak periods will be improved and delays reduced.
- *Campbelltown Road capacity improvements:* This scheme proposes improvements to Campbelltown Road to improve access to Cammell Laird and the offshore wind farm.
- *A41 Southern Bus Access improvements*: This scheme proposes the delivery of new or enhanced bus services, including where appropriate infrastructure improvements, connecting rail stations and town centres with employment sites and retail parks along the A41 North Corridor. In particular relation to the town centre and A41 North Corridor regeneration area, bus services from the A41 North Corridor would be re-routed via the proposed new infrastructure to provide direct access to the bus station, Queensway Tunnel and other required routes.

2.6.2.2 Scheme risk review

Risks associated with this particular scheme could include:

- Agreement on the removal of the Birkenhead flyovers not being achieved in the short term would significantly reduce the redevelopment potential of this area;
- Lack of coordination between interested parties would affect overall regeneration benefits;
- Removal of former rail land would likely be required to achieve new accesses to the A41;
- Planning approvals would need to be gained for new developments and access points.

The scheme is more of a package of measures with several related but independently delivered components. There is a risk that the schemes could conflict with each other unless co-ordinated oversight is undertaken and the schedule of works is programmed carefully.

2.6.2.3 Scheme budget estimate

£3m-£10m

3 Preferred Schemes and Phasing: Phase 2

3.1 Birkenhead Town Centre Streetscape

See description and objectives in Section 2.3.

3.1.1 Scheme 1: Pedestrian overbridge of Borough Road at Whetstone Lane

Scheme not to be progressed

3.1.1.1 Scheme description

One of the key pedestrian entry routes into Birkenhead is from the south via Whetstone Lane which gives access to the substantial residential area of Tranmere. However, a main barrier to movement along the route is that people need to cross Borough Road through a large signal junction. To help facilitate this desire line and improve road safety, this scheme suggested a pedestrian overbridge of Borough Road – for which it was hoped that the gradient changes to either side of Borough Road would allow a crossing with no requirement for stairs.

However, further investigation suggests that this may not be practical due to the clearance needed to cross the road, the associated length required for ramped gradient and the presence existing access points to properties to either side.

An overbridge which needed stair access would also be unpopular to use.

3.2 Regenerating Woodside and Hamilton Square

See description and objectives in Section 2.4

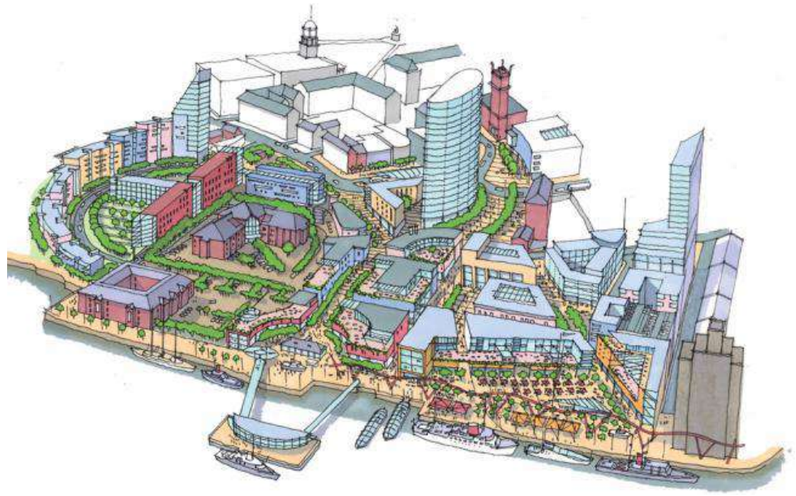
3.2.1 Scheme 2: Regenerating Woodside and Hamilton Square

Drawing No. 392148-MMD-00-XX-DR-C-0002, 0004 and 0004A

3.2.1.1 Scheme description

Woodside could be considered to be one of Birkenhead's most unrealised assets with its prominent position on the Riverside, excellent views of the Liverpool waterfront and the Mersey Ferry terminal. This fact has been recognised, and various regeneration masterplans have been developed in the past (one of which is shown in the image below), but as yet widescale changes have not been implemented.

Figure 3: Previous Woodside Masterplan



Source: BDP

One of the main groups of issues which the masterplans have sought to overcome is the set of barriers to movement between Woodside and Birkenhead. The combination of these tends to isolate Woodside from the main built-up area of Birkenhead. Key barriers include:

- Extents of surface parking for the ferry terminal;
- The heritage tram which has a terminus just outside the ferry terminal. The track of which is raised and consequently protected by fencing;
- The large bus terminus which is infrequently used by passengers, but is surrounded by guard railing;
- The Woodside gyratory which can be intimidating to cross;
- A rank of bus stops, which are only partially used; and
- A lack of a clear walk route through the area, and a destination to aim for.

Many of these items can only be addressed through the implementation of a land-use and movement masterplan. The masterplan would define development parcels, land-uses and densities against which the access strategy could be tested and refined. It is understood that the previous masterplan may be refreshed in the near future.

Two options have been developed as part of this study to reconfigure the Woodside Gyratory to give an indication of the land which would be released and how pedestrian movement could be significantly improved between Hamilton Square and Woodside.

In the first option, an east / west street grid is reinstated, and in the second option Chester Street is realigned with Canning Street through the middle of the gyratory. Both offer significant benefits, but the second option would provide the greater traffic capacity.

3.2.1.2 Scheme risk review

The main risk for Woodside is that a deliverable plan is not put in place and acted upon. Without which, significant change is unlikely to happen. Piecemeal redevelopment may not provide sufficient changes to realise the full potential of the Woodside area.

3.2.1.3 Scheme budget estimate

£3m-£10m

3.2.2 Scheme 3: Access road to Rosebrae development site

Drawing No. 392148-MMD-00-XX-DR-C-0004

3.2.2.1 Scheme description

Rosebrae is a cleared brownfield site to the south of Woodside and to the north of the Priory Wharf residential development. The land has been previously used as dry docks for ship building, but these have since been filled in and the area landscaped. Now, proposals are being prepared to redevelop the land for housing.

This scheme reviews options for access to the proposed development.

The simplest access point would be from Church Street which runs adjacent to the eastern boundary of the site. This road gives direct access to the A41 Chester Street and should be sufficient to serve a relatively low density development similar to Priory Wharf.

Should a higher density development with more car parking be proposed, an alternative access strategy may be required. Two options for this could be:

- Removal of the road closure of Church Street to the south of the Priory Wharf access. This would give a second means of access to the A41 via Ivy Street and its signalised junction with Chester Street; or
- Opening up of a second access into the Rosebrae site, which could be via the access road to the Land Registry office. It is understood that this site may be redeveloped in the future which would allow the access route to be upgraded to be suitable to serve a residential development. However, in the shorter term, the route would not be an option as it passes over private land which could be unavailable.

3.2.2.2 Scheme risk review

The main risk for this scheme is that, if access via Church Street is not deemed suitable, the alternative would be a new access that would need to be established over private land.

3.2.2.3 Scheme budget estimate

£1m-£3m

3.3 A41 Site Access Improvements

See description and objectives in Section 2.6.

3.3.1 Schemes 4 and 5: A41 / A552 / Flyovers remodelling – Phase 2, and Access to Hind Street - Mollington Link Road

Drawing No. 392148-MMD-00-XX-DR-C-0005

3.3.1.1 Scheme description

These schemes would immediately follow on from the interim temporary arrangement, to deliver the final highway and movement scheme associated with the removal of the Birkenhead flyovers.

The final arrangement will be subject to more detailed planning, design and consultation but is expected to include the following key elements:

- Removal of the Borough Road / Argyle Street gyratory and replacement with a four-arm traffic signal junction. This junction should include high quality pedestrian crossing facilities, and, in particular, link Birkenhead Central rail station with the town centre. Significant extents of space should be freed up by this type of junction allowing improved waiting areas around the station, and possibly a new public space / square around the clock tower (currently central to the gyratory). The new public space could also be linked with removal / redevelopment of the Central Hotel site to create a quality pedestrian walk link into the town centre;
- Creation of a new east / west link between Borough Road and Chester Road, connecting with Chester Street. This would form the at-grade replacement to the Wirral Council flyover. The core benefit of this scheme would be to provide a connection into the Hind Street development site, facilitating and enabling this important regeneration development;
- A new junction connection to King's Square to the north forming the at-grade replacement to the Merseytravel flyover and main access route to the Queensway Tunnel;
- A new junction with Chester Street, removing the requirement for the underpass. This junction could free up significant space which could be used for new development, or potentially a new public park around the Tunnel Monument which was formerly located in King's Square;
- The revised access arrangement to Queensway Tunnel would also allow the reconfiguration of the Toll Plaza, which would again free up significant space for other uses. The reconfigured Toll Plaza could take advantage of the latest technologies for the collection of toll monies to again minimise space requirement; and
- Creation of new connections into the undeveloped / underutilised land between the Green Lane and Birkenhead Central rail stations to help facilitate new development.

3.3.1.2 Scheme risk review

The majority of the risks associated with this scheme will have been assessed and resolved in the planning and implementation of the interim temporary highway access arrangement. But, risks associated with delivery of the final scheme could include:

- The masterplan and development plans for the land south of Birkenhead do not proceed which may mean access opportunities for the site cannot be included in the scheme design;
- The scheme may require third-party land to deliver.

3.3.1.3 Scheme budget estimate

£20m-£50m

3.4 A41 Sustainable Connectivity

See description and objectives in Section 2.3.

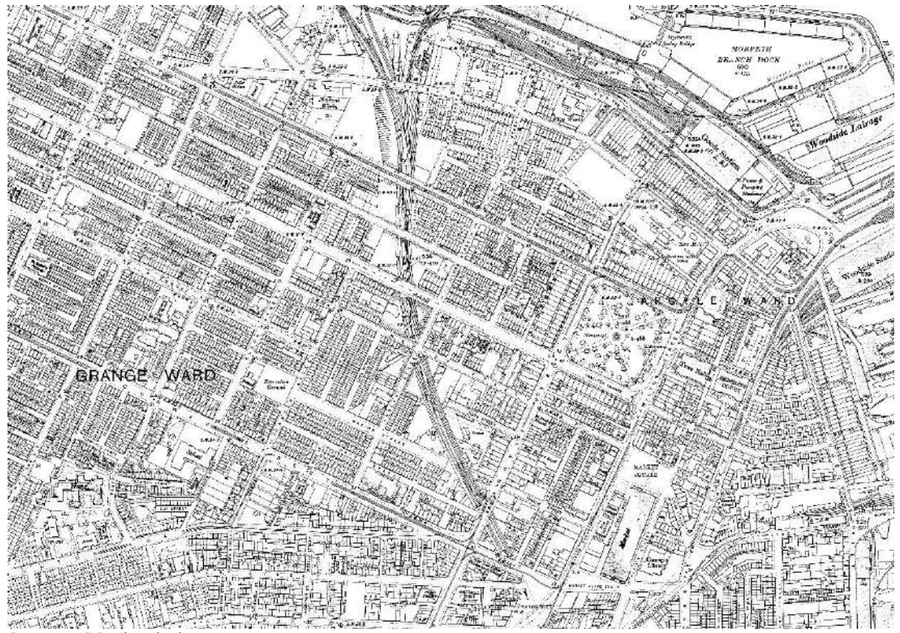
3.4.1 Scheme 6: Birkenhead Green Corridor

Drawing No. 392148-MMD-00-XX-DR-C-0001, 0003 and 0005

3.4.1.1 Scheme description

Bisecting Birkenhead is a former rail corridor which used to link the Wirral Waters dock area with the Chester rail line. This rail line is now disused and the rail tracks removed, but the corridor itself remains almost intact.

Figure 4: Green Corridor within Birkenhead Historical Street Pattern



Source: OS Historical

The corridor itself is largely in cutting of about 6.0m in depth, with a minimum width of about 19.0m. As can be seen in the image above, many key streets in Birkenhead pass over the corridor, but several were severed. Public access to the corridor is not permitted, and it has now been taken over by self-seeding vegetation. However, there is also widespread fly-tipping where roads cross the cutting. Much of the boundary treatment for properties backing on to the corridor is palisade fencing often topped with barbed wire. The corridor is therefore not only a barrier to movement, but also a significant eye-sore and is open to anti-social behaviour.

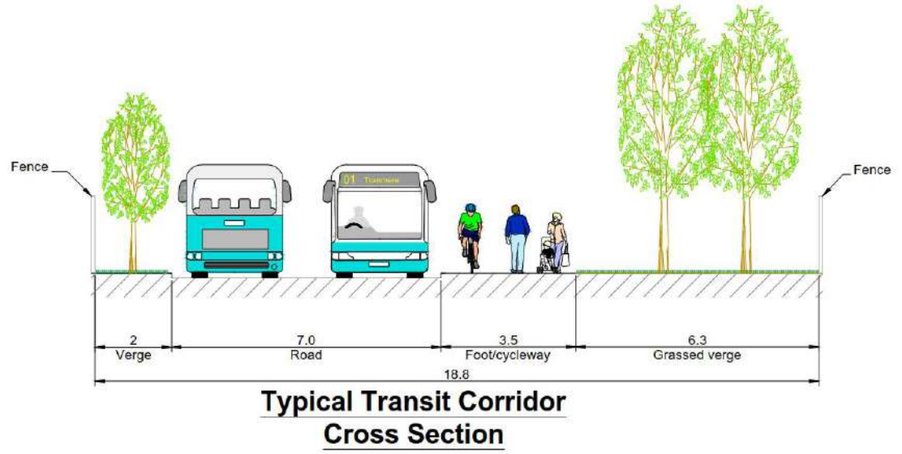
This scheme will seek to bring this corridor back into active usage, to make it into a significant asset and to be a key catalyst not only in the regeneration of Birkenhead but also the wider area – including Wirral Waters.

Key elements of the scheme will be:

- To fill-in the cutting to bring the surface level to the same grade as adjacent streets. This will increase the permeability of the corridor and also significant improve the perception of safety by increasing its visibility to the surrounding area;
- Where possible, to reconnect severed streets to again increase the permeability of the corridor;
- To open the corridor to public transport, pedestrians and cyclists only. This will therefore create a high quality segregated corridor, linking Wirral Waters with Birkenhead town centre and the development land adjacent to Birkenhead Central rail station;
- To introduce CCTV and street lighting to again promote personal security.

The width of the corridor is of such an extent that wide variety cross-section profiles are possible – one of which is shown in the image below. In this option, a two-way public transit corridor is provided adjacent to a shared pedestrian / cycleway and associated landscaping. At points along the route, the width of the corridor significantly increases which would allow a variety of other uses – such as pocket parks or children's play parks.

Figure 5: Green Corridor Proposed Cross-Section



Source: Mott MacDonald

Bringing the corridor up to grade will mean that the transit / pedestrian / cycle corridor will need cross roads at the same level. There are several options for controlling these crossings, the most convenient of which may be traffic signals that are activated by an approaching transit vehicle and a push button facility for pedestrians and cyclists.

The transit corridor could be used by a variety of types of vehicles from conventional buses, to specialist vehicles such as light tram. However, running at-grade gives versatility for route choice as the vehicles will be able to join and leave the corridor at multiple points.

3.4.1.2 Scheme risk review

The risks specific to this particular scheme could include:

- Unknown quality of ecology within the existing corridor, such as bats;

- The amount of material which will be required to fill the corridor will generate significant numbers of HGV's;
- The condition of the structures along the corridor is unknown;
- Properties backing onto the corridor will need to support the scheme as their boundary fencing may need to be changed, but remain secure;
- Public transport operators will need to route services via the corridor.

3.4.1.3 Scheme budget estimate

£5-10m

3.4.2 Scheme 7: Riverside Green Link

Drawing No. 392148-MMD-00-XX-DR-C-0001 and 0002

3.4.2.1 Scheme description

The A41 North Corridor regeneration area is in very close proximity to the waterways of the River Mersey and Birkenhead Docks, but access to them is limited – the principal point being at Woodside. From here people can walk and cycle along the waterside and through the docks via the Wirral Circular Trail.

This scheme presents the opportunity to create another high quality connection to the Waterways via Morpeth Dock which is currently closed off to public access. The dock and the adjacent land is believed to be under the ownership / control of British Waterways, and it may be that an agreement could be reached for the land to be opened up for improvement and public access. If this can be achieved it will be possible to create a pedestrian and cycle route between Shore Road to the east of the Twelve Quays College, through Morpeth Dock, to connect with the Wirral Circular Trail. Within the dock itself there is sufficient unused land to allow for the creation of a high quality urban park with excellent views over the Liverpool Waterfront.

Links to this scheme could be made to the Birkenhead Green Corridor scheme which enable almost a traffic free walking and cycling route between Birkenhead town centre and the River Mersey Waterfront which would likely be very popular for recreational and commuter travel.

A second connection to the Birkenhead Green Corridor scheme could also be made via Egerton Wharf and hence Egerton Dock. Again, improving walking and cycling linkage between the town centre and Wirral Waters.

3.4.2.2 Scheme risk review

The risks specific to this particular scheme could include:

- Failure the reach agreement with land owner of Morpeth Dock to open up the land to public access.

3.4.2.3 Scheme budget estimate

£0.4m

4 Preferred Schemes and Phasing: Phase 3

4.1 Cross River Strategy

This package focuses on improving Wirral's connectivity to Liverpool and the wider City Region. The schemes within the package are focused across public transport interventions for rail, bus and rapid transit, as well as maximising vehicle capacity of the Mersey Tunnels. There are further ambitions for a new access link between Wirral and Liverpool, located further south at Bromborough, however this is not directly linked to the A41 North Corridor regeneration area and is therefore not discussed in detail here.

The aims of this package are to improve connectivity to and reduce congestion at the Mersey Tunnels. Improving access between Wirral and Liverpool across all modes remains the key focus, to improve journey times and drive productivity.

4.1.1 Scheme 1: Repurposing of Queensway Tunnel for public transport only

No scheme drawing

4.1.1.1 Scheme description

Queensway tunnel is a major piece of infrastructure carrying around 35,000 vehicles per day including a mixture of private, public and commercial vehicles. The tunnel was originally constructed between 1925 and 1934 and is therefore approaching its 85th year of public service. Although concerns about the immediacy of its future date of life expiry have recently lessened, there remains an issue with the tunnel deck structure which will need to be resolved if the tunnel is to continue operating at its current levels of use for the foreseeable future. This remedial work is likely to be a costly piece of infrastructure and may only prolong the life of the tunnel by a relatively short amount of time given its age and the differences between modern and past safety standards and construction techniques associated with this type of infrastructure.

As a result, this scheme proposes to radically alter the nature of use of the Queensway tunnel by removing private traffic and reserving it for use exclusively by public transport. By reducing the number of vehicles using the tunnel so radically, and by so alleviating the demands placed on the deck structure, there is the potential to dramatically increase the life of the tunnel, perhaps indefinitely. At the same time, the scheme would provide a first class prioritised public transport corridor between Birkenhead and Liverpool, providing passengers with a real choice of modes and reducing congestion in both Birkenhead town centre and Liverpool city centre. The total removal of the Queensway toll plaza and the reduction of traffic into this sensitive part of Birkenhead and the A41 regeneration area will clearly have significant benefits for the sustainability of future development and has the potential to radically improve the environment for existing users.

Use of the tunnel would, at least initially, be reserved for the bus services that currently use the route to travel between Birkenhead and Liverpool, namely services 1, 2, X8, 407, 423,437, 464, 471, 472 and 487. This amounts to a total of 25 buses per hour in each direction during the daytime. In addition, the tunnel would form an important component of the proposed rapid transit system linking the A41 regeneration area with Wirral Waters, Seacombe and New Brighton et al. It is proposed that the transit system could make use of the existing Queensway service tunnel emerging in Rendell Street (near Wirral Waters) to provide a direct connection to Liverpool city centre (potentially connecting in future with rapid transit aspirations on the Liverpool side of the river). A ten minute frequency on this service would add a further 6 vehicles per hour in each direction to the tunnel, which would also potentially have dedicated space for this new system depending on its requirements for guidance and power.

4.1.1.2 Scheme risk review

The key set of risks for this scheme are associated with the transfer of existing traffic away from Queensway to other cross-river links. A certain amount may be expected to transfer to use Kingsway tunnel in Wallasey or the Mersey Gateway and Silver Jubilee bridges in Halton requiring some potential capacity enhancement schemes on these links. In particular, initial modelling has shown that Kingsway could become more congested under this scenario and would therefore require a complimentary scheme to improve capacity, however it is considered that the capacity of this tunnel could be significantly enhanced by removing the requirement for toll booths by utilising Automatic Number Plate Recognition and automatic tolling technology such as is currently used on Mersey Gateway.

Despite this, it is highly likely that capacity enhancements to existing links will not be sufficient to accommodate the additional traffic from Queensway and it is therefore concluded that an additional link will be required across the Mersey in a strategic location. As is reported in the Strategic Transport Framework Action Plan (Dec 2018) that preceded this report, this link is proposed to run between Bromborough and Otters pool in Liverpool providing a strategic connection for those accessing Liverpool from south of Bromborough (including Chester, Ellesmere Port and North Wales), and linking directly into the strategic road network via Queens Drive and the south Liverpool Key Corridors. Modelling shows that a sizeable proportion of traffic currently using Queensway to access Liverpool City Centre, south Liverpool and the M62, M57 and M58 motorways would transfer to use this new link, thereby reducing the amount of traffic and impact thereof on the A41 north of Bromborough and in Birkenhead Town Centre.

4.1.1.3 Scheme budget estimate

The repurposing of the Queensway tunnel would likely be accomplished as part of a wider package of measures for the measures for the link including conversion of the link to rapid transit and a flood resilience scheme. In total, this package is expected to cost between £20m and £50m.

4.1.2 Scheme 2: Wirral Line Connectivity

No scheme drawing

4.1.2.1 Scheme description

In addition to the proposed repurposing of the Queensway Tunnel for Public Transport, a further significant scheme is proposed to transform the ease of access between the A41 regeneration area and Liverpool. It has long been an aspiration of Merseytravel and City Region leaders to connect the three primary line groups of the Merseyrail network to provide greater cross-city journey opportunity and remove the need for interchange and termination in the city centre. One scheme that is currently being progressed is the Wapping Tunnel project to link the City Line at Edge Hill with the Northern Line to the south of Liverpool Central. A less well-advanced option is to further connect the Wirral Line with the Northern Line using, for example, the existing Stock Interchange Tunnel between James Street and Liverpool Central Stations/

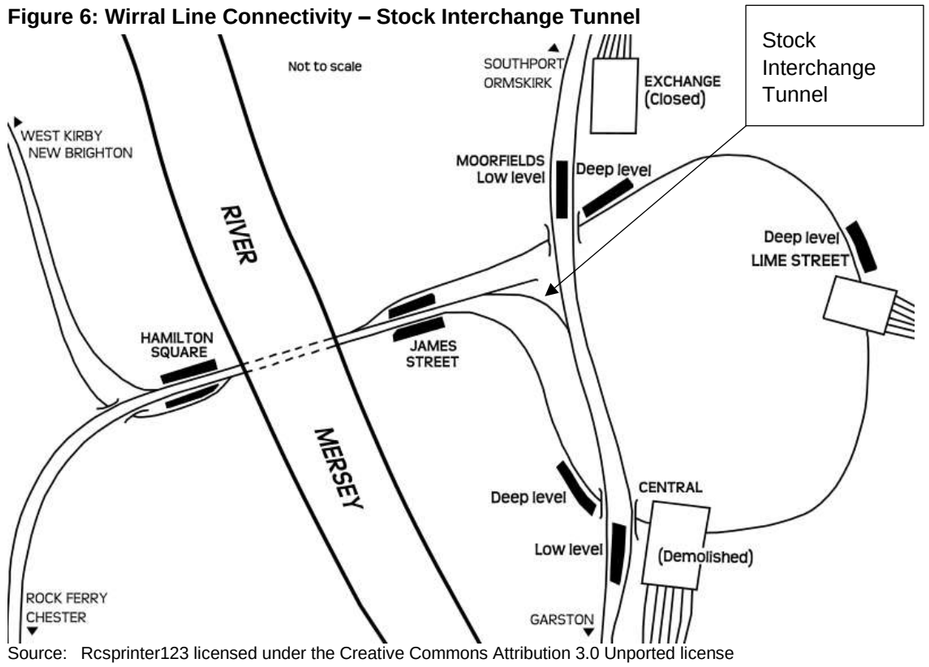
The Stock Interchange Tunnel was built in the late 1880s and formed part of the original Mersey Railways extension from James Street to Liverpool Central Low Level – the platforms that serve the Northern Line today. Today it is used purely to transport stock between the Wirral and

Northern lines of the network. It is proposed that this tunnel could be brought back into passenger use providing Wirral Line users with the ability to travel directly onwards from James Street via Liverpool Central's Northern Line platforms and southwards towards Liverpool South Parkway and Hunts Cross (and eventually towards Warrington and via the Wapping Tunnel towards Wigan).

For the A41 regeneration area, the benefits of this scheme would be in new journey opportunities, particularly direct interchange-free routes directly between Birkenhead Central or Conway Park, and Liverpool South Parkway, providing significantly improved accessibility to Liverpool John Lennon Airport. The scheme could potentially allow additional services beyond the 14 hourly Wirral Line services around the Liverpool Loop, increasing connectivity with Central Liverpool and removing the requirement to change trains at either Moorfields or Liverpool Central for onward travel.

The location of the Stock Interchange Tunnel is shown in the diagram below:

Figure 6: Wirral Line Connectivity – Stock Interchange Tunnel



Source: Rcsprinter123 licensed under the Creative Commons Attribution 3.0 Unported license

4.1.2.2 Scheme risk review

The scheme is likely to be of a significant cost since, as present, the Stock Interchange Tunnel is single track and may require widening to support two-way passenger journeys. In addition, the loop and link network in Central Liverpool would require a significant amount of re-signalling to facilitate the project. The largest single risk is at Liverpool Central's Northern Line platforms, however, since these are already overcapacity and are likely to get busier in the coming years as new rolling stock and journey opportunities are brought online. Business Case and design work is currently ongoing on a scheme to upgrade the capacity and lift the profile of Liverpool Central, and it is likely that the Wirral Line Connectivity Scheme will be dependent on the delivery of this to be feasible.

4.1.2.3 Scheme budget estimate

Assuming that the scheme would require no tunnel widening or major infrastructure works other than signalling (and that additional rolling stock capital and maintenance costs would be met by the operator) the scheme might be deliverable for between £10m and £20m. This cost would rise by orders of magnitude if tunnel widening or new boring is required.

5 Risk Register

The following table provides an overview of general risks associated with all schemes described in the previous chapters.

Table 1: Risk Register

Item	Risk	Severity	Mitigation
Ground conditions	Adverse ground conditions significantly increasing cost of scheme delivery	High	Undertake ground investigation
Planning applications	Delay to scheme delivery. Potential for objections to schemes	Medium	Consultation with public and stakeholders
Ecology	Potential for protected habitats and species	Low	Undertake Stage 1 assessments to determine extent of potential issues
Utilities	Diversion / protection of utilities significantly increasing cost of scheme delivery	High	Effective liaison with utility providers
Scheme costs	Potential for scheme delivery to be significantly greater than budgets	Medium	Undertake more detailed cost estimates with additional design information
Scheme funding	Packages of schemes do not attain funding approval	High	Prepare business case for phased packages of schemes
Land ownership issues	Schemes are undeliverable	Medium	Undertake detailed land ownership searches for all schemes
Type and density of development	Development within A41 North Corridor regeneration area does progress as proposed, significantly reducing requirement for transport interventions	High	Maintain dialogue with primary land use developers
Change in Council priorities	Wirral Council not supporting new development in the study area	Low	Regular reporting to Council members

Source: Mott MacDonald

From the above it can be seen that the key risks are considered to be:

- Adverse ground conditions, especially around the Hind Street and Woodside sites where it is likely that there will be contamination and buried structures from current and former industrial uses that may need to be mitigated;
- Currently no information of type and scale of utilities which could have a significant influence on the deliverability of schemes;
- The availability of sufficient scheme funding to deliver the suites of schemes, rather than just individual elements of the packages; and
- The speed and the type of development that comes forward in the A41 North Corridor regeneration area and the surrounding areas. Low take-up and / or low development density would have a significant influence on the type and requirement for transport schemes.

6 Public Transit Options

6.1 Background

One of the key schemes to support the A41 North Transport Strategy laid out in the preceding chapters is the implementation of a high quality, high frequency transit system to provide users of the development with a real alternative to the private car. Considerable work to date has been undertaken to develop the 'Wirral Streetcar' system – a light rail system, the first phase of which would be designed to run on the existing heritage tram tracks between Woodside Ferry Terminal and Shore Street, extending on new rails to Wirral Waters via Egerton Wharf and Tower Road. Later phases would then extend around Wirral Waters and further afield, utilising the existing track-bed from the previous freight railway in the area.

Opportunities to extend the existing Heritage Tramway to make it part of the commercial offering of Birkenhead were explored by Wirral Council in a 1996 study, with further investigation of costings in 2001. A further presentation to Merseytravel in late 2008 recognised that Birkenhead needed to establish itself as an attractive destination for inward investment by creating attractive links to the signature locations in the town (Birkenhead Park, Europa Boulevard, and Hamilton Square) connecting new development (including Wirral Waters) to Merseyrail and Mersey Ferries. It was discussed that a more attractive and higher capacity mode was required for this purpose than the existing offer of service buses; the Hamilton Square – Birkenhead Park axis is already served by buses but these did not serve to boost the town's image, nor were the existing service buses suitable for use in the pedestrianised areas and parklands likely to arise as part of the regeneration of the area.

Merseytravel commissioned a Wirral Tram Reinvigoration Study in 2009, considering whether the assets and current operating pattern of the heritage tram system in place could be used to greater effect to generate increased use and revenue whilst future improvements and extension plans were being developed. Engagement with Peel Holdings late in 2009 enabled the project to be refined to integrate with the transport and place making needs of the Wirral Waters development, including development of the Wirral Waters Loop to serve the dockside developments, providing the link to the wider transport network at Hamilton Square and assisting in local movement within Wirral Waters.

Previous appraisal of mode options was undertaken at high level in early 2013 which looked at:

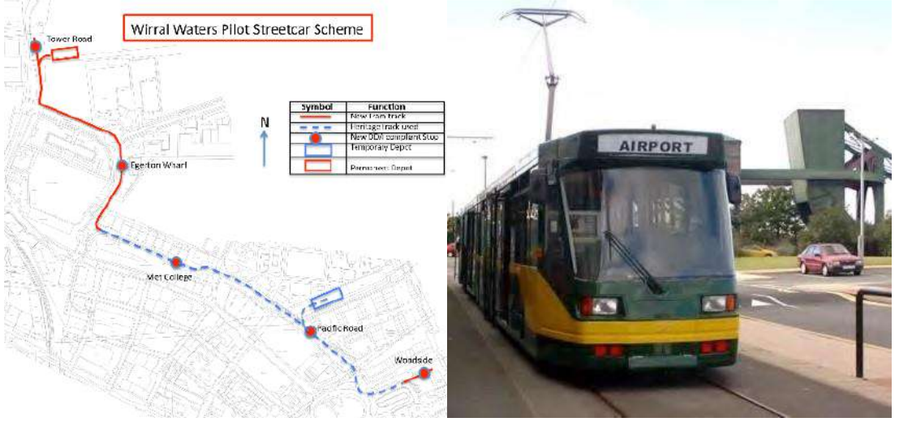
- The potential transport impacts of Wirral Waters;
- Options for dealing with impacts;
- Improving sustainable transport accessibility of the development; and
- The potential for the system to form part of the sustainable transport and economic development strategy for Wirral Waters.

During this study it was concluded that light rail operations perform better than bus modes over a range of criteria. Despite this, it is considered worthwhile to review some of the more specific mode options for the proposed transit system since the network proposals put forward in this document extend beyond the original aspirations of Streetcar to serve corridors including New Brighton via Seacombe, and Liverpool via the Queensway tunnel, and therefore present a different set of requirements to those originally envisaged. Indeed, as a result of the wide geographic extent of the proposed network, it is clear that other options should be considered in enhancing the network and the ultimate solution may involve a different type of transit mode or indeed a combination of different modes working in concert.

A full review of the various transit options that may be considered in this context is included as **Appendix A** of this document, however this section provides an overview of those considered to be the most suitable of these in a Wirral Waters context.

6.2 The Wirral Streetcar Pilot Scheme (Phase 1A)

Figure 7: The Wirral Streetcar



Source: Streetcar Feasibility Report

Although not yet constructed, Wirral Streetcar Phase 1A has been proposed, developed and heavily promoted as a transit solution to serve the Wirral Waters development area. In general Streetcars are a form of Light Rapid Transit (LRT) guided by tracks usually on or partially on highway and receive electricity from overhead wires which are responsible for powering the vehicle; as they are directly electrically powered they tend to have low levels of emissions. Streetcars are a form of local transport, which implies that they are usually better for shorter journeys with more frequent stops allowing passengers to get closer to their desired destination.

6.3 Other Streetcars

Figure 8: Streetcars

Source: Wikimedia

A.1.1 Case study: Toronto Streetcar

- Location: Toronto
- Population: 2,732,000
- Population Density: 4,334 p/km2
- Cost Per Streetcar: £2.5 million
- Frequency: 4-9 minutes
- Length of Track: 83 km
- Track Gauge: 1495 mm
- Minimum Radius of Curvature: 10.973 meters
- Electrification: Trolley Wire 600 V DC
- No. of Streetcars: 264+
- No. of Stops: 685
- No. of Lines: 11
- No. of daily rides: 292,000 passengers
- Dimensions: 30.2 meters long, 2.4 meters wide and 3.84 meters high
- Capacity: 250 (70 seated, 150 standing)
- Speed: maximum 43 mph
- Driven: Driver
- Power: Electricity

Advantages

- These streetcars have a smaller minimum radius of curvature than other methods of transport discussed, this would be ideal for use in the Wirral as there is restricted space.
- High capacity compared to other methods of transit discussed, this would be good in the later stages in the redevelopment.
- Tram systems have a proven ability to act as a catalyst for economic development, investment and regeneration, and to attract motorists to switch modes and thus reduce traffic congestion, providing added environmental benefits.

Disadvantages

- It would be more difficult to expand widely than some of the other methods discussed as new tracks would have to be implemented.

Table 2 <Streetcar>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation Cost – Wirral Streetcar Phase 1A	
Implementation cost – wider system	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

Note: This comparative analysis table and those that follow in sub-sections below provide a high level overview only and are not intended to form a rigorous quantified appraisal of the relative merits of each mode. Further work will be required on this subject to establish the optimum mode for the transit system proposed considering such criteria as economy, image, safety, accessibility, integration, mode share, and as noted previously, the ultimate solution may be formed of a combination of different modes which, together, form an integrated network.

6.4 Electric Trolleybus

Figure 9: Electric Trolleybus

Source: Wikimedia

Electric trolleybuses are rubber-tired vehicles powered by electricity from overhead using spring-loaded trolley poles, this means there is no need to stop to refuel or recharge. Being solely powered by electricity, trolleybuses have extremely low emissions.

Modern trolley buses also have a battery which allows them to travel off-wire and reroute around anything obstruction blocking their path, or detour for short sections of route.

6.4.1 Case study: San Francisco Muni

- Location: San Francisco
- Population in Catchment Area: 884,400
- Population Density 7,132 p/km2
- Cost Per Trolleybus: £300,000 - £1 million depending on age and specification
- Frequency: 20 minutes
- No. of Trolleybuses: 268
- No. of Stops: 142
- No. of Lines: 16
- Dimensions: 12-25 meters long and 2.55 meters wide
- Capacity: 82-200 passengers
- Speed: maximum speed 50 mph, average speed 38 mph
- Driven: Driver
- Power: Electricity

Advantages

- The trolleybus is significantly quieter than an original diesel bus which could be more suitable in residential areas.
- If there is an obstruction in its normal path, it can drive off wire for a period of time to manoeuvre around the obstruction, unlike streetcars or trams that operate on fixed tracks.

Disadvantages

- They are less manoeuvrable than traditional buses.
- Other forms of transport are easier to adjust or expand as overhead wires would have to be added or amended.

Table 3 <Electric Trolleybus>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

6.5 Tram bus

A tram bus is a tram on pneumatic tyres instead of tracks. The tram bus must have its own infrastructure to reach a good operating speed. What makes the tram bus so unique is that it combines the efficiency and stability of a tram with the flexibility of a bus. The tram bus has a much larger capacity compared to a traditional bus and can also run as an electric or hybrid vehicle, making it even more environmentally-friendly.

6.5.1 Case Study: Malmo Sweden

Figure 10: Skanetrafiken Tram bus

Source: Wikimedia, YouTube - MediaServiceTV1

- Location: Malmö, Sweden
- Population in Catchment Area: 341,457
- Population Density: 2,175 p/km^2
- Cost of Buses: approximately £650,000, based on 30 being bought for £19million
- Frequency: 5 minutes
- Length of Route:
- No. of Buses: 15
- No. of Stops: 40
- No. of Lines: 1
- No. of Daily Rides: estimated 13,700 -21,000
- Dimensions: 24 meters long
- Capacity: 55 seated with 95 standing
- Driven: Driven
- Power: Compressed Natural Gas (other options available)

Advantages

- There is little construction cost, primarily only the cost of the vehicles.
- Routes can easily be changed or extended.

Disadvantages

- Much higher capacity than possibly required in the case of Wirral Waters.
- Would need trained drivers and would not be able to rely on volunteers as the Wirral street car proposes to do.

Table 4 <Tram buses>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	

Criteria	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

6.6 Bus Rapid Transit

Bus Rapid Transit is a form of rapid transit which involves stretches of highway being segregated and dedicated for the use of specialist buses. Where this is not possible due to land constraints, the specialist buses will use public highways. When using public highways, the buses will typically be given priority over other road users to reduce delays. Station platforms should be level with the bus floor for quick and easy boarding, making the system fully accessible for wheelchairs and disabled passengers with minimal delays.

6.6.1 Case study: BRT Sunway Line

Figure 11: BRT – Sunway Line

Source: Wikimedia

- Location: Subang Jaya, Malaysia
- Population in Catchment Area: 6,071,644
- Population Density: 6,581 p/km^2
- Cost of Buses: £3.3million for 8 double deckers and 6 larger single deckers in York
- Planning & Capital Cost: £24.5 million
- Frequency: 4 minutes
- Length of track: 5.4 km
- No. of Buses: 15
- No. of Stops: 5
- No. of Lines: 1
- No. of daily Rides: 5,300 passengers
- Dimensions: 11-12 meters long
- Capacity: 80
- Speed: 50 mph
- Driven: Driven
- Power: Electric,

Advantages

- Electric Buses mean virtually zero emissions
- Faster than some other methods of transport discussed

Disadvantages

- High capital cost compared to the Wirral streetcar

Table 5 <Electric BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

6.6.2 Case study: New York BRT

Figure 12: BRT – New York

Source: nyc.streetsblog.org and nyc.gov

- Location: New York
- Population in Catchment Area: 8,538,000
- Population Density: 10,630 p/km^2
- Cost p/km: $1,072,000
- Frequency: 3-4 minutes
- Length of track: 90 km

- No. of Buses: 398
- No. of Stops: 145
- No. of Lines: 7
- No. of daily Rides: 245,566
- Dimensions: 11-12 meters long
- Capacity: 120
- Average Speed: 10.2 mph (average speed including stopping time)
- Driven: Driven
- Power: Hybrid & CNG

Advantages

- High frequency and capacity which means it would be more reliable than just having one streetcar every 15 minutes.

Disadvantages

- The vehicles only travel at 10mph on average making journeys even longer than using other methods of transport
- Hybrid engines are not as eco-friendly as other methods of transport discussed.

Table 6 <Hybrid BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

6.6.3 Case Study: Cambridgeshire Guided Busway

Figure 13: Cambridgeshire Guided Busway

Source: Geograph & Flickr

- Location: Cambridge
- Population in Catchment Area: 123,867
- Population Density: 3,135 p/km^2
- Cost p/km: Bronze average £7,400,000
- Frequency: 5 minutes
- Length of track: 40 km
- No. of Stops: 8
- No. of Lines: 1
- No. of daily Rides: 12,000
- Dimensions: 11-12 meters long
- Capacity: 120
- Average Speed: 37mph
- Driven: Driven and Kerb guidance
- Power: Diesel

Advantages

- Provides faster transport than other methods discussed
- Has 25km of segregated busway that is specifically for these buses which limits the impact of traffic disruption

Disadvantages

- The buses are powered by diesel and will produce the highest amount of emissions compared to other methods discussed.

Table 7 <Diesel BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility	

Criteria	
How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

6.7 Summary

Based on the analysis above, and the various costs, constraints and characteristics of each system in the context of Wirral Waters, four of the potential available modes have been shortlisted as representing the most likely to offer benefit and value-for-money for the travelling public. As well as the Streetcar mode which is at a more advance state of development in the Wirral Waters context than other modes and has considerable support from multiple parties, the following modes are shortlisted for further consideration:

- Tram-Bus
- Bus Rapid Transit
- Electric Trolley Bus

At this stage, no ultimate preference is expressed for any one of these modes over the other within this document. The considerable work that has been undertaken previously to develop the Streetcar scheme is noted, including the work undertaken to establish a Light Rail mode as the most suitable in a Wirral Waters context[1]. Despite this, the expansion of the network to north (New Brighton), south (Birkenhead Central and potentially ultimately Rock Ferry or beyond) and east (Liverpool City Centre) may alter the conclusions of this modal analysis, particularly in light of the need and desire to integrate with plans on the Liverpool side of the Mersey to create transit links to Liverpool Waters and the Knowledge Quarter etc. As such it is recommended that further future consideration of modes be undertaken noting that the ultimate solution may represent a combination of different modes working in concert with each other.

The table overleaf summarises the key considerations with regard to each of these four modes, and a wider review of additional modes is provided in Appendix A of this document.

[1] Wirral Waters Transport Options Appraisal, 2013 - Vectos

Table 8<Comparison of Transit Modes – Summary Table>

	Street Car	Tram Bus	Bus Rapid Transit	Electric Trolley Bus
Example				
	Toronto Street Car	Skanetrafiken Tram Bus (Sweden)	Cambridgeshire Guided Busway	San Francisco Electric Trolley Bus
Attributes	• Frequent stops ensure passengers can get very close to desired destination. • Provide a frequent and reliable service. • Attractive to passengers as 10% of Toronto's population use streetcars each day.	• Routes can be easily altered, or new routes added as the vehicles operate on the existing road network. • Can become a 'transit like system' if investment is made in e.g. real time passenger information, priority signals, enhanced shelters etc.	• Magnetic or kerb guidance with the ability to travel on-carriageway, when land restrictions are poor at the end of routes or in urban areas. • Many new guided busways also incorporate shared use paths along their length	• Much quieter than traditional buses, which is preferred in residential areas. • Able to drive 'off-wire' for short periods using battery power to avoid obstructions in the normal path or to detour from the wired section. • Low emissions as electricity is sole source of power.
Opportunities	• Streetcars typically have a longer lifespan than traditional motor buses. • Potential to add additional streetcars to increase frequency and capacity. • More reliable journey times and higher frequency than other buses	• Low outline cost as no rails or overhead power lines are needed. • Low outline capital costs could lead to lower ticket prices for passengers. As the main capital cost would be purchasing the vehicles. • Higher frequencies and capacity, giving more opportunity to provide dedicated areas for different user groups	• More reliable journey times and higher frequency than other buses • Promotes increased levels of active travel if appropriate infrastructure is developed alongside the routes • Conventional bus routes can be withdrawn, reducing traffic levels in certain areas.	• Can operate on roads with higher gradients than traditional buses. • Typically have a longer lifespan than traditional motor buses. • The cost of a trolley bus can be considerably lower than that of a Streetcar.
Constraints	• Less manoeuvrable or flexible than traditional busses. • The cost to replace a streetcar or to upgrade to newer model is relatively high. • Longer routes cannot be easily altered or extended as new tracks would need to be implemented.	• Running on open highway in some areas can add delay to services, decreasing customer confidence in the network.	• High outline capital cost to develop key infrastructure (track, stops, car parks etc.) • High initial costs likely to be passed onto passengers in ticket prices • Difficult and expensive to expand or alter guided section of routes, but flexibility allows onward travel on traditional highway.	• High outline capital cost to construct overhead cables. • Less manoeuvrable or flexible than traditional busses. • Longer routes cannot be easily altered or extended as new overhead wires would need to be implemented. • Overhead cables can have a poor aesthetic value.

7 Economic Impacts / Benefits Review

7.1 Introduction

In the next section (Section 8) the preferred schemes described earlier in the document are modelled and appraised using various traffic modelling tools, providing an understanding of the benefits versus costs involved with each. In reality many of the schemes' most significant benefits are not identifiable from traditional traffic models since they relate to public realm improvements, reduced severance for pedestrians and cyclists, enhanced quality of place and other less tangible effects. In many cases, the benefits are only identifiable as economic effects in terms of land value increase, GVA gains and employment growth. As a result, and prior to discussing the modelling results, this section provides a discussion of the qualitative benefits that may be expected from the implementation of 32 schemes to demonstrate the value in terms of benefits to Wirral of implementing these schemes and to its residents and employers.

The purpose of this section is to demonstrate the value of these shortlisted schemes in terms of benefits that they could provide should they be constructed. In place of transport benefits this chapter will provide a narrative of the potential economic benefits in terms of jobs created and quantum of development unlocked as well as other social benefits such as improvements in health, increased equality for minority groups and access to employment and other facilities and amenities.

7.2 Schemes considered in this section

As noted above, this chapter deals exclusively with 32 schemes for which the modelling tools available are not able to discern all transport benefits but for which clear economic and/or social benefits exist. The 14 schemes that can be modelled using the available modelling tools are discussed in the next section.

The 32 schemes are listed in the following sub-sections and divided into phases as detailed previously.

7.2.1 Phase 1 Schemes

The transport schemes assessed in this section that are part of Phase 1 are described below in Table 9. These schemes are anticipated to be delivered between 0-5 years of the publication of the final strategy.

Table 9: Details of Phase 1 A41 North Corridor transport schemes

Scheme name	Description
Station facilities and waiting environment enhancements	The purpose of this scheme is to encourage greater use of rail for all trip purposes by improving the experience, ease of access, and comfort of the wait associated with the mode at rail stations. The scheme would seek to deliver for all rail stations across Wirral (subject to an audit of need): • New and improved waiting shelters with enhanced seating, CCTV and heating units; • Automatic Ticket Machines at all stations with no staff presence (and ultimately at all stations), at which a full range of tickets may be purchased; • Enhanced retail units at stations with a sufficient potential demand, to include newspapers, food and drink; • Upgraded information boards and screens; and • Secure cycle parking. This is already available at most Merseyrail stations but should be extended to all including Borderlands line stations.
Wirral line park and ride enhancements	This scheme proposes to deliver new and increased parking capacity at several key stations across the borough with the aim of increasing the accessibility of stations for those outside immediate walking or cycling distance, and thereby reducing the number of journeys within the borough made entirely by private car.
Green Lane station refurbishment	The scheme would involve the installation of upgraded disabled facilities, enhanced lighting, a new ticket counter and two new seated waiting areas. It would also involve a refurbishment of the stairway and exterior of the station, as well as the parking area to the front. The aim of this is to create a more attractive public transport offer for new and existing passengers and thereby reduce the number of private car trips made within the borough.
Birkenhead Central: new forecourt and eastern access route	Birkenhead rail station is one of the most popular entry points to the town for workers and shoppers, but it suffers from several operational issues, including: • Poor interchange with bus services due to the space constrained nature of Argyle Street South outside the station; • No car parking, pick-up or drop-off facilities. Again, adding to the poor traffic environment outside the station; • Only limited secure cycle parking; and • A large highway gyratory situated between the station and the town centre, which is a real barrier to pedestrian movement. To alleviate these issues this scheme could potentially comprise the following: • The removal of a derelict rail storage shed to the east of the station; • The creation of a second pedestrian access to the station from the east; • Provision of a new station forecourt to the east, and south of Hind Street. The forecourt could allow a turnaround for buses, pick-up and drop-off and possibly car parking.
Improvements to bus infrastructure at Birkenhead Park and Conway Park	This scheme would deliver new bus interchange facilities at both Birkenhead Park and Conway Park stations to improve access to the railway stations and encourage multi-modal journeys. The scheme would also include the replacement of existing bus provision at the stations with enhanced bus stopping facilities in easy reach of the station entrances and providing shelter, seating and information on interchange and upcoming services via Real Time Information. Signage would also be improved with mutual signage between bus and rail areas.
Hamilton Square bus / rail interchange improvements	In this scheme, works would be implemented outside Hamilton Square rail station on Hamilton Street to improve passenger interchange between rail and bus. The works are primarily planned to comprise of: • Allowing two-way bus routing on Hamilton Street outside of the station. This will allow greater flexibility in bus routing, plus shorter walk distances for passengers; • Improved waiting environment for passengers; • Public realm works to the footway and carriageway; and • Taxi ranking facilities.
Birkenhead North bus / rail interchange improvements	This scheme would deliver new bus interchange facilities at Birkenhead North station to improve access to the railway station and encourage multi-modal journeys. The scheme would also include the replacement of existing bus provision at the station with enhanced bus stopping facilities in easy reach of the station entrances and providing shelter, seating and information on interchange and upcoming services via Real Time Information. Signage would also be improved with mutual signage between bus and rail areas.
Birkenhead Central bus / rail interchange improvements	This scheme would deliver new bus interchange facilities at Birkenhead Central station to improve access to the railway station and encourage multi-modal journeys. The scheme would include the replacement of existing bus provision at the station with enhanced bus stopping facilities in easy reach of the station entrances and providing shelter, seating and information on interchange and upcoming services via Real Time Information. Signage would also be improved with mutual signage between bus and rail areas.

Scheme name	Description
A41 Chester Road / A552 Borough highway realignment (Phase 1)	This scheme forms the first phase of the scheme which is likely to have the most significant and wide-reaching transport impacts being proposed as part of this study. This scheme gives an interim construction arrangement which indicates how the streets could function whilst the flyovers are being dropped. Key to this could be the use of the historic streets of Borough Road East and Tunnel Road, however it is noted that highway capacity will be significantly reduced during the construction period.
A41 Chester Road / Ivy Street junction improvement	This scheme is associated with removal of the Birkenhead flyovers, and will reconfigure the Chester Road / Ivy Street junction to be suitable for the new traffic arrangement. The scheme also offers the opportunity to improve pedestrian crossing facilities through the junction to better link the town centre with the riverfront and Birkenhead Priory. The scheme would also incorporate improved landscaping around the junction.
Signage improvement to Birkenhead Priory	A signage strategy and interpretation boards could be used to link the Priory with local destinations (the town centre, Hamilton Square and Woodside). Later, the scheme could be enhanced with improved walk routes and landscaping.
Electric charging points across borough	This scheme would provide electric charging points across Wirral to improve the infrastructure available or electric vehicles. The aim would be to create a comprehensive network of publicly available charge-points across the borough with associated ancillary technology including an app and website to show the location of nearest facilities.
Signage and better entrance to retail core	This scheme would improve the quality of pedestrian and cycle signage to Birkenhead Town Centre from key gateways including Birkenhead Bus Station, Conway Park and Birkenhead Central rail stations, the Borough Road / Whetstone Lane junction and the Claughton Road / Exmouth Street junction.
Birkenhead local access road improvements	This scheme would provide a package of small-scale local access road improvements, enhancing surface quality, removing potential safety risks, and upgrading footways and public realm. The aim of the scheme is to improve access and movement along these links and provide a higher quality experience for all users including pedestrians and cyclists.
Road safety improvements at Whetstone Lane / Borough Road	The scheme would involve a significant design stage and would require junction modelling to arrive at an optimum solution which avoids traffic congestion or excessive queuing. In principal, however, the scheme is designed to re-balance priority in favour of the pedestrian and an increase in overall traffic delay at the junction is therefore to be expected.
Improved public realm in retail core	The scheme would seek to refurbish the entire area providing new surfacing, fresh planting and with a complimentary signage and access strategy to improve the environment around the retail core and stimulate use.
Improved public realm Argyle Street	This scheme would seek to achieve a balance between the requirement (if any) for through traffic movements and improving the environment for walking and cycling. At this time, the scheme is seen as extending from Hamilton Square to Conway Street. However, it would coordinate with other improvement schemes to help achieve and overall area wide benefit.
Cleveland Street / Market Street / Price Street public realm	This scheme would seek to introduce public realm improvements on each of the streets suitable for their function and form. Also important will be facilitating ease of walking and cycling between residential, commercial, retail and education facilities.
Improved public realm Conway Street	This scheme would seek to upgrade Conway Street so that it is more suitable for pedestrian crossings, and that it is more consistent in nature along its length. Measures could include: • Carriageway narrowing to widen footways, create on-street parking bays and reduce road crossing widths; • Removal of guard railing and general street decluttering; • Improved surfacing on footways; and • New landscaping, and if possible tree planting.
Improved pedestrian crossing facilities along Argyle Street	This scheme is linked with Schemes 17 and 18 to improve the environment on Argyle Street. The scheme will specifically help pick up north / south and east / west pedestrian desire lines along and across Argyle Street which may be currently lacking – such as at Market Street. Crossing types could be mix of uncontrolled (dropped crossings and refuge islands) or controlled (such as zebra crossings).
Conway Park and Birkenhead Market improved walk route	The Conway Park scheme will create a significant increase in activity in this area of Birkenhead and will be attracting trips from all directions. This scheme will therefore need to coordinate well with other transport schemes being promoted within this report to ensure overall benefits are being maximised. This scheme would also provide an improved route around Conway Park connecting to Birkenhead Market, to attract increased footfall into the retail core, and to provide improved accessibility to new development north of Conway Park. The scheme would greatly improve the quality of public realm and signage on Europa Boulevard and would install new high-quality crossing facilities over Conway Street to improve integration with the bus station and wider town centre.
Improved public realm Conway Park and Europa Boulevard	As described in Conway Park and Birkenhead Market improved walk route scheme.
Hamilton Square and Hamilton Street improvements	This scheme includes the following proposals: • Removal of the two large mini roundabouts on the east side of the Square and replaced with a more informal space shared between pedestrians and vehicles; • Removal of the road closure between Duncan Street and Hamilton Square; • Conversion of Duncan Street to be two-way to traffic for its full length; • Conversion of Hamilton Street to be two-way to traffic between Hamilton Square and Hinson Street; • Conversion of Hinson Street to be two-way to traffic between Argyle Street and Hamilton Street; • Improved landscaping, including tree planting where possible; • Road narrowing via creation of sheltered on-street parking bays and uncontrolled pedestrian crossings; • Improved public realm, including street furniture and footway resurfacing; and • New and repositioned bus stops and waiting facilities to take advantage of the new street circulation and passenger destinations. The scheme will also need to coordinate with other initiatives being proposed by this package of works, including: • Argyle Street public realm improvements; • Market Street enhancement; and • Works outside of Hamilton Square station.
Relocation of Birkenhead bus station	As part of proposals to improve the route between Conway Park station and Birkenhead Town Centre, and to provide additional space with which to extend the town centre offer including the Market, it is proposed to relocate the bus station to a more suitable location. There is also an important integration argument for this scheme since the bus station is currently remote from the three town centre stations (although it is closest to Conway Park) and is rather peripheral to the primary retail core.
A41 / A552 / Flyovers remodelling – Phase 1	This scheme forms the first phase of the scheme which likely to have the most significant and wide reaching transport impacts being proposed as part of this study. At the heart of the scheme is the removal of the elevated highway fly-overs to the south of Birkenhead town centre. The flyovers themselves are basically made up of two structures: one structure (owned by Merseytravel) gives access to the Queensway Tunnel from the A41 Chester Road and the A552 Borough Road; and the second structure (owned by Wirral Council) gives

Scheme name	Description
	direct linkage between Chester Road and Borough Road. Also associated with the flyovers are range of other free-flowing highway links – including an underpass to Chester Street.
Other A41 Site Access Improvement Schemes – Phase 1	Associated with the removal of the flyovers to the south of Birkenhead town centre, would also be complimentary works to provide appropriate site access arrangements to currently undeveloped or underutilised land. Particularly the significant area of brownfield land between Green Lane and Birkenhead Central rail stations. • *Queensway Toll Plaza Re-modelling / Removal:* This scheme would aim to increase Queensway's capacity through remodelling/removing the toll plaza in Wirral and instead utilising ANPR technology to administer and enforce the toll system as currently occurs on the Mersey Gateway Bridge. • *Green Lane Roundabout capacity improvements:* This scheme would comprise a series of improvements to the Green Lane / A41 roundabout to increase capacity, flow and journey time reliability of the A41 Strategic Corridor. Journey times on the A41 during peak periods will be improved and delays reduced. • *Campbelltown Road capacity improvements:* This scheme proposes improvements to Campbelltown Road to improve access to Cammell Laird and the offshore wind farm businesses. • *A41 Southern Bus Access improvements*: This scheme proposes the delivery of new or enhanced bus services, including where appropriate infrastructure improvements, connecting rail stations and town centres with employment sites and retail parks along the A41 North Corridor. In particular relation to the town centre and A41 area, bus services from the A41 North Corridor would be re-routed via the proposed new infrastructure to provide direct access to the bus station, Queensway Tunnel and other required routes.

Source: Mott MacDonald

7.2.2 Phase 2 Schemes

The transport schemes assessed in this report that are part of Phase 2 are shown below in Table 10. These schemes are anticipated to be delivered between 5-10 years of the publication of the final strategy.

Table 10: Details of Package 2 A41 North Corridor transport schemes

Scheme name	Description
Regenerating Woodside and Hamilton Square	One of the main issues which the masterplans have sought to overcome are the barriers to movement between Woodside towards Birkenhead. Two options have been developed to reconfigure the Woodside Gyratory to give an indication of the land which would be released and how pedestrian movement could be significantly improved between Hamilton Square and Woodside. In the first option, an east / west street grid is reinstated, and in the second option Chester Street is realigned with Canning Street through the middle of the gyratory. Both offering significant benefits, but the second option would provide the greater traffic capacity.
Access road to Rosebrae development site	This scheme reviews options for access to the proposed development. The simplest access point would be from Church Street which runs adjacent to the eastern boundary of the site. This road gives direct access to the A41 Chester Street and should be sufficient to serve a relatively low density development similar to Priory Wharf. Should a higher density development with more car parking be proposed, an alternative access strategy may be required.
A41 / A552 / Flyovers remodelling – Phase 2, and Access to Hind Street - Mollington Link Road	These schemes would immediately follow on from the interim temporary arrangement, to deliver the final highway and movement scheme associated with the removal of the Birkenhead flyovers. The final arrangement will be subject to more detailed planning, design and consultation but is expected to include the following key elements: • Removal of the Borough Road / Argyle Street gyratory and replacement with a four-arm signal traffic signal junction. This junction should include high quality pedestrian crossing facilities, and to link Birkenhead Central rail station with the town centre; • Creation of a new east / west link between Borough Road and Chester Road, and connecting with Chester Street. Hence, forming the at-grade replacement to the Wirral Council flyover; • A new junction connection to King's Square to the north forming the at grade replacement to the Merseytravel flyover and main access route to the Queensway Tunnel; • A new junction with Chester Street, removing the requirement for the underpass. This junction could free up significant space which could be used for new development, or potentially a new public park around the Tunnel Monument which was formerly located in King's Square; • The revised access arrangement to Queensway Tunnel would also allow the reconfiguration of the Toll Plaza, which would again free up significant space for other uses; and • Creation of new connections into the undeveloped / underutilised land between the Green Lane and Birkenhead Central rail stations to help facilitate new development.
Birkenhead Green Corridor	Bisecting Birkenhead is a former rail corridor which used to link the Wirral Waters dock area with the Chester rail line. This rail line is now disused and the rail tracks removed, but the corridor itself remains almost intact. This scheme will seek to bring this corridor back into active usage, to make it into a significant asset and to be a key catalyst not only in the regeneration of Birkenhead but also the wider area – including Wirral Waters. Key elements of the scheme will be: • To fill-in the cutting to bring the surface level to the same grade as adjacent streets; • Where possible, to reconnect severed streets to again increase the permeability of the corridor; • To open the corridor to public transport, pedestrians and cyclists only. This will therefore create a high quality segregated corridor, linking Wirral Waters with Birkenhead town centre and the development land adjacent to Birkenhead Central rail station; • To introduce CCTV and street lighting to again promote personal security. The transit corridor could be used by a variety of types of vehicles from conventional buses, to specialist vehicles such as light tram.
Riverside Green Link	This scheme presents the opportunity to create another high quality connection to the Waterways via Morpeth Dock which currently closed off to public access. The dock and the adjacent land is believed to be under the ownership / control of British Waterways, and it may well be that an agreement could be reached for the land to be opened up for improvement and public access. If this can be achieved it will be possible to create a pedestrian and cycle route between Shore Road to the east of the Twelve Quays College, through Morpeth Dock and connect with the Wirral Circular Trail. Links to this scheme could be made to the Birkenhead Green Corridor scheme which enable almost a traffic free walking and cycling route between Birkenhead town centre and the River Mersey Waterfront which would likely be very popular for recreational and commuter travel. A second connection to the Birkenhead Green Corridor scheme could also be made via Egerton Wharf and hence Egerton Dock. Again, improving walking and cycling linkage between the town centre and Wirral Waters.

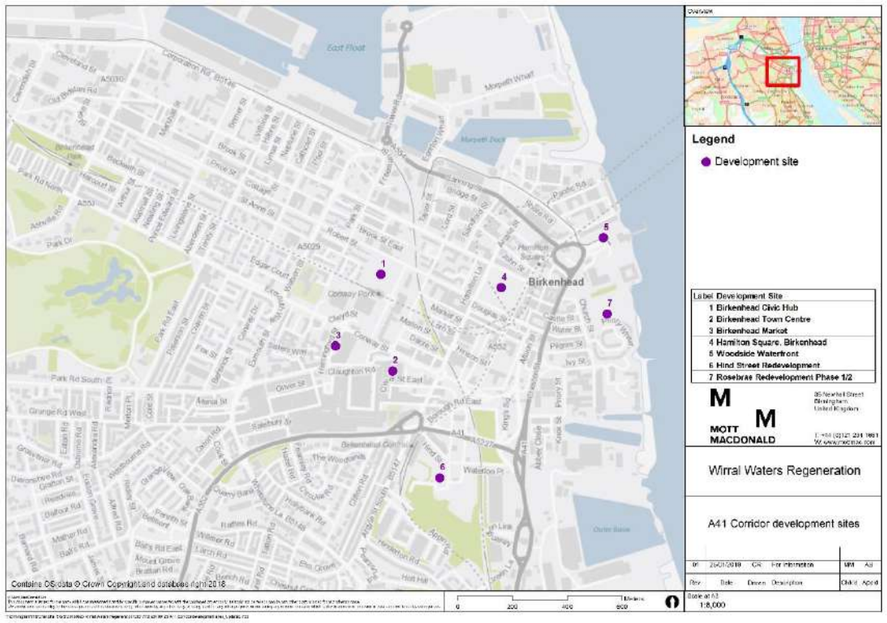
Source: Mott MacDonald

7.3 A41 North Corridor Regeneration Area

The A41 North Corridor is a strategic route into Birkenhead linking the eastern side of the borough into the commercial and employment centre. The transport corridor and town centre have evolved independently leaving people arriving in the town centre isolated as well as creating transport barriers. As a key gateway into Birkenhead the A41 North Corridor is overcomplicated and creates a significant barrier to other modes of transport, especially pedestrians and cyclists. To support the regeneration of the area the transport network in this area including the A41 North Corridor must be improved to support the development of key proposed development sites and the redevelopment of existing employment centres in this region.

There are 7 key existing employment areas and proposed development sites within the vicinity of the A41 North Corridor that include a range of both employment and residential uses. The location of these 7 key existing employment areas and proposed development sites are shown on the map below.

Figure 14: A41 North Corridor development sites



Source: Mott MacDonald

The proposed employment and residential development for these sites and within these key existing areas are outlined in the table below.

Table 11: A41 North Corridor proposed development details

Site number	Site name	Proposed land use*	Source
1	Birkenhead Civic Hub	A 26,942m² office requirement for Wirral Council and several other public sector covenants, with scope for additional leisure development of up to 2,323m² on adjacent sites.	Wirral Growth Company: Our growth prospectus
2	Birkenhead Town Centre	The council is developing a regeneration plan for Birkenhead's historic core and has brought numerous properties in to its ownership, so it can work with joint venture partners. There's scope for almost 32,516m² of commercial development, 200 residential units and car parking.	Wirral Growth Company: Our growth prospectus
3	Birkenhead Market	A transformation of the market to create a unique and highly differentiated food and leisure dining offer capable of drawing in tourists and visitors from a wide area.	Wirral Growth Company: Our growth prospectus
4	Hamilton Square, Birkenhead	This Grade I-listed square offers potential for a £60m transformation to include boutique hotels, offices and 3,345m² of leisure space. Birkenhead Town Hall can become a destination hotel and wedding venue, an arts space or theatre complex.	Wirral Growth Company: Our growth prospectus
5	Woodside Waterfront	A prime waterfront site with outstanding views to Liverpool's World Heritage waterfront. A 464,512m² mixed use scheme with a GDV in excess of £300m and scope for hotels, leisure, offices and high-end residential.	Wirral Growth Company: Our growth prospectus
6	Hind Street Redevelopment	A 7.9ha mixed use development site whose land uses will not compete with Birkenhead Town Centre.	Information from Wirral Council
7	Rosebrae Redevelopment Phase 1/2	Phase 1 development aims to deliver approximately 300 new residential units. Phase 2 development envisaged to be focused on mixture of commercial and leisure use.	Information from Wirral Council

Source: See Source column in table. * Floorspaces have been converted from sqft in initial information to m² for consistency with requirements of TEAM calculations.

7.3.1 Summary

The A41 North Corridor is a strategic route into Birkenhead and is therefore essential to the regeneration of this economic centre and the economic buoyancy of the borough. Along the A41 North Corridor there are a number of high-profile proposed development sites as well as plans to regenerate already existing areas through new development which could deliver up to **608,638m² of developable floorspace** and **500 new homes** to support local growth.

The table below outlines a summary of the reported totals of employment and residential development anticipated on each of the identified sites.

Table 12: A41 North Corridor proposed development summary

Site number	Site name	Proposed employment development	Proposed residential development
1	Birkenhead Civic Hub	26,942m² office floorspace 2,323m² leisure floorspace	N/A
2	Birkenhead Town Centre	32,516m² commercial floorspace	200 new residential units
3	Birkenhead Market	A transformation of the market to create a unique and highly differentiated food and leisure dining offer capable of drawing in tourists and visitors from a wide area.	N/A

Site number	Site name	Proposed employment development	Proposed residential development
4	Hamilton Square, Birkenhead	3,345m² leisure floorspace	N/A
5	Woodside Waterfront	464,512m² mixed use floorspace including office leisure, hotels and office	Some anticipated residential use
6	Hind Street Redevelopment	A 7.9ha mixed use development	N/A
7	Rosebrae Redevelopment Phase 1/2	Phase 2 development envisaged to be focused on mixture of commercial and leisure use	Phase 1 development aims to deliver approximately 300 new residential units

Source: Wirral Growth Company: Our growth prospectus, Wirral Council

7.4 Quantified Economic Impact

This scheme has the potential to support the development of these sites for both employment and residential uses. To demonstrate the potential value of these sites to the local economy, the potential gross number of jobs that can be accommodated at these sites has been assessed using Mott MacDonald's Transparent Economic Assessment Model (TEAM). TEAM assesses the economic benefits arising from land-use change calculated in line with HM Treasury Green Book principles of additionality.

TEAM has been used to assess the gross employment impacts each site could deliver to the area, based on the site information provided by a number of sources including the Wirral Growth Company and Wirral Council. Each site was entered into TEAM where a standard employment density was applied based on the proposed use for the site. The level of additionality has not been assessed due to limited information available at this time. The site details entered into TEAM are set out in Table 13.

Table 13: TEAM – Employment sites included in analysis

Site name	Land use	Size (m² or other)
Birkenhead Civic Hub	B1	26,942
	Leisure (D2)	2,323
Birkenhead Town Centre	Commercial (A1/A2/A3/B1)	32,516
Hamilton Square, Birkenhead	Leisure (D2)	3,345
Woodside Waterfront	B1	116,218
	D2	116,218
Hind Street Redevelopment	B1/B2/B8	79,000

Source: Wirral Growth Company: Our growth prospectus, Wirral Council

7.4.1 Assumptions used

As TEAM was used in this instance only to assess gross-level impacts, no additionality assumptions (such as deadweight, displacement or leakage) were used. The assumptions that were used for this assessment are set out in Table 14.

Table 14: Assumptions used

Assumption	Justification
Employment site assumptions	
Birkenhead Town Centre land use assumption	This site has been identified as being available for commercial development without any specific detail on type of commercial land use.
	It has been assumed that given the location within a town centre the land use would be split evenly between A1, A2, A3 and B1.
Woodside Waterfront	This site has been identified as having a total of 464,512m² with scope for hotel, leisure, office and high-end residential use. Without knowing the detailed breakdown of the total floorspace assumptions have been on how much floorspace to attribute to each of the identified uses. It has been assumed that 116,128m² of floorspace is available for each of the four land uses identified.
Hind Street Redevelopment land use assumption	This site has no identified land uses. Therefore, it has been assumed that the land uses for this site will be split evenly between B1, B2 and B8 land uses.
Employment densities	
General B1 land use – 20m² of Net Internal Area (NIA) per Full Time Equivalent (FTE) job.	Where the proposed land use was listed as B1, with no further information provided, an assumption of 20m² NIA/FTE was applied, this is average of all B1 employment densities provided in Homes England (formerly the HCA) Employment Density Guide 2015.
B1c land use – 47m² NIA/FTE.	Where B1c land use was specified (in the West Float sites), the standard employment density of 47m² NIA/FTE from the HCA Employment Density Guide 2015 was used.
B2 land use - 36m² Gross External Area (GEA)/FTE.	All sites identified for B2 use were assumed to be regional distribution centres, with an employment density of 36m² NIA/FTE. This is the approximate mid-point of three B2 employment densities provided in the Employment Density Guide 2015.
B8 land use - 77m² Gross External Area (GEA)/FTE.	All sites identified for B8 use were assumed to be regional distribution centres, with an employment density of 77m² NIA/FTE. This is the approximate mid-point of three B8 employment densities provided in the Employment Density Guide 2015.
A1 land use – 18 m² NIA/FTE.	A1 retail was assumed to be equivalent to high street retail and accordingly was aligned to the standard assumption of 18m² NIA/FTE from the Employment Density Guide 2015.
A2 land use - 16 m² NIA/FTE.	The Employment Density Guide (2015) proposes an employment density of 16 m² NIA/FTE for A2 Finance and Professional Services.
A3 land use - 18 m² NIA/FTE.	The Employment Density Guide (2015) proposes an employment density of 18 m² NIA/FTE for A3 restaurants.
General D2 land use – 100m² of Gross Internal Area (NIA) per Full Time Equivalent (FTE) job.	Where the proposed land use was listed as leisure or D2, with no further information provided, an assumption of 100m² GIA/FTE was applied, this is average of all D2 employment densities provided in Homes England (formerly the HCA) Employment Density Guide 2015.
Hotels – assumed to be three staff per hotel bed.	The hotel was assumed to be a mid-range quality hotel as a mid-point assumption, the Employment Density Guide (2015) proposes an employment density of three staff per hotel bed.
Other assumptions	
GVA per worker - £44,852	GVA per worker UK NUTS Level 3 (Wirral), ONS, 2017.

Source: Mott MacDonald

7.4.2 Outputs

The high-level analysis of the employment sites identified for the A41 North Corridor schemes has found that the sites could support approximately 7,396 gross jobs and £331.7m of GVA per annum. These figures are shown at a gross-level only, and the analysis did not take into account the scale of additionality with regard to these jobs and GVA. The breakdown of the potential employment and GVA impact of each site is shown in Table 15.

Table 15: TEAM outputs

Site name	Gross jobs	Gross GVA (£m)
Birkenhead Civic Hub	1,028	£46.1
Birkenhead Town Centre	470	£21.1

Site name	Gross jobs	Gross GVA (£m)
Hamilton Square, Birkenhead	25	£1.1
Woodside Waterfront	5,226	£234.4
Hind Street Redevelopment	647	£29.0
Total	**7,396**	**£331.7**

Source: Mott MacDonald

The outputs from TEAM demonstrate that the sites identified as part of this development could have a significant impact on employment in the area. While this analysis follows best-practice for the assessment of gross employment and GVA impacts, there are a number of caveats to the outputs that may ultimately impact the scale of the employment benefits ultimately delivered by this scheme, these are:

- As stated, this analysis only assesses employment and GVA impacts at a gross level, therefore not addressing the likely level of additionality. The level of additionality of the benefits of this development will reduce the scale of these benefits; high leakage or the displacement of benefits from elsewhere in the Wirral may result in a lower overall impact than anticipated.
- Where individual sites were designated for a mix of uses, the total floorspace was divided between the three uses evenly. The eventual level of demand for each type of floorspace and the needs of the occupants of these sites may result in a different split of uses. As each land use has a different employment density, a different division of uses among B-class land uses can impact the number of jobs at each site. This analysis is based on the assumption that the division of the site is equal between the three use classes, although the actual division may vary.
- As the GVA produced by different sectors and industries varies, the GVA supported at these sites may ultimately differ from that shown in this analysis, depending on the nature of the businesses that occupy these sites, although a reasonable average figure has been applied here.

Based on the sites identified around the A41 North Corridor and the assumptions set out above, this high-level analysis has found that the development of the sites around the A41 North Corridor could support approximately:

- 7,396 jobs; and,
- £331.7m in GVA per annum.

While no comment has been made on the degree to which each package of interventions may support the delivery of these sites, this analysis quantifies the value of the proposed developments around the A41 North Corridor to the Wirral's economy, ultimately demonstrating the case for intervention to support the development around the A41 North Corridor.

The packages of interventions involved in this scheme are set out below.

7.5 Phase 1

The table below outlines the potential qualitative economic impacts for the transport schemes included in Package 1.

Table 16: Economic impact of Package 1 schemes

Scheme name	Economic impact
Station facilities and waiting environment enhancements	• Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
Wirral line park and ride enhancements	• Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
Green Lane station refurbishment	• Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
Birkenhead Central: new forecourt and eastern access route	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Directly supports access to the proposed development in Birkenhead Town Centre.
Improvements to bus infrastructure at Birkenhead Park and Conway Park	• Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Hamilton Square bus / rail interchange improvements	• Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
Birkenhead North bus / rail interchange improvements	• Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
Birkenhead Central bus / rail interchange improvements	• Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
A41 Chester Road / A552 Borough highway realignment (Phase 1)	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment.
A41 Chester Road / Ivy Street junction improvement	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Signage improvement to Birkenhead Priory	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Electric charging points across borough	• Improved connectivity by offering opportunity to use electric cars to travel within the borough thereby supporting labour market accessibility.

Scheme name	Economic impact
Signage and better entrance to retail core	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Directly supports access to the proposed development in Birkenhead Town Centre.
Birkenhead local access road improvements	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Road safety improvements at Whetstone Lane / Borough Road	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment.
Improved public realm in retail core	• Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Improved public realm Argyle Street	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Cleveland Street / Market Street / Price Street public realm	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Improved public realm Conway Street	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Improved pedestrian crossing facilities along Argyle Street	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment.
Conway Park and Birkenhead Market improved walk route	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Directly supports access to the proposed development in Birkenhead Market.
Improved public realm Conway Park and Europa Boulevard	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Directly supports access to the proposed development in Birkenhead Market.
Hamilton Square and Hamilton Street improvements	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Directly supports access to the proposed Hamilton Square development site.
Relocation of Birkenhead bus station	• Directly supports access to the proposed development in Birkenhead Town Centre and the Hamilton Square development site.
A41/A552/Flyovers remodelling – Phase 1	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Reduction of severance will support labour market accessibility and business investment.
Other A41 Site Access Improvements Schemes – Phase 1	• Reduction of severance will support labour market accessibility and business investment. • Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment.

Source: Mott MacDonald

The focus of the transport schemes within Package 1 is on the reduction of severance across the area surrounding the A41 North Corridor, improving connectivity for pedestrians and cyclists as well as offering better access to proposed development sites such as Birkenhead Town Centre, Woodside Waterfront and Hamilton Square amongst others. By achieving these objectives Package 1 will support accessibility for the current and future labour market and may support confidence in businesses to invest in the area. Several schemes also focus on improving public realm of key gateways that will make the area more aesthetically attractive thereby acting as a further incentive for businesses and residents to locate to the area. Other schemes also seek to improve the capacity of public transport networks within the vicinity of the A41 North Corridor thereby further increasing access to the labour market as well as further enticing business and resident to locate there because of the increased transport options.

7.6 Phase 2

The table below outlines the potential qualitative economic impacts for the transport schemes included in Package 2.

Table 17: Economic impact of Package 2 schemes

Scheme name	Economic impact
Regenerating Woodside and Hamilton Square	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Directly supports access to the proposed Woodside Waterfront and Hamilton Square, Birkenhead sites.
Access road to Rosebrae development site	• Improved connectivity and reduction of severance will support labour market accessibility and business investment. • Directly supports access to the proposed Rosebrae Redevelopment Phase1 / 2 site.
A41 / A552 / Flyovers remodelling – Phase 2, and	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment.

Scheme name	Economic impact
Access to Hind Street - Mollington Link Road	• Directly supports access to the proposed development at Birkenhead Town Centre.
Birkenhead Green Corridor	• Reduction of severance will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment.
Riverside Green Link	• Reduction of severance will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Directly supports access to the proposed Woodside Waterfront site.

Source: Mott MacDonald

The focus of the transport schemes within Package 2 is on the reduction of severance across the area surrounding the A41 North Corridor as well as offering better access to proposed development sites such as Woodside Waterfront and Hind Street Redevelopment amongst others. By achieving these objectives Package 2 will continue to build on the improvements made by the schemes in Package 1 in supporting accessibility to the current and future labour market and may support confidence in businesses to invest in the area. Several schemes also focus on improving public realm of key gateways that will make the area more aesthetically attractive thereby acting as a further incentive for businesses and residents to locate to the area.

7.6.1 Summary of Economic Impact

In order for the area surrounding the A41 North Corridor to maximise its full potential as an economic hub there is a requirement for additional transport infrastructure to be implemented to support current and future development. The transport schemes in Packages 1 and 2 represent part of the proposed transport solution and could support the economic performance of the area in a number of ways including:

- Improving labour market access and mobility.
- Supporting business investment and growth.
- Supporting land utilisation impacts.

Packages 1 and 2 are set to make significant strides in these area by improving connectivity, especially for pedestrians and cyclists, increasing capacity on public transport networks as well as reducing severance across the area surrounding the A41 North Corridor. This will enable increased accessibility to and from residential and economic opportunities around the A41 North Corridor that will in turn increase market confidence leading to increased investment in the area. Other schemes will improve the public realm thereby making the area more attractive to residents and businesses alike.

7.7 Social Impact

The A41 North Corridor – including key areas from Eastham, through Bromborough, up to Birkenhead Town Centre, Hamilton Square and the Woodside Waterfront – has been identified as a spatial priority for delivering growth and investment across the borough.[2] The proposed packages of schemes that have been developed as part of the STF aim to achieve this through improved public spaces and community connectivity that supports a more accessible and healthy transportation experience for those that visit, live or work in Wirral.

The analysis below provides a high-level appraisal of the social impacts which could be supported by each package, through linking the schemes to relevant literature and local social, economic and demographic trends. These impacts are also linked to relevant policy objectives where they are supported.

The potential social impacts which could be supported by each package are discussed below in two subsections; those that enhance community health and wellbeing, and those that improve social mobility, inclusion and accessibility.

7.7.1 Community health and wellbeing

Scheme proposals focussing on improvements to active travel facilities, green spaces/corridors or the public realm are likely to support positive health and wellbeing outcomes for Wirral. Evidence on how schemes may support community health and wellbeing is outlined in sections 4.2.1.1 to 4.2.1.4.

The Wirral Strategic Regeneration Framework (SRF) sets out priorities and challenges for economic growth in the borough. Positive health and wellbeing outcomes are supported by two of the strategic themes of the SRF: ‘healthier lifestyles and safer neighbourhoods’, and ‘sustainable development and a high-quality environment’.[3] Health and wellbeing impacts are also relevant to the Wirral 2020 themes of ‘protecting the most vulnerable’ and ‘improving the local environment’.[4]

The community health and wellbeing benefits that are supported by each package of schemes are detailed in the summary table in section 4.3.

7.7.1.1 Air quality

Schemes resulting in the creation of or improvement of access to green spaces, or the promotion of sustainable modes of transportation can help to improve health benefits associated with local air quality. This includes schemes that draw trips away from private motor vehicles, and encourage active travel such as walking and cycling, and/or lower-emission travel by bus or rail. Research has shown that there is a link between both long and short-term exposure to particulate matter emissions, respiratory health, and long-term health outcomes;[5] air pollution disproportionately impacts children, older people, and people with pre-existing

[2] Wirral Council (2017). ‘Wirral Strategic Regeneration Framework’ Available at https://www.wirral.gov.uk/sites/default/files/all/business/Regeneration/Strategic%20Regeneration%20main%20report.pdf

[3] Wirral Council (2017). ‘Wirral Strategic Regeneration Framework’ Available at https://www.wirral.gov.uk/sites/default/files/all/business/Regeneration/Strategic%20Regeneration%20main%20report.pdf

[4] Wirral Council (2017) ‘Wirral Plan 2020’ Available at: https://www.wirral.gov.uk/about-council/wirral-plan-2020-vision#wgSM-0

[5] Kilbane-Dawe, !. and Clement, L. (2014). ‘The impacts of air pollution on health: a summary of the state of current knowledge’. Parliament Hill Research. Available at: https://www.cityoflondon.gov.uk/business/environmental-health/environmental-protection/air-quality/Documents/Impacts-Of-Air-Pollution-On-Health.pdf

conditions (such as asthma, chronic obstructive pulmonary disease (COPD) and coronary artery disease).[6] In addition, elevated levels of pollution are typically concentrated amongst socially deprived neighbourhoods; therefore, schemes which improve air quality may disproportionately impact those who suffer from deprivation.[7]

Air quality improvements resulting from reduced emissions and increased capture of pollutants would have particular benefits for Wirral, which has a high under 75 mortality rate due to respiratory disease, when compared to the national average (51.1 and 33.8 per 100,000, respectively), and a higher under 75 rate of mortality due to cardiovascular disease than the national average, at 82 per 100,000, compared to 73.5 in England.[8] In addition, as elevated pollution levels are typically concentrated in deprived areas, air quality improvements could benefit some of the most vulnerable areas of Wirral. Wirral contains ten Lower-layer Super Output Areas (LSOAs, a unit of measurement for the English indices of deprivation), which are among the 1% most deprived LSOAs in England.[9]

7.7.1.2 Noise and disturbance

Schemes that improve walking and cycling facilities, promote increased use of mass transport like bus and rail, or introduce green, motor vehicle-free corridors may help to reduce local road traffic. Reduced road traffic can have indirect positive health benefits due to decreased levels of noise. Research shows that raised noise levels can cause high blood pressure in children, and can negatively affect their cognitive learning and memory.[10] Noise can also be a contributory factor in several adverse health outcomes for older people, including cardiovascular disease, stress, dementia, and sleep disturbance.[11]

In Wirral, there is a higher than average proportion of older people (aged over 65, at 19.1%) when compared to the national average (16.4%) and a similar proportion of children (aged under-16, at 18.6%) when compared to the national average (18.9%).[12] Traffic noise reduction in areas with higher concentrations of older people and children, or on roads close to schools, care homes, or other community facilities serving these user groups may generate particular benefits for these groups.

7.7.1.3 Access to exercise and active travel

Cumulative health benefits can be realised through schemes that promote exercise through active travel, while simultaneously improving local air quality by reducing motor vehicle use.

Health benefits may also be realised by schemes that create or improve access to open spaces where play, sport and other outdoor exercise can take place, such as local parks.

Increased exercise can contribute positively to improving cardiovascular health in Wirral, which has a high under 75 mortality rates for cardiovascular and respiratory disease.[13] Improved opportunities for exercise could also have positive health outcomes for children in the Wirral, where child obesity (20.6%) is slightly higher than the national average (20%).[14]

7.7.1.4 Road safety

Improvements to walking and cycling facilities and minimisation of conflicts between transportation modes can improve road safety outcomes by reducing the likelihood of harm from road traffic. Benefits may result from interventions that increase the uptake of cycling and walking to 'normalise' these activities, particularly in spaces which previously would be dominated by motor vehicles. Benefits may also be realised through schemes which improve the safety of crossings or provide new infrastructure to segregate cyclists from other road users. Such improvements could particularly benefit children from low income areas, who have much higher rates of casualties from road traffic collisions due to greater exposure to higher levels of traffic.[15]

Road safety improvements could result in positive health outcomes for Wirral, which has a higher rate of people killed and injured on roads (41.7) than both the North West and England (39.8 and 39.7, respectively).[16] Children in deprived areas of Wirral, such as those in the 1% most deprived LSOAs in England,[17] may particularly benefit from improved road safety due to their likelihood of being exposed to higher levels of traffic.

7.7.1.5 Personal safety and journey experience

Improvements to the public realm, as well as enhancement of station and waiting facilities, can positively impact upon personal safety and journey experience when travelling.[18] Enhancement of security measures may disproportionately benefit women, ethnic minority groups, and Lesbian, Gay, Bisexual and Transgender (LGBT) people, as research shows that these groups

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[6] Department for Environment, Food and Rural Affairs (2018). '*The health impacts of poor air quality*'. Available at: h https://publications.parliament.uk/pa/cm201719/cmselect/cmenvfru/433/43308.htm#footnote-259

[7] Goodman, A., Wilkinson, P., Stafford, M., & Tonne, C. (2011). '*Characterising socio-economic inequalities in exposure to air pollution: a comparison of socio-economic markers and scales of measurement*'. Health & place, 17(3), 767-774.

[8] Public Health England (2014-16). '*Public Health Profiles: Under-75 mortality rate from respiratory disease''*. Available at: https://fingertips.phe.org.uk/search/respiratory%20disease#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

Public Health England (2014-16). '*Public Health Profiles –Under 75 mortality rate from all cardiovascular diseases''*. Available at: https://fingertips.phe.org.uk/search/cardiovascular#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

[9] Wirral Council Public Health Intelligence Team (2015). '*Indices of Multiple Deprivation for Wirral*' Available at: https://www.wirralintelligenceservice.org/media/1145/imd-2015-report-final.pdf

[10] World Health Organisation (2011): *'Burden of disease from environmental noise Quantification of healthy life years lost in Europe'*. Available at: http://www.who.int/quantifying_ehimpacts/publications/e94888.pdf?ua=1

[11] World Health Organisation (2011): *'Burden of disease from environmental noise Quantification of healthy life years lost in Europe'*. Available at: http://www.who.int/quantifying_ehimpacts/publications/e94888.pdf?ua=1

[12] ONS (2011) Local Area Reports. Available at: https://www.nomisweb.co.uk/reports/localarea?compare=1946157107

[13] Public Health England (2014-16). '*Public Health Profiles –Under 75 mortality rate from all cardiovascular diseases''*. Available at: https://fingertips.phe.org.uk/search/cardiovascular#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

Public Health England (2014-16). '*Public Health Profiles –Under 75 mortality rate from respiratory disease''*. Available at: https://fingertips.phe.org.uk/search/respiratory%20disease#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

[14] Public Health England (2016-17). '*Public Health Profiles –Year 6: Prevalence of obesity''*. Available at: https://fingertips.phe.org.uk/search/obesity#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

[15] Social Exclusion Unit (2003). '*Making the connections: transport and social exclusion*'. Social Exclusion Unit, *The Stationery Office, London*.

[16] Public Health England (2016-17). '*Public Health Profiles –Killed and seriously injured casualties on England's roads''*. Available at: Public Health England (2016-17). '*Public Health Profiles –Year 6: Prevalence of obesity''*. Available at: https://fingertips.phe.org.uk/search/obesity#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

[17] Wirral Council Public Health Intelligence Team (2015). '*Indices of Multiple Deprivation for Wirral*' Available at: https://www.wirralintelligenceservice.org/media/1145/imd-2015-report-final.pdf

[18] Department for Transport (2006), *Personal security issues in pedestrian journeys*, available at: http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/crime/personalsecurity/personalsecurityissuesinpede3005?page=5

often fear for their safety and well-being in public spaces and on pedestrian journeys.[19] Using environmental design to prevent antisocial behaviour, including informal surveillance such as spaces with clear sightlines that are well-maintained and well-lit, or formal surveillance such as CCTV, may improve safety and feelings of safety for these groups. Journey experience can also be influenced positively by schemes which enhance station and waiting facilities such as increased or improved seating, heating, or retail offer.

For the year ending in June 2018, the crime rate (police recorded crimes per 1,000 population) was lower in Wirral on average than other comparable areas. For crimes that may occur while travelling, such as theft from the person or violence and sexual offences, the crime rate is 0.47 and 25.84 per 1,000 population, respectively.[20] Improvements to travel facilities or the public realm may help to reduce crime rates and improve safety for people in Wirral.

7.7.2 Social mobility, inclusion and accessibility

Scheme proposals focussing on improving infrastructure and connections between or within communities may support positive equality outcomes, including improved social mobility, inclusion and accessibility. Evidence on how schemes may support social mobility, inclusion and accessibility is outlined in sections 4.2.2.1 and 4.2.2.2.

Improved social mobility, inclusion and accessibility is in line with strategic themes of the SRF, including: ‘employment, skills and economic development’, ‘transport connectivity’, ’sustainable development’ and ‘a high-quality environment’. Impacts are also relevant to the key themes for Wirral 2020 of ‘protecting the most vulnerable’ and ‘driving economic growth’.[21]

Social mobility, inclusion and accessibility benefits that are supported by each package of schemes are outlined in the summary table in section 4.3

7.7.2.1 Connections to employment, education and social resources

Improved connectivity between communities may include further connections between residential areas and town centres, places of employment and education, and other employment sites, such as enterprise, office, and retail parks along the A41 North Corridor.

Research by the Joseph Rowntree Foundation indicates that transport is a key barrier to employment for people living in areas of high deprivation.[22] As a result, improved transport could improve opportunities to access employment and education, which can serve to address issues of inequality and improve social mobility.

Improved transport access to jobs for areas with poor employment performance could benefit the Wirral area, which has areas of high deprivation in neighbourhoods near to Wirral Waters, in Birkenhead and Wallasey.[23] In addition, Wirral has a lower percentage of people in employment (73.8%) than the average for Great Britain (75%), and a higher percentage of households that are workless (19%, compared to 14.5% for Great Britain).[24]

Improved connectivity between neighbourhoods may also provide better access to social infrastructure including facilities for health, early years provision, education, community connection, worship, play and recreation.

In Wirral, there is a higher than average proportion of older people (aged over 65, at 19.1%) when compared to the national average (16.4%) and a similar proportion of children (aged under 16, at 18.6%) when compared to the national average (18.9%).[25] Creation of or improved access to open spaces, such as proposed play parks along the Birkenhead Green Corridor or the creation of a new public park around the Tunnel Monument, may impact children in deprived areas of Wirral, as children living in deprived areas are nine times less likely to be able to access green space than those living in less deprived areas.[26] Increased connectivity to social infrastructure can also benefit older people in Wirral, who make up a larger proportion of the population, when compared to the national average, and who can experience feelings of isolation and loneliness due to physical isolation and a lack of social resources.[27]

7.7.2.2 Equality and Inclusion

Creating inclusive neighbourhoods and taking steps to create a more equal and welcoming community can be achieved through removing barriers to access or use of the streetscape, buildings and the transport network. This includes schemes that create public spaces, facilities and infrastructure that work for many different types of people.[28]

Older people and people with a limiting long-term illness or disability are more likely to experience isolation and barriers to accessing social infrastructure. [29] In Wirral, there is a higher proportion of older people and people with a limiting long-term illness or disability than the national average, and these groups are disproportionately likely to benefit from schemes that improve pedestrian infrastructure or accessibility of facilities at stations and waiting areas.[30]

The 2015 National Travel Survey found that the proportion of people with mobility difficulties increases with age.[31] Schemes which improve or create new pedestrian routes, as is the case with “Hamilton Square bus / rail interchange improvements”, may decrease walking distances, which could benefit older people. Pedestrian infrastructure improvements could also benefit

[19] Stonewall (2017) LGBT in Britain: Hate Crime. Available at: https://www.stonewall.org.uk/comeoutforLGBT/lgbt-in-britain/hate-crime

Department for Transport (2006), *Personal security issues in pedestrian journeys*, available at: http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/crime/personalsecurity/personalsecurityissuesinpede3005?page=5

[20] ONS (2018). Crime and Justice. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice

[21] Wirral Council (2017) ‘Wirral Plan 2020’ Available at: https://www.wirral.gov.uk/about-council/wirral-plan-2020-vision#wgSM-0

[22] Joseph Rowntree Foundation (2018), Tackling transport-related barriers to employment in low-income neighbourhoods. Available at: file:///C:/Users/luh88061/AppData/Local/Packages/Microsoft.MicrosoftEdge_8wekyb3d8bbwe/TempState/Downloads/tackling_transport-related_barriers_low-income_neighbourhoods.pdf

[23] Department for Communities and Local Government (2015). ‘*English Indices of Deprivation, 2015*’ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/465791/English_Indices_of_Deprivation_2015_-_Statistical_Release.pdf

[24] ONS (2011): ‘*Census*’. Available at: https://www.ons.gov.uk/census/2011census

[25] ONS (2011) Local Area Reports. Available at: https://www.nomisweb.co.uk/reports/localarea?compare=1946157107

[26] Quoted in King’s Fund, Access to green and open spaces and the role of leisure services Available at: https://www.kingsfund.org.uk/projects/improving-publics-health/access-green-and-open-spaces-and-role-leisure-services

[27] Age UK, (2012): 'Loneliness and isolation evidence review'.

[28] Commission for Architecture and the Built Environment (2006). ‘The principles of inclusive design.’ Available at: https://www.designcouncil.org.uk/sites/default/files/asset/document/the-principles-of-inclusive-design.pdf

Commission for Architecture and the Built Environment (2008). ‘Inclusion by design’. Available at: https://www.designcouncil.org.uk/sites/default/files/asset/document/inclusion-by-design.pdf

[29] Department for Transport, *National Travel Survey: England 2015*, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/551437/national-travel-survey-2015.pdf

[30] ONS (2011): ‘*Census*’. Available at: https://www.ons.gov.uk/census/2011census

Age UK, (2012): 'Loneliness and isolation evidence review'.

[31] Department for Transport, *National Travel Survey: England 2015*, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/551437/national-travel-survey-2015.pdf

disabled people, as research from the DfT indicates that of people with a disability who are able to walk, around 30% can walk no more than 50 metres without stopping or experiencing severe discomfort. [32]

Children and young people could also benefit from improved pedestrian and cycle facilities, as approximately half of children in England walk or cycle to school,[33] and young people are more likely to be users of non-motorised forms of transport.[34] Households without access to a car, of which Wirral has a higher than average proportion,[35] may also benefit from schemes supporting active travel and improved public transport.

Finally, wayfinding or signage strategies can improve the accessibility of the public realm for disabled people, including those with physical, cognitive or sensory impairments, or ethnic minority groups, including those who may have a limited understanding of English, or those with a limited understanding of the local area, such as visitors and tourists.[36] Benefits may arise from orientation support that includes clear information, signage and intuitive wayfinding, provided by schemes such as “Station facilities and waiting environment enhancements”, which aims to improve station information boards.

7.7.3 Social Impact Summary

The following summary table details the potential social impacts that may arise from each scheme.

Table 18: Summary of potential social impacts

Package number	Scheme	Potential community health/wellbeing impacts					Potential social mobility/inclusion/accessibility impacts	
		Air quality	Noise	Exercise	Road safety	Travel safety and comfort	Connections to employment, education and social resources	Equality and inclusion
1	Station facilities and waiting environment enhancements	✓	✓	✓		✓		✓
	Wirral line park and ride enhancements	✓	✓	✓	✓			✓
	Green Lane station refurbishment	✓	✓			✓		✓
	Birkenhead Central: new forecourt and eastern access route	✓	✓	✓		✓	✓	✓
	Improvements to bus infrastructure at Birkenhead Park and Conway Park	✓	✓			✓	✓	✓
	Hamilton Square bus / rail interchange improvements	✓	✓			✓	✓	✓
	Birkenhead North bus / rail interchange improvements	✓	✓			✓	✓	✓
	Birkenhead Central bus / rail interchange improvements	✓	✓				✓	✓
	A41 Chester Road / A552 Borough highway realignment (Phase 1)	✓	✓				✓	✓
	A41 Chester Road / Ivy Street junction improvement	✓			✓	✓	✓	✓
	Signage improvement to Birkenhead Priory	✓	✓	✓	✓		✓	✓
	Electric charging points across borough	✓						
	Signage and better entrance to retail core	✓	✓	✓	✓	✓		✓
	Birkenhead local access road improvements	✓	✓	✓	✓	✓	✓	✓
	Road safety improvements at Whetstone Lane / Borough Road			✓	✓	✓		✓
	Improved public realm in retail core	✓	✓	✓		✓	✓	✓
	Improved public realm Argyle Street	✓	✓	✓	✓	✓		✓
	Cleveland Street / Market Street / Price Street public realm	✓	✓	✓	✓	✓	✓	✓
	Improved public realm Conway Street	✓	✓	✓	✓	✓	✓	✓
	Improved pedestrian crossing facilities along Argyle Street	✓	✓	✓	✓	✓	✓	✓

[32] Department for Transport (2002), *Inclusive mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure*, available at: https://www.gov.uk/government/publications/inclusive-mobility

[33] Department of Transport (2017) ‘*Walking and Cycling Statistics: England,* *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/736909/walking-and-cycling-statistics-england-2017.pdf*

[34] Department for Transport (2015-16), *Walking and cycling levels demographic breakdown: England*, available at https://www.gov.uk/government/statistical-data-sets/walking-and-cycling-levels-demographic-breakdown-england-cw020

[35] ONS (2011): ‘*Census*’. Available at: https://www.ons.gov.uk/census/2011census

[36] NHS (2005). ‘Wayfinding’. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/148500/Wayfinding.pdf

Package number	Scheme	Potential community health/wellbeing impacts					Potential social mobility/inclusion/accessibility impacts	
		Air quality	Noise	Exercise	Road safety	Travel safety and comfort	Connections to employment, education and social resources	Equality and inclusion
2	Conway Park and Birkenhead Market improved walk route	✓	✓	✓	✓	✓	✓	✓
	Improved public realm Conway Park and Europa Boulevard					✓		✓
	Hamilton Square and Hamilton Street improvements	✓	✓	✓	✓	✓	✓	✓
	Relocation of Birkenhead bus station	✓	✓	✓	✓		✓	✓
	A41 / A552 / Flyovers remodelling – Phase 1						✓	
	Other A41 Site Access Improvement Schemes – Phase 1	✓	✓				✓	✓
	Regenerating Woodside and Hamilton Square	✓	✓	✓	✓		✓	✓
	Access road to Rosebrae development site						✓	
	A41 / A552 / Flyovers remodelling – Phase 2, and Access to Hind Street - Mollington Link Road	✓	✓	✓	✓	✓	✓	✓
	Birkenhead Green Corridor	✓	✓	✓	✓	✓	✓	✓
	Riverside Green Link	✓	✓	✓	✓	✓	✓	✓

Source: Mott MacDonald

7.8 Conclusion

The analysis in this section has highlighted that, whilst many of the benefits of the schemes proposed for the A41 North Corridor Regeneration Area are not measurable by the traffic modelling tools available for the purposes of this study, there are nonetheless significant and widespread benefits to be derived from these schemes. In economic terms, even the simplest public realm scheme can have a noticeable impact upon the attractiveness of an area for investment, and the social benefits for such a scheme can be major when taken against the size of the population of people that will make use of that space.

8 Traffic Modelling

8.1 Introduction

A transport modelling exercise has been undertaken to ascertain the benefits of the proposed A41 North Corridor schemes. For the purpose of the modelling, Phases 1 and 2 have been combined to provide a more accurate representation of impacts. Also, many of the schemes in Phase 1 are enablers for the Phase 2 schemes. The highway and public transport schemes for the A41 North Corridor have been modelled separately using the appropriate models as described below, as part of the wider Wirral Regeneration modelling commission. This section discusses the modelling process and results for the A41 North Corridor schemes.

8.2 Highway

8.2.1 Modelling Approach

All highway schemes have been modelled using the Wirral Traffic Model (WTM), a SATURN model providing detailed representation of traffic conditions within the Wirral district. This considers the assignment impacts of the schemes. A41 North Corridor schemes focused on public realm and active travel have not been assessed at this stage. Table 19 below provides a full list of the highway schemes that have been modelled for the A41 North Corridor. Full details of the schemes have been provided in Sections 2-3.

Table 19: A41 North Corridor highway schemes modelled in WTM

Phase	Scheme	Package Name	Drawing Reference
Phase 1	• A41 Chester Street highway alignment • Chester Street junction improvements • Birkenhead – local access road improvements	Birkenhead Town Centre Gateways	• 392148-MMD-00-XX-DR-C-0005A
	• Improved public realm Argyle Street • Public realm improvements: Conway Street	Birkenhead Town Centre Streetscape	• 392148-MMD-00-XX-DR-C-0003 • 392148-MMD-00-XX-DR-C-0004
	• Hamilton Street two-way outside station • Remove Hamilton Street/Duncan Street road closure	Regenerating Woodside and Hamilton Square	• 392148-MMD-00-XX-DR-C-0004
	• Green Lane roundabout capacity improvements • Ivy Street junction capacity improvements • Campbelltown Road capacity improvements • A41/A552/Flyover area remodelling	A41 Site Access Improvements	• 392148-MMD-00-XX-DR-C-0004 • 392148-MMD-00-XX-DR-C-0005 • 392148-MMD-00-XX-DR-C-0006 • 392148-MMD-00-XX-DR-C-0007
Phase 2	• Reconfigure/Redevelop Woodside Gyratory roundabout	Regenerating Woodside and Hamilton Square	• 392148-MMD-00-XX-DR-C-0002 / 0004 / 0004A
	• Access to Hind Street – Mollington Link Road	A41 Site Access Improvements	• 392148-MMD-00-XX-DR-C-0005
	• A41 Chester Road / A552 Borough Road highway realignment (Phase 2)		• 392148-MMD-00-XX-DR-C-0005

Phase 1 provides a series of junction and highway improvements in the A41 North Corridor area, as well as enhancing the public realm around Birkenhead town centre and local rail stations. Phase 1 also includes the first stage of works around the removal of flyovers and remodelling of the network around the A41/A552.

Phase 2 then provides the long-term alignment for a Mollington Link Road equivalent (i.e. a route that will open up access and development opportunities on the Hind Street site, and that will improve the attractiveness of the former flyover. Phase 2 also includes reconfiguring the Woodside gyratory to improve public realm in the area and provide improved access to new development sites.

8.2.2 Results

Many of the Phase 1 schemes are planned and designed to facilitate Phase 2, and as such, a model run has been undertaken for Phase 2 only. This encompasses all modelled schemes within Phase 1 and Phase 2. WTM has default future years of 2020 and 2030, Phase 2 has been modelled using both of these future years.

The operational performance of the local highway network has been reviewed using the maximum turn volume over capacity (v/c) relationships for turning movements at junctions and also link V/C. The junctions and links have been plotted on the network and colour classified according to the following capacity bands:

- **Red (>115% V/C):** This junction/link is operating significantly over capacity for at least one turning movement. Queues and delays at this location are likely to grow exponentially.
- **Orange (>100% V/C):** This junction/link is operating over capacity for at least one turning movement. Queues and delays at this location are likely to grow exponentially.
- **Yellow (85% V/C to 100% V/C):** This junction/link is operating with at least one turning movement that is approaching capacity and as a result there are increased queue lengths and delays.

8.2.2.1 Junctions Over Capacity

The junctions over capacity in the 2030 AM peak are shown for the Do Minimum and Phase 2 in Figure 15 and Figure 16 respectively. Figure 17 presents changes in the junction V/C for junctions that have a V/C of greater than 85% in either the Do Minimum or Phase 2.

In the Do Minimum the junctions with a V/C of between 85% and 100% are located along Green Lane and the roundabout with the A51 New Chester Road. There are also a few outlying junctions situated within Birkenhead including on the A41 and A552 that have a V/C of between 85% and 100%.

Phase 2 addresses the capacity issues at junctions along Green Lane/A51. However, the reconfiguration of the road network and replacement of the existing flyovers by Queensway Tunnel results in a number of junctions being over capacity.

Several junctions across Birkenhead town centre are over capacity in Phase 2 due a number of schemes prioritising public realm and active travel improvements and reducing vehicle capacity at junctions. The Woodside Gyratory is also over capacity following a redesign to unlock new development space and enhance public realm in the area.

Figure 15: Do Minimum 2030 AM Junctions Over Capacity

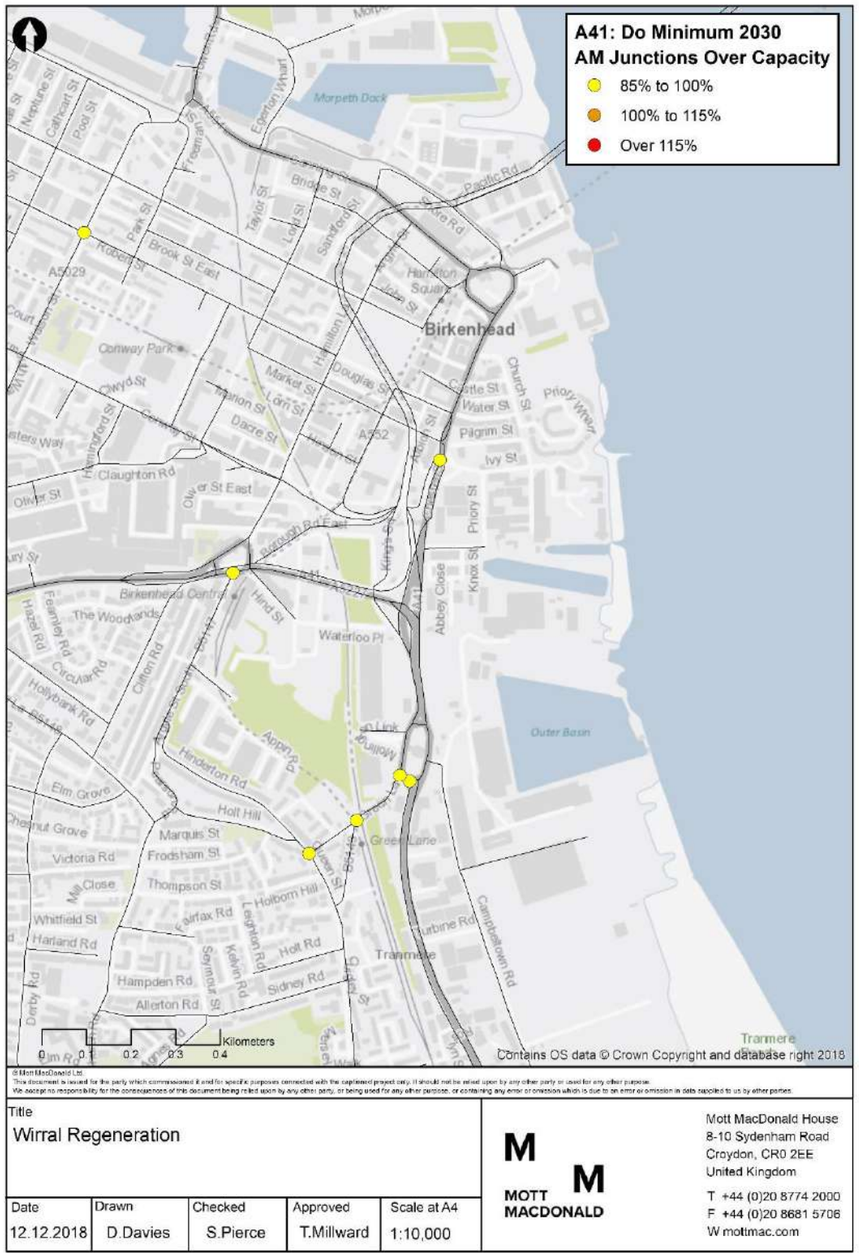


Figure 16: A41 North Corridor Phase 2 2030 AM Junctions Over Capacity

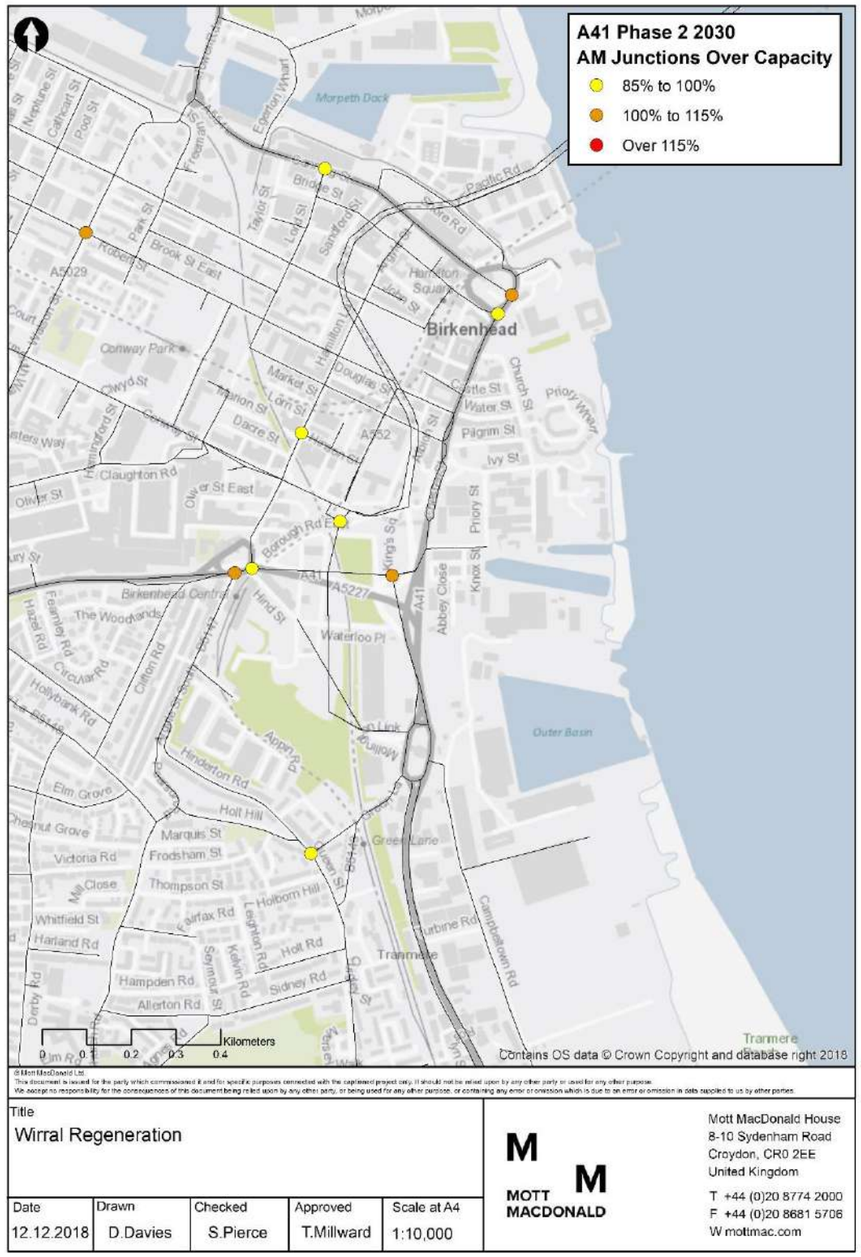
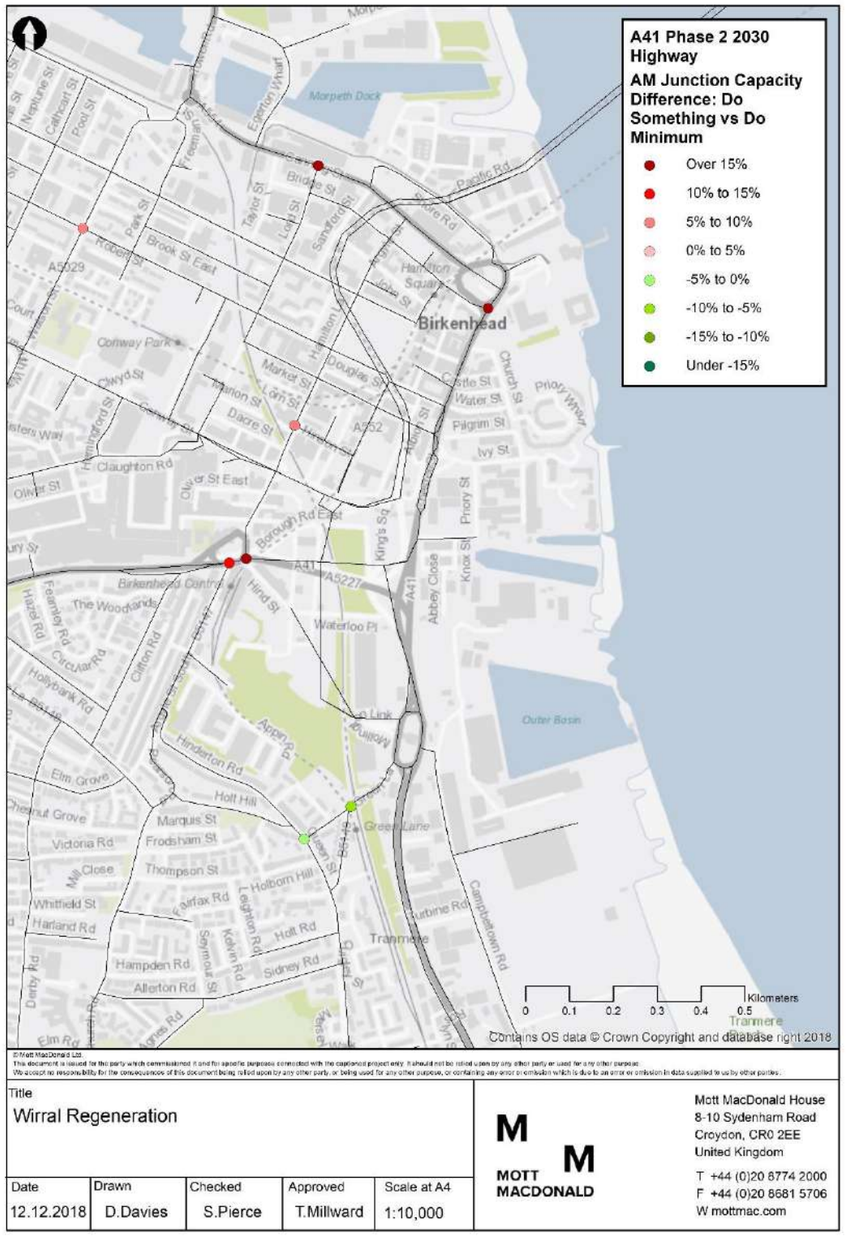


Figure 17: A41 North Corridor Phase 2 to Do Minimum 2030 AM: Changes in Junction V/C (percentage point)



8.2.2.2 Links Over Capacity

The links over capacity in the 2030 AM peak are shown for the Do Minimum and Phase 2 in Figure 18 and Figure 19 respectively. Figure 20 presents changes in the link V/C for links that have a V/C of greater than 85% in either the Do Minimum or Phase 2.

In the Do Minimum there are several northbound links along the A41 New Chester Road and Green Lane, northbound links from Queensway Tunnel and Argyle Street South that have a V/C of between 85% and 100%.

In Phase 2 the links along the A41 New Chester Road no longer experience capacity issues. Some of the new roads delivered in Phase 2, located around Queensway Tunnel, have a V/C of between 85% and 100%. The link on Argyle Street South experiences a deterioration in performance with the V/C increasing to between 100%-115%.

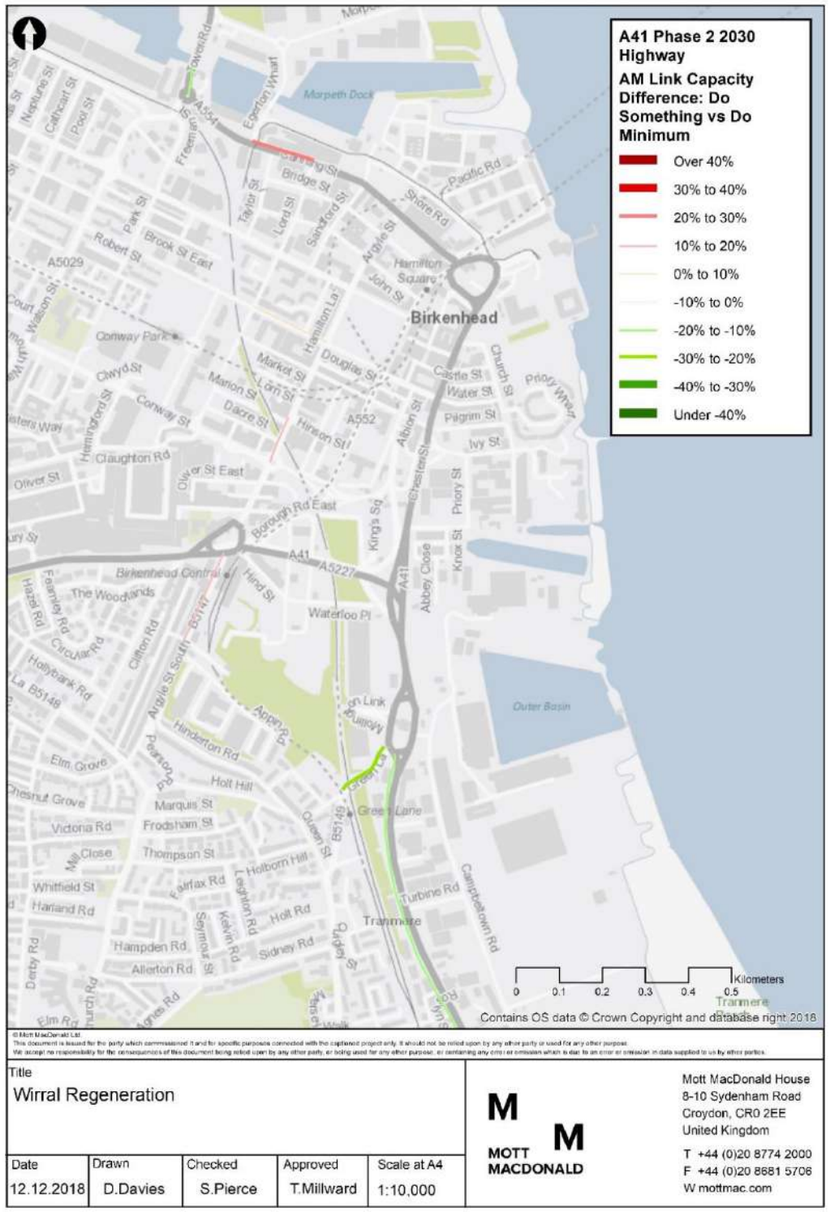
Several links across the town centre experience a reduction in performance with a V/C of between 85% and 100% in due to the prioritisation of public realm enhancements and the promotion of active travel schemes reducing junction capacity. The redesign of the Woodside Gyratory also creates some capacity issues due to a reduction in road capacity to enhance the public realm in the area, reduce severance and unlock new development land.

The results of the modelling exercise for the A41 North Corridor schemes shows local reassignment of trips only.

Figure 818: Do Minimum 2030 AM Links Over Capacity

Figure 19: A41 Phase 2 2030 AM Links Over Capacity

Figure 20: A41 North Corridor Phase 2 to Do Minimum 2030 AM: Changes in Link V/C (percentage point)



A more detailed account of the scheme coding and results from the A41 North Corridor modelling project is contained in the *Wirral Regeneration Modelling Report, Mott MacDonald (2019)*. This includes flow difference plots for the A41 North Corridor.

8.3 Transport Economic Assessment

An assessment of the transport economic benefits has been undertaken. Table 20 below contains a summary of the results from the modelling exercise for the A41 North Corridor Phase 2. Optimism bias of 44% has been applied to all scheme costs.

Table 20: A41 Phase 2 Results

Scheme	Present Value of Benefits	Present Value of Costs	Benefit Cost Ratio
A41 North Corridor Phase 2	-£26m	£28m	-0.9

All entries are present values discounted to 2010, in 2010 prices.

The benefit cost ratio (BCR) is -0.9. This is categorised as very poor value for money (VfM) in the Department for Transports VfM Framework[37]. However, this scheme is designed to aid the regeneration of Birkenhead town centre and unlock development land rather than being a congestion relief scheme. The high level capacity analysis show that the scheme does not cause substantial new issues. The poor BCR is a result of the introduction traffic signals adding delay, whereas in the Do Minimum there is no delay associated with the flyovers.

The previous section details the likely economic and social benefit of the A41 North Corridor schemes and highlights that there is significant potential for these schemes to contribute to a largescale regeneration of the town centre with associated economic and social benefits. As noted in that section, these benefits are not measurable using the traffic modelling tools available in this case, explaining the poor value for money result obtained.

8.4 Public Transport

8.4.1 Modelling Approach

All public transport schemes have been modelled using the public transport assignment module of the Liverpool City Region Transport Model (LCRTM) to take into account reassignment.

The modelling of public transport schemes includes both the Wirral Waters and A41 North Corridor public transport schemes as it is not possible to separate the schemes (rapid transit routes start at Wirral Waters and go through the A41 area).

Phase 1 includes reduced bus journey time at the exit of Queensway Tunnel due to the network reconfiguration introduced as part of the A41 North Corridor schemes. Bus services have been rerouted along Duke Street Bridge instead of Tower Road.

Phase 2 then introduces the rapid transit system around the East Float of Wirral Waters, the use of the former dock railway for rapid transit and improving bus access around Hamilton Square. The rapid transit system has been modelled as a bus for this high-level exercise, but this simplification is for modelling purposes only.

A full breakdown of the public transport schemes that have been modelled are contained in Table 21 below.

[37] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/630704/value-for-money-framework.pdf

Table 21: Public Transport Schemes

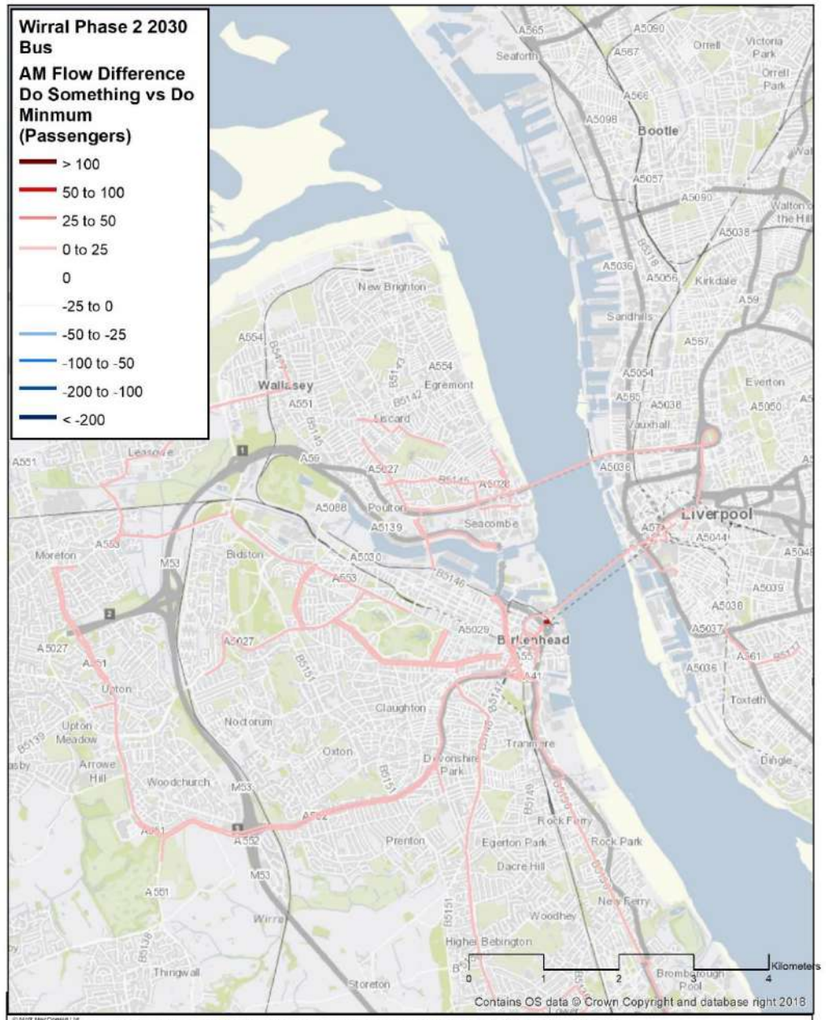
Phase	Scheme	Package Name	Drawing Reference
Phase 1	• Bus routes diverted via Wirral Waters (410, 411, 413, 423) • Reduced bus journey time at the exit of Queensway Tunnel	World-Class Public Transport	• N/A • N/A
Phase 2	• Hamilton Square two-way outside station	Regenerating Woodside and Hamilton Square	• 392148-MMD-00-XX-DR-C-0002 • 392148-MMD-00-XX-DR-C-0004 • 392148-MMD-00-XX-DR-C-0004A
	• Rapid Transit – East Float – Woodside – Birkenhead Central (10 minute frequency)	World-Class Public Transport	• N/A
	• Use of former Dock Railway for Rapid Transit	A41 Sustainable Connectivity	• 392148-MMD-00-XX-DR-C-0001 • 392148-MMD-00-XX-DR-C-0003 • 392148-MMD-00-XX-DR-C-0005

8.4.2 Results

The results from Phase 1 indicate that the reduced bus journey times at exit of Queensway Tunnel and the re-routeing of bus services along Duke Street Bridge instead of Tower Road has a negligible impact on patronage.

Figure 21 presents a passenger difference plot between Phase 2 and the Do Minimum for 2030 AM. This show some increase in bus patronage in the A41/Wirral Waters areas.

Figure 21: Phase 2 to Do Minimum 2030 AM: Bus Passenger Volume Differences



A more detailed account of the scheme coding and results from the modelling is contained in the *Wirral Regeneration Modelling Report, Mott MacDonald (2019)*.

8.4.3 Transport Economic Assessment

An assessment of the transport economic benefits has been undertaken. Table 22 below contains a summary of the results from the modelling exercise for Public Transport Phases 1 and 2. Optimism bias of 44% has been applied to all scheme costs.

Table 22: Public Transport Phase 1 and 2 Results

Scheme	Present Value of Benefits	Present Value of Costs	Benefit Cost Ratio
Phase 1	£11m	£0m*	-
Phase 2	£14m	£10m	1.4

All entries are present values discounted to 2010, in 2010 prices.
** Costs are included as part of the A41 scheme*

Phase 1 provides £11m of benefits largely due to the journey time savings at Queensway Tunnel exit. The cost associated with this is included in the highway assessment.

The benefit cost ratio (BCR) for Phase 2 is 1.4. According to DfT guidance this is categorised as low value for money. However, it is noted that the improvements are required to better link the A41 redevelopment zones with Birkenhead town centre and its transport hubs, and establishing high quality connections to Wirral Waters Enterprise Zone. Also, the public transport schemes incorporate significant walking and cycling improvements to also better connect the area to wider residential communities. respectively.

9 Funding Opportunities

A review of available funding sources for the implementation of schemes within the A41 North Corridor Study has been undertaken, including both short and long-term funding opportunities. Alongside a number of sub-regional funding streams, there is also an opportunity for Wirral Council and the Liverpool City Region Combined Authority to obtain funds from national funding streams such as the recent national allocation of £475m to major schemes. Working in conjunction with private developers and the planning system offers a further opportunity to raise funding for infrastructure that would be beneficial to both the Council and developers. This can include the Community Infrastructure Levy and Section 106 and 278 funding as well as other non-Government funding through working with charity groups such as Sustrans. It will be critical to get schemes developed to both attract interest and ensure a strong position for requesting funding from public sources.

9.1 Sub Regional Funding

9.1.1 Liverpool City Region Local Enterprise Partnership (LEP) & Local Growth Fund

The Liverpool City Region LEP works with Government to set out investment priorities for transport infrastructure at a regional and local level. LEPs play a key role in facilitating the devolution of transport decision making to local areas and are expected by Government to support sustainable economic growth in their engagement with local authorities and through funding bids.

The Local Growth Fund forms the Government's funding pot of at least £2 billion per year from 2015/16 to 2020/21. Through the Liverpool City Region LEPs submission of their Economic Strategy in July 2014, a £230 million Growth Fund was awarded for this period to unlock the region's economic potential. Within this fund a transport package totalling over £97 million was established, of which £51.6 million was allocated to enhancing the connectivity and attractiveness of the Liverpool City Region. The initial Growth Deal was expanded in January 2015 with a further £31.6 million of devolved funding granted to the LEP. Since then two further growth deals have been announced in March 2016 and January 2017. In total, the Liverpool City Region LEP have secured £336 million of Growth Deal funding from Government to date.

Ensuring efficient and futureproofed connectivity to the A41 North Corridor regeneration area will be key to unlocking the economic potential of both Wirral and the Liverpool City Region as a whole over the coming years. A great number of the schemes proposed in this study are thus well positioned to tap into this funding pot.

9.1.2 Liverpool City Region Sustainable Transport Enhancements Package (STEP)

The Liverpool City Region Sustainable Transport Enhancement Package (STEP) comprises a £41.4 million package of sustainable transport improvement measures to be delivered over a six-year period from 2015/16 to 2020/21. It was announced in July 2014 as part of the Growth Deal aimed to provide funds to LEPs for projects that benefit the local area. The STEP investments form a critical part of this Growth Plan, as well as the Liverpool City Region Strategic Economic Plan, and are shaped around four interrelated Strategic Packages of works, as indicated below in Figure 22.

Figure 22: STEP in the National and Regional Policy Context

Source: Mersey Travel, 2016

STEP is being delivered over two phases: Years 1-2 and Years 3-6. £13.8 million of capital funding was made available for Years 1-2 across 7 key growth zones. Within Years 1-2, a number of improvement schemes were funded in and around Birkenhead as part of Growth Zone 2 improvements. These schemes pulled in over £3 million of STEP funding, to deliver schemes such as access improvements, focusing on sustainable travel links, to be implemented along Poulton Swing Bridge and Duke Street Bridge as part of the Wirral Waters Eastern Portal project.

Further Investments for Years 3-6 have also been approved across the 7 growth zones. Again growth Zone 2, which encompasses the Mersey Waterfront, has secured £980,000 to enhance connectivity at a number of Wirral and Liverpool Waters destinations, including further improvements to walking and cycling links to key destinations. A further £3,002,000 has also been approved for Growth Zone 5 along the A41 North Corridor which will also facilitate improved accessibility to the Wirral Waters area.

Many of the schemes this study proposes, covering improved pedestrian, cycle and vehicular accessibility, align well with and would complement these established schemes. Due to the strong focus on sustainability imbedded in most of the proposed schemes, this funding package is set up well to support them. Most of this funding has, however, already been allocated and making use of any remaining funds available will require a quick turnaround by the applicant.

9.1.3 Single Investment Fund (SIF)

The SIF forms the key funding tool for the Liverpool City Region and addresses its strategic priorities. Over £458 million is being invested in the City Region through to March 2021 as part of the City Region's Devolution Agreement with the Government. This pot is made up from a number of sources including the Local Growth Fund and the funding secured through the Devolution Agreement.

9.1.4 Transforming Cities Fund

The £1.7 billion Transforming Cities Fund (TCF) was launched as part of the Industrial Strategy in the 2017 Autumn Budget. It supports ambitious and innovative transport projects that seek to increase productivity and reduce highway network congestion through delivering investment in active and sustainable modes. The investment also falls within the Government's £31 billion

National Productivity Investment Fund aimed at improving productivity, which is thought to be key to raising living standards.

The Transforming Cities Fund invited city regions across England to bid for funding from a £1.7 billion pot. In 2018 the first £840 million of the fund was allocated between six Mayoral Combined Authorities empowered to deliver schemes to facilitate better, safer and faster commuter journeys. Liverpool City Region was awarded £134 million in capital grant for local transport investment over a 4-year period. Funding is being awarded through Merseytravel, with recent awards to projects to develop business cases for a new Mersey Ferry and a smart ticketing solution for the LCR. Scheme 3 (City Boulevard) as well as our range of transit schemes represent good examples of preferred schemes within this work that are well placed to benefit from TCF funding going forward. Work beyond the scope of this commission should take place to secure development funding for these schemes from TCF.

9.2 Regional / National Funding

9.2.1 Transport for the North (TfN)

In November 2017 Transport for the North (TfN) became the UK's first statutory sub-national transport body. Backed with £260 million of government funding, TfN plan to transform transport across the North of England, providing the infrastructure needed to drive economic growth. By working alongside local transport authorities, TfN fund, promote and deliver transport-based projects. TfN published its draft Strategic Transport Plan for consultation in January 2018, in which it sets out the case for investment by 2050 to help transform the North's road, rail, sea and air connections to help drive long term economic growth. The larger road infrastructure-based improvement schemes as well as transit schemes detailed within this study have good potential to receive funding for early case making from TfN.

9.2.2 Road Investment Strategy

The first Road Investment Strategy (RIS 1) outlines a long-term funding programme for motorways and major roads. It comprises a multi-year investment plan that is being used to improve the network through high-level objectives for the first period from 2015 through to 2020. Over £15 billion was allocated to the first strategy which aims to enhance the strategic highway network, improving connectivity, journey times and road safety.

For the next Road Investment Strategy (RIS 2) for the period 2020 through to 2025, a grant of £25.3 billion has been allocated, significantly higher than the available funding through RIS1. will also be awarding significantly more than the £15 billion made available through RIS 1. The Department for Transport (DfT) will continue to work with Highways England, the Office for Road and Rail and stakeholders to ensure that RIS2 is a robust strategy and any opportunities for Wirral Council to feed into the RIS2 development process will help advance work against our major highways scheme.

9.2.3 Major Road Network (MRN)

As part of the Transport Investment Strategy announced in 2017, the government committed to creating a Major Road Network (MRN). Approximately 5,000 miles of 'A' road were brought into scope for extra funding from the National Roads Fund for upgrades and improvements. Through investment in the MRN, the government aims to reduce congestion and support economic growth, housing delivery and the strategic road network.

Local highways authorities are eligible for up to £100 million of government funding for successful bids to deliver investment in the MRN. Both the A41 and A59 are proposed to be included in the MRN. As such, the supporting road infrastructure projects proposed around the A41 North Corridor regeneration area are potentially eligible to benefit from this funding source.

9.2.4 Clean Air Fund

In March 2018 a package of funding worth over £260 million was launched by the Government to assist air quality improvements in some of England's most polluted areas. The investment package was launched on the back of the UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations released in July 2017, which outlined a need for councils with high levels of air pollution at busy road junctions and hotspots to take quick and robust action. Fulfilling a commitment to support local authorities to deliver these plans, the government launched the £220 million Clean Air Fund alongside a further £40 million from the £255 million Implementation Fund. The Implementation Fund was made available to councils in 2017 to accelerate the development of local clean air plans. Together these funds aim to support local authorities to take action to improve air quality and minimise the impact of Local Plans on individuals and businesses. The Clean Air Fund will be available from 2018 to 2021.

The Liverpool City Region was among the eight local authorities recently required by Government to carry out a detailed study to be submitted by the 31st October 2019, outlining how they will tackle air quality problems. The Government has ensured they will continue to provide funding, such as the funds received through the Clean Air Fund, to authorities. Many of the schemes proposed in this study, especially those related to active travel, could benefit from this funding as they will aid in the improvement of local air quality.

9.2.5 Air Quality Grant

The Air Quality Grant scheme facilitated by Defra provides additional funding to eligible local authorities to aid in the improvement of air quality. Since it was first made available in 1997 the scheme has awarded over £57 million in funding to a variety of projects. A total of £2,394,956 was given to successful projects in 2017/18, including a £450,000 investment into a cycling infrastructure and communications package project carried out by Portsmouth City Council. Each year applications must generally be received by the end of November to be considered for the following year's grants.

9.2.6 Cycling and Walking to Work Fund

In January 2017 the Government announced a £64 million investment fund to help encourage more people to cycle and walk to work. The funding, that will support local projects over three years from 2017 to 2020, forms part of a wider government package of more than £300 million to boost walking and cycling during the current parliament.

All English transport authorities were invited to bid for the £60 million Sustainable Travel Access Fund of which 25 authorities received a share. The remaining £3.8 million formed the Cycling and Walking to Work Fund to be invested in three City Regions over the 2017-18 period to connect people with employment and apprenticeships. Liverpool City Region was awarded £770,000 to be invested over the 2017-2018 period. Applications for this round of funding closed in March 2018, however, the active travel packages proposed within this study will have great potential to receive support from similar funding rounds in the coming years.

9.2.7 Large Local Majors Fund

The Large Local Majors Fund was announced in 2016 as part of the £12 billion Local Growth Fund. It forms a competitive process for LEPs in which funding can be provided for exceptionally large, potentially transformative, local schemes. The initial fund of £475 million

was made available for projects up to 2021. This funding pot became fully allocated in 2018, however, the Government recently awarded a further £173 million to three road schemes in Devon, East Riding of Yorkshire and Leicester, which took the total funding pledged through the fund to £603 million. Through this the Government have shown continued commitment to fund projects through to 2021, reinforcing the Large Local Majors Fund as a potential source of funding for schemes proposed within this study.

9.2.8 Town Centre Fund

Specifically, regarding the LCR. £5m - £1m per district with a town centre for the five districts excluding Liverpool.

It is understood that it is the town (or the district on its behalf) which applies for funding through the City Region Town Centre Commission, which is a new body. Districts choose which of their towns they would like to put forward. The types of eligible scheme that it could be used for includes: restructuring retail, business space, public sector hubs, event venues and cultural offers. Implies each of the five districts can have £1m, it's not a competition between them, but they have to make case for where the funding will be implemented.

9.2.9 Future High Street Fund

Nationally announced in October 2018 budget. £675m available altogether spread out around the country.

Applications to it require a supporting vision document for the town centre. It will fund physical infrastructure to support residential and employment developments, and support existing local communities and the regeneration of heritage high streets. The aim is to support regeneration of high streets and adaptation to consumer trends/demands. Exact application process is yet to be confirmed, but full prospectus will be launched 'later this year' detailing the objectives of the fund, further detail on nature of projects eligible, and assessment criteria. The process will also include a High Street Taskforce to support scheme development. In addition, the process will need to demonstrate how specific scheme supports overall vision for town/city high street, and will be assessed according to Value for Money and deliverability, strategic fit etc.

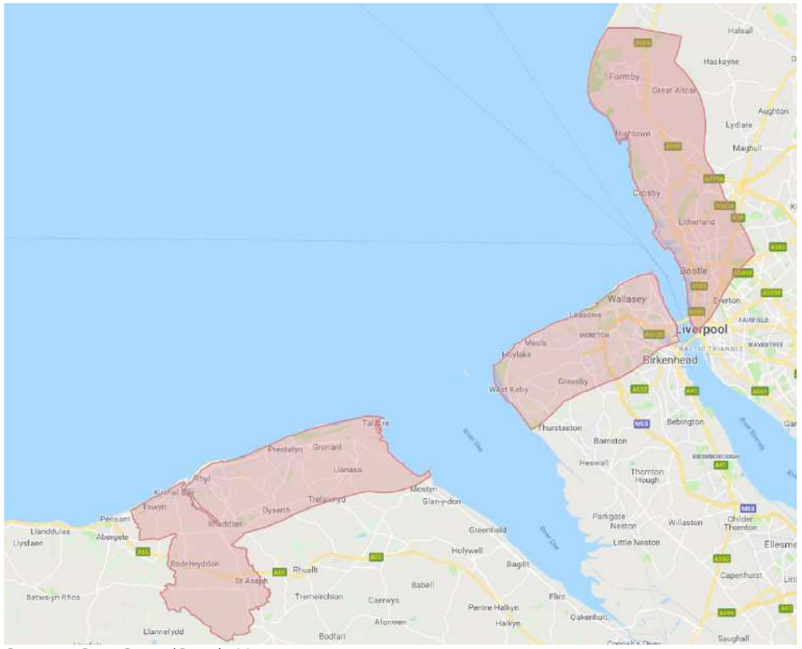
9.3 Non-Government Funding

In recent years, the use of non-Government funding for local and major transport schemes has become increasingly important as the DfT has sought to reduce its spending. This section details a number of funding arrangements and agreements that Wirral Council and the Liverpool City Region Combined Authority could take advantage of to finance packages within this study. Where new developments require enhancements to the local transport network and other infrastructure, planning obligations will be sought by local authorities to fund the necessary works.

9.3.1 Community Benefit Fund

The Community Benefit Fund is used to support community and environmental projects in coastal areas which host major wind energy projects. Ørsted (formerly DONG Energy) are providing grants as part of the community support associated with their extension project for their Burbo Bank wind farm, off the coast of Wirral. Approximately £225,000 is being made available for community projects that will benefit the local area throughout the expected 25-year lifetime of the wind farm. The fund launched in 2015 to all community organisations located coastally in Denbighshire, Flintshire, Wirral and Sefton, as demonstrated in Figure 23. The fund is managed by GrantScape and applications can be made for individual grants of between £500 and £25,000. For each year that the fund is open, two application rounds are available. The next application closing date is on 3rd April 2019 and decisions on successful grants will be announced approximately 3 months after each closing date.

Figure 23: Burbo Bank Community Fund (Funding Area)



Source: GrantScape/Google Maps

9.3.2 Community Infrastructure Levy (CIL)

Larger scale infrastructure which is identified as being required through the Council's Infrastructure Delivery Plan can be funded through the Community Infrastructure Levy. The levy is paid by land owners and developers to the relevant local council, with charges based on the size and type of new development. Money raised can then be spent in line with council priorities and needs. Wirral Council has not yet made a decision on whether to introduce a levy in Wirral , with further consideration required to explore the feasibility and viability of introducing a CIL for Wirral.

9.3.3 Section 106 and 278 Funding

Section 106 and 278 agreements negotiated with developers allow funds to be raised to mitigate the potentially negative impacts of new developments. Typically, section 106 and 278 agreements include requirements to make contributions to new infrastructure in the vicinity of the development. In some cases, sums of money from a number of arrangements can be put towards larger mitigation measures. Therefore, section 106 and 278 agreements provide an opportunity to use funds raised to build up a pot of money to deliver identified and prioritised schemes.

9.3.4 Private Business/Employers

Beyond section 106 and 278 contributions, developers and private investors should also contribute to the delivery of the strategy through schemes that enhance the individual development as well as providing an upgrade to the general setting of Wirral.

9.3.5 Charities and Voluntary Groups

Within the promotion, funding and delivery of schemes, Wirral Council could take advantage of the interest and expertise that charities and voluntary groups have in relation to transport. Sustrans, a charity concerned with promoting everyday travel by foot, bike and public transport, could help to promote a number of schemes within the A41 North Corridor Study, which encompass active travel-based improvements. In 2014/15, Sustrans delivered £41.6m of projects and have worked on the design and construction of cycling facilities in a number of locations including Bristol, Edinburgh and Newcastle. As such, Sustrans are well positioned to provide funding towards the multitude of active travel and public transport-based improvement schemes proposed within this study. For instance, the Birkenhead Streetscape package encompassing Phase 1 schemes 16-23 proposes a number of physical pedestrian and cycle infrastructure additions which mirror previous schemes Sustrans has financed.

10 Conclusions and Next Steps

10.1 Conclusions

Following on from previous reports in the suite of documents associated with Wirral Regeneration Schemes, including Wirral Strategic Transport Framework Action Plan (2019), and A41 North Corridor Study Baseline and Options Appraisal Reports (2018), this document presents the preferred set of schemes identified for the A41 North Corridor regeneration area. The various sites involved (including Woodside, Hind Street and links into Birkenhead Town Centre) present a clear opportunity for largescale regeneration with Woodside providing some of the best urban views and accessibility with the Liverpool City Region, and Hind Street exhibiting significant potential as an exemplar zone of industrial regeneration. It is clear that it is not enough to simply develop the area with mixed-use residential and commercial opportunities since the transport infrastructure serving the area is currently unsuitable for a large scale increase in movements to and from the area each day.

As a result, this document proposes a series of schemes packaged and phased into three timescales for delivery. These schemes are aimed at resolving existing constraints and issues within the wider transport network, reducing the severance caused by the existing road network including the system of flyovers and underpasses, and improving public transport networks serving the A41 area, better tying the development zone into the wider context within Birkenhead and the wider Wirral borough, and significantly improving conditions for pedestrians and cyclists.

It is recognised that the transport strategy for the A41 North Corridor regeneration area will need to multi-modal in nature if existing issues of congestion, air quality and severance are to be tackled effectively. To this end, and building upon the work undertaken by Peel on the Wirral Streetcar project, to link Wirral Waters with Woodside and Hamilton Square, we propose a comprehensive transit network (which could be formed of one of a variety of available mode types as detailed in this document, or even a combination of these). The network is designed to support and tie into the existing Merseyrail and bus networks to provide seamless multi-modal travel via an off-street alignment between Birkenhead Central and Wirral Waters via the town centre and civic hub development. Ultimately the system is proposed to extend north towards New Brighton via Seacombe and west to Liverpool City Centre, with possible future extensions including southern links towards Rock Ferry. The system will provide high quality and frequent public transport to the heart of the A41 North Corridor regeneration area and will provide residents and users with a true choice of modes.

The document has discussed the economic and social impact of the transport interventions in the area, noting the gross number of jobs, residents and GVA growth that will be supported by the project. In this way it may be seen that the measures to improve active travel and quality of place such as the walking, cycling and public realm schemes, have an important role to play in the overall economic benefit of the strategy. Traffic and public transport modelling tools were then used to determine the benefit of the more traditionally measurable components and determined that, when all phases are taken into account, the interventions proposed are likely to offer sound value for money even without the impact of the non-measurable (at this level of detail) components.

Finally, some initial thought has been given within this document to the potential future funding mechanisms for the schemes proposed. Given the widely varying size and scale of the interventions, and the different bodies with which they must interface, it is likely that a mixture of multiple potential funding sources is the most likely outcome for delivering the individual elements with some of the most strategic and impactful likely to be delivered via the devolved major scheme process (Local Growth Fund) at a City Region Level. Conversely some of the smaller scale interventions could be delivered through new opportunities such as those provided by the Town Centre or Local High Street funds, or non-Governmental funding mechanisms such as the Community Benefit Fund. Given the fact that the transport schemes support local development so strongly it is also likely that a substantial proportion of the ultimate funding package will come from local developer contributions either through the established S106/278 mechanisms or a future Community Infrastructure Levy.

It should be noted that the A41 North Corridor and Wirral Waters Transport Feasibility Studies have been designed to function as complete packages of work. As a result they should not be considered in isolation from each other, just as the individual schemes contained within should not be seen in isolation from the other components of the respective strategies.

To sum up, this is an exciting time for Birkenhead and the A41 North Corridor regeneration area will form part of a rejuvenated and regenerated wider Birkenhead and Wirral borough, for the benefit of its existing and future residents, employees and users. The challenge is to ensure that the significant level of aspiration for the area is matched by the short and medium term delivery of vital, efficient and effective transport solutions to create a truly multi-modal and sustainable network in which choice is provided to the benefit of all.

10.2 Next Steps

Following the publication of this report, the transport strategy for the A41 North Corridor will need to be progressed in the following ways:

- Further consultation with cabinet members within Wirral Council and leadership within Liverpool City Region to ensure buy-in and support at the highest level of decision making within the borough and wider city region;
- Further consultation with key stakeholders to disseminate the findings of the study, gain feedback and refine the results and scheme development;
- Identification of funding for further development, detailed design and delivery of the core scheme components via a variety of sources – the key schemes contained within packages as reported in the recent Strategic Transport Framework Action Plan report are in the process of being submitted to Liverpool City Region for consideration within their own scheme pipeline process;
- Development of Business Cases for the key components of the strategy (or the strategy as a whole if this is deemed appropriate) to test and prove value for money. This will form a key aspect of application for funding and is a requirement for national or regional funding mechanisms;
- Delivery of the schemes in phases as envisaged over the next ten to fifteen years to coincide with the build-out of Woodside and Hind Street, and the wider Birkenhead Town Centre regeneration.

Appendices

A. Transit Options Review

This section provides a review of potential public transport options to operate on the proposed Wirral Waters transit scheme. As will be seen, the options include vehicles which run on dedicated infrastructure, and vehicles which would mix with general traffic.

A.2 Other Streetcars

Figure 1: Streetcars

Source: Wikimedia

Streetcar routes operate on street tracks shared with other vehicles. Streetcars stop on demand at frequent stops like buses and provide a crucial role in providing frequent, reliable transport.

A.2.1 Case study: Toronto Streetcar

- Location: Toronto
- Population: 2,732,000
- Population Density: 4,334 p/km2
- Cost Per Streetcar: £2.5 million
- Frequency: 4-9 minutes
- Length of Track: 83 km
- Track Gauge: 1495 mm
- Minimum Radius of Curvature: 10.973 meters
- Electrification: Trolley Wire 600 V DC
- No. of Streetcars: 264+
- No. of Stops: 685
- No. of Lines: 11
- No. of daily rides: 292,000 passengers
- Dimensions: 30.2 meters long, 2.4 meters wide and 3.84 meters high
- Capacity: 250 (70 seated, 150 standing)
- Speed: maximum 43 mph
- Driven: Driver
- Power: Electricity

Advantages

- These streetcars have a smaller minimum radius of curvature than other methods of transport discussed, this would be ideal for use in the Wirral as there is restricted space.
- High capacity compared to other methods of transit discussed, this would be good in the later stages in the redevelopment.

Disadvantages

- The cost is considerably higher than the proposed Wirral Streetcar
- It would be more difficult to expand than other methods discussed as new tracks would have to be implemented.

Table 1 <Streetcar>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.3 Electric Trolleybus

Figure 2: Electric Trolleybus

Source: Wikimedia

Electric trolleybuses are rubber-tired vehicles powered by electricity from overhead using spring-loaded trolley poles, this means there is no need to stop to refuel or recharge. Being solely powered by electricity, trolleybuses have extremely low emissions.

Modern trolley buses also have a battery which allows them to travel off-wire and reroute around anything obstruction blocking their path, or detour for short sections of route.

A.3.1 Case study: San Francisco Muni

- Location: San Francisco
- Population: 884,400
- Population Density 7,132 p/km2
- Cost Per Trolleybus: £300,000 - £1 million depending on age and specification
- Frequency: 20 minutes
- No. of Trolleybuses: 268
- No. of Stops: 142
- No. of Lines: 16
- Dimensions: 12-25 meters long and 2.55 meters wide
- Capacity: 82-200 passengers
- Speed: maximum speed 50 mph, average speed 38 mph
- Driven: Driver
- Power: Electricity

Advantages

- The trolleybus is significantly quieter than an original diesel bus which could be more suitable in residential areas.
- If there is an obstruction in its normal path, it can drive off wire for a period of time to manoeuvre around the obstruction, unlike streetcars or trams that operate on fixed tracks.

Disadvantages

- They are less manoeuvrable than traditional buses.
- Other forms of transport are easier to adjust or expand as overhead wires would have to be added or amended.

Table 2 <Electric Trolleybus>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.4 Light Rapid Transit

Figure 3: Light Rapid Transit – DLR & Manchester Metrolink

Source: Wikimedia & geograph.org.uk

Light rail systems are guided by tracks and most have overhead lines supply the electricity. The exception to this is The Docklands Light Railway in London as this uses an inverted third rail for its electrical power which allows the electrified rail to be covered and the power drawn from the underside. Trams in Bordeaux, France use a special third-rail configuration where the power is only switched on beneath the trams as the vehicle passes, making it safe to use on city streets.

Light rail systems provide easy access to city centres as they can run right up to pedestrianised areas, this provides a very attractive alternative to driving in busy areas.

A.4.1 Case study: The Docklands Light Rail

- Location: London
- Population: 150,000
- Population Density: 5,285 p/km2

- Cost Per km: The average in Europe is between £9 million - £12 million
- Frequency: 10 minutes
- Length of track: 38km
- Track Gauge: 1435 mm
- Minimum Radius of Curvature: 40 meters
- Electrification: 750 V DC third rail
- No. of Trains: 149
- No. of Stops: 45
- No. of Lines: 7
- No. of daily Rides: 340,000 passengers
- Dimensions: Train consists of 2 or 3 cars and dimensions are 2.65m wide and 56-84m long
- Capacity: 278 per car
- Speed: Maximum 65 mph and an average 50mph
- Driven: Autonomous
- Power: Electricity

Advantages

- Autonomous, this could reduce costs as no drivers are needed, the system could run for longer periods to satisfy demand.
- Higher speed than most other forms of transport discussed, gets the passengers to their desired destination much quicker.

Disadvantages

- Minimum radius of curvature is 40 meters which would make this type of system very difficult to implement in the Wirral.
- Very expensive compared to other forms of transport.

Table 3 <LRT – Docklands Light Rail>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.4.2 Case study: Manchester Metrolink

Figure 4: Manchester Metrolink

Source: Wikimedia

Manchester's Metrolink has more than doubled the number of passenger journeys from 19.2 million journeys in the 2010/2011 fiscal year to 41.2 million passenger journeys in 2017/2018 fiscal year. It achieves 89.3% of trams departing less than 2 minutes late and 98.9% of planned miles operated. It has step-free access for wheelchair-users, free Wi-Fi and provides a useful app that includes real time data, line status, planned improvements and much more to enhance passenger satisfaction.

- Location: Manchester
- Population: 545,500
- Population Density: 9,689 p/km2
- Frequency: 12 minutes
- Length of track: 100 km
- Track Gauge: 1435 mm
- Minimum Radius of Curvature: 25 meters
- Electrification: Overhead line 750 V DC
- No. of Trains: 147
- No. of Stops: 93
- No. of Lines: 7
- No. of Daily Rides: 113,187
- Dimensions: 28.4 meters long
- Capacity: 212
- Speed: Maximum speed 50 mph
- Driven: Driver
- Power: Electricity

Advantages

- Increasing passenger satisfaction by introducing a useful app and free Wi-Fi
- Could make passengers journeys through the Wirral very short in comparison to other forms of transport.

Disadvantages

- Very expensive compared to other systems discussed and this system is only worthwhile if there is a high demand that would be travelling using it frequently.

Table 4 <LRT – Manchester Metrolink>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.5 Personal Rapid Transit

PRT is a concept based on driverless vehicles which operate on a segregated track, travelling from point to point rather than using a fixed route. These vehicles are typically lightweight and battery powered which means that any necessary structures are much cheaper than those for a conventional transit system, and that emissions at point of use are virtually zero. If clean energy sources can be used to generate electricity, then such systems can be effectively carbon-neutral.

A.5.1 Case study: Heathrow PRT System

Figure 5: PRT-Heathrow

Source: Wikimedia & Mott MacDonald

- Location: Heathrow, London
- Cost per Km: £5.4 million - £11.5 million
- Planning & Capital Cost: £25 million
- Frequency: 0 -15 seconds
- Length of track: 3.8km
- No. of Pods: 21
- No. of Stops: 3
- No. of Lines: 1
- Dimensions: 4 meters wide, 1.8 meters high
- Capacity: 4
- Speed: 25 mph
- Driven: fully autonomous
- Power: Electric motor & 4 batteries

Advantages

- The headway can be less than 15 seconds which is much more frequent than any other type of transport.
- Passengers do not have to share pods, making the mode more attractive to users.
- Very small dimensions, there does not need to be lots of free space to implement this system.
- They are fully autonomous, reduced costs as no drivers are needed.

Disadvantages

- The capacity is usually only around 4 passengers per pod which means a high number of pods would be needed to satisfy total demand.
- They travel at 25 mph, this could make some journeys very long and could be completed by other forms of transport much quicker.

Table 5 <PRT – Heathrow>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.5.2 Case study: Morgantown

Figure 6: PRT- Morgantown

Source: Wikimedia

- Location: West Virginia USA
- Population: 30,855
- Population Density: 1,181 p/km2
- Planning & Capital Cost: around $120 million
- Frequency: 5 minutes
- Length of track: 5.8km
- Track Gauge: Concrete guideway
- No. of Pods: 71
- No. of Stops: 5
- No. of Lines: 1
- No. of Daily Rides: 15,000
- Dimensions: 4.72 meters long, 2.03 meters wide and 2.67 meters high
- Capacity: 20
- Speed: 30 mph
- Driven: Pods are autonomous but are monitored in a control centre
- Power: Electric

Advantages

- The units travel directly to the desired destination with no stops.
- The capacity is much higher per pod than the previous PRT system discussed.

Disadvantages

- It would be difficult to expand or change the track if flexibility is needed.

Table 6 <PRT – Morgantown>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.6 Demand Responsive Transport (DRT)

Figure 7: Arrivaclick

Source: BBC & PJB

DRT systems such as Arrivaclick combine the convenience of a taxi with the price of a bus ticket. Arrivaclick is a minibus service that picks multiple passengers all heading in the same direction and gets them to their desired location. It is ordered via an app where you enter your pick up ad drop off point and Arriva plan the rest.

A.6.1 Case study: Arrivaclick

- Location: Liverpool
- Population: 489,421
- Population Density: 3,889 p/km^2
- Cost Per Minibus: Around £30,000
- Frequency: Depends on availability
- Capacity:15
- No. of Minibuses: 6 currently but expanding to 25 mid 2019
- No. of Stops: Passengers can be picked up and dropped off anywhere
- No. of daily Rides: 186 in week 34 of operation
- Driven: Driver
- Power: Diesel

Advantages

- There is no construction cost, only the cost of the vehicles, drivers, software development and maintenance
- Provides a quick and easy service for passengers

- Would be very easy to change routes if necessary

Disadvantages

- Only has a capacity of 15, requiring large numbers of units to satisfy total demand.
- Reliability is dependent on availability and during peak times users may not be able to find a local available mini bus
- There is a need to further develop algorithms and software if the system is to be expanded to include Wirral
- Customers will need access to the app via smartphone or tablet. Some older people may not have access and these this could lead to them being unable to access the service

Table 7 <Arrivaclick>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.7 Tram bus

A tram bus is a tram on pneumatic tyres instead of tracks. The tram bus must have its own infrastructure to reach a good operating speed. What makes the tram bus so unique is that it combines the efficiency and stability of a tram with the flexibility of a bus. The tram bus has a much larger capacity compared to a traditional bus and can also run as an electric or hybrid vehicle, making it even more environmentally-friendly.

A.7.1 Case Study: Malmo Sweden

Figure 8: Skanetrafiken Tram bus

Source: Wikimedia, YouTube - MediaServiceTV1

- Location: Malmö, Sweden
- Population: 341,457
- Population Density: 2,175 p/km^2
- Cost of Buses: approximately £650,000, based on 30 being bought for £19million
- Frequency: 5 minutes
- Length of Route:
- No. of Buses: 15
- No. of Stops: 40
- No. of Lines: 1
- No. of Daily Rides: estimated 13,700 -21,000
- Dimensions: 24 meters long
- Capacity: 55 seated with 95 standing
- Driven: Driven
- Power: Compressed Natural Gas (other options available)

Advantages

- There is little construction cost, primarily only the cost of the vehicles.
- Routes can easily be changed or extended.

Disadvantages

- Much higher capacity than possibly required in the case of Wirral Waters.
- Would need trained drivers and would not be able to rely on volunteers as the Wirral street car proposes to do.

Table 8 <Tram buses>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.8 Bus Rapid Transit

Bus Rapid Transit is a form of rapid transit which involves stretches of highway being segregated and dedicated for the use of specialist buses. Where this is not possible due to land constraints, the specialist buses will use public highways. When using public highways, the buses will typically be given priority over other road users to reduce delays. Station platforms should be level with the bus floor for quick and easy boarding, making the system fully accessible for wheelchairs and disabled passengers with minimal delays.

A.8.1 Case study: BRT Sunway Line

Figure 9: BRT – Sunway Line

Source: Wikimedia

- Location: Subang Jaya, Malaysia
- Population: 6,071,644
- Population Density: 6,581 p/km^2
- Cost of Buses: £3.3million for 8 double deckers and 6 larger single deckers in York
- Planning & Capital Cost: £24.5 million
- Frequency: 4 minutes
- Length of track: 5.4 km
- No. of Buses: 15
- No. of Stops: 5
- No. of Lines: 1
- No. of daily Rides: 5,300 passengers
- Dimensions: 11-12 meters long
- Capacity: 80
- Speed: 50 mph
- Driven: Driven
- Power: Electric,

Advantages

- Electric Buses mean virtually zero emissions
- Faster than some other methods of transport discussed

Disadvantages

- High capital cost compared to the Wirral streetcar

Table 9 <Electric BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	

Criteria	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.8.2 Case study: New York BRT

Figure 10: BRT – New York

Source: nyc.streetsblog.org and nyc.gov

- Location: New York
- Population: 8,538,000
- Population Density: 10,630 p/km^2
- Cost p/km: $1,072,000
- Frequency: 3-4 minutes
- Length of track: 90 km
- No. of Buses: 398
- No. of Stops: 145
- No. of Lines: 7
- No. of daily Rides: 245,566
- Dimensions: 11-12 meters long
- Capacity: 120
- Average Speed: 10.2 mph (average speed including stopping time)
- Driven: Driven
- Power: Hybrid & CNG

Advantages

- High frequency and capacity which means it would be more reliable than just having one streetcar every 15 minutes.

Disadvantages

- The vehicles only travel at 10mph on average making journeys even longer than using other methods of transport
- Hybrid engines are not as eco-friendly as other methods of transport discussed.

Table 10 <Hybrid BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.8.3 Case Study: Cambridgeshire Guided Busway

Figure 11: Cambridgeshire Guided Busway

Source: Geograph & Flickr

- Location: Cambridge
- Population: 123,867
- Population Density: 3,135 p/km^2
- Cost p/km: Bronze average £7,400,000
- Frequency: 5 minutes
- Length of track: 40 km
- No. of Stops: 8
- No. of Lines: 1
- No. of daily Rides: 12,000
- Dimensions: 11-12 meters long
- Capacity: 120
- Average Speed: 37mph
- Driven: Driven and Kerb guidance
- Power: Diesel

Advantages

- Provides faster transport than other methods discussed
- Has 25km of segregated busway that is specifically for these buses which limits the impact of traffic disruption

Disadvantages

- The buses are powered by diesel and will produce the highest amount of emissions compared to other methods discussed.

Table 11 <Diesel BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.8.4 Guidance Systems

Driven

Driven vehicles are the most common types of BRT system. These requires large numbers of drivers to be on a rotation and the system is therefore prone to human error. Driven vehicles could cost more than autonomous vehicles as there must be sufficient drivers and cover staff available.

Semi-Autonomous

Figure 12: Mercedes Semi-Autonomous Future Bus

Source: Caradvise & Mashable

Semi-autonomous vehicles are capable of letting the driver take their hands of the wheel and feet of the pedals by using a range of sensors and mapping systems. They still require a driver to be present and paying full attention however. An infrared camera is mounted onto the

steering column to keep a track of where the driver is looking, if the driver looks away for too long a light in the steering bar will flash red and the driver's seat will vibrate.

Fully Autonomous

There are 8 main sensors that are required for a fully autonomous vehicle to operate safely. This includes Lidar: a camera that uses lasers to measure the distance to objects to build up a 3D letting the vehicle know if there is a hazard. The second is a standard camera that points through the windscreen, this is used to spot hazards like pedestrians and reads road signs and traffic light signals. There are also radar sensors dotted around the bus to monitor the position of vehicles and a rear-mounted aerial that receives information from GPS and an ultrasonic sensor that monitors the vehicles movements. The others include altimeters, gyroscopes and a tachometer to provide more accurate measurements on the cars location.

Kerb Guidance

Figure 13: Kerb Guidance

Source: Flickr and Londonguidedbusway.co.uk

Kerb-guided buses (KGB) have got small guide wheels attached to the bus to engage vertical kerbs on either side of the guideway. These guide wheels push the steering mechanism of the bus, keeping it centralised on the track. When the bus is not on a designated guideway, the bus is steered like an ordinary bus. The start of the guideway is funnelled from a wide track to guideway width. This system permits high-speed operation on a narrow guideway and precise positioning at boarding platforms, facilitating access for the elderly and disabled. Guide wheels can be attached and removed from almost any bus and this therefore is an adaptable system that can be easily changed.

Optical Guidance

Figure 14: Optical Guidance

Source: Wikimedia

A system of lines is applied to the roadway to guide vehicles, this is done by the use of modern cameras and image processing systems that detect the lines and keep the vehicle safe by precisely following the specified route. Other sensors would be used alongside this system to ensure that the vehicle is safe in respect to its surroundings such as in relation to other vehicles or hazards such as pedestrians. The latest technology offers the ability to recognize coded tracks or optical markers.

B. Economic and Social Impact Summary Table

Issue and Revision Record

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01	Feb 19	CR	NO / DC	CH	First Issue
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Contents

1 Introduction

Mott MacDonald have been commissioned by Wirral Council to develop phased packages of transport improvements to help aid the regeneration of Birkenhead and the surrounding areas.

Birkenhead is at the forefront of Wirral Council's efforts to stimulate new economic and social development, and there is a growing momentum for this positive change to happen in and around the town. The planning for significant redevelopment is progressing – in particular:

- The Wirral Growth Company's plans for a mixed-use development centred on Europa Boulevard and Conway Park rail station. Bringing forward a new employment zone and reconfiguring and improving the retail offer on the north side of the town centre including plans for Birkenhead Market;
- The Woodside area which has considerable potential for another mixed-use development with excellent views of the Liverpool waterfront, and links back to Hamilton Square and the town centre. Masterplanning is at an early stage, but the land-use focus could be more upon residential, leisure and tourism, with the unique feature of the Mersey Ferry terminal as a key focus; and
- Land south of Birkenhead (Hind Street) - This area is likely to become a major mixed-use development bringing new housing and jobs and improving the permeability of the south side of the town.

In addition, just to the north east of the town centre is Wirral Waters- part of the Mersey Waters Enterprise Zone and the subject of another transport feasibility study. This, in turn, is increasing in momentum with early phases of new development complete, and the next phases in the advanced stages of planning and expected to be on-site in the near future. Birkenhead and surrounding areas are therefore very likely to experience a dramatic increase in activity with new employment areas, places to live and places of entertainment.

This study is targeted at helping to realise a reconfiguration of Birkenhead's transport system, with a particular emphasis on facilitating access into the area by more sustainable modes, and removing significant barriers to movement. Following consultation with multiple partners and stakeholders, and with reference to the 'A41 North Corridor Study – Options Identification, Appraisal and Selection' report', the long list of potential improvement schemes was reviewed to identify the preferred schemes. These schemes are described in detail in this report which should be read in conjunction with the **'A41 North Corridor Study: Preferred Options Scheme Drawings'** report issued in October 2018. The schemes have been grouped into packages of works for three main phases, as summarised below, with further details in the following sections.

1.1 Summary of Schemes, Packaging and Phasing

Phase 1 schemes are anticipated for delivery between 0-5 years of the publication of the final strategy. These schemes are as follows:

- **Phase 1 Schemes:**
  - Wirral Rail Line Enhancements
    - Station facilities and waiting environment enhancements
    - Wirral line park and ride enhancements
    - Green Lane station refurbishment
    - Birkenhead Central station: new forecourt and eastern access route
    - Improvements to bus infrastructure at Birkenhead Park and Conway Park stations
    - Hamilton Square station bus / rail interchange improvements
    - Birkenhead North station bus / rail interchange improvements
    - Birkenhead Central stations bus / rail interchange improvements
  - Birkenhead Town Centre Gateways
    - A41 Chester Road / A552 Borough Road highway realignment (Phase 1)
    - A41 Chester Road / Ivy Street junction improvement
    - Signage improvement to Birkenhead Priory
    - Electric charging points across borough
    - Signage and better entrance to retail core
    - Birkenhead local access road improvements
    - Road safety improvements at Whetstone Lane / Borough Road
  - Birkenhead Town Centre Streetscape
    - Improved public realm in retail core
    - Improved public realm Argyle Street
    - Cleveland Street / Market Street / Price Street public realm
    - Improved public realm Conway Street
    - Improved pedestrian crossing facilities along Argyle Street
    - Conway Park station and Birkenhead Market improved pedestrian route
    - Improved public realm Conway Park and Europa Boulevard
  - Regenerating Woodside and Hamilton Square
    - Hamilton Square and Hamilton Street improvements
  - World Class Public Transport
    - Relocation of Birkenhead bus station
  - A41 Site Access Improvements
    - A41 site access improvements Phase 1
- **Phase 2 Schemes**
  - Birkenhead Town Centre Streetscape
    - A41 Chester Road / A552 Borough Road highway realignment (Phase 2)
    - Pedestrian overbridge of Borough Road at Whetstone Lane
  - Regenerating Woodside and Hamilton Square
    - Access road to Rosebrae development site
  - A41 Site Access Improvements
    - A41 site access improvements Phase 2
  - A41 Sustainable Connectivity
    - Birkenhead Green Corridor
    - Riverside Green Link
- Phase 3 Schemes
  - Cross River Strategy
    - Queensway Tunnel

- Scheme 2: Wirral Line Connectivity

1.2 Document Structure

Following this introductory section, the report is structured into the following sections:

- Sections 2 – 4 respectively present details of the preferred options which have been packaged into three overall phases of implementation. Each scheme has been provided with an outline budget cost, and for many schemes a concept design has also been developed. However, many of the schemes have a variety of design solutions (such as public realm improvements), and will therefore be subject to more detailed design and costing as the improvement packages move forward;
- Section 5 presents a general risk register for the delivery of the schemes as a whole;
- Section 6 provides a review of the various options available for the transit mode referred to in the scheme identification;
- Section 7 presents a review of likely social and economic impacts of the schemes, in particular those not modellable at this level by the traffic modelling tools discussed in Section 8;
- Section 8 presents an assessment of the likely traffic impact of the schemes utilising Wirral and Merseyside strategic traffic models. Interestingly, many parts of Birkenhead have an oversupply of highway capacity – which may be considered a part of the existing baseline issue in the town as it creates barriers to pedestrian and cycle movement and access for new development. However removing the oversupply can have a negative impact on traffic capacity, and the impact of this is discussed in this section;
- Section 9 provides a discussion on funding opportunities to help bring forward the schemes; and
- Section 10 provides final conclusions in relation to the study and notes the next steps on the road to delivery.

This A41 North Corridor Study has been prepared in parallel to a similar study to help bring forward development at Wirral Waters. In part, the improvement schemes have been designed to work in coordination between the two redevelopment areas so that transport benefits can be maximised.

2 Preferred Schemes and Phasing: Phase 1

This chapter provides a summary of the details of the schemes suggested to be included in the first phase of the A41 North Corridor Transport Strategy. The section includes a description of the scheme, potential risks directly associated with the particular scheme, and a budget estimate for the delivery of the scheme. This section is to be read alongside the earlier report 'A41 North Corridor Study: Preferred Options Scheme Drawings' issued in October 2018.

2.1 Wirral Line Enhancements

This package will introduce several measures that will enhance the Wirral Line - part of the Merseyrail network. The schemes proposed will enhance station facilities and accessibility, provide Park & Ride opportunities, and foster greater interchange with other public transport modes. The aims of this package will be to raise rail patronage along the Merseyrail network and consequently reduce car usage within Wirral, particularly along the A41 North Corridor. This will be achieved through increasing the attractiveness of rail travel, by delivering an improved standard of service along the Wirral Line. It should be noted that from 2020 there will be new state of the art rolling stock on the Merseyrail network which will bring benefits such as increased capacity, reduced journey times and improved accessibility.

2.1.1 Scheme 1: Station facilities and waiting environment enhancements

No scheme drawing

2.1.1.1 Scheme description

The purpose of this scheme is to encourage greater use of rail for all trip purposes by improving the experience, ease of access, and comfort of the wait associated with the mode at rail stations. In particular, the scheme would seek to deliver for all rail stations across Wirral (subject to an audit of need):

- New and improved waiting shelters with enhanced seating, CCTV and heating units;
- Automatic Ticket Machines at all stations with no staff presence (and ultimately at all stations), at which a full range of tickets may be purchased;
- Enhanced retail units at stations with a sufficient potential demand, to include newspapers, food and drink;
- Upgraded information boards and screens; and
- Secure cycle parking. This is already available at most Merseyrail stations but should be extended to all including Borderlands line stations between Bidston and Wrexham. An audit would be required to review the capacity of cycle parking at stations as it is noted that cycle parking is fully utilised at some.

It is hoped that by improving the experience of rail users at stations across the network, more of the travelling public will choose this mode over the private car, thereby reducing traffic congestion and air quality issues across the borough.

2.1.1.2 Scheme risk review

- The scheme requires co-ordination with the station owner (Network Rail), Station Facilities Owner (Merseyrail) and other interested parties including Merseytravel. All of these have their own maintenance and upgrade programmes which will require alignment to ensure no repeat or abortive work.

2.1.1.3 Scheme budget estimate

£10-£20m

2.1.2 Scheme 2: Wirral line Park & Ride enhancements

No scheme drawing

2.1.2.1 Scheme description

This scheme proposes to deliver new and increased parking capacity at several key stations across the borough with the aim of increasing the accessibility of stations for those outside immediate walking or cycling distance, and thereby reducing the number of journeys within the borough made entirely by private car. Whilst it is understood that it will not be possible or desirable for all stations on the borough's rail network to have large car parks, a number of stations are located at key strategic locations with the potential to intercept car journeys and convert these to rail journeys. These include existing Park & Ride sites such as Hooton, Birkenhead North and Spital, and stations without large car parks but with good accessibility to the strategic road network and large potential P&R catchments such as Upton and Heswall. A particular focus on upgrading Park & Ride capacity on the Chester line has the potential to reduce vehicle trips on the busy A41 North Corridor and help to alleviate congestion.

The scheme would include the purchasing or other acquisition of land adjacent to the station in question, the conversion of this land to car parking using decking and other capacity increasing techniques if warranted by demand, and the upgrading of connections including road signage and pedestrian walkways between the car park and the station platforms. It would be preceded by a comprehensive study to identify the most appropriate locations for enhanced Park & Ride provision including survey and market research work.

2.1.2.2 Scheme risk review

The aim of the scheme is to reduce the amount of private car miles overall. There is a risk that creating new Park and Ride capacity will abstract users off existing public transport services, or those that currently walk and cycle, rather than users that currently drive for their entire journey. This risks increasing overall car mileage and careful consideration must be given to the location of the new and expanded sites as a result.

2.1.2.3 Scheme budget estimate

£1m-£3m

2.1.3 Scheme 3: Green Lane station refurbishment

No scheme drawing

2.1.3.1 Scheme description

Green Lane rail station currently requires some refurbishment. Whilst it has recently had work undertaken to improve the on-platform waiting environment, the station concourse, stairs and exterior are in need of significant improvements to create an attractive public transport experience. In addition, disabled access at the station is difficult, and the platform area is dark and gloomy especially at night and in inclement weather.

The scheme would involve the installation of upgraded disabled facilities, enhanced lighting, a new ticket counter and two new seated waiting areas. It would also involve a refurbishment of the stairway and exterior of the station, as well as the parking area to the front. The aim of this is to create a more attractive public transport offer for new and existing passengers and thereby reduce the number of private car trips made within the borough.

2.1.3.2 Scheme risk review

The scheme requires co-ordination with the station owner (Network Rail), Station Facilities Owner (Merseyrail) and other interested parties including Merseytravel. All of these have their own maintenance and upgrade programmes which will require alignment to ensure no repeat or abortive work.

2.1.3.3 Scheme budget estimate

£3m-£10m

2.1.4 Scheme 4: Birkenhead Central: new forecourt and eastern access route

Drawing No. 392148-MMD-00-XX-DR-C-0005

2.1.4.1 Scheme description

The redevelopment of land south of Birkenhead town centre will open up many opportunities to improve the linkage of the town centre with residential areas to the south. Birkenhead Central rail station is one of the most popular entry points to the town for workers and shoppers, but it suffers from a number of operational issues, including:

- Poor interchange with bus services due to the space constrained nature of Argyle Street South outside the station;
- No car parking, pick-up or drop-off facilities. Again, adding to the poor traffic environment outside the station;
- Only limited secure cycle parking; and
- A large highway gyratory situated between the station and the town centre, which is a significant barrier to pedestrian movement.

To the east of the existing station, the land was formerly occupied by a number of substantial gas storage containers, but these have now been cleared. This land is now expected to form part of the Hind Street regeneration area, and consequently there will be a unique opportunity to significantly improve access to Birkenhead station. This scheme could potentially comprise the following:

- The removal of a derelict rail storage shed to the east of the station;
- The creation of a second pedestrian access to the station from the east;
- Provision of a new station forecourt to the east, and south of Hind Street. The forecourt could allow a turnaround for buses, pick-up and drop-off and possibly car parking.

This scheme is also linked and coordinated with other schemes in the Phase 1 and 2 improvements described in this report, which in combination could have a dramatic influence on the usage of Birkenhead Central station.

2.1.4.2 Scheme risk review

The following could be considered risks for this particular scheme:

- Land required for the scheme is not available;
- Other complimentary improvement schemes do not come forward, consequently reducing the overall benefits of this scheme.

2.1.4.3 Scheme budget estimate

£3m-£10m

2.1.5 Schemes 5 and 7: Improvements to bus infrastructure at Birkenhead Park, Conway Park and Birkenhead North

No scheme drawing

2.1.5.1 Scheme description

This scheme would deliver new bus interchange facilities at Birkenhead Park, Conway Park, and Birkenhead North stations to improve access to the railway stations and encourage multi-modal journeys. In particular, it is hoped that bus services might act as feeder services for the railway particularly for longer distance cross-river trips or journeys to and from New Brighton and West Kirby. Conversely, providing enhanced bus interchange at these locations has the potential to provide enhanced access to areas of Birkenhead not well served by rail including the central area of Wirral Waters, the area to the south of Birkenhead Park including Claughton and Oxton, and areas to the north including Seacombe. In the short term, this could greatly enhance the accessibility of both Wirral Waters and the A41 North Corridor regeneration area by public transport from places such as Liverpool City Centre.

The scheme would include the replacement of existing bus provision at the stations with enhanced bus stopping facilities in easy reach of the station entrances and providing shelter, seating and information on interchange and upcoming services via Real Time Information. Signage would also be improved with mutual signage between bus and rail areas. Through-timetables (showing both legs of the journey plus suggested interchanges) could also be constructed and displayed for journeys involving interchange between, for instance, Wirral Waters and Liverpool City Centre.

2.1.5.2 Scheme risk review

This scheme is designed to build on existing service provision to increase the attractiveness of public transport and attempt to overcome the long-understood reluctance to interchange particularly between modes. Unless marketing and ticketing options adopt a similarly unified approach across modes, any improvements made in this area will be of limited impact.

2.1.5.3 Scheme budget estimate

£3m-£10m

2.1.6 Scheme 6: Hamilton Square bus / rail interchange improvements

Drawing No. 392148-MMD-00-XX-DR-C-0004

2.1.6.1 Scheme description

In this scheme, works would be implemented outside Hamilton Square rail station on Hamilton Street to improve passenger interchange between rail and bus. The works are primarily planned to comprise of:

- Allowing two-way bus routing on Hamilton Street outside of the station. This will allow greater flexibility in bus routing, plus shorter walk distances for passengers;
- Improved waiting environment for passengers;
- Public realm works to the footway and carriageway; and
- Taxi ranking facilities.

Again, this scheme can be coordinated with other schemes to help maximise transport benefits.

2.1.6.2 Scheme risk review

Risks associated with this scheme are:

- Consultation with adjacent businesses and landowners will be needed on the scheme;
- An amended traffic order would be required to manage Hamilton Street.

2.1.6.3 Scheme budget estimate

£1m-£3m

2.1.7 Scheme 8: Birkenhead Central bus / rail interchange improvements

No scheme drawing

2.1.7.1 Scheme description

This scheme would deliver new bus interchange facilities at Birkenhead Central station to improve access to the railway station and encourage multi-modal journeys. In particular, it is hoped that bus services might act as feeder services for the railway particularly for longer distance cross-river trips or journeys to and from Chester and Ellesmere Port. Conversely, providing enhanced bus interchange at these locations has the potential to provide enhanced access to areas of Birkenhead not well served by rail including the Tranmere and Prenton areas of Birkenhead to the south, the Oxton and Claughton areas to the west, and the industrial areas of the A41 North Corridor including Cammell Laird's shipyards. In the short term, this could greatly enhance the accessibility of the A41 North Corridor regeneration area by public transport from places such as Liverpool City Centre and Chester.

The scheme would include the replacement of existing bus provision at the station with enhanced bus stopping facilities in easy reach of the station entrances and providing shelter, seating and information on interchange and upcoming services via Real Time Information. Signage would also be improved with mutual signage between bus and rail areas. Through-timetables could also be constructed and displayed for journeys involving interchange between, for instance, St Catherine's Hospital and Liverpool City Centre.

2.1.7.2 Scheme risk review

This scheme is designed to build on existing service provision to increase the attractiveness of public transport and attempt to overcome the long-understood reluctance to interchange particularly between modes. Unless marketing and ticketing options adopt a similarly unified approach across modes, any improvements made in this area will be of limited impact.

2.1.7.3 Scheme budget estimate

£1m-£3m

2.2 Birkenhead Town Centre Gateways

This is a package of infrastructure improvements to support the regeneration of Birkenhead Town Centre through the improvement of the gateway road arrival points in the town centre. This includes addressing a number of junctions that experience capacity problems and increase signposting and wayfinding into Birkenhead town centre. This package will enable more efficient traffic movements and will facilitate improved access to land in need of redevelopment, improve accessibility to the town centre, and create a more efficient and safer road layout and improved visual approach to Birkenhead.

2.2.1 Scheme 9: A41 Chester Street highway realignment (Phase 1)

Drawing No. 392148-MMD-00-XX-DR-C-0005A

2.2.1.1 Scheme description

This scheme would improve the A41 Chester Street highway alignment to increase capacity and connectivity along the A41 North Corridor, and to remove the northbound underpass. This would be undertaken in conjunction with Scheme 25: A41 / A552 / Flyovers remodelling – Phase 1 and would involve a removal of the mainline route between Chester Street and New Chester Road to the south, instead requiring this move to be completed via a signalised junction. The mainline flow would instead connect New Chester Road with a new roundabout serving the Queensway Tunnel, and new at-grade links to both Conway Street and Borough Road's junctions with Argyle Street, better reflecting the bulk of demand.

The aim of the scheme is to remove a potential bottleneck on the approach to the A41 North Corridor development sites and eliminate a land hungry and pedestrian / cycle unfriendly underpass from the network, instead restoring at-grade operations. The scheme forms part of the wider phase 1 temporary arrangement following the removal of the flyovers as detailed in Scheme 25 below.

2.2.1.2 Scheme risk review

This scheme is designed to integrate with the wider phase 1 scheme described later as Scheme 25. As such, its deliverability is linked intrinsically with this larger scheme and it may therefore not be feasible in isolation without a significant redesign, consultation and traffic mitigation plan.

2.2.1.3 Scheme budget estimate

£3m-£10m

2.2.2 Scheme 10: A41 Chester Street junction improvements

Drawing No. 392148-MMD-00-XX-DR-C-0004

Scheme description

This scheme is associated with the removal of the Birkenhead flyovers, and will reconfigure the Chester Road / Ivy Street junction to be suitable for the new traffic arrangement.

The scheme offers the opportunity to improve pedestrian crossing facilities through the junction to better link the town centre with the riverfront and Birkenhead Priory. The scheme would also incorporate improved landscaping around the junction.

Scheme risk review

Potential risks for this particular scheme could be as follows:

- The scheme facilitates the reconfiguration of the Birkenhead flyovers and therefore is linked to the delivery of the scheme;
- Consultation will be required with local residents and businesses as the scheme will need changes to access and circulation.

Scheme budget estimate

£1m-£3m

2.2.3 Scheme 11: Signage improvement to Birkenhead Priory

Drawing No. 392148-MMD-00-XX-DR-C-0006

Scheme description

Birkenhead Priory is a hidden treasure tucked away just north of the Cammell Laird shipyard, and hidden by the industrial area to the east of Birkenhead town centre.

The removal of the Birkenhead flyovers will offer an excellent opportunity to reconnect this area back with the town centre, and the new development areas being planned in the locality.

In the first instance, a signage strategy and interpretation boards could be used to link the Priory with local destinations (the town centre, Hamilton Square and Woodside). Later, the scheme could be enhanced with improved walk routes and landscaping.

Scheme risk review

No specific risks known.

Scheme budget estimate

£100k

2.2.4 Scheme 12: Electric charging points across borough

No scheme drawing

2.2.4.1 Scheme description

This scheme would provide electric charging points across Wirral to improve the infrastructure available for electric vehicles. This could make use of national schemes such as the Government's 'On-street Residential Charge-point Scheme'. It could be delivered directly by Wirral Council within their off-street car parks and in other public areas, or could be delivered in part by developers as a result of the inclusion of charge-points as planning conditions for new homes. The aim would be to create a comprehensive network of publicly available charge-points across the borough with associated ancillary technology including an app and website to show the location of nearest facilities.

2.2.4.2 Scheme risk review

Investments in new technology such as this include an inherent risk that they will quickly be overtaken by further advancements, for instance as a result of future advances in hydrogen power. However, the cost of the infrastructure is reducing at the same time as its reach increases and it is therefore likely that battery charging of electric vehicles will form an important part of the borough's future transport network.

2.2.4.3 Scheme budget estimate

£3m-£10m

2.2.5 Scheme 13: Signage and better entrance to retail core

No scheme drawing

2.2.5.1 Scheme description

This scheme would improve the quality of pedestrian and cycle signage to Birkenhead Town Centre from key gateways including Birkenhead Bus Station, Conway Park and Birkenhead Central rail stations, the Borough Road / Whetstone Lane junction and the Claughton Road / Exmouth Street junction.

2.2.5.2 Scheme risk review

No specific risks known.

2.2.5.3 Scheme budget estimate

£100k

2.2.6 Scheme 14: Birkenhead local access road improvements

No scheme drawing

2.2.6.1 Scheme description

This scheme would provide a package of small-scale local access road improvements, enhancing surface quality, removing potential safety risks, and upgrading footways and public realm. The aim of the scheme is to improve access and movement along these links and provide a higher quality experience for all users including pedestrians and cyclists.

2.2.6.2 Scheme risk review

The main risk associated with this scheme is in the encouragement and inducement of additional traffic to use these minor links which may often be residential and unsuitable in nature. Careful consideration of traffic calming and pedestrian safety treatments will be required in order to ensure that these upgraded links do not become attractive options for through-traffic.

2.2.6.3 Scheme budget estimate

£1m-£3m

2.2.7 Scheme 15: Road safety improvements at Whetstone Lane / Borough Road

No scheme drawing

2.2.7.1 Scheme description

The junction of Whetstone Lane and Borough Road is a major cause for concern in terms of pedestrian safety. It is a key gateway to Birkenhead Town Centre and a major node for footfall between the residential areas to the south of the town (including Tranmere) and the retail core. This scheme will address these safety issues by reducing the width of the carriageway (potentially taking out traffic lanes), removing the central island refuges and installing 'all red'

pedestrian phases with enhanced super-crossings, removing left-turn filter lanes and guard rail and increasing pedestrian green time.

The scheme would involve a significant design stage and would require junction modelling to arrive at an optimum solution which avoids traffic congestion or excessive queuing. In principal, however, the scheme is designed to re-balance priority in favour of the pedestrian and an increase in overall traffic delay at the junction is therefore to be expected.

2.2.7.2 Scheme risk review

A scheme of this nature risks increasing the volume of queuing traffic and congestion at the junction if not modelled and planned out meticulously. The risks associated with this are:

- Reduce air quality as a result of increased volumes of stationary traffic;
- Increased delay at the junction for private vehicles and the social costs associated with this;
- Potential introduction of additional traffic in alternative locations as a result of drivers re-routing to avoid the remodelled junction.

2.2.7.3 Scheme budget estimate

£1m-£3m

2.3 Birkenhead Town Centre Streetscape

This package will provide options to join together the disparate parts of Birkenhead Town Centre through an improved active travel public realm. An improved streetscape would increase movement between the retail and commercial/office areas through creating a pedestrian and cycle friendly environment. This package will introduce a range of public realm improvements that will encourage more walking and cycling activity in the area. The package will support the town centre to provide a more attractive retail offer to residents and visitors, and also enhance the public realm between commercial and retail cores.

2.3.1 Scheme 16: Improved public realm in retail core

No scheme drawing

2.3.1.1 Scheme description

The existing pedestrianised area within the retail core of Birkenhead (including the Grange Precinct, Birkenhead Market and the area surrounding the Pyramids Shopping Centre) is now many years old and is beginning to look tired and unattractive to potential users, particularly on Grange Road itself which has loose bricks, uneven flagging and a distinctly old fashioned appearance. The scheme would seek to refurbish the entire area providing new surfacing, fresh planting and with a complimentary signage and access strategy to improve the environment around the retail core and stimulate use. The aim would be to increase footfall in this important location and improve connectivity to the various segments and neighbourhoods of the town centre, removing severance wherever possible.

The scheme is tied to a potential remodelling and refurbishment of Birkenhead Market proposed by Wirral Growth Company and should be programmed in conjunction with this scheme.

2.3.1.2 Scheme risk review

A key risk associated with this scheme is that there is, as yet, no firm consensus on the future direction and role of Birkenhead Town Centre in the context of Wirral Waters, the A41 regeneration area and an expanded City Regional centre in Liverpool. It will be important to understand the future role of Birkenhead as an employment and /or retail centre before a decision can be made on the size and scope of the refurbishment proposals, to avoid unnecessary or poorly targeted work.

2.3.1.3 Scheme budget estimate

£1m-£3m

2.3.2 Scheme 17: Improved public realm Argyle Street

Drawing No. 392148-MMD-00-XX-DR-C-0003 and 0004

2.3.2.1 Scheme description

Argyle Street already has significant activity along its length, and has the potential to be used even more. Uses to either side are made up of bars and other entertainment venues, commercial businesses and residential apartments. There is therefore much demand for road crossings.

The street itself is also relatively heavily trafficked, with traffic volumes approximately equivalent to the parallel Chester Street. In addition, the street is very well used by bus services.

With the Woodside and Wirral Waters schemes coming forward, there is the likely potential that the street will see an increase pedestrian and traffic movements. However, should traffic become over dominating it will have a negative impact to both new businesses coming into the area, and also the type of business.

This scheme would seek to achieve a balance between the requirement (if any) for through traffic movements, and improving the environment for walking and cycling. As has been the case in other towns, a well-planned, designed and delivered public realm and traffic management scheme can have a dramatic positive influence on economic activity of an area. At this time, the scheme is seen as extending from Hamilton Square to Conway Street. However, it would coordinate with other improvement schemes to help achieve an overall area wide benefit.

2.3.2.2 Scheme risk review

Particular risks associated with this scheme could include:

- Inclusive consultation will be required with local residents, businesses and community representatives (such as disability groups) to gain buy-in to the scheme;
- A scheme not suitable for the future operation of the street may introduce road safety issues;
- Appropriate materials will need to be used to avoid a maintenance liability for the Council.

2.3.2.3 Scheme budget estimate

£1m-£3m

2.3.3 Scheme 18: Cleveland Street / Market Street / Price Street public realm

Drawing No. 392148-MMD-00-XX-DR-C-0003 and 0004

2.3.3.1 Scheme description

Cleveland Street, Market Street and Price Street are all east / west roads running perpendicular to Argyle Street and Chester Street. Each of the streets has a slightly different function and use which could change in the future as new development comes forward and new populations are established. For example, Price Street and Cleveland Street intersect with the Hamilton Square conservation area, but are also well trafficked streets. Conversely, Market Street is much less trafficked but has a parade of shops with great regeneration potential between Hamilton Street and Argyle Street.

This scheme would seek to introduce public realm improvements on each of the streets suitable for their function and form. For example, Cleveland Street and Market Street could see improvements to landscaping and tree planting to better connect it with Hamilton Square and Market Street improvements to footway and carriageway surfacing. All of the schemes would need to coordinate with the Argyle Street scheme which will be central to the improvement area.

Also important to the east / west streets will be facilitating ease of walking and cycling between residential, commercial, retail and education facilities. Linking with other planned Green infrastructure and the emerging plans for the Wirral Growth Company around Conway Park.

2.3.3.2 Scheme risk review

Possible risks with this project could include:

- Consultation will be required with businesses and residents adjacent to the scheme;
- Individual improvement schemes will need to coordinate with other schemes in the area.

2.3.3.3 Scheme budget estimate

£1m-£3m

2.3.4 Scheme 19: Improved public realm Conway Street

Drawing No. 392148-MMD-00-XX-DR-C-0003

2.3.4.1 Scheme description

Similar to Argyle Street, Conway Street experiences relatively high traffic flows, but is also a key pedestrian route in Birkenhead – both along its length and also north / south at certain junctions. Conway Street is also home to Birkenhead bus station and therefore accommodates large volumes of buses. The street also changes in nature as it skirts the northern boundary of the town centre – to the west, the road is single carriageway with a relatively open aspect to either side, whereas to the east, the road is a dual (2) carriageway with extensive use of guard railing.

Europa Boulevard, approximately opposite the bus station, is planned to be the main access spine for the early phase of Wirral Growth Company's redevelopment initiative. This boulevard would likely be subject to highway and public realm improvements. In addition, the redevelopment scheme may extend across Conway Street to help create / develop a new retail / leisure extension to the south of the street.

This scheme would therefore seek to upgrade Conway Street so that it is more suitable for pedestrian crossings, and that it is more consistent in nature along its length. Measures could include:

- Carriageway narrowing to widen footways, create on-street parking bays and reduce road crossing widths;
- Removal of guard railing and general street decluttering;
- Improved surfacing on footways; and
- New landscaping, and if possible tree planting.

2.3.4.2 Scheme risk review

Particular risks that could be associated with this scheme include the following:

- Coordination will be required with other improvement schemes in the area to ensure consistency of measures and materials;
- Consultation with stakeholders may be required to ensure buy in to the scheme.

2.3.4.3 Scheme budget estimate

£1m-£3m

2.3.5 Scheme 20: Improved pedestrian crossing facilities along Argyle Street

Drawing No. 392148-MMD-00-XX-DR-C-0003 and 0004

2.3.5.1 Scheme description

This scheme is linked with Schemes 17 and 18 to improve the environment on Argyle Street. The scheme will specifically help pick up north / south and east / west pedestrian desire lines along and across Argyle Street which may be currently lacking – such as at Market Street.

Crossing types could be mix of uncontrolled (dropped crossings and refuge islands), or controlled (such as zebra crossings).

2.3.5.2 Scheme risk review

Risks associated with this scheme could be:

- The scheme will need to coordinate with both other improvement schemes in the area and also new development / zones of activity to help ensure the optimum pedestrian environment is achieved on and around Argyle Street.

2.3.5.3 Scheme budget estimate

£100k

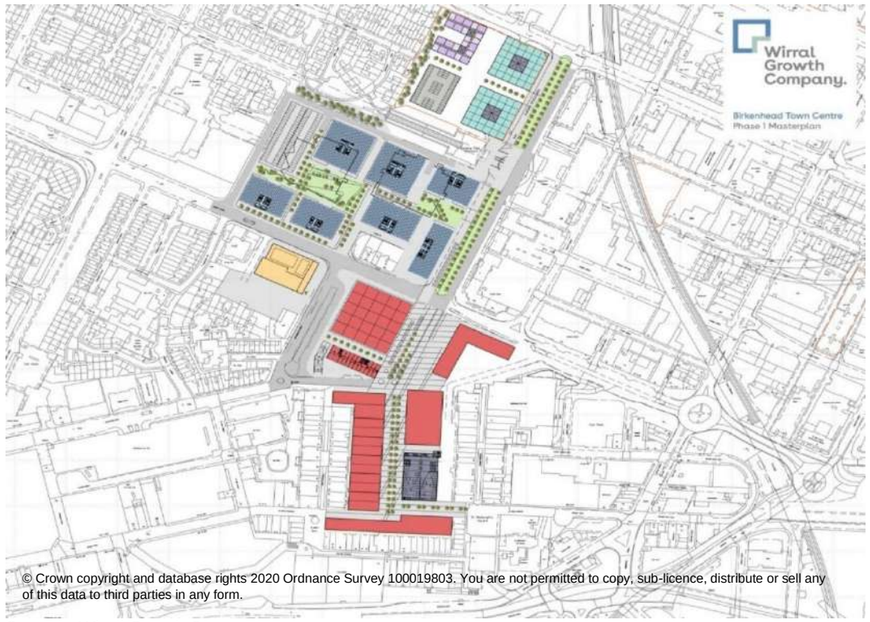
2.3.6 Scheme 21: Conway Park and Birkenhead Market improved walk route

No scheme drawing

2.3.6.1 Scheme description

One of the early projects under development by the Wirral Growth Company is the mixed-use development that is centred around the Conway Park rail station – see image below.

Figure 1: Birkenhead Civic Hub Scheme



Source: Wirral Growth Company

In its entirety, this scheme could provide new commercial, leisure and residential uses to the north of Conwy Street and an improved retail extension (including a new indoor market) to the south. An important part of this will be a high quality pedestrian route to connect the various elements of the scheme, and to ensure that Conway Street is not a barrier to movement.

The Conway Park scheme will create a significant increase in activity in this area of Birkenhead, and will attract trips from all directions. This scheme will therefore need to coordinate well with other transport schemes being promoted within this report to ensure overall benefits are being maximised.

Closely aligned to the proposed Wirral Growth Company scheme to improve the environment around Conway Park station on Europa Boulevard and to refurbish Birkenhead Market, this scheme would provide an improved route around Conway Park connecting to Birkenhead Market, to attract increased footfall into the retail core, and to provide improved access to new development north of Conway Park. The scheme would greatly improve the quality of public realm and signage on Europa Boulevard and would install new high quality crossing facilities over Conway Street to improve integration with the bus station and wider town centre. Much of the walk route would be provided in a traffic-free environment and consideration could be given to creating sheltered safe-spaces on the route with enhanced lighting and CCTV coverage to help to remove the perception of isolation and danger.

2.3.6.2 Scheme risk review

As discussed above, the scheme will need to coordinate with other initiatives in the area.

The scheme will need to closely align with related schemes to improve public realm on Europa Boulevard, and the aspirations of Wirral Growth Company to create office space and enhanced activity to the north of Conway Park.

2.3.6.3 Scheme budget estimate

No budget required by Wirral Council as the works will be undertaken by other parties as part of the wider Civic Hub scheme.

2.3.7 Scheme 22: Improved public realm Conway Park and Europa Boulevard

Drawing No. 392148-MMD-00-XX-DR-C-0003

2.3.7.1 Scheme description

To complement the improved walking route between Conway Park and Birkenhead Market, a number of public realm improvements are proposed for Europa Boulevard itself. These will include significant tree planting and other greening alongside work to improve the quality of footways and reduce traffic dominance on what will become a key pedestrian desire line.

2.3.7.2 Scheme risk review

Should the Wirral Growth Company scheme not proceed as currently being envisaged, an alternative improvement strategy may need to be prepared.

2.3.7.3 Scheme budget estimate

Work to be undertaken by Wirral Growth Company as part of the wider Civic Hub scheme.

2.4 Regenerating Woodside and Hamilton Square

This package includes a series of schemes focused on regenerating the Woodside and Hamilton Square areas of Birkenhead. The area has several key features such as Hamilton Square and the waterfront. This package provides a series of public realm and highway enhancements focused on driving the regeneration of the area. The aim of this package is to serve as a catalyst for the regeneration of Woodside and Hamilton Square. The schemes included in the package aim to increase footfall into the area and attract inward investment. The schemes focus on enriching the existing assets such as Hamilton Square and the waterfront which will serve as a catalyst for area's regeneration.

2.4.1 Scheme 23: Hamilton Square and Hamilton Street improvements

Drawing No. 392148-MMD-00-XX-DR-C-0004

2.4.1.1 Scheme description

Hamilton Square and its surrounding architecture is potentially one of Wirral’s greatest assets, and should be at the heart of a thriving community, containing a wide range of land-uses. However, at present activity is low around the Square and the area is recognised as not meeting its potential.

A previous initiative to help bring activity into the area focused around removing the road closure on Hamilton Street between the Town Hall and the Cenotaph. The road closure would allow traffic to pass through this space, but the space would have a public realm treatment in keeping with the surroundings. However, objections were received to this initiative and it has since not been progressed.

But, bringing activity back into the locality is still seen as key to helping support the future wellbeing of the Square and the adjacent areas. To this end, this scheme includes the following proposals:

- Removal of the two large mini roundabouts on the east side of the Square, to be replaced with a more informal space shared between pedestrians and vehicles;
- Removal of the road closure between Duncan Street and Hamilton Square;
- Conversion of Duncan Street to two-way traffic for its full length;
- Conversion of Hamilton Street to two-way traffic between Hamilton Square and Hinson Street;
- Conversion of Hinson Street to two-way traffic between Argyle Street and Hamilton Street;
- Improved landscaping, including tree planting where possible;
- Road narrowing via creation of sheltered on-street parking bays and uncontrolled pedestrian crossings;
- Improved public realm, including street furniture and footway resurfacing; and
- New and repositioned bus stops and waiting facilities to take advantage of the new street circulation and passenger destinations.

This scheme will therefore not only seek to improve the accessibility of Hamilton Square, but also Hamilton Street which currently has low permeability, but is home to several large employers.

The scheme will also need to coordinate with other initiatives being proposed by this package of works, including:

- Argyle Street public realm improvements;
- Market Street enhancement; and
- Works outside of Hamilton Square station.

In their entirety, the schemes should bring a dramatic positive benefit to the Birkenhead area.

2.4.1.2 Scheme risk review

Risks that could be associated with this particular scheme could be:

- Other schemes do not proceed, reducing the overall benefit of this scheme;
- Consultation would be would be required with local residents, businesses and stakeholders to help ensure buy-in to the scheme;
- Changes would be required to traffic regulation orders which would be subject to advertisement.

2.4.1.3 Scheme budget estimate

£3m-£10m

2.5 World Class Public Transport

This package contains a series of schemes that are focused on improving public transport across Wirral including the A41 North Corridor area, with one of these identified for delivery as part of Phase 1. There are a number of bus related measures that include integrated ticketing and greater connectivity with other modes. The package also includes aspirations to develop a mass transport solution to provide a feeder service/"last mile solution" to the existing Merseyrail network to better access the areas the current network fails to serve and better connect key parts of Birkenhead Town Centre and Wirral Waters. The objectives of this package are to increase public transport patronage and develop a 'world class' public transport network in Wirral that encourages multi-modal trips with integrated ticketing. This aims to reduce dependence on the car and provide public transport that will meet future demand generated by development.

2.5.1 Scheme 24: Relocation of Birkenhead bus station

No scheme drawing

2.5.1.1 Scheme description

As part of proposals to improve the route between Conway Park station and Birkenhead Town Centre, and to provide additional space with which to extend the town centre offer including the Market, it is currently proposed to relocate the bus station to a more suitable location.

Whilst no preferred site has been agreed for the relocated facility, a number of options have presented themselves including on land adjacent to St Werburgh's Church and currently occupied by the defunct Central Hotel – this would provide enhanced interchange with Birkenhead Central station; or on land adjacent to Birkenhead Central as part of the Hind Street development – this would create excellent bus rail interchange but would potentially increase remoteness from the retail core.

The scheme would closely align with work to remove the severance of the Argyle Street / A552 junction which could potentially be remodelled to include pedestrian super-crossings. It would also obviate the need for enhanced bus interchange at Birkenhead Central itself, tying into a remodelling of the station as part of the Hind Street development. There is also the potential to replace the bus station with a series of bus super-stops around the town centre, however this option runs the risk of eliminating interchange capability within the network and is therefore not a preferred choice at this early stage of development.

2.5.1.2 Scheme risk review

Although remote from the rail stations and peripheral to the retail core at present, Birkenhead Bus Station is easily accessible from the strategic road network via the A553 Conway Street with access also provided from Claughton Road. Relocation runs the risk of reducing the accessibility of the bus station for certain key routes and also, depending on its ultimate location, reducing the accessibility of the facility for pedestrians and town centre users.

2.5.1.3 Scheme budget estimate

£10m-£20m

2.6 A41 Site Access Improvements

The area of land in question is planned to be subject to a detailed land-use and movement masterplan, which will identify a grid and hierarchy of streets and will consider access by all modes.

This plan will therefore propose connections to all adjacent roads (including the A41), whilst being cognisant of the plans being developed to also aid the wider regeneration of Birkenhead. As such, close coordination between schemes will be of the greatest importance to ensure an appropriate balance of movement and interaction is achieved. For example, ease of pedestrian and cycle permeability, or avoiding inappropriate through traffic on sensitive streets.

This intervention provides a series of schemes focused on improving access along the A41 to key employment and development sites, and from the south into Birkenhead Town Centre. The package consists of several schemes aimed at increasing capacity, improving pedestrian connectivity and altering the existing road network to enhance the area. In particular, the schemes suggested to accomplish the aims of this package are as follows:

2.6.1 Scheme 25: A41 / A552 / Flyovers remodelling – Phase 1

Drawing No. 392148-MMD-00-XX-DR-C-0005A

2.6.1.1 Scheme description

This scheme forms the first phase of the intervention which is likely to have the most significant and wide reaching transport impacts being proposed as part of this study.

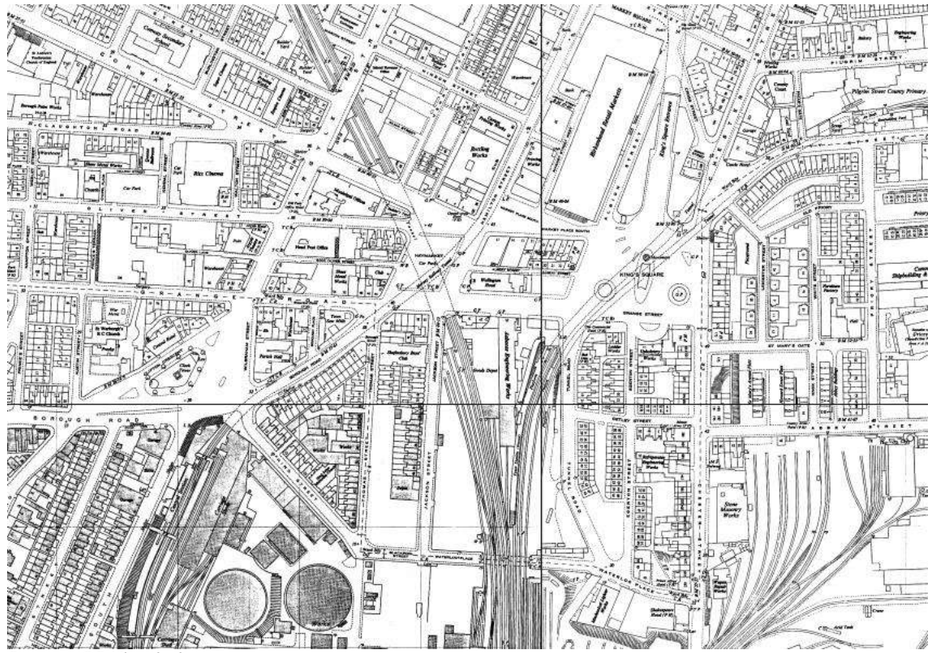
At the heart of the scheme is the removal of the elevated highway flyovers to the south of Birkenhead town centre. The flyovers themselves are basically made up of two structures: one structure (owned by Merseytravel) gives access to the Queensway Tunnel from the A41 New Chester Road and the A552 Borough Road; and the second structure (owned by Wirral Council) gives direct linkage between New Chester Road and Borough Road. Also associated with the flyovers are a range of other free-flowing highway links – including an underpass to Chester Street.

The flyovers and associated access roads have a range social and accessibility issues which this scheme seeks to begin to solve, including:

- Creating a significant barrier to north / south and east / west pedestrian and cycle movements;
- Attracting large volumes of traffic into the centre of Birkenhead which does not have a destination in the local area – i.e. Liverpool or further afield;
- Virtually landlocking large tracts of brownfield potential development land to the south of the flyovers;
- Sterilising land below the flyovers; and
- Creating a vista not conducive for new urban developments.

For information, the below image gives the historical street pattern of Birkenhead before the flyovers were constructed. From this it can be seen that access to the Queensway Tunnel was somewhat convoluted and restricted, but the streets were generally laid out in a grid, and access to land south of the town centre was much more direct.

Figure 2: Historical Street Pattern of Birkenhead



Source: OS Historical

The access routes to the flyovers are however regionally important and are currently necessary to the day-to-day functioning of the Wirral. So, when the flyovers are removed, vehicles will still need to be able to access the Queensway Tunnel and travel between Borough Road and Chester Road.

A significant short term benefit of the scheme is that buses will be able to turn right on exiting the Birkenhead portal of the tunnel, and hence giving almost direct access to Conway Street and the bus station.

This scheme gives an interim construction arrangement which indicates how the streets could function whilst the flyovers are being removed. Key to this could be the use of the historic streets of Borough Road East and Tunnel Road, however it is noted that highway capacity will be significantly reduced during the interim construction period.

2.6.1.2 Scheme risk review

Key risks associated with this particular scheme can be summarised as follows:

- Funding will need to be secured and in place for the final access scheme as this scheme will not serve the economic or operational needs of the Wirral beyond temporary short term;
- Significant consultation will be required with the public, commercial businesses and stakeholders to help ensure the final benefits of the scheme can be realised;
- Detailed investigation will be required to determine the optimum method of traffic management during demolition and reconstruction;

- Capacity of the Kingsway Tunnel may need to be reviewed to accommodate additional traffic demand.

2.6.1.3 Scheme budget estimate

£10m-£20m

2.6.2 Scheme 26: Other A41 Site Access Improvement Schemes – Phase 1

No scheme drawing

2.6.2.1 Scheme description

Associated with the removal of the flyovers to the south of Birkenhead town centre, would also be complimentary works to provide appropriate site access arrangements to currently undeveloped or underutilised land. Particularly the significant area of brownfield land between Green Lane and Birkenhead Central rail stations.

- *Queensway Toll Plaza Re-modelling / Removal:* This scheme would aim to increase Queensway's capacity through remodelling/removing the toll plaza in Wirral and instead utilising ANPR technology to administer and enforce the toll system as currently occurs on the Mersey Gateway Bridge.
- *Green Lane Roundabout capacity improvements:* This scheme would comprise a series of improvements to the Green Lane / A41 roundabout to increase capacity, flow and journey time reliability of the A41 Strategic Corridor. Journey times on the A41 during peak periods will be improved and delays reduced.
- *Campbelltown Road capacity improvements:* This scheme proposes improvements to Campbelltown Road to improve access to Cammell Laird and the offshore wind farm.
- *A41 Southern Bus Access improvements*: This scheme proposes the delivery of new or enhanced bus services, including where appropriate infrastructure improvements, connecting rail stations and town centres with employment sites and retail parks along the A41 North Corridor. In particular relation to the town centre and A41 North Corridor regeneration area, bus services from the A41 North Corridor would be re-routed via the proposed new infrastructure to provide direct access to the bus station, Queensway Tunnel and other required routes.

2.6.2.2 Scheme risk review

Risks associated with this particular scheme could include:

- Agreement on the removal of the Birkenhead flyovers not being achieved in the short term would significantly reduce the redevelopment potential of this area;
- Lack of coordination between interested parties would affect overall regeneration benefits;
- Removal of former rail land would likely be required to achieve new accesses to the A41;
- Planning approvals would need to be gained for new developments and access points.

The scheme is more of a package of measures with several related but independently delivered components. There is a risk that the schemes could conflict with each other unless co-ordinated oversight is undertaken and the schedule of works is programmed carefully.

2.6.2.3 Scheme budget estimate

£3m-£10m

3 Preferred Schemes and Phasing: Phase 2

3.1 Birkenhead Town Centre Streetscape

See description and objectives in Section 2.3.

3.1.1 Scheme 1: Pedestrian overbridge of Borough Road at Whetstone Lane

Scheme not to be progressed

3.1.1.1 Scheme description

One of the key pedestrian entry routes into Birkenhead is from the south via Whetstone Lane which gives access to the substantial residential area of Tranmere. However, a main barrier to movement along the route is that people need to cross Borough Road through a large signal junction. To help facilitate this desire line and improve road safety, this scheme suggested a pedestrian overbridge of Borough Road – for which it was hoped that the gradient changes to either side of Borough Road would allow a crossing with no requirement for stairs.

However, further investigation suggests that this may not be practical due to the clearance needed to cross the road, the associated length required for ramped gradient and the presence existing access points to properties to either side.

An overbridge which needed stair access would also be unpopular to use.

3.2 Regenerating Woodside and Hamilton Square

See description and objectives in Section 2.4

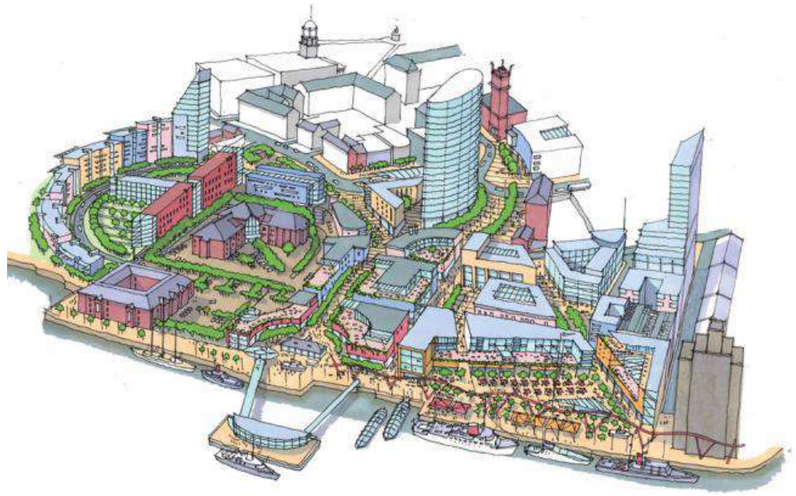
3.2.1 Scheme 2: Regenerating Woodside and Hamilton Square

Drawing No. 392148-MMD-00-XX-DR-C-0002, 0004 and 0004A

3.2.1.1 Scheme description

Woodside could be considered to be one of Birkenhead's most unrealised assets with its prominent position on the Riverside, excellent views of the Liverpool waterfront and the Mersey Ferry terminal. This fact has been recognised, and various regeneration masterplans have been developed in the past (one of which is shown in the image below), but as yet widescale changes have not been implemented.

Figure 3: Previous Woodside Masterplan



Source: BDP

One of the main groups of issues which the masterplans have sought to overcome is the set of barriers to movement between Woodside and Birkenhead. The combination of these tends to isolate Woodside from the main built-up area of Birkenhead. Key barriers include:

- Extents of surface parking for the ferry terminal;
- The heritage tram which has a terminus just outside the ferry terminal. The track of which is raised and consequently protected by fencing;
- The large bus terminus which is infrequently used by passengers, but is surrounded by guard railing;
- The Woodside gyratory which can be intimidating to cross;
- A rank of bus stops, which are only partially used; and
- A lack of a clear walk route through the area, and a destination to aim for.

Many of these items can only be addressed through the implementation of a land-use and movement masterplan. The masterplan would define development parcels, land-uses and densities against which the access strategy could be tested and refined. It is understood that the previous masterplan may be refreshed in the near future.

Two options have been developed as part of this study to reconfigure the Woodside Gyratory to give an indication of the land which would be released and how pedestrian movement could be significantly improved between Hamilton Square and Woodside.

In the first option, an east / west street grid is reinstated, and in the second option Chester Street is realigned with Canning Street through the middle of the gyratory. Both offer significant benefits, but the second option would provide the greater traffic capacity.

3.2.1.2 Scheme risk review

The main risk for Woodside is that a deliverable plan is not put in place and acted upon. Without which, significant change is unlikely to happen. Piecemeal redevelopment may not provide sufficient changes to realise the full potential of the Woodside area.

3.2.1.3 Scheme budget estimate

£3m-£10m

3.2.2 Scheme 3: Access road to Rosebrae development site

Drawing No. 392148-MMD-00-XX-DR-C-0004

3.2.2.1 Scheme description

Rosebrae is a cleared brownfield site to the south of Woodside and to the north of the Priory Wharf residential development. The land has been previously used as dry docks for ship building, but these have since been filled in and the area landscaped. Now, proposals are being prepared to redevelop the land for housing.

This scheme reviews options for access to the proposed development.

The simplest access point would be from Church Street which runs adjacent to the eastern boundary of the site. This road gives direct access to the A41 Chester Street and should be sufficient to serve a relatively low density development similar to Priory Wharf.

Should a higher density development with more car parking be proposed, an alternative access strategy may be required. Two options for this could be:

- Removal of the road closure of Church Street to the south of the Priory Wharf access. This would give a second means of access to the A41 via Ivy Street and its signalised junction with Chester Street; or
- Opening up of a second access into the Rosebrae site, which could be via the access road to the Land Registry office. It is understood that this site may be redeveloped in the future which would allow the access route to be upgraded to be suitable to serve a residential development. However, in the shorter term, the route would not be an option as it passes over private land which could be unavailable.

3.2.2.2 Scheme risk review

The main risk for this scheme is that, if access via Church Street is not deemed suitable, the alternative would be a new access that would need to be established over private land.

3.2.2.3 Scheme budget estimate

£1m-£3m

3.3 A41 Site Access Improvements

See description and objectives in Section 2.6.

3.3.1 Schemes 4 and 5: A41 / A552 / Flyovers remodelling – Phase 2, and Access to Hind Street - Mollington Link Road

Drawing No. 392148-MMD-00-XX-DR-C-0005

3.3.1.1 Scheme description

These schemes would immediately follow on from the interim temporary arrangement, to deliver the final highway and movement scheme associated with the removal of the Birkenhead flyovers.

The final arrangement will be subject to more detailed planning, design and consultation but is expected to include the following key elements:

- Removal of the Borough Road / Argyle Street gyratory and replacement with a four-arm traffic signal junction. This junction should include high quality pedestrian crossing facilities, and, in particular, link Birkenhead Central rail station with the town centre. Significant extents of space should be freed up by this type of junction allowing improved waiting areas around the station, and possibly a new public space / square around the clock tower (currently central to the gyratory). The new public space could also be linked with removal / redevelopment of the Central Hotel site to create a quality pedestrian walk link into the town centre;
- Creation of a new east / west link between Borough Road and Chester Road, connecting with Chester Street. This would form the at-grade replacement to the Wirral Council flyover. The core benefit of this scheme would be to provide a connection into the Hind Street development site, facilitating and enabling this important regeneration development;
- A new junction connection to King's Square to the north forming the at-grade replacement to the Merseytravel flyover and main access route to the Queensway Tunnel;
- A new junction with Chester Street, removing the requirement for the underpass. This junction could free up significant space which could be used for new development, or potentially a new public park around the Tunnel Monument which was formerly located in King's Square;
- The revised access arrangement to Queensway Tunnel would also allow the reconfiguration of the Toll Plaza, which would again free up significant space for other uses. The reconfigured Toll Plaza could take advantage of the latest technologies for the collection of toll monies to again minimise space requirement; and
- Creation of new connections into the undeveloped / underutilised land between the Green Lane and Birkenhead Central rail stations to help facilitate new development.

3.3.1.2 Scheme risk review

The majority of the risks associated with this scheme will have been assessed and resolved in the planning and implementation of the interim temporary highway access arrangement. But, risks associated with delivery of the final scheme could include:

- The masterplan and development plans for the land south of Birkenhead do not proceed which may mean access opportunities for the site cannot be included in the scheme design;
- The scheme may require third-party land to deliver.

3.3.1.3 Scheme budget estimate

£20m-£50m

3.4 A41 Sustainable Connectivity

See description and objectives in Section 2.3.

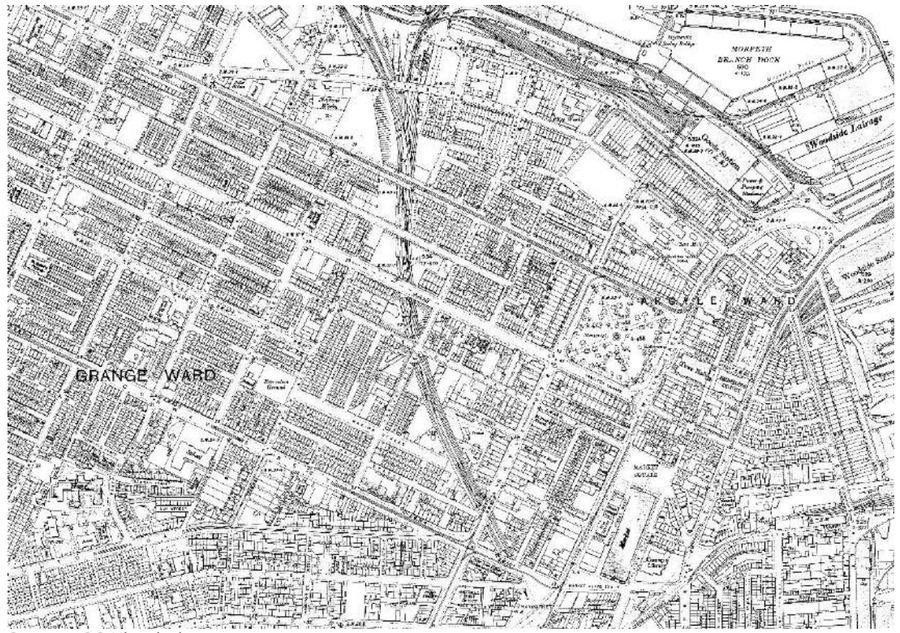
3.4.1 Scheme 6: Birkenhead Green Corridor

Drawing No. 392148-MMD-00-XX-DR-C-0001, 0003 and 0005

3.4.1.1 Scheme description

Bisecting Birkenhead is a former rail corridor which used to link the Wirral Waters dock area with the Chester rail line. This rail line is now disused and the rail tracks removed, but the corridor itself remains almost intact.

Figure 4: Green Corridor within Birkenhead Historical Street Pattern



Source: OS Historical

The corridor itself is largely in cutting of about 6.0m in depth, with a minimum width of about 19.0m. As can be seen in the image above, many key streets in Birkenhead pass over the corridor, but several were severed. Public access to the corridor is not permitted, and it has now been taken over by self-seeding vegetation. However, there is also widespread fly-tipping where roads cross the cutting. Much of the boundary treatment for properties backing on to the corridor is palisade fencing often topped with barbed wire. The corridor is therefore not only a barrier to movement, but also a significant eye-sore and is open to anti-social behaviour.

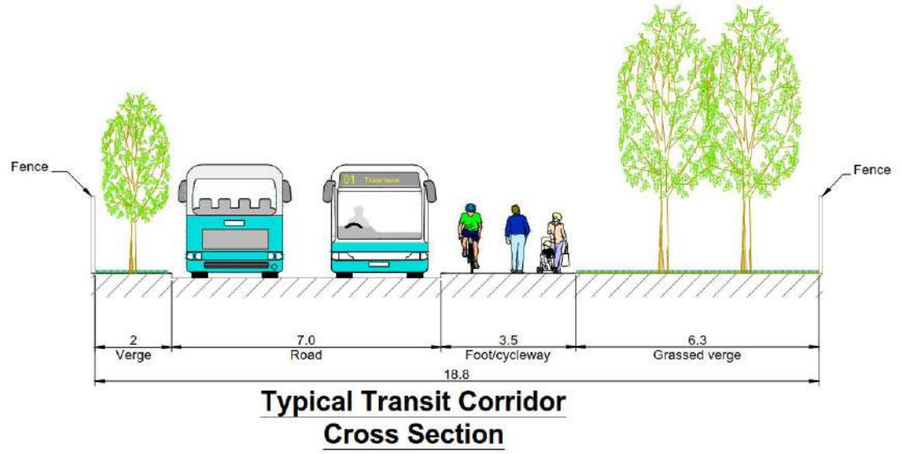
This scheme will seek to bring this corridor back into active usage, to make it into a significant asset and to be a key catalyst not only in the regeneration of Birkenhead but also the wider area – including Wirral Waters.

Key elements of the scheme will be:

- To fill-in the cutting to bring the surface level to the same grade as adjacent streets. This will increase the permeability of the corridor and also significant improve the perception of safety by increasing its visibility to the surrounding area;
- Where possible, to reconnect severed streets to again increase the permeability of the corridor;
- To open the corridor to public transport, pedestrians and cyclists only. This will therefore create a high quality segregated corridor, linking Wirral Waters with Birkenhead town centre and the development land adjacent to Birkenhead Central rail station;
- To introduce CCTV and street lighting to again promote personal security.

The width of the corridor is of such an extent that wide variety cross-section profiles are possible – one of which is shown in the image below. In this option, a two-way public transit corridor is provided adjacent to a shared pedestrian / cycleway and associated landscaping. At points along the route, the width of the corridor significantly increases which would allow a variety of other uses – such as pocket parks or children's play parks.

Figure 5: Green Corridor Proposed Cross-Section



Source: Mott MacDonald

Bringing the corridor up to grade will mean that the transit / pedestrian / cycle corridor will need cross roads at the same level. There are several options for controlling these crossings, the most convenient of which may be traffic signals that are activated by an approaching transit vehicle and a push button facility for pedestrians and cyclists.

The transit corridor could be used by a variety of types of vehicles from conventional buses, to specialist vehicles such as light tram. However, running at-grade gives versatility for route choice as the vehicles will be able to join and leave the corridor at multiple points.

3.4.1.2 Scheme risk review

The risks specific to this particular scheme could include:

- Unknown quality of ecology within the existing corridor, such as bats;

- The amount of material which will be required to fill the corridor will generate significant numbers of HGV's;
- The condition of the structures along the corridor is unknown;
- Properties backing onto the corridor will need to support the scheme as their boundary fencing may need to be changed, but remain secure;
- Public transport operators will need to route services via the corridor.

3.4.1.3 Scheme budget estimate

£5-10m

3.4.2 Scheme 7: Riverside Green Link

Drawing No. 392148-MMD-00-XX-DR-C-0001 and 0002

3.4.2.1 Scheme description

The A41 North Corridor regeneration area is in very close proximity to the waterways of the River Mersey and Birkenhead Docks, but access to them is limited – the principal point being at Woodside. From here people can walk and cycle along the waterside and through the docks via the Wirral Circular Trail.

This scheme presents the opportunity to create another high quality connection to the Waterways via Morpeth Dock which is currently closed off to public access. The dock and the adjacent land is believed to be under the ownership / control of British Waterways, and it may be that an agreement could be reached for the land to be opened up for improvement and public access. If this can be achieved it will be possible to create a pedestrian and cycle route between Shore Road to the east of the Twelve Quays College, through Morpeth Dock, to connect with the Wirral Circular Trail. Within the dock itself there is sufficient unused land to allow for the creation of a high quality urban park with excellent views over the Liverpool Waterfront.

Links to this scheme could be made to the Birkenhead Green Corridor scheme which enable almost a traffic free walking and cycling route between Birkenhead town centre and the River Mersey Waterfront which would likely be very popular for recreational and commuter travel.

A second connection to the Birkenhead Green Corridor scheme could also be made via Egerton Wharf and hence Egerton Dock. Again, improving walking and cycling linkage between the town centre and Wirral Waters.

3.4.2.2 Scheme risk review

The risks specific to this particular scheme could include:

- Failure the reach agreement with land owner of Morpeth Dock to open up the land to public access.

3.4.2.3 Scheme budget estimate

£0.4m

4 Preferred Schemes and Phasing: Phase 3

4.1 Cross River Strategy

This package focuses on improving Wirral's connectivity to Liverpool and the wider City Region. The schemes within the package are focused across public transport interventions for rail, bus and rapid transit, as well as maximising vehicle capacity of the Mersey Tunnels. There are further ambitions for a new access link between Wirral and Liverpool, located further south at Bromborough, however this is not directly linked to the A41 North Corridor regeneration area and is therefore not discussed in detail here.

The aims of this package are to improve connectivity to and reduce congestion at the Mersey Tunnels. Improving access between Wirral and Liverpool across all modes remains the key focus, to improve journey times and drive productivity.

4.1.1 Scheme 1: Repurposing of Queensway Tunnel for public transport only

No scheme drawing

4.1.1.1 Scheme description

Queensway tunnel is a major piece of infrastructure carrying around 35,000 vehicles per day including a mixture of private, public and commercial vehicles. The tunnel was originally constructed between 1925 and 1934 and is therefore approaching its 85th year of public service. Although concerns about the immediacy of its future date of life expiry have recently lessened, there remains an issue with the tunnel deck structure which will need to be resolved if the tunnel is to continue operating at its current levels of use for the foreseeable future. This remedial work is likely to be a costly piece of infrastructure and may only prolong the life of the tunnel by a relatively short amount of time given its age and the differences between modern and past safety standards and construction techniques associated with this type of infrastructure.

As a result, this scheme proposes to radically alter the nature of use of the Queensway tunnel by removing private traffic and reserving it for use exclusively by public transport. By reducing the number of vehicles using the tunnel so radically, and by so alleviating the demands placed on the deck structure, there is the potential to dramatically increase the life of the tunnel, perhaps indefinitely. At the same time, the scheme would provide a first class prioritised public transport corridor between Birkenhead and Liverpool, providing passengers with a real choice of modes and reducing congestion in both Birkenhead town centre and Liverpool city centre. The total removal of the Queensway toll plaza and the reduction of traffic into this sensitive part of Birkenhead and the A41 regeneration area will clearly have significant benefits for the sustainability of future development and has the potential to radically improve the environment for existing users.

Use of the tunnel would, at least initially, be reserved for the bus services that currently use the route to travel between Birkenhead and Liverpool, namely services 1, 2, X8, 407, 423,437, 464, 471, 472 and 487. This amounts to a total of 25 buses per hour in each direction during the daytime. In addition, the tunnel would form an important component of the proposed rapid transit system linking the A41 regeneration area with Wirral Waters, Seacombe and New Brighton et al. It is proposed that the transit system could make use of the existing Queensway service tunnel emerging in Rendell Street (near Wirral Waters) to provide a direct connection to Liverpool city centre (potentially connecting in future with rapid transit aspirations on the Liverpool side of the river). A ten minute frequency on this service would add a further 6 vehicles per hour in each direction to the tunnel, which would also potentially have dedicated space for this new system depending on its requirements for guidance and power.

4.1.1.2 Scheme risk review

The key set of risks for this scheme are associated with the transfer of existing traffic away from Queensway to other cross-river links. A certain amount may be expected to transfer to use Kingsway tunnel in Wallasey or the Mersey Gateway and Silver Jubilee bridges in Halton requiring some potential capacity enhancement schemes on these links. In particular, initial modelling has shown that Kingsway could become more congested under this scenario and would therefore require a complimentary scheme to improve capacity, however it is considered that the capacity of this tunnel could be significantly enhanced by removing the requirement for toll booths by utilising Automatic Number Plate Recognition and automatic tolling technology such as is currently used on Mersey Gateway.

Despite this, it is highly likely that capacity enhancements to existing links will not be sufficient to accommodate the additional traffic from Queensway and it is therefore concluded that an additional link will be required across the Mersey in a strategic location. As is reported in the Strategic Transport Framework Action Plan (Dec 2018) that preceded this report, this link is proposed to run between Bromborough and Otters pool in Liverpool providing a strategic connection for those accessing Liverpool from south of Bromborough (including Chester, Ellesmere Port and North Wales), and linking directly into the strategic road network via Queens Drive and the south Liverpool Key Corridors. Modelling shows that a sizeable proportion of traffic currently using Queensway to access Liverpool City Centre, south Liverpool and the M62, M57 and M58 motorways would transfer to use this new link, thereby reducing the amount of traffic and impact thereof on the A41 north of Bromborough and in Birkenhead Town Centre.

4.1.1.3 Scheme budget estimate

The repurposing of the Queensway tunnel would likely be accomplished as part of a wider package of measures for the measures for the link including conversion of the link to rapid transit and a flood resilience scheme. In total, this package is expected to cost between £20m and £50m.

4.1.2 Scheme 2: Wirral Line Connectivity

No scheme drawing

4.1.2.1 Scheme description

In addition to the proposed repurposing of the Queensway Tunnel for Public Transport, a further significant scheme is proposed to transform the ease of access between the A41 regeneration area and Liverpool. It has long been an aspiration of Merseytravel and City Region leaders to connect the three primary line groups of the Merseyrail network to provide greater cross-city journey opportunity and remove the need for interchange and termination in the city centre. One scheme that is currently being progressed is the Wapping Tunnel project to link the City Line at Edge Hill with the Northern Line to the south of Liverpool Central. A less well-advanced option is to further connect the Wirral Line with the Northern Line using, for example, the existing Stock Interchange Tunnel between James Street and Liverpool Central Stations/

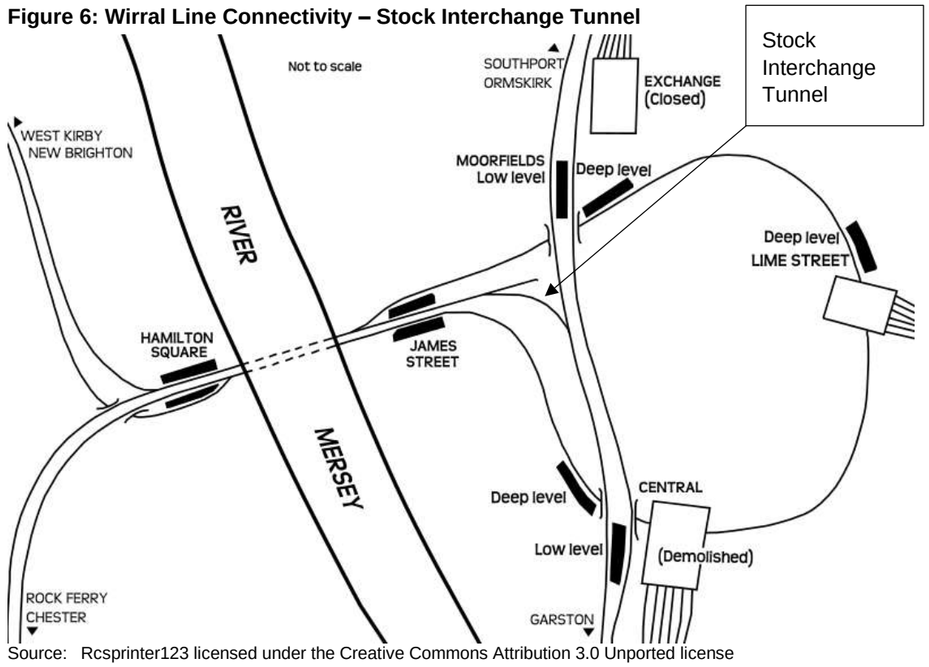
The Stock Interchange Tunnel was built in the late 1880s and formed part of the original Mersey Railways extension from James Street to Liverpool Central Low Level – the platforms that serve the Northern Line today. Today it is used purely to transport stock between the Wirral and

Northern lines of the network. It is proposed that this tunnel could be brought back into passenger use providing Wirral Line users with the ability to travel directly onwards from James Street via Liverpool Central's Northern Line platforms and southwards towards Liverpool South Parkway and Hunts Cross (and eventually towards Warrington and via the Wapping Tunnel towards Wigan).

For the A41 regeneration area, the benefits of this scheme would be in new journey opportunities, particularly direct interchange-free routes directly between Birkenhead Central or Conway Park, and Liverpool South Parkway, providing significantly improved accessibility to Liverpool John Lennon Airport. The scheme could potentially allow additional services beyond the 14 hourly Wirral Line services around the Liverpool Loop, increasing connectivity with Central Liverpool and removing the requirement to change trains at either Moorfields or Liverpool Central for onward travel.

The location of the Stock Interchange Tunnel is shown in the diagram below:

Figure 6: Wirral Line Connectivity – Stock Interchange Tunnel



Source: Rcsprinter123 licensed under the Creative Commons Attribution 3.0 Unported license

4.1.2.2 Scheme risk review

The scheme is likely to be of a significant cost since, as present, the Stock Interchange Tunnel is single track and may require widening to support two-way passenger journeys. In addition, the loop and link network in Central Liverpool would require a significant amount of re-signalling to facilitate the project. The largest single risk is at Liverpool Central's Northern Line platforms, however, since these are already overcapacity and are likely to get busier in the coming years as new rolling stock and journey opportunities are brought online. Business Case and design work is currently ongoing on a scheme to upgrade the capacity and lift the profile of Liverpool Central, and it is likely that the Wirral Line Connectivity Scheme will be dependent on the delivery of this to be feasible.

4.1.2.3 Scheme budget estimate

Assuming that the scheme would require no tunnel widening or major infrastructure works other than signalling (and that additional rolling stock capital and maintenance costs would be met by the operator) the scheme might be deliverable for between £10m and £20m. This cost would rise by orders of magnitude if tunnel widening or new boring is required.

5 Risk Register

The following table provides an overview of general risks associated with all schemes described in the previous chapters.

Table 1: Risk Register

Item	Risk	Severity	Mitigation
Ground conditions	Adverse ground conditions significantly increasing cost of scheme delivery	High	Undertake ground investigation
Planning applications	Delay to scheme delivery. Potential for objections to schemes	Medium	Consultation with public and stakeholders
Ecology	Potential for protected habitats and species	Low	Undertake Stage 1 assessments to determine extent of potential issues
Utilities	Diversion / protection of utilities significantly increasing cost of scheme delivery	High	Effective liaison with utility providers
Scheme costs	Potential for scheme delivery to be significantly greater than budgets	Medium	Undertake more detailed cost estimates with additional design information
Scheme funding	Packages of schemes do not attain funding approval	High	Prepare business case for phased packages of schemes
Land ownership issues	Schemes are undeliverable	Medium	Undertake detailed land ownership searches for all schemes
Type and density of development	Development within A41 North Corridor regeneration area does progress as proposed, significantly reducing requirement for transport interventions	High	Maintain dialogue with primary land use developers
Change in Council priorities	Wirral Council not supporting new development in the study area	Low	Regular reporting to Council members

Source: Mott MacDonald

From the above it can be seen that the key risks are considered to be:

- Adverse ground conditions, especially around the Hind Street and Woodside sites where it is likely that there will be contamination and buried structures from current and former industrial uses that may need to be mitigated;
- Currently no information of type and scale of utilities which could have a significant influence on the deliverability of schemes;
- The availability of sufficient scheme funding to deliver the suites of schemes, rather than just individual elements of the packages; and
- The speed and the type of development that comes forward in the A41 North Corridor regeneration area and the surrounding areas. Low take-up and / or low development density would have a significant influence on the type and requirement for transport schemes.

6 Public Transit Options

6.1 Background

One of the key schemes to support the A41 North Transport Strategy laid out in the preceding chapters is the implementation of a high quality, high frequency transit system to provide users of the development with a real alternative to the private car. Considerable work to date has been undertaken to develop the 'Wirral Streetcar' system – a light rail system, the first phase of which would be designed to run on the existing heritage tram tracks between Woodside Ferry Terminal and Shore Street, extending on new rails to Wirral Waters via Egerton Wharf and Tower Road. Later phases would then extend around Wirral Waters and further afield, utilising the existing track-bed from the previous freight railway in the area.

Opportunities to extend the existing Heritage Tramway to make it part of the commercial offering of Birkenhead were explored by Wirral Council in a 1996 study, with further investigation of costings in 2001. A further presentation to Merseytravel in late 2008 recognised that Birkenhead needed to establish itself as an attractive destination for inward investment by creating attractive links to the signature locations in the town (Birkenhead Park, Europa Boulevard, and Hamilton Square) connecting new development (including Wirral Waters) to Merseyrail and Mersey Ferries. It was discussed that a more attractive and higher capacity mode was required for this purpose than the existing offer of service buses; the Hamilton Square – Birkenhead Park axis is already served by buses but these did not serve to boost the town's image, nor were the existing service buses suitable for use in the pedestrianised areas and parklands likely to arise as part of the regeneration of the area.

Merseytravel commissioned a Wirral Tram Reinvigoration Study in 2009, considering whether the assets and current operating pattern of the heritage tram system in place could be used to greater effect to generate increased use and revenue whilst future improvements and extension plans were being developed. Engagement with Peel Holdings late in 2009 enabled the project to be refined to integrate with the transport and place making needs of the Wirral Waters development, including development of the Wirral Waters Loop to serve the dockside developments, providing the link to the wider transport network at Hamilton Square and assisting in local movement within Wirral Waters.

Previous appraisal of mode options was undertaken at high level in early 2013 which looked at:

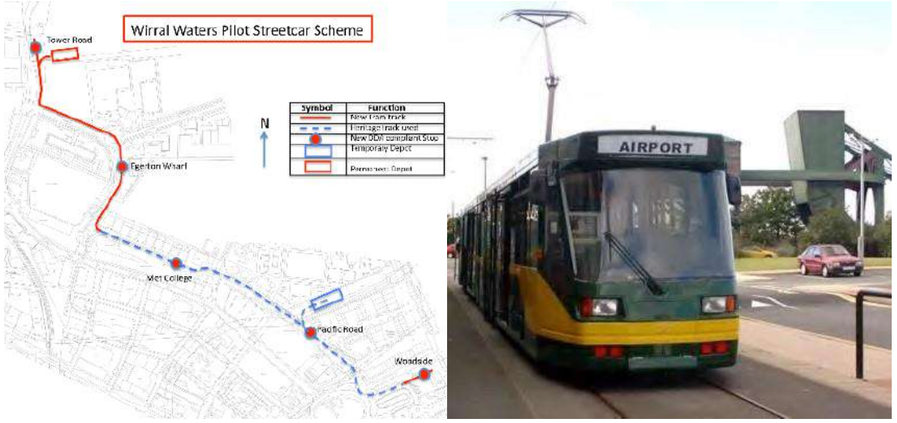
- The potential transport impacts of Wirral Waters;
- Options for dealing with impacts;
- Improving sustainable transport accessibility of the development; and
- The potential for the system to form part of the sustainable transport and economic development strategy for Wirral Waters.

During this study it was concluded that light rail operations perform better than bus modes over a range of criteria. Despite this, it is considered worthwhile to review some of the more specific mode options for the proposed transit system since the network proposals put forward in this document extend beyond the original aspirations of Streetcar to serve corridors including New Brighton via Seacombe, and Liverpool via the Queensway tunnel, and therefore present a different set of requirements to those originally envisaged. Indeed, as a result of the wide geographic extent of the proposed network, it is clear that other options should be considered in enhancing the network and the ultimate solution may involve a different type of transit mode or indeed a combination of different modes working in concert.

A full review of the various transit options that may be considered in this context is included as **Appendix A** of this document, however this section provides an overview of those considered to be the most suitable of these in a Wirral Waters context.

6.2 The Wirral Streetcar Pilot Scheme (Phase 1A)

Figure 7: The Wirral Streetcar



Source: Streetcar Feasibility Report

Although not yet constructed, Wirral Streetcar Phase 1A has been proposed, developed and heavily promoted as a transit solution to serve the Wirral Waters development area. In general Streetcars are a form of Light Rapid Transit (LRT) guided by tracks usually on or partially on highway and receive electricity from overhead wires which are responsible for powering the vehicle; as they are directly electrically powered they tend to have low levels of emissions. Streetcars are a form of local transport, which implies that they are usually better for shorter journeys with more frequent stops allowing passengers to get closer to their desired destination.

6.3 Other Streetcars

Figure 8: Streetcars

Source: Wikimedia

A.1.1 Case study: Toronto Streetcar

- Location: Toronto
- Population: 2,732,000
- Population Density: 4,334 p/km2
- Cost Per Streetcar: £2.5 million
- Frequency: 4-9 minutes
- Length of Track: 83 km
- Track Gauge: 1495 mm
- Minimum Radius of Curvature: 10.973 meters
- Electrification: Trolley Wire 600 V DC
- No. of Streetcars: 264+
- No. of Stops: 685
- No. of Lines: 11
- No. of daily rides: 292,000 passengers
- Dimensions: 30.2 meters long, 2.4 meters wide and 3.84 meters high
- Capacity: 250 (70 seated, 150 standing)
- Speed: maximum 43 mph
- Driven: Driver
- Power: Electricity

Advantages

- These streetcars have a smaller minimum radius of curvature than other methods of transport discussed, this would be ideal for use in the Wirral as there is restricted space.
- High capacity compared to other methods of transit discussed, this would be good in the later stages in the redevelopment.
- Tram systems have a proven ability to act as a catalyst for economic development, investment and regeneration, and to attract motorists to switch modes and thus reduce traffic congestion, providing added environmental benefits.

Disadvantages

- It would be more difficult to expand widely than some of the other methods discussed as new tracks would have to be implemented.

Table 2 <Streetcar>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation Cost – Wirral Streetcar Phase 1A	
Implementation cost – wider system	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

Note: This comparative analysis table and those that follow in sub-sections below provide a high level overview only and are not intended to form a rigorous quantified appraisal of the relative merits of each mode. Further work will be required on this subject to establish the optimum mode for the transit system proposed considering such criteria as economy, image, safety, accessibility, integration, mode share, and as noted previously, the ultimate solution may be formed of a combination of different modes which, together, form an integrated network.

6.4 Electric Trolleybus

Figure 9: Electric Trolleybus

Source: Wikimedia

Electric trolleybuses are rubber-tired vehicles powered by electricity from overhead using spring-loaded trolley poles, this means there is no need to stop to refuel or recharge. Being solely powered by electricity, trolleybuses have extremely low emissions.

Modern trolley buses also have a battery which allows them to travel off-wire and reroute around anything obstruction blocking their path, or detour for short sections of route.

6.4.1 Case study: San Francisco Muni

- Location: San Francisco
- Population in Catchment Area: 884,400
- Population Density 7,132 p/km2
- Cost Per Trolleybus: £300,000 - £1 million depending on age and specification
- Frequency: 20 minutes
- No. of Trolleybuses: 268
- No. of Stops: 142
- No. of Lines: 16
- Dimensions: 12-25 meters long and 2.55 meters wide
- Capacity: 82-200 passengers
- Speed: maximum speed 50 mph, average speed 38 mph
- Driven: Driver
- Power: Electricity

Advantages

- The trolleybus is significantly quieter than an original diesel bus which could be more suitable in residential areas.
- If there is an obstruction in its normal path, it can drive off wire for a period of time to manoeuvre around the obstruction, unlike streetcars or trams that operate on fixed tracks.

Disadvantages

- They are less manoeuvrable than traditional buses.
- Other forms of transport are easier to adjust or expand as overhead wires would have to be added or amended.

Table 3 <Electric Trolleybus>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

6.5 Tram bus

A tram bus is a tram on pneumatic tyres instead of tracks. The tram bus must have its own infrastructure to reach a good operating speed. What makes the tram bus so unique is that it combines the efficiency and stability of a tram with the flexibility of a bus. The tram bus has a much larger capacity compared to a traditional bus and can also run as an electric or hybrid vehicle, making it even more environmentally-friendly.

6.5.1 Case Study: Malmo Sweden

Figure 10: Skanetrafiken Tram bus

Source: Wikimedia, YouTube - MediaServiceTV1

- Location: Malmö, Sweden
- Population in Catchment Area: 341,457
- Population Density: 2,175 p/km^2
- Cost of Buses: approximately £650,000, based on 30 being bought for £19million
- Frequency: 5 minutes
- Length of Route:
- No. of Buses: 15
- No. of Stops: 40
- No. of Lines: 1
- No. of Daily Rides: estimated 13,700 -21,000
- Dimensions: 24 meters long
- Capacity: 55 seated with 95 standing
- Driven: Driven
- Power: Compressed Natural Gas (other options available)

Advantages

- There is little construction cost, primarily only the cost of the vehicles.
- Routes can easily be changed or extended.

Disadvantages

- Much higher capacity than possibly required in the case of Wirral Waters.
- Would need trained drivers and would not be able to rely on volunteers as the Wirral street car proposes to do.

Table 4 <Tram buses>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	

Criteria	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

6.6 Bus Rapid Transit

Bus Rapid Transit is a form of rapid transit which involves stretches of highway being segregated and dedicated for the use of specialist buses. Where this is not possible due to land constraints, the specialist buses will use public highways. When using public highways, the buses will typically be given priority over other road users to reduce delays. Station platforms should be level with the bus floor for quick and easy boarding, making the system fully accessible for wheelchairs and disabled passengers with minimal delays.

6.6.1 Case study: BRT Sunway Line

Figure 11: BRT – Sunway Line

Source: Wikimedia

- Location: Subang Jaya, Malaysia
- Population in Catchment Area: 6,071,644
- Population Density: 6,581 p/km^2
- Cost of Buses: £3.3million for 8 double deckers and 6 larger single deckers in York
- Planning & Capital Cost: £24.5 million
- Frequency: 4 minutes
- Length of track: 5.4 km
- No. of Buses: 15
- No. of Stops: 5
- No. of Lines: 1
- No. of daily Rides: 5,300 passengers
- Dimensions: 11-12 meters long
- Capacity: 80
- Speed: 50 mph
- Driven: Driven
- Power: Electric,

Advantages

- Electric Buses mean virtually zero emissions
- Faster than some other methods of transport discussed

Disadvantages

- High capital cost compared to the Wirral streetcar

Table 5 <Electric BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

6.6.2 Case study: New York BRT

Figure 12: BRT – New York

Source: nyc.streetsblog.org and nyc.gov

- Location: New York
- Population in Catchment Area: 8,538,000
- Population Density: 10,630 p/km^2
- Cost p/km: $1,072,000
- Frequency: 3-4 minutes
- Length of track: 90 km

- No. of Buses: 398
- No. of Stops: 145
- No. of Lines: 7
- No. of daily Rides: 245,566
- Dimensions: 11-12 meters long
- Capacity: 120
- Average Speed: 10.2 mph (average speed including stopping time)
- Driven: Driven
- Power: Hybrid & CNG

Advantages

- High frequency and capacity which means it would be more reliable than just having one streetcar every 15 minutes.

Disadvantages

- The vehicles only travel at 10mph on average making journeys even longer than using other methods of transport
- Hybrid engines are not as eco-friendly as other methods of transport discussed.

Table 6 <Hybrid BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

6.6.3 Case Study: Cambridgeshire Guided Busway

Figure 13: Cambridgeshire Guided Busway

Source: Geograph & Flickr

- Location: Cambridge
- Population in Catchment Area: 123,867
- Population Density: 3,135 p/km^2
- Cost p/km: Bronze average £7,400,000
- Frequency: 5 minutes
- Length of track: 40 km
- No. of Stops: 8
- No. of Lines: 1
- No. of daily Rides: 12,000
- Dimensions: 11-12 meters long
- Capacity: 120
- Average Speed: 37mph
- Driven: Driven and Kerb guidance
- Power: Diesel

Advantages

- Provides faster transport than other methods discussed
- Has 25km of segregated busway that is specifically for these buses which limits the impact of traffic disruption

Disadvantages

- The buses are powered by diesel and will produce the highest amount of emissions compared to other methods discussed.

Table 7 <Diesel BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility	

Criteria	
How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

6.7 Summary

Based on the analysis above, and the various costs, constraints and characteristics of each system in the context of Wirral Waters, four of the potential available modes have been shortlisted as representing the most likely to offer benefit and value-for-money for the travelling public. As well as the Streetcar mode which is at a more advance state of development in the Wirral Waters context than other modes and has considerable support from multiple parties, the following modes are shortlisted for further consideration:

- Tram-Bus
- Bus Rapid Transit
- Electric Trolley Bus

At this stage, no ultimate preference is expressed for any one of these modes over the other within this document. The considerable work that has been undertaken previously to develop the Streetcar scheme is noted, including the work undertaken to establish a Light Rail mode as the most suitable in a Wirral Waters context[1]. Despite this, the expansion of the network to north (New Brighton), south (Birkenhead Central and potentially ultimately Rock Ferry or beyond) and east (Liverpool City Centre) may alter the conclusions of this modal analysis, particularly in light of the need and desire to integrate with plans on the Liverpool side of the Mersey to create transit links to Liverpool Waters and the Knowledge Quarter etc. As such it is recommended that further future consideration of modes be undertaken noting that the ultimate solution may represent a combination of different modes working in concert with each other.

The table overleaf summarises the key considerations with regard to each of these four modes, and a wider review of additional modes is provided in Appendix A of this document.

[1] Wirral Waters Transport Options Appraisal, 2013 - Vectos

Table 8<Comparison of Transit Modes – Summary Table>

	Street Car	Tram Bus	Bus Rapid Transit	Electric Trolley Bus
Example				
	Toronto Street Car	Skanetrafiken Tram Bus (Sweden)	Cambridgeshire Guided Busway	San Francisco Electric Trolley Bus
Attributes	• Frequent stops ensure passengers can get very close to desired destination. • Provide a frequent and reliable service. • Attractive to passengers as 10% of Toronto's population use streetcars each day.	• Routes can be easily altered, or new routes added as the vehicles operate on the existing road network. • Can become a 'transit like system' if investment is made in e.g. real time passenger information, priority signals, enhanced shelters etc.	• Magnetic or kerb guidance with the ability to travel on-carriageway, when land restrictions are poor at the end of routes or in urban areas. • Many new guided busways also incorporate shared use paths along their length	• Much quieter than traditional buses, which is preferred in residential areas. • Able to drive 'off-wire' for short periods using battery power to avoid obstructions in the normal path or to detour from the wired section. • Low emissions as electricity is sole source of power.
Opportunities	• Streetcars typically have a longer lifespan than traditional motor buses. • Potential to add additional streetcars to increase frequency and capacity. • More reliable journey times and higher frequency than other buses	• Low outline cost as no rails or overhead power lines are needed. • Low outline capital costs could lead to lower ticket prices for passengers. As the main capital cost would be purchasing the vehicles. • Higher frequencies and capacity, giving more opportunity to provide dedicated areas for different user groups	• More reliable journey times and higher frequency than other buses • Promotes increased levels of active travel if appropriate infrastructure is developed alongside the routes • Conventional bus routes can be withdrawn, reducing traffic levels in certain areas.	• Can operate on roads with higher gradients than traditional buses. • Typically have a longer lifespan than traditional motor buses. • The cost of a trolley bus can be considerably lower than that of a Streetcar.
Constraints	• Less manoeuvrable or flexible than traditional busses. • The cost to replace a streetcar or to upgrade to newer model is relatively high. • Longer routes cannot be easily altered or extended as new tracks would need to be implemented.	• Running on open highway in some areas can add delay to services, decreasing customer confidence in the network.	• High outline capital cost to develop key infrastructure (track, stops, car parks etc.) • High initial costs likely to be passed onto passengers in ticket prices • Difficult and expensive to expand or alter guided section of routes, but flexibility allows onward travel on traditional highway.	• High outline capital cost to construct overhead cables. • Less manoeuvrable or flexible than traditional busses. • Longer routes cannot be easily altered or extended as new overhead wires would need to be implemented. • Overhead cables can have a poor aesthetic value.

7 Economic Impacts / Benefits Review

7.1 Introduction

In the next section (Section 8) the preferred schemes described earlier in the document are modelled and appraised using various traffic modelling tools, providing an understanding of the benefits versus costs involved with each. In reality many of the schemes' most significant benefits are not identifiable from traditional traffic models since they relate to public realm improvements, reduced severance for pedestrians and cyclists, enhanced quality of place and other less tangible effects. In many cases, the benefits are only identifiable as economic effects in terms of land value increase, GVA gains and employment growth. As a result, and prior to discussing the modelling results, this section provides a discussion of the qualitative benefits that may be expected from the implementation of 32 schemes to demonstrate the value in terms of benefits to Wirral of implementing these schemes and to its residents and employers.

The purpose of this section is to demonstrate the value of these shortlisted schemes in terms of benefits that they could provide should they be constructed. In place of transport benefits this chapter will provide a narrative of the potential economic benefits in terms of jobs created and quantum of development unlocked as well as other social benefits such as improvements in health, increased equality for minority groups and access to employment and other facilities and amenities.

7.2 Schemes considered in this section

As noted above, this chapter deals exclusively with 32 schemes for which the modelling tools available are not able to discern all transport benefits but for which clear economic and/or social benefits exist. The 14 schemes that can be modelled using the available modelling tools are discussed in the next section.

The 32 schemes are listed in the following sub-sections and divided into phases as detailed previously.

7.2.1 Phase 1 Schemes

The transport schemes assessed in this section that are part of Phase 1 are described below in Table 9. These schemes are anticipated to be delivered between 0-5 years of the publication of the final strategy.

Table 9: Details of Phase 1 A41 North Corridor transport schemes

Scheme name	Description
Station facilities and waiting environment enhancements	The purpose of this scheme is to encourage greater use of rail for all trip purposes by improving the experience, ease of access, and comfort of the wait associated with the mode at rail stations. The scheme would seek to deliver for all rail stations across Wirral (subject to an audit of need): • New and improved waiting shelters with enhanced seating, CCTV and heating units; • Automatic Ticket Machines at all stations with no staff presence (and ultimately at all stations), at which a full range of tickets may be purchased; • Enhanced retail units at stations with a sufficient potential demand, to include newspapers, food and drink; • Upgraded information boards and screens; and • Secure cycle parking. This is already available at most Merseyrail stations but should be extended to all including Borderlands line stations.
Wirral line park and ride enhancements	This scheme proposes to deliver new and increased parking capacity at several key stations across the borough with the aim of increasing the accessibility of stations for those outside immediate walking or cycling distance, and thereby reducing the number of journeys within the borough made entirely by private car.
Green Lane station refurbishment	The scheme would involve the installation of upgraded disabled facilities, enhanced lighting, a new ticket counter and two new seated waiting areas. It would also involve a refurbishment of the stairway and exterior of the station, as well as the parking area to the front. The aim of this is to create a more attractive public transport offer for new and existing passengers and thereby reduce the number of private car trips made within the borough.
Birkenhead Central: new forecourt and eastern access route	Birkenhead rail station is one of the most popular entry points to the town for workers and shoppers, but it suffers from several operational issues, including: • Poor interchange with bus services due to the space constrained nature of Argyle Street South outside the station; • No car parking, pick-up or drop-off facilities. Again, adding to the poor traffic environment outside the station; • Only limited secure cycle parking; and • A large highway gyratory situated between the station and the town centre, which is a real barrier to pedestrian movement. To alleviate these issues this scheme could potentially comprise the following: • The removal of a derelict rail storage shed to the east of the station; • The creation of a second pedestrian access to the station from the east; • Provision of a new station forecourt to the east, and south of Hind Street. The forecourt could allow a turnaround for buses, pick-up and drop-off and possibly car parking.
Improvements to bus infrastructure at Birkenhead Park and Conway Park	This scheme would deliver new bus interchange facilities at both Birkenhead Park and Conway Park stations to improve access to the railway stations and encourage multi-modal journeys. The scheme would also include the replacement of existing bus provision at the stations with enhanced bus stopping facilities in easy reach of the station entrances and providing shelter, seating and information on interchange and upcoming services via Real Time Information. Signage would also be improved with mutual signage between bus and rail areas.
Hamilton Square bus / rail interchange improvements	In this scheme, works would be implemented outside Hamilton Square rail station on Hamilton Street to improve passenger interchange between rail and bus. The works are primarily planned to comprise of: • Allowing two-way bus routing on Hamilton Street outside of the station. This will allow greater flexibility in bus routing, plus shorter walk distances for passengers; • Improved waiting environment for passengers; • Public realm works to the footway and carriageway; and • Taxi ranking facilities.
Birkenhead North bus / rail interchange improvements	This scheme would deliver new bus interchange facilities at Birkenhead North station to improve access to the railway station and encourage multi-modal journeys. The scheme would also include the replacement of existing bus provision at the station with enhanced bus stopping facilities in easy reach of the station entrances and providing shelter, seating and information on interchange and upcoming services via Real Time Information. Signage would also be improved with mutual signage between bus and rail areas.
Birkenhead Central bus / rail interchange improvements	This scheme would deliver new bus interchange facilities at Birkenhead Central station to improve access to the railway station and encourage multi-modal journeys. The scheme would include the replacement of existing bus provision at the station with enhanced bus stopping facilities in easy reach of the station entrances and providing shelter, seating and information on interchange and upcoming services via Real Time Information. Signage would also be improved with mutual signage between bus and rail areas.

Scheme name	Description
A41 Chester Road / A552 Borough highway realignment (Phase 1)	This scheme forms the first phase of the scheme which is likely to have the most significant and wide-reaching transport impacts being proposed as part of this study. This scheme gives an interim construction arrangement which indicates how the streets could function whilst the flyovers are being dropped. Key to this could be the use of the historic streets of Borough Road East and Tunnel Road, however it is noted that highway capacity will be significantly reduced during the construction period.
A41 Chester Road / Ivy Street junction improvement	This scheme is associated with removal of the Birkenhead flyovers, and will reconfigure the Chester Road / Ivy Street junction to be suitable for the new traffic arrangement. The scheme also offers the opportunity to improve pedestrian crossing facilities through the junction to better link the town centre with the riverfront and Birkenhead Priory. The scheme would also incorporate improved landscaping around the junction.
Signage improvement to Birkenhead Priory	A signage strategy and interpretation boards could be used to link the Priory with local destinations (the town centre, Hamilton Square and Woodside). Later, the scheme could be enhanced with improved walk routes and landscaping.
Electric charging points across borough	This scheme would provide electric charging points across Wirral to improve the infrastructure available or electric vehicles. The aim would be to create a comprehensive network of publicly available charge-points across the borough with associated ancillary technology including an app and website to show the location of nearest facilities.
Signage and better entrance to retail core	This scheme would improve the quality of pedestrian and cycle signage to Birkenhead Town Centre from key gateways including Birkenhead Bus Station, Conway Park and Birkenhead Central rail stations, the Borough Road / Whetstone Lane junction and the Claughton Road / Exmouth Street junction.
Birkenhead local access road improvements	This scheme would provide a package of small-scale local access road improvements, enhancing surface quality, removing potential safety risks, and upgrading footways and public realm. The aim of the scheme is to improve access and movement along these links and provide a higher quality experience for all users including pedestrians and cyclists.
Road safety improvements at Whetstone Lane / Borough Road	The scheme would involve a significant design stage and would require junction modelling to arrive at an optimum solution which avoids traffic congestion or excessive queuing. In principal, however, the scheme is designed to re-balance priority in favour of the pedestrian and an increase in overall traffic delay at the junction is therefore to be expected.
Improved public realm in retail core	The scheme would seek to refurbish the entire area providing new surfacing, fresh planting and with a complimentary signage and access strategy to improve the environment around the retail core and stimulate use.
Improved public realm Argyle Street	This scheme would seek to achieve a balance between the requirement (if any) for through traffic movements and improving the environment for walking and cycling. At this time, the scheme is seen as extending from Hamilton Square to Conway Street. However, it would coordinate with other improvement schemes to help achieve and overall area wide benefit.
Cleveland Street / Market Street / Price Street public realm	This scheme would seek to introduce public realm improvements on each of the streets suitable for their function and form. Also important will be facilitating ease of walking and cycling between residential, commercial, retail and education facilities.
Improved public realm Conway Street	This scheme would seek to upgrade Conway Street so that it is more suitable for pedestrian crossings, and that it is more consistent in nature along its length. Measures could include: • Carriageway narrowing to widen footways, create on-street parking bays and reduce road crossing widths; • Removal of guard railing and general street decluttering; • Improved surfacing on footways; and • New landscaping, and if possible tree planting.
Improved pedestrian crossing facilities along Argyle Street	This scheme is linked with Schemes 17 and 18 to improve the environment on Argyle Street. The scheme will specifically help pick up north / south and east / west pedestrian desire lines along and across Argyle Street which may be currently lacking – such as at Market Street. Crossing types could be mix of uncontrolled (dropped crossings and refuge islands) or controlled (such as zebra crossings).
Conway Park and Birkenhead Market improved walk route	The Conway Park scheme will create a significant increase in activity in this area of Birkenhead and will be attracting trips from all directions. This scheme will therefore need to coordinate well with other transport schemes being promoted within this report to ensure overall benefits are being maximised. This scheme would also provide an improved route around Conway Park connecting to Birkenhead Market, to attract increased footfall into the retail core, and to provide improved accessibility to new development north of Conway Park. The scheme would greatly improve the quality of public realm and signage on Europa Boulevard and would install new high-quality crossing facilities over Conway Street to improve integration with the bus station and wider town centre.
Improved public realm Conway Park and Europa Boulevard	As described in Conway Park and Birkenhead Market improved walk route scheme.
Hamilton Square and Hamilton Street improvements	This scheme includes the following proposals: • Removal of the two large mini roundabouts on the east side of the Square and replaced with a more informal space shared between pedestrians and vehicles; • Removal of the road closure between Duncan Street and Hamilton Square; • Conversion of Duncan Street to be two-way to traffic for its full length; • Conversion of Hamilton Street to be two-way to traffic between Hamilton Square and Hinson Street; • Conversion of Hinson Street to be two-way to traffic between Argyle Street and Hamilton Street; • Improved landscaping, including tree planting where possible; • Road narrowing via creation of sheltered on-street parking bays and uncontrolled pedestrian crossings; • Improved public realm, including street furniture and footway resurfacing; and • New and repositioned bus stops and waiting facilities to take advantage of the new street circulation and passenger destinations. The scheme will also need to coordinate with other initiatives being proposed by this package of works, including: • Argyle Street public realm improvements; • Market Street enhancement; and • Works outside of Hamilton Square station.
Relocation of Birkenhead bus station	As part of proposals to improve the route between Conway Park station and Birkenhead Town Centre, and to provide additional space with which to extend the town centre offer including the Market, it is proposed to relocate the bus station to a more suitable location. There is also an important integration argument for this scheme since the bus station is currently remote from the three town centre stations (although it is closest to Conway Park) and is rather peripheral to the primary retail core.
A41 / A552 / Flyovers remodelling – Phase 1	This scheme forms the first phase of the scheme which likely to have the most significant and wide reaching transport impacts being proposed as part of this study. At the heart of the scheme is the removal of the elevated highway fly-overs to the south of Birkenhead town centre. The flyovers themselves are basically made up of two structures: one structure (owned by Merseytravel) gives access to the Queensway Tunnel from the A41 Chester Road and the A552 Borough Road; and the second structure (owned by Wirral Council) gives

Scheme name	Description
	direct linkage between Chester Road and Borough Road. Also associated with the flyovers are range of other free-flowing highway links – including an underpass to Chester Street.
Other A41 Site Access Improvement Schemes – Phase 1	Associated with the removal of the flyovers to the south of Birkenhead town centre, would also be complimentary works to provide appropriate site access arrangements to currently undeveloped or underutilised land. Particularly the significant area of brownfield land between Green Lane and Birkenhead Central rail stations. • *Queensway Toll Plaza Re-modelling / Removal:* This scheme would aim to increase Queensway's capacity through remodelling/removing the toll plaza in Wirral and instead utilising ANPR technology to administer and enforce the toll system as currently occurs on the Mersey Gateway Bridge. • *Green Lane Roundabout capacity improvements:* This scheme would comprise a series of improvements to the Green Lane / A41 roundabout to increase capacity, flow and journey time reliability of the A41 Strategic Corridor. Journey times on the A41 during peak periods will be improved and delays reduced. • *Campbelltown Road capacity improvements:* This scheme proposes improvements to Campbelltown Road to improve access to Cammell Laird and the offshore wind farm businesses. • *A41 Southern Bus Access improvements*: This scheme proposes the delivery of new or enhanced bus services, including where appropriate infrastructure improvements, connecting rail stations and town centres with employment sites and retail parks along the A41 North Corridor. In particular relation to the town centre and A41 area, bus services from the A41 North Corridor would be re-routed via the proposed new infrastructure to provide direct access to the bus station, Queensway Tunnel and other required routes.

Source: Mott MacDonald

7.2.2 Phase 2 Schemes

The transport schemes assessed in this report that are part of Phase 2 are shown below in Table 10. These schemes are anticipated to be delivered between 5-10 years of the publication of the final strategy.

Table 10: Details of Package 2 A41 North Corridor transport schemes

Scheme name	Description
Regenerating Woodside and Hamilton Square	One of the main issues which the masterplans have sought to overcome are the barriers to movement between Woodside towards Birkenhead. Two options have been developed to reconfigure the Woodside Gyratory to give an indication of the land which would be released and how pedestrian movement could be significantly improved between Hamilton Square and Woodside. In the first option, an east / west street grid is reinstated, and in the second option Chester Street is realigned with Canning Street through the middle of the gyratory. Both offering significant benefits, but the second option would provide the greater traffic capacity.
Access road to Rosebrae development site	This scheme reviews options for access to the proposed development. The simplest access point would be from Church Street which runs adjacent to the eastern boundary of the site. This road gives direct access to the A41 Chester Street and should be sufficient to serve a relatively low density development similar to Priory Wharf. Should a higher density development with more car parking be proposed, an alternative access strategy may be required.
A41 / A552 / Flyovers remodelling – Phase 2, and Access to Hind Street - Mollington Link Road	The final arrangement will be subject to more detailed planning, design and consultation but is expected to include the following key elements: • Removal of the Borough Road / Argyle Street gyratory and replacement with a four-arm signal traffic signal junction. This junction should include high quality pedestrian crossing facilities, and to link Birkenhead Central rail station with the town centre; • Creation of a new east / west link between Borough Road and Chester Road, and connecting with Chester Street. Hence, forming the at-grade replacement to the Wirral Council flyover; • A new junction connection to King's Square to the north forming the at grade replacement to the Merseytravel flyover and main access route to the Queensway Tunnel; • A new junction with Chester Street, removing the requirement for the underpass. This junction could free up significant space which could be used for new development, or potentially a new public park around the Tunnel Monument which was formerly located in King's Square; • The revised access arrangement to Queensway Tunnel would also allow the reconfiguration of the Toll Plaza, which would again free up significant space for other uses; and • Creation of new connections into the undeveloped / underutilised land between the Green Lane and Birkenhead Central rail stations to help facilitate new development.
Birkenhead Green Corridor	Bisecting Birkenhead is a former rail corridor which used to link the Wirral Waters dock area with the Chester rail line. This rail line is now disused and the rail tracks removed, but the corridor itself remains almost intact. This scheme will seek to bring this corridor back into active usage, to make it into a significant asset and to be a key catalyst not only in the regeneration of Birkenhead but also the wider area – including Wirral Waters. Key elements of the scheme will be: • To fill-in the cutting to bring the surface level to the same grade as adjacent streets; • Where possible, to reconnect severed streets to again increase the permeability of the corridor; • To open the corridor to public transport, pedestrians and cyclists only. This will therefore create a high quality segregated corridor, linking Wirral Waters with Birkenhead town centre and the development land adjacent to Birkenhead Central rail station; • To introduce CCTV and street lighting to again promote personal security. The transit corridor could be used by a variety of types of vehicles from conventional buses, to specialist vehicles such as light tram.
Riverside Green Link	This scheme presents the opportunity to create another high quality connection to the Waterways via Morpeth Dock which currently closed off to public access. The dock and the adjacent land is believed to be under the ownership / control of British Waterways, and it may well be that an agreement could be reached for the land to be opened up for improvement and public access. If this can be achieved it will be possible to create a pedestrian and cycle route between Shore Road to the east of the Twelve Quays College, through Morpeth Dock and connect with the Wirral Circular Trail. Links to this scheme could be made to the Birkenhead Green Corridor scheme which enable almost a traffic free walking and cycling route between Birkenhead town centre and the River Mersey Waterfront which would likely be very popular for recreational and commuter travel. A second connection to the Birkenhead Green Corridor scheme could also be made via Egerton Wharf and hence Egerton Dock. Again, improving walking and cycling linkage between the town centre and Wirral Waters.

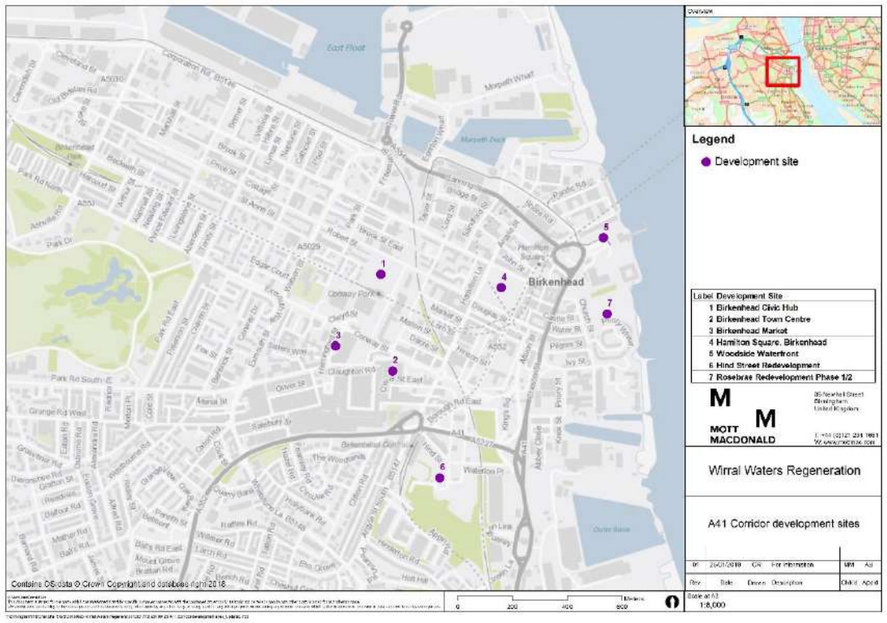
Source: Mott MacDonald

7.3 A41 North Corridor Regeneration Area

The A41 North Corridor is a strategic route into Birkenhead linking the eastern side of the borough into the commercial and employment centre. The transport corridor and town centre have evolved independently leaving people arriving in the town centre isolated as well as creating transport barriers. As a key gateway into Birkenhead the A41 North Corridor is overcomplicated and creates a significant barrier to other modes of transport, especially pedestrians and cyclists. To support the regeneration of the area the transport network in this area including the A41 North Corridor must be improved to support the development of key proposed development sites and the redevelopment of existing employment centres in this region.

There are 7 key existing employment areas and proposed development sites within the vicinity of the A41 North Corridor that include a range of both employment and residential uses. The location of these 7 key existing employment areas and proposed development sites are shown on the map below.

Figure 14: A41 North Corridor development sites



Source: Mott MacDonald

The proposed employment and residential development for these sites and within these key existing areas are outlined in the table below.

Table 11: A41 North Corridor proposed development details

Site number	Site name	Proposed land use*	Source
1	Birkenhead Civic Hub	A 26,942m² office requirement for Wirral Council and several other public sector covenants, with scope for additional leisure development of up to 2,323m² on adjacent sites.	Wirral Growth Company: Our growth prospectus
2	Birkenhead Town Centre	The council is developing a regeneration plan for Birkenhead's historic core and has brought numerous properties in to its ownership, so it can work with joint venture partners. There's scope for almost 32,516m² of commercial development, 200 residential units and car parking.	Wirral Growth Company: Our growth prospectus
3	Birkenhead Market	A transformation of the market to create a unique and highly differentiated food and leisure dining offer capable of drawing in tourists and visitors from a wide area.	Wirral Growth Company: Our growth prospectus
4	Hamilton Square, Birkenhead	This Grade I-listed square offers potential for a £60m transformation to include boutique hotels, offices and 3,345m² of leisure space. Birkenhead Town Hall can become a destination hotel and wedding venue, an arts space or theatre complex.	Wirral Growth Company: Our growth prospectus
5	Woodside Waterfront	A prime waterfront site with outstanding views to Liverpool's World Heritage waterfront. A 464,512m² mixed use scheme with a GDV in excess of £300m and scope for hotels, leisure, offices and high-end residential.	Wirral Growth Company: Our growth prospectus
6	Hind Street Redevelopment	A 7.9ha mixed use development site whose land uses will not compete with Birkenhead Town Centre.	Information from Wirral Council
7	Rosebrae Redevelopment Phase 1/2	Phase 1 development aims to deliver approximately 300 new residential units. Phase 2 development envisaged to be focused on mixture of commercial and leisure use.	Information from Wirral Council

Source: See Source column in table. * Floorspaces have been converted from sqft in initial information to m² for consistency with requirements of TEAM calculations.

7.3.1 Summary

The A41 North Corridor is a strategic route into Birkenhead and is therefore essential to the regeneration of this economic centre and the economic buoyancy of the borough. Along the A41 North Corridor there are a number of high-profile proposed development sites as well as plans to regenerate already existing areas through new development which could deliver up to **608,638m² of developable floorspace** and **500 new homes** to support local growth.

The table below outlines a summary of the reported totals of employment and residential development anticipated on each of the identified sites.

Table 12: A41 North Corridor proposed development summary

Site number	Site name	Proposed employment development	Proposed residential development
1	Birkenhead Civic Hub	26,942m² office floorspace 2,323m² leisure floorspace	N/A
2	Birkenhead Town Centre	32,516m² commercial floorspace	200 new residential units
3	Birkenhead Market	A transformation of the market to create a unique and highly differentiated food and leisure dining offer capable of drawing in tourists and visitors from a wide area.	N/A

Site number	Site name	Proposed employment development	Proposed residential development
4	Hamilton Square, Birkenhead	3,345m² leisure floorspace	N/A
5	Woodside Waterfront	464,512m² mixed use floorspace including office leisure, hotels and office	Some anticipated residential use
6	Hind Street Redevelopment	A 7.9ha mixed use development	N/A
7	Rosebrae Redevelopment Phase 1/2	Phase 2 development envisaged to be focused on mixture of commercial and leisure use	Phase 1 development aims to deliver approximately 300 new residential units

Source: Wirral Growth Company: Our growth prospectus, Wirral Council

7.4 Quantified Economic Impact

This scheme has the potential to support the development of these sites for both employment and residential uses. To demonstrate the potential value of these sites to the local economy, the potential gross number of jobs that can be accommodated at these sites has been assessed using Mott MacDonald's Transparent Economic Assessment Model (TEAM). TEAM assesses the economic benefits arising from land-use change calculated in line with HM Treasury Green Book principles of additionality.

TEAM has been used to assess the gross employment impacts each site could deliver to the area, based on the site information provided by a number of sources including the Wirral Growth Company and Wirral Council. Each site was entered into TEAM where a standard employment density was applied based on the proposed use for the site. The level of additionality has not been assessed due to limited information available at this time. The site details entered into TEAM are set out in Table 13.

Table 13: TEAM – Employment sites included in analysis

Site name	Land use	Size (m² or other)
Birkenhead Civic Hub	B1	26,942
	Leisure (D2)	2,323
Birkenhead Town Centre	Commercial (A1/A2/A3/B1)	32,516
Hamilton Square, Birkenhead	Leisure (D2)	3,345
Woodside Waterfront	B1	116,218
	D2	116,218
Hind Street Redevelopment	B1/B2/B8	79,000

Source: Wirral Growth Company: Our growth prospectus, Wirral Council

7.4.1 Assumptions used

As TEAM was used in this instance only to assess gross-level impacts, no additionality assumptions (such as deadweight, displacement or leakage) were used. The assumptions that were used for this assessment are set out in Table 14.

Table 14: Assumptions used

Assumption	Justification
Employment site assumptions	
Birkenhead Town Centre land use assumption	This site has been identified as being available for commercial development without any specific detail on type of commercial land use.
	It has been assumed that given the location within a town centre the land use would be split evenly between A1, A2, A3 and B1.
Woodside Waterfront	This site has been identified as having a total of 464,512m² with scope for hotel, leisure, office and high-end residential use. Without knowing the detailed breakdown of the total floorspace assumptions have been on how much floorspace to attribute to each of the identified uses. It has been assumed that 116,128m² of floorspace is available for each of the four land uses identified.
Hind Street Redevelopment land use assumption	This site has no identified land uses. Therefore, it has been assumed that the land uses for this site will be split evenly between B1, B2 and B8 land uses.
Employment densities	
General B1 land use – 20m² of Net Internal Area (NIA) per Full Time Equivalent (FTE) job.	Where the proposed land use was listed as B1, with no further information provided, an assumption of 20m² NIA/FTE was applied, this is average of all B1 employment densities provided in Homes England (formerly the HCA) Employment Density Guide 2015.
B1c land use – 47m² NIA/FTE.	Where B1c land use was specified (in the West Float sites), the standard employment density of 47m² NIA/FTE from the HCA Employment Density Guide 2015 was used.
B2 land use - 36m² Gross External Area (GEA)/FTE.	All sites identified for B2 use were assumed to be regional distribution centres, with an employment density of 36m² NIA/FTE. This is the approximate mid-point of three B2 employment densities provided in the Employment Density Guide 2015.
B8 land use - 77m² Gross External Area (GEA)/FTE.	All sites identified for B8 use were assumed to be regional distribution centres, with an employment density of 77m² NIA/FTE. This is the approximate mid-point of three B8 employment densities provided in the Employment Density Guide 2015.
A1 land use – 18 m² NIA/FTE.	A1 retail was assumed to be equivalent to high street retail and accordingly was aligned to the standard assumption of 18m² NIA/FTE from the Employment Density Guide 2015.
A2 land use - 16 m² NIA/FTE.	The Employment Density Guide (2015) proposes an employment density of 16 m² NIA/FTE for A2 Finance and Professional Services.
A3 land use - 18 m² NIA/FTE.	The Employment Density Guide (2015) proposes an employment density of 18 m² NIA/FTE for A3 restaurants.
General D2 land use – 100m² of Gross Internal Area (NIA) per Full Time Equivalent (FTE) job.	Where the proposed land use was listed as leisure or D2, with no further information provided, an assumption of 100m² GIA/FTE was applied, this is average of all D2 employment densities provided in Homes England (formerly the HCA) Employment Density Guide 2015.
Hotels – assumed to be three staff per hotel bed.	The hotel was assumed to be a mid-range quality hotel as a mid-point assumption, the Employment Density Guide (2015) proposes an employment density of three staff per hotel bed.
Other assumptions	
GVA per worker - £44,852	GVA per worker UK NUTS Level 3 (Wirral), ONS, 2017.

Source: Mott MacDonald

7.4.2 Outputs

The high-level analysis of the employment sites identified for the A41 North Corridor schemes has found that the sites could support approximately 7,396 gross jobs and £331.7m of GVA per annum. These figures are shown at a gross-level only, and the analysis did not take into account the scale of additionality with regard to these jobs and GVA. The breakdown of the potential employment and GVA impact of each site is shown in Table 15.

Table 15: TEAM outputs

Site name	Gross jobs	Gross GVA (£m)
Birkenhead Civic Hub	1,028	£46.1
Birkenhead Town Centre	470	£21.1

Site name	Gross jobs	Gross GVA (£m)
Hamilton Square, Birkenhead	25	£1.1
Woodside Waterfront	5,226	£234.4
Hind Street Redevelopment	647	£29.0
Total	**7,396**	**£331.7**

Source: Mott MacDonald

The outputs from TEAM demonstrate that the sites identified as part of this development could have a significant impact on employment in the area. While this analysis follows best-practice for the assessment of gross employment and GVA impacts, there are a number of caveats to the outputs that may ultimately impact the scale of the employment benefits ultimately delivered by this scheme, these are:

- As stated, this analysis only assesses employment and GVA impacts at a gross level, therefore not addressing the likely level of additionality. The level of additionality of the benefits of this development will reduce the scale of these benefits; high leakage or the displacement of benefits from elsewhere in the Wirral may result in a lower overall impact than anticipated.
- Where individual sites were designated for a mix of uses, the total floorspace was divided between the three uses evenly. The eventual level of demand for each type of floorspace and the needs of the occupants of these sites may result in a different split of uses. As each land use has a different employment density, a different division of uses among B-class land uses can impact the number of jobs at each site. This analysis is based on the assumption that the division of the site is equal between the three use classes, although the actual division may vary.
- As the GVA produced by different sectors and industries varies, the GVA supported at these sites may ultimately differ from that shown in this analysis, depending on the nature of the businesses that occupy these sites, although a reasonable average figure has been applied here.

Based on the sites identified around the A41 North Corridor and the assumptions set out above, this high-level analysis has found that the development of the sites around the A41 North Corridor could support approximately:

- 7,396 jobs; and,
- £331.7m in GVA per annum.

While no comment has been made on the degree to which each package of interventions may support the delivery of these sites, this analysis quantifies the value of the proposed developments around the A41 North Corridor to the Wirral's economy, ultimately demonstrating the case for intervention to support the development around the A41 North Corridor.

The packages of interventions involved in this scheme are set out below.

7.5 Phase 1

The table below outlines the potential qualitative economic impacts for the transport schemes included in Package 1.

Table 16: Economic impact of Package 1 schemes

Scheme name	Economic impact
Station facilities and waiting environment enhancements	• Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
Wirral line park and ride enhancements	• Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
Green Lane station refurbishment	• Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
Birkenhead Central: new forecourt and eastern access route	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Directly supports access to the proposed development in Birkenhead Town Centre.
Improvements to bus infrastructure at Birkenhead Park and Conway Park	• Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Hamilton Square bus / rail interchange improvements	• Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
Birkenhead North bus / rail interchange improvements	• Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
Birkenhead Central bus / rail interchange improvements	• Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Improved connectivity and capacity for public transport systems to offer greater opportunities for commuters to labour market as well as encouraging business investment.
A41 Chester Road / A552 Borough highway realignment (Phase 1)	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment.
A41 Chester Road / Ivy Street junction improvement	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Signage improvement to Birkenhead Priory	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Electric charging points across borough	• Improved connectivity by offering opportunity to use electric cars to travel within the borough thereby supporting labour market accessibility.

Scheme name	Economic impact
Signage and better entrance to retail core	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Directly supports access to the proposed development in Birkenhead Town Centre.
Birkenhead local access road improvements	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Road safety improvements at Whetstone Lane / Borough Road	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment.
Improved public realm in retail core	• Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Improved public realm Argyle Street	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Cleveland Street / Market Street / Price Street public realm	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Improved public realm Conway Street	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities.
Improved pedestrian crossing facilities along Argyle Street	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment.
Conway Park and Birkenhead Market improved walk route	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Directly supports access to the proposed development in Birkenhead Market.
Improved public realm Conway Park and Europa Boulevard	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Directly supports access to the proposed development in Birkenhead Market.
Hamilton Square and Hamilton Street improvements	• Improved connectivity and capacity for pedestrians will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Directly supports access to the proposed Hamilton Square development site.
Relocation of Birkenhead bus station	• Directly supports access to the proposed development in Birkenhead Town Centre and the Hamilton Square development site.
A41/A552/Flyovers remodelling – Phase 1	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Reduction of severance will support labour market accessibility and business investment.
Other A41 Site Access Improvements Schemes – Phase 1	• Reduction of severance will support labour market accessibility and business investment. • Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment.

Source: Mott MacDonald

The focus of the transport schemes within Package 1 is on the reduction of severance across the area surrounding the A41 North Corridor, improving connectivity for pedestrians and cyclists as well as offering better access to proposed development sites such as Birkenhead Town Centre, Woodside Waterfront and Hamilton Square amongst others. By achieving these objectives Package 1 will support accessibility for the current and future labour market and may support confidence in businesses to invest in the area. Several schemes also focus on improving public realm of key gateways that will make the area more aesthetically attractive thereby acting as a further incentive for businesses and residents to locate to the area. Other schemes also seek to improve the capacity of public transport networks within the vicinity of the A41 North Corridor thereby further increasing access to the labour market as well as further enticing business and resident to locate there because of the increased transport options.

7.6 Phase 2

The table below outlines the potential qualitative economic impacts for the transport schemes included in Package 2.

Table 17: Economic impact of Package 2 schemes

Scheme name	Economic impact
Regenerating Woodside and Hamilton Square	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Directly supports access to the proposed Woodside Waterfront and Hamilton Square, Birkenhead sites.
Access road to Rosebrae development site	• Improved connectivity and reduction of severance will support labour market accessibility and business investment. • Directly supports access to the proposed Rosebrae Redevelopment Phase1 / 2 site.
A41 / A552 / Flyovers remodelling – Phase 2, and	• Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment.

Scheme name	Economic impact
Access to Hind Street - Mollington Link Road	• Directly supports access to the proposed development at Birkenhead Town Centre.
Birkenhead Green Corridor	• Reduction of severance will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment.
Riverside Green Link	• Reduction of severance will support labour market accessibility and business investment. • Improvements in public realm will support the attractiveness of current and future development within the vicinity to business investment and those seeking residential opportunities. • Improved connectivity and capacity for pedestrians and cyclists will support labour market accessibility and business investment. • Directly supports access to the proposed Woodside Waterfront site.

Source: Mott MacDonald

The focus of the transport schemes within Package 2 is on the reduction of severance across the area surrounding the A41 North Corridor as well as offering better access to proposed development sites such as Woodside Waterfront and Hind Street Redevelopment amongst others. By achieving these objectives Package 2 will continue to build on the improvements made by the schemes in Package 1 in supporting accessibility to the current and future labour market and may support confidence in businesses to invest in the area. Several schemes also focus on improving public realm of key gateways that will make the area more aesthetically attractive thereby acting as a further incentive for businesses and residents to locate to the area.

7.6.1 Summary of Economic Impact

In order for the area surrounding the A41 North Corridor to maximise its full potential as an economic hub there is a requirement for additional transport infrastructure to be implemented to support current and future development. The transport schemes in Packages 1 and 2 represent part of the proposed transport solution and could support the economic performance of the area in a number of ways including:

- Improving labour market access and mobility.
- Supporting business investment and growth.
- Supporting land utilisation impacts.

Packages 1 and 2 are set to make significant strides in these area by improving connectivity, especially for pedestrians and cyclists, increasing capacity on public transport networks as well as reducing severance across the area surrounding the A41 North Corridor. This will enable increased accessibility to and from residential and economic opportunities around the A41 North Corridor that will in turn increase market confidence leading to increased investment in the area. Other schemes will improve the public realm thereby making the area more attractive to residents and businesses alike.

7.7 Social Impact

The A41 North Corridor – including key areas from Eastham, through Bromborough, up to Birkenhead Town Centre, Hamilton Square and the Woodside Waterfront – has been identified as a spatial priority for delivering growth and investment across the borough.[2] The proposed packages of schemes that have been developed as part of the STF aim to achieve this through improved public spaces and community connectivity that supports a more accessible and healthy transportation experience for those that visit, live or work in Wirral.

The analysis below provides a high-level appraisal of the social impacts which could be supported by each package, through linking the schemes to relevant literature and local social, economic and demographic trends. These impacts are also linked to relevant policy objectives where they are supported.

The potential social impacts which could be supported by each package are discussed below in two subsections; those that enhance community health and wellbeing, and those that improve social mobility, inclusion and accessibility.

7.7.1 Community health and wellbeing

Scheme proposals focussing on improvements to active travel facilities, green spaces/corridors or the public realm are likely to support positive health and wellbeing outcomes for Wirral. Evidence on how schemes may support community health and wellbeing is outlined in sections 4.2.1.1 to 4.2.1.4.

The Wirral Strategic Regeneration Framework (SRF) sets out priorities and challenges for economic growth in the borough. Positive health and wellbeing outcomes are supported by two of the strategic themes of the SRF: ‘healthier lifestyles and safer neighbourhoods’, and ‘sustainable development and a high-quality environment’.[3] Health and wellbeing impacts are also relevant to the Wirral 2020 themes of ‘protecting the most vulnerable’ and ‘improving the local environment’.[4]

The community health and wellbeing benefits that are supported by each package of schemes are detailed in the summary table in section 4.3.

7.7.1.1 Air quality

Schemes resulting in the creation of or improvement of access to green spaces, or the promotion of sustainable modes of transportation can help to improve health benefits associated with local air quality. This includes schemes that draw trips away from private motor vehicles, and encourage active travel such as walking and cycling, and/or lower-emission travel by bus or rail. Research has shown that there is a link between both long and short-term exposure to particulate matter emissions, respiratory health, and long-term health outcomes;[5] air pollution disproportionately impacts children, older people, and people with pre-existing

[2] Wirral Council (2017). ‘Wirral Strategic Regeneration Framework’ Available at https://www.wirral.gov.uk/sites/default/files/all/business/Regeneration/Strategic%20Regeneration%20main%20report.pdf

[3] Wirral Council (2017). ‘Wirral Strategic Regeneration Framework’ Available at https://www.wirral.gov.uk/sites/default/files/all/business/Regeneration/Strategic%20Regeneration%20main%20report.pdf

[4] Wirral Council (2017) ‘Wirral Plan 2020’ Available at: https://www.wirral.gov.uk/about-council/wirral-plan-2020-vision#wgSM-0

[5] Kilbane-Dawe, !. and Clement, L. (2014). ‘The impacts of air pollution on health: a summary of the state of current knowledge’. Parliament Hill Research. Available at: https://www.cityoflondon.gov.uk/business/environmental-health/environmental-protection/air-quality/Documents/Impacts-Of-Air-Pollution-On-Health.pdf

conditions (such as asthma, chronic obstructive pulmonary disease (COPD) and coronary artery disease).[6] In addition, elevated levels of pollution are typically concentrated amongst socially deprived neighbourhoods; therefore, schemes which improve air quality may disproportionately impact those who suffer from deprivation.[7]

Air quality improvements resulting from reduced emissions and increased capture of pollutants would have particular benefits for Wirral, which has a high under 75 mortality rate due to respiratory disease, when compared to the national average (51.1 and 33.8 per 100,000, respectively), and a higher under 75 rate of mortality due to cardiovascular disease than the national average, at 82 per 100,000, compared to 73.5 in England.[8] In addition, as elevated pollution levels are typically concentrated in deprived areas, air quality improvements could benefit some of the most vulnerable areas of Wirral. Wirral contains ten Lower-layer Super Output Areas (LSOAs, a unit of measurement for the English indices of deprivation), which are among the 1% most deprived LSOAs in England.[9]

7.7.1.2 Noise and disturbance

Schemes that improve walking and cycling facilities, promote increased use of mass transport like bus and rail, or introduce green, motor vehicle-free corridors may help to reduce local road traffic. Reduced road traffic can have indirect positive health benefits due to decreased levels of noise. Research shows that raised noise levels can cause high blood pressure in children, and can negatively affect their cognitive learning and memory.[10] Noise can also be a contributory factor in several adverse health outcomes for older people, including cardiovascular disease, stress, dementia, and sleep disturbance.[11]

In Wirral, there is a higher than average proportion of older people (aged over 65, at 19.1%) when compared to the national average (16.4%) and a similar proportion of children (aged under-16, at 18.6%) when compared to the national average (18.9%).[12] Traffic noise reduction in areas with higher concentrations of older people and children, or on roads close to schools, care homes, or other community facilities serving these user groups may generate particular benefits for these groups.

7.7.1.3 Access to exercise and active travel

Cumulative health benefits can be realised through schemes that promote exercise through active travel, while simultaneously improving local air quality by reducing motor vehicle use.

Health benefits may also be realised by schemes that create or improve access to open spaces where play, sport and other outdoor exercise can take place, such as local parks.

Increased exercise can contribute positively to improving cardiovascular health in Wirral, which has a high under 75 mortality rates for cardiovascular and respiratory disease.[13] Improved opportunities for exercise could also have positive health outcomes for children in the Wirral, where child obesity (20.6%) is slightly higher than the national average (20%).[14]

7.7.1.4 Road safety

Improvements to walking and cycling facilities and minimisation of conflicts between transportation modes can improve road safety outcomes by reducing the likelihood of harm from road traffic. Benefits may result from interventions that increase the uptake of cycling and walking to 'normalise' these activities, particularly in spaces which previously would be dominated by motor vehicles. Benefits may also be realised through schemes which improve the safety of crossings or provide new infrastructure to segregate cyclists from other road users. Such improvements could particularly benefit children from low income areas, who have much higher rates of casualties from road traffic collisions due to greater exposure to higher levels of traffic.[15]

Road safety improvements could result in positive health outcomes for Wirral, which has a higher rate of people killed and injured on roads (41.7) than both the North West and England (39.8 and 39.7, respectively).[16] Children in deprived areas of Wirral, such as those in the 1% most deprived LSOAs in England,[17] may particularly benefit from improved road safety due to their likelihood of being exposed to higher levels of traffic.

7.7.1.5 Personal safety and journey experience

Improvements to the public realm, as well as enhancement of station and waiting facilities, can positively impact upon personal safety and journey experience when travelling.[18] Enhancement of security measures may disproportionately benefit women, ethnic minority groups, and Lesbian, Gay, Bisexual and Transgender (LGBT) people, as research shows that these groups

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[6] Department for Environment, Food and Rural Affairs (2018). '*The health impacts of poor air quality*'. Available at: h https://publications.parliament.uk/pa/cm201719/cmselect/cmenvfru/433/43308.htm#footnote-259

[7] Goodman, A., Wilkinson, P., Stafford, M., & Tonne, C. (2011). '*Characterising socio-economic inequalities in exposure to air pollution: a comparison of socio-economic markers and scales of measurement*'. Health & place, 17(3), 767-774.

[8] Public Health England (2014-16). '*Public Health Profiles: Under-75 mortality rate from respiratory disease''*. Available at: https://fingertips.phe.org.uk/search/respiratory%20disease#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

Public Health England (2014-16). '*Public Health Profiles –Under 75 mortality rate from all cardiovascular diseases''*. Available at: https://fingertips.phe.org.uk/search/cardiovascular#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

[9] Wirral Council Public Health Intelligence Team (2015). '*Indices of Multiple Deprivation for Wirral*' Available at: https://www.wirralintelligenceservice.org/media/1145/imd-2015-report-final.pdf

[10] World Health Organisation (2011): *'Burden of disease from environmental noise Quantification of healthy life years lost in Europe'*. Available at: http://www.who.int/quantifying_ehimpacts/publications/e94888.pdf?ua=1

[11] World Health Organisation (2011): *'Burden of disease from environmental noise Quantification of healthy life years lost in Europe'*. Available at: http://www.who.int/quantifying_ehimpacts/publications/e94888.pdf?ua=1

[12] ONS (2011) Local Area Reports. Available at: https://www.nomisweb.co.uk/reports/localarea?compare=1946157107

[13] Public Health England (2014-16). '*Public Health Profiles –Under 75 mortality rate from all cardiovascular diseases''*. Available at: https://fingertips.phe.org.uk/search/cardiovascular#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

Public Health England (2014-16). '*Public Health Profiles –Under 75 mortality rate from respiratory disease''*. Available at: https://fingertips.phe.org.uk/search/respiratory%20disease#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

[14] Public Health England (2016-17). '*Public Health Profiles –Year 6: Prevalence of obesity''*. Available at: https://fingertips.phe.org.uk/search/obesity#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

[15] Social Exclusion Unit (2003). '*Making the connections: transport and social exclusion*'. Social Exclusion Unit, *The Stationery Office, London*.

[16] Public Health England (2016-17). '*Public Health Profiles –Killed and seriously injured casualties on England's roads''*. Available at: Public Health England (2016-17). '*Public Health Profiles –Year 6: Prevalence of obesity''*. Available at: https://fingertips.phe.org.uk/search/obesity#page/1/gid/1/pat/6/par/E12000002/ati/102/are/E08000015

[17] Wirral Council Public Health Intelligence Team (2015). '*Indices of Multiple Deprivation for Wirral*' Available at: https://www.wirralintelligenceservice.org/media/1145/imd-2015-report-final.pdf

[18] Department for Transport (2006), *Personal security issues in pedestrian journeys*, available at: http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/crime/personalsecurity/personalsecurityissuesinpede3005?page=5

often fear for their safety and well-being in public spaces and on pedestrian journeys.[19] Using environmental design to prevent antisocial behaviour, including informal surveillance such as spaces with clear sightlines that are well-maintained and well-lit, or formal surveillance such as CCTV, may improve safety and feelings of safety for these groups. Journey experience can also be influenced positively by schemes which enhance station and waiting facilities such as increased or improved seating, heating, or retail offer.

For the year ending in June 2018, the crime rate (police recorded crimes per 1,000 population) was lower in Wirral on average than other comparable areas. For crimes that may occur while travelling, such as theft from the person or violence and sexual offences, the crime rate is 0.47 and 25.84 per 1,000 population, respectively.[20] Improvements to travel facilities or the public realm may help to reduce crime rates and improve safety for people in Wirral.

7.7.2 Social mobility, inclusion and accessibility

Scheme proposals focussing on improving infrastructure and connections between or within communities may support positive equality outcomes, including improved social mobility, inclusion and accessibility. Evidence on how schemes may support social mobility, inclusion and accessibility is outlined in sections 4.2.2.1 and 4.2.2.2.

Improved social mobility, inclusion and accessibility is in line with strategic themes of the SRF, including: ‘employment, skills and economic development’, ‘transport connectivity’, ’sustainable development’ and ‘a high-quality environment’. Impacts are also relevant to the key themes for Wirral 2020 of ‘protecting the most vulnerable’ and ‘driving economic growth’.[21]

Social mobility, inclusion and accessibility benefits that are supported by each package of schemes are outlined in the summary table in section 4.3

7.7.2.1 Connections to employment, education and social resources

Improved connectivity between communities may include further connections between residential areas and town centres, places of employment and education, and other employment sites, such as enterprise, office, and retail parks along the A41 North Corridor.

Research by the Joseph Rowntree Foundation indicates that transport is a key barrier to employment for people living in areas of high deprivation.[22] As a result, improved transport could improve opportunities to access employment and education, which can serve to address issues of inequality and improve social mobility.

Improved transport access to jobs for areas with poor employment performance could benefit the Wirral area, which has areas of high deprivation in neighbourhoods near to Wirral Waters, in Birkenhead and Wallasey.[23] In addition, Wirral has a lower percentage of people in employment (73.8%) than the average for Great Britain (75%), and a higher percentage of households that are workless (19%, compared to 14.5% for Great Britain).[24]

Improved connectivity between neighbourhoods may also provide better access to social infrastructure including facilities for health, early years provision, education, community connection, worship, play and recreation.

In Wirral, there is a higher than average proportion of older people (aged over 65, at 19.1%) when compared to the national average (16.4%) and a similar proportion of children (aged under 16, at 18.6%) when compared to the national average (18.9%).[25] Creation of or improved access to open spaces, such as proposed play parks along the Birkenhead Green Corridor or the creation of a new public park around the Tunnel Monument, may impact children in deprived areas of Wirral, as children living in deprived areas are nine times less likely to be able to access green space than those living in less deprived areas.[26] Increased connectivity to social infrastructure can also benefit older people in Wirral, who make up a larger proportion of the population, when compared to the national average, and who can experience feelings of isolation and loneliness due to physical isolation and a lack of social resources.[27]

7.7.2.2 Equality and Inclusion

Creating inclusive neighbourhoods and taking steps to create a more equal and welcoming community can be achieved through removing barriers to access or use of the streetscape, buildings and the transport network. This includes schemes that create public spaces, facilities and infrastructure that work for many different types of people.[28]

Older people and people with a limiting long-term illness or disability are more likely to experience isolation and barriers to accessing social infrastructure. [29] In Wirral, there is a higher proportion of older people and people with a limiting long-term illness or disability than the national average, and these groups are disproportionately likely to benefit from schemes that improve pedestrian infrastructure or accessibility of facilities at stations and waiting areas.[30]

The 2015 National Travel Survey found that the proportion of people with mobility difficulties increases with age.[31] Schemes which improve or create new pedestrian routes, as is the case with “Hamilton Square bus / rail interchange improvements”, may decrease walking distances, which could benefit older people. Pedestrian infrastructure improvements could also benefit

[19] Stonewall (2017) LGBT in Britain: Hate Crime. Available at: https://www.stonewall.org.uk/comeoutforLGBT/lgbt-in-britain/hate-crime

Department for Transport (2006), *Personal security issues in pedestrian journeys*, available at: http://webarchive.nationalarchives.gov.uk/+/http:/www.dft.gov.uk/pgr/crime/personalsecurity/personalsecurityissuesinpede3005?page=5

[20] ONS (2018). Crime and Justice. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice

[21] Wirral Council (2017) ‘Wirral Plan 2020’ Available at: https://www.wirral.gov.uk/about-council/wirral-plan-2020-vision#wgSM-0

[22] Joseph Rowntree Foundation (2018), Tackling transport-related barriers to employment in low-income neighbourhoods. Available at: file:///C:/Users/luh88061/AppData/Local/Packages/Microsoft.MicrosoftEdge_8wekyb3d8bbwe/TempState/Downloads/tackling_transport-related_barriers_low-income_neighbourhoods.pdf

[23] Department for Communities and Local Government (2015). ‘*English Indices of Deprivation, 2015*’ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/465791/English_Indices_of_Deprivation_2015_-_Statistical_Release.pdf

[24] ONS (2011): ‘*Census*’. Available at: https://www.ons.gov.uk/census/2011census

[25] ONS (2011) Local Area Reports. Available at: https://www.nomisweb.co.uk/reports/localarea?compare=1946157107

[26] Quoted in King’s Fund, Access to green and open spaces and the role of leisure services Available at: https://www.kingsfund.org.uk/projects/improving-publics-health/access-green-and-open-spaces-and-role-leisure-services

[27] Age UK, (2012): 'Loneliness and isolation evidence review'.

[28] Commission for Architecture and the Built Environment (2006). ‘The principles of inclusive design.’ Available at: https://www.designcouncil.org.uk/sites/default/files/asset/document/the-principles-of-inclusive-design.pdf

Commission for Architecture and the Built Environment (2008). ‘Inclusion by design’. Available at: https://www.designcouncil.org.uk/sites/default/files/asset/document/inclusion-by-design.pdf

[29] Department for Transport, *National Travel Survey: England 2015*, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/551437/national-travel-survey-2015.pdf

[30] ONS (2011): ‘*Census*’. Available at: https://www.ons.gov.uk/census/2011census

Age UK, (2012): 'Loneliness and isolation evidence review'.

[31] Department for Transport, *National Travel Survey: England 2015*, available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/551437/national-travel-survey-2015.pdf

disabled people, as research from the DfT indicates that of people with a disability who are able to walk, around 30% can walk no more than 50 metres without stopping or experiencing severe discomfort. [32]

Children and young people could also benefit from improved pedestrian and cycle facilities, as approximately half of children in England walk or cycle to school,[33] and young people are more likely to be users of non-motorised forms of transport.[34] Households without access to a car, of which Wirral has a higher than average proportion,[35] may also benefit from schemes supporting active travel and improved public transport.

Finally, wayfinding or signage strategies can improve the accessibility of the public realm for disabled people, including those with physical, cognitive or sensory impairments, or ethnic minority groups, including those who may have a limited understanding of English, or those with a limited understanding of the local area, such as visitors and tourists.[36] Benefits may arise from orientation support that includes clear information, signage and intuitive wayfinding, provided by schemes such as “Station facilities and waiting environment enhancements”, which aims to improve station information boards.

7.7.3 Social Impact Summary

The following summary table details the potential social impacts that may arise from each scheme.

Table 18: Summary of potential social impacts

Package number	Scheme	Potential community health/wellbeing impacts					Potential social mobility/inclusion/accessibility impacts	
		Air quality	Noise	Exercise	Road safety	Travel safety and comfort	Connections to employment, education and social resources	Equality and inclusion
1	Station facilities and waiting environment enhancements	✓	✓	✓		✓		✓
	Wirral line park and ride enhancements	✓	✓	✓	✓			✓
	Green Lane station refurbishment	✓	✓			✓		✓
	Birkenhead Central: new forecourt and eastern access route	✓	✓	✓		✓	✓	✓
	Improvements to bus infrastructure at Birkenhead Park and Conway Park	✓	✓			✓	✓	✓
	Hamilton Square bus / rail interchange improvements	✓	✓			✓	✓	✓
	Birkenhead North bus / rail interchange improvements	✓	✓			✓	✓	✓
	Birkenhead Central bus / rail interchange improvements	✓	✓				✓	✓
	A41 Chester Road / A552 Borough highway realignment (Phase 1)	✓	✓				✓	✓
	A41 Chester Road / Ivy Street junction improvement	✓			✓	✓	✓	✓
	Signage improvement to Birkenhead Priory	✓	✓	✓	✓		✓	✓
	Electric charging points across borough	✓						
	Signage and better entrance to retail core	✓	✓	✓	✓	✓		✓
	Birkenhead local access road improvements	✓	✓	✓	✓	✓	✓	✓
	Road safety improvements at Whetstone Lane / Borough Road			✓	✓	✓		✓
	Improved public realm in retail core	✓	✓	✓		✓	✓	✓
	Improved public realm Argyle Street	✓	✓	✓	✓	✓		✓
	Cleveland Street / Market Street / Price Street public realm	✓	✓	✓	✓	✓	✓	✓
	Improved public realm Conway Street	✓	✓	✓	✓	✓	✓	✓
	Improved pedestrian crossing facilities along Argyle Street	✓	✓	✓	✓	✓	✓	✓

[32] Department for Transport (2002), *Inclusive mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure*, available at: https://www.gov.uk/government/publications/inclusive-mobility

[33] Department of Transport (2017) ‘*Walking and Cycling Statistics: England,* *https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/736909/walking-and-cycling-statistics-england-2017.pdf*

[34] Department for Transport (2015-16), *Walking and cycling levels demographic breakdown: England*, available at https://www.gov.uk/government/statistical-data-sets/walking-and-cycling-levels-demographic-breakdown-england-cw020

[35] ONS (2011): ‘*Census*’. Available at: https://www.ons.gov.uk/census/2011census

[36] NHS (2005). ‘Wayfinding’. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/148500/Wayfinding.pdf

Package number	Scheme	Potential community health/wellbeing impacts					Potential social mobility/inclusion/accessibility impacts	
		Air quality	Noise	Exercise	Road safety	Travel safety and comfort	Connections to employment, education and social resources	Equality and inclusion
2	Conway Park and Birkenhead Market improved walk route	✓	✓	✓	✓	✓	✓	✓
	Improved public realm Conway Park and Europa Boulevard					✓		✓
	Hamilton Square and Hamilton Street improvements	✓	✓	✓	✓	✓	✓	✓
	Relocation of Birkenhead bus station	✓	✓	✓	✓		✓	✓
	A41 / A552 / Flyovers remodelling – Phase 1						✓	
	Other A41 Site Access Improvement Schemes – Phase 1	✓	✓				✓	✓
	Regenerating Woodside and Hamilton Square	✓	✓	✓	✓		✓	✓
	Access road to Rosebrae development site						✓	
	A41 / A552 / Flyovers remodelling – Phase 2, and Access to Hind Street - Mollington Link Road	✓	✓	✓	✓	✓	✓	✓
	Birkenhead Green Corridor	✓	✓	✓	✓	✓	✓	✓
	Riverside Green Link	✓	✓	✓	✓	✓	✓	✓

Source: Mott MacDonald

7.8 Conclusion

The analysis in this section has highlighted that, whilst many of the benefits of the schemes proposed for the A41 North Corridor Regeneration Area are not measurable by the traffic modelling tools available for the purposes of this study, there are nonetheless significant and widespread benefits to be derived from these schemes. In economic terms, even the simplest public realm scheme can have a noticeable impact upon the attractiveness of an area for investment, and the social benefits for such a scheme can be major when taken against the size of the population of people that will make use of that space.

8 Traffic Modelling

8.1 Introduction

A transport modelling exercise has been undertaken to ascertain the benefits of the proposed A41 North Corridor schemes. For the purpose of the modelling, Phases 1 and 2 have been combined to provide a more accurate representation of impacts. Also, many of the schemes in Phase 1 are enablers for the Phase 2 schemes. The highway and public transport schemes for the A41 North Corridor have been modelled separately using the appropriate models as described below, as part of the wider Wirral Regeneration modelling commission. This section discusses the modelling process and results for the A41 North Corridor schemes.

8.2 Highway

8.2.1 Modelling Approach

All highway schemes have been modelled using the Wirral Traffic Model (WTM), a SATURN model providing detailed representation of traffic conditions within the Wirral district. This considers the assignment impacts of the schemes. A41 North Corridor schemes focused on public realm and active travel have not been assessed at this stage. Table 19 below provides a full list of the highway schemes that have been modelled for the A41 North Corridor. Full details of the schemes have been provided in Sections 2-3.

Table 19: A41 North Corridor highway schemes modelled in WTM

Phase	Scheme	Package Name	Drawing Reference
Phase 1	• A41 Chester Street highway alignment • Chester Street junction improvements • Birkenhead – local access road improvements	Birkenhead Town Centre Gateways	• 392148-MMD-00-XX-DR-C-0005A
	• Improved public realm Argyle Street • Public realm improvements: Conway Street	Birkenhead Town Centre Streetscape	• 392148-MMD-00-XX-DR-C-0003 • 392148-MMD-00-XX-DR-C-0004
	• Hamilton Street two-way outside station • Remove Hamilton Street/Duncan Street road closure	Regenerating Woodside and Hamilton Square	• 392148-MMD-00-XX-DR-C-0004
	• Green Lane roundabout capacity improvements • Ivy Street junction capacity improvements • Campbelltown Road capacity improvements • A41/A552/Flyover area remodelling	A41 Site Access Improvements	• 392148-MMD-00-XX-DR-C-0004 • 392148-MMD-00-XX-DR-C-0005 • 392148-MMD-00-XX-DR-C-0006 • 392148-MMD-00-XX-DR-C-0007
Phase 2	• Reconfigure/Redevelop Woodside Gyratory roundabout	Regenerating Woodside and Hamilton Square	• 392148-MMD-00-XX-DR-C-0002 / 0004 / 0004A
	• Access to Hind Street – Mollington Link Road	A41 Site Access Improvements	• 392148-MMD-00-XX-DR-C-0005
	• A41 Chester Road / A552 Borough Road highway realignment (Phase 2)		• 392148-MMD-00-XX-DR-C-0005

Phase 1 provides a series of junction and highway improvements in the A41 North Corridor area, as well as enhancing the public realm around Birkenhead town centre and local rail stations. Phase 1 also includes the first stage of works around the removal of flyovers and remodelling of the network around the A41/A552.

Phase 2 then provides the long-term alignment for a Mollington Link Road equivalent (i.e. a route that will open up access and development opportunities on the Hind Street site, and that will improve the attractiveness of the former flyover. Phase 2 also includes reconfiguring the Woodside gyratory to improve public realm in the area and provide improved access to new development sites.

8.2.2 Results

Many of the Phase 1 schemes are planned and designed to facilitate Phase 2, and as such, a model run has been undertaken for Phase 2 only. This encompasses all modelled schemes within Phase 1 and Phase 2. WTM has default future years of 2020 and 2030, Phase 2 has been modelled using both of these future years.

The operational performance of the local highway network has been reviewed using the maximum turn volume over capacity (v/c) relationships for turning movements at junctions and also link V/C. The junctions and links have been plotted on the network and colour classified according to the following capacity bands:

- **Red (>115% V/C):** This junction/link is operating significantly over capacity for at least one turning movement. Queues and delays at this location are likely to grow exponentially.
- **Orange (>100% V/C):** This junction/link is operating over capacity for at least one turning movement. Queues and delays at this location are likely to grow exponentially.
- **Yellow (85% V/C to 100% V/C):** This junction/link is operating with at least one turning movement that is approaching capacity and as a result there are increased queue lengths and delays.

8.2.2.1 Junctions Over Capacity

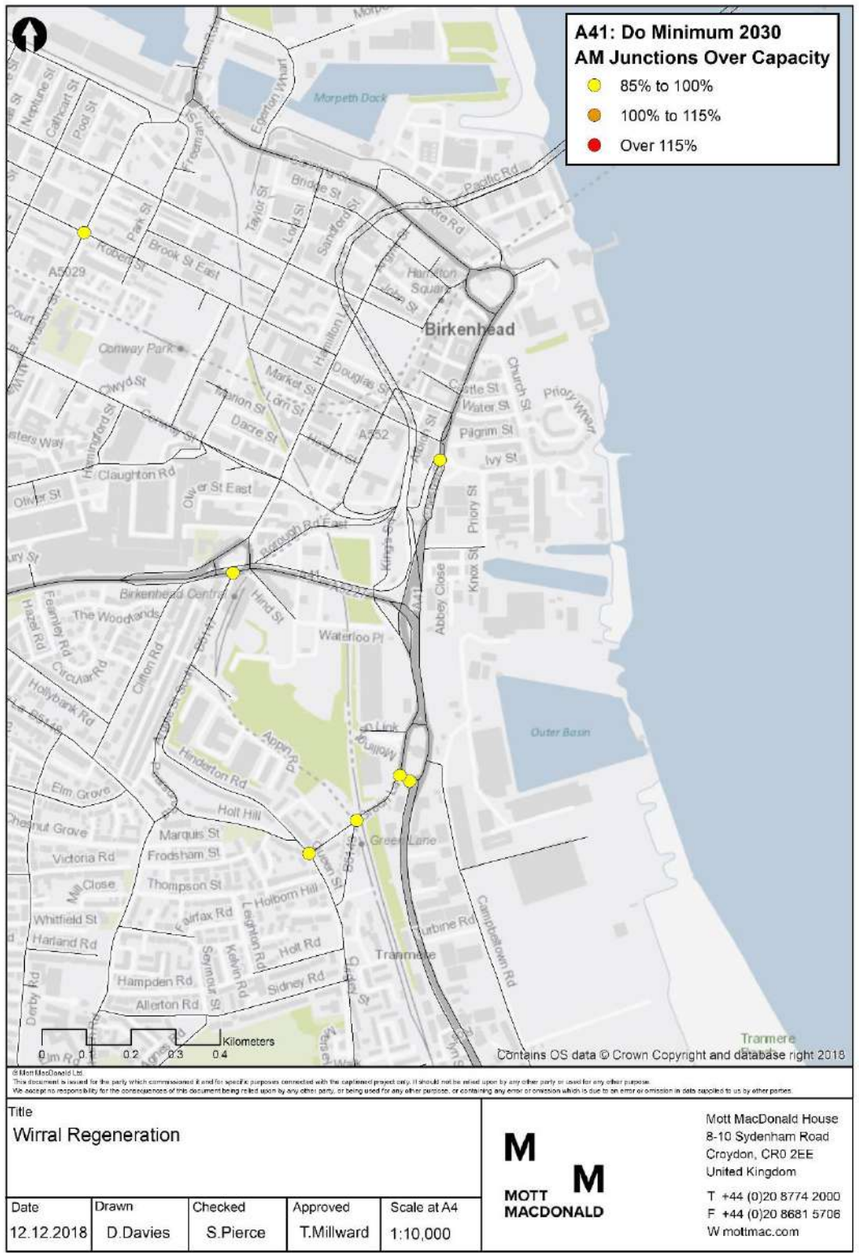
The junctions over capacity in the 2030 AM peak are shown for the Do Minimum and Phase 2 in Figure 15 and Figure 16 respectively. Figure 17 presents changes in the junction V/C for junctions that have a V/C of greater than 85% in either the Do Minimum or Phase 2.

In the Do Minimum the junctions with a V/C of between 85% and 100% are located along Green Lane and the roundabout with the A51 New Chester Road. There are also a few outlying junctions situated within Birkenhead including on the A41 and A552 that have a V/C of between 85% and 100%.

Phase 2 addresses the capacity issues at junctions along Green Lane/A51. However, the reconfiguration of the road network and replacement of the existing flyovers by Queensway Tunnel results in a number of junctions being over capacity.

Several junctions across Birkenhead town centre are over capacity in Phase 2 due a number of schemes prioritising public realm and active travel improvements and reducing vehicle capacity at junctions. The Woodside Gyratory is also over capacity following a redesign to unlock new development space and enhance public realm in the area.

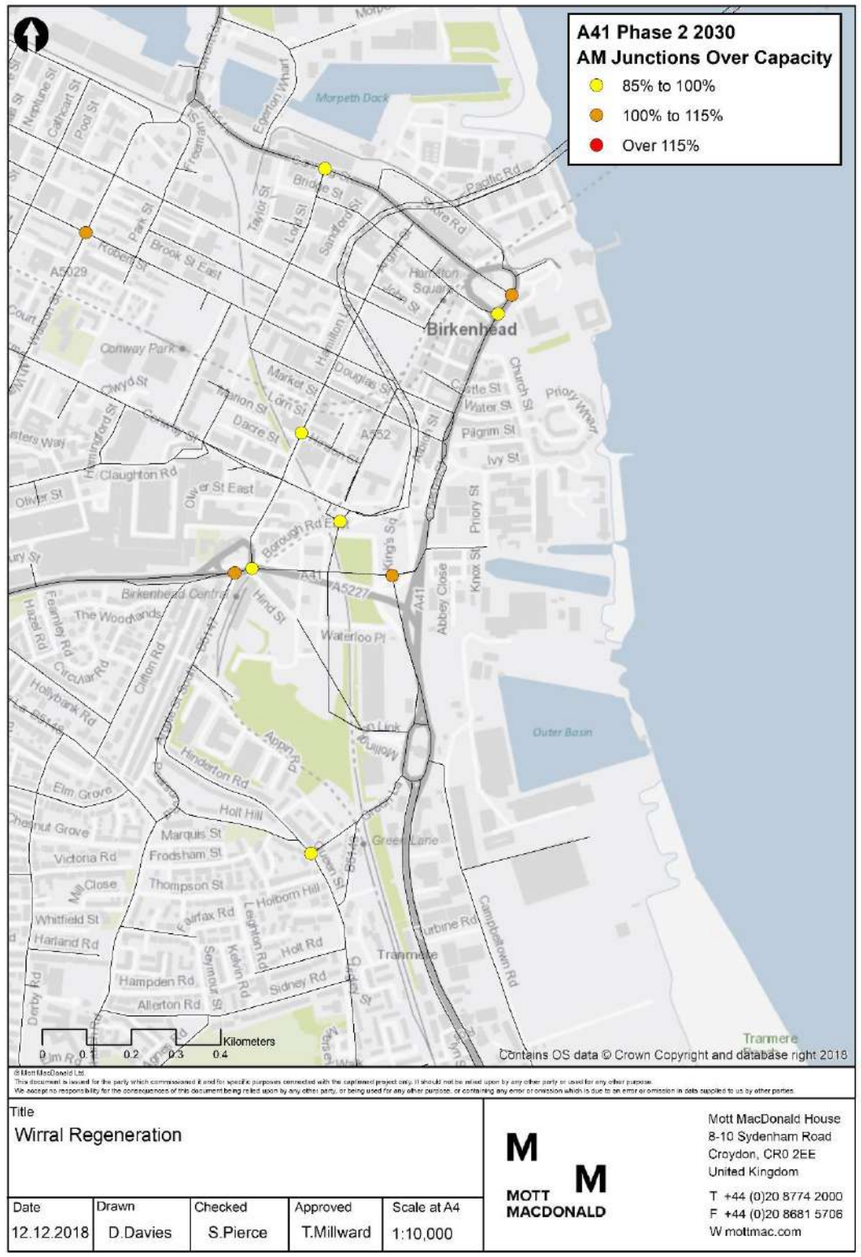
Figure 15: Do Minimum 2030 AM Junctions Over Capacity



Title				
Wirral Regeneration				
Date	Drawn	Checked	Approved	Scale at A4
12.12.2018	D.Davies	S.Pierce	T.Millward	1:10,000

MOTT MACDONALD
Mott MacDonald House
8-10 Sydenham Road
Croydon, CR0 2EE
United Kingdom
T +44 (0)20 8774 2000
F +44 (0)20 8681 5706
W mottmac.com

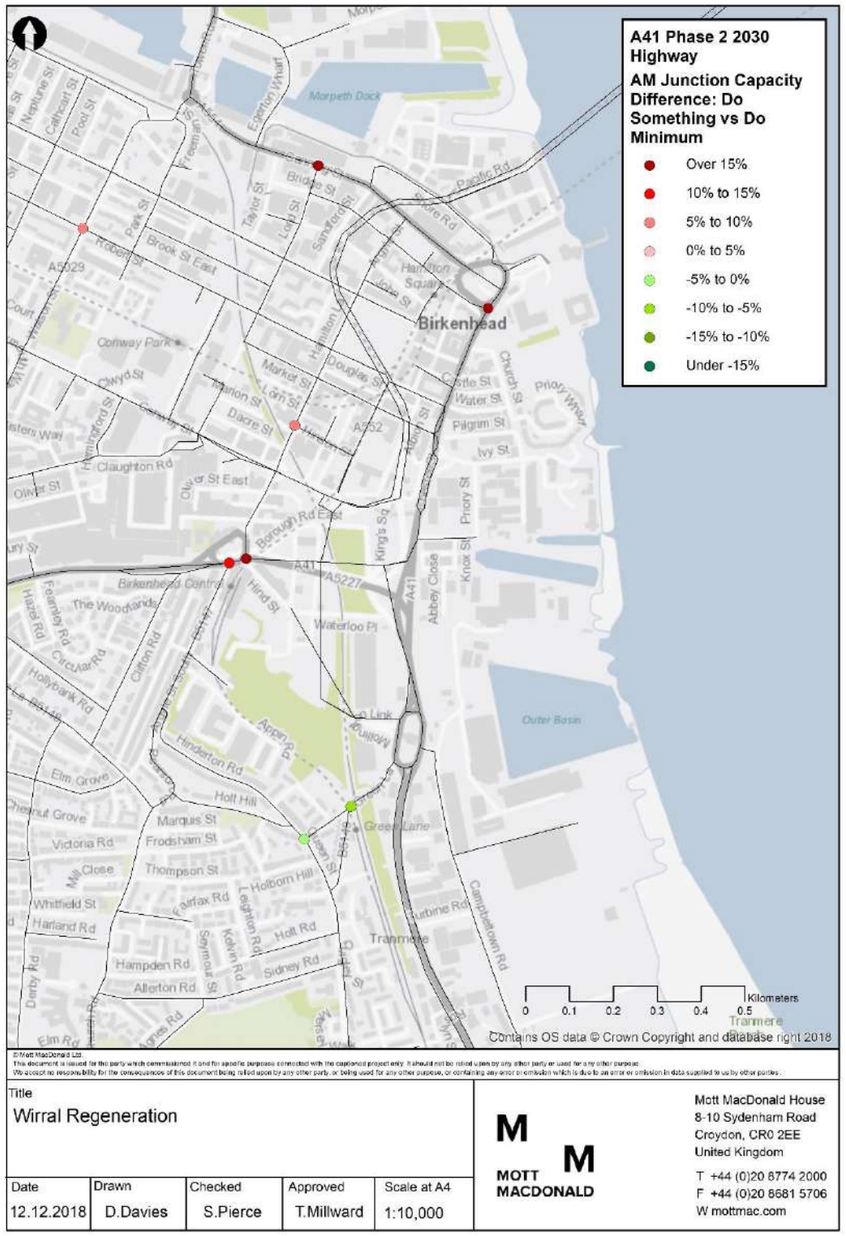
Figure 16: A41 North Corridor Phase 2 2030 AM Junctions Over Capacity



Title				
Wirral Regeneration				
Date	Drawn	Checked	Approved	Scale at A4
12.12.2018	D.Davies	S.Pierce	T.Millward	1:10,000

MOTT MACDONALD
Mott MacDonald House
8-10 Sydenham Road
Croydon, CR0 2EE
United Kingdom
T +44 (0)20 8774 2000
F +44 (0)20 8681 5706
W mottmac.com

Figure 17: A41 North Corridor Phase 2 to Do Minimum 2030 AM: Changes in Junction V/C (percentage point)



8.2.2.2 Links Over Capacity

The links over capacity in the 2030 AM peak are shown for the Do Minimum and Phase 2 in Figure 18 and Figure 19 respectively. Figure 20 presents changes in the link V/C for links that have a V/C of greater than 85% in either the Do Minimum or Phase 2.

In the Do Minimum there are several northbound links along the A41 New Chester Road and Green Lane, northbound links from Queensway Tunnel and Argyle Street South that have a V/C of between 85% and 100%.

In Phase 2 the links along the A41 New Chester Road no longer experience capacity issues. Some of the new roads delivered in Phase 2, located around Queensway Tunnel, have a V/C of between 85% and 100%. The link on Argyle Street South experiences a deterioration in performance with the V/C increasing to between 100%-115%.

Several links across the town centre experience a reduction in performance with a V/C of between 85% and 100% in due to the prioritisation of public realm enhancements and the promotion of active travel schemes reducing junction capacity. The redesign of the Woodside Gyratory also creates some capacity issues due to a reduction in road capacity to enhance the public realm in the area, reduce severance and unlock new development land.

The results of the modelling exercise for the A41 North Corridor schemes shows local reassignment of trips only.

Figure 818: Do Minimum 2030 AM Links Over Capacity

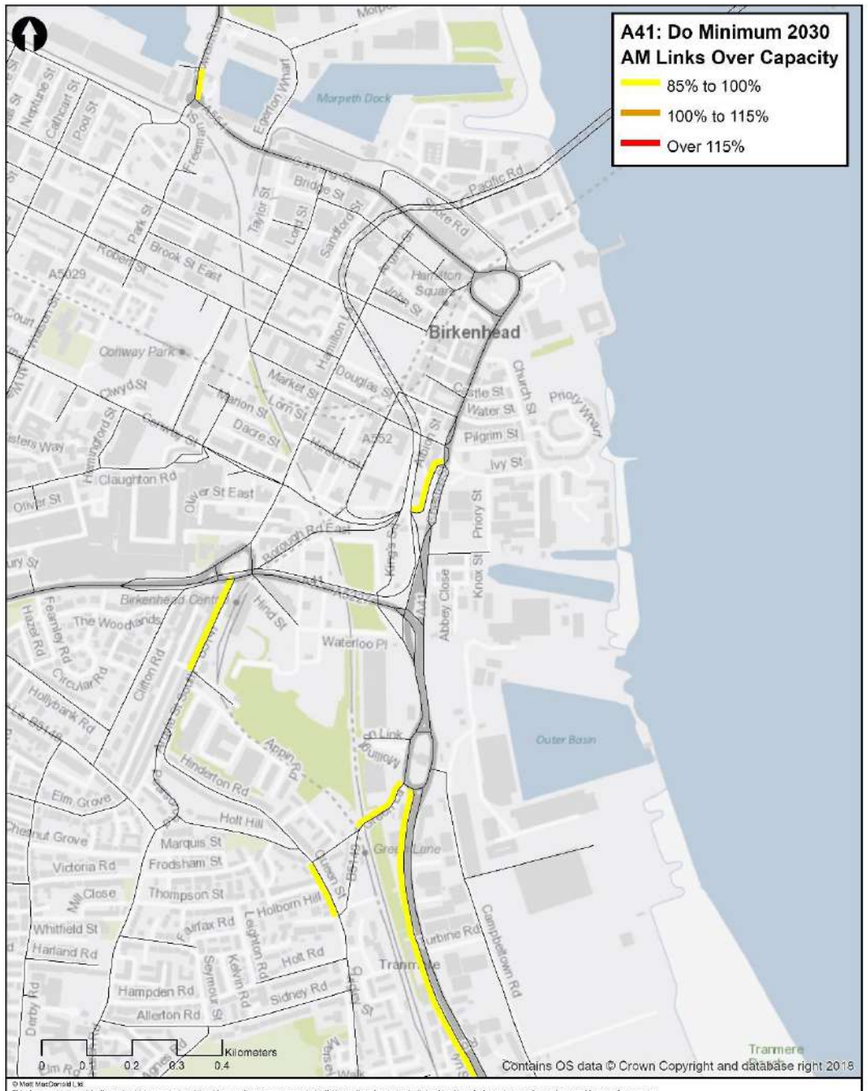


Figure 19: A41 Phase 2 2030 AM Links Over Capacity

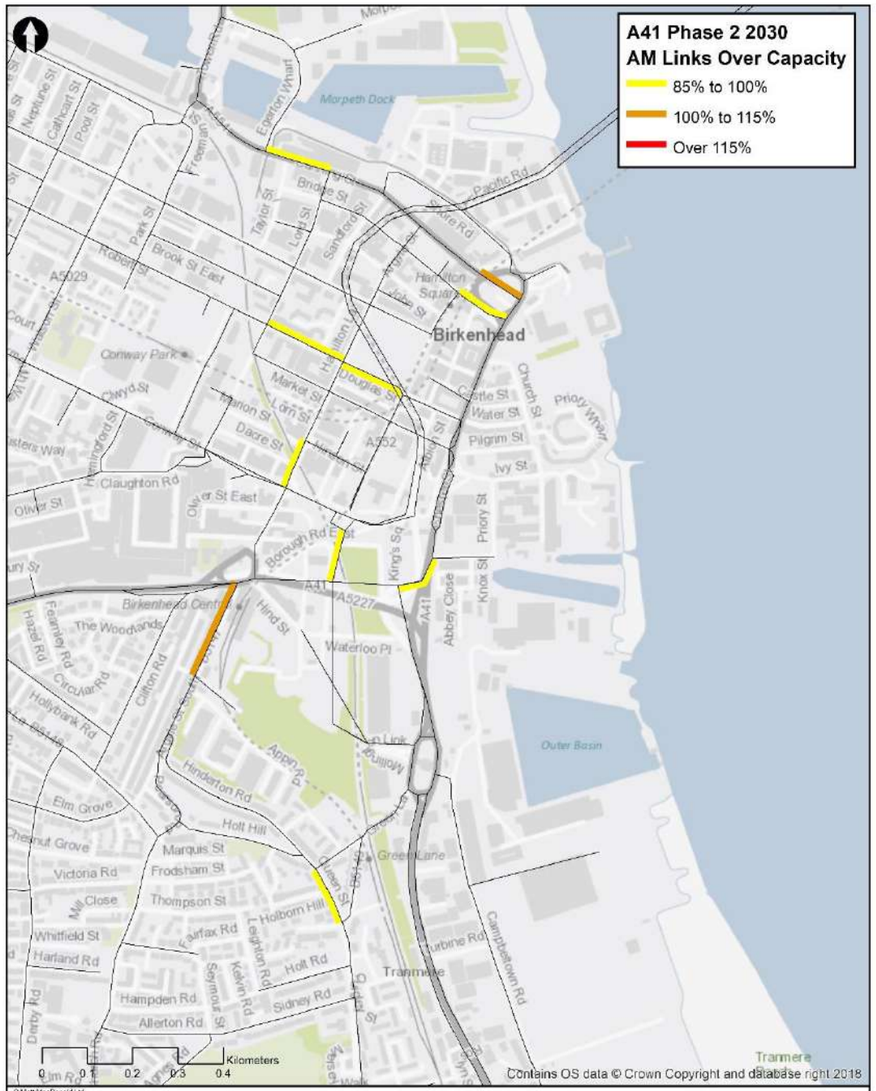
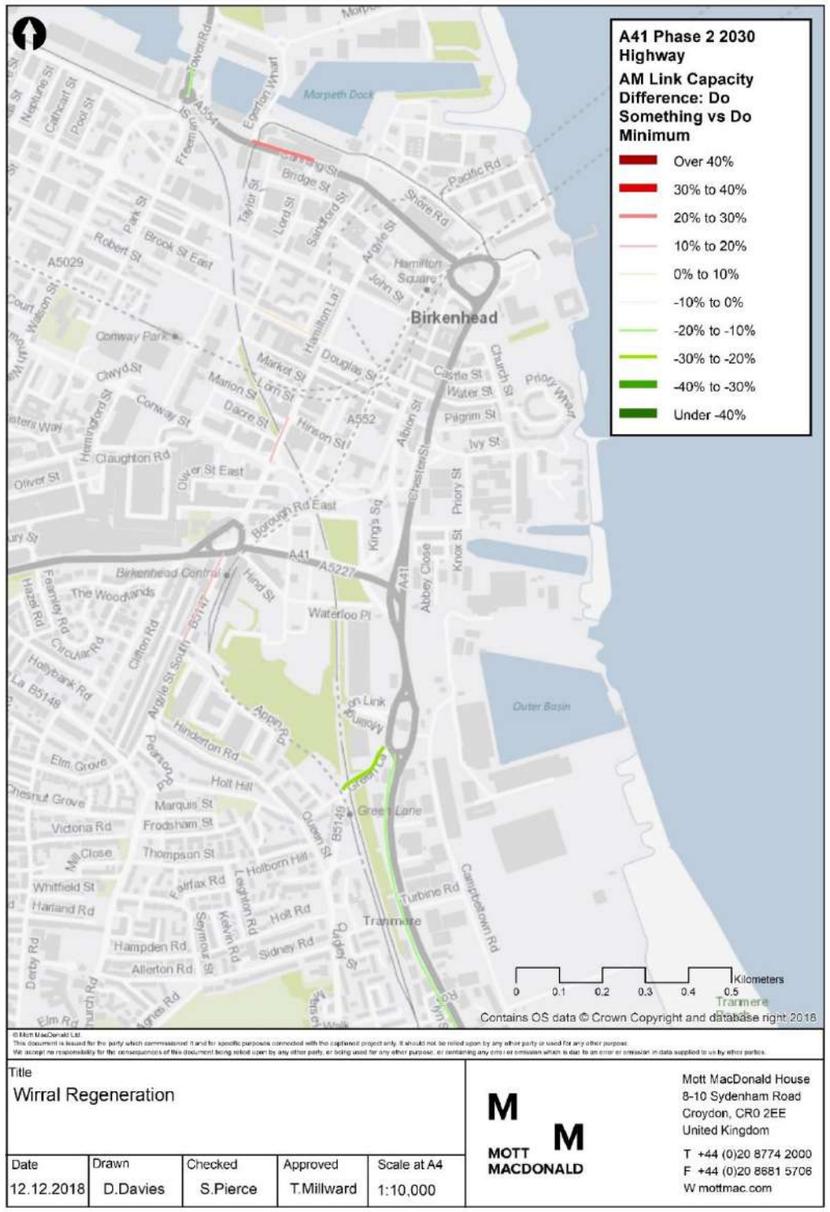


Figure 20: A41 North Corridor Phase 2 to Do Minimum 2030 AM: Changes in Link V/C (percentage point)



A more detailed account of the scheme coding and results from the A41 North Corridor modelling project is contained in the *Wirral Regeneration Modelling Report, Mott MacDonald (2019)*. This includes flow difference plots for the A41 North Corridor.

8.3 Transport Economic Assessment

An assessment of the transport economic benefits has been undertaken. Table 20 below contains a summary of the results from the modelling exercise for the A41 North Corridor Phase 2. Optimism bias of 44% has been applied to all scheme costs.

Table 20: A41 Phase 2 Results

Scheme	Present Value of Benefits	Present Value of Costs	Benefit Cost Ratio
A41 North Corridor Phase 2	-£26m	£28m	-0.9

All entries are present values discounted to 2010, in 2010 prices.

The benefit cost ratio (BCR) is -0.9. This is categorised as very poor value for money (VfM) in the Department for Transports VfM Framework[37]. However, this scheme is designed to aid the regeneration of Birkenhead town centre and unlock development land rather than being a congestion relief scheme. The high level capacity analysis show that the scheme does not cause substantial new issues. The poor BCR is a result of the introduction traffic signals adding delay, whereas in the Do Minimum there is no delay associated with the flyovers.

The previous section details the likely economic and social benefit of the A41 North Corridor schemes and highlights that there is significant potential for these schemes to contribute to a largescale regeneration of the town centre with associated economic and social benefits. As noted in that section, these benefits are not measurable using the traffic modelling tools available in this case, explaining the poor value for money result obtained.

8.4 Public Transport

8.4.1 Modelling Approach

All public transport schemes have been modelled using the public transport assignment module of the Liverpool City Region Transport Model (LCRTM) to take into account reassignment.

The modelling of public transport schemes includes both the Wirral Waters and A41 North Corridor public transport schemes as it is not possible to separate the schemes (rapid transit routes start at Wirral Waters and go through the A41 area).

Phase 1 includes reduced bus journey time at the exit of Queensway Tunnel due to the network reconfiguration introduced as part of the A41 North Corridor schemes. Bus services have been rerouted along Duke Street Bridge instead of Tower Road.

Phase 2 then introduces the rapid transit system around the East Float of Wirral Waters, the use of the former dock railway for rapid transit and improving bus access around Hamilton Square. The rapid transit system has been modelled as a bus for this high-level exercise, but this simplification is for modelling purposes only.

A full breakdown of the public transport schemes that have been modelled are contained in Table 21 below.

[37] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/630704/value-for-money-framework.pdf

Table 21: Public Transport Schemes

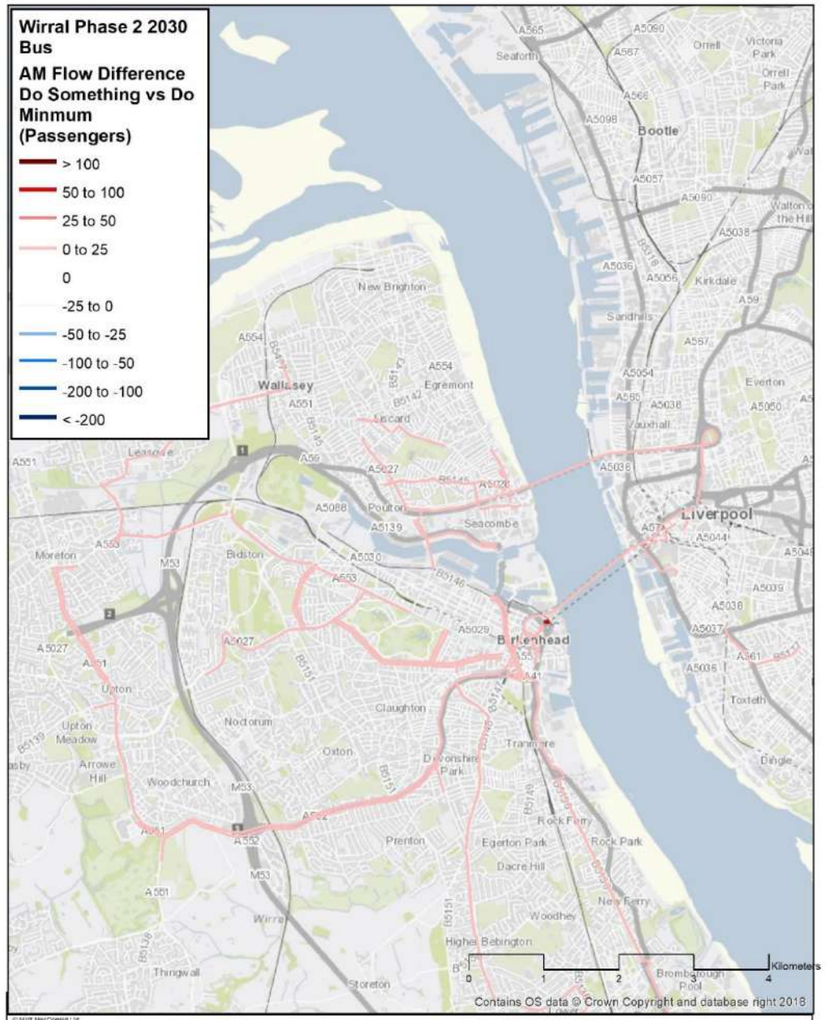
Phase	Scheme	Package Name	Drawing Reference
Phase 1	• Bus routes diverted via Wirral Waters (410, 411, 413, 423) • Reduced bus journey time at the exit of Queensway Tunnel	World-Class Public Transport	• N/A • N/A
Phase 2	• Hamilton Square two-way outside station	Regenerating Woodside and Hamilton Square	• 392148-MMD-00-XX-DR-C-0002 • 392148-MMD-00-XX-DR-C-0004 • 392148-MMD-00-XX-DR-C-0004A
	• Rapid Transit – East Float – Woodside – Birkenhead Central (10 minute frequency)	World-Class Public Transport	• N/A
	• Use of former Dock Railway for Rapid Transit	A41 Sustainable Connectivity	• 392148-MMD-00-XX-DR-C-0001 • 392148-MMD-00-XX-DR-C-0003 • 392148-MMD-00-XX-DR-C-0005

8.4.2 Results

The results from Phase 1 indicate that the reduced bus journey times at exit of Queensway Tunnel and the re-routeing of bus services along Duke Street Bridge instead of Tower Road has a negligible impact on patronage.

Figure 21 presents a passenger difference plot between Phase 2 and the Do Minimum for 2030 AM. This show some increase in bus patronage in the A41/Wirral Waters areas.

Figure 21: Phase 2 to Do Minimum 2030 AM: Bus Passenger Volume Differences



Title				
Wirral Regeneration				
Date	Drawn	Checked	Approved	Scale at A4
20.12.2018	N. Osborne	S.Pierce	T.Millward	1:56,575

MOTT MACDONALD
Mott MacDonald House
8-10 Sydenham Road
Croydon, CR0 2EE
United Kingdom
T +44 (0)20 8774 2000
F +44 (0)20 8681 5706
W mottmac.com

A more detailed account of the scheme coding and results from the modelling is contained in the *Wirral Regeneration Modelling Report, Mott MacDonald (2019)*.

8.4.3 Transport Economic Assessment

An assessment of the transport economic benefits has been undertaken. Table 22 below contains a summary of the results from the modelling exercise for Public Transport Phases 1 and 2. Optimism bias of 44% has been applied to all scheme costs.

Table 22: Public Transport Phase 1 and 2 Results

Scheme	Present Value of Benefits	Present Value of Costs	Benefit Cost Ratio
Phase 1	£11m	£0m*	-
Phase 2	£14m	£10m	1.4

All entries are present values discounted to 2010, in 2010 prices.
** Costs are included as part of the A41 scheme*

Phase 1 provides £11m of benefits largely due to the journey time savings at Queensway Tunnel exit. The cost associated with this is included in the highway assessment.

The benefit cost ratio (BCR) for Phase 2 is 1.4. According to DfT guidance this is categorised as low value for money. However, it is noted that the improvements are required to better link the A41 redevelopment zones with Birkenhead town centre and its transport hubs, and establishing high quality connections to Wirral Waters Enterprise Zone. Also, the public transport schemes incorporate significant walking and cycling improvements to also better connect the area to wider residential communities. respectively.

9 Funding Opportunities

A review of available funding sources for the implementation of schemes within the A41 North Corridor Study has been undertaken, including both short and long-term funding opportunities. Alongside a number of sub-regional funding streams, there is also an opportunity for Wirral Council and the Liverpool City Region Combined Authority to obtain funds from national funding streams such as the recent national allocation of £475m to major schemes. Working in conjunction with private developers and the planning system offers a further opportunity to raise funding for infrastructure that would be beneficial to both the Council and developers. This can include the Community Infrastructure Levy and Section 106 and 278 funding as well as other non-Government funding through working with charity groups such as Sustrans. It will be critical to get schemes developed to both attract interest and ensure a strong position for requesting funding from public sources.

9.1 Sub Regional Funding

9.1.1 Liverpool City Region Local Enterprise Partnership (LEP) & Local Growth Fund

The Liverpool City Region LEP works with Government to set out investment priorities for transport infrastructure at a regional and local level. LEPs play a key role in facilitating the devolution of transport decision making to local areas and are expected by Government to support sustainable economic growth in their engagement with local authorities and through funding bids.

The Local Growth Fund forms the Government's funding pot of at least £2 billion per year from 2015/16 to 2020/21. Through the Liverpool City Region LEPs submission of their Economic Strategy in July 2014, a £230 million Growth Fund was awarded for this period to unlock the region's economic potential. Within this fund a transport package totalling over £97 million was established, of which £51.6 million was allocated to enhancing the connectivity and attractiveness of the Liverpool City Region. The initial Growth Deal was expanded in January 2015 with a further £31.6 million of devolved funding granted to the LEP. Since then two further growth deals have been announced in March 2016 and January 2017. In total, the Liverpool City Region LEP have secured £336 million of Growth Deal funding from Government to date.

Ensuring efficient and futureproofed connectivity to the A41 North Corridor regeneration area will be key to unlocking the economic potential of both Wirral and the Liverpool City Region as a whole over the coming years. A great number of the schemes proposed in this study are thus well positioned to tap into this funding pot.

9.1.2 Liverpool City Region Sustainable Transport Enhancements Package (STEP)

The Liverpool City Region Sustainable Transport Enhancement Package (STEP) comprises a £41.4 million package of sustainable transport improvement measures to be delivered over a six-year period from 2015/16 to 2020/21. It was announced in July 2014 as part of the Growth Deal aimed to provide funds to LEPs for projects that benefit the local area. The STEP investments form a critical part of this Growth Plan, as well as the Liverpool City Region Strategic Economic Plan, and are shaped around four interrelated Strategic Packages of works, as indicated below in Figure 22.

Figure 22: STEP in the National and Regional Policy Context

Source: Mersey Travel, 2016

STEP is being delivered over two phases: Years 1-2 and Years 3-6. £13.8 million of capital funding was made available for Years 1-2 across 7 key growth zones. Within Years 1-2, a number of improvement schemes were funded in and around Birkenhead as part of Growth Zone 2 improvements. These schemes pulled in over £3 million of STEP funding, to deliver schemes such as access improvements, focusing on sustainable travel links, to be implemented along Poulton Swing Bridge and Duke Street Bridge as part of the Wirral Waters Eastern Portal project.

Further Investments for Years 3-6 have also been approved across the 7 growth zones. Again growth Zone 2, which encompasses the Mersey Waterfront, has secured £980,000 to enhance connectivity at a number of Wirral and Liverpool Waters destinations, including further improvements to walking and cycling links to key destinations. A further £3,002,000 has also been approved for Growth Zone 5 along the A41 North Corridor which will also facilitate improved accessibility to the Wirral Waters area.

Many of the schemes this study proposes, covering improved pedestrian, cycle and vehicular accessibility, align well with and would complement these established schemes. Due to the strong focus on sustainability imbedded in most of the proposed schemes, this funding package is set up well to support them. Most of this funding has, however, already been allocated and making use of any remaining funds available will require a quick turnaround by the applicant.

9.1.3 Single Investment Fund (SIF)

The SIF forms the key funding tool for the Liverpool City Region and addresses its strategic priorities. Over £458 million is being invested in the City Region through to March 2021 as part of the City Region's Devolution Agreement with the Government. This pot is made up from a number of sources including the Local Growth Fund and the funding secured through the Devolution Agreement.

9.1.4 Transforming Cities Fund

The £1.7 billion Transforming Cities Fund (TCF) was launched as part of the Industrial Strategy in the 2017 Autumn Budget. It supports ambitious and innovative transport projects that seek to increase productivity and reduce highway network congestion through delivering investment in active and sustainable modes. The investment also falls within the Government's £31 billion

National Productivity Investment Fund aimed at improving productivity, which is thought to be key to raising living standards.

The Transforming Cities Fund invited city regions across England to bid for funding from a £1.7 billion pot. In 2018 the first £840 million of the fund was allocated between six Mayoral Combined Authorities empowered to deliver schemes to facilitate better, safer and faster commuter journeys. Liverpool City Region was awarded £134 million in capital grant for local transport investment over a 4-year period. Funding is being awarded through Merseytravel, with recent awards to projects to develop business cases for a new Mersey Ferry and a smart ticketing solution for the LCR. Scheme 3 (City Boulevard) as well as our range of transit schemes represent good examples of preferred schemes within this work that are well placed to benefit from TCF funding going forward. Work beyond the scope of this commission should take place to secure development funding for these schemes from TCF.

9.2 Regional / National Funding

9.2.1 Transport for the North (TfN)

In November 2017 Transport for the North (TfN) became the UK's first statutory sub-national transport body. Backed with £260 million of government funding, TfN plan to transform transport across the North of England, providing the infrastructure needed to drive economic growth. By working alongside local transport authorities, TfN fund, promote and deliver transport-based projects. TfN published its draft Strategic Transport Plan for consultation in January 2018, in which it sets out the case for investment by 2050 to help transform the North's road, rail, sea and air connections to help drive long term economic growth. The larger road infrastructure-based improvement schemes as well as transit schemes detailed within this study have good potential to receive funding for early case making from TfN.

9.2.2 Road Investment Strategy

The first Road Investment Strategy (RIS 1) outlines a long-term funding programme for motorways and major roads. It comprises a multi-year investment plan that is being used to improve the network through high-level objectives for the first period from 2015 through to 2020. Over £15 billion was allocated to the first strategy which aims to enhance the strategic highway network, improving connectivity, journey times and road safety.

For the next Road Investment Strategy (RIS 2) for the period 2020 through to 2025, a grant of £25.3 billion has been allocated, significantly higher than the available funding through RIS1. will also be awarding significantly more than the £15 billion made available through RIS 1. The Department for Transport (DfT) will continue to work with Highways England, the Office for Road and Rail and stakeholders to ensure that RIS2 is a robust strategy and any opportunities for Wirral Council to feed into the RIS2 development process will help advance work against our major highways scheme.

9.2.3 Major Road Network (MRN)

As part of the Transport Investment Strategy announced in 2017, the government committed to creating a Major Road Network (MRN). Approximately 5,000 miles of 'A' road were brought into scope for extra funding from the National Roads Fund for upgrades and improvements. Through investment in the MRN, the government aims to reduce congestion and support economic growth, housing delivery and the strategic road network.

Local highways authorities are eligible for up to £100 million of government funding for successful bids to deliver investment in the MRN. Both the A41 and A59 are proposed to be included in the MRN. As such, the supporting road infrastructure projects proposed around the A41 North Corridor regeneration area are potentially eligible to benefit from this funding source.

9.2.4 Clean Air Fund

In March 2018 a package of funding worth over £260 million was launched by the Government to assist air quality improvements in some of England's most polluted areas. The investment package was launched on the back of the UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations released in July 2017, which outlined a need for councils with high levels of air pollution at busy road junctions and hotspots to take quick and robust action. Fulfilling a commitment to support local authorities to deliver these plans, the government launched the £220 million Clean Air Fund alongside a further £40 million from the £255 million Implementation Fund. The Implementation Fund was made available to councils in 2017 to accelerate the development of local clean air plans. Together these funds aim to support local authorities to take action to improve air quality and minimise the impact of Local Plans on individuals and businesses. The Clean Air Fund will be available from 2018 to 2021.

The Liverpool City Region was among the eight local authorities recently required by Government to carry out a detailed study to be submitted by the 31st October 2019, outlining how they will tackle air quality problems. The Government has ensured they will continue to provide funding, such as the funds received through the Clean Air Fund, to authorities. Many of the schemes proposed in this study, especially those related to active travel, could benefit from this funding as they will aid in the improvement of local air quality.

9.2.5 Air Quality Grant

The Air Quality Grant scheme facilitated by Defra provides additional funding to eligible local authorities to aid in the improvement of air quality. Since it was first made available in 1997 the scheme has awarded over £57 million in funding to a variety of projects. A total of £2,394,956 was given to successful projects in 2017/18, including a £450,000 investment into a cycling infrastructure and communications package project carried out by Portsmouth City Council. Each year applications must generally be received by the end of November to be considered for the following year's grants.

9.2.6 Cycling and Walking to Work Fund

In January 2017 the Government announced a £64 million investment fund to help encourage more people to cycle and walk to work. The funding, that will support local projects over three years from 2017 to 2020, forms part of a wider government package of more than £300 million to boost walking and cycling during the current parliament.

All English transport authorities were invited to bid for the £60 million Sustainable Travel Access Fund of which 25 authorities received a share. The remaining £3.8 million formed the Cycling and Walking to Work Fund to be invested in three City Regions over the 2017-18 period to connect people with employment and apprenticeships. Liverpool City Region was awarded £770,000 to be invested over the 2017-2018 period. Applications for this round of funding closed in March 2018, however, the active travel packages proposed within this study will have great potential to receive support from similar funding rounds in the coming years.

9.2.7 Large Local Majors Fund

The Large Local Majors Fund was announced in 2016 as part of the £12 billion Local Growth Fund. It forms a competitive process for LEPs in which funding can be provided for exceptionally large, potentially transformative, local schemes. The initial fund of £475 million

was made available for projects up to 2021. This funding pot became fully allocated in 2018, however, the Government recently awarded a further £173 million to three road schemes in Devon, East Riding of Yorkshire and Leicester, which took the total funding pledged through the fund to £603 million. Through this the Government have shown continued commitment to fund projects through to 2021, reinforcing the Large Local Majors Fund as a potential source of funding for schemes proposed within this study.

9.2.8 Town Centre Fund

Specifically, regarding the LCR. £5m - £1m per district with a town centre for the five districts excluding Liverpool.

It is understood that it is the town (or the district on its behalf) which applies for funding through the City Region Town Centre Commission, which is a new body. Districts choose which of their towns they would like to put forward. The types of eligible scheme that it could be used for includes: restructuring retail, business space, public sector hubs, event venues and cultural offers. Implies each of the five districts can have £1m, it's not a competition between them, but they have to make case for where the funding will be implemented.

9.2.9 Future High Street Fund

Nationally announced in October 2018 budget. £675m available altogether spread out around the country.

Applications to it require a supporting vision document for the town centre. It will fund physical infrastructure to support residential and employment developments, and support existing local communities and the regeneration of heritage high streets. The aim is to support regeneration of high streets and adaptation to consumer trends/demands. Exact application process is yet to be confirmed, but full prospectus will be launched 'later this year' detailing the objectives of the fund, further detail on nature of projects eligible, and assessment criteria. The process will also include a High Street Taskforce to support scheme development. In addition, the process will need to demonstrate how specific scheme supports overall vision for town/city high street, and will be assessed according to Value for Money and deliverability, strategic fit etc.

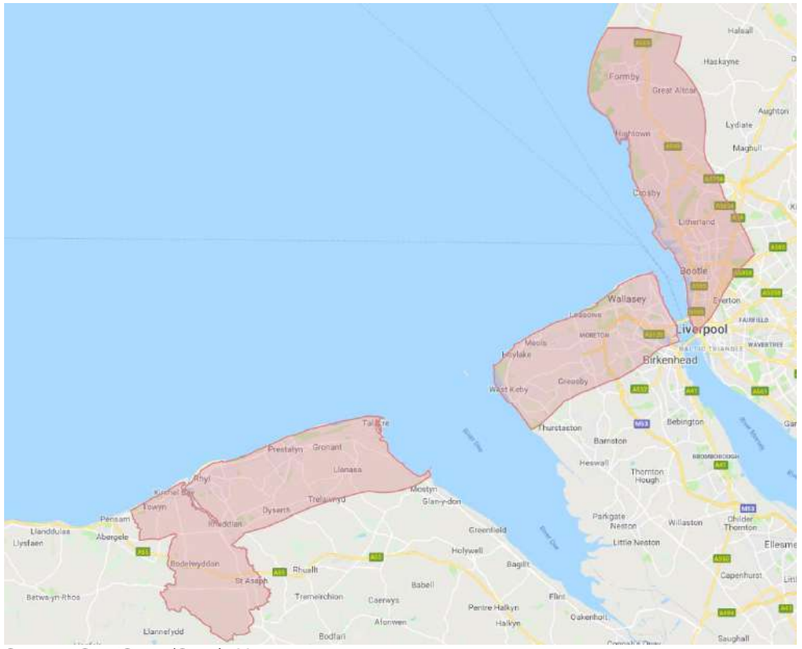
9.3 Non-Government Funding

In recent years, the use of non-Government funding for local and major transport schemes has become increasingly important as the DfT has sought to reduce its spending. This section details a number of funding arrangements and agreements that Wirral Council and the Liverpool City Region Combined Authority could take advantage of to finance packages within this study. Where new developments require enhancements to the local transport network and other infrastructure, planning obligations will be sought by local authorities to fund the necessary works.

9.3.1 Community Benefit Fund

The Community Benefit Fund is used to support community and environmental projects in coastal areas which host major wind energy projects. Ørsted (formerly DONG Energy) are providing grants as part of the community support associated with their extension project for their Burbo Bank wind farm, off the coast of Wirral. Approximately £225,000 is being made available for community projects that will benefit the local area throughout the expected 25-year lifetime of the wind farm. The fund launched in 2015 to all community organisations located coastally in Denbighshire, Flintshire, Wirral and Sefton, as demonstrated in Figure 23. The fund is managed by GrantScape and applications can be made for individual grants of between £500 and £25,000. For each year that the fund is open, two application rounds are available. The next application closing date is on 3rd April 2019 and decisions on successful grants will be announced approximately 3 months after each closing date.

Figure 23: Burbo Bank Community Fund (Funding Area)



Source: GrantScape/Google Maps

9.3.2 Community Infrastructure Levy (CIL)

Larger scale infrastructure which is identified as being required through the Council's Infrastructure Delivery Plan can be funded through the Community Infrastructure Levy. The levy is paid by land owners and developers to the relevant local council, with charges based on the size and type of new development. Money raised can then be spent in line with council priorities and needs. Wirral Council has not yet made a decision on whether to introduce a levy in Wirral , with further consideration required to explore the feasibility and viability of introducing a CIL for Wirral.

9.3.3 Section 106 and 278 Funding

Section 106 and 278 agreements negotiated with developers allow funds to be raised to mitigate the potentially negative impacts of new developments. Typically, section 106 and 278 agreements include requirements to make contributions to new infrastructure in the vicinity of the development. In some cases, sums of money from a number of arrangements can be put towards larger mitigation measures. Therefore, section 106 and 278 agreements provide an opportunity to use funds raised to build up a pot of money to deliver identified and prioritised schemes.

9.3.4 Private Business/Employers

Beyond section 106 and 278 contributions, developers and private investors should also contribute to the delivery of the strategy through schemes that enhance the individual development as well as providing an upgrade to the general setting of Wirral.

9.3.5 Charities and Voluntary Groups

Within the promotion, funding and delivery of schemes, Wirral Council could take advantage of the interest and expertise that charities and voluntary groups have in relation to transport. Sustrans, a charity concerned with promoting everyday travel by foot, bike and public transport, could help to promote a number of schemes within the A41 North Corridor Study, which encompass active travel-based improvements. In 2014/15, Sustrans delivered £41.6m of projects and have worked on the design and construction of cycling facilities in a number of locations including Bristol, Edinburgh and Newcastle. As such, Sustrans are well positioned to provide funding towards the multitude of active travel and public transport-based improvement schemes proposed within this study. For instance, the Birkenhead Streetscape package encompassing Phase 1 schemes 16-23 proposes a number of physical pedestrian and cycle infrastructure additions which mirror previous schemes Sustrans has financed.

10 Conclusions and Next Steps

10.1 Conclusions

Following on from previous reports in the suite of documents associated with Wirral Regeneration Schemes, including Wirral Strategic Transport Framework Action Plan (2019), and A41 North Corridor Study Baseline and Options Appraisal Reports (2018), this document presents the preferred set of schemes identified for the A41 North Corridor regeneration area. The various sites involved (including Woodside, Hind Street and links into Birkenhead Town Centre) present a clear opportunity for largescale regeneration with Woodside providing some of the best urban views and accessibility with the Liverpool City Region, and Hind Street exhibiting significant potential as an exemplar zone of industrial regeneration. It is clear that it is not enough to simply develop the area with mixed-use residential and commercial opportunities since the transport infrastructure serving the area is currently unsuitable for a large scale increase in movements to and from the area each day.

As a result, this document proposes a series of schemes packaged and phased into three timescales for delivery. These schemes are aimed at resolving existing constraints and issues within the wider transport network, reducing the severance caused by the existing road network including the system of flyovers and underpasses, and improving public transport networks serving the A41 area, better tying the development zone into the wider context within Birkenhead and the wider Wirral borough, and significantly improving conditions for pedestrians and cyclists.

It is recognised that the transport strategy for the A41 North Corridor regeneration area will need to multi-modal in nature if existing issues of congestion, air quality and severance are to be tackled effectively. To this end, and building upon the work undertaken by Peel on the Wirral Streetcar project, to link Wirral Waters with Woodside and Hamilton Square, we propose a comprehensive transit network (which could be formed of one of a variety of available mode types as detailed in this document, or even a combination of these). The network is designed to support and tie into the existing Merseyrail and bus networks to provide seamless multi-modal travel via an off-street alignment between Birkenhead Central and Wirral Waters via the town centre and civic hub development. Ultimately the system is proposed to extend north towards New Brighton via Seacombe and west to Liverpool City Centre, with possible future extensions including southern links towards Rock Ferry. The system will provide high quality and frequent public transport to the heart of the A41 North Corridor regeneration area and will provide residents and users with a true choice of modes.

The document has discussed the economic and social impact of the transport interventions in the area, noting the gross number of jobs, residents and GVA growth that will be supported by the project. In this way it may be seen that the measures to improve active travel and quality of place such as the walking, cycling and public realm schemes, have an important role to play in the overall economic benefit of the strategy. Traffic and public transport modelling tools were then used to determine the benefit of the more traditionally measurable components and determined that, when all phases are taken into account, the interventions proposed are likely to offer sound value for money even without the impact of the non-measurable (at this level of detail) components.

Finally, some initial thought has been given within this document to the potential future funding mechanisms for the schemes proposed. Given the widely varying size and scale of the interventions, and the different bodies with which they must interface, it is likely that a mixture of multiple potential funding sources is the most likely outcome for delivering the individual elements with some of the most strategic and impactful likely to be delivered via the devolved major scheme process (Local Growth Fund) at a City Region Level. Conversely some of the smaller scale interventions could be delivered through new opportunities such as those provided by the Town Centre or Local High Street funds, or non-Governmental funding mechanisms such as the Community Benefit Fund. Given the fact that the transport schemes support local development so strongly it is also likely that a substantial proportion of the ultimate funding package will come from local developer contributions either through the established S106/278 mechanisms or a future Community Infrastructure Levy.

It should be noted that the A41 North Corridor and Wirral Waters Transport Feasibility Studies have been designed to function as complete packages of work. As a result they should not be considered in isolation from each other, just as the individual schemes contained within should not be seen in isolation from the other components of the respective strategies.

To sum up, this is an exciting time for Birkenhead and the A41 North Corridor regeneration area will form part of a rejuvenated and regenerated wider Birkenhead and Wirral borough, for the benefit of its existing and future residents, employees and users. The challenge is to ensure that the significant level of aspiration for the area is matched by the short and medium term delivery of vital, efficient and effective transport solutions to create a truly multi-modal and sustainable network in which choice is provided to the benefit of all.

10.2 Next Steps

Following the publication of this report, the transport strategy for the A41 North Corridor will need to be progressed in the following ways:

- Further consultation with cabinet members within Wirral Council and leadership within Liverpool City Region to ensure buy-in and support at the highest level of decision making within the borough and wider city region;
- Further consultation with key stakeholders to disseminate the findings of the study, gain feedback and refine the results and scheme development;
- Identification of funding for further development, detailed design and delivery of the core scheme components via a variety of sources – the key schemes contained within packages as reported in the recent Strategic Transport Framework Action Plan report are in the process of being submitted to Liverpool City Region for consideration within their own scheme pipeline process;
- Development of Business Cases for the key components of the strategy (or the strategy as a whole if this is deemed appropriate) to test and prove value for money. This will form a key aspect of application for funding and is a requirement for national or regional funding mechanisms;
- Delivery of the schemes in phases as envisaged over the next ten to fifteen years to coincide with the build-out of Woodside and Hind Street, and the wider Birkenhead Town Centre regeneration.

Appendices

A. Transit Options Review

This section provides a review of potential public transport options to operate on the proposed Wirral Waters transit scheme. As will be seen, the options include vehicles which run on dedicated infrastructure, and vehicles which would mix with general traffic.

A.2 Other Streetcars

Figure 1: Streetcars

Source: Wikimedia

Streetcar routes operate on street tracks shared with other vehicles. Streetcars stop on demand at frequent stops like buses and provide a crucial role in providing frequent, reliable transport.

A.2.1 Case study: Toronto Streetcar

- Location: Toronto
- Population: 2,732,000
- Population Density: 4,334 p/km2
- Cost Per Streetcar: £2.5 million
- Frequency: 4-9 minutes
- Length of Track: 83 km
- Track Gauge: 1495 mm
- Minimum Radius of Curvature: 10.973 meters
- Electrification: Trolley Wire 600 V DC
- No. of Streetcars: 264+
- No. of Stops: 685
- No. of Lines: 11
- No. of daily rides: 292,000 passengers
- Dimensions: 30.2 meters long, 2.4 meters wide and 3.84 meters high
- Capacity: 250 (70 seated, 150 standing)
- Speed: maximum 43 mph
- Driven: Driver
- Power: Electricity

Advantages

- These streetcars have a smaller minimum radius of curvature than other methods of transport discussed, this would be ideal for use in the Wirral as there is restricted space.
- High capacity compared to other methods of transit discussed, this would be good in the later stages in the redevelopment.

Disadvantages

- The cost is considerably higher than the proposed Wirral Streetcar
- It would be more difficult to expand than other methods discussed as new tracks would have to be implemented.

Table 1 <Streetcar>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.3 Electric Trolleybus

Figure 2: Electric Trolleybus

Source: Wikimedia

Electric trolleybuses are rubber-tired vehicles powered by electricity from overhead using spring-loaded trolley poles, this means there is no need to stop to refuel or recharge. Being solely powered by electricity, trolleybuses have extremely low emissions.

Modern trolley buses also have a battery which allows them to travel off-wire and reroute around anything obstruction blocking their path, or detour for short sections of route.

A.3.1 Case study: San Francisco Muni

- Location: San Francisco
- Population: 884,400
- Population Density 7,132 p/km2
- Cost Per Trolleybus: £300,000 - £1 million depending on age and specification
- Frequency: 20 minutes
- No. of Trolleybuses: 268
- No. of Stops: 142
- No. of Lines: 16
- Dimensions: 12-25 meters long and 2.55 meters wide
- Capacity: 82-200 passengers
- Speed: maximum speed 50 mph, average speed 38 mph
- Driven: Driver
- Power: Electricity

Advantages

- The trolleybus is significantly quieter than an original diesel bus which could be more suitable in residential areas.
- If there is an obstruction in its normal path, it can drive off wire for a period of time to manoeuvre around the obstruction, unlike streetcars or trams that operate on fixed tracks.

Disadvantages

- They are less manoeuvrable than traditional buses.
- Other forms of transport are easier to adjust or expand as overhead wires would have to be added or amended.

Table 2 <Electric Trolleybus>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.4 Light Rapid Transit

Figure 3: Light Rapid Transit – DLR & Manchester Metrolink

Source: Wikimedia & geograph.org.uk

Light rail systems are guided by tracks and most have overhead lines supply the electricity. The exception to this is The Docklands Light Railway in London as this uses an inverted third rail for its electrical power which allows the electrified rail to be covered and the power drawn from the underside. Trams in Bordeaux, France use a special third-rail configuration where the power is only switched on beneath the trams as the vehicle passes, making it safe to use on city streets.

Light rail systems provide easy access to city centres as they can run right up to pedestrianised areas, this provides a very attractive alternative to driving in busy areas.

A.4.1 Case study: The Docklands Light Rail

- Location: London
- Population: 150,000
- Population Density: 5,285 p/km2

- Cost Per km: The average in Europe is between £9 million - £12 million
- Frequency: 10 minutes
- Length of track: 38km
- Track Gauge: 1435 mm
- Minimum Radius of Curvature: 40 meters
- Electrification: 750 V DC third rail
- No. of Trains: 149
- No. of Stops: 45
- No. of Lines: 7
- No. of daily Rides: 340,000 passengers
- Dimensions: Train consists of 2 or 3 cars and dimensions are 2.65m wide and 56-84m long
- Capacity: 278 per car
- Speed: Maximum 65 mph and an average 50mph
- Driven: Autonomous
- Power: Electricity

Advantages

- Autonomous, this could reduce costs as no drivers are needed, the system could run for longer periods to satisfy demand.
- Higher speed than most other forms of transport discussed, gets the passengers to their desired destination much quicker.

Disadvantages

- Minimum radius of curvature is 40 meters which would make this type of system very difficult to implement in the Wirral.
- Very expensive compared to other forms of transport.

Table 3 <LRT – Docklands Light Rail>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.4.2 Case study: Manchester Metrolink

Figure 4: Manchester Metrolink

Source: Wikimedia

Manchester's Metrolink has more than doubled the number of passenger journeys from 19.2 million journeys in the 2010/2011 fiscal year to 41.2 million passenger journeys in 2017/2018 fiscal year. It achieves 89.3% of trams departing less than 2 minutes late and 98.9% of planned miles operated. It has step-free access for wheelchair-users, free Wi-Fi and provides a useful app that includes real time data, line status, planned improvements and much more to enhance passenger satisfaction.

- Location: Manchester
- Population: 545,500
- Population Density: 9,689 p/km2
- Frequency: 12 minutes
- Length of track: 100 km
- Track Gauge: 1435 mm
- Minimum Radius of Curvature: 25 meters
- Electrification: Overhead line 750 V DC
- No. of Trains: 147
- No. of Stops: 93
- No. of Lines: 7
- No. of Daily Rides: 113,187
- Dimensions: 28.4 meters long
- Capacity: 212
- Speed: Maximum speed 50 mph
- Driven: Driver
- Power: Electricity

Advantages

- Increasing passenger satisfaction by introducing a useful app and free Wi-Fi
- Could make passengers journeys through the Wirral very short in comparison to other forms of transport.

Disadvantages

- Very expensive compared to other systems discussed and this system is only worthwhile if there is a high demand that would be travelling using it frequently.

Table 4 <LRT – Manchester Metrolink>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.5 Personal Rapid Transit

PRT is a concept based on driverless vehicles which operate on a segregated track, travelling from point to point rather than using a fixed route. These vehicles are typically lightweight and battery powered which means that any necessary structures are much cheaper than those for a conventional transit system, and that emissions at point of use are virtually zero. If clean energy sources can be used to generate electricity, then such systems can be effectively carbon-neutral.

A.5.1 Case study: Heathrow PRT System

Figure 5: PRT-Heathrow

Source: Wikimedia & Mott MacDonald

- Location: Heathrow, London
- Cost per Km: £5.4 million - £11.5 million
- Planning & Capital Cost: £25 million
- Frequency: 0 -15 seconds
- Length of track: 3.8km
- No. of Pods: 21
- No. of Stops: 3
- No. of Lines: 1
- Dimensions: 4 meters wide, 1.8 meters high
- Capacity: 4
- Speed: 25 mph
- Driven: fully autonomous
- Power: Electric motor & 4 batteries

Advantages

- The headway can be less than 15 seconds which is much more frequent than any other type of transport.
- Passengers do not have to share pods, making the mode more attractive to users.
- Very small dimensions, there does not need to be lots of free space to implement this system.
- They are fully autonomous, reduced costs as no drivers are needed.

Disadvantages

- The capacity is usually only around 4 passengers per pod which means a high number of pods would be needed to satisfy total demand.
- They travel at 25 mph, this could make some journeys very long and could be completed by other forms of transport much quicker.

Table 5 <PRT – Heathrow>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.5.2 Case study: Morgantown

Figure 6: PRT- Morgantown

Source: Wikimedia

- Location: West Virginia USA
- Population: 30,855
- Population Density: 1,181 p/km2
- Planning & Capital Cost: around $120 million
- Frequency: 5 minutes
- Length of track: 5.8km
- Track Gauge: Concrete guideway
- No. of Pods: 71
- No. of Stops: 5
- No. of Lines: 1
- No. of Daily Rides: 15,000
- Dimensions: 4.72 meters long, 2.03 meters wide and 2.67 meters high
- Capacity: 20
- Speed: 30 mph
- Driven: Pods are autonomous but are monitored in a control centre
- Power: Electric

Advantages

- The units travel directly to the desired destination with no stops.
- The capacity is much higher per pod than the previous PRT system discussed.

Disadvantages

- It would be difficult to expand or change the track if flexibility is needed.

Table 6 <PRT – Morgantown>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.6 Demand Responsive Transport (DRT)

Figure 7: Arrivaclick

Source: BBC & PJB

DRT systems such as Arrivaclick combine the convenience of a taxi with the price of a bus ticket. Arrivaclick is a minibus service that picks multiple passengers all heading in the same direction and gets them to their desired location. It is ordered via an app where you enter your pick up ad drop off point and Arriva plan the rest.

A.6.1 Case study: Arrivaclick

- Location: Liverpool
- Population: 489,421
- Population Density: 3,889 p/km^2
- Cost Per Minibus: Around £30,000
- Frequency: Depends on availability
- Capacity:15
- No. of Minibuses: 6 currently but expanding to 25 mid 2019
- No. of Stops: Passengers can be picked up and dropped off anywhere
- No. of daily Rides: 186 in week 34 of operation
- Driven: Driver
- Power: Diesel

Advantages

- There is no construction cost, only the cost of the vehicles, drivers, software development and maintenance
- Provides a quick and easy service for passengers

- Would be very easy to change routes if necessary

Disadvantages

- Only has a capacity of 15, requiring large numbers of units to satisfy total demand.
- Reliability is dependent on availability and during peak times users may not be able to find a local available mini bus
- There is a need to further develop algorithms and software if the system is to be expanded to include Wirral
- Customers will need access to the app via smartphone or tablet. Some older people may not have access and these this could lead to them being unable to access the service

Table 7 <Arrivaclick>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.7 Tram bus

A tram bus is a tram on pneumatic tyres instead of tracks. The tram bus must have its own infrastructure to reach a good operating speed. What makes the tram bus so unique is that it combines the efficiency and stability of a tram with the flexibility of a bus. The tram bus has a much larger capacity compared to a traditional bus and can also run as an electric or hybrid vehicle, making it even more environmentally-friendly.

A.7.1 Case Study: Malmo Sweden

Figure 8: Skanetrafiken Tram bus

Source: Wikimedia, YouTube - MediaServiceTV1

- Location: Malmö, Sweden
- Population: 341,457
- Population Density: 2,175 p/km^2
- Cost of Buses: approximately £650,000, based on 30 being bought for £19million
- Frequency: 5 minutes
- Length of Route:
- No. of Buses: 15
- No. of Stops: 40
- No. of Lines: 1
- No. of Daily Rides: estimated 13,700 -21,000
- Dimensions: 24 meters long
- Capacity: 55 seated with 95 standing
- Driven: Driven
- Power: Compressed Natural Gas (other options available)

Advantages

- There is little construction cost, primarily only the cost of the vehicles.
- Routes can easily be changed or extended.

Disadvantages

- Much higher capacity than possibly required in the case of Wirral Waters.
- Would need trained drivers and would not be able to rely on volunteers as the Wirral street car proposes to do.

Table 8 <Tram buses>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.8 Bus Rapid Transit

Bus Rapid Transit is a form of rapid transit which involves stretches of highway being segregated and dedicated for the use of specialist buses. Where this is not possible due to land constraints, the specialist buses will use public highways. When using public highways, the buses will typically be given priority over other road users to reduce delays. Station platforms should be level with the bus floor for quick and easy boarding, making the system fully accessible for wheelchairs and disabled passengers with minimal delays.

A.8.1 Case study: BRT Sunway Line

Figure 9: BRT – Sunway Line

Source: Wikimedia

- Location: Subang Jaya, Malaysia
- Population: 6,071,644
- Population Density: 6,581 p/km^2
- Cost of Buses: £3.3million for 8 double deckers and 6 larger single deckers in York
- Planning & Capital Cost: £24.5 million
- Frequency: 4 minutes
- Length of track: 5.4 km
- No. of Buses: 15
- No. of Stops: 5
- No. of Lines: 1
- No. of daily Rides: 5,300 passengers
- Dimensions: 11-12 meters long
- Capacity: 80
- Speed: 50 mph
- Driven: Driven
- Power: Electric,

Advantages

- Electric Buses mean virtually zero emissions
- Faster than some other methods of transport discussed

Disadvantages

- High capital cost compared to the Wirral streetcar

Table 9 <Electric BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	

Criteria	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.8.2 Case study: New York BRT

Figure 10: BRT – New York

Source: nyc.streetsblog.org and nyc.gov

- Location: New York
- Population: 8,538,000
- Population Density: 10,630 p/km^2
- Cost p/km: $1,072,000
- Frequency: 3-4 minutes
- Length of track: 90 km
- No. of Buses: 398
- No. of Stops: 145
- No. of Lines: 7
- No. of daily Rides: 245,566
- Dimensions: 11-12 meters long
- Capacity: 120
- Average Speed: 10.2 mph (average speed including stopping time)
- Driven: Driven
- Power: Hybrid & CNG

Advantages

- High frequency and capacity which means it would be more reliable than just having one streetcar every 15 minutes.

Disadvantages

- The vehicles only travel at 10mph on average making journeys even longer than using other methods of transport
- Hybrid engines are not as eco-friendly as other methods of transport discussed.

Table 10 <Hybrid BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.8.3 Case Study: Cambridgeshire Guided Busway

Figure 11: Cambridgeshire Guided Busway

Source: Geograph & Flickr

- Location: Cambridge
- Population: 123,867
- Population Density: 3,135 p/km^2
- Cost p/km: Bronze average £7,400,000
- Frequency: 5 minutes
- Length of track: 40 km
- No. of Stops: 8
- No. of Lines: 1
- No. of daily Rides: 12,000
- Dimensions: 11-12 meters long
- Capacity: 120
- Average Speed: 37mph
- Driven: Driven and Kerb guidance
- Power: Diesel

Advantages

- Provides faster transport than other methods discussed
- Has 25km of segregated busway that is specifically for these buses which limits the impact of traffic disruption

Disadvantages

- The buses are powered by diesel and will produce the highest amount of emissions compared to other methods discussed.

Table 11 <Diesel BRT>

Criteria	
Flexibility of the system How easy is it to react to changes	
Implementation cost	
Operating Cost	
Branding & Legibility How recognisable is it and how easy is it to use	
Capacity	
Environmental Impact	
Deliverability How acceptable is this system, amount of physical required and constraints	

A.8.4 Guidance Systems

Driven

Driven vehicles are the most common types of BRT system. These requires large numbers of drivers to be on a rotation and the system is therefore prone to human error. Driven vehicles could cost more than autonomous vehicles as there must be sufficient drivers and cover staff available.

Semi-Autonomous

Figure 12: Mercedes Semi-Autonomous Future Bus

Source: Caradvise & Mashable

Semi-autonomous vehicles are capable of letting the driver take their hands of the wheel and feet of the pedals by using a range of sensors and mapping systems. They still require a driver to be present and paying full attention however. An infrared camera is mounted onto the

steering column to keep a track of where the driver is looking, if the driver looks away for too long a light in the steering bar will flash red and the driver's seat will vibrate.

Fully Autonomous

There are 8 main sensors that are required for a fully autonomous vehicle to operate safely. This includes Lidar: a camera that uses lasers to measure the distance to objects to build up a 3D letting the vehicle know if there is a hazard. The second is a standard camera that points through the windscreen, this is used to spot hazards like pedestrians and reads road signs and traffic light signals. There are also radar sensors dotted around the bus to monitor the position of vehicles and a rear-mounted aerial that receives information from GPS and an ultrasonic sensor that monitors the vehicles movements. The others include altimeters, gyroscopes and a tachometer to provide more accurate measurements on the cars location.

Kerb Guidance

Figure 13: Kerb Guidance

Source: Flickr and Londonguidedbusway.co.uk

Kerb-guided buses (KGB) have got small guide wheels attached to the bus to engage vertical kerbs on either side of the guideway. These guide wheels push the steering mechanism of the bus, keeping it centralised on the track. When the bus is not on a designated guideway, the bus is steered like an ordinary bus. The start of the guideway is funnelled from a wide track to guideway width. This system permits high-speed operation on a narrow guideway and precise positioning at boarding platforms, facilitating access for the elderly and disabled. Guide wheels can be attached and removed from almost any bus and this therefore is an adaptable system that can be easily changed.

Optical Guidance

Figure 14: Optical Guidance

Source: Wikimedia

A system of lines is applied to the roadway to guide vehicles, this is done by the use of modern cameras and image processing systems that detect the lines and keep the vehicle safe by precisely following the specified route. Other sensors would be used alongside this system to ensure that the vehicle is safe in respect to its surroundings such as in relation to other vehicles or hazards such as pedestrians. The latest technology offers the ability to recognize coded tracks or optical markers.

B. Economic and Social Impact Summary Table