



Outline Business Case Executive Summary

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1 Introduction

This document is an executive summary of the Outline Business Case (OBC) being prepared for The Western Link Scheme. It has been produced to support the Warrington Borough Council Executive Board Report issued for the Executive Board Meeting on the 13/11/17.

This Executive Summary provides the key messages and themes that will be included in the full OBC to be submitted to Warrington Borough Council on 3/11/17. The content has been split into five sections which match the five cases contained within the full OBC. These are:

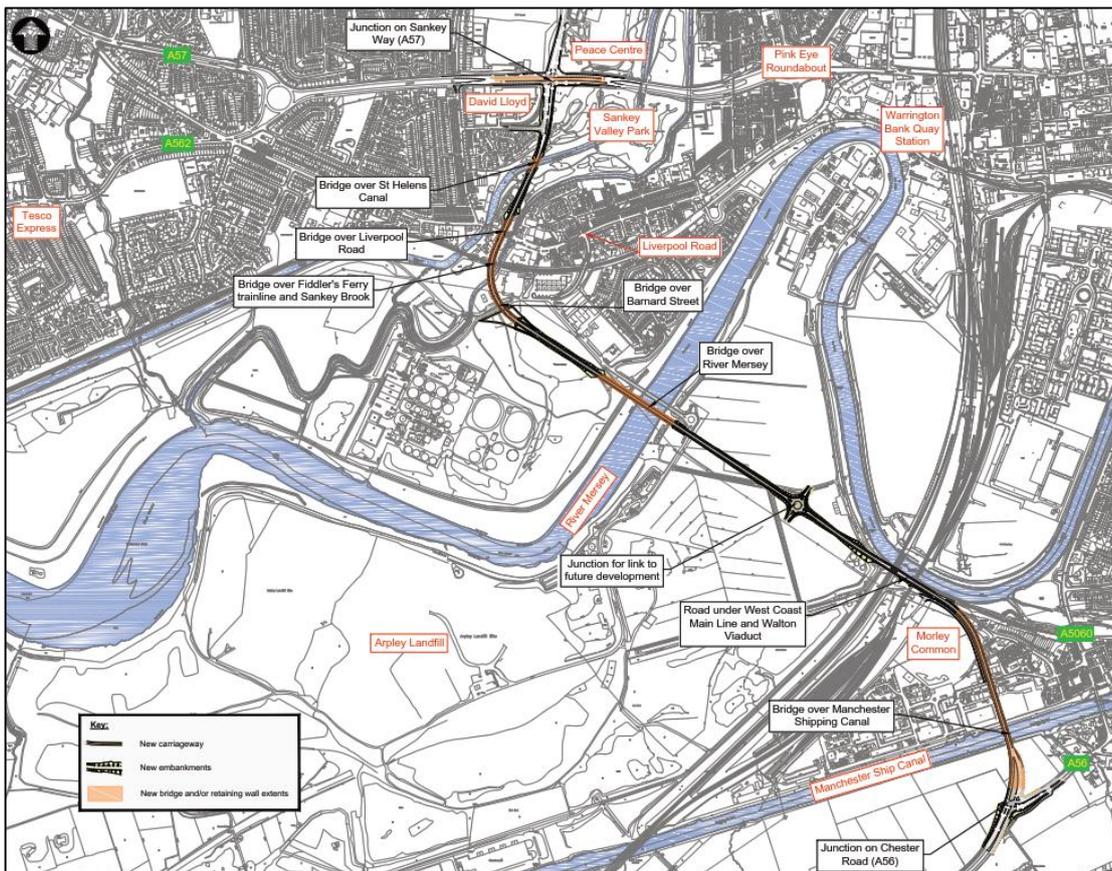
- The Strategic Case;
- The Economic Case;
- The Financial Case;
- The Commercial Case; and
- The Management Case.

2 Strategic Case

Mott MacDonald has been commissioned on behalf of Warrington Borough Council to produce an Outline Business Case (OBC) for the Western Link scheme. The purpose of the Strategic Case within the OBC is to determine whether investment in the Western Link scheme is required now or in the future. The Strategic Case sets out a clear process for establishing the need for intervention in the study area and identifies a preferred option for the Western Link scheme.

The scheme concerns the construction of a single carriage link road in west Warrington, between Chester Rd (A56) to Sankey Way (A57). The preferred option is shown below in Figure 1. Western Link seeks to address a range of transport issues within the town of Warrington including congestion at key junctions and resilience at times of severe network stress. The scheme also has the opportunity to act as a catalyst for development by delivering access to the Warrington Waterfront development and unlocking land immediately south-west of the town centre.

Figure 1: The preferred option for Western Link – Red Route



Source: Mott MacDonald

The Outline Business Case Strategic Case is split into 5 parts as shown in Table 1.

Table 1: Contents of the strategic case

Part	Contents	
A	The Scheme	Part A of the report introduces the Western Link Scheme. It details the schemes development, key project stakeholders and introduces the strategic need for the scheme in the context of local, regional and wider national growth plans.
B	Understanding the problems and issues	Part B presents the second part of this report and details the approach to establishing the problems and opportunities evident in the study area. Eight thematic areas are used to explore and capture a solid evidence base of the current and future issues in Warrington.
C	Objective setting	Part C of the report details the objective setting process for the Western Link scheme. The section considers the previous evidence review in Part B and a review of policy in Part C. In doing so, an identified case for change is set out. The aim and objectives of the Western Link Scheme are then formulated.
D	Scheme development	Part D of this report concerns the development and identification of a preferred option for the Western Link scheme. The scheme development summarises the in-depth option appraisal process undertaken in the Options Appraisal Report found in Appendix. A of the Outline Business Case.
E	The Preferred scheme	Part E presents the fifth and final part of this report and notes the description of the preferred scheme and investment needed to realise the ambition of Western Link. The benefits of the scheme are identified and the means to deliver Western Link.

2.1 Part A: The scheme

Part A introduces the Western Link Scheme, its development, key project stakeholders and provides a summary of the strategic need for the scheme. The traffic problems evident in Warrington and the towns development ambitions have led to the proposal of the Western Link Scheme.

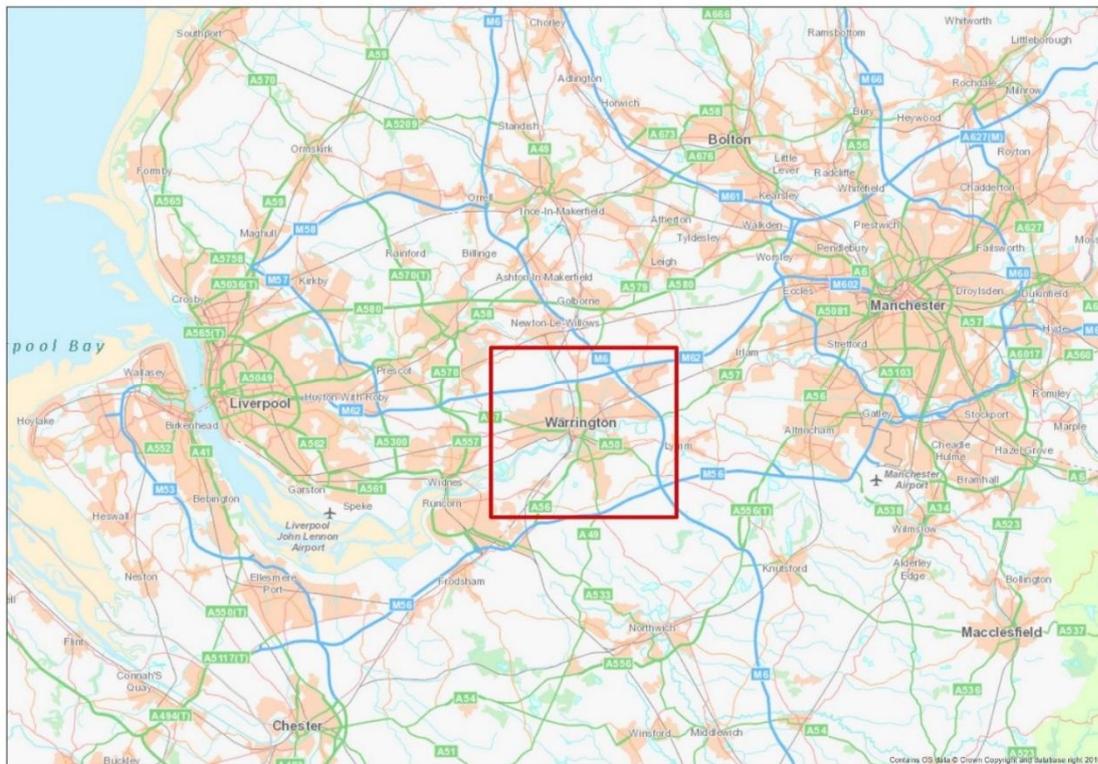
Scheme background

Warrington is a large town situated in North West England, it lies between two large northern cities; Manchester, found 20miles to the east, and Liverpool 20miles to the west (Figure 2). The River Mersey and Manchester ship canal pass through the town. These waterways are a defining feature of the towns character.

There are limited crossing points for both waterways and they provide challenges for north-south highways movements across the town. As a result, Warrington town centre has become subject to chronic traffic congestion, queues, delays and vehicular pollution. There is a serious risk that network resilience could decrease and further network degradation could occur.

In tandem to the town's traffic problems, Warrington seeks to build its growing economy and regenerate key parts of the town. Included in the town's 'New City' growth ambitions, is a high-quality mixed used development proposed directly west of the town centre – the Warrington Waterfront development. The development presents the opportunity to revitalise the town's riverside economy by delivering new housing, office and recreational space. However, the development hinges on highways access being improved. Without doing so, the development cannot be brought forward.

Therefore, the town's serious congestion issues and faltering network resilience, in tandem with the town's growth ambitions, has prompted Warrington Borough Council to explore options into the development of a crossing point to the west of the town. The route also seeks to facilitate access to the Warrington Waterfront development area. This has formed the origins of the Western Link scheme.

Figure 2: The location of Warrington

Source: OS maps

Warrington's aspirations for growth

Warrington sits within a number of growth corridors in the UK: The Northern Powerhouse (NPH); the Atlantic Gateway; the M6 Growth corridor; HS2; and two international airports. The town has strong ambitions to regenerate Warrington into a New City. Western Link can directly help Warrington meet its aspirations for growth by:

- Enhancing Warrington's access to a range of local, regional and international markets. This includes nationally significant industry in Warrington associated with nuclear, science & research and freight activities that take place in north-west and south-west Warrington;
- Western link can deliver highways access to the Warrington Waterfront development. This could help release crucial land for housing catering for 5,000 residential units, 110Ha of commercial floor space, recreational space and the Port Warrington development;
- Support residents' and workers access to Warrington Bank Quay, which could cater for enhanced rail services associated with HS2 and Northern Powerhouse Rail;
- Enhance connection to the strategic network and onward connection to Manchester and Liverpool international airports;
- Improve highways network resilience, reduce town centre congestion and overall increase in the efficiency of Warrington's transport network; and
- Help cut transport emissions in the town centre and aid a refreshment of town centre air quality.

2.2 Part B: Understanding the problems and opportunities

Part B presents the second part of the Strategic Case and details the approach to establishing the problems and opportunities evident in the study area. This forms a crucial stage of the OBC and enables the process of evidence based objective setting for the Western Link scheme.

Eight themes were identified as a basis for undertaking a review of evidence to establish key problems and opportunities for Warrington that transport investment may either alleviate or support, these are noted below.

- Socio-economic issues
- Economy & Business
- Highways network & traffic
- Wider transport provision
- Why people travel
- Land use and development
- Housing
- Environment

The key problems and opportunities identified in the evidence review have been summarised below in Table 2.

Table 2: Key problems and opportunities identified in the evidence review

Problem	Opportunity
<ul style="list-style-type: none"> ● Warrington's population is estimated to grow to 213,000 in size by 2020. ● There will be greater commuter flows associated with employment sites in the AG, M6 growth corridor, Sci Tech Daresbury, Birchwood, and mega sites. 	<ul style="list-style-type: none"> ● A growing Warrington population has the potential to bring greater purchasing power and boost the local economy. ● New employment sites in the Atlantic Gateway, M6 growth corridor, Sci Tech Daresbury, Birchwood, and Omega sites can provide a range of highly skilled jobs for Warrington residents.
<ul style="list-style-type: none"> ● Warrington has a lower GVA per filled job when compared to Cheshire East, Cheshire West and Chester. 	<ul style="list-style-type: none"> ● Key economic and business indicators show a strong outlook for Warrington which is above the levels for the North West and Great Britain.
<ul style="list-style-type: none"> ● Warrington's strategic network endures large flows of vehicles each day, with AADF totals over 20,000 a day. ● Evidence from travel time surveys indicates that there are congestion issues in the town centre; including Brian Bevan Island, Bridgefoot Gyrotory, Cockhedge Green and Wilson Patten Street. ● Warrington town centre is a significant 'hotspot' for road traffic accidents. ● Swing bridge movements cause severe delays for traffic entering and egressing from the town centre. 	<ul style="list-style-type: none"> ● Constructing Western Link will allow traffic travelling between the south and west to bypass the town centre and reduce traffic flows on some of the more heavily utilised urban routes. The delays at the pinch points could also be mitigated. ● Port of Warrington could bring extra freight services to Warrington and enable more efficient transport of goods in and around the Local Authority. ● Providing another crossing point across the Manchester Ship Canal could help strengthen network resilience.
<ul style="list-style-type: none"> ● On average, Warrington has fewer adults who cycle on a monthly, weekly and daily basis compared with the North West and national average. 	<ul style="list-style-type: none"> ● Western Link has the opportunity to incorporate a segregated cycle path alongside the link road.
<ul style="list-style-type: none"> ● The majority of commuter trips into Warrington and out of Warrington are made by car, making up between 65-90% of modal split. 	<ul style="list-style-type: none"> ● Where distances are appropriate in length and suitable infrastructure is present, active travel should be encouraged to embed the mode as a regular commuter mode within Warrington.
<ul style="list-style-type: none"> ● Warrington Waterfront has the potential to add great value to Warrington's local economy. However, at the existing development site there is a lack of suitable transport infrastructure to facilitate access to the development. 	<ul style="list-style-type: none"> ● The Western Link could provide the necessary access to deliver the Warrington Waterfront development.
<ul style="list-style-type: none"> ● The need to deliver a significant number of homes per year is clear through both WBC draft 2017 local plan and the future need identified in the research by Micklemore on the future housing need. 	<ul style="list-style-type: none"> ● Any significant contribution to the current and future housing need across Warrington could, according to the projections of future housing need, actively support the continued economic growth of Warrington.
<ul style="list-style-type: none"> ● Emissions of harmful pollutants such as NO2 are in exceedance of national and EU targets in central Warrington. 	<ul style="list-style-type: none"> ● A new link route that takes through traffic out of the town centre could help to reduce emissions in the town centre.

Source: Mott MacDonald

In light of the evidence review above, the need for intervention in Warrington was established. This is summarised below:

Issues impacting growth and development	Opportunities for growth	Addressing the issues
<ul style="list-style-type: none"> • Population growth. • Increase in demand for housing and employment land. • Congestion and air quality issues in the town centre. • Lack of crossing points of waterways in and around Warrington. • Additional traffic growth from residential and employment sites. • Worsening highways network resilience. 	<ul style="list-style-type: none"> • Position in the Northern Powerhouse. • Proximity to key growth corridors: the Atlantic Gateway; M6 Growth Corridor; HS2; and international airports. • The transformation and revitalisation of Warrington town centre. • Delivering highways access to development land in south-west Warrington associated with Warrington Waterfront. • Warrington's growing economy. 	<ul style="list-style-type: none"> • The south west of Warrington is a prime location for delivering a parallel strategy for transport and development. • Delivering town connectivity improvements and the Warrington waterfront development hinges on the construction of Western Link. • Alleviating congestion at key network pinch points enhancing strategic connectivity between north and south Warrington. • Address potential barriers to growth such as congestion and accessibility. • Delivering an additional crossing over Warrington's main watercourses

2.3 Part C: Objective setting

Part C of the Strategic Case details the objective setting process for the Western Link scheme. The scheme aim and objectives are set out below. The aim of Western Link is to:

Relieve congestion and delays in Warrington town centre and at major pinch points, whilst adding additional route choice across Warrington and unlocking development land for Warrington Waters and making Warrington a better place to live, work and visit.

The objectives of the Western Link scheme are to:

1. Relieve congestion and improve air quality in Warrington Town centre

- Reduce volumes of through traffic passing through the town centre.
- Free up town centre capacity for bus, public realm and active travel improvements.
- Relieve severe pinch points on the network, including Bridgefoot Gyratory and Brian Bevan Roundabout.
- Contribute to improved air quality in the Warrington Town centre Air Quality Management Area.

2. Improve connectivity between North and South Warrington

- Improve local connectivity, by delivering additional route choice and reducing the 'barrier effect' caused by the River Mersey, Manchester Ship Canal and railway lines.
- Improve strategic connectivity, by making Warrington more resilient in case of incidents on the 'Motorway Box'.

3. Unlock key development land to support the growth aspirations of 'Warrington Means Business' and the Warrington Local Plan

- Deliver access to the next phase of the Warrington Waterfront Masterplan.
- Deliver improved access to Port Warrington.
- Deliver access and capacity to support new housing developments.
- Deliver access and capacity to support the development of employment land.

4. Support the continued growth of Warrington's economy within the Northern Powerhouse

- Deliver journey time savings for commuters travelling into, out of and within Warrington.
- Provide better access to growing employment sites in and around Warrington, including Omega, Lingley Mere, Sci-Tech Daresbury, Warrington town centre and Birchwood.

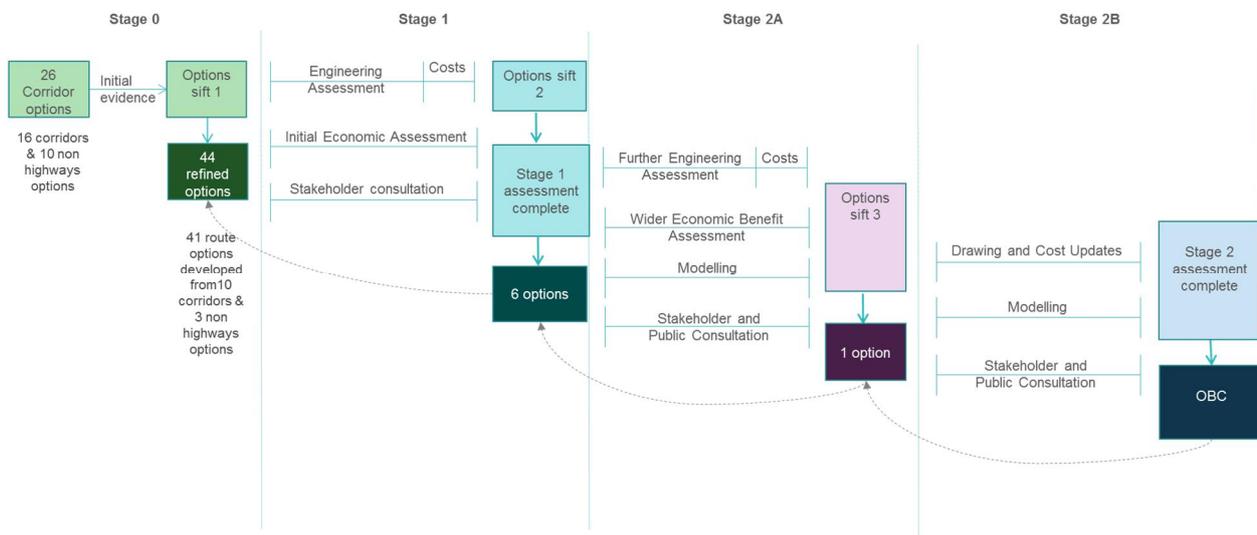
5. Make Warrington a more attractive place to live

- Provide access to new green and recreational space between the River Mersey and the Manchester Ship Canal
- Support the implementation of new public transport and active travel routes associated with the Warrington Waterfront development
- Support the Warrington Health and Wellbeing Strategy's vision to work together for stronger neighbourhoods, healthier people, a vibrant and resilient economy and greater equality across all our communities.

2.4 Part D: Scheme development

Part D of the Strategic Case concerns the development and identification of a preferred option for the Western Link scheme. A wide range of options went through a rigorous and systematic appraisal process to identify a preferred option for the scheme (Figure 3). This options development and appraisal process is documented fully in the Options Appraisal Report (OAR) which is found in Appendix. A of the Outline Business Case.

Figure 3: Four stage options appraisal process



Source: Mott MacDonald

At each of these 4 assessment stages, options were sifted out, so the number of options under consideration became progressively smaller. Conversely, the information used to drive the assessment of the options became progressively more detailed at each stage. A summary of the 4-stage assessment process is given below.

2.4.1 Stage 0

Stage 0 represented options development, the first options assessment and initial sift. The purpose of this initial sift was not to immediately identify a preferred option, but to narrow the 'pool' of options down to a more manageable number by identifying any significant issues which are likely to prevent an option progressing at a subsequent stage in the process. Options that clearly failed to address the scheme objectives, or any options that were unlikely to be deliverable in technical, financial, or public acceptability terms were discounted at this stage.

Stage 0 assessment was undertaken using Mott MacDonald's decisions support toolkit developed in house called Investment Sifting and Evaluation Tool (INSET). Over 90 options were initially identified. For the purposes of analysis these were grouped into highway corridor options and non-highway options. 26 options were therefore presented for sifting at Stage 0 consisting of 16 highways corridor based options and 10 non-corridor options. Through Stage 0

INSET options assessment, 10 better performing highways corridor options and 3 better non-corridor options passed through to Stage 1 assessment.

2.4.2 Stage 1

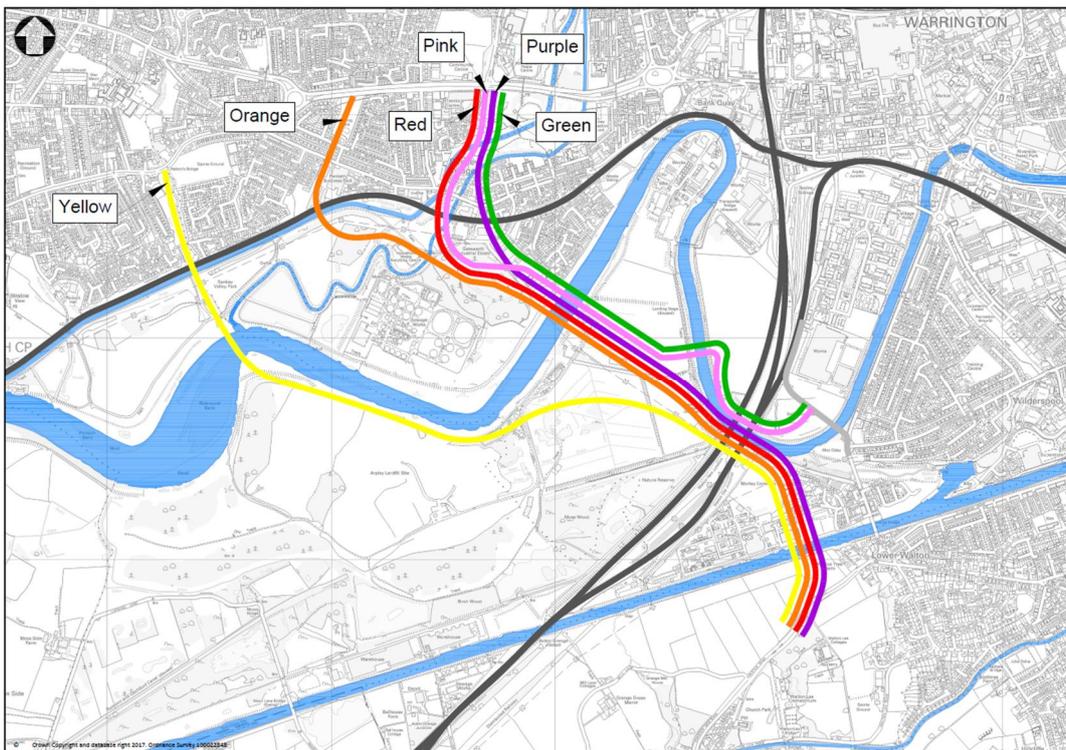
The Stage 0 sift resulted in a refined long list of 10 highway corridor options and 3 non-highway options. At Stage 1, this refined long list of options were then developed further to provide enhanced detail to enable a more in-depth second sift at Stage 1. 41 specific highways route options were developed from the 10 corridor base options. The 3 better non-corridor options were also presented for Stage 1 options appraisal.

The Stage 1 sifting included the findings of engineering assessments, costs, initial stakeholder feedback and a high-level analysis of wider economic benefits. At this stage, the information was based on a wider set of assessment criteria and a broader panel of expertise than at Stage 0. A refined application of INSET was applied to the Stage 1 sift. Six best performing highways options were identified and were selected for further appraisal at Stage 2A.

2.4.3 Stage 2A

In Stage 2A, a detailed assessment of the 6 shortlisted options was completed. The 6 options were developed further and henceforth referred to by their colour name, the 6 routes are shown below in Figure 4.

Figure 4: Shortlisted options from Stage 1 INSET appraisal



Source: Warrington Borough Council & Mott MacDonald

The purpose of Stage 2A assessment was to identify a preferred option for the scheme. For this reason, the assessment at Stage 2A was significantly more quantitative in nature than the assessment at Stage 1. Key elements of new evidence introduced at Stage 2A are listed below:

- Cost-benefit analysis of the shortlisted options, following WebTAG Unit A1 and using the 2016 Warrington Multi-Modal Transport Model (highways element only) and TUBA;
- Initial analysis of wider economic impact (jobs and GVA) using Mott MacDonald's Transparent Economic Assessment Model (TEAM), Mott MacDonald's in-house economic model which has been designed in line with HM Treasury Green Book and HCA Additionality Guide principles;
- More detailed costings and quantified risk assessment
- Strategic highways modelling using SATURN and Warrington Western Link Road Model;
- Junction modelling in LinSIG and ARCADY to test the effects of junction designs on traffic flows;
- More detailed environmental analysis;
- An assessment of land take requirements; and
- Public consultation over the shortlisted options.

Through Stage 2A INSET and economic analysis, the options appraisal process identified the preferred option for the scheme to be the Red Route.

2.4.4 Stage 2B

Finally, in Stage 2B, the most detailed elements of evidence were analysed, and these were used to re-confirm the selection of the Red Route, and to refine the design of this option as necessary. Compared to Stage 2A, additional assessment in Stage 2B includes:

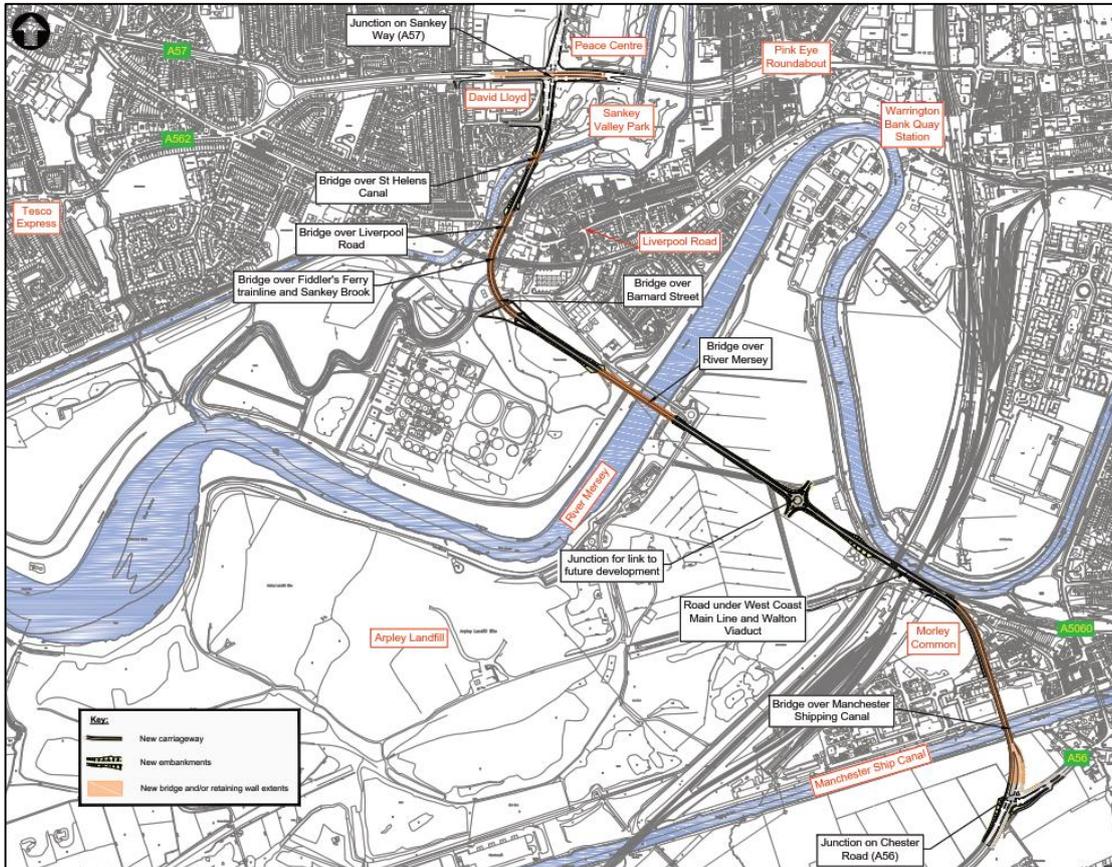
- Cost-benefit analysis using the full multi-modal version of WMMTM 2016, TUBA, WITA and COBALT;
- Inclusion of additional of network junction upgrades in the modelling process to assess transport impacts over a wider range of the network;
- Review of the treatment of construction inflation;
- Signal optimisation;
- Revision of the analysis and philosophy used to assess Swing Bridge impacts;
- Inclusion of the analysis of weekend benefits;
- Final engineering assessments for the preferred option; and
- Full Social and Distributional Impact Appraisal.
- Two comparative tests of the preferred option.

2.5 Part E: The preferred scheme

Part E presents the fifth and final part of the Strategic Case and notes the description of the preferred scheme and investment needed to realise our ambition. The Red Route was identified as the preferred option for the Western Link scheme in Part D Scheme development. The outline of the Route is set out below alongside its description (Figure 5).

This option starts on Sankey Way (A57) at the junction with Cromwell Avenue. The route travels south through Sankey Valley Park, crossing over St Helens Canal. The route continues south over Old Liverpool Road, Fiddlers Ferry Line and Sankey Brook keeping to the west of the electrical grid site. It proceeds south-east parallel to Forrest Way and then crosses the River Mersey. The route continues south-east through Arpley Meadows and crosses underneath the West Coast Main Line and Walton Viaduct. It then proceeds south along the eastern edge of Morley Common, crosses the Manchester Ship Canal, then connects to Chester Road (A56). The length of the route is 3167 metres.

Figure 5: The preferred option for Western Link



Source: Mott MacDonald

2.5.1 Scheme impacts and benefits

Overall, the preferred route proposed for Western link is forecast to deliver a present value of main transport economic benefits (PVB) of £350.2m over a standard appraisal period of 60 years. When the PVB is taken together with the present value of scheme costs (PVC) of £183.8m the initial BCR is calculated as 1.90. According to Department for Transport guidance, the BCR of 1.90 represents Medium Value for Money.

Additional benefits of the scheme were calculated. These relate to transport reliability benefit and wider impacts. In consideration of the wider economic benefits, a modified BCR is more indicative of the quantifiable economic benefits that Western Link could deliver. Therefore, the BCR is calculated as **2.24** and represents a **High value for money**.

Further to the monetised benefits, Western Link is expected to deliver a wide range of impacts that could benefit Warrington residents, its workforce, business and visitors. These are summarised in Table 3.

Table 3: Summary of benefits associated with Western Link

Objective	Benefits associated with western link
1	<ul style="list-style-type: none"> Reduced traffic entering the town centre to access northern and southern sites within Warrington. Less congestion in central Warrington. Reduction in vehicular greenhouse gas emissions in the town centre. Reduced congestion across the wider highways network.
2	<ul style="list-style-type: none"> Reduced impact of Manchester ship canal bridge swings on traffic flows across Warrington. Extra route choice and highways resilience associated with another crossing of the Manchester Ship canal. The journey time reliability benefits have been calculated to deliver an additional £19.7m. This will help maintain and preserve network performance with Warrington's growth ambitions.
3	<ul style="list-style-type: none"> Deliver access to the Waterfront development and help revitalise Warrington's riverside environment into an exciting destination for new residential housing, employment and recreational space. Deliver access to the Port of Warrington intra-modal freight facility. The Link road could help unlock housing and employment sites in south-west Warrington, associated with the Warrington 2017 draft local plan.
4	<ul style="list-style-type: none"> The link road has the potential to unlock employment and residential sites (identified in Warrington's 2017 draft local plan) in south-west Warrington. It has the potential to contribute to: <ul style="list-style-type: none"> 367 net additional jobs and £16.1 of net additional GVA per annum; and Bring forward 863 dwellings over the local plan period¹. The construction of the dwellings has the potential to generate a temporary economic impact of 105 construction jobs and £4.4m of GVA per annum during the construction period. The tax impact of developing these sites to Warrington Brough Council is: <ul style="list-style-type: none"> An additional £2m in business rates per annum; and Approximately £1,000,000 in additional council tax each year. The total value of this intervention in GVA, modelled over 30 years, in 2010 prices, discounted to 2010, is an NPV of £137.63m.
5	<ul style="list-style-type: none"> Improved accessibility to homes, jobs and leisure sites on Old Liverpool Rd, A56, Daresbury and onto the M56. Helping to bring forward the redevelopment of leisure parkland at Arpley Landfill. Reduced vehicles travelling entering the town centre and reduction in vehicle greenhouse gas emissions. Helping to raise active travel in Warrington through the addition of a cycle lane alongside western link.

Source: Mott MacDonald

2.5.2 Summary

To conclude, the Strategic Case sets out the strategic need for the Western Link scheme. Through a structured and rigorous options appraisal process, the preferred option for the Western Link scheme was identified to be the Red Route, a link road connecting north-west and south-west Warrington.

The Western Link scheme was calculated to give a BCR of 2.24 and displays High Value for Money. Through a suite of transport modelling and appraisal techniques, the new link road was found to deliver multiple benefits for Warrington, its population, businesses and workforce. The Red Route was successful in providing additional route choice, reducing town centre congestion and vehicular GHG emissions, unlocking key development land and increasing network reliability.

Western Link therefore presents a valuable and essential scheme in addressing Warrington's traffic problems, furthering the towns growth ambitions and adding to Warrington's reputation as quality place to live and work in the North West.

¹ 863 dwellings represents the gross number of homes constructed. It should also be noted that sites such as K4 identified in the Warrington 2017 Draft Local plan have not been assessed. The site was deemed unlikely to come forward in the local plan period (despite being in the local plan). The K4 site is however likely to come forward before 2057 making the associated housing delivered to be 1,015 over 40 years, but for the purposes of this assessment undertaken within the timeframe of the local plan it has not been included.

3 Economic Case

The economic appraisal of the Warrington Western Link (WWL) has been carried out in line with Department for Transport guidance included in WebTAG. The economic appraisal assesses the key benefits and impacts of the scheme: weighing the benefits against the costs to indicate whether it is Value for Money (VfM). A wide spectrum of impacts is considered in a detailed appraisal, including various impacts on the economy, the environment and social welfare. The following impacts have been assessed for the Warrington Western Link scheme:

- Traveller benefits in terms of time, vehicle operating costs and tolls;
- Traveller benefits associated with delay at Manchester Ship Canal swing bridge;
- Safety benefits in terms of accident savings;
- The benefits of “unlocking” development land that is currently inaccessible;
- Changes in noise, air quality and greenhouse gases;
- Journey time reliability benefits;
- The wider impacts to the economy of improving the transport network; and
- The costs required to deliver the scheme.

3.1 Methodology

The Warrington Multi Modal Transport Model (WMMTM) has been used to assess the WWL. The WMMTM provides traffic forecasts and changes in network performance to allow the assessment of the above impacts to be quantified and monetised.

The WMMTM includes three elements: a highway traffic model; a public transport model; and a variable demand model. The local highway SATURN model provides a detailed representation of the highway network in Warrington and the surrounding strategic highway network. The highway reflects changes in delay at junctions and on links and the impacts these delays have on routing through the network. It has been calibrated and validated to a 2016 base year level in accordance with the Department for Transport’s Transport Analysis Guidance (TAG). The public transport model includes the bus and rail network for the same geographical area.

The variable demand model reflects the impacts of changes in transport costs in the future on travel. This includes trip frequency, i.e. how often people travel, modal split i.e. the choice between public transport and car, and destination choice - where people chose to travel to. It takes information from the highway and public transport model. The whole modelling framework has been calibrated and validated to a 2016 base year level in accordance with TAG to reflect observed travel behaviour.

Future year networks and trip matrices have been developed for two forecast years, 2026, representative of a scheme opening year, and 2036 which aligns with the local plan horizon year. Forecasts have included future year transport schemes and land-use proposals that are listed in the development uncertainty log. Only those transport schemes and developments that are likely to happen, identified as “more than likely” according to TAG, have been included.

The transport economic appraisal has been undertaken using the TUBA program (Transport Users Benefit Appraisal) together with trip and cost matrices from the transport model.

The traffic model and TUBA has been used to assess the delay associated with the opening of the swing bridges on the Manchester Ship Canal and the reduction in delay that would occur with the WWL in place. This assessment is based on the length of time the swing bridges are open and the frequency of openings per annum.

The impact of unlocking development sites which currently have no transport accessibility have been assessed in line with TAG guidance. This relates to development land at Arpley Meadows that would be unlocked by the WWL. This assessment accounts for the increase in the value of the land unlocked by the scheme and the marginal change in costs that traffic relating to the development would impose on other traffic.

3.2 Safety benefits

Safety benefits in terms of cost of accident savings have been calculated using the DfT's software COBALT. This program utilises modelled traffic flows with and without the scheme and information on road standards and junction types.

3.3 Environmental impacts

The noise and air quality appraisal has been undertaken in accordance with TAG using outputs from the traffic model. The greenhouse gases appraisal has been undertaken using outputs from TUBA.

3.4 Transport economic appraisal

The calculation of the BCR value is given in Table 4. This assessment includes:

- Traveller benefits in terms of time, vehicle operating costs and tolls;
- Traveller benefits associated with delay at Manchester Ship Canal swing bridge;
- Safety benefits in terms of accident savings;
- The benefits of “unlocking” development land that is currently inaccessible; and
- Changes in noise, air quality and greenhouse gases.

The cost of the proposed WWL scheme is estimated to be £245.66m, excluding optimism bias (2017 prices). The total cost of the scheme with inclusion of optimism bias (uplift of 15%), is estimated to be £282.51m (2017 factor prices).

The monetised economic benefits (based on transport modelling outcomes) show that the scheme produces an initial Benefit to Cost Ratio (BCR) of 1.90 from Present Value of Benefits of £350m (2010 prices, discounted to 2010) and a cost to public accounts of £184m (2010 prices, discounted to 2010). According to DfT guidance and criteria the BCR of 1.90 yields Medium Value for Money.

Table 4: Standard Benefit to Cost Appraisal Summary (£000s, 2010 prices)

Appraisal Benefit	£000s
Transport User Benefits	£340,668
Swing bridge delay	£24,220
Greenhouse Gases	£3,977
Air Quality	£217
Noise	-£19,062
Accidents	£278
Present Value of Benefits (PVB)	£350,298
Present Value of Costs (PVC)	£183,892

Appraisal Benefit	£000s
Net Present Value (NPV)	£166,406
Benefit to Cost Ratio (BCR)	1.90

Source: Mott MacDonald

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

3.5 Assessment of additional benefits

Additional benefits of the scheme have been calculated. These relate to transport reliability benefit and wider impacts. These benefits are included in an adjusted economic assessment as the realisation of these benefits is less certain.

Journey time reliability has been assessed using a methodology based on guidelines set out in TAG for urban roads.

Wider impacts is the term given to some of the other economic impacts of transport that are additional to transport user benefits. These include agglomeration, output change in imperfectly competitive markets and tax revenues arising from labour market impacts. Wider impacts have been assessed using the DfT WITA program.

The adjusted BCR considering reliability and wider impacts is shown in Table 5. This shows that the scheme produces an adjusted BCR of 2.24 from Present Value of Benefits of £412m (2010 prices, discounted to 2010). According to DfT guidance and criteria the BCR of 2.24 reflects High Value for Money.

Table 5: Adjusted Benefit to Cost Appraisal Summary (£000s, 2010 prices)

Appraisal Benefit	£000s
Transport User Benefits	£340,668
Swing bridge delay	£24,220
Greenhouse Gases	£3,977
Air Quality	£217
Noise	-£19,062
Accidents	£278
Wider Impacts	£41,776
Reliability	£19,705
Present Value of Benefits (PVB)	£411,779
Present Value of Costs (PVC)	£183,892
Net Present Value (NPV)	£227,887
Benefit to Cost Ratio (BCR)	2.24

Source: Mott MacDonald

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

3.6 Wider economic and land use impacts

Western Link has been identified as an enabler and catalyst for development in west Warrington through its ability to bring forward development and support economic growth, therefore the wider economic benefits associated with the scheme in terms of job creation and Gross Value Added (GVA) growth and the potential for Western Link unlock housing and employment sites was assessed.

The analysis found Western Link to be capable of supporting:

- A total of **367 net additional jobs**
- **£16.1m of net additional GVA per annum.**

In addition to this, the construction of the 863 homes could generate a temporary economic impact of:

- 105 temporary construction jobs; and,
- Approximately £4.4m of GVA per annum during the construction period.

The tax impact of developing these sites to Warrington Brough Council is:

- An additional £2m in business rates per annum;
- Approximately £1,000,000 in additional council tax each year.

The total value of this intervention in GVA, modelled over 30 years, in 2010 prices, discounted to 2010 is an NPV of **£137.63m.**

3.7 Sensitivity Tests

A number of sensitivity tests have been carried out around the preferred option. The purpose of the sensitivity tests is to understand if the intervention being proposed is still value for money given alternative cost assumptions, whether alternative scheme standards would provide better value for money or be more effective in addressing congestion, and whether the preferred option is still value for money and effective in addressing congestion under alternative demand scenarios.

- Sensitivity around scheme costs indicate that the scheme remains medium value for money if the P80 scheme costs are used, and just drops into low value for money if a 44% optimism bias is used instead of the 15% adopted.
- Sensitivity tests around scheme design demonstrated that the design standard of the preferred scheme is better value for money than both lower and higher standard options.
- Sensitivity around alternative demand scenarios indicated that the scheme provides low value for money in a low growth scenario, but high value for money in a high growth scenario, compared to medium value for money in the core scenario.
- Including Centre Park Link in the Do Something rather than Do Minimum produces a higher level of benefits, a slightly higher BCR but same value for money category as the preferred scheme.

4 Financial Case

4.1 Scheme Costs without risks

The scheme costs are wholly based on the assumptions that the construction of Western Link will begin in 2020 and subsequently see full scheme completion in 2023. Official opening of the highway scheme is expected in the same year as completion. Table 1 shows the disaggregated costs, inclusive of maintenance, but without risk.

Table 6: Summary of scheme costs (excluding risk)

Item	Cost
Pre-construction and preparation	£2.5m
Design	£9.263m
Highways and Structures	£93.08m
Staff	£9.838m
Utilities	£13.245m
Inflation	£24.613m
Land	£21.2m
Business Case	£1.5m
WBC costs	£4.0m
Wider Network Costs	£5.0m
Network Rail	£0.883m
Total without Maintenance	£185.12m
Maintenance	£42.07
Total with Maintenance	£227.19m

Source: Balfour Beatty

The base construction costs are based on costs incurred on current and recently completed projects. The land costs are based on the plan for permanent and temporary land requirements for the scheme. Other costs have been assessed based on: project team review of resource requirements; utilities information and stakeholder interactions.

Inflation has been averaged at 5.4%, using the BCIS forecast, over the design and construction period from 2018-2023.

Maintenance costs account for £42.070m over a 60-year period. The potential annual maintenance costs for the proposed scheme will vary year-on year depending on the level of maintenance that is required, however, estimates of yearly maintenance costs have been calculated as £0.225m per year. Larger maintenance funding allocations are required at future intervals from 2032 to 2082 with costs ranging from £0.856m in the early years to £13.02m up to 2082.

4.2 Scheme costs including risk

A quantified risk assessment (QRA) has been carried out by the project team. The identification and quantification of risk through this process has led to the inclusion of an £27.62m allowance in the scheme costs. **Table 7** shows the scheme costs including risk.

Table 7: Total scheme costs including risk

Item	Cost
Scheme cost total without maintenance	£212.74m
Maintenance	£42.07
Scheme cost total with maintenance	£254.81m

Source: Balfour Beatty

The QRA has been verified through a Monte Carlo analysis which yields a P50 value within 0.5% of the value allowed for risk in the scheme costs. The Monte Carlo analysis has also been used to generate a P80 value for use in sensitivity testing in the Economic Case.

4.3 Funding requirements

The proposed funding mix is a combination of funds awarded by the DfT through the 'Large Local Majors' fund and prudential borrowing by WBC.

The proposed funding profile is based on a funding bid from the DfT of 67% of the scheme costs, totalling £142.5m with WBC is proposing to meet the remaining 33% of the scheme costs of £70.2m on the condition of successfully achieving DfT funding.

Table 8: Annual funding requirements.

Funding source	2018	2019	2020	2021	2022	2023	Total
Local Major Scheme fund (67%)	£14.16	£15.54	£35.66	£23.68	£26.29	£27.22	£142.54
Local contribution (33%)	£6.97	£7.66	£17.56	£11.66	£12.95	£13.41	£70.21
Total	£21.13	£23.2	£53.22	£35.34	£39.24	£40.63	£212.75

Source: Warrington Borough Council

The council is in discussion with the DfT and DCLG/HCA regarding a potential split of contributions between central government departments that would effectively lessen the burden on the DfT's Large Local Majors fund by securing a DCLG/HCA contribution. These discussions will continue over the coming months and the DfT will be updated following confirmation of the DCLG/HCA contribution

5 Commercial Case

5.1 Procurement strategy

To date, through RIBA stages 0-2 and the development of this OBC the scheme has primarily used 2 existing contracts:

- SCAPE national Civil Engineering and Infrastructure Framework 2015 to engage Balfour Beatty for early contractor involvement; and
- Transportation and Public Realm Consultancy Services Framework 2013 to engage consultancy support for options design and development and preparation of this OBC.

As the scheme moves forward into RIBA stages 3, 4 and 5 a Design and Build procurement approach was selected as it allows the scheme programme to progress without delay. It also achieves an appropriate balance of design progression to allow consistent tendering whilst allowing contractor input to design before final contract award.

5.2 Contractor procurement

The preferred contractor procurement option taken forward for stages 4 & 5 of the Western Link Scheme is to undertake a competitive dialogue OJEU tendering process. This process is intended to identify the solutions most likely to meet client needs and allows the client flexibility in progressively reducing the number of bidders through the process.

It is likely an NEC4 option C contract would be used to secure the services of the preferred contractors this type of contract.

5.3 Consultant procurement method

The preferred options taken forward for delivery of stage 3 are use of a consultancy framework and early contractor involvement through SCAPE. These allow the possibility of maintaining the team used to deliver stage 0-2, ensuring that project knowledge is maintained.

Table 9 summarises proposed contract types to be used at each stage, plus an estimate of the length of time of each contract.

Table 9: Proposed sources for use on Western Link

Contract Type	Stage	Length
SCAPE national Civil Engineering and Infrastructure Framework 2015	Stages 3 Early Contractor Involvement	12 months
Transportation and Public Realm Consultancy Services Framework 2013	Stage 3 Design Consultant	12 months
		However, the contract is due to be re-tendered in early 2018. Will be replaced with TPRSF 2018-2022.
Competitive Dialogue Process, OJEU, Public Contracts Regulations (NEC3 Option C)	Stage 4 and 5 onward Design and Build Contractor	4 years

Source: Warrington Borough Council

6 Management Case

6.1 Proven delivery experience

Warrington Borough Council (WBC) has a history of successful delivery of projects of a similar scope and scale ranging in value from £2.4m-£101m and include corridor and junction based highway improvements as well as entirely new link roads, namely;

- Warrington East Transport Strategy Phase 1: Birchwood Pinch Point;
- A49 Winwick Road / A50 Long Lane junction improvement scheme;
- Skyline Drive;
- Centre Park Link (currently being delivered); and
- Time Square (currently being delivered).

Together they demonstrate a successful history of highways schemes that have been delivered on time, to budget and have helped further the attraction of working and living in Warrington, which substantially aligns with the objectives of the Western Link scheme.

6.2 Project and programme dependencies

Key project dependencies include.

- DfT approval of Western Link Scheme OBC.
- Approval by the Council executive board to CPO and SUO.
- Planning permission granted for the construction of the scheme.
- Inspector and Secretary of State finding in favour of the scheme should a Public Inquiry be held.
- Agreement of bridging rights over River Mersey and Manchester Ship Canal.
- DfT approval of the Western Link FBC.
- Procurement of a suitable D&B Contractor.
- Successful application for works to be carried out in common land (Morley Common).
- Agreement of statutory approvals with Network Rail, the Environment Agency and natural England.
- Agreeing of works to be carried out in land not subject to CPO (i.e. crown land).

6.3 Strategic and operational governance

WBC are scheme promotor and delivery agent for Western Link; the overall project governance structure is shown in Figure 6.

Figure 6: Strategic governance structure



The WBC Project Executive, in accordance with Prince2 principles, consists of a Project Director, Senior User and Senior Supplier and operate as the Project Board. They are accountable to Warrington Borough Council members, and are responsible for scrutinizing delivery of the scheme.

At an operational level, the Project Manager and Project Team are responsible for the on-ground delivery of the scheme and report to the Project Board. The Project Team is made up of the following work streams:

WSP are appointed to provide technical review of designs and Faithful and Gould are appointed to provide review of costs.

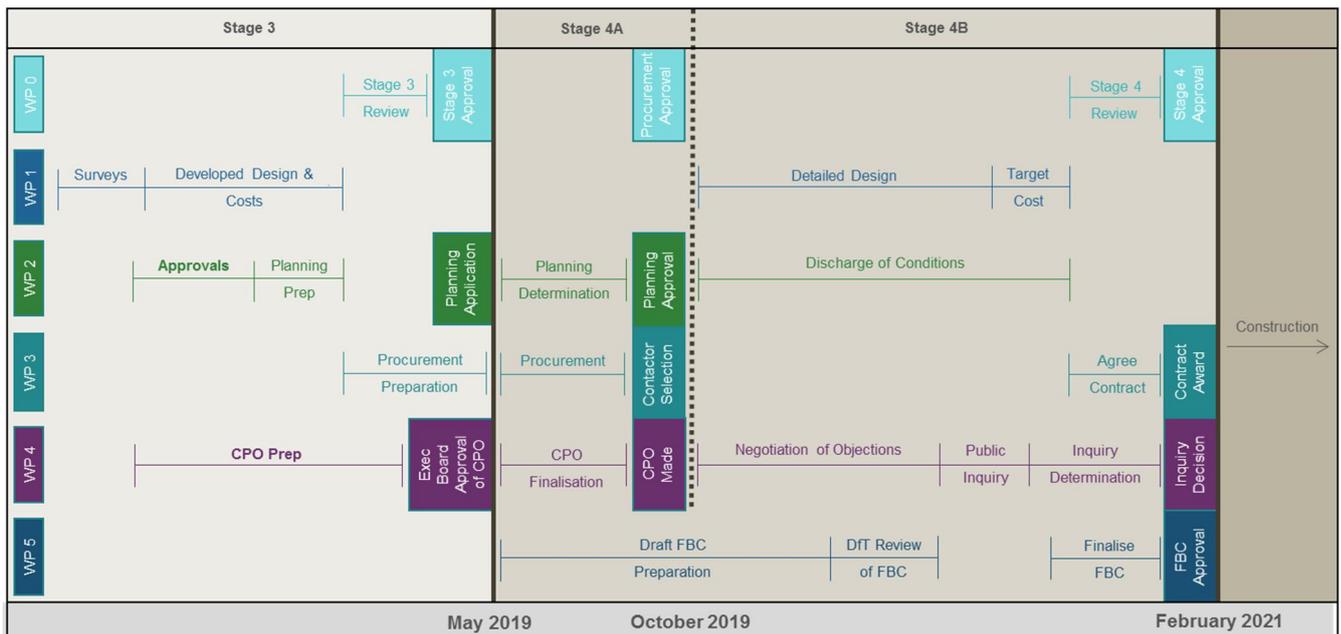
6.4 Scheme delivery

To date and including the submission of this OBC, RIBA stages 0-2 are complete and the future delivery of the programme is split into 3 distinct stages Progression through these stages will be facilitated through 6 distinct work packages:

- Project management
- Technical Design and Approvals
- Planning
- Procurement
- Land, CPO/SUO and Inquiry
- Business Case

These are shown in and highlight the key tasks and milestones in each of the work packages during each stage as well as indicative dates for completion of milestones (Figure 7).

Figure 7: Western Link high level programme



Source: Mott MacDonald

6.5 Risk management

Two levels of project based risk management have been identified. These are:

- Project Risks - those affecting the cost, scope and timescale for the project; and
- Project Management and Delivery Risks - those presenting wider risks to the client body.

Table 10: Top Ten Project Risks

Project Risks		Project Management and Delivery Risks	
Risk	Mitigation	Risk	Mitigation
Earthworks - Potential for excavated ground to be contaminated.	<ul style="list-style-type: none"> Minimise excavation into waste deposits. Adoption of geocell within design. 	Western Link is the first test of the new Warrington Multi Modal Transport Model (MMTM).	<ul style="list-style-type: none"> Assurance role provided by WSP. Modelling work has had input and check from both AECOM and Mott MacDonald.
Vertical alignment tie in difficulties due to existing topography and height restrictions.	<ul style="list-style-type: none"> Full topographical survey to confirm if horizontal alignment risk can be mitigated. 	Council has unclear approach to blight issues, and/or scheme requires CPO and has been subject to some opposition.	<ul style="list-style-type: none"> Employ solicitor Agree CPO and blight approach with executive board Hold consultation events Maintain close dialogue with directly affected land owners Adjust cost and risk allowance appropriately.
Utility clashes due to limited corridor for route.	<ul style="list-style-type: none"> GPR survey of entire preferred route. Modify alignment of preferred route to minimise diversions. 	Inspector decides against the progress of scheme at Public/Land Inquiry.	<ul style="list-style-type: none"> Maintain project records. Maintain consistent project team. Employ third party for assurance role. Maintain a risk register Engage solicitor Programme ecological surveys in Stage 2B to ensure full dataset.
Cost of acquiring businesses where severance results in whole property being acquired.	<ul style="list-style-type: none"> Early negotiations with claimants to ascertain likelihood of such a claim being received. 	Network Rail approvals delay or increase cost of project.	<ul style="list-style-type: none"> Hold early dialogue with Network Rail. Include approval processes in programme. Employ consultant with knowledge of Network Rail processes.
Claims for No Land Taken (where properties have now been avoided).	<ul style="list-style-type: none"> Maintain access to all properties during works. Obtain traffic management plans at the earliest opportunity for review. 	If exchange land cannot be offered for affected Commons/open land, scheme could be subject to SPP.	<ul style="list-style-type: none"> Investigate options and provide suitable exchange land to avoid SPP.
Weather event, stats diversions delayed, supply chain difficulties.	<ul style="list-style-type: none"> Robust monitoring and management. 	Stakeholder objection.	<ul style="list-style-type: none"> Hold consultation events ahead of planning. Maintain close dialogue with directly affected land owners and interested parties.
Additional Inflationary Effects.	<ul style="list-style-type: none"> Make allowance in risk register for costs. Adjust cost and risk allowance appropriately. 	Additional utilities diversions required and/or statutory undertaker objections to any required CPO.	<ul style="list-style-type: none"> Carry out ground survey of area and engage statutory undertakers in scheme development.
Poor highway foundation due to Landfill beneath road alignment.	<ul style="list-style-type: none"> Minimise excavation into landfill. Reinstate capping as required. Adopt geocell basal reinforcement as required. Adopt pile load platforms to transfer load to either Glacial Soils or Rockhead. Programme ecological surveys in Stage 2B to ensure full dataset. 	Ecological mitigation measures required beyond those allowed for.	<ul style="list-style-type: none"> Carry out necessary ecological surveys and hold dialogue with EA and Natural England.
Design scope changes.	<ul style="list-style-type: none"> Control and definition of scope by client and delivery team. 	Appropriate delivery team is not available.	<ul style="list-style-type: none"> Appoint delivery team early to secure service for project.
Traffic Modelling requires wider WBC network Improvements.	<ul style="list-style-type: none"> Make cost allowance in capital and risk costs Assess wide. network impacts during stage 3 Design necessary junction improvements. 	Failure to obtain Political Support.	<ul style="list-style-type: none"> Hold dialogue with MP, Local Members and neighbouring authorities.

Source: Warrington Borough Council

6.6 Stakeholder engagement and communications

Key stakeholders have been identified as:

- Department for Transport
- Highways England
- Land owners
- The Homes and Community Agency (HCA)
- Warrington Borough Council
- Warrington & Co
- Local residents and community
- Network Rail
- Cheshire and Warrington LEP
- Transport for the North
- Peel Holdings

Public and Stakeholder engagement was undertaken in 2 rounds, at stage 2A (6 shortlisted options) in July 2017 and again at stage 2B (preferred option only) in September 2017.

18 consultation events took place during stage 2A July 2017. Of the 2,236 people that provided feedback, 43% were supportive of the scheme and of the 1907 people who expressed an option preference, the largest measure of support (31%) was for the scheme now being taken forward and which was consulted on further at stage 2B.

3 consultation events took place at stage 2B in September 2017. Of the 758 responses received 562 people provided written feedback on the recommended route. Key issues raised included

- Noise, vibration, air quality, light pollution
- Not needed/waste of money/won't solve the problem
- Most logical/appropriate route choice
- Consultation criticism/ Criticism of Council/ Lack of information
- Impact on community facilities and green spaces
- Building road to bring forward development will neutralise the relief the road brings
- Cromwell Avenue
- Highway safety e.g. children walking to school
- Will likely invite additional traffic avoiding Mersey Gateway
- Nature conservation/impact on wildlife
- Congestion will worsen
- Impact on residential and commercial properties/ Compulsory purchase

It is proposed that for RIBA stage 3 the pre-application consultation for any planning application would be done in two steps, with a third consultation step post-submission of the planning.

6.7 Monitoring and evaluation to measure benefits

Key benefits of the scheme are:

- Journey time savings and increased journey time reliability when travelling across west Warrington (between north-west and south-west Warrington);
- A reduction in congestion and queues in Warrington town centre;
- Better connection with the strategic network and improved commercial and freight movements
- More reliable bus travel times and enhancement of bus services.
- Increased economic performance and greater economic prosperity within Warrington
- Increase in employment opportunities and housing in west Warrington;
- More pleasant and safer pedestrian conditions
- Healthier communities
- Reduced delays at town centre pinch points (Bridgefoot Gyratory, Brian Bevan Roundabout, Sankey Way/Liverpool Road Roundabout/ Cockhedge Green Roundabout)
- Access delivered to the Warrington Waterfront site
- More attractive place for investment and town centre regeneration
- Further establishment of Warrington as a key player within the NPH
- Improved air quality in Warrington town centre
- Reduction in traffic noise within the town centre

The success of Western Link will be determined by the realisation of the above benefits as well as on time, on budget delivery and delivery to specification.

DfT guidance sets out the requirements for the monitoring of schemes and outlines three tiers of monitoring and evaluation, these are:

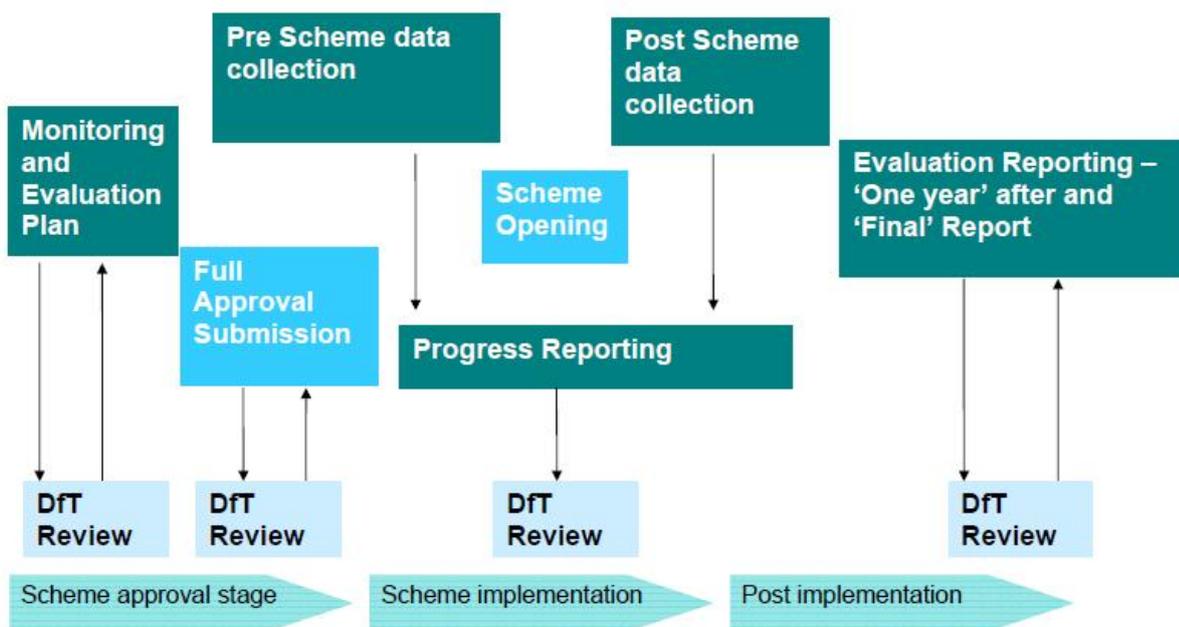
- Standard monitoring
- Enhanced monitoring
- Fuller evaluation

Western Link follows the enhanced monitoring practice as the scheme is greater than £50m in value and must monitor a set of standard measures which are summarised here.

- | | |
|---|--|
| <ul style="list-style-type: none"> • Scheme build • Costs • Travel demand • Impact on the economy • Noise • Accidents | <ul style="list-style-type: none"> • Delivered scheme • Scheme objectives • Travel times and reliability • Carbon • Local air quality |
|---|--|

Figure 8 shows how, aligned with DfT monitoring guidance, Warrington Borough Council will interact with the DfT in terms of reporting on progress toward the realisation of outcomes and benefits:

Figure 8: Monitoring and evaluation engagement process between Local Authority and DfT



Source: DfT

The total budget outlined for monitoring and evaluation activities £115,000.

6.8 Contingency measures

Contingency measures have been established that relate mostly to ensuring that the impacts of the project are as close to cost neutral on the Council balance sheet as possible.

In the event the council is unable to construct the highway following the necessary land acquisition and the project being halted before the beginning of RIBA stage 5 – construction stage, the council would need to accept that the money spent to date on the pre-construction and design works would be abortive and need to be halted.

The council would then assess the key land assets acquired as part of the scheme. As CPO would be the background to land acquisition it is likely that, in the first instance, land belonging to previous owners would be offered for sale back to the previous incumbent on a 'first refusal' basis. If previous owners did not wish to repurchase the land, then WBC would re-market the properties and holdings to try and cover the potential capital outlay for the land.

In terms of progressing a highways scheme, WBC would continue to investigate low cost alternatives in an attempt to deliver on some of the objectives identified as part of the scheme development.

