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1. Introduction

This Application

- 1.1 This document forms the Major Scheme Business Case (MSBC) submission to the Department for Transport (DfT), seeking Programme Entry for Croxley Rail Link. It is the culmination of recent development work on the project including updates to transport models. Although it represents an update of the February 2008 MSBC submission, it is a stand alone document, with all relevant information concerning the assessment of the scheme included in this document and its associated appendices. Key additions since the February 2008 submission include:
- London Underground Limited (LUL) have completed an estimate of the incremental operating costs for the proposals (Section 4);
 - updated QRA (Section 5 Appendix B), risk register updated and annotated to include risk owners (Appendix B);
 - independent cost review conducted by Volker Rail (Appendix B);
 - updated Communications Strategy (Appendix D);
 - written statement of support from the region (Appendix E);
 - written confirmation of support and commitment to progress the scheme from TfL (Appendix E);
 - New bus surveys and data collection to inform updates to transport models (Appendix K);
 - update to transport models and demand forecasting report (Appendix K);
 - inclusion of New Approach to Appraisal (NATA) worksheets (Appendix L);
 - wider impacts assessment (Section 13, Appendix M);
 - updated Appraisal Summary Table (Section 18);
 - establishment of Project Board with Network Rail, LUL and HCC (Section 19);
 - updated project plan and process map (Section 20, Appendices O and P); and
 - updated Monitoring and Evaluation strategy (Section 23).
- 1.2 In summary, the Croxley Rail Link increases the population served by the London Underground connection between Watford and London; improves access from the Metropolitan Line into Watford town centre; and creates interchange opportunities between Underground services and National Rail services at Watford High Street and Watford Junction stations.
- 1.3 The Croxley Rail Link has a long history of development with many of the important criteria for funding approval having been fully demonstrated in previous reports. A bibliography of relevant documents is provided as Appendix A.
- 1.4 This submission does not re-appraise the previous long-list of options but qualitatively evaluates a number of alternatives previously considered against current scheme objectives. From this re-evaluation, a Lower Cost Alternative (which is also considered to be the ‘next best option’) has been identified and appraised alongside the proposed Croxley Rail Link scheme in detail.
- 1.5 Programme entry is required at this stage to ensure the scheme is implemented within the proposed timetable. There is a great deal of stakeholder support for the project and programme entry at this stage will strengthen that support and reduce the potential risk of support being reduced as a result of delay. The Secretary of State for Transport’s instruction to Network Rail to protect the alignment expired in November 2007. Loss of the corridor which cuts through potential development sites would be catastrophic for the proposals. Network Rail currently has a policy in place to protect the alignment for rail improvements, but could theoretically sell it and change their policy. Protection is now effectively through

the development agreement between the promoters and Network Rail. This agreement is dependent on continuing progress towards implementation of the proposals, which is in turn dependent on receiving programme entry in the near future.

- 1.6 The region support and recognise the advantages of the proposals. It is also possible to accelerate the programme if funding allows so that the benefits are brought forward and the impact of inflation is reduced in comparison with the latest Regional Funding Allocation (RFA) allocated funding schedule. If funding was brought forward so that the construction programme could be accelerated, the construction site compound and necessary working space will be provided by the as yet undeveloped Health Campus site. The proposals are also supported in the recently published Mayor’s Transport Strategy Public Draft, consultation document, October 2009.
- 1.7 The revenue forecasts and appraisal underpinning this application have been discussed and developed in consultation with DfT and LUL.

Promoters

- 1.8 The current MSBC for Croxley Rail Link is being promoted by Hertfordshire County Council (HCC). The contact details of the promoter are as follows:

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Scheme Description

- 1.9 Watford has enjoyed economic prosperity over recent years, resulting in it becoming established as a major attractor for employment, retail and leisure trips and drawing in visitors from an expanding catchment area. It has a retail centre of regional importance and has been designated within the East of England Plan as a *Key Centre for Development and Change* (KCDC) within the London Arc. There are now signs that the town has started to suffer from its own success, with congestion threatening future growth and the town’s KCDC status, together with a decline in quality of the local living environment for residents.
- 1.10 HCC first acknowledged this issue in the 1990s when it worked alongside major stakeholders to develop and implement the South West Hertfordshire Transportation strategy. One outcome was the Council’s current role in promoting the Croxley Rail Link; a scheme where the existing Watford branch of the Metropolitan Line will be diverted to Watford Junction, with intermediate stations at Ascot Road, Watford General Hospital and Watford High Street. The proposed alignment is illustrated in Figure 1.1.

Lower Cost Alternative

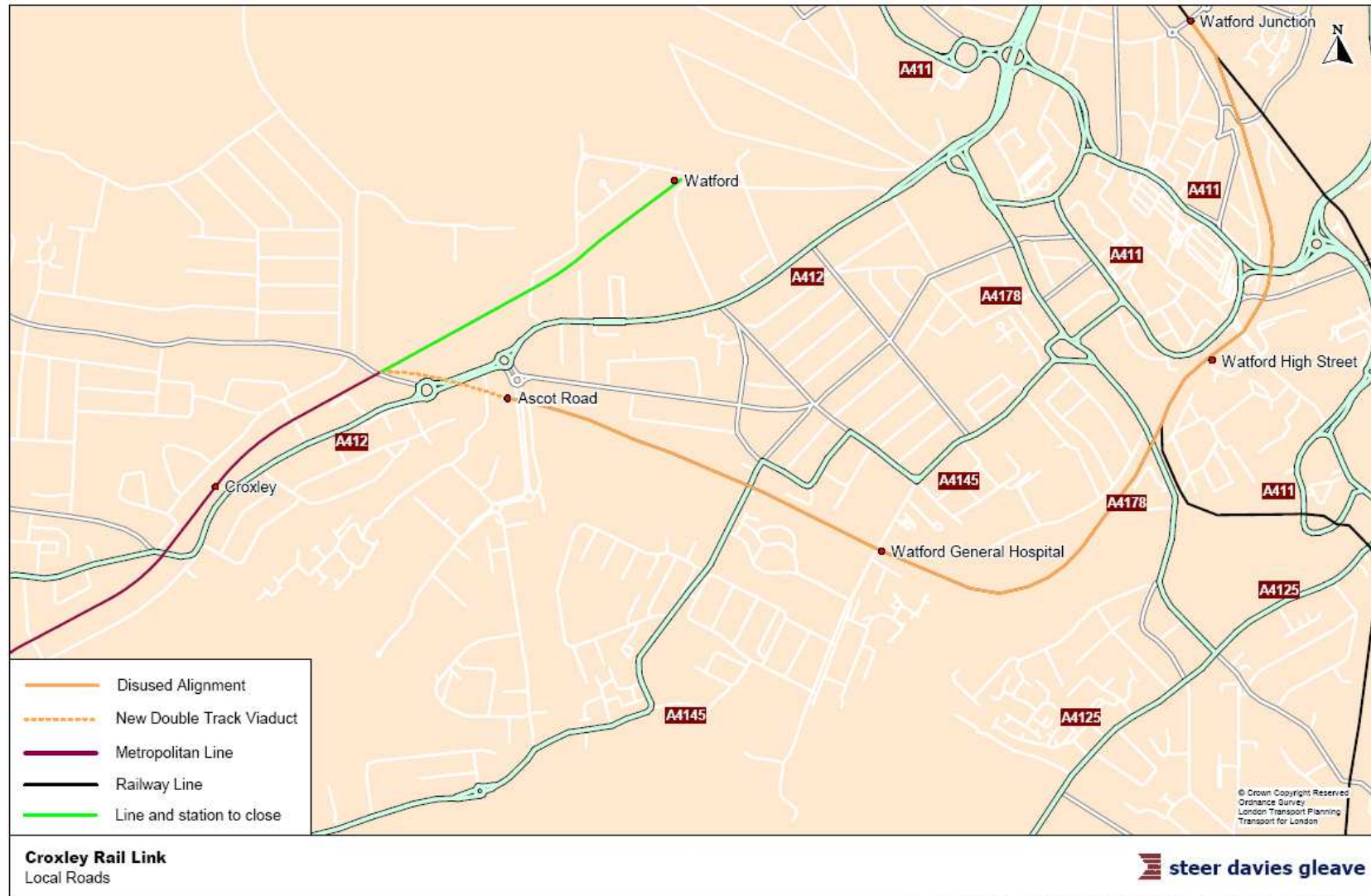
- 1.11 For this MSBC a combined Lower Cost Alternative and next best option has been appraised. The lower cost alternative option taken forward is a segregated, but unguided, busway between Ascot Road and Wiggshall Road; which then rejoins the highway network through the town centre and terminates at Watford Junction.

- 1.12 A segregated busway option was chosen because the alternative of improving bus priorities and infrastructure on the existing bus network has been previously demonstrated to have a poor economic performance, is particularly poor when considered against local scheme objectives, and has little impact when assessed against Central Government (New Approach to Appraisal/NATA) objectives. This non-segregated option cannot be considered comparable with the Preferred Scheme and has therefore been rejected.

Project History

- 1.13 The Croxley Rail Link project has been under development for over 15 years. The project was promoted by London Underground Limited (LUL) until Spring 1997 who had the aim of funding construction and operating the resulting service. LUL prepared business cases on this basis and submitted them to the Department of Transport in preparation for the submission of a Transport & Works application. To this end substantial engineering feasibility and design work was completed along with a full environmental assessment and demand forecasting.
- 1.14 During this period, the local councils and BR/Railtrack examined how best the project could be integrated with their own strategies. The rail link was recognised as a key passenger transport improvement within the South West Hertfordshire Transportation Strategy. This led to Central Government recognition of the scheme through the award of Package funding and subsequently to Capital Challenge and Single Regeneration Budget (SRB) funding for station provision and improvement.
- 1.15 In Spring 1997, LUL announced that it remained committed to the project, but that it needed partners to come on board to assist with the funding of the core scheme. It became clear at that time that the project could only be implemented by Railtrack, whilst LUL would act merely as service operator.
- 1.16 The project lead was accepted by Railtrack, on the proviso that it needed to oversee detailed studies of its own, before it could make a long term commitment to leading the delivery of the scheme. The study subsequently completed by Hyder in December 1998 demonstrated construction and operational feasibility, provided a robust cost estimate and quantified risks. Further demand forecasting work undertaken by Halcrow in 1997/98 demonstrated that potential demand for the rail link was higher than originally forecast.
- 1.17 When the results of the studies were drawn together, the resulting business case demonstrated that the rail link was feasible in construction and operational terms, and was economically viable. However, it highlighted that the project costs could not be financed from operating revenue and therefore that additional funding would need to be secured to bridge the gap. Railtrack confirmed that it was unable to provide or undertake to secure the necessary capital funding and, as its financial position worsened, declared that it could no longer take the project lead.
- 1.18 Following discussions between Government Regional Office, the then Department of Environment, Transport and the Regions (DETR), London Underground (LUL) and HCC it was agreed that HCC would take the lead partner role and submit an application for Section 56 grant through its Provisional LTP, which was duly made in July 1999.
- 1.19 At that time HCC commissioned Steer Davies Gleave, to undertake a comprehensive appraisal of options (including stakeholder consultation) for serving the Croxley Corridor, using the Government's *New Approach to Appraisal* (NATA) framework. The report, submitted as a supplement to the Provisional LTP, re-affirmed that the rail link offered the best overall option when appraised against the 1998 Transport White Paper and local objectives. The scheme was given 'deferred' status by DETR in December 1999, who requested a consolidated submission including more detailed assessment.

FIGURE 1.1 CROXLEY RAIL LINK ALIGNMENT



P:\CGI\GIS\Work\Projects\7200s\7255\Maping\Mapinfo\Workspaces\Croxley_ARoads.WOR

- 1.20 In July 2001 HCC submitted an LTP ‘Annex E’ funding submission to DETR with a view to securing approval to progress a TWA order application. The economic case for the scheme was acknowledged, however concerns over Railtrack’s commitment to deliver the scheme as proposed were raised. Subsequently a report setting out the relative merits of a range of delivery options was submitted to the DfT following extensive consultation within the rail industry. This report concluded that use of the LUL Public Private Partnership (PPP) would provide the optimum and most practical mechanism for securing the delivery of the scheme, a conclusion endorsed by LUL.
- 1.21 In early 2005 detailed discussions between DfT, LUL, TfL and HCC resulted in the submission of an application for ‘Provisional Approval’ including a proposed funding cap figure and clarification of proposals for risk management. The response from DfT requested a cost estimate based on updated unit rates and triggered a review of the delivery mechanism as emerging experience of the PPP suggested that alternative mechanisms may be more financially advantageous.
- 1.22 This review resulted in the promotion of the current procurement strategy, reflecting the outcome of consultation with stakeholders including TfL, LUL and Network Rail. It is now proposed that the scheme will be procured through a hybrid approach, whereby:
- HCC will procure the civil engineering elements of the scheme (including permanent way and power) by tendering an Early Contractor Involvement, Design & Build Contract; and
 - LUL will fit out the specialist railway related elements of the scheme (communications and signalling), procuring them through a combination of its framework contracts and the Public Private Partnership (PPP) legacy arrangement.
- 1.23 This preferred strategy best uses the capacities and capabilities of the stakeholders, optimises the use of the procurement models available to them and optimises the control of risks. This submission is based on this approach.
- 1.24 In 2008, a Major Scheme Business Case was submitted to the DfT which reflected the latest scheme. The DfT requested that further work was required to ensure, inter alia, that transport models reflected current travel patterns. This updated submission addresses the issues raised.
- 1.25 A benefit of the long project history (that has seen the leadership change between stakeholders) is that each promoter has undertaken its own cost and risk assessment and reviewed the existing assessments, from their individual perspective. This has helped to ensure that engineering and operational assessments are robust, giving a high level of understanding of costs and impacts. The proposed scheme has therefore been subject to challenge from all key stakeholders and the detailed development studies undertaken focused on achieving a robust scheme. The most recent cost and operational assessments undertaken can be found in Appendix B. This includes a further independent review of the costs by Volker Rail in May 2009 and the Risk Assessment conducted by Mouchel in August 2009. A summary of Scheme Development is provided as Appendix C.

Stakeholder Support

- 1.26 The Croxley Rail Link scheme has active support from key stakeholders, including a commitment from London Underground Limited (LUL) to operate services and pass through the operating surplus to HCC in support of a local financial contribution. Network Rail have been engaged with the project, as existing owners of the heavy rail alignment, and because of the interface/interaction with the operational Direct Current (DC) lines through Watford High Street station into Watford Junction. A Strategic Board has been established which consists of Network Rail, LUL and HCC. Go-East has also been invited to attend. Appendix D sets out the Communications Strategy and Appendix E provides letters of support received from Stakeholders.

Key Benefits

- 1.27 Operating a high quality London Underground (LUL) service to Watford Junction will contribute towards a number of objectives of local, regional and Central Government policies. Key benefits of this scheme include:
- The provision of an alternative route between Watford and central & north London allowing travellers to access greater levels of employment, health and leisure destinations seamlessly;
 - Support for Watford's new role as a Key Centre for Development and Change (KCDC) within the London Arc. Improved transport provision will enable sustainable development of the Watford area, including commercial, retail, leisure and residential opportunities;
 - The provision of improved connections to local services such as the general hospital and, in particular, the proposed Watford Health Campus major regeneration project which provides health services and employment and is of importance to both London and Hertfordshire;
 - The provision of improved local and regional public transport network connections to Watford, particularly from West Watford and the Metropolitan Line;
 - Contribution to the role of Watford Junction as an interchange hub for outer London orbital and West Coast mainline movements;
 - A significant improvement in public transport provision enabling the local authorities to manage the highway network and demands on it more effectively; and
 - Provision of a direct, mass transit service from Watford Junction to the National Stadium for visitors from Scotland, the north-west and the midlands.
- 1.28 In summary, the scheme has support of all key stakeholders, makes use of existing under-utilised transport infrastructure and with a BCR of 2.55:1 presents a good value for money investment.
- 1.29 The proposed Croxley Rail Link clearly supports a number of key themes which were presented in the Eddington Report of December 2006. These include:
- Making the best use of existing infrastructure;
 - Filling gaps and pinch points to improve the performance of existing networks;
 - Providing investments in areas with economic priority with congested urban areas and catchments;
 - Offering greater choice of mode; and
 - Increasing energy efficiency of public transport modes.
- 1.30 In response to the Eddington Study and the Stern Review in 2007, the DfT published "Towards a Sustainable Transport System" (TaSTS). TaSTS outlines five goals for transport:
- maximise the competitiveness and productivity of the economy;
 - address climate change, by cutting emissions of carbon dioxide (CO₂) and other greenhouse gases;
 - protect people's safety, security and health;
 - improve quality of life, including through a healthy natural environment; and
 - promote greater equality of opportunity.
- 1.31 Delivering a Sustainable Transport System (DaSTS), sets out the DfT's plans for putting TaSTS "into action in a way that both tackles our immediate problems and also shapes our transport system to meet the longer term challenges".

- 1.32 Croxley Rail Link supports these goals as illustrated in Section 9 and Appendix J of this document.

Transport and Works Act Powers

- 1.33 HCC has commissioned major project development studies to increase the level of detail supporting the case for Croxley Rail Link and to generate inputs to the LUL approvals process. Heads of Terms are currently being agreed between HCC and LUL. Work required for the TWA Application is being progressed whilst Programme Entry Status is awaited. A full public consultation on the scheme is planned for early 2010.
- 1.34 In November 2002 the Secretary of State for Transport ordered that the currently disused Croxley Green corridor should be retained in order to allow determination of the future of the Croxley Rail Link. This notice expired in November 2007, when Network Rail acquired sufficient control of the corridor for it to be able to consider disposal of the rail alignment.
- 1.35 Network Rail are now actively engaged in the development of the project and, providing commitment to progress the rail link can be demonstrated, arrangements for the transfer of the land from British Railways Board (BRB) to probable TfL/LUL ownership will be taken forward as part of the delivery of the project.

Report Structure

- 1.36 This document is structured to conform to the DfT guidance on the preparation of Major Scheme Business Cases published in 2008. The analysis presented within this document has been undertaken in line with the guidance on WebTAG (www.webtag.org.uk).
- 1.37 The first part of this business case, comprising Sections 1-6, sets out an introduction to the proposed scheme, the scheme history, base case (Do Minimum) and different options appraised in this business case, risk and contingency, together with summary estimates of capital and operating costs.
- 1.38 The second part of this application document, comprising Sections 7-10 sets out the strategic case for the project, describes the scheme context, problems, opportunities and objectives which the project aims to address, along with the processes followed to identify and assess potential options. The strategic fit of the selected options with regional and local policies/strategies and how the options will assist in meeting regional and local objectives are also considered.
- 1.39 The third part of this document, comprising Sections 11-19 considers the Value for Money Case and sets out the scheme benefits, appraisal, cost benefit analysis and wider analysis.
- 1.40 The fourth part of this document, comprising Sections 20-24 sets out the delivery plans put into place for the successful implementation of the options. The delivery case considers project management proposals, key management roles and sets out the proposals for measuring the impacts of the options and undertaking evaluation of the completed project.
- 1.41 The Commercial Case is set out in Section 25 and describes the procurement strategy and approach to private sector involvement.
- 1.42 The Financial Case presented in Sections 26 to 27 considers the financial implications of the options. This includes the identification of funding sources for the options and the analysis undertaken of the affordability of the scheme - both during construction and in the future operational phase.
- 1.43 Finally a summary of the options presented in this MSBC and taken through the full appraisal process is set out in Section 28.

- 1.44 The major scheme application checklist can be found at Appendix F, listing where the required elements of analysis can be found within this document. The major scheme application cover form is submitted as a separate document.

Appendices

- 1.45 The appendices to this application, containing all supporting information, are bound under separate cover. These comprise:

- A Bibliography;
- B Cost and Risk Reports:
 - B1 Cost Cover Sheet;
 - B2 Risk Review and QRA;
 - B3 VolkerRail Cost Review;
 - B4 Croxley Rail Link Cost Review;
 - B5 Croxley Busway Cost & Risk Review; and
 - B6 Renewals and Maintenance Programme.
- C Summary of Scheme Development;
- D Communications Strategy;
- E Selection of Letters of Support;
- F Major Scheme Checklist;
- G Busway and Rail Design Specifications:
 - G1 Croxley Rail Link Design;
 - G2 Croxley Busway Design; and
 - G3 Hyder Feasibility Report.
- H Alternative Options Considered;
- I Assessment of Options against Local Policy;
- J Assessment of Options against Regional Policy;
- K Demand Forecasting Update Report;
- L TAG worksheets;
 - L1 Noise;
 - L2 Air Quality and Greenhouse Gases;
 - L3 Landscape;
 - L4 Townscape;
 - L5 Heritage of Historic Resources;
 - L6 Biodiversity;
 - L7 Water Environment;
 - L8 Physical Fitness;
 - L9 Journey Ambience;
 - L10 Security;
 - L11 Accessibility; and
 - L12 Integration.
- M Wider Impacts Study;
- N Project Assessment Spreadsheet;
- O Implementation and Process Map; and
- P Project Timescale.

2. Options Taken to Appraisal

Croxley Rail Link

- 2.1 The Croxley Rail Link is a proposed extension of the LUL Metropolitan Line to Watford Junction via Watford High Street. The proposed alignment is illustrated earlier in Figure 1.1. The scheme involves the construction of a viaduct to connect the existing Metropolitan Line to the currently disused Croxley Green Branch line, currently owned by Network Rail/BRB. The scheme in its current form would involve the closure of the current LUL line from Croxley to Watford Metropolitan station and the latter station itself.
- 2.2 The length of new railway (structures, track and signalling) added to the Metropolitan Line is approximately 4.5km, although the scheme facilitates the closure of 1.3km of the existing Metropolitan Line between the new viaduct and Watford Metropolitan station. This results in a net increase in the operating track length of around 3.2km. The length of the new link structure (on embankment and viaduct) connecting the existing Metropolitan Line to the disused Croxley Green Branch line is approximately 0.4km. The journey time between Croxley and Watford Junction stations is predicted to be 11 minutes.
- 2.3 Fully accessible stations served by the Metropolitan Line would be provided at Ascot Road (replacing Croxley Green), Watford General Hospital, Watford High Street and Watford Junction. These will be constructed and fitted to TfL's Station Planning Guidance standards, which include meeting the requirements of the Disability Discrimination Act (DDA).

Service Frequency

- 2.4 The existing Metropolitan Line service frequency between Watford and Central London of 6 to 8 trains per hour would operate between Watford Junction and Central London. One additional LUL rolling stock set would be required to operate the service.

Land and Operations

- 2.5 Metropolitan Line services will share track with National Rail DC line services operating between Watford Junction and London Euston, from south of Watford High Street station to the approach to Watford Junction station. Watford High Street station would be served by both National Rail and Metropolitan Line services.
- 2.6 A Transport & Works Act Order will be required to secure powers to acquire land and construct the rail link, and closure procedures would be required in relation to the existing Metropolitan Line (north of the new link) to Watford Metropolitan station.

Delivery Mechanism

- 2.7 The principles of a Joint Promotion Agreement between HCC and LUL/TfL have been previously established. Heads of Terms are currently being agreed. A Project Board with HCC, LUL/TfL and Network Rail has been established. This forum will be used to agree the responsibilities and liabilities of each party. Network Rail are also key to these processes, as they are the current owner of the Croxley Green Branch infrastructure and remaining owner of the joint running section between Watford High Street and Watford Junction stations. The delivery mechanism is described in the "Delivery Case" section.
- 2.8 It should be noted that the scheme being promoted has the potential to be further developed to facilitate the operation of services between Rickmansworth/Aylesbury and Watford Junction. This variant of the scheme is not being promoted as it would have rail franchise implications that cannot be addressed at this stage and would also require additional works at Watford Junction, the feasibility of which has not been established. The scheme being promoted provides a useful first step to this long-term aspiration.

Opening Date

- 2.9 Croxley Rail Link has a full programme from consultation, Transport and Works Act submission, financial approval and construction to implementation in 2018. In order to take full advantage of the stakeholder support that currently exists for the project and reduce the potential risk of support being reduced as a result of delay, programme entry is required now.

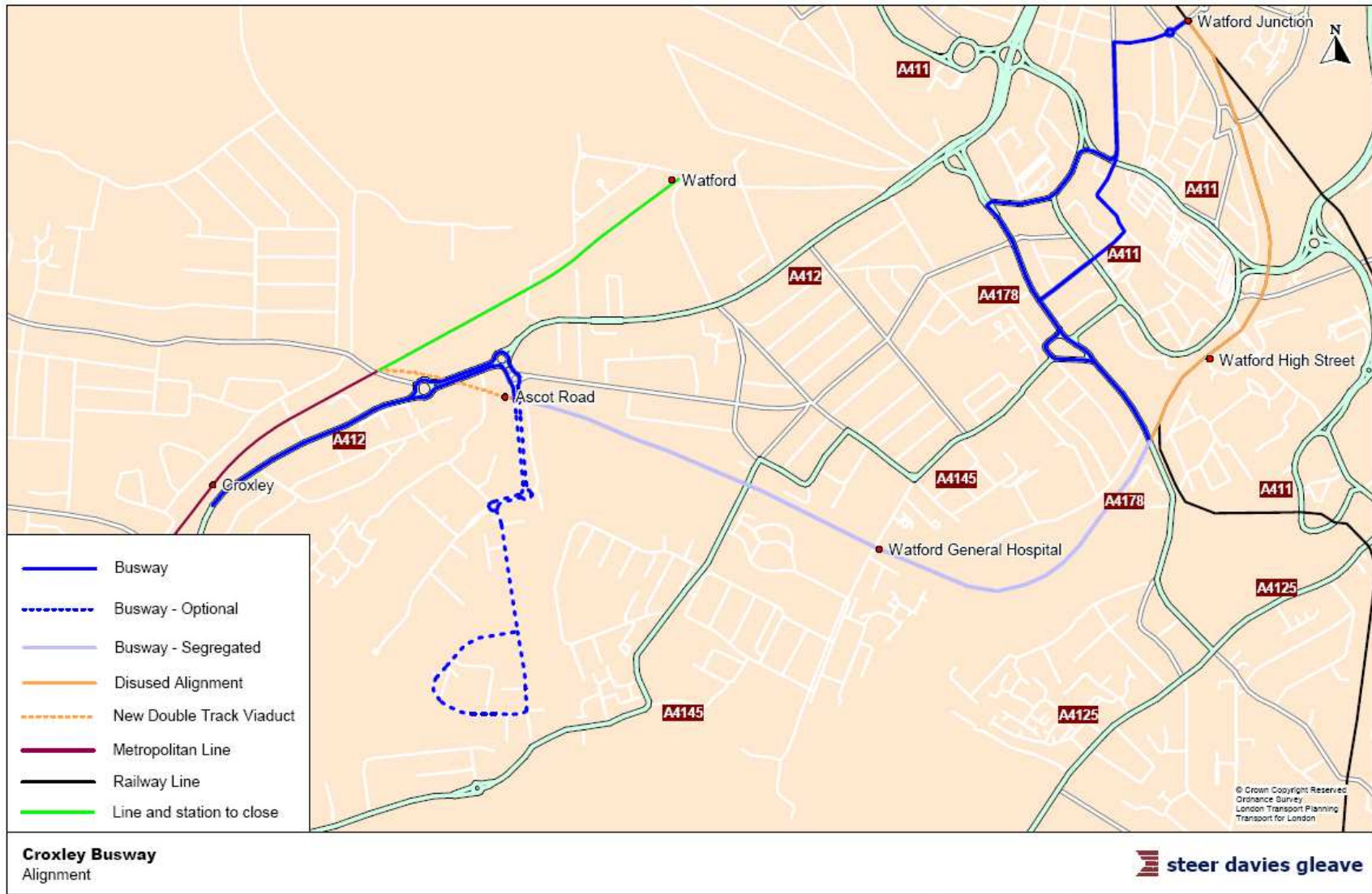
Croxley Busway - Alternative Option

- 2.10 The Croxley Busway lower cost alternative option comprises a bus service between Croxley station and Watford Junction station, calling at Ascot Road, Watford General Hospital on a segregated alignment and rejoining the existing road network at Wiggshall Road to access the town centre. An additional service would operate from Watford Junction to Croxley Business Park also using the segregated busway. These options are presented in Figure 2.1.
- 2.11 The overall distance of the proposed route is approximately 5.5km, 3.2km of which will be along the segregated busway. The end-to-end journey time between the two stations is predicted to be approximately 20 minutes (Appendix B).
- 2.12 The infrastructure required for the Croxley Busway option includes:
- Construction of a bus only carriageway with lit pedestrian footpath on the Croxley Green rail alignment between Ascot Road and Wiggshall Road;
 - Vehicle access roads from Ascot Road, Vicarage Lane and Wiggshall Road onto the busway alignment to/from all directions and including bus priority measures to prevent delay in access/egress from the busway;
 - Bus priority measures en route, including into Watford Town Centre, to reduce the delay to vehicles to the maximum extent possible;
 - Fully accessible new bus stop facilities at Watford General Hospital (intersection with Tolpits Lane), Watford Stadium (intersection with Vicarage Lane);
 - Additional bus stop facilities at Ascot Road and Wiggshall Road;
 - Improved quality/branding of existing bus stops en route;
 - Real time travel information at all bus stops en route;
 - Enforcement measures to prevent vehicles other than cyclists, buses, and emergency (including recovery) vehicles entering the busway at each of the three access points;
 - Cyclist and pedestrian accesses and crossings as required for integration with existing/potential rights of ways/desire lines; and
 - CCTV/lighting/other security measures for waiting passengers, passengers accessing services and other users at the busway stops.

Service Frequency and Vehicle Requirements

- 2.13 The busway service is proposed to offer a 10 minute headway service (equivalent to the Rail Link proposal) in each direction between Croxley and Watford Junction stations. To provide 6 buses per hour in each direction with adequate layover and recovery time it is assumed that 11 new, high quality low-floor double-decker bus vehicles will be deployed for service. An additional 2 vehicles would be used to provide an additional service on a thirty minute headway between Watford Junction and Watford/Croxley Business Parks.

FIGURE 2.1 CROXLEY BUSWAY ALIGNMENT



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- 2.14 The supplementary service between Croxley Business Park and Watford Junction would run a 30 minute headway service requiring three additional vehicles.
- 2.15 The infrastructure has been specified to accommodate up to four times the frequency of the core service with allowance for the impacts of bus bunching or other operational problems. This provides for future capacity growth and promotes higher levels of service reliability than a quality corridor would require and than would be expected from a minimum scope scheme.
- 2.16 It should be noted that a busway option is unlikely to contribute significantly to strategic objectives and this means that local objectives should become the main focus of the busway option. An example of this is serving the Croxley Business Park and linking it directly to the residents near Watford General Hospital, and the provision of a bus stop by Vicarage Lane to improve accessibility from the Watford Health Campus.
- 2.17 Existing bus services have been reviewed to identify new opportunities offered by the busway in terms of providing journey time savings for similar routes. However, it was concluded that no suitable service would particularly benefit from the busway and this would also potentially result in a reduction of bus services immediately adjacent to Watford General Hospital.

Land and Operations

- 2.18 Powers under the Highways Act would be required to acquire land and construct the busway link. Additional time and resources will be required as this presents a significant variation to the original Croxley Rail Link, specifically in terms of feasibility of access roads, and may be subject to objections from local residents and stakeholders as the busway will effectively remove future possibilities for implementing a rail service. The promotion of a busway link would require a change to the Local Development Framework, which designates the land specifically for the rail link proposals. This would present a further opportunity for objections to the scheme to be made and for resulting delays in implementation.

Delivery Mechanism

- 2.19 The busway option, if selected, would be promoted by HCC with no involvement from Transport for London or Network Rail/BRB (except in the transfer of land across to HCC). The operations contract would be tendered to local bus operators.

Opening Date

- 2.20 It is assumed for appraisal purposes that the time required for the construction process would be similar to that for the Croxley Rail Link; although there is less construction required, the proposals have not been developed to the same extent as the rail link scheme. Powers would still be required, and it can be expected that they would be seen as more contentious by heavy rail lobby groups and by both pro-car lobbyists and taxi operators who will see the potential opportunity of an uncongested route that they will believe should be open to them. Anti-car lobbyists will see the busway as a new section of highway introduced by the 'back door'. As such it is assumed that the opening date would also be in 2018. There is a significant increase in the risk of delay due to the acceptability of a busway solution with stakeholders, local residents and politicians.

3. Capital Costs

Introduction

- 3.1 This section of the report sets out the methodology used to prepare capital cost estimates for implementing the Croxley Rail Link and the alternative Croxley Busway. A brief description of infrastructure and other elements included in the costs is also presented.

Preferred Scheme

- 3.2 The Mouchel Parkman cost estimates (Appendix B) took a consolidated judgement based on the following earlier sources:

- Review of Estimates Mouchel Parkman June 2005;
- Cost Estimate by Turner & Townsend October 2005;
- Design Specification by Mouchel Parkman March 2006;
- Contractor Cost Estimate First Engineering dated July 2006;
- Contractor Cost Estimate by Norwest Holst dated Q3 2006;
- Review of Cost Estimates by Mouchel Parkman, August 2007;

- 3.3 A review of the cost estimates was additionally undertaken by Volker Rail in May 2009 as required by DfT MSBC guidance and was based on previous work undertaken for HCC and current market intelligence (Appendix B). As there has been considerable and relatively recent work undertaken into developing scheme costs for Croxley Rail Link, the capital cost estimates presented in this report are considered to be robust.

Scheme Works

- 3.4 The main civil infrastructure work required for the Croxley Rail Link is set out in detail within the Mouchel Parkman report, included as Appendix B to this document. In summary the estimate includes:

- 4.5km of new railway track, signalling and structures;
- 0.4km embankment and viaduct over Watford Road, Grand Union Canal and River Gade linking the Metropolitan Line and the Croxley Green Branch;
- New stations at Ascot Road and Watford General Hospital;
- Refurbishment of station at Watford High Street;
- Refurbishment of Cardiff Road, Ascot Road and River Colne underbridges; and
- Maintenance of Tolpits Lane, Vicarage Road and Wiggshall Road overbridges.

Capital Cost Estimates

- 3.5 The estimated capital costs by item, in 2007 prices, are set out in Table 3.1. It should be noted that these estimates exclude VAT. Additional land cost and light rail vehicle costs have been included based on previous cost estimates, taking account of inflation.

TABLE 3.1 PREFERRED SCHEME CAPITAL COST SUMMARY

Cost Item	£m 2007 prices
Construction costs	£51.87
Preliminaries	£11.02
Contractor Overheads	£4.72
Design	£4.00
Project Management	£3.35
Assurance	£1.89
Third Party Costs	£7.78
Possession Costs	£0.50
Land Costs	£4.00
Public Inquiry	£1.00
Vehicle Costs (one additional set)	£8.30
Third Party Compensation	£0.25
Monitoring and evaluation (at ½% of scheme costs)	£0.43
Scheme cost excluding Risk	£99.11
Risk Allowance from QRA	£12.70
Total	£111.81

Inflation Assumptions

- 3.6 Based on allowances made on similar projects, advice from DfT and the allowances made in the Regional Funding Allocations (RFA) construction cost inflation has been assumed at 4.5% pa in nominal terms (2.0% real assuming RPI of 2.5%). The impact of current financial circumstances is not expected to have any residual impact on cost inflation over the projected timescale for construction.

Funding Requirements

- 3.7 The forecast funding requirement, assuming construction spend in 2013/14 and 2014/15 is estimated at £172m, including risk allowance (Table 3.2). The costs presented do not include optimism bias or the additional risk layer (which will be set by DfT to represent the maximum approved scheme cost). These costs represent the current best estimates for Croxley Rail Link - however they are dependent on underlying inflation assumptions and programme; if construction costs increase faster than is assumed, or if implementation is delayed for any reason, the funding requirement will increase.

TABLE 3.2 RAIL LINK FUNDING REQUIREMENT

Cost Item	£m 2007 prices	£m outturn
Construction and management costs	£85.1	£133.0
Other costs (land, additional vehicles, public inquiry)	£14.0	£19.1
Risk allowance	£12.70	£19.9
Total	£111.8	£172.0

Capital Renewal Costs

- 3.8 It is assumed that major civil engineering works, such as over-bridges, and highway works will not require full renewal over the 60 year appraisal life, but they will require cyclic maintenance. The costs of any maintenance and/or partial renewals are included within LUL's operating cost estimate - set out in Section 4.

Lower Cost Alternative

- 3.9 A design specification was prepared and costs estimated for the Croxley Busway by Mouchel Parkman. The design specification can be found as Appendix G to this MSBC and the cost estimate as Appendix B. The scheme has been specified to deliver a high quality system, more comparable with the preferred LUL option than existing bus services. HCC are not able to commit the required revenue funding to subsidise a bus service (and such funding is not available from DfT for a major scheme application); the service specification has therefore been developed to ensure that the option is commercially viable, over the longer term if not initially so.

Scheme Works

- 3.10 The main civil engineering infrastructure work required for the scheme is set out in the Mouchel Parkman reports. In summary this estimate includes:
- 2.3km of access-controlled segregated busway on the former branch line, within the total 5.5km length scheme;
 - Lit pedestrian footway along the segregated section;
 - Stops on the segregated section at Ascot Road, Watford West, Vicarage Road, Wigenhall Road;
 - Stops on the highway network at Croxley Metropolitan Station, Sycamore Approach, Watford Town Centre and Watford Junction Station;
 - Full CCTV coverage and lighting; passenger help points at all stops;
 - Bus service at the same frequency (to ensure commercial viability) of Metropolitan Line services, timed to connect with alternate services to and from Central London;
 - High quality of service with clearly branded modern vehicles and stops

fully/conveniently accessible to the mobility impaired;

- Bus Priority measures on highway, particularly through Watford Town Centre to allow bus link vehicles to pass through this congested area with a minimum of disruption;
- At stop ticket machines;
- Full compatibility with Oystercard; and
- Real time passenger information provided at stops; at Croxley and Watford Junction Stations and within Watford town centre.

Capital Cost Estimates

- 3.11 The estimated capital costs are presented in Table 3.3 in 2007 prices. The costs presented do not include optimism bias or the additional risk layer. It should be noted that these figures exclude VAT. Allowances for land and for public inquiry costs are consistent with those items for the preferred alternative. On the latter point, although the scheme is lower cost and would seek Highways Act rather than TWA powers, recent experience has shown that there is more likely to be opposition to a project (leading to an extended/more costly public inquiry) which converts an existing - if unused - rail asset to non rail use.

TABLE 3.3 SUMMARY OF LOWER COST ALTERNATIVE CAPITAL COSTS

Cost Item	£m 2007 prices
Construction costs (segregated section)	£12.05
Construction costs (unsegregated section)	£2.92
Preliminaries	£3.37
Contractor Overheads	£1.38
Design	£2.75
Project Management	£0.92
Land Costs	£5.25
Third Party Compensation	£0.25
Public Inquiry	£1.00
Monitoring and evaluation (at ½% of scheme costs)	£0.12
Scheme Cost Excluding Risk	£29.99
Risk Allowance	£3.24
Total	£33.23

Inflation Assumptions

- 3.12 Inflation assumptions are common with the Preferred Scheme, amounting to an approximately 20% increase to the mid point of programmed construction.

Busway Option Funding Requirement

- 3.13 It is assumed that the simpler and cheaper Croxley Busway can be implemented over a more optimal timescale¹ than the preferred alternative (which is effectively 'fixed' by RFA

¹ A sensitivity test showing an accelerated rail link implementation on this same programme is included within Section 16 of this business case

availability). The overall funding requirement is set out in Table 3.4 in forecast outturn values (inclusive of inflation).

TABLE 3.4 LOWER COST ALTERNATIVE FUNDING REQUIREMENT

Cost Item	£m 2007 prices	£m outturn
Construction and management costs	£23.4	£32.0
Other costs (land, public inquiry)	£6.6	£8.7
Risk allowance	£3.2	£4.4
Total	£33.2	£45.1

- 3.14 These costs represent the current best estimate for the Croxley Busway option. They have been prepared by the same organisation estimating the costs of the Preferred Scheme on a comparable basis and to a broadly equivalent level of detail.

Capital Renewal Costs

- 3.15 For the purposes of this business case, Mouchel Parkman prepared a schedule of the renewals and day to day maintenance expenditure that will be required to secure the long-term availability of the Croxley Busway infrastructure. This schedule forms Appendix B to this MSBC. This expenditure is comparable to an annual payment of around £100k - although it could not be reduced to a fixed annual payment, as has effectively happened for the Rail Link, on a project of this scale because it is an isolated project rather than being incorporated with the wider underground network.

4. Operating and Maintenance Costs

Introduction

4.1 This section of the MSBC sets out the operating and maintenance cost assumptions relating to the Croxley Rail Link and Alternative Busway. Since the previous submission London Underground Limited (LUL) have completed an estimate of the incremental operating costs for the proposals. These costs have been derived in a way to provide the optimum fit with the partnership agreement between LUL and HCC being specified as annual payments (including for renewals - as the full network managed by LUL is of sufficient size to allow them to programme works in such a way as to smooth out these irregular costs) The costs include:

- Service and station operating costs (power, labour etc);
- Maintenance and renewals of the new link; and
- Charges to cover access to Network Rail infrastructure.

4.2 All costs impacts have been derived as the net position including the closure of the existing link and as net in relation to Transport for London overall - i.e. taking into account savings made in access charges by London Overground services which are franchised to TfL.

Operating and Maintenance Cost Inflation

4.3 Baseline operating and maintenance costs estimates are assumed to be constant in real terms, with the exception of staff costs which are assumed to increase by 1.0% pa in the future. Both assumptions are on the advice of LUL (and are consistent with current standard industry assumptions).

Preferred Scheme

Operating and Maintenance Costs

4.4 The closure of the Watford Met Line station and associated track will result in an operating cost saving partially offsetting the operating costs over the new alignment. The additional annual cost of delivering the Rail Link proposals has been calculated by LUL for this submission. The breakdown of operating costs incurred and avoided is set out in Table 4.1, in 2009 prices.

TABLE 4.1 ANNUAL LUL OPERATING & MAINTENANCE COSTS (£000 2009 PRICES)

TfL Operating Costs	Incurred Cost	Avoided Cost	Net Change
Station operating staff	£969	£433	£536
Train operating staff	£439	-	£439
Uniforms	£3	-	£3
Station maintenance	£104	£52	£52
Station energy	£35	£18	£17
Gateline contract	£88	£44	£44
Service costs/track maintenance	£23,002	£22,542	£460
TOTAL	£24,640	£23,089	£1,551

Access Charges

- 4.5 Network Rail would levy access charges for: Watford High Street and Junction stations; and the track north of Watford High Street Junction. For the purposes of this business case and the financial agreement with HCC, LUL have forecast the change in access charge payments.
- 4.6 Station Access Charges are made up of: the long term charge (LTC), payable to Network Rail to cover their liabilities on the facility; and the Qualifying Expenditure (QEx), the shared costs of staffing, providing information and undertaking day to day maintenance. Current station access charges for National Rail stations are pro-rated in line with the number of services/train-lengths calling. The LTC is regulated by the Office of Rail Regulation. QEx can materially change only with the agreement of all access beneficiaries.
- 4.7 The total station access charge payable remains constant - but LUL will incur additional costs and DC lines operators will pay a reduced access charge. The net impact on TfL will therefore be neutral at Watford High Street station (where only TfL sponsored services will call). At Watford Junction the Station Access Charges are shared with other operators franchised to DfT rather than TfL; at this station the net impact on TfL is a combination of charges incurred by Croxley Rail Link services and savings by DC lines services - which pay a smaller contribution of the total as follows (in 2009 prices - source ORR and TfL):
- Current London Overground Rail Operations Limited (LOROL) services calls incur 8.23%, £128k, of the total LTC and QEx at Watford Junction
 - Croxley Rail Link calls will incur 32.20%, £501k, of LTC and QEx
 - LOROL services will incur 5.58%, £86k, of LTC and QEx a saving of £42k
 - The net impact on TfL is therefore an increase of **£460k pa. This provides a potential benefit to DfT through the effect this will have on the TOC franchise through the reduction in contribution from others.**
- 4.8 Track access charges were estimated on the basis of LUL's current agreement with Network Rail for access to the Richmond Branch of the District Line. The resulting variable track access charges and power charges included within the appraisal are £92k pa. (2009 prices). LOROL services currently already run over this section of route and therefore there is no change in fixed track access charges on TfL overall. The agreement between LUL and HCC also excludes Schedule 8 variable track access charges - which form the performance regime between operators and Network Rail and are effectively LUL's risk. For the appraisal it is assumed that a reliable service is maintained and therefore that LUL remains cost neutral.

Lower Cost Alternative

Operating Costs

- 4.9 Hertfordshire County Council Passenger Transport Unit estimate the cost of operating proposed services at £1.04m, based on current contract costs for supported services. The assumptions behind these cost estimates are as follows:
- **Watford Junction to Croxley** - 5 (max) buses required to operate a 10 minute headway with 20 minute running time:
 - Monday to Saturday. 14 hour period. £735,000 pa;
 - Monday to Saturday. 4 hour period at half frequency. £126,000 pa;
 - Sundays and Public/Bank Holidays. 14 hour period. £97,440 pa;
 - **Watford Junction/Croxley to Croxley Business Park** - 3 buses required to operate a 30 minute frequency with 20 minute running time:
 - Monday to Friday. 3 hour period. £52,500 pa.

Annual Maintenance Costs

- 4.10 In addition to those items detailed under capital renewal costs (previous section), Mouchel Parkman has estimated day-to-day service/maintenance costs for the segregated busway and for site management/maintenance. The annual infrastructure operating cost equates to £36k

pa in 2007 prices. Site management and maintenance costs were estimated using the current running costs of a similar high quality local scheme at a total of £310k (in 2007 prices).

5. Risk and Contingency

Introduction

- 5.1 This section of the report summarises the methodology and results of the Quantified Risk Assessment (QRA) undertaken for this MSBC. Further details of the risk analysis for both appraised options can be found in Appendix B. The QRA has been carried out to quantify the probable financial impact of the various risks associated with the underlying outturn capital costs.

Quantified Risk Analysis

- 5.2 An initial rail link risk workshop was held in 2005 forming the basis of the QRA undertaken. The most recent update has been in September 2009 immediately prior to the resubmission of this MSBC. A risk assessment for the Croxley Busway option was undertaken during development of the current scheme in Summer 2007. Risk registers for both options are provided in Appendix B, along with details of the QRA processes and results.
- 5.3 QRA allowances were calculated using Latin Hypercube Sampling, a form of Monte Carlo analysis where a distribution of outcomes is simulated by sampling high multiples of input values, based on the distribution of individual risks identified by the project team and the likelihood and severity estimated for each risk.

Preferred Scheme

- 5.4 Using this methodology the quantified risk allowance for the Croxley Rail Link option is estimated at £12.7m in 2007 prices. This equates to an increase of approximately 10% to the base capital cost estimate and is based on the 50th percentile value. Key risks identified through the analysis include:
- General design development;
 - Power supply to new substation from Croxley hall substation;
 - Planning / Public Enquiries;
 - Onerous commercial conditions;
 - Programme delays leading to higher inflation costs;
 - Requirement for a departure from standards to be accepted on Wiggshall Road overbridge; and
 - Buffers at Watford Junction Station and connections to the DC lines loop.

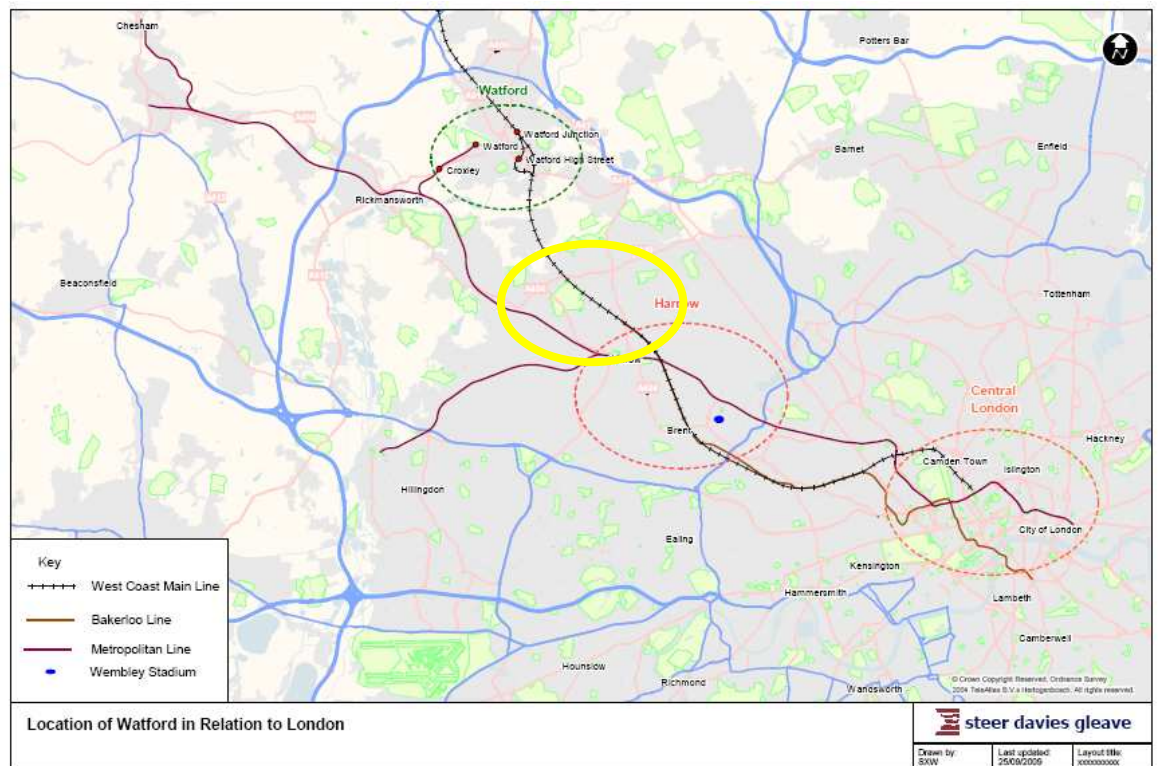
Lower Cost Alternative Option

- 5.5 A slightly simplified method of estimating the risk allowance for the Croxley Busway option was used, drawing on the results of the risk simulation of the Preferred Scheme. The risk allowance for this option is estimated at £3.2m in 2007 prices or around 11% of the base capital cost estimate. The list of key risks for the Busway option shows similarities to those for the rail link scheme and include:
- General design development;
 - Onerous commercial conditions; and
 - Ground conditions/ground water.

6. Scheme Context

- 6.1 The town of Watford is located within the Borough of Watford which forms part of the County of Hertfordshire. The Croxley Rail Link infrastructure falls entirely within the County of Hertfordshire. Figure 6.1 illustrates the location of Watford with respect to London; Figure 6.2 shows the scheme and its location within Watford.
- 6.2 This section of the document provides a description of the local area and identifies key problems and opportunities, taking into account local and Central Government objectives, and how implementation of the proposed scheme may contribute to the mitigation of these problems.

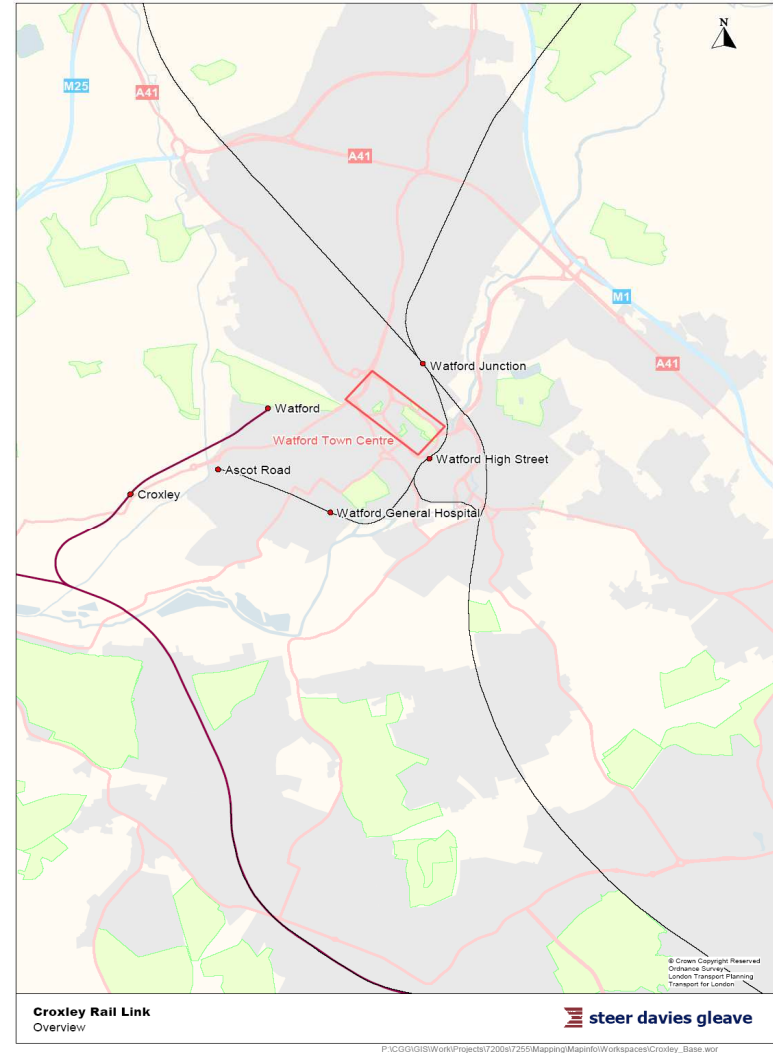
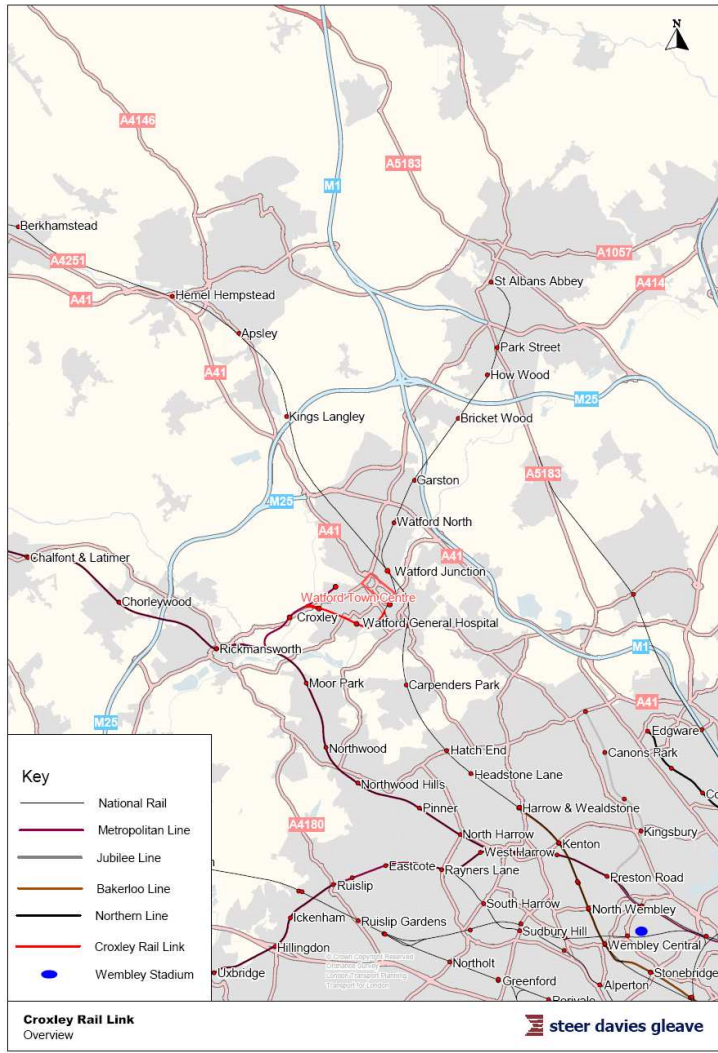
FIGURE 6.1 LOCATION OF WATFORD IN RELATION TO LONDON



Regional Overview

- 6.3 South West Hertfordshire comprises the large urbanised area that includes Watford, Bushey and Rickmansworth, with a total population of 153,227 according to 2001 Census. The conurbation is a mix of high density residential areas and industrial sites; this has contributed to problems of increasing traffic congestion in recent years.
- 6.4 Watford occupies a strategic location to the north of London which has resulted in a gradual replacement, over the past 25 years, of former engineering and printing industries with commercial and retail redevelopments. Watford, as a regional shopping centre, competes against Brent Cross and Milton Keynes.
- 6.5 A number of sites that attract/generate significant volumes of traffic lie in the immediate vicinity of the Croxley Rail Link corridor. These include:
- The Harlequin Shopping Centre;
 - Watford General Hospital;
 - Watford Football Club;
 - Croxley Business Park; and
 - Cardiff Road area industrial sites.

FIGURE 6.2 CROXLEY RAIL LINK SCHEME IN RELATION TO WATFORD



Croxley Rail Link – Major Scheme Business Case

6.6 The sizeable residential population within the Watford area has been reinforced in recent years by new housing developments. The area has exhibited strong economic and housing growth and this has added to commuter journeys made to Central London as well as local trips, increasing congestion within the locality. Watford has been designated as a Key Centre for Development and Change (KCDC) within the London Arc.

Population of Watford

6.7 Watford town had a population of 81,200 in 2006 (Source: TEMPRO v5.4). The population density, (based on 2001 Census data) is illustrated in Figure 6.3. Watford’s population density is on average 37 persons per hectare. This is ten times the national average of approximately 3.8 persons per hectare, with the most densely populated areas being within West Watford. As a result of planned developments in the area, Watford’s population is projected to grow by approximately 15% over the period from 2006 to 2030 (Source: TEMPRO v5.4). This projected growth is illustrated in more detail in Table 6.1.

TABLE 6.1 TEMPRO POPULATION FORECASTS (VERSION 5.4)

Area	2001	2006	2012	2018	2030
Hertfordshire	1,020,600	1,054,100	1,108,600	1,163,900	1,269,000
Watford	79,200	81,200	84,000	87,300	93,900

FIGURE 6.3 WATFORD POPULATION DENSITY

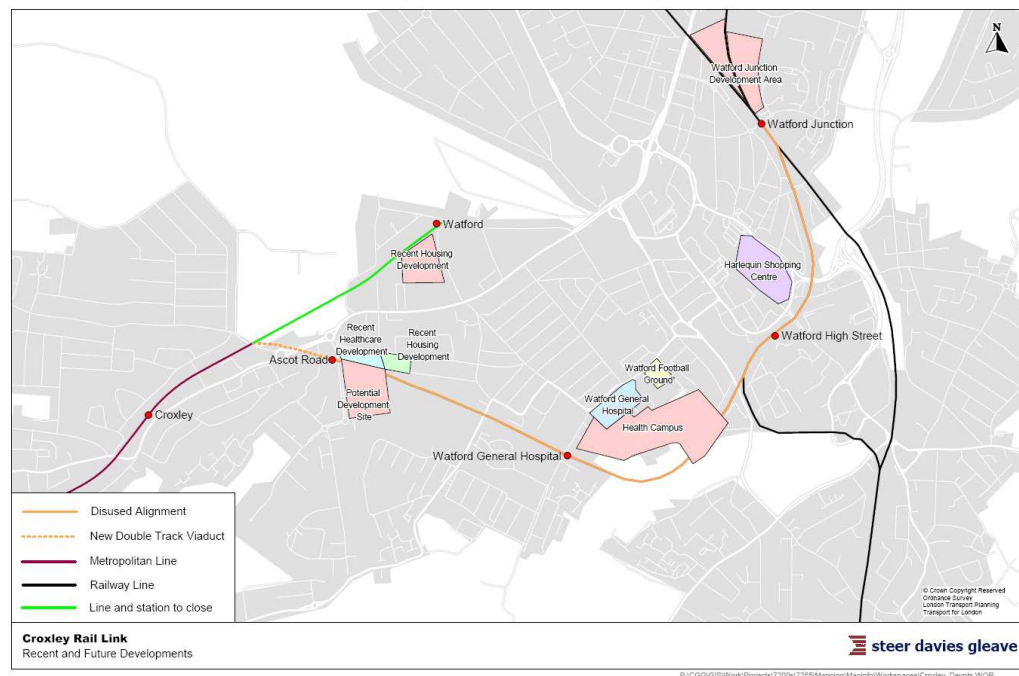


6.8 The forecast growth in population within a relatively confined community will generate additional strain on local roads and on demand for local services such as education, healthcare and leisure facilities. This will increasingly become a challenge that needs to be addressed if Watford is to continue to prosper and not be constrained by its own success.

Recent and Proposed Developments

- 6.9 There has been significant development and regeneration within Watford since the previous funding submission, including:
- The relatively recently occupied western end of Whippendell Road, including a new Travel Inn, the Whippendell Dental Clinic and Care Home, a supermarket and significant residential developments between Whippendell Road and the Croxley Rail Link lines; and
 - The relatively recently completed medium/high density residential development to the west of Metropolitan Station Approach Road consisting of approximately 400 new dwellings.
- 6.10 In addition, there are several large development projects within Watford progressing through the planning processes including:
- Watford Health Campus;
 - Watford Junction Regeneration scheme comprising considerable commercial and residential development;
 - The Watford Junction Station Interchange improvement scheme;
 - The Charter Place redevelopment scheme; and
 - The Civic Centre education/leisure campus.
- 6.11 Figure 6.4 sets out the key recent and future developments within the area. It is clear that Watford's designation as a regional shopping centre, provider of local services and regional transport interchange will increase local and regional travel demand. As such there is a need to further develop passenger transport services to and from other centres of the region in order to tackle the prospect of severe traffic congestion in the near future.

FIGURE 6.4 KEY RECENT AND PROPOSED DEVELOPMENTS



Watford Health Campus

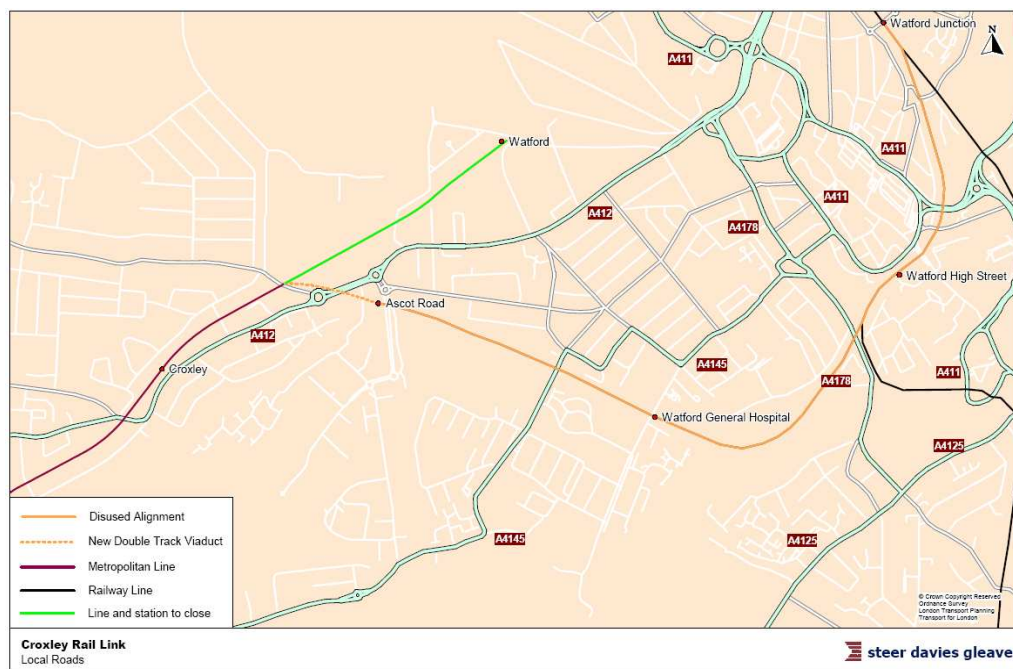
- 6.12 The Watford Health Campus is a major regeneration project aimed at delivering improved health, a more sustainable community and enhanced leisure opportunities for the West Hertfordshire region.
- 6.13 In addition to providing excellent healthcare and educational facilities, the Watford Health Campus strives for higher goals of promoting environmental sustainability through Workplace Travel Plans, promoting social inclusion and cohesion through community involvement and encouraging social and economic regeneration.
- 6.14 The Croxley Rail Link, which is explicitly supported by the Watford Health Campus Masterplan, provides transport linkages with the proposed Watford General Hospital station, situated in close proximity to the development. The new sections of the Hospital are due for completion in 2014, with the campus opening in 2018. Within the proposed programme, the construction site compound and necessary working space for Croxley Rail Link will be provided by the as yet undeveloped Health Campus site. Construction of the rail link at the same time as, or following the development of the Health Campus will create inefficiencies and additional risks.

Current and Future Transport Problems

Primary Highway Network

- 6.15 Watford is skirted by the M25, the A41 and the M1, all of which exhibit problems associated with high and increasing traffic volumes. The existing trunk and local road network features junctions, at, or in some cases above, practical capacity in peak periods; this situation is forecast to worsen without substantial action being taken. Figure 6.5 shows the local highway network.

FIGURE 6.5 LOCAL HIGHWAY NETWORK



- 6.16 Two significant traffic movements are identified as being central to congestion problems in this area. These are:
- Movements between central Watford and the Croxley/Rickmansworth area; and
 - Movements from within the Croxley to Watford Junction corridor to/from the area south of Watford (including London).
- 6.17 For the latter, there is no main route running directly south from West Watford. This requires people to access routes south via Watford, exacerbating congestion problems.
- 6.18 Residential roads are increasingly being used for ‘rat-running’ as primary routes become more congested. Restrictions on city centre parking as part of the South West Hertfordshire Transportation Strategy have resulted in many residential roads being used as an alternative. A tranche of parking restrictions and traffic management measures has been introduced within the town centre and West Watford as part of the South West Herts Transportation strategy and a programme of Smarter Choices has just been introduced to the area. However, the effectiveness of these existing measures and opportunities to extend or intensify them are limited without introduction of a credible alternative means of access such as the Croxley Rail Link.
- 6.19 Capital Shopping Centres (owners of the Harlequin Shopping Centre) have asserted that accessibility problems due to congestion are reflected in a lower than expected retail demand from the west of Watford. This is due in part to the inner ring road which encircles Watford town centre and creates a significant physical barrier to pedestrian movement.

Growth in Highway Demand

6.20 TEMPRO (version 5.4 July 2008) highway demand growth trends for London, Hertfordshire and Watford are set out in Figure 6.6 and Figure 6.7 for the weekday AM and Interpeak periods respectively. It should be noted that these forecasts apply to overall traffic growth; local traffic demand within the centre of Watford is expected to grow at a higher rate due to the concentration of development in the area.

FIGURE 6.6 HIGHWAY DEMAND GROWTH - WEEKDAY AM PEAK

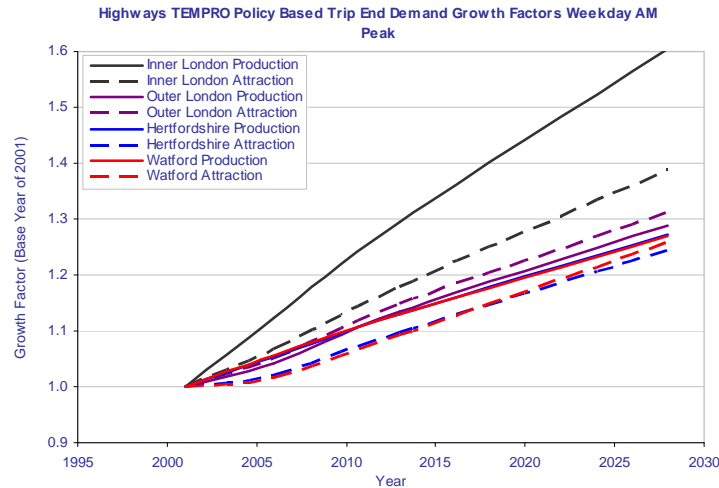
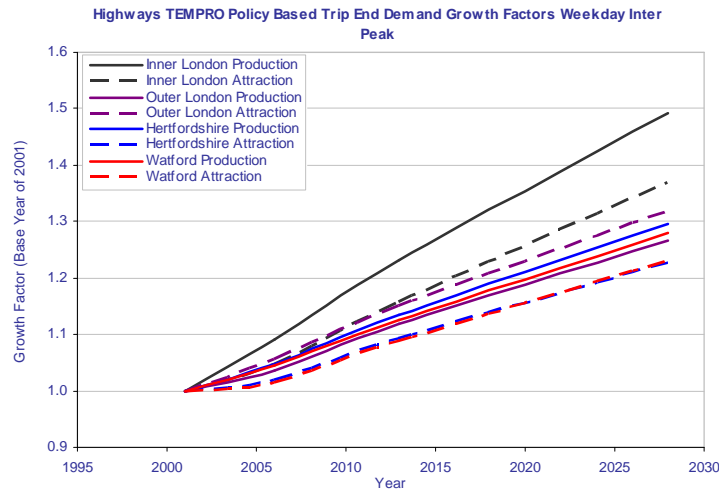


FIGURE 6.7 HIGHWAY DEMAND GROWTH - WEEKDAY INTERPEAK



6.21 These trends illustrate that the traffic growth forecast in Watford is in line with the overall Hertfordshire and outer London demand trends, with traffic growing around 5% from 2001 to 2006 and a further 20% expected by 2028. The growth rates forecast for the AM and Interpeak periods are similar for Watford, as it is an established regional centre and a significant draw for leisure journeys. With this growth in demand there will be additional strain on the highway network and congestion is expected to become more severe.

London Underground

- 6.22 LUL operates Metropolitan Line services to stations at Croxley and Watford, providing a direct service from the area via key local destinations such as Harrow, Finchley and Chorley Wood into central London, with half of day time services running through to the City of London, and the major railway termini of Kings Cross St Pancras and Liverpool Street stations. Other services terminate at Baker Street.
- 6.23 Journey times between Watford and Baker Street are typically 41 minutes and services operate at 6-8 trains per hour. Croxley and Watford stations are within the TfL Travelcard Zone 7; a single cash fare to Zone 1 (in 2009) costs £5.50 or £4.70 in the peak/£3.00 off-peak with Oystercard.
- 6.24 Metropolitan Line services also operate from Moor Park to Amersham and from Chalfont & Latimer to Chesham. Both Croxley and Watford stations are within residential areas and are too remotely located for serving central Watford and its key trip attractors adequately.
- 6.25 Currently, LUL does not operate any services to Watford Junction. There are longer term proposals to extend the Bakerloo line services to terminate at Watford Junction, which provides another alternative for travelling between Watford and the city of London.

Heavy Rail

6.26 The area is served by National Rail services operating from stations at Watford Junction and Watford High Street. The key services include:

- local services to North and Central London operated by London Overground (part of TfL's London Rail Concession since November 2007) serving both Watford Junction and Watford High Street;
- Services to Birmingham, Northampton and Central London operated by Go-Via London Midland franchise (Figure 6.8);
- Services to St Albans Abbey operated by Go-Via London Midland franchise;
- West Coast Main Line intercity (Virgin West Coast franchise) services to/from London and the north serve Watford Junction (Figure 6.9); and
- Services to Clapham Junction via Kensington Olympia (change to Southern passenger service requirements as a result of the Brighton Main Line Railway Utilisation Study), operated by the Southern Trains franchise.

FIGURE 6.8 LONDON MIDLAND TRAIN SERVICES FROM WATFORD JUNCTION

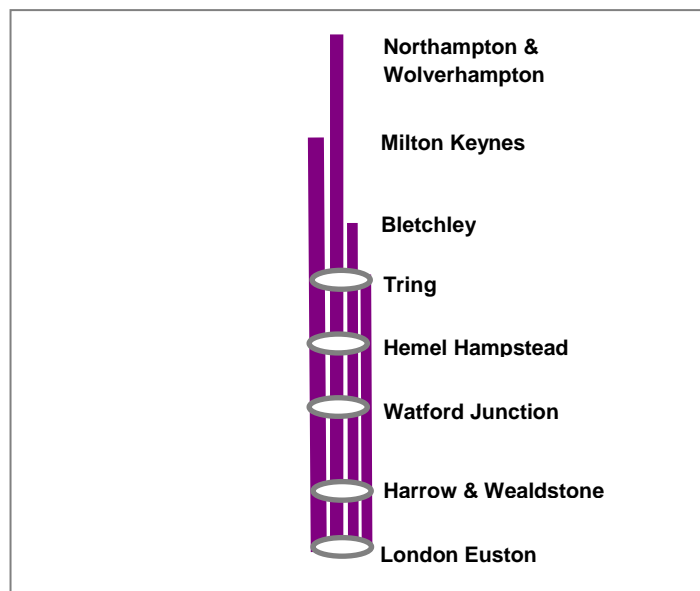
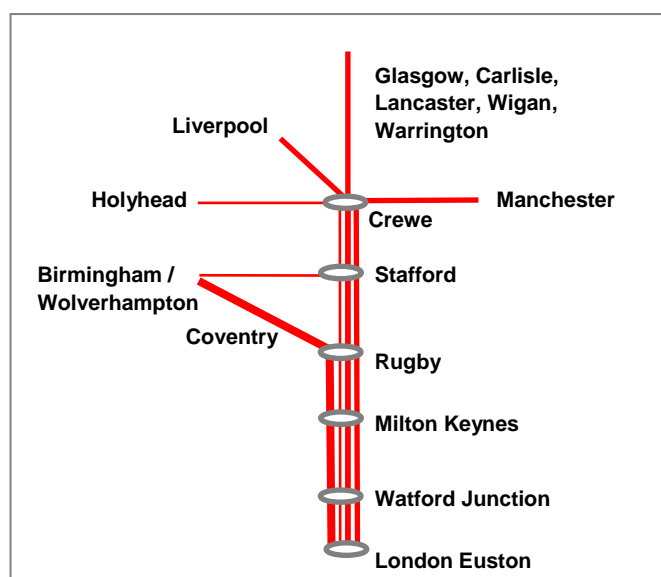


FIGURE 6.9 EXISTING VIRGIN TRAIN SERVICES FROM WATFORD JUNCTION



London Overground

- 6.27 The London Overground service provides key movements between Watford Junction and High Street stations and London Euston. Such journeys take approximately 48-52 minutes with a headway of around 20 minutes throughout the day. Rail fares on this service from Watford Junction Station to London Euston are currently £6.00 (peak) and £3.50 (off-peak) for a single journey on Oyster fare.

Go Via London Midland

- 6.28 London Midland services cater for a significant portion of public transport commuting north south and into London as well as providing services on the St Albans Abbey Branch. Services take approximately 20-24 minutes to London Euston, 38-42 minutes to Milton Keynes and 55-60 minutes to Northampton. Milton Keynes to London services operate at approximately four trains per hour in each direction (more in the peaks) with one service per hour extending to/from Milton Keynes. Services on the St Albans Abbey Branch take 16 minutes and operate an approximately 45 minute interval service.

Virgin Trains

- 6.29 Virgin Trains services have a less regular stopping pattern at Watford. There are approximately three northbound services from Watford Junction during the morning peak hour. These services do not compete with London Midlands services to central London but provide a link to Manchester, Liverpool, Glasgow and other destinations in the north.

Oyster Fares

- 6.30 Since the commencement of the London Overground service franchise between Watford Junction and London Euston, use of the Oyster 'Pay As You Go' card has been possible for journeys utilising the 'stopping' service between Watford and London. This service has also been introduced for Watford Junction Station, however it remains outside of the standard London Travel Zones 1-9.

Growth in Rail Demand

- 6.31 The future rail demand growth forecast by TEMPRO v5.4 is set out in Figure 6.10 and Figure 6.11 for AM peak and Interpeak respectively. The forecasts suggest that there will be moderate demand growth for rail in the Watford area, with a growth in the order of 10% between 2006 and 2028 for both AM and Interpeak trips.
- 6.32 However, with substantial drive from HCC and other scheme promoters to further enhance Watford Junction as a transport interchange hub, the flow of passengers through the area is expected to increase in excess of TEMPRO forecasts.

FIGURE 6.10 FUTURE RAIL DEMAND GROWTH FORECAST - AM PEAK

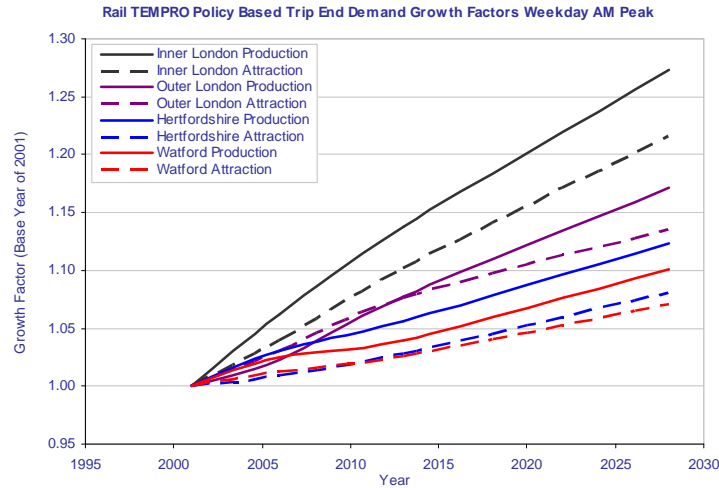
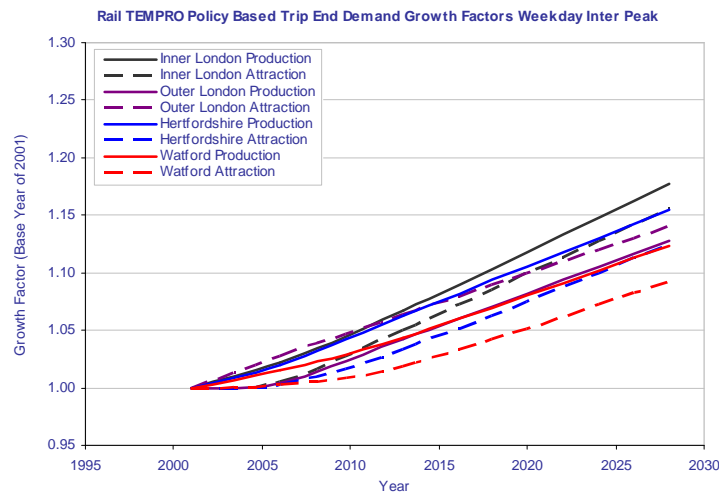


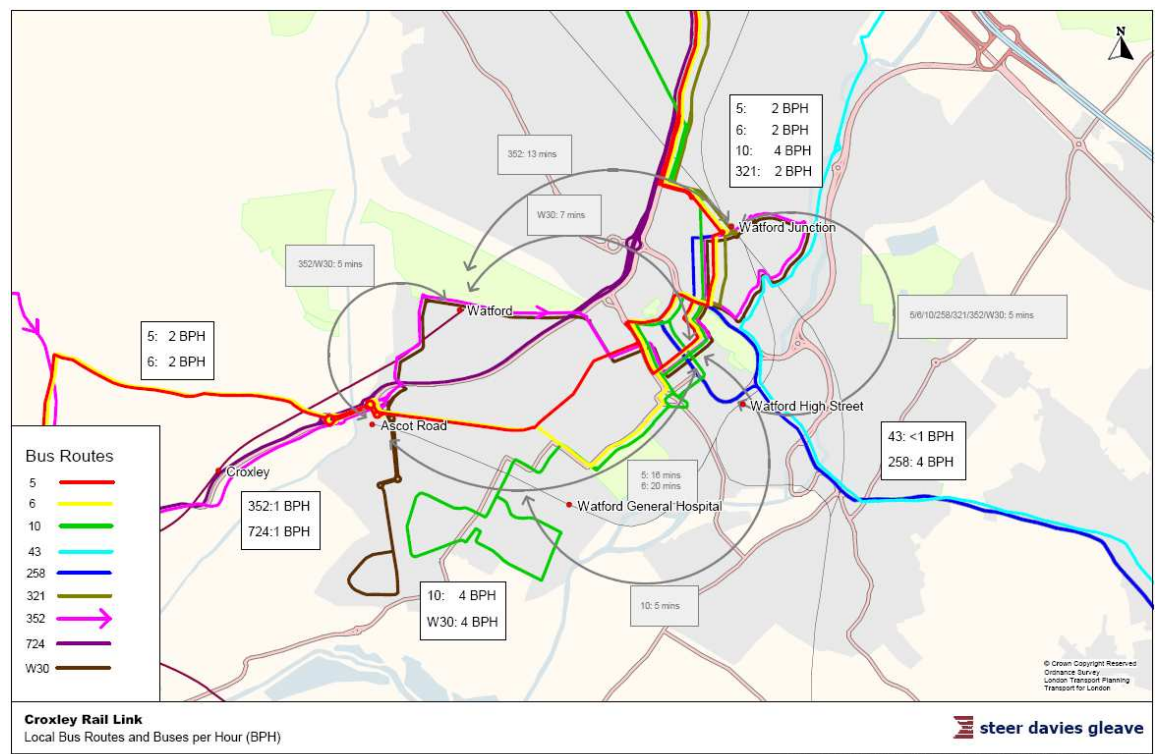
FIGURE 6.11 FUTURE RAIL DEMAND GROWTH FORECAST - INTERPEAK



Bus Services

- 6.33 The existing public transport network is completed by bus services provided predominantly by the operator Arriva. The current bus network is shown schematically in Figure 6.12. Additional information regarding approximate number of buses per hour (bph) and journey times between key locations has been included in this figure.
- 6.34 Continuing operational problems faced as a result of increasing road traffic congestion impact on service reliability in peak periods. The opportunities for implementing extensive priority are constrained by the lack of scope to divert road traffic in the event of road space reallocation.
- 6.35 Watford Junction is the key interchange in the town and an important interchange at County and Regional level. The station is the focus for 38 bus routes in Watford, and is served by the Green Route bus priority scheme.
- 6.36 Increasing pressures for interchange at the station have resulted in the limitations of the present arrangements becoming increasingly apparent, and have highlighted a need to improve interchange and public transport access to Watford Junction. This will be addressed as part of the Watford Junction Interchange improvement project.

FIGURE 6.12 BUS SERVICES IN WATFORD



- 6.37 Arriva are in the process of introducing new bus vehicles on a number of routes to improve the quality of services. There are also a number of routes which will benefit from frequency enhancements. These measures, however, are largely seen as attempts to prevent the mode share of bus from declining in line with national trends as opposed to delivering growth.

Bus Patronage Trends

6.38 The forecast growth from TEMPRO v5.4 as shown in Figure 6.13 and Figure 6.14 show moderate growth in the future for bus passengers travelling from Watford as well as in Hertfordshire and outer London as car ownership, especially in terms of households with second cars, increases in the future. In fact, bus passenger numbers travelling to Watford and Hertfordshire are expected to decline during the morning peak in the future.

FIGURE 6.13 FUTURE BUS DEMAND GROWTH – AM PEAK

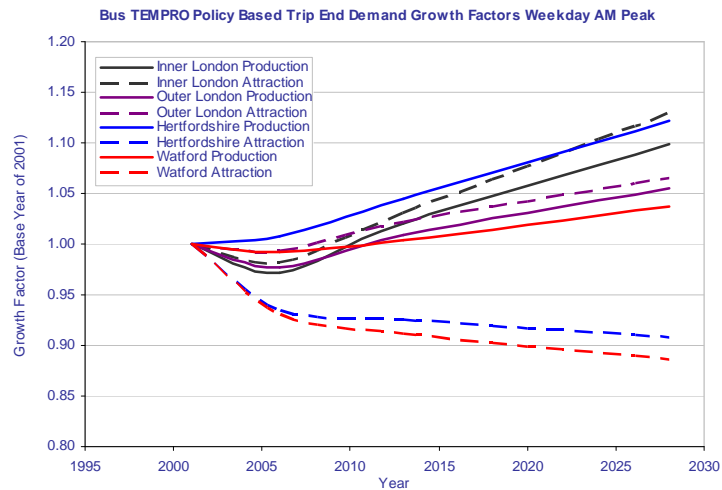
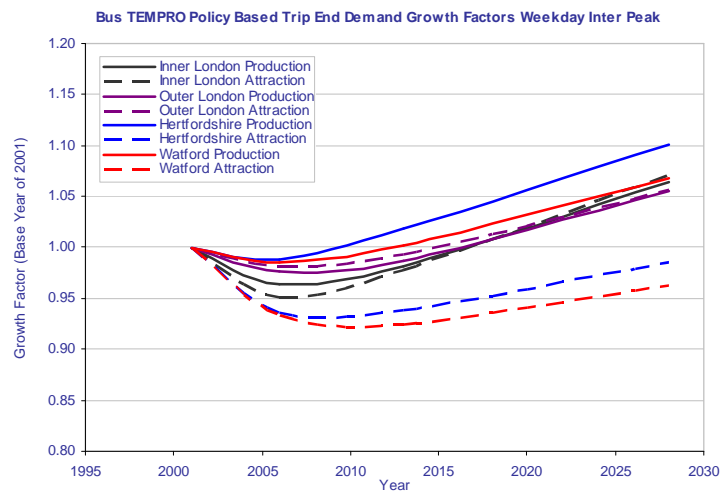


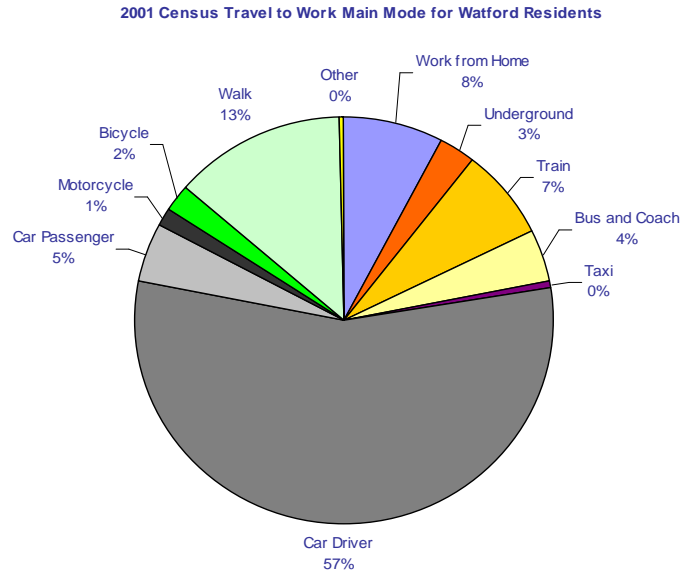
FIGURE 6.14 FUTURE BUS DEMAND GROWTH - INTERPEAK



Travel to Work Mode Shares

- 6.39 The 2001 Census Travel to Work data registers the main mode of transport in which residents travel to work based on the longest leg of the journey in terms of time. The composition of mode used in Watford is set out in Figure 6.15.

FIGURE 6.15 MAIN TRAVEL TO WORK MODE (2001 CENSUS)



- 6.40 The Census data shows that approximately 10% of commuters travel by train or Underground while 62% travel by private car. It should be noted that, as this data represents the main mode, a significant number of multi-modal trips made will be masked, including driving or taking the bus to Underground or rail stations.
- 6.41 Overall, the public transport mode shares are considerably lower than typical outer London areas with similar public transport accessibility, although this might be due to a different pattern of trips (e.g. smaller proportion to central London). According to Census data, commuting distances in Watford are lower than the national average with less than 48% of residents travelling more than 5km to work.

Mode Shares for Trips to London

- 6.42 A significant proportion of Watford residents commute to London. Figure 6.16, Figure 6.17 and Figure 6.18 present the mode shares of trips from Watford to central London by car, rail and Underground respectively.
- 6.43 The data presented in Figure 6.16 shows that the overall mode share of car to central London is moderate at 10-25%. However, it is notable that the Watford General Hospital area, which does not have a main rail station within easy walking distance, shows significantly higher numbers of car trips to central London.

FIGURE 6.16 WORK TRIPS TO CENTRAL LONDON BY CAR



- 6.44 Figure 6.17 shows that there is a strong propensity for residents in the Watford Junction and High Street areas to commute by rail to central London, given the frequent services offered by London Overground and London Midlands. The mode share declines considerably towards the west. In comparison, Figure 6.18 shows that the majority of residents towards the west of Watford near Croxley commute by Underground, although Underground usage is relatively low near Watford Junction. Overall, these plots suggest that rail and Underground are attractive means for residents to commute to central London provided that the station is within walking distance.

FIGURE 6.17 WORK TRIPS TO CENTRAL LONDON BY RAIL

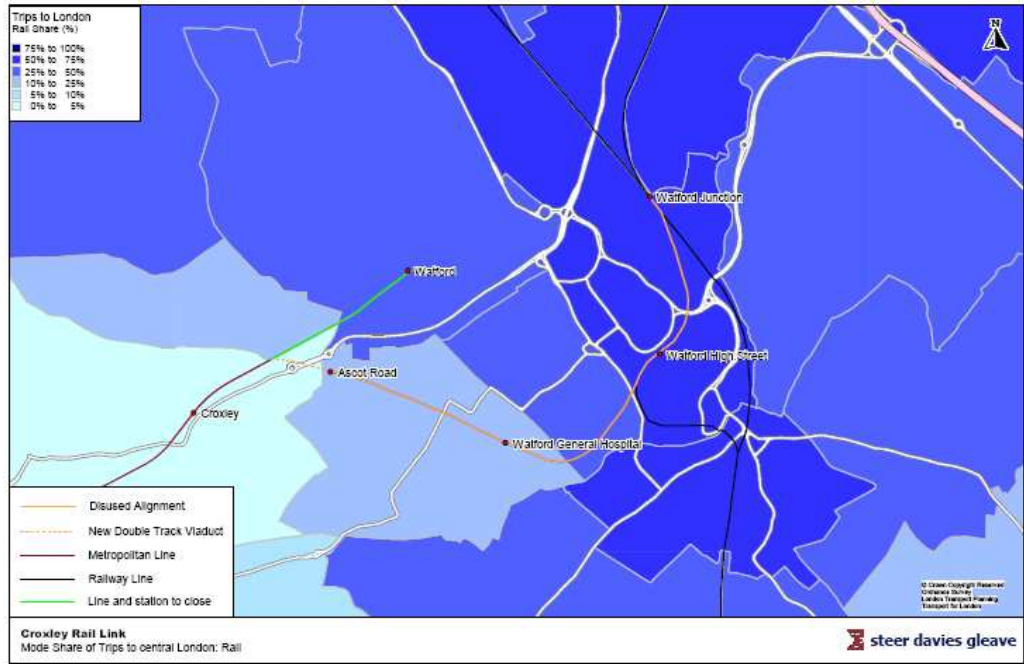
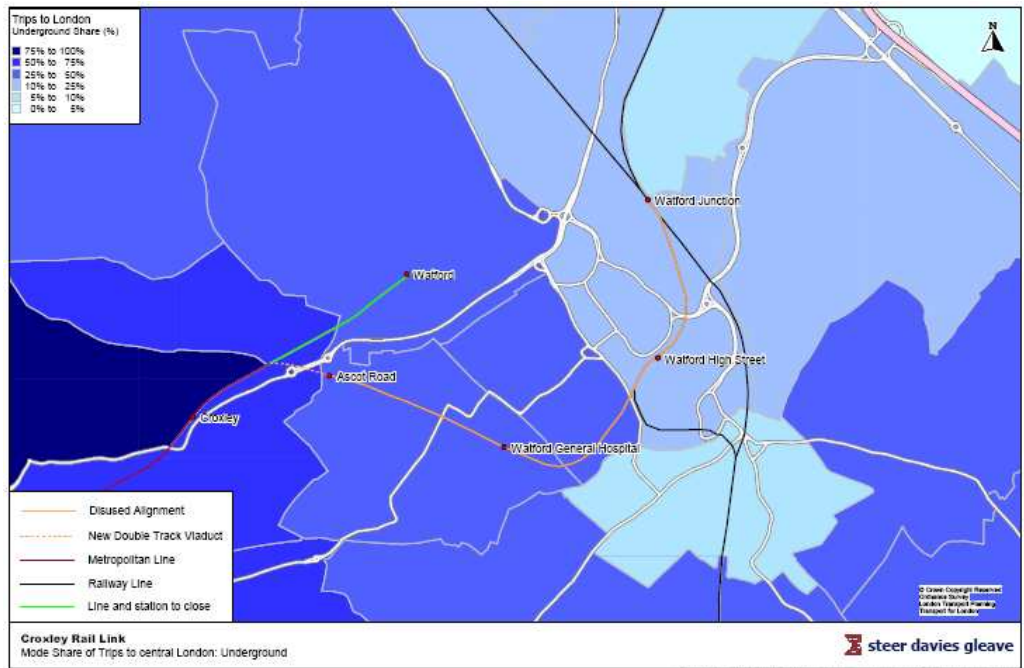


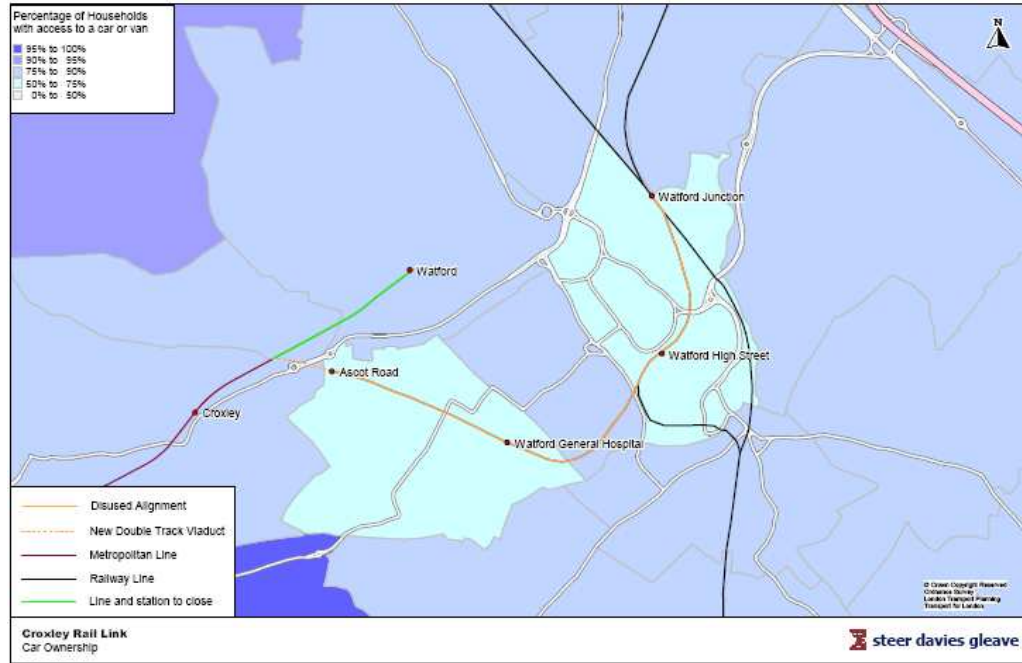
FIGURE 6.18 WORK TRIPS TO CENTRAL LONDON BY UNDERGROUND



Car Ownership

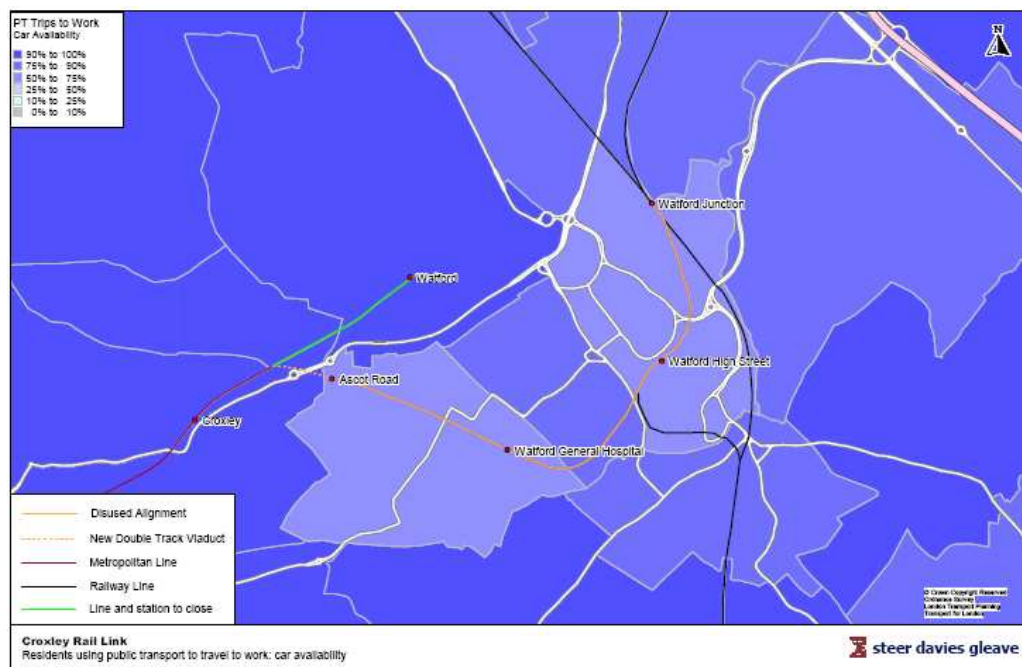
- 6.45 According to Census 2001 data, car ownership levels within Watford are relatively high, with around 80% of households having at least one car available. This is shown in Figure 6.19. It should be noted that the area within Watford with the lowest car ownership is around Watford General Hospital, also the area without a rail or Underground station within proximity and which has the highest population density and levels of social deprivation.

FIGURE 6.19 CAR OWNERSHIP



- 6.46 Figure 6.20 presents the total Census Travel to Work data for public transport trips with car available. It shows that the areas within catchment of the Underground stations of Watford and Croxley have the highest rates of public transport use despite also having high car availability.

FIGURE 6.20 PUBLIC TRANSPORT TRIPS WITH CAR AVAILABLE



Wider Issues of Relevance

- 6.47 Two key strategic movements are particularly pertinent to the examination of the need to develop a scheme to serve the South West Hertfordshire Area. Firstly, strategic east-west and orbital movements using the M25 Motorway. Secondly, north-south movements between London and the Midlands/the north catered for via the M1 motorway and the West Coast Main Line serving Watford Junction. Both cases serve to highlight Watford's position at the intersection of nationally important strategic transport corridors, the impact of which can have significant local consequences.

Local Attitude to Transport Issues

- 6.48 HCC conducted their third Travel Survey in November 2005 to understand travel behaviour and attitudes within the council area. This survey achieved a 24% response rate and is considered a statistically significant and representative sample.
- 6.49 When residents were asked which transport improvements were perceived as more important to them, the areas with highest response included:
- Maintaining existing roads;
 - Improving bus and rail facilities; and
 - Reducing congestion.
- 6.50 The respondents did not value improvements in traffic management or building new roads as highly as these other issues.

Proposed Transport Improvements

- 6.51 The Croxley Rail Link is not expected to be dependent on any other current public transport proposals. However, a number of recent and future proposed public transport developments in the area have been reviewed in conjunction with the proposed rail link and are set out in Table 6.2. None of these future transport schemes present a conflict with the proposed Croxley Rail Link and as such no specific representation has been made within the network model for other highway or public transport schemes.

TABLE 6.2 IMPACTS OF RECENT AND FUTURE TRANSPORT PROPOSALS

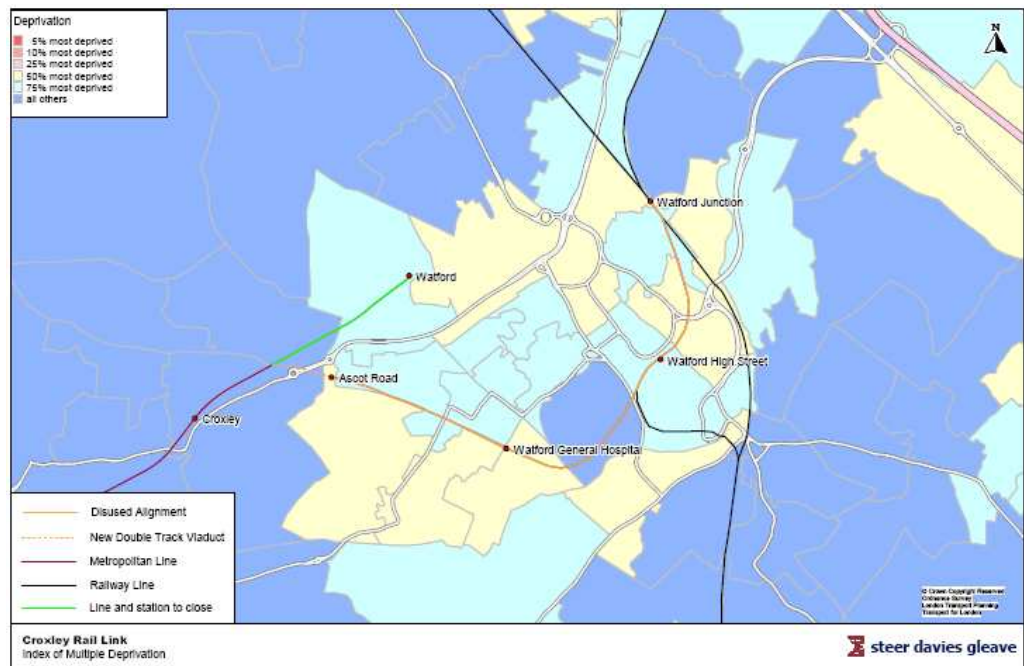
Transport Scheme	Qualitative Impact on Croxley Rail Link
Bakerloo line extension to Watford Junction	Of the schemes identified this is likely to have the most material impact. The Bakerloo line is likely to have journey times of around 46 minutes from Watford Junction to Baker Street, similar to that offered by the Metropolitan Line route, so in effect the final destination and first service available will dictate route choice for central London trips to/from Watford Junction and Watford High Street.
Watford Junction Station Redevelopment	Access to Watford Junction will be improved by 2014 as part of the Watford Junction Improvement project, including a new multi-storey car park and access road, promoting park and ride usage of the station and improving access to the station for all modes. This will result in more trips made with a rail/Underground leg which would have been entirely by car previously. This will mean that the Rail Link forecasts may be slightly conservative, because these trips will not be in the base demand for transfer to the scheme.
London Congestion Charging	The London Congestion Charge has had a moderate impact (around 15% reduction) on the number of vehicles entering the charge zone. This is unlikely to have a significant impact on car trips in the Watford area.
Watford centre traffic/parking management	Traffic management schemes in Watford town centre have meant that car use has been discouraged and walking has been made easier for pedestrians. This will result in public transport modes being more attractive than before.
Aylesbury to Watford Junction rail corridor	Although this scheme is currently a concept which depends on Croxley Rail Link, an additional service along the Croxley corridor would enhance rail frequencies by 2 tph. It would provide better connections with other towns to the north west of Watford.

Socio-Economic Problems

Index of Multiple Deprivation

- 6.52 Watford has enjoyed economic prosperity in the past, and compared with many parts of London for example, the socio-economic problems are less critical. However, some areas within Watford remain relatively deprived and require local investment and regeneration. The Index of Multiple Deprivation (IOMD), an indicator that takes into account access to health, employment and environmental factors, illustrates that that all areas along the Croxley Rail Link corridor are amongst the 75% least deprived wards in England (see Figure 6.21). However this is not to say that there is no deprivation in this area; in particular individual pockets of deprivation tend to be masked at ward level.

FIGURE 6.21 INDEX OF MULTIPLE DEPRIVATION



Employment

- 6.53 According to the 2001 Census data, 72% of residents within Watford are within social grade C2 (skilled manual workers) or higher, compared to the national average of 67%. The biggest industry employer for residents of Watford is wholesale and retail (19%) followed by real estate (16%) and healthcare (10%).
- 6.54 Employment density within the Watford area is illustrated within Figure 6.22. This figure shows that the key job opportunities are within Watford High Street and West Watford. The Census employment data illustrated within Figure 6.23 shows that unemployment rates within the areas of West Watford and Watford Junction are between 3-5%, with the majority of other areas being lower. In 2001, there were approximately 1,000 unemployment benefit claimants in the Watford area, representing 1.2% of its population. This is marginally higher than the average for the East of England but lower than London (4.4%) and the national average (1.4%).

FIGURE 6.22 EMPLOYMENT DENSITY

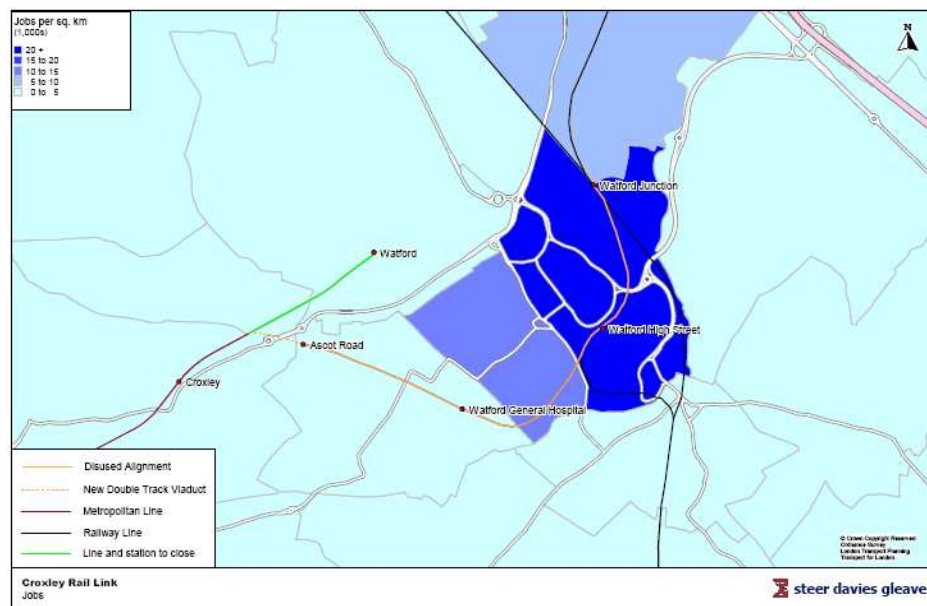
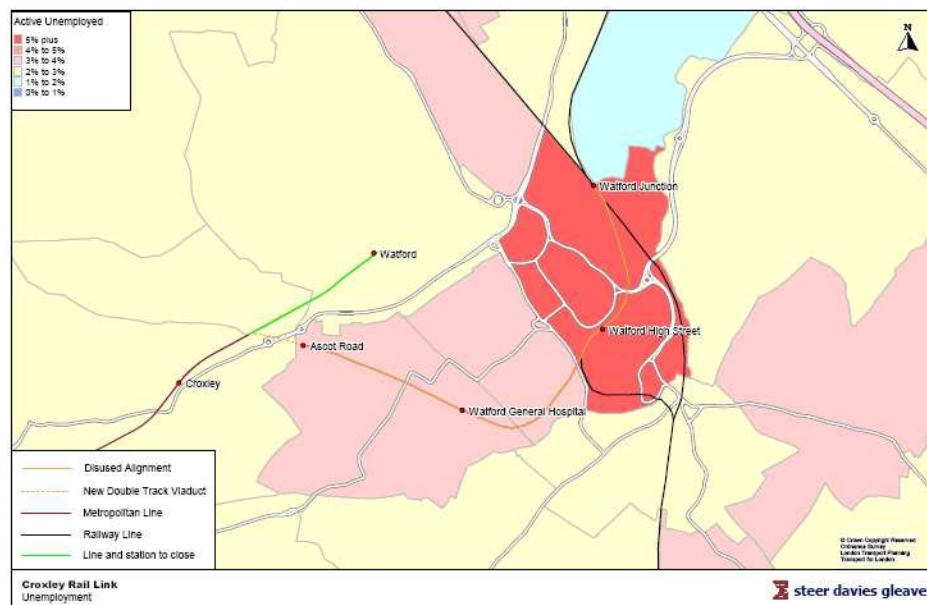


FIGURE 6.23 LOCAL UNEMPLOYMENT



Crime

- 6.55 Within 2001, there was an average of 28 violent offences per 1,000 people recorded in the Census compared to the national average of 20 offences per 1,000. This figure is not particularly high when compared to other urban areas.

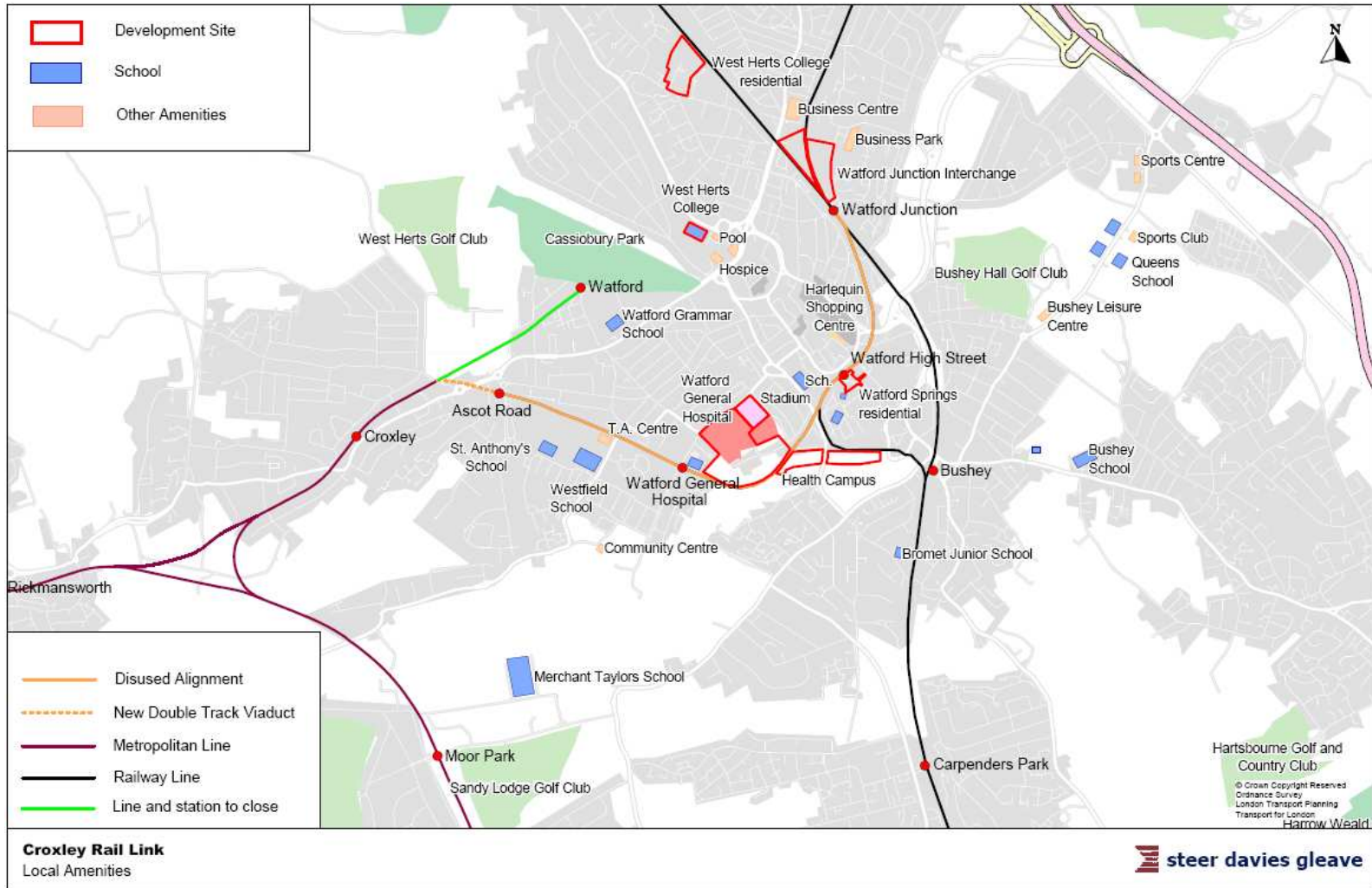
Land Uses and Designations

- 6.56 The main land use of Watford town centre is wholesale and retail, concentrated within the Watford High Street/ring road area. There are large scale shopping centres and superstores within the vicinity and it serves as the local and regional retail hub, attracting trips from a broad catchment. In addition, there are considerable healthcare facilities in West Watford and near Ascot Road. Key residential areas are located within West Watford between Rickmansworth Road and Vicarage Road, while the area between Watford Metropolitan station and Whippendell Road consists of mixed residential and light industrial land use. The Croxley and Watford Business Parks are major commercial and industrial employment sites.

Local Health, Leisure and Education Services

- 6.57 Apart from major retailing, Watford boasts important health, leisure and education services and amenities which attract significant local trips. These are illustrated in Figure 6.24 overleaf. Given that a large number of these major community facilities are not currently located near a rail station, the provision of improved public transport would enable quicker and more direct access to such facilities by residents.
- 6.58 The Watford Health Campus Proposals are centred on a site with limited access by public transport. Trips to the campus will be attracted in greater numbers than the existing hospital and from a wider area.

FIGURE 6.24 LOCAL HEALTH, LEISURE AND EDUCATION SERVICES AND AMENITIES



Summary of Opportunities

6.59 Following a review of the local demographic characteristics, transport provision and future plans, a summary of problems, opportunities and objectives has been compiled in Table 6.3.

TABLE 6.3 SUMMARY OF TRANSPORT PROBLEMS AND OPPORTUNITIES

Item	Problems	Opportunities
Public Transport Network	Rail services radial/London based and no orbital services	Disused Croxley Green railway line presents opportunities for orbital and 'dog-legged' movements
	Metropolitan Line services terminate in suburban fringe of West Watford	Improved connections to town centre and Watford Junction transport hub - as gateway to the North
	Increasing public transport demand from numerous developments	Provide public transport services to areas which generate the highest demand
Highway Network	Increasing highway demand creates congestion and contributes to environmental impacts	Improving public transport will reduce car usage and result in reduced congestion and greenhouse gas emissions
	Current accessibility constraints effectively limiting the potential to expand on existing demand management measures.	Delivering a realistic public transport alternative to private car use will give HCC and Watford Borough Council the confidence to implement complementary demand management measures
Social Equity	Areas of West Watford poorest and with lowest car ownerships in Hertfordshire but weak transport links	Provide public transport services to assist in the regeneration of pockets of deprivation
	Local amenities poorly connected by public transport	Provide direct public transport services to amenities for more local residents
Economy	Constraints on highway and public transport affect local retail and business prosperity and could prevent realisation of designation as a KCDC.	Unlock the full economic potential of Watford given its strategic location/good connections with London and the North; increase the labour force catchment

Scheme Objectives

6.60 In this section regional and local problems and opportunities were considered in detail. These have been consolidated to form the list of scheme objectives set out in Table 6.4. It should be noted that although it is not expected that a single scheme can satisfy all objectives, schemes should be able to make a contribution to achieving each individual objective. Any scheme promoted should not have an adverse effect on the ability of any future scheme to achieve these objectives.

TABLE 6.4 IDENTIFIED SCHEME OBJECTIVES

Area	Objective
Accessibility	Further enhance Watford Junction as a regional transport hub
	Provide improved and direct access to jobs in the north west and centre of London
	Enhance east-west passenger transport links across Hertfordshire and make more journeys seamless
	Provide more sustainable links between Watford and other local areas in north-west London
	Address pressures for orbital movement around London in a sustainable manner
Equality	Improve access to local health, education, employment and leisure services, including the Watford General Hospital and Health Campus.
Environment	Improve quality of life and environment by providing alternatives to private car for trips made within and to/from the area, reducing the adverse effect of road congestion such as noise, pollution and safety
Economy	Assist economic development by improving transport access by sustainable means to existing centres of economic activity such as Watford town centre, new business parks near Ascot Road and Watford Junction redevelopment.
Value for Money	Meet transport requirements efficiently and in a sustainable manner by making best use of existing rail, bus and highway networks and infrastructure which offers good value for money and long term commercial sustainability.
Deliverability	Promote a scheme which has the support of all key stakeholders, and a clear funding solution available for the capital investment required

7. Option Selection and Scheme Development

Introduction

- 7.1 The proposed scheme has a solid case due to the work previously undertaken which has consistently shown that it has a robust economic case. Nonetheless this MSBC is structured to demonstrate from first principles that the proposed scheme should be publicly funded.

Options Considered

- 7.2 In August 1999 Steer Davies Gleave completed a comparative outline NATA appraisal of a number of LTP major scheme options for the South West Hertfordshire area. The aim of the study was to establish the best value option to progress in the area. A range of alternatives were considered comprising different infrastructure and service pattern options. These included London Underground, heavy rail and bus solutions with different service frequencies.
- 7.3 The study concluded that the best performing options were those introducing a high frequency additional service into Watford Junction. The small cost saving associated with a single track viaduct option was disproportionate with the much reduced benefit delivered by this option. The benefits delivered by the Metropolitan Line extension options were greater than those for the segregated bus options, creating a greater and more attractive range of destinations available without interchange. The option including the Aylesbury service delivered the best performance overall.
- 7.4 The opportunities for improving public transport services without the introduction of new infrastructure were considered to be limited - and were combined with the difficulties in delivering an assured improvement in bus service frequency in the context of a deregulated bus service industry.
- 7.5 Following submission of this assessment to the (former) Department of Environment, Transport and the Regions, they requested that further investigation into lower cost bus-based alternatives be undertaken. This analysis was completed in March 2000.
- 7.6 This further analysis concluded that a segregated bus-based option on the Croxley Green Branch was technically feasible. This option included a busway between Ascot Road and the Cardiff Road area (Wiggenhall Road). The study concluded that there was little scope for extending the implementation of full segregation beyond these two points because services using the guideway would be required to negotiate the remainder of the journey on existing highway, with the associated disadvantages of this in terms of delays and reliability.
- 7.7 The analysis suggested that the economic performance of the unguided busway was superior to that of the more costly guided busway. The bus options remain less attractive in terms of the destinations served without the need for interchange, and would be less attractive to existing car users as an alternative. Bus services could not combine with existing rail services through Watford High Street Station; they therefore would have to revert to existing highway to penetrate the town centre - the section of the journey where segregation would offer the most benefits.
- 7.8 This previous analysis has informed the choice of options assessed as part of this MSBC.

Further Background

Introduction

- 7.9 In 2001 the Strategic Rail Authority published a closure notice for the Croxley Green Branch pursuant to the Railways Act 1993. The Secretary of State for Transport's decision, in November 2002, gave consent to the closure but Network Rail was instructed not to dispose of the trackbed for a period of five years from the date of the consent. This was in order to allow time for the further development and outcome of Croxley Rail Link proposals. On the 6 November 2007 the 5-year moratorium ended; Network Rail is now no longer obliged to retain the trackbed.
- 7.10 Although this may not have any immediate implications for the Croxley Rail Link, Network Rail will take steps to minimise any cost or liability to themselves resulting from the Link. Over time it is likely that Network Rail will take steps to ensure that they are not liable to fund maintenance of any structures along the branch - for example road bridges or culverts. This may result in removal of structures along the route, or sale of sections of the route resulting in the permanent opportunity loss of the continuous corridor.

Review of Options

- 7.11 In order to confirm that the Preferred Scheme remains the best solution, the options assessed in previous documentation and submissions have since been reviewed by an evaluation against criteria broadly in line with the scheme objectives using a scoring of 0 to 6, where 0 is 'strong adverse', 3 is 'neutral' and 6 is 'strongly beneficial'. The list of criteria considered were:
- Improvement in **public transport network**, enhancing local as well as regional transport links and **interchange**, including sustainable provisions of **orbital movements**;
 - **Reduction in local congestion** in order to ensure sustainability of **business** attractiveness and local **environmental** impacts;
 - Provide improved public transport **access to new developments** and local services, including the **Watford General Hospital**; and
 - Whether the scheme is realistically **deliverable** (support of stakeholders and have funding) and offers **good value for money** investment which yields significant **economic benefits** locally and regionally.
- 7.12 A summary of the assessment of the long-list of options is set out as Table 7.1. The detailed assessment of the shortlist of options is presented in Appendix H. It should be noted that these scores do not necessarily perfectly reflect the cost benefit performance of options. The review of options shows that the findings of the previous assessment of options remain valid, with high frequency Underground based solutions performing better against objectives than rail or bus based solutions.
- 7.13 The previous analysis demonstrated that the double track viaduct Metropolitan Line Extension options offered the best overall performance against NATA and local objectives - with clear advantages against the limited service improvement that a busway could offer. An updated assessment suggests that the option which includes the Aylesbury service would present the best solution against objectives on a qualitative basis.
- 7.14 Whilst the previous assessment also showed that the option including a service to Aylesbury achieved a stronger economic performance than the option without, this option introduces considerably greater operating costs, delivery complexity and risk than the basic option and is therefore not taken forward as the basis of this application.
- 7.15 However, the Aylesbury to Watford Junction service could form a future enhancement to the corridor and should offer incremental benefits on top of the existing Preferred Scheme. The

Aylesbury service link is likely to be of increasing interest in the near future as London Overground gained operational powers of Silverlink Metro services in November 2007.

TABLE 7.1 SUMMARY OF ALTERNATIVE OPTIONS CONSIDERED

Option Name	Option Description	Score
Combined Rail	Current Met Line services diverted to Watford Junction on new double track viaduct. New Watford to Aylesbury heavy rail service REJECTED DUE TO HIGH LEVEL OF IMPLEMENTATION RISK	22
Double Rail Link	Current Met Line services diverted to Watford Junction on new double track viaduct ADOPTED AS PREFERRED SCHEME	21
Segregated Busway	High quality bus service linking Croxley Met Line and Watford Junction stations using Croxley Green Branch converted to busway ADOPTED AS LOWER COST ALTERNATIVE	18
Heavy Rail	New Watford to Aylesbury service on new single track viaduct	18
Conventional Bus	High quality bus service linking Croxley Met Line and Watford Junction stations on existing highway network with additional bus priority measures	18
Single Rail Link	Two of current eight per hour Met Line services diverted to Watford Junction on new single track viaduct	17
Guided Bus	High quality bus service linking Croxley Met Line and Watford Junction stations using Croxley Green Branch converted to guided busway	17
Reopening	Croxley Green Branch reopened as shuttle service with no connection to the Met Line	15
Status Quo	Met Line services remain as now. Gradual loss of the Croxley Green branch asset to development etc ADOPTED AS DO MINIMUM COMPARATOR	10

Summary of Options Taken Forward for Assessment

- 7.16 The **DO MINIMUM** option, forming the comparator for the appraisal, is for no change to current Metropolitan Line Scheme, Heavy Rail or bus services and gradual loss of the Croxley Green Branch transport asset to developers.
- 7.17 The **PREFERRED SCHEME** retains the proposal of diversion of all existing Metropolitan Line services from Watford Station across a double track viaduct to join the Croxley Green branch terminating at Watford Junction Station. The journey time from Croxley to Watford Junction is estimated at 11 minutes with services operating on a 10 minute headway. Intermediate stations would include Ascot Road, Watford General Hospital and Watford High Street.
- 7.18 The **LOWER COST ALTERNATIVE OPTION** comprises conversion of the Croxley Green Branch to a segregated busway alignment. Additional bus services between Watford Junction and Croxley Met Line station would access the busway at Croxley Green and use it to bypass traffic congestion before accessing Watford Town Centre/Junction Station on the existing highway network where measures to give buses priority would be introduced. The journey time from Croxley to Watford Junction is estimated at 26 minutes operating on a 10 minute headway. A 30 minute frequency service would connect Watford Junction and Croxley Business Park using the busway.

- 7.19 More detailed descriptions of the options taken forward for appraisal can be found in Section 2 of this MSBC.

8. Assessment against Wider Local Policy, Strategy and Objectives

- 8.1 This section presents a summary of the assessment of the Croxley Rail Link and Alternative Busway options against plans and policies at the local level. All relevant policy documents have been reviewed to see how the appraised options fit with local policies and programmes. There have been several recent changes in national policy which will shape emerging Local Development Frameworks and Local Transport Plans.

Assessment against Local Level Policies

- 8.2 The Croxley Rail Link and Busway schemes have been assessed against a number of local level policy documents. The most recent policy documents include:
- Hertfordshire Local Transport Plan 2006/07 - 2010/11 (HCC, 2006);
 - Watford Borough Council's emerging Local Development Framework;
 - Local Development Framework - Core Strategy (Three Rivers District Council, 2006);
 - Three Rivers Local Plan - 1996-2011(Three Rivers District Council, 2002); and
 - Planning Now for Hertfordshire's Future, Hertfordshire Structure Plan 2001-2016 (HCC, 2002).
- 8.3 In addition, the Croxley Rail Link and the Busway schemes have also been assessed for how well they achieve the objectives envisioned for the scheme.
- 8.4 The strategic fit against the full set of policy documents reviewed are set out in Appendix I.

Summary of Assessment against Local Level Policies

- 8.5 As with the Regional Level policies, there are numerous common themes within the Local Level policies. The Croxley Rail Link proposal provides a very good fit with the various policies considered.
- 8.6 The Croxley Busway also has a good fit with many local level policies but not to the same extent as the Rail Link proposition. The Croxley Rail Link was explicitly named as a priority under a number of policies to improve rail links; a bus based solution would compromise future rail based opportunities and would therefore conflict with these policies.

Summary of Assessment against Scheme Objectives

- 8.7 The Croxley Rail Link proposals are in line with the scheme objectives identified in Section 6 of this MSBC, which are based on finding solutions for current transport and socio-economic problems. Although the Croxley Busway is generally in line with the identified objectives, in every case the contribution to achieving that objective is less significant than would be delivered by the Preferred Scheme. This is predominantly a result of the local, rather than regional, influence of the scheme. The support of stakeholders for the Lower Cost Alternative does not match the level of support for the rail link.

9. Assessment against Wider Policy, Strategy and Objectives

- 9.1 This section presents a summary of the assessment of the Croxley Rail Link and Alternative Busway against various plans and policies at the regional level. All relevant policy documents have been reviewed to see how the appraised options fit with regional policies and programmes.
- 9.2 The Watford area lies at the boundary of the East of England and Greater London regions and as such is affected by the plans and policies of both these regions. While the Watford area lies in Hertfordshire County within the East of England region, it also falls within the M25 motorway and is directly or indirectly linked to Central London by various transport routes. Given the location of Watford both regions have been considered.
- 9.3 There have been several recent changes in national policy which will shape the emerging Integrated Regional Strategies. In particular, Delivering a Sustainable Transport System (DaSTS) is relevant to the Croxley Rail Link and busway schemes.

Assessment against Delivering a Sustainable Transport Strategy

- 9.4 In response to the Eddington Study and the Stern Review in 2007, the DfT published “Towards a Sustainable Transport System” (TaSTS). TaSTS outlines five goals for transport:
- maximise the competitiveness and productivity of the economy;
 - address climate change, by cutting emissions of carbon dioxide (CO₂) and other greenhouse gases;
 - protect people’s safety, security and health;
 - improve quality of life, including through a healthy natural environment; and
 - promote greater equality of opportunity.
- 9.5 Delivering a Sustainable Transport System (DaSTS), sets out the DfT’s plans for putting TaSTS “into action in a way that both tackles our immediate problems and also shapes our transport system to meet the longer term challenges”.
- 9.6 Croxley Rail Link supports these goals through:
- assisting economic development by improving transport access by sustainable means to existing centres of economic activity such as Watford town centre, new business parks near Ascot Road and Watford Junction redevelopment;
 - providing improved and direct access to jobs in the north west and centre of London;
 - enhancing east-west passenger transport links across Hertfordshire and making more journeys seamless;
 - providing more sustainable links between Watford and other local areas in north-west London;
 - addressing pressures for orbital movement around London in a sustainable manner;
 - improving local air quality and reduces greenhouse gas emissions by providing a realistic alternative to the car;
 - improving connections to the general hospital and Watford Health Campus;
 - reduction in accidents;
 - incorporating a high level of passenger security, particularly noticeable in the

proposed new stations; and

- increasing catchment population to rail stations.

Assessment against National Indicators

9.7 A single set of National Indicators has been published as part of the New Performance Framework for Local Authorities & Local Authority Partnerships, and these have been reviewed by the promoters to establish which indicators are most appropriate to act as potential proxy measures against the Croxley Rail Link's core scheme objectives. There are currently 10 National Indicators relating to transport and it is anticipated that Croxley Rail Link will impact on the following National Indicators:

- NI 167 - Congestion - Average journey time per mile during the morning peak - It is predicted that Croxley Rail Link will have minimal impact on this target, however, it may persuade some local car users to convert to more sustainable alternatives as a result of improved local transport links.
- NI 175 - Access to services and facilities by public transport, walking and cycling. This target has relevance for Croxley Rail Link in terms of the anticipated increased accessibility to retail, commercial and health facilities that the project will facilitate.
- NI 176 - Working age people with access to employment by public transport (and other specified modes) - It is expected that Croxley Rail Link will have a significant impact on this target as a result of the increased accessibility to Watford town centre, London, and surrounding towns within the area.
- NI 177 - Local bus passenger journeys originating in the authority area. It is anticipated that this target has significant relevance to Croxley Rail Link. It is expected that on completion, Croxley Rail Link will trigger some modal shift from buses to Croxley Rail Link, which may result in possible patronage changes within the area, and a review of certain bus routes.
- NI 198 - Children travelling to school (mode of travel usually used). - The construction of Croxley Rail Link may trigger a modal change in school travel. There is a large concentration of schools in the surrounding area in which Croxley Rail Link could be promoted as a viable sustainable travel option.

9.8 It is also anticipated that Croxley Rail Link will have a significant impact on contributing to other National Targets. This corridor suffers from high levels of deprivation and is in need of regeneration. Croxley Rail Link will provide vital sustainable access to the proposed Watford Health Campus, a major regeneration project aimed at providing local and regional health services. Improved accessibility will hopefully also facilitate an increase in employment opportunities in this area.

Assessment against Regional Level Policies for the East of England

9.9 The Croxley Rail Link and Busway schemes have been assessed against regional level policy documents and their objectives/strategies. These include:

- Delivering a Sustainable Transport System (DfT, 2008);
- Regional Funding Allocations - Advice to the Government from the East of England (EERA, 2009);
- Sustainable Futures - Integrated Regional Strategy for the East of England (EERA, 2005);
- East of England Plan - Regional Spatial Strategy (RSS) for the East of England (EERA, 2008);
- Inventing our Future - the Regional Economic Strategy for the East of England 2008-2031 (EEDA, 2008);
- Our Environment Our Future - The Regional Environment Strategy for the East of England (EERA and the East of England Environment Forum, 2003); and
- A Sustainable Development Framework for the East of England (EERA, 2001).

- 9.10 The strategic fit against all regional level policy documents reviewed are set out in Appendix J.

Assessment against Policies for London

- 9.11 The Croxley Rail Link and Busway project are considered against the following policy documents and their objectives/strategies for London.

- The London Plan - Mayor's Transport Strategy Public draft (Consultation Document, TfL, October 2009). The scheme is explicitly presented "*improves the regional connectivity of northwest London by linking the Tube network to the important National Rail interchange at Watford Junction and the employment, retail, leisure and healthcare opportunities in Watford town centre*".
- The London Plan - Spatial Development Strategy for Greater London (GLA, February 2008);
- Sustaining Success - the Mayor's Economic Development Strategy for London (GLA, 2005); and
- The Mayor of London's Environmental Strategies (GLA, various dates).

- 9.12 The strategic fit against these documents are set out in Appendix J.

Summary of Assessment against Wider Policies

- 9.13 Overall, as summarised in the tables provided within Appendix J, there are numerous common themes within the regional level policies and the proposed Croxley Rail Link provides a very good fit with the various policies considered including the recent "Delivering a Sustainable Transport System" (DaSTS).

- 9.14 It can also be seen that the Croxley Busway does not provide as good a fit with regional level policies as the Preferred Scheme. For example the Busway will limit future development of orbital rail corridors and therefore conflicts with Greater London policies.

10. Scheme Benefits

Introduction

- 10.1 The proposed Croxley Rail Link (CRL) is forecast to provide significant welfare benefits through travel time savings and improved integration. This section summarises how these benefits have been calculated and the approach to estimating demand and revenue.

Demand Forecasting

- 10.2 The demand forecasting framework employs a spreadsheet based logit model with travel costs derived from a SATURN highway model (South West Hertfordshire Model, SWHM) and a TRIPS public transport model. Further details of these models can be found in the Demand Forecasting Update Report in Appendix K.

Model Development

- 10.3 The models developed for previous submissions were considered to be fit for purpose at those times. However, a thorough review of model inputs has been undertaken for this submission and updates made where appropriate. These updates include:
- Using more recently available 2006 Interpeak highway model demand and costs from SWHM model development to include impacts of recent highway network changes and provide a better representation of traffic conditions;
 - Updating transport network journey time and costs based on 2008 fare and timetable information obtained from service providers;
 - Updating the bus demand matrix based on a bus origin-destination survey undertaken in September 2008;
 - Updating the rail demand matrix to reflect the recent rapid growth trend based on the latest Office of Rail Regulation statistics;
 - Updating the Underground demand matrix to include data from the Transport for London (TfL) 2007 annual origin-destination survey;
 - Segmenting the demand by three journey purposes (business, commuting and other) in accordance with WebTAG requirements;
 - Updating the base year demand model to 2008, including value of time, vehicle operating cost and car occupancy changes in line with WebTAG and TfL's BCDM²;
 - Updating the mode choice parameters based on a revised model choice calibration exercise;
 - Updating future year demand forecasts to years 2013 and 2028 using Tempro v5.4 and an assessment of local land use development plans;
 - Revising the annualisation factors using recent public transport data.

Future Year Demand and Revenue Forecasts

- 10.4 The demand and revenue forecasts for the proposed Croxley Rail Link, based on the outputs of the models set out above, are presented in Table 10.1. Forecasts are presented for the future year of 2028, which is sufficiently distant to allow the proposals to reach 'mature' levels of demand.
- 10.5 For AM peak and Inter-peak the impact of the proposals on the travel market is shown. Negative numbers signify an abstractive impact - for example both options are forecast to

² Transport for London's Business Case Development Manual, March 2007

attract passengers who are currently using existing bus and rail services. Flows shown are two way boarders by mode/period over a single hour.

TABLE 10.1 HOURLY FORECAST SHIFTS IN DEMAND AND REVENUE (2028)

Forecasts	AM	Interpeak
Demand Forecasts (passenger per hour)		
Change in car passengers	-64	-7
Change in bus passengers	-116	-42
Change in rail passengers	-422	-214
Change in LU passengers	601	262
Additional induced demand (from inter-peak)	0	96
Total additional demand for LU & CRL	601	358
Revenue Forecasts (£ per hour in 2008 real prices)		
Change in bus revenue	£-177	£-38
Change in rail revenue	£-2,454	£-682
Change in LU revenue	£3,148	£741
Additional induced revenue (from inter-peak)	-	£246
Total additional revenue for LU & CRL	£3,148	£987

Note: The above numbers are rounded to the nearest integer

- 10.6 The demand forecast results show that for the Croxley Rail Link scheme there is a morning peak hour demand shift in excess of 600 passengers towards LU. Observed LU data suggests that the directional split is approximately 60% southbound (towards London) and 40% northbound (towards Watford). Based on this, the forecast demand shift is expected to be 360 passengers southbound and 240 passengers northbound. This equates to an average of an additional 45 passengers per train on the southbound services and 30 passengers per train on the northbound services. The average inter-peak hour also shows a demand shift of around 360 passengers per hour. The directional split is expected to be more balanced for the inter-peak, at approximately 50:50. This equates to an average of an additional 30 passengers per train for both directions.
- 10.7 Although there is some abstraction of trips from highway, the numbers and consequent impacts are small in comparison with the impact of the proposals on public transport users. Runs of the highway model including the impact of the Croxley Rail Link scheme did not show any material congestion relief from the reduction in highway trips/km. These impacts have therefore not been included with the economic appraisal, effectively removing any risk associated with the SWHM not being fully WebTAG compliant. The remaining issue is the robustness of the estimate of the car market in scope for transfer to the Croxley Rail Link scheme - the numbers of transfers forecast represent only a small proportion of this market the risk of transfer being overestimated and therefore can also be seen to be non-material.
- 10.8 The forecasts show that there is significant abstraction of demand and revenue from rail, principally because of the significant improvement in accessibility along the Croxley Rail Link corridor with the introduction of the two new stations at Ascot Rd and Watford General Hospital as well as the new connections to Watford High Street (Town Centre) and Watford Junction. In addition, unlike heavy rail, the Croxley Rail Link and the Metropolitan Line provide a direct connection between Watford and many parts of Central London with minimal interchange required.

Annualisation of Demand and Benefits

- 10.9 Annualisation factors are used to construct the annual forecasts required by the economic appraisal from the individually modelled peak and Interpeak hours. The annualisation factors employed in this appraisal have been derived from the recent bus passenger OD survey undertaken on a sample of bus services around the Croxley Rail Link corridor. This represents a robust use of the best source of data available at the time of assessment.
- 10.10 Based on the survey, the annualisation factors for the AM peak hour and Interpeak hour forecasts to annual values have been estimated at 950 and 2,794 respectively. Derivation of these factors is discussed in the Demand Forecasting Update Report in Appendix K.

Annual Forecasts

- 10.11 Annualised modal demand and revenue forecasts for the Croxley Rail Link are set out in Table 10.2. The values are shown in millions.

TABLE 10.2 ANNUAL FORECAST SHIFTS IN DEMAND AND REVENUE (2028)

Annual Forecasts (millions)	From AM peak model	From Inter-peak Model	Total
Demand Forecasts			
Change in car passengers	-0.06	-0.02	-0.08
Change in bus passengers	-0.11	-0.12	-0.23
Change in rail passengers	-0.40	-0.60	-1.00
Change in LU passengers	0.57	0.73	1.30
Additional induced demand	-	0.27	0.27
Additional LU and CRL demand	0.57	1.00	1.57
Net Annual Demand Impact	0	0.27	0.27
Revenue Forecasts (£m per year in 2008 real prices)			
Change in bus revenue	£-0.17	£-0.10	£-0.27
Change in rail revenue	£-2.33	£-1.91	£-4.24
Change in LU revenue	£2.99	£2.07	£5.06
Additional induced revenue	-	£0.69	£0.69
Additional LU and CRL revenue	£2.99	£2.76	£5.75
Net Annual Revenue Impact	£0.49	£0.75	£1.24

Note: The above numbers are rounded to the nearest 10,000

- 10.12 The results set out in Table 10.2 show that 1.6 million passengers are forecast to use the Croxley Rail Link in 2028, representing incremental total revenue of £5.75 million (in 2008 prices) including assumed real fare inflation at 1% per annum. The average yield per passenger in 2028 is therefore £3.66 (in 2008 real prices). In financial nominal terms (with a 2.5% annual inflation rate), the total incremental revenue is £9.47 million in 2028.

Key Appraisal Assumptions

- 10.13 The Croxley Rail Link proposals have been appraised in accordance with DfT guidelines over a 60-year period, and have been discounted at 3.5% (reducing to 3.0% after 30 years of operation) to 2002 and are presented in 2002 prices. The user benefits of the scheme have been forecast by the software TUBA as recommended by DfT.
- 10.14 The scheme has been assumed to commence operation in 2018/19. Ramp-up of benefits has been adopted for economic benefits at 70% in year 1, 80% year 2 and 90% in year 3 of operation. Real growth in demand is based on TEMPRO v5.4 forecasts.

Public Transport User Benefits

- 10.15 For the Preferred Scheme public transport user benefits result from the net journey time impacts of the scheme, taking into account decreased access distances and journey time savings for trips from the rail link and increases for some current users of the Underground Metropolitan Line who have lengthened access distances. Rationalising Underground and Overground fares from Watford Junction station and adjusting other fares for consistency (as advised by LUL) would result in an increase in some ticket prices - shown as user charge disbenefits. The resulting TUBA outputs are presented in Table 10.3. Further discussion of these results can be found in Section 13 of this MSBC.

TABLE 10.3 CROXLEY RAIL LINK TRAVELLER ECONOMIC BENEFITS

Economic Benefit (PV 2002)	Consumer Users	Business Users	Total
Time Impacts	£290m	£45m	£335
User Impacts	-£30m	-£0m	-£30m
Total User Impacts	£261m	£44m	£305m

Note: The figures in Table 10.3 are rounded up to the nearest £m.

Highway User Benefits

- 10.16 As stated earlier in this section, the impact on highway users is not material and is therefore not included within the economic case for the scheme.

Other Benefits

- 10.17 The public transport user benefits set out in Table 10.3 include those impacts which can be represented as changes in generalised time in the demand forecasting, for example access improvements, journey time improvements and service frequency increases. Other benefits of the proposals cannot currently be monetised, such as passenger security improvements and the wider regeneration effects of improving accessibility and confidence in the adequacy of public transport. All benefits of the appraised schemes are set out in more detail in the following sections.

11. Environmental Impact

Introduction

- 11.1 This section presents the appraisal of the impact of the proposed scheme on the environment. The following sub-objectives detailed in WebTAG are examined in turn:
- Noise;
 - Local Air Quality;
 - Greenhouse Gases;
 - Landscape;
 - Town;
 - Heritage of Historic Resources;
 - Biodiversity;
 - Water Environment;
 - Physical Fitness; and
 - Journey Ambience.
- 11.2 TAG worksheets are provided as Appendix L.
- 11.3 The assessment of the Croxley Rail Link and Busway options against each of the Environment sub-objectives has drawn on the following key data sources:
- Trip/demand forecasts from the latest forecasting model;
 - Croxley Rail Link Environmental Statement (1995) produced by Aspinwall & Company on behalf of LUL; and
 - Environmental Impact Assessment by Mouchel updated 2004.
- 11.4 It is apparent that the construction of substantial new infrastructure (the viaduct connecting the LUL Metropolitan Line and along the Croxley Green Branch line) will have a significant temporary impact on the environment, particularly in the areas of noise/emissions, and a longer term impact on landscape. It is anticipated that these impacts could, to a significant degree, be mitigated but some adverse impact is inevitable. In most areas the residual impact of the scheme, once mitigation measures are accounted for, is likely to be negligible.
- 11.5 Figure 11.1 identifies the environmental constraints relevant to the Croxley to Watford corridor including protected heritage resources, designated sites of nature conservation and water features. The relationship between the proposed options and these constraints is detailed under the various sub-objectives detailed in this section of the MSBC.

Noise

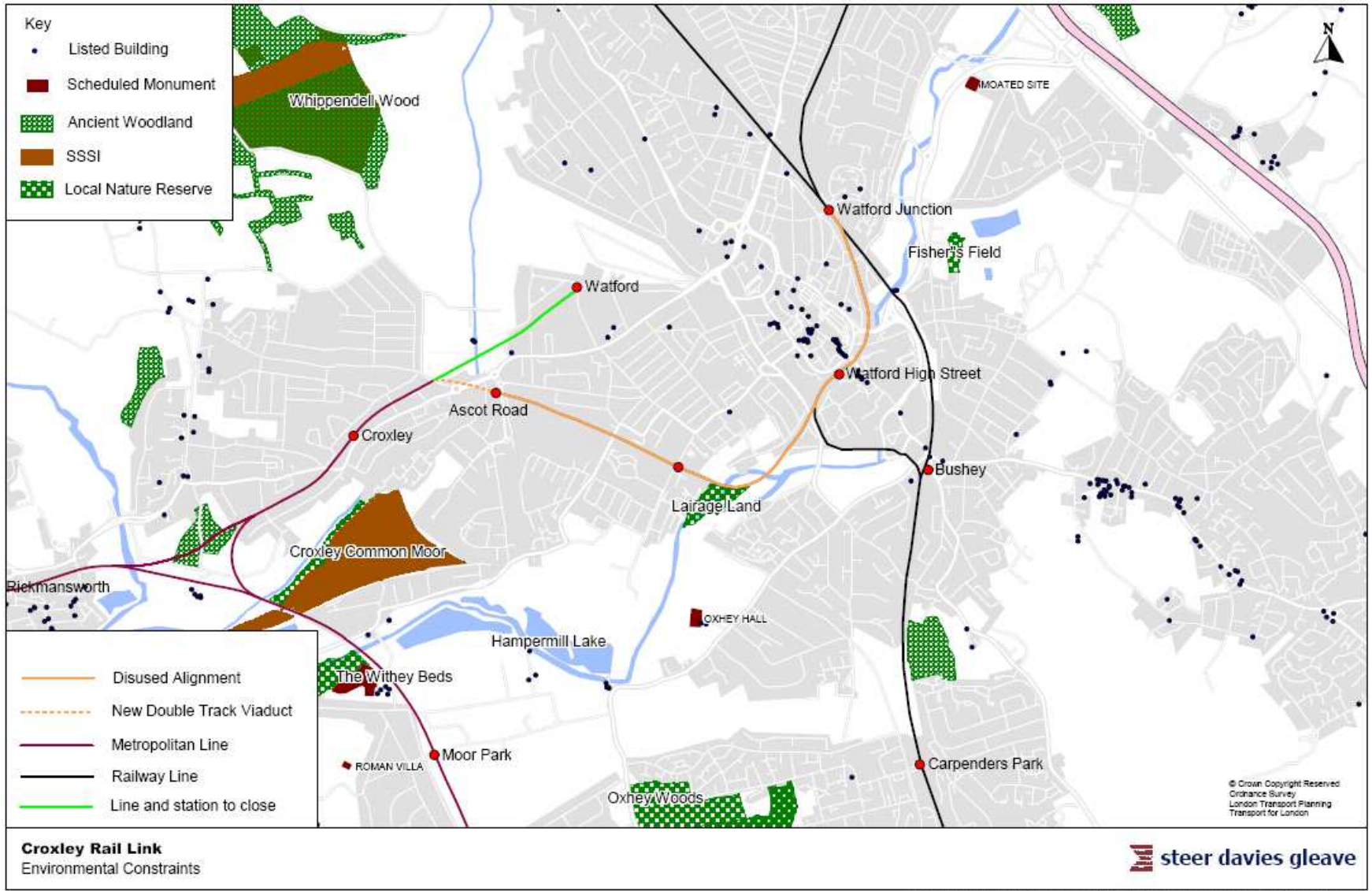
Baseline Conditions

- 11.6 The baseline noise level on and around the Croxley Green Branch is primarily ambient. The main sources include car traffic, aircraft, street noise (e.g. road maintenance, people walking, conversations etc.) and occasional emergency vehicles.

Impact of Do Minimum

- 11.7 The Do Minimum scenario for the Croxley Green Branch involves some short term construction and engineering work to make the track area safe. The physical removal/making safe of the track may result in some short term noise generation. The overall impact of the Do Minimum scheme has been assessed as **slight adverse**.

FIGURE 11.1 STUDY AREA – ENVIRONMENTAL CONSTRAINTS



Impact of Preferred Scheme

- 11.8 The Preferred Scheme involves reinstatement of the track and construction of a viaduct to join the Croxley Green Branch with the existing Metropolitan Line. Underground services would operate along this section of line to Watford Junction Station.
- 11.9 There are a number of potential sources of noise during both construction and operation as this option involves a level of track upgrade and construction work. These works may include:
- Site related road traffic;
 - Track construction;
 - Platform construction/reinstatement; and
 - Other civil engineering works.
- 11.10 The effects of noise pollution as a result of construction will be mitigated by the enforcement of a code of conduct that will specify the agreed noise limits and hours of work on site. This will minimise noise for surrounding properties.
- 11.11 In terms of operational noise, the impacts from this option will be minimal. The overall impact on noise levels has been assessed as **slight adverse** in comparison with the Do Minimum conditions.

Impact of Lower Cost Alternative

- 11.12 The Lower Cost Alternative would convert the existing rail alignment to segregated busway operation up to the junction with the A411. There would be some construction noise with this option, as well as noise impacts during the operation of the busway. However the impacts on noise levels resulting from the operation of buses will be shorter in duration and the vehicles would produce marginally more noise overall. There is no significant difference in operational noise between the Preferred and Lower Cost Options.
- 11.13 The overall impact on noise levels of this option have been assessed as **slight adverse** when compared to the Do Minimum conditions.

Local Air Quality

Baseline Conditions

- 11.14 Baseline air quality and forecast air quality are indicated in Table 11.1 below. The Environmental Impact Statement report (Mouchel Consulting, 2004) comments that the ambient levels of PM₁₀ and NO₂ are within the target levels set by the National Air Quality Strategy (NAQS). NO₂ levels exceed vegetation and ecosystem health recommendations, which are not included in the regulations. Six AQMAs are identified within the Watford Borough, the nearest being 0.75km from the route.

TABLE 11.1 ESTIMATED ANNUAL MEAN BACKGROUND CONCENTRATIONS AT SITE (µG/M³)

Grid Square	2007			2013		
	NO ₂	NO _x	PM ₁₀	NO ₂	NO _x	PM ₁₀
509500, 195500	21.30	33.29	23.39	18.81	26.85	21.54
510500, 195500	22.44	35.97	23.87	19.77	28.88	21.93
511500, 195500	22.06	35.05	23.48	19.38	28.14	21.54
Mean	21.93	34.77	23.58	19.32	27.95	21.67

Impact of Do Minimum

- 11.15 The air quality impacts of the Do Minimum option would involve some impacts during the engineering phase, but no significant change in air quality after the completion of the engineering works. The overall impact of the Do Minimum option on local air quality has been assessed as **neutral**.

Impact of Preferred Scheme

- 11.16 The likely impacts on local air quality from the rail link option are:
- Dust produced as a result of construction/track reinstatement;
 - Ozone as a result of arcing from the conductor shoes and motor brushes of the carriages;
 - Finely divided iron emissions caused by friction during braking; and
 - Track maintenance which may result in temporary, localised deterioration in air quality dependent on the maintenance operation being undertaken (e.g. herbicide/pesticide application to control trackside vegetation).
- 11.17 LUL has advised that the replacement stock that will be used on the Croxley Rail Link has no motor brushes and therefore less friction is produced. As a result emissions from the replacement stock will be reduced. Emissions of ozone and iron from current rolling stock are unlikely to differ from current levels.
- 11.18 The overall impact of the Preferred Scheme on local air quality levels is likely to be **neutral**.

Impact of Lower Cost Alternative

- 11.19 With the busway option there will be some local air quality impacts associated with the conversion of the existing track to a busway. These include some negative air quality impacts during construction/engineering and vehicle emissions during operation.
- 11.20 The overall impact of the Lower Cost Alternative is assessed as being **neutral**.

Greenhouse Gases

Baseline Conditions

- 11.21 In terms of greenhouse gas emissions, carbon dioxide (CO₂) is considered to be the most important and is used in WebTAG as the key indicator of the impacts of transport on climate change.
- 11.22 The main source of carbon dioxide in the Watford area is vehicle emissions, with cars being the fastest growing source of carbon dioxide (J Colls, 1997, quoted by Mouchel, 2004). Emissions from trains passing through Watford Junction station are also a source of CO₂ emissions. These are likely to increase due to the demand for freight and passenger services through Watford Junction.
- 11.23 It should be noted that a conservative approach was taken in the appraisal of greenhouse gases, in that it was assumed in that all carbon present in fuel would be released as CO₂, although in reality, some of the carbon would be released as particles or hydrocarbons.

Impact of Do Minimum

- 11.24 The primary impact on greenhouse gases of the Do Minimum option would be from construction and maintenance vehicles which are required to make the track area safe. These emissions would be for a limited time and would be minor in comparison with the levels of road traffic in the area and the numbers of trains passing through Watford Junction on a daily basis. The overall impact of the Do Minimum on Greenhouse gases is assessed as **neutral**.

Impact of Preferred Scheme

- 11.25 The change in emission of carbon is 572 tonnes per year for the rail route option relative to the base option, approximately 2.5% of all carbon emissions from all transport in Watford Borough Council. The overall impact of the Preferred Scheme on carbon dioxide emissions is assessed as **slight adverse**.

Impact of Lower Cost Alternative

- 11.26 The change in emission of carbon is 14 tonnes per year for the low cost alternative option relative to the base option, approximately 0.06% of all C emissions from all transport in Watford Borough Council. The overall impact on carbon dioxide of the Lower Cost Alternative has been assessed as **neutral**.

Landscape

Baseline Conditions

- 11.27 The Croxley Green Branch runs through an urban area on the fringes of Watford town centre. The former branch line is an existing rail facility and has little landscape value. The section between Croxley Green and the Metropolitan Line has little landscape value.

Impact of Do Minimum

- 11.28 The Do Minimum scheme will remove the track and make the track bed area safe. This will have minimal impact upon the landscape and the surrounding area. The overall impact on landscape of the Do Minimum option is assessed as **neutral**.

Impact of Preferred scheme

- 11.29 As the area surrounding the Croxley Green Branch is of an urban nature already, any works on the rail alignment would not have any significant impact on the landscape. The construction of the viaduct over Watford Road and the Grand Union Canal is the primary adverse landscape impact of this option. The overall impact on the landscape of the Preferred Scheme is assessed to be **neutral** when compared to the Do Minimum.

Impact of Lower Cost Alternative

- 11.30 The busway option will not have a significant impact on the landscape as it does not involve any construction work outside of the boundaries of the existing rail alignment. The overall impact on the landscape of the Lower Cost Alternative is assessed as **neutral**.

Townscape

Baseline Conditions

- 11.31 The study area is mainly composed of light industry and late Victorian and early Edwardian housing. The scheme is unlikely to have any impact upon Watford's Conservation Area, but it may affect views of the townscape. The Croxley Green Branch has been part of the townscape of this area of Watford since the 1920s. Its current poor condition is detrimental to the townscape of the area.

Impact of Do Minimum

- 11.32 The Do Minimum proposals do not propose any improvement in the appearance of the disused station buildings and bridges, only essential repairs and making the track area safe. As a result, they may be viewed as having a neutral impact on the townscape of the area as they will not improve the appearance or halt the deterioration of the disused station buildings and bridges (illustrated in Figure 11.2). The impact of the Do Minimum on the townscape of the study area is assessed as being **neutral**.

FIGURE 11.2 CROXLEY GREEN BRANCH – CURRENT SITUATION



Impact of Preferred Scheme

- 11.33 At the moment the stations along the Croxley Green Branch are disused and falling into disrepair. The Preferred Scheme will see the branch line used as a rail line once more and as a result will improve the townscape of the areas directly surrounding the rail line. The Preferred Scheme's impact on townscape is assessed to be **slight beneficial**.

Impact of Lower Cost Alternative

- 11.34 The busway option will see the existing track converted to a busway. This will have some positive impacts on the study area as it will remove the derelict stations at Ascot Road and Watford West and lift the appearance of the area; however it will change the nature and character of the link from its original status. The highway measures required to give priority to bus services into and through the town centre will have some negative implications within the town centre. The impact of the Lower Cost Alternative on townscape is therefore assessed as being **slight beneficial**.

Heritage of Historic Resources

Baseline Conditions

- 11.35 The urban settlement of Watford was first recorded in 1007 with the earliest built foundations dated to the 12th Century. The major development of Watford as a town can be traced to the 18th Century when it developed as an industrial and population centre. The development of the town has been strongly linked to the construction of the Grand Union Canal (1798) and the London to Birmingham railway (1837/8). The area surrounding the Croxley Green Branch ('the study area') appears to have been largely under agricultural management up to the 1870s.
- 11.36 Watford has several legally protected sites within the study area. These include listed buildings such as the Lord Essex Almshouses, the London Orphan Asylum and a 15th/16th Century warehouse. Cassiobury Park is also protected.
- 11.37 The Environmental Impact Statement (Mouchel, 2004) notes that there is a low level of known archaeological activity at the station site earmarked for redevelopment by the scheme. The branch line does pass through the former historic core of Watford town; however the potential for below ground remains is low.

Impact of Do Minimum

- 11.38 The Do Minimum scheme would result in the decommissioning of the Croxley Green Branch. In terms of historic resources, this would not have a significant impact. Due to the loss of railway heritage, the overall effect of the Do Minimum option on historic resources is assessed as being **slight adverse**.

Impact of Preferred Scheme

- 11.39 The Preferred Scheme will not have an impact on any of the historic buildings in the study area. The construction of the viaduct does not require any demolition and the rest of the route is on existing infrastructure. There may potentially be adverse impacts on the setting of Estcourt conservation area and the construction of a car park at Ascot Road may adversely affect below ground remains. Overall the impact of the Preferred Scheme on the heritage of historic resources is assessed as being **slight adverse**.

Impact of Lower Cost Alternative

- 11.40 The busway option will have no impact on historic buildings in the study area. Due to the loss of railway heritage, the overall effect of the Low Cost Alternative option on historic resources is assessed as being **slight adverse**.

Biodiversity

Baseline Conditions

- 11.41 Information on the study area has been collated by Mouchel (2004)³ through field survey, data collection, consultation and desk based investigation. The data collected indicates no designated sites of nature conservation of national or international importance within or immediately adjacent to the site. Consultation with English Nature has not revealed any previous records of protected species apart from the colony of Pipistrelle bats believed to inhabit the existing viaduct and Croxley Marina railway bridge over the River Gade and Grand Union Canal. The EIA did not identify any other protected or locally rare species of flora.

Impact of Do Minimum

- 11.42 The impact of the Do Minimum proposals on biodiversity is likely to be minimal. Some of the existing vegetation along the rail corridor may be lost. The impact of the Do Minimum proposals on biodiversity has therefore been assessed as **neutral**.

Impact of Preferred Scheme

- 11.43 Although there are some protected species of wildlife within the vicinity of the rail corridor, the engineering works are not likely to have a significant impact on these sites. Certain habitats e.g. reedbeds are declining nationally and are UKBAP priority habitats. Great crested newts were not detected in the study area, but the habitat is suitable for these and other reptiles, so they may be present along, or immediately adjacent to the rail corridor. The initial bat survey found no evidence of bats in trees, hedges or built structures within study area, but habitats are likely to be of value for commuting/foraging bats. Signs of badger activity were found, but no permanently occupied setts were found along the route. The impact of the Preferred Scheme on biodiversity has therefore been assessed as **moderate adverse**.

Impact of Low Cost Alternative

- 11.44 Although there are some protected species of wildlife within the vicinity of the rail corridor, the engineering works are not likely to have a significant impact on these sites. Certain habitats e.g. reedbeds are declining nationally and are UKBAP priority habitats. Great crested newts were not detected in the study area, but the habitat is suitable for these and other reptiles, so they may be present along, or immediately adjacent to the rail corridor. The initial bat survey found no evidence of bats in trees, hedges or built structures within study area, but habitats are likely to be of value for commuting/foraging bats. Signs of badger activity were found, but no permanently occupied setts were found along the route. The

³ This data source is considered robust enough for MSBC, but will be updated for TWA Order

impact of the Low Cost Alternative option on biodiversity has therefore been assessed as **moderate adverse**.

Water Environment

Baseline Conditions

- 11.45 The main water bodies within the study area are the Gade and Colne rivers and the Grand Union Canal. There are also watercress beds, ponds and several culverts. The water quality within rivers and canals is monitored at least 12 times a year using the General Quality Assessment system (GQA). Rivers and canals are divided into subsections; each characterised by a single monitoring point. Water quality is classified from A (very good) to F (poor). The GQA involves both chemical and biological assessments with the chemical assessment identifying quantities of organic pollutants that have entered the watercourse through waste water discharges or land runoff.
- 11.46 The majority of the route and study area overlies a major chalk aquifer. The aquifer is highly permeable and classed as being of high groundwater vulnerability, with a known or probable presence of significant fracturing. The route is also located over a Groundwater Source Protection Zone (GSPZ). GSPZs have been identified by the Environment Agency (EA) as areas where potentially polluting activities and accidental release of pollutants pose a particular risk to the quality of abstracted groundwater supplies.

Impact of Do Minimum

- 11.47 The Do Minimum scheme does not propose any significant construction work. Therefore the main impact on water resources will be from any weed killer or other substances used to clear vegetation on the existing rail alignment as general maintenance or to allow decommissioning, which should be minimal providing suitable precautionary measures are followed. The impact of the Do Minimum scheme on water resources is assessed as being **neutral**.

Impact of Preferred Scheme

- 11.48 The principal residual impact of the rail link scheme on the water environment will be a result of the construction of piles extending below the water table. In addition the track adhesion solutions, track lubricant, weed killer, platform cleaning solutions and car park de-icer may have impacts on water resources. As long as sufficient precautionary measures are followed, this option would have no significant impact on surface or groundwater quality; therefore the impact of the Preferred Scheme on water resources is assessed as being **slight adverse**.

Impact of Low Cost Alternative

- 11.49 Many of the hydrological and potential water quality impacts of the busway option are also associated with the construction phase. Strict codes of practice and specifications will be produced to control contractor activity, with reference to Environment Agency standard conditions and requirements to complete all licence procedures.
- 11.50 In terms of the potential impacts of the investment options, it is likely that the Lower Cost Alternative will have a greater impact than the Preferred Scheme on the water environment due to the larger amounts of surface runoff produced by the asphalt busway and greater potential for this water to pick up contaminants from the busway. The impact of the Lower Cost Alternative on water resources is therefore assessed as being **moderate adverse**.

Physical Fitness

Baseline Conditions

- 11.51 It is recognised that people who use public transport tend to walk further, which has a beneficial impact on physical fitness. Relatively small amounts of regular walking and cycling can lead to significant improvements in physical fitness and overall wellbeing.

Impact of Do Minimum

- 11.52 The Do Minimum option would not have any impact on physical fitness. Any works that Network Rail would undertake to make the track safe would not have an impact on people's choice to use public transport. Therefore the impact of the Do Minimum option on physical fitness is assessed as being **neutral**.

Impact of Preferred Scheme

- 11.53 The Preferred Scheme may have a positive impact on the number of people using public transport. By increasing the choice of destinations served by the Metropolitan Line and improving links to other parts of Watford from Watford Junction, this may encourage more people to make their journey by public transport.
- 11.54 Although this is an improvement, it is not significant when considered against NATA assessment guidelines. Therefore, the overall impact of the Preferred Scheme on physical fitness is assessed as being **neutral**.

Impact of Lower Cost Option

- 11.55 The Lower Cost Option may have a positive impact on the number of people using public transport. By increasing the choice of destinations served by the Metropolitan Line and improving links to other parts of Watford from Watford Junction, this may encourage more people to make their journey by public transport.
- 11.56 Although this is an improvement, it is not significant when considered against NATA assessment guidelines. The overall impact of the Lower Cost Option on physical fitness is assessed as being **neutral**.

Journey Ambience

- 11.57 Journey ambience looks at the 'quality' of a journey as perceived from the traveller's perspective without taking into account reliability or journey time which are analysed within other sections of the appraisal. The network and service providers have a strong influence on journey ambience; key factors include traveller care, traveller stress and the personal views of the traveller. It should also be noted that a high quality journey might often be taken for granted whereas a poor quality journey is often noticed and remembered.

Baseline Conditions

- 11.58 At the moment, although there is no direct service, bus is the only mode which links Croxley and Watford Junction station. Current bus services run on road and do not have segregation from other traffic.

Impact of Do Minimum

- 11.59 The Do Minimum scenario would not result in the introduction of any improved service passengers would have to travel by bus between Croxley and Watford Town Centre/Junction station as they do currently. The impact of the Do Minimum proposals on journey ambience would therefore be **neutral**.

Impact of Preferred Scheme

- 11.60 The Preferred Scheme involves the redirection of Metropolitan Line services to the Croxley Green Branch. As part of this option, the existing track would be repaired and therefore the ride quality of this section of track will be of a good standard. New rolling stock will be used which will provide a good standard of comfort for passengers. In comparison with the Do Minimum, journey ambience will be improved by the Preferred Scheme. Therefore the impact of the Preferred Scheme on journey ambience will be **moderate beneficial**.

Impact of Lower Cost Alternative

- 11.61 The Lower Cost Alternative proposes the introduction of a busway along the Croxley Green Branch alignment between Ascot Road and Watford General Hospital. The busway would continue on road with bus priority measures through the town centre to Watford Junction. In terms of journey ambience the busway may provide a slightly better ride quality and newer vehicles than the existing bus services. However, this is not as significant an improvement as the Preferred Scheme proposals would have. Therefore the Lower Cost Alternative is assessed as having a **slight beneficial** impact on journey ambience.

12. Safety and Security

12.1 This section presents the appraisal in terms of the security of the Preferred Scheme and Lower Cost Alternative options against the sub-objectives of reducing accidents and improving security.

12.2 In addition, the impact of the schemes in two additional areas has also been examined:

- Operational safety; and
- Pedestrian safety.

Accident Reductions

12.3 Based on the demand forecasting undertaken, neither the rail link or busway options show a significant impact on highway travel. Therefore a quantified assessment of accident benefits has not been undertaken. However it is noted that although the highway impact of the options considered would be marginal, both the rail link and busway would result in a reduction in accidents because both would reduce the number of vehicle km travelled on the highway network. Therefore, both options have been assessed as **slight beneficial**.

Passenger Security

12.4 Passenger security is a fundamental component of any high quality public transport scheme. Positive perceptions of security are vital in attracting patronage, particularly from certain users, such as women and the elderly. High quality security measures also, therefore, contribute to the accessibility and social inclusiveness criteria within the appraisal framework.

12.5 Under DfT guidelines, passenger security is assessed under the following security indicators:

- Site perimeters, entrances and exits;
- Formal surveillance;
- Informal surveillance;
- Landscaping;
- Lighting and visibility; and
- Provision of emergency call points.

12.6 The relevant security TAG worksheet is provided as Appendix L.

Impact of Do Minimum

12.7 There are no changes proposed or expected which would have a significant impact on perceived levels of security in the Do Minimum; therefore the impact is assessed as **neutral**.

Impact of the Preferred Scheme

12.8 As part of the scheme design, measures to enhance passenger security will include:

- The provision of CCTV, passenger help points, passenger information and lighting; and
- Staffing on both vehicles and stations.

12.9 The design of the Croxley Rail Link, in line with the latest LUL planning and design guidelines, will incorporate a high level of passenger security and this would be particularly noticeable in the proposed new stations. Compared to the alternative offered by existing public transport services, namely bus, there will be an improvement in the majority of key security indicators.

Consequently, the scheme assessed as having a **strong beneficial** effect on passenger security.

Impact of Lower Cost Alternative

- 12.10 The Croxley Busway includes stop facilities broadly similar to existing bus stops on both segregated and unsegregated sections. However, for stops within the segregated section there will be additional information provision and good quality lighting to mitigate perceived safety concerns which arise from lower numbers of pedestrians passing by and the isolated nature of the segregated alignment. As such the scheme is viewed as having a **neutral** effect on passenger security.

Impact on Operational Safety

- 12.11 Operational safety refers to the intrinsic safeness of a particular mode in terms of its services and infrastructure. This largely relates to the degree to which a given mode is segregated from other modes and the safety regime within which it operates.

Impact of Do Minimum

- 12.12 There are no changes proposed or expected which would have a significant impact on perceived levels of operational safety in the Do Minimum; therefore the impact is assessed as **neutral**.

Impact of Preferred Scheme

- 12.13 The Croxley Rail Link will operate on a wholly segregated alignment, and will not conflict with other modes. The scheme will fully comply with HMRI safety standards that ensure a very high degree of operational safety. In comparison to existing public transport alternatives this impact is assessed as **moderate beneficial** on a basis broadly equivalent to NATA.

Impact of Lower Cost Alternative

- 12.14 The Croxley Busway will partially operate on segregated alignment with a higher degree of risk on unsegregated sections through interaction with other road users. In addition, operational safety requirements are not expected to be as stringent as those for a rail link in regard to risk avoidance and impact mitigation. However, the segregated section can be expected to be inherently operationally safer than existing bus routes and the impact is assessed as being **slight beneficial**.

Impact on Pedestrian Safety

Impact of Do Minimum

- 12.15 There are no changes proposed or expected which would have a significant impact on perceived levels of pedestrian safety in the Do Minimum; therefore the impact is assessed as **neutral**.

Impact of Preferred Scheme

- 12.16 Pedestrian safety is affected by the access and egress facilities at stations/stops; in the case of the Croxley Rail Link the design will take account of the need to ensure a safe environment. A significant improvement to pedestrians of the Croxley Rail Link will be the provision of a dedicated pedestrian walkway between Watford High Street and the Harlequin Centre negating the need to cross the town centre ring road at road level. Consequently, the Croxley Rail Link will have a **moderate beneficial** impact on pedestrian safety.

Impact of Lower Cost Alternative

- 12.17 The Croxley Busway introduces an additional mode of transport and turning/crossing manoeuvres into the pedestrian realm, at points where buses will access/egress the segregated alignment. In addition there will be no improvement to the pedestrian crossing between the Harlequin Centre and Watford High Street station and as such the scheme is expected to have a **neutral** impact on pedestrian safety.

13. Economy

- 13.1 The appraisal of the proposed Croxley Rail Link and Croxley Busway against Central Government's Economy objective is set out in this section of the MSBC, with further information contained within Appendix K. This section describes the transport economic efficiency analysis undertaken for the options set out in this funding application. This analysis is consistent with WebTAG.
- 13.2 The results presented in this section relate to the central case; the full 'value for money' assessment, which cuts across appraisal objectives, can be found in Section 18 of this document, along with additional option tests and the results of sensitivity tests undertaken on key appraisal and demand assumptions.

Economic Appraisal

- 13.3 DfT TUBA software was used for calculating user economic benefits, in accordance with MSBC guidance. TUBA input and output files are presented in Appendix K to this document.
- 13.4 In order to allow the required flexibility in interpretation and sensitivity testing, financial impacts (capital and operating costs, public transport revenues and their indirect tax impacts) were calculated outside TUBA using a spreadsheet. These calculations are consistent with TUBA treatment of costs and revenues.

Appraisal Inputs and Assumptions

- 13.5 Section 10 of this MSBC sets out the approach taken to forecasting demand, revenue and economic benefits for both the Croxley Rail Link and Croxley Busway options. Assumptions behind the calculation of the benefits can also be found in Section 10.
- 13.6 Additional assumptions were made in converting financial (cost and revenue) impacts into appraisal consistent values. All impacts were converted to 2002 values using RPI and converted into Market Prices by increasing by 20.9% as specified in WebTAG. Real growth in costs was taken into account at the rates detailed in Sections 3 and 4 of this MSBC.
- 13.7 The appraisal assumes that commercial operations start midway through the financial year 2017/18, with three months operating cost allowed before operations for safety case preparation, testing, driver training and recruitment.

Optimism Bias

- 13.8 As the project development of the rail link options has reached a relatively mature stage, the optimism bias on capital costs applied within the economic appraisal is 22%. Although this is lower than the WebTAG recommended value of 44% at Programme Entry this is believed to be entirely appropriate bearing in mind the extensive development work undertaken previously on the proposals. This is in addition to the contingency allowance within the base costs and to the QRA allowance.
- 13.9 For consistency the same level of optimism bias has been adopted for the busway option. Although this option has been developed more recently, and there is less background information for purposes of ensuring a fair comparison, the same value has been assumed.
- 13.10 The sensitivity tests set out in Section 16 of this business case include the results of a test with an alternative optimism bias assumption.

Public Accounts

- 13.11 This application is for LTP Major Scheme funding for the implementation costs of the proposals. Ongoing maintenance costs and conceptually basic renewals costs will be funded from revenue. Further details of these costs are set out in Sections 3 and 4.
- 13.12 The present value (PV) of the cost of the Public Sector grant for the Preferred Scheme is £106.5m in appraisal consistent units. The corresponding capital figures for the Lower Cost Alternative are a Public Sector PV of grant funding of £33.4m; and for renewals PV costs of £2.4m.
- 13.13 The public sector, which in the form of TfL will directly operate the rail link, benefits from the net increase in public transport revenues, in this case a combination of gains to the new Croyley Rail Link/Metropolitan Line service and a loss to other public transport modes because of abstraction. The total net public sector revenue is £26.1m PV for the Preferred Scheme, made up of a net gain of £99.1m PV to London Underground and net loss to rail operators of £73.0m PV. The abstractive impact of the rail link (and Lower Cost Alternative) on bus operators is detailed under private sector transport providers below.
- 13.14 For the Preferred Scheme the gain of London Underground is offset by the costs of providing the service. The PV of total cost of operating Metropolitan Line services is £40.9m over the 60-year appraisal. The apparent shortfall in revenue versus operating costs is a result of the Transport Economic Efficiency (TEE) presentation of net Public Transport (PT) revenue. Details of the operating performance of the scheme can be found in Section 17 in the Affordability and Financial Sustainability Analysis.
- 13.15 The Lower Cost Alternative will be operated by the private sector and therefore operating impacts are shown under transport economic efficiency. The abstraction of rail revenue by the busway is a public sector impact and totals £36.7m PV over the appraisal.
- 13.16 Additional costs to Central Government from changes in indirect tax revenue have been calculated in the appraisal. The net impact of reduced consumer spend on untaxed public transport fares results in a total PV loss of £3.6m to Central Government for the Preferred Scheme, because of the shift of expenditure to public transport fares. The equivalent indirect cost calculated for the Lower Cost Alternative assessment comes to a loss of £4.4m PV to Central Government. That the Lower Cost Alternative results in a greater loss of tax revenue than the Preferred Scheme is a function of the different structures for underground and bus fares.
- 13.17 The public accounts table for the Preferred Scheme is shown as Table 13.1. The total PV of the impact on public accounts is £125.0m, representing the 'cost' in the economic appraisal. The public accounts table for the Lower Cost Alternative option is shown as Table 13.2. The total PV of the impact on public accounts is £77.0m for the Croyley Busway proposals.

TABLE 13.1 PREFERRED SCHEME PUBLIC ACCOUNTS TABLE

	ALL MODES TOTAL	ROAD INFRASTRUCTURE	BUS & COACH	RAIL	OTHER
Local Government Funding					
Revenue	-£26,092			-£26,092	
Operating Costs	£40,932			£40,932	
Investment Costs	£0				
Developer and Other Contributions	£0				
Grant/Subsidy Payments	£21,371			£21,371	
NET IMPACT	£36,211 (7)	£0	£0	£36,211	£0
Central Government Funding					
Revenue	£0				
Operating Costs	£0				
Investment Costs	£0				
Developer and Other Contributions	£0				
Grant/Subsidy Payments	£85,130			£85,130	
Indirect Tax Revenues	£3,621		-£819	£4,440	
NET IMPACT	£88,751 (8)	£0	-£819	£89,570	£0
TOTAL Present Value of Costs (PVC)	£124,962 (9) = (7) + (8)				

Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers. All values in £,000's in 2002 prices and values

TABLE 13.2 LOWER COST ALTERNATIVE PUBLIC ACCOUNT TABLE

	ALL MODES TOTAL	ROAD INFRASTRUCTURE	BUS & COACH	RAIL	OTHER
Local Government Funding					
Revenue	£36,706			£36,706	
Operating Costs	£0			£0	
Investment Costs	£2,417		£2,417		
Developer and Other Contributions	£0				
Grant/Subsidy Payments	£3,342		£3,342		
NET IMPACT	£42,465 ⁽⁷⁾	£0	£3,342	£36,706	£0
Central Government Funding					
Revenue	£0				
Operating Costs	£0				
Investment Costs	£0				
Developer and Other Contributions	£0				
Grant/Subsidy Payments	£30,078		£30,078		
Indirect Tax Revenues	£4,442		£10,787	-£6,345	
NET IMPACT	£34,520 ⁽⁸⁾	£0	£40,865	-£6,345	£0
TOTAL Present Value of Costs (PVC)	£76,985 ^{(9) = (7) + (8)}				

Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers. All values in £,000's in 2002 prices and values

Transport Economic Efficiency

Business Users and Transport Providers

- 13.18 Default journey purpose splits from TUBA/WebTAG have been applied in the appraisal. The small proportion of business bus users (2.2% on average across the week for Underground users, 1.4% for bus users) benefit from the improvements to the transport system. The present value of business user benefits for the Preferred Scheme is £44.4m. For the Lower Cost Alternative option the equivalent PV total is £17.3m.
- 13.19 The net private sector revenue impact for the Rail Link option is a loss of £4.7m PV due to abstraction. The equivalent for the Lower Cost Alternative is a PV increase of £62.9m. Abstraction from rail operators is detailed above under public sector impacts.
- 13.20 For the busway the gain of the operator is offset by the costs of providing the service. The PV of total cost of operating the additional segregated bus services is £44.3m over the 60 year appraisal.
- 13.21 The net rail link impact on businesses is a PV benefit of £39.6m. The net impact on businesses from the busway option is a benefit of £35.9m over the life of the appraisal. The analysis undertaken shows that over the full length of the appraisal the net bus revenue gained exceed the additional operating costs for the busway service. However, taking into account revenue losses to other bus operators reduces the total business sector impact.

Consumers

- 13.22 Consumer travellers, both commuters and other users, benefit from savings in travel times on the public transport network. The present value of benefits for the Preferred Scheme is £260.7m. For the Lower Cost Alternative the present value of benefits is £114.1m.
- 13.23 The Transport Economic Efficiency (TEE) table for the Preferred Scheme is presented as Table 13.3 and for the Lower Cost Alternative as Table 13.4. The total value of economic efficiency impacts, forming the bulk of the 'benefit' in the economic appraisal is £300.3m over the sixty year period for the Preferred Scheme and £150.0m for the Lower Cost Alternative.

Quality Benefits

- 13.24 Users of the Metropolitan Line services benefit from the willingness-to-pay derived quality benefits, applied as boarding penalties within the demand forecasting. These benefits are not strictly transport economic efficiency benefits and therefore would generally be shown in the 'Journey Ambience' section of the Analysis of Monetised Costs and Benefits (AMCB) table.
- 13.25 The combination of the demand forecasting undertaken for this project and the use of TUBA effectively means that splitting these benefits out into the AMCB is not possible. While this will not have an impact on the overall value-for-money performance of the scheme it does have the effect of slightly exaggerating user travel time benefits in the TEE presentation.

TABLE 13.3 PREFERRED SCHEME TRANSPORT ECONOMIC EFFICIENCY TABLE

Consumers	ALL MODES	ROAD	BUS & COACH	RAIL	OTHER	
<i>User benefits</i>	TOTAL	Private Cars and LGVs	Passengers	Passengers		
Travel time	£290,371	£0	£0	£290,371	£0	
Vehicle operating costs	£0	£0			£0	
User charges	-£29,718	£0	£0	-£29,718	£0	
During Construction & Maintenance	£0	£0	£0	£0	£0	
NET CONSUMER BENEFITS	£260,653 (1)	£0	£0	£260,653	£0	
Business		Goods Vehicles	Business Cars & LGVs	Passengers	Freight	Passengers
<i>User benefits</i>						
Travel time	£44,531	£0	£0	£0	£0	£44,531
Vehicle operating costs	£0	£0	£0			
User charges	-£178	£0	£0	£0	£0	-£178
During Construction & Maintenance	£0	£0	£0	£0	£0	£0
Subtotal	£44,352 (2)	£0	£0	£0	£0	£44,352
<i>Private sector provider impacts</i>				Freight	Passengers	
Revenue	-£4,737			-£4,737		
Operating costs	£0					
Investment costs	-£106,501				-£106,501	
Grant/subsidy	£106,501				£106,501	
Subtotal	-£4,737 (3)			-£4,737	£0	£0
<i>Other business impacts</i>						
Developer contributions	£0					
NET BUSINESS IMPACT	£39,615 (5) = (2) + (3) + (4)					
TOTAL						
Present Value of Transport Economic Efficiency Benefits	£300,268 (6) = (1) + (5)					

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All values in £,000's in 2002 prices and values

TABLE 13.4 LOWER COST ALTERNATIVE TRANSPORT ECONOMIC EFFICIENCY TABLE

Consumers	ALL MODES	ROAD	BUS & COACH	RAIL	OTHER	
<i>User benefits</i>	TOTAL	Private Cars and LGVs	Passengers	Passengers		
Travel time	£129,313	£0	£0	£129,313	£0	
Vehicle operating costs	£0	£0			£0	
User charges	-£15,218	£0	-£16,358	£1,140	£0	
During Construction & Maintenance	£0	£0	£0	£0	£0	
NET CONSUMER BENEFITS	£114,095 (1)	£0	-£16,358	£130,453	£0	
Business						
<i>User benefits</i>		Goods Vehicles	Business Cars & LGVs	Passengers	Freight	Passengers
Travel time	£17,646	£0	£0	£0	£0	£17,646
Vehicle operating costs	£0	£0	£0			£0
User charges	-£378	£0	£0	£0	£0	-£378
During Construction & Maintenance	£0	£0	£0	£0	£0	£0
Subtotal	£17,268 (2)	£0	£0	£0	£0	£17,268
<i>Private sector provider impacts</i>				Freight	Passengers	
Revenue	£62,895			£62,895		
Operating costs	-£44,281			-£44,281		
Investment costs	-£33,420			-£33,420		
Grant/subsidy	£33,420			£33,420		
Subtotal	£18,614 (3)			£18,614	£0	£0
<i>Other business impacts</i>						
Developer contributions	£0 (4)					
NET BUSINESS IMPACT	£35,882 (5) = (2) + (3) + (4)					
TOTAL						
Present Value of Transport Economic Efficiency Benefits	£149,977 (6) = (1) + (5)					

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All values in £,000's in 2002 prices and values

Reliability

Do Minimum Impact

- 13.26 Current public transport links on the Croyley - Watford corridor are provided by bus services. Peak hour journey time reliability on these services is poor, principally due to operational problems resulting from road traffic congestion. Highway traffic is forecast to continue to increase into the future and therefore reliability will continue to decline. The Do Minimum contains no measures/proposals which will have an impact in this area and therefore the assessment of the Do Minimum is **neutral**.

Impact of Preferred Scheme

- 13.27 As the Metropolitan Line operates in complete segregation from traffic, there will be significant passenger reliability benefits in comparison to the Do Minimum. These have not been fully quantified/monetised and therefore the economic appraisal for the Croyley Rail Link represents a conservative view of the full user benefits. It is not expected that joint running with National Rail services on the DC lines loop into Watford Junction will introduce any material performance risk. The assessment of the Preferred Scheme against the sub-objective of reliability is therefore **strong beneficial**.

Impact of Do Lower Cost Alternative

- 13.28 The Croyley Busway proposal will operate in complete segregation from traffic over a proportion of its length and therefore on this section reliability will be significantly improved from the Do Minimum. For the remainder of its length the busway will operate on highway, with measures introduced to increase the level of priority given to bus; however there will still be interaction with other traffic and any reliability benefit will be less significant. Overall the reliability impact of the Lower Cost Alternative is assessed as **slight beneficial**.

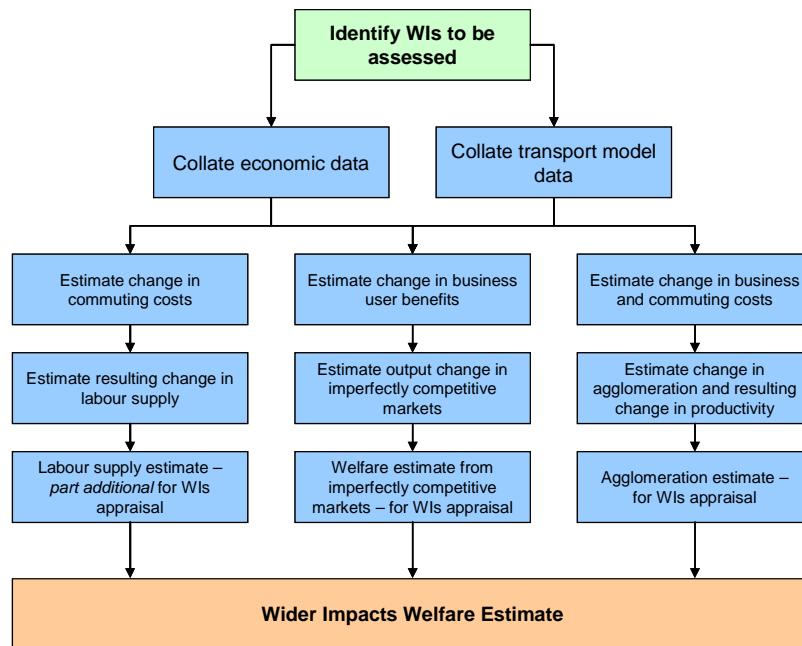
Wider Impacts

- 13.29 The proposed Croyley Rail Link provides connections between recent and future developments along the corridor and London/National Rail services at Watford Junction. Future development includes the proposed Watford Health Campus, directly served by the rail link, and of regional importance. The provision of a high quality fixed track transport system will enhance the attractiveness of sites and facilitate future development in a sustainable fashion.
- 13.30 An exercise to quantify the wider impacts (WI) of the Croyley Rail Link - compliant with the WebTAG units to be adopted in April 2010 has been undertaken and is provided as Appendix M. The key steps in the WI appraisal are shown in Figure 13.1.
- 13.31 The whole of Great Britain was used as the study area to assess three types of Wider Impacts:
- Agglomeration;
 - Imperfectly competitive markets; and
 - Labour supply.
- 13.32 The following data was used to inform the WIs study:
- Croyley study transport model data including: generalised cost and travel demand information by journey purpose and mode (highway, rail, London Underground and bus) in Do Minimum and Do Something scenarios;
 - Transport data for Great Britain: generalised cost and travel demand data by journey purpose and mode for Highway and Rail⁴ passengers; and
 - Economic data: this includes data on the productivity of labour, on employment

⁴ Data gathered from several sources, including the *National Travel Survey* and *Census Travel do Work*

numbers in an area, and on the likely productivity impacts that results from changes in the level of agglomeration.

FIGURE 13.1 THE PROCESS OF ESTIMATING WIDER IMPACTS



13.33 Table 13.5 summarises the conventional and wider impacts from Croxley Rail Link scheme in 2028. The conventional user benefits of £6.7m in 2028 are the total benefits from the conventional appraisal TEE table.

TABLE 13.5 WIDER IMPACTS AND PRODUCTIVITY GAINS FROM THE CROXLEY RAIL LINK IN 2028 (2002 PRICES)

Benefit	Welfare	GDP
Business	£339,300	£339,300
Commuting	£3,732,300	
Others	£2,714,400	
Conventional User Benefits	£6,786,000	
Agglomeration	£1,636,172	£1,636,172
Imperfect Competition	£33,930	£33,930
Labour Supply	£160,590	£401,476
Wider Impacts	£1,830,692	
Total Benefits	£8,616,692	£2,410,878

Wider Impacts add a further £1.8m, or 22%, the majority of which are from agglomeration (89% of the total WIs).

13.34 The GDP column shows productivity gains. Croxley Rail Link contributes over £2.4m per year to UK's economic output by increasing the productivity of activity mostly in and around the Watford-London corridor. The main beneficiaries of the scheme in terms of productivity gains, are the districts of Watford and Three Rivers: together they encompass 84% of productivity gains. Other districts that assist relevant benefits from the scheme consist of Hertsmere, Harrow London, Islington, City of Westminster, Camden and Hillingdon.

14. Accessibility

- 14.1 This section presents the assessment of the Croxley Rail Link and Busway against the Accessibility objective through analysis against its three sub-objectives of:
- **Option Values** - the extent to which the scheme will improve transport options and mode choice in the area it serves;
 - **Severance** - the extent to which the scheme creates new, or overcomes existing, physical barriers to movement; and
 - **Access to the Transport System** - the extent to which the scheme improves access to the public transport network, particularly to those reliant on it.

Option Values

- 14.2 The sub-objective of option values illustrates how someone views a service available to them, even if they do not necessarily use the service. For example if a new railway station is opened, even if someone who lives close to the station does not intend to use it, they could still gain a value from it being available to them in case of unforeseen circumstances.

Impact of Do Minimum

- 14.3 The Croxley Green branch is not in use. The impact on the proposals of the Do Minimum scenario is assessed as **neutral**.

Impact of Preferred Scheme

- 14.4 From the analysis undertaken it is clear that a significant number of available households would benefit from increased travel/mode choice with the introduction of the Croxley Rail Link. An estimated 2,700 net additional households would fall within an 800m catchment area of a rail station. This total does not include those households which presently are within the catchments of Watford Junction and High Street stations and already have an existing rail-based option.

- 14.5 It should be noted that this represents a significant increase in catchment population from Ascot Road, Watford General Hospital, Watford High Street and Watford Junction stations compared to the closure of the Watford Metropolitan station. This benefit is enhanced by the large number of journey destinations (both local and long-distance (north-west and central London for example)) that the rail link will make readily accessible.

- 14.6 By employing the DfT consultation guidance paper on the quantification of option values, whereby the annual benefit of a rail service is £170 in 2002 prices, the annual benefits are estimated at £460k, resulting in a total of £18.3m PV over the scheme life. The scheme is therefore deemed to have a **strong beneficial** impact on option values.

Impact of Lower Cost Alternative

- 14.7 The Croxley Busway will provide additional services for local trips to, from and in between Croxley and Watford Junction. However, these services are largely catered for by existing bus services and where on the guideway may require longer walk times to stops. As such, the busway will offer limited additional benefit. In accordance with the DfT's consultation guidance no additional monetary benefits have been quantified for the busway option. The proposals are assessed as having a **slight beneficial** impact on option values.

Severance

- 14.8 Severance predominantly affects pedestrians and cyclists and is caused when they are deterred from making journeys to the extent that they have to reorganise their activities.

Impact of Do Minimum

- 14.9 The disused Croxley Green Branch will become developed and will no longer be a transport corridor. The overall impact on severance of the Do Minimum is considered **neutral**.

Impact of Preferred Scheme

- 14.10 As the Croxley Rail Link alignment is an existing railway alignment and (new) viaduct, no pedestrian or cycle movements will be adversely affected by the scheme. The scheme utilises an existing transport corridor and may in fact provide some opportunities for improving access. A primary example of this severance benefit is the provision of a new walkway between Watford High Street Station and the Harlequin Shopping Centre reducing the severance effects of the town centre ring road. The impact of the scheme is deemed as being **slight beneficial**.

Impact of Lower Cost Alternative

- 14.11 Similarly, the Croxley Busway is not expected to have any negative impacts on pedestrian severance. While parts of it run on the segregated corridor, the remaining sections will run on street. This option will introduce a new footway alongside the busway however this is primarily intended as a means of access to stops or as a evacuation route from broken down vehicles and therefore will not have a dramatic effect on severance. The overall impact on severance of the Croxley Busway is considered **neutral**.

Access to the Transport System

- 14.12 Access to the transport system takes into account car availability and access to the public transport network. For public transport, factors including wait time, crowding, fares, number of interchanges, travel speeds and the overall quality of the public transport network are used to assess access to the transport system. Although most of these factors are taken into account in the cost benefit analysis, the aim here is to show the information in an alternative light, so that accessibility can be directly assessed.
- 14.13 Of the 2,700 net increase in households within 800m of London Underground or rail as a result of the Croxley Rail Link and Busway routes (excluding Watford Junction and High Street stations), over 700 (28%) do not have access to a car. These areas are typically served by infrequent bus services.
- 14.14 The net change in Access to Transport Systems Indicator, as defined by WebTAG, requires the analysis of non-car owning catchment change which is not within 250m of a public transport service. Because the majority of these areas are already served by at least an hourly bus service, the change in indicator is difficult to quantify accurately, and it is not expected to be significant. As such both the Croxley Rail Link and Busway options are assessed as having a **neutral** impact on access to the transport system.

15. Integration

15.1 This section presents the assessment of the Croxley Rail Link and Busway against the Integration objective through analysis against three sub-objectives of:

- **Transport Interchange** - the extent to which the scheme recommended improves interchange and in so doing makes journeys more seamless;
- **Land Use Policy** - the extent to which the scheme integrates with the land use policies for the area it serves; and
- **Other Government Policies** - the extent to which the scheme is consistent with other, wider government policy objectives.

Transport Interchange

15.2 This section presents the assessment of the Croxley Rail Link and Busway against the Transport Interchange sub-objective through an analysis of its impact on interchange with all modes.

15.3 Table 15.1 sets out the assessment under the Interchange sub-objective. With the introduction of a new rail service operated by London Underground, Croxley Rail Link will deliver a range of benefits that will facilitate improved interchange, including:

- Comprehensive and real-time travel information, including local and network maps;
- Improved stop comfort, shelter, facilities and lighting;
- Improved reliability; and
- CCTV, ticket barriers and staff support for increased security.

15.4 The TAG worksheet is provided as Appendix L.

TABLE 15.1 ASSESSMENT AGAINST THE TRANSPORT INTERCHANGE SUB-OBJECTIVE

Passenger Interchange Indicator	Do Minimum	Preferred Scheme	Low Cost Alternative
Waiting environment	Poor	High	Moderate
Level of facilities	Poor	High	High
Level of information	Poor	High	High
Visible staff presence	Poor	Moderate	Moderate
Physical linkage for next stage of journey	Moderate	High	Moderate
Connection time and risk of missing a connection	Poor	Moderate	Poor

15.5 The overall assessment for interchange is **strong beneficial** for Preferred Scheme option, **slight beneficial** for the Low Cost Alternative option and **neutral** for the Do Minimum situation - where there is no change in current poor provision.

15.6 In addition to assessing the interchange environment and facilities in line with WebTAG guidance, Croxley Rail Link provides significant improvements to providing seamless onward journeys which are not currently possible. The identified wider interchange impacts, set out in Table 15.2, demonstrate that the Croxley Rail Link can deliver substantial benefits and reduce congestion at existing interchange hubs, particularly in the Watford area.

TABLE 15.2 WIDER TRANSPORT INTERCHANGE OPPORTUNITIES FROM CROXLEY RAIL LINK

Interchange Mode	Opportunities with Croxley Rail Link	Opportunities with Croxley Busway
International/National Air	Croxley Rail Link will provide connections from the Metropolitan Line catchment with Watford Junction which has: Direct access from Watford town centre via express bus service to Heathrow and access to West Coast Main Line services to Birmingham International from Watford Junction. Direct services from Watford Junction to Gatwick Airport via Southern services. Direct services to Kings Cross for First Capital Connect services to Luton/Gatwick and London Liverpool Street for Stansted Express rail services	Croxley Busway will provide connections from the Busway corridor catchment with Watford Junction which has direct services to Heathrow, Gatwick and Birmingham. However this is only likely to be used by local residents as a bus-rail interchange is not an attractive method of airport access.
National Rail	Direct access for Metropolitan Line catchment to Watford Junction for West Coast Main Line services north to the Midlands, North West and Scotland and south to London.	Direct access for Busway corridor catchment to Watford Junction for West Coast Main Line services north to the Midlands, North West and Scotland and south to London.
Regional/Local Rail	Direct access to Watford Junction and Watford High Street for interchange with local services to north (Hemel Hempstead, Leighton Buzzard) and south (Harrow, Queens Park, Euston).	Direct access to Watford Junction and Watford High Street for interchange with local services to north (Hemel Hempstead, Leighton Buzzard) and south (Harrow, Queens Park, Euston).
London Underground	Extends and seamlessly integrates the Croxley Green branch line into the existing LUL network; providing direct access from Watford Junction through central London and providing easy interchange to other parts of the London Underground network. Closure of the existing Watford Met Station will impact on some existing users.	Connects local residents to Croxley station but interchange required to access London Underground network. Watford station remains open to services.
Bus	Improved bus interchange opportunities at Ascot Road, Watford High Street and Watford Junction. Introduction of scheme may negate the need for some interchange movements altogether.	Complements existing bus services to yield a step change in service provisions. Interchange opportunities arise especially at Watford Junction bus station
Kiss/Park and Ride	Park and ride site identified at Ascot Road. Redevelopment at Watford Junction to include significant parking provisions and potentially at Croxley and Moor Park for access to Watford.	Park and ride site possible at Ascot Road but busway may not generate sufficient demand to be commercially viable. Will be connected to Watford Junction parking but demand market of busway unlikely to be affected.
Cycle/Walk	Provision to be made at all stations for cycle parking. Cycles allowed on Metropolitan Line trains off-peak. Introduction of stations close to residential catchments should encourage walk-in traffic.	Provisions will be made for cycle parking at Busway stops. Introduction of stations close to residential catchments should encourage pedestrian traffic.

Land Use Policy

- 15.7 The policy fit of Croxley Rail Link and Busway were reviewed with respect to various regional and local policies. It was concluded that both the rail link and busway proposals were consistent with land use policy and therefore assessed as **beneficial**.

Other Government Policy

- 15.8 Table 15.3 presents the appraisal of the Croxley Rail Link and Busway against the Other Government Policy sub-objective based on the examination of alignment/consistency with key policy documents and their objectives. Overall the assessments for both the rail link and busway options are similar, and thus not separately presented. The assessment for both options is **beneficial**.

TABLE 15.3 INTEGRATION – OTHER GOVERNMENT POLICY ASSESSMENT

Government Department	Policy Area	Specific Policies
Communities and Local Government	Housing	Towards an Urban Renaissance The Way Forward for Housing
Communities and Local Government	Regeneration	Our Towns and Cities: The Future
Department for Environment, Food and Rural Affairs	Environmental Protection	Securing the Future - delivering the UK sustainable development strategy Working Together for Clean Air, The Air Quality Strategy for England, Scotland, Wales and Northern Ireland
Department for Innovation, Universities and Skills	Education	Education and Skills: Delivering Results, A Strategy to 2006 14 - 19 Education and Skills Equality and Diversity National Skills Strategy Success for All
Department for Work and Pensions	Social Justice	Opportunity for All Opportunity for All Indicators update
Department of Health	Health	The NHS Improvement Plan
Department for Culture, Media & Sport	Heritage	The Historic Environment: A Force for our Future World Heritage for the Nation: Identifying, protecting and promoting our World Heritage
Communities and Local Government	Neighbourhood Renewal	A New Commitment to Neighbourhood Renewal: A National Strategy Action Plan
Cabinet Office	Social Exclusion	Making the connections: Final Report on transport and social exclusion from the Social Exclusion Unit
HM Treasury	Economic Growth	Fiscal Policy: A New Framework for Public Investment The Government's Fiscal Framework
HM Treasury	Public Expenditure	2007 Spending Review
HM Treasury	Workforce Skills	Developing Workforce Skills: Piloting a New Approach
Department for Business, Enterprise and Regulatory Reform	National Competitiveness	Opportunity for all in a world of change
EEDA	Regional Competitiveness	Opportunities for the East of England

16. Cost Benefit Analysis

Analysis of Monetised Costs and Benefits

- 16.1 The results of the cost benefit analysis undertaken for the Croxley Rail Link and Croxley Busway proposals is set out in Table 16.1, as an Analysis of Monetised Costs and Benefits (AMCB) table. This draws together the outputs from the Transport Economic Efficiency and Public Accounts tables (detailed in Section 13) with other monetised outputs; in this case for journey ambience (Section 14). These impacts cut across NATA Objectives and therefore the results are presented separately to that analysis.

TABLE 16.1 ANALYSIS OF MONETISED COSTS AND BENEFITS (£M PV)

	Preferred Scheme	Lower Cost Alternative
Consumer Users	£260.6	£114.1
Business Users and Providers	£39.6	£35.9
Option Values	£18.3	£0.0
Present Value of Benefits (PVB)	£318.6	£150.0
Present Value of Costs (PVC)	£125.0	£77.0
Net Present Value (NPV)	£193.6	£73.0
Benefit to Cost Ratio (BCR)	2.55:1	1.95:1

- 16.2 The results set out in Table 16.5 demonstrate that both the Preferred Scheme and Lower Cost Alternative have Benefit:Cost Ratios (BCR) considerably in excess of 1:1 and therefore represent Value for Money and would be justified as a use of public sector investment. According to DfT definitions the rail link proposal represents 'Strong' value for money, as it has a BCRs of over 2:1. The busway alternative represents 'Medium' value for money on the same basis.
- 16.3 The results presented demonstrate that the performance of the Preferred Scheme is stronger than that of the Lower Cost Alternative as it has a higher BCR. The selection of Croxley Rail Link as the Preferred Scheme is therefore justified. It is also noted that the Preferred Scheme delivers more than 2½ times more net economic benefit than the Lower Cost Alternative, at only around 60% more cost to the public sector.

Alternative Options Considered

Croxley Rail Link - Accelerated Implementation

- 16.4 An appraisal of an alternative implementation plan has been undertaken and is presented as Table 16.2. The programme for the Rail Link project is effectively fixed by the funding allocated by the region. The RFA shows preparatory cost funding (between Programme Entry and Full Approval) over a five year period with construction commencing in 2016/17. It is considered that construction could potentially begin two years ahead of this if the same funding was available earlier.
- 16.5 Faster delivery of the scheme is beneficial because: the benefits can be realised sooner; savings can be made in project management costs (which are at least as dependent on project duration as on the scale of the project); reduced impact of inflation; and greater ability to manage/control risks over a shorter time frame. The assessment presented in Table 16.2 takes into account all of these factors except the last. Therefore it should be noted that the accelerated programme cost could be reduced by an additional modest amount if the required separate risk analysis was completed.

TABLE 16.2 ACCELERATED IMPLEMENTATION TEST

Test Description	Central Case	Accelerated Programme
Outturn Cost (nominal)	£172.0	£151.2
Regional Funding Requirement (nominal)	£136.5	£119.9
Eligible Local Funding Requirement (nominal)	£34.3	£30.1
Ineligible Local Funding Requirement (nominal)	£1.2	£1.2
Present Value of Capital Costs (2002 prices/discounting)	£106.5	£110.6
Net Present Value (2002 prices/discounting)	£193.6	£200.2
Benefit to Cost Ratio	2.55	2.52

16.6 The results presented in Table 16.2 show that the economic performance of the two options is very close - with both having a BCR in excess of 2.5. The principal reason that the performance of the central case is marginally stronger is that the public sector discount factor is higher than the assumed real capital growth rate - and therefore PV costs reduce as they move further away.

16.7 However it is in terms of **affordability** that the accelerated programme option shows itself to be a stronger option. A saving of more than £20m is seen between the two options. The promoter's preference would be to proceed on this faster plan; opportunities for this will be discussed with DfT when Programme Entry has been achieved.

Croxley Busway - Reduced Frequency Test

16.8 For the Lower Cost Alternative a service frequency equivalent to the London Underground option has been assumed; an alternative test has been appraised with this frequency halved, to better understand how this affects the proposal's economic and financial performance. The results of this test are set out in Table 16.3.

TABLE 16.3 LOWER COST ALTERNATIVE – FREQUENCY TEST (£M PV)

Test Description	Base Frequency (Equal to Met Line)	Test Frequency (Half Met Line)
Service Operating Costs	£44.3	£39.1
Operator Revenue	£62.9	£49.3
Operator Position (over 60 years)	£18.6	£6.7
Operator Ratio (over 60 years)	1.42	1.26
Operator Position (over 5 years)	£0.1	£0.5
Operator Ratio (over 5 years)	1.02	1.10
Net Present Value	£73.0	£17.7
Benefit to Cost Ratio	1.95	1.27

16.9 Table 16.3 shows that the reduction in frequency under this sensitivity test results in a significant loss of revenue (around 20%) for a 12% saving in operating costs. This demonstrates that over the full length of the appraisal the selection of the higher frequency option adopted is justified. However the reason for this test is shown in the early years, where the revenue for the high frequency option only just exceeds operating costs. This is unlikely to be seen as an attractive proposition by the private sector as with a modest reduction in revenue the costs would not be covered.

16.10 The outcome from this conclusion is that HCC would need to be required to subsidise the service operator in early years. Because of the scarcity of revenue funding, a more likely outcome of revenue being less than forecast would be that HCC would specify that the service frequency is reduced to a more sustainable (at least in the short term) position. However this would have an adverse impact on the economic case of the project.

Sensitivity Tests Undertaken

Forecasting Sensitivity Tests

- 16.11 A range of modelled sensitivity tests have been completed for the Croxley Rail Link forecasting framework and are presented within the Demand Forecasting Update Report (Appendix K) to this business case. A subset of these tests (those showing the greatest impact on the forecasts) have been analysed within TUBA. The results of these tests are set out in Table 16.4.

TABLE 16.4 MODELLED SENSITIVITY TESTS UNDERTAKEN (£M PV)

Test Description	Preferred Scheme	
	NPV	BCR
<i>Central Case</i>	£193.6	2.55
Bus mode constant reduced from 10 to 5 minutes	£191.9	2.53
Heavy rail journey times reduced by 10%	£192.1	2.54
LUL Fares increase by 3% pa rather than 1%pa (real)	£190.8	2.51
Heavy rail market reduced in scale	£189.3	2.51
Excluding passengers forecast to transfer from highway	£186.1	2.47

- 16.12 The tests undertaken show that the value for money performance of the Croxley Rail Link scheme is not sensitive to the underlying assumptions in these areas and continues to deliver a BCR of around 2.5:1 in all of them.

Appraisal Sensitivity Tests

- 16.13 Table 16.5 sets out the results of a comprehensive range of sensitivity tests carried out on the Preferred Scheme and Lower Cost Alternative appraisals. Two broad types of test were undertaken: the first identifying the impact of a fixed percentage change in the parameter; the second the level of change required to effectively force the appraisal into a 'no net benefit' position - i.e. where the NPV = £0m and the BCR = 1.0:1. These tests have been carried out against the following groups of parameters:

- Capital/implementation costs;
- Revenue costs;
- Demand and revenue forecasts; and
- Economic benefits.

- 16.14 The results presented in Table 16.5 show that the performance of both options presented in this funding application is extremely robust. In both cases an increase of more than 25% in the estimated capital cost would be required before the BCRs dropped sufficiently to result in a reduction in the Value for Money rating. The test against forecast operating costs demonstrate the extent to which redirecting/extending Met Line services to Watford Junction is a cost effective means of making this strategic connection - these costs could increase by a factor of almost six times before the proposals no longer represent value for money.

TABLE 16.5 ECONOMIC APPRAISAL SENSITIVITY TESTS UNDERTAKEN (£M PV)

Test Description	Preferred Scheme		Lower Cost Alternative	
	NPV	BCR	NPV	BCR
<i>Central Case</i>	£193.6	2.55	£73.0	1.95
Capital + 15%	£177.6	2.26	£68.0	1.83
Capital + 25%	£167.0	2.10	£64.6	1.76
Optimism Bias 44%	£174.4	2.21	£67.0	1.81
Optimism Bias 66%	£155.2	1.95	£60.9	1.68
Capital increases to NPV = 0	x 2.82		X 3.18	
Revenue Costs + 15%	£187.5	2.43	£66.3	1.86
Revenue Costs + 25%	£183.4	2.36	£61.9	1.80
Revenue Costs to NPV = 0	x 5.73		X 2.65	
No Interpeak Generation	£172.3	2.36	not applicable	
Demand Decreases to NPV = 0	x 0.40		X 0.52	
No Option Value Benefits	£175.3	2.40	not applicable	
Benefits Decrease to NPV = 0	x 0.42		X 0.50	

April 2010 Changes in Appraisal Guidance

- 16.15 DfT have publicised changes to WebTAG which will come into force in April next year. Two of these are relevant to the economic appraisal results for Croxley Rail Link: a change in the treatment of Indirect Tax Revenues (ITR) and the inclusion of Wider Impacts (WI) within cost benefit analysis. The impact of these changes on the economic case for Croxley is presented in Table 16.6.

TABLE 16.6 IMPACT OF CHANGES IN APPRAISAL GUIDANCE (£M PV)

Test Description	Preferred Scheme	
	NPV	BCR
<i>Central Case</i>	£193.6	2.55
Including Change in Indirect Tax Revenue Treatment	£193.6	2.60
Including Wider Impacts	£278.2	3.22
Including Change in ITR Treatment and Wider Impacts	£278.2	3.29

- 16.16 It can be seen from Table 16.6 that the proposed changes will improve the economic case for the rail link - with the inclusion of WIs increasing the BCR to greater than 3:1. The lesser impact of the change in Indirect Tax Revenue treatment will also have a benefit to the Croxley Busway case - but there are no material WIs for this option because of its essentially local focus.

17. Wider Analysis

17.1 This section considers the Supporting Analysis as set out within WebTAG, covering the following issues:

- Distribution and Equity;
- Affordability and Financial Sustainability; and
- Practicality and Public Acceptability.

Distribution and Equity

17.2 This section of the MSBC considers the distribution of key impacts geographically and to different groups of people. For the purposes of this application, the forms of distribution considered include:

- Geographical distribution;
- Transport users by mode;
- The socially deprived and accessibility to all;
- Opportunities in relation to local facilities and employment; and
- Distribution of user benefits for local and central London trips.

Geographical Distribution of Impacts

Impact of Preferred Scheme

17.3 The Croxley Rail link will serve the South West Hertfordshire Area and the Croxley Green to Watford High Street/Watford Junction corridor in particular. Closure of Watford Met station will result in some worsening of access to rail for a small number of households in the Cassiobury Park area though this is significantly outweighed by improvements in access to those in south, west and central Watford, where significantly more residents (of poorer areas) gain benefit.

Impact of Lower Cost Alternative

17.4 The alternative busway option largely serves the same areas of Ascot Road and Watford General Hospital, but includes the additional service of Croxley Business Park and does not involve the removal of Watford Met station services. It serves local deprived areas and links residents to local employment opportunities.

Distribution of Impacts by Transport Mode

17.5 Each mode of transport was examined in turn and Table 17.1 sets out the performance of the Croxley Rail Link in terms of distribution and equity.

TABLE 17.1 DISTRIBUTION OF IMPACTS BY TRANSPORT USER GROUP

User group	Croxley Rail Link	Croxley Busway
Private car	Limited reduction in road traffic on existing highway network with transfers to rail link Assessment: Neutral	Limited reduction in road traffic on existing highway network with transfers to busway. Delays in town centre due to bus priority measures and additional services. Assessment: Adverse
Taxis	Taxi facilities provided at new stations Assessment: Beneficial	Taxis not permitted to use busway and potentially likely to object to plans. Assessment: Neutral
Bus	Dependent on response to rail link. Possible reduction in service provision balanced by new interchange opportunities at Ascot Road and Watford Junction. Assessment: Neutral	The busway will increase overall service frequency in certain sections, but segregated section unlikely to be of benefit to existing routes. Assessment: Neutral
Coach	Improved connection to Heathrow coach services at Watford Junction. No significant impact. Assessment: Neutral	Improved connection to Heathrow coach services at Watford Junction. No significant impact. Assessment: Neutral
Rail	Improved service choice to rail users with improved interchange with additional stations and improved interchange opportunities. Introduction of underground services to share track to Watford junction will not result in significant performance risk. Assessment: Beneficial	Improved service choice to rail users with improved interchange with additional stations and improved interchange opportunities Assessment: Beneficial
Underground	Improved interchange with heavy rail and greater catchment potential. Assessment: Beneficial	Limited improvement in interchange potential through the introduction of a dedicated service between Underground and heavy rail. Assessment: Neutral
Cycle	Provision for cycle-rail interchange at new stations Assessment: Beneficial	The footway adjacent to the busway would be available for the use of cyclists as an essentially segregated element of the local cycling network. Assessment: Beneficial
Walk	Increases the population within 800m radius of an Underground station. Assessment: Beneficial	The additional population within 500m radius of a bus stop increases which will encourage walk trips to the bus stop. The proposals include construction of an adjacent pedestrian footway along the segregated section. Assessment: Beneficial
Freight road	No significant impact envisaged. Assessment: Neutral	Limited reduction in road traffic on existing highway network with transfers to busway. Delays in town centre due to bus priority measures and additional services. Assessment: Adverse
Freight rail	Introduction of Underground services to share track to Watford Junction not envisaged to impact on rail freight. Assessment: Neutral	No impact. Assessment: Neutral

Social Inclusion

- 17.6 This section sets out the key social inclusion problems and opportunities in the area using a qualitative measure. Analysis of the socio-economic characteristics of those in the area served by the scheme and the extent to which the scheme improves access to opportunities is the basis for assessment under this sub-criterion. This is done through the use of Index of Multiple Deprivation statistics at district and ward level.
- 17.7 The Index draws on a number of datasets including household overcrowding, unemployment and income support statistics. For the purpose of analysis, only wards exhibiting an index score of over 2 are examined as these may be viewed as exhibiting some degree of local deprivation. Areas exhibiting an index score above 6 may be considered to be suffering from severe local deprivation.
- 17.8 To assess the impact of schemes on social inclusion, the extent to which they serve deprived wards has been used as a measure. The number of ward households in “deprived” wards falling within an 800m area of an option station/stop has been used to derive a figure. The same station catchments areas as used for the assessment of access to public transport are used.
- 17.9 Four wards are identified as deprived in the study area. These are Callowland, Central, Holywell and Vicarage. All four wards are in the Watford district. Table 17.2 presents the results of the ward level index of deprivation catchment analysis for Croxley Rail Link.

TABLE 17.2 INDEX OF DEPRIVATION WARD ANALYSIS

	Index of Deprivation	Ward Households	Ward households within 800m	% of ward households within 800m
Callowland	2.41	2,268	818	36%
Central	9.02	2,766	2,696	97%
Holywell	5.06	2,256	1,903	84%
Vicarage	4.69	2,878	2,094	73%
TOTAL		10,168	7,511	74%

- 17.10 The data presented demonstrates that a significant number of deprived households would be offered improved public transport service through introduction of the rail link or busway.

Making Transport Accessible to All

Impact of Preferred Scheme

- 17.11 The Croxley Rail Link will incorporate facilities at stations to make access from street to train step-free through the provision of lifts and ramps in line with LUL’s Station Planning Standards and Guidance. Platform heights would be designed to facilitate level boarding of trains. All stations would be staffed, ensuring that assistance is on hand when necessary. Public address systems, electronic information and help points would make the system more accessible to all sections of the community.

Impact of Lower Cost Alternative

- 17.12 The Croxley Busway proposal will by and large provide similar access and service as existing bus stops. This means that it is likely that the mobility impaired would still find accessing the stations of Ascot Road and Watford General Hospital a barrier to accessing transport services. In addition, the information and announcement systems would not be up to the standards of a London Underground operated station. As such the Croxley Busway is unable to promote access of public transport to as many as the Rail Link proposal.

Access to Community Facilities/Amenities

- 17.13 The key facilities in the corridor identified are:
- Watford town centre, in particular the High Street and Harlequin Centre;
 - Watford District Hospital and the Health Campus;
 - Watford FC Stadium;
 - The Colne Valley Linear Park;
 - The Grand Union Canal; and
 - Cassiobury Park.
- 17.14 This assessment has focused on the relationship each option will have in providing access to these facilities. In addition, a view has also been taken on access to facilities further afield.
- 17.15 The Preferred Scheme would serve the key facilities identified in the corridor as the proposed stops between Ascot Road and Watford Junction are within reasonable walking distance of all of the sites. The Watford FC stadium is also within reasonable walking distance and the Health Campus would be directly served by a dedicated station. The rail link offers the additional benefit of providing direct access to facilities close to stations on the Metropolitan Line on the route to Baker Street and beyond. These facilities include the National Stadium.
- 17.16 The Lower Cost Alternative would also serve the key facilities on the corridor and additionally would connect the Croxley Business Park with Watford Junction Station and the town centre. However a further interchange would be required onto Metropolitan Line services to the detriment of connections to facilities on that route including the National Stadium.

Affordability and Financial Sustainability

Affordability

- 17.17 The main affordability analysis undertaken for the Preferred Scheme and Lower Cost Alternative options is set out in Sections 26 (Funding Requirements) and 27 (Funding Package) of this MSBC.
- 17.18 The Preferred Scheme would cost a total of £172.0 million in forecast outturn prices (including base inflation at 2.5% pa and real construction inflation at 2.0% pa). This application is for total Central Government funding of **£136.5 million**. Local contributions making up more than 20% (excluding ineligible costs) of the total project would be made by HCC amounting to £6.2 million towards eligible project development costs and £25.8 million towards implementation costs based on capitalising projections of revenue surplus received by HCC. The final element of local contribution is formed by the value of the Rail Link asset (£2.2 million) being transferred to the project from the British Railways Board. A further £1.2 million of local funding would be contributed to cover the cost of the expected public inquiry (included in the £172 million total but not in the money requested from Central Government) Local contributions have been confirmed.
- 17.19 The Lower Cost Alternative would cost a total of £45.1 million in forecast outturn prices (including inflation as per the Preferred Scheme). This application would be for total Central Government funding of £39.5 million. A local contribution of 10% of the total project has been assumed from HCC at £4.4 million. However it is noted that use of the funding protected for delivery of the preferred option would need to be agreed with delivery partners. The busway scheme would not deliver a revenue stream that would be available for or sustain the raising of additional local capital.

Financial Sustainability

- 17.20 Financial Sustainability analysis considers the operating position of any proposed transport system and any requirement for ongoing subsidy. Revenue funding for ongoing subsidy is not available through LTP processes; all promoted projects are expected to be commercially viable.
- 17.21 For the affordability analysis, costs are presented as forecast outturn values including base inflation of 2.5% pa. Staff wages are assumed to increase at 1.0% pa in real terms; however it is assumed that other operating cost elements are constant in real terms. Real fares inflation is assumed at 1% over RPI. Real cost increases continued until 2028/29, when market growth for the service stops. General (RPI) inflation continues through the entire appraisal period.
- 17.22 Table 17.3 sets out the financial sustainability summary for the Croxley Rail Link option, both as the net position for the Metropolitan Line (taking into account cost savings from discontinuing services to Watford Met Station) and the net TfL position - taking into account abstraction from National Rail Overground services.

TABLE 17.3 PREFERRED SCHEME FINANCIAL SUSTAINABILITY (£M NOMINAL)

	Year 1 2015/16	Year 2 2016/17	Year 5 2020/21	Year 11 2025/26	Year 21 2035/36
Net Operating Costs	£2.8	£2.9	£3.2	£3.8	£5.1
Net LUL Revenue	£3.9	£4.7	£6.6	£8.4	£12.7
LUL Operating Position	+£1.1	+£1.8	+£3.4	+£4.6	+£7.6
Net LOROL Revenue	-£0.6	-£0.7	-£1.0	-£1.2	-£1.9
Net TfL Position	+£0.5	+£1.1	+£2.4	+£3.4	+£5.7

- 17.23 Table 17.3 shows that the rail link proposals deliver a consistent and substantial operating surplus from the first year of operations. Even taking into account abstraction from heavy rail services the net TfL position is positive from year one. This revenue surplus will be transferred to HCC and forms the basis of the local capital contribution to the project.
- 17.24 Table 17.4 sets out the financial sustainability summary for the Croxley Busway option, separating out the pure service operating costs and the required operator contribution to maintenance for the busway infrastructure.

TABLE 17.4 LOWER COST ALTERNATIVE FINANCIAL SUSTAINABILITY (£M NOMINAL)

	Year 1 2015/16	Year 2 2016/17	Year 5 2020/21	Year 11 2025/26	Year 21 2035/36
Operating Costs	£1.6	£1.6	£1.9	£2.6	£4.2
Busway Maintenance	£0.5	£0.5	£0.6	£0.7	£1.0
Net Operating Costs	£2.1	£2.2	£2.6	£3.3	£5.2
Net Revenue	£1.7	£2.0	£2.9	£3.6	£5.4
Operating Position	-£0.4	-£0.2	+£0.3	+£0.3	+£0.2

- 17.25 Table 17.4 shows that the busway proposals deliver a modest operating surplus from the third year of operations - the loss in years one and two being a result of the ramp-up applied to revenues. The commercial viability of the Lower Cost Alternative is of particular concern to HCC; since they would be solely responsible for continued operation of the service, unlike the Underground service which would be operated by TfL.

- 17.26 The conclusions of the financial sustainability assessment can be seen to differ slightly from the economic appraisal results (as presented in Table 16.2). In real terms over sixty years the WebTAG compliant appraisal shows a reasonable operating surplus - however this is unlikely to be taken into account by a private sector operator bidding to run the services and only taken short term impacts into consideration. The low cost alternative reduced frequency option (which has an overall poor economic performance) represents less financial risk to HCC.

Practicality and Public Acceptability

- 17.27 Table 17.5 below presents the practicality and public acceptability analysis of the Preferred Scheme.

TABLE 17.5 RAIL LINK PRACTICALITY AND PUBLIC ACCEPTABILITY ANALYSIS

Practicality & Public Acceptability	
Feasibility	Significant engineering feasibility and design work has established the technical feasibility of the scheme. The scheme has very strong political support but would require TWA powers.
Enforcement	The scheme is effectively self-enforcing.
Complexity	The scheme is quite complex and involves a number of different organisations. Issues such as the interaction/negotiation required between Government, LUL and Network Rail and HCC in relation to funding add to complexity. The committed support of all stakeholders should assist in moving the project forward.
Implementation time-scale	The project could be implemented by 2017 (or earlier, subject to the availability of funding and TWA progress).
Complementarity	The scheme is central to and complements HCC's other policies, particularly those specifically relating to South West Hertfordshire. The scheme will facilitate the implementation of complementary parking measures, a new pedestrian link to the Harlequin Shopping Centre and provide scope for complementary PT priority measures on highways benefiting from reduced traffic volumes.
Conflicts	No conflicts identified.
Public acceptability	There is widespread public support for the project though particular aspects of the scheme are likely to generate some local opposition, namely, closure of Watford Met. Station, the construction of the viaduct to connect the Metropolitan Line to the Croxley branch line, and the concerns of residents close to the railway line at the re-introduction of rail services. However these impacts are significantly outweighed by the wider public benefit of the proposals.

- 17.28 The practicality and public acceptability analysis indicates that the scheme is deliverable and has been developed to a high level of detail sufficient to allow for the preparation of a Transport & Works Order (subject to Government approval of funding eligibility and availability).
- 17.29 Table 17.6 presents the practicality and public acceptability analysis for the Lower Cost Alternative option.
- 17.30 The practicality and public acceptability analysis indicates that the scheme may be deliverable, although it is a recent proposition in comparison to the Preferred Scheme and has not been developed to an equivalent level of detail. In particular no public consultation has been undertaken for this scheme and it lacks the high level of stakeholder support that is behind the rail link. Similar recent schemes converting former rail assets to guided/unguided busways have faced vocal opposition from the heavy rail lobby; it is also believed that

creating what could appear to be a new road could be unpopular with environmental groups and with highway users who are prevented from using it by the enforcement measures.

- 17.31 The requirement for a change in the land planning designation creates a further opportunity for objection to the scheme; including potentially from Network Rail who would benefit from an alternative change in the planning designation allowing them to realise the value of the corridor as development land.

TABLE 17.6 BUSWAY PRACTICALITY AND PUBLIC ACCEPTABILITY ANALYSIS

Practicality & Public Acceptability	
Feasibility	Engineering feasibility and design work has broadly established the technical feasibility of the scheme. The scheme would require Highways Act powers and a change in planning designation.
Enforcement	The segregated busway alignment has been designed to be self-enforcing, with measures to restrict access to other vehicles.
Complexity	The segregated scheme is generally simpler in concept than the rail link option and would be promoted exclusively by HCC. An agreement with Network Rail would be required to transfer the Croxley Green Branch into HCC ownership. A change in planning designation would be required. The introduction of bus priority measures in a congested town centre environment is likely to present significant technical and land acquisition issues.
Implementation time-scale	The project could be implemented by March 2014 subject to the availability of funding and TWA progress.
Complementarity	The scheme broadly complements HCC's other policies, particularly those specifically relating to South West Hertfordshire.
Conflicts	The connection between the busway and the highway network at the eastern end of the alignment would require land currently identified for development for the Croxley Health Campus.
Public acceptability	Public support for the project has not been tested for the busway proposals to the same degree as the Preferred Scheme; the project is likely to be seen as second best by the public in comparison to the rail link option. In addition there is a history of local opposition to road building. The busway proposals do not have the same level of Stakeholder support as the proposed rail link.

18. Value for Money Case Summary

- 18.1 This section brings together the various aspects of the Value for Money case into a summary of the performance of the Croxley Rail Link and the Croxley Busway options; including Central Government Appraisal Summary Tables for both options.

Appraisal against Government Objectives

- 18.2 Overall, the Preferred Scheme provides a good fit with Central Government NATA objectives; the Appraisal Summary Table (AST) for the Croxley Rail Link is presented as Table 18.2. The Croxley Busway/Lower Cost Alternative overall provides a good fit with NATA objectives but does not satisfy as many of them or to the same level as the rail link. The AST for the Lower Cost Alternative is presented in Table 18.3. A direct comparison of the assessments of the two options is set out as Table 18.1.

TABLE 18.1 APPRAISAL SUMMARY TABLE – COMPARISON OF OPTIONS

Objective	Sub-Objective	Preferred Scheme	Lower Cost Alternative
Environment	Noise	Slight adverse	Slight adverse
	Local Air Quality	Neutral	Neutral
	Greenhouse Gases	Slight adverse	Neutral
	Landscape	Neutral	Neutral
	Townscape	Slight beneficial	Slight beneficial
	Heritage of Historic Resources	Slight adverse	Slight adverse
	Biodiversity	Moderate adverse	Moderate adverse
	Water Environment	Slight adverse	Moderate adverse
	Physical Fitness	Neutral	Neutral
	Journey Ambience	Moderate beneficial	Slight beneficial
Safety	Accidents	Slight beneficial	Slight beneficial
	Security	Moderate beneficial	Neutral
Economy	Public Accounts	PVC £125.0m	PVC £77.0m
	TEE: Business Users and Transport Providers	PVB £39.6m	PVB £35.9m
	TEE: Consumers	PVB £260.7m	PVB £114.1m
Accessibility	Reliability	Strong beneficial	Slight beneficial
	Wider Economic Impacts	Moderate beneficial	Slight beneficial
	Option Values	PVB £18.3m Strong beneficial	Slight beneficial
Integration	Severance	Slight beneficial	Neutral
	Access to the Transport System	Neutral	Neutral
	Transport Interchange	Strong beneficial	Slight beneficial
Integration	Land Use Policy	Beneficial	Beneficial
	Other Government Policies	Beneficial	Beneficial

- 18.3 Against all sub-objectives the assessment of the Preferred Scheme is equal to or better than that of the Lower Cost Alternative. In particular the rail link performs significantly better against the objective of Economy and the sub-objectives of: Journey Ambience, Security, Option Values, Severance and Transport Interchange.

TABLE 18.2 CROXLEY RAIL LINK APPRAISAL SUMMARY TABLE (AST)

Option:	Croxley Rail Link	Description:	Problems:	Total Outturn Cost of Proposal: £172.0m	
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS		QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	Some temporary noise impacts along the route during construction. The introduction of frequent rail services along a currently disused route will have a significant noise impact, although mitigation measures will reduce this.			Slight adverse
	Local Air Quality	Some temporary dust production during construction/track reinstatement within segregated alignment. Emissions of ozone and iron from rolling stock unlikely to be higher than background levels. Potential replacement stock would reduce emissions in the future.			Neutral
	Greenhouse Gases	The change in emission of carbon is 572 tonnes per year.			Slight adverse
	Landscape	Work on the rail alignment will not have a significant impact on the existing urban landscape surrounding the area. Construction of the required viaduct is the primary landscape impact of this option.			Neutral
	Townscape	The Preferred Scheme will improve the townscape directly surrounding the existing rail line and associated stations that are to be brought back into use. The Croxley Green Branch has formed part of the local townscape since the 1920s.			Slight beneficial
	Heritage of Historic Resources	This option will have no impact on the historic buildings within the vicinity of the existing infrastructure and the site for the construction of the viaduct/link to the Metropolitan Line. There may be potential adverse impacts on the setting of Estcourt conservation area.			Slight adverse
	Biodiversity	There are some protected species of wildlife within the vicinity of the rail corridor. Engineering works are not expected to have any significant impact upon the biodiversity of the area, but some existing UKBAP priority habitats.			Moderate adverse
	Water Environment	Providing sufficient precautionary measures are followed regarding the use of substances during construction and maintenance, this option will have little impact on the water environment.			Slight adverse
	Physical Fitness	The overall impact on physical fitness will be positive, but not significant against the standard NATA scale.			Neutral
SAFETY	Journey Ambience	The standard LUL vehicles used along the Croxley Rail Link will provide good passenger ride quality over the repaired/renewed track, offering an improved level of journey ambience over the current public transport alternative.			Moderate beneficial
	Accidents	An assessment of accidents is not justified because of the low level of mode shift from highway, although what impact there is will be positive.			Slight beneficial
ECONOMY	Security	This option will see the implementation of measures including CCTV, passenger help and information points, and lighting. Passenger security will be further increased by the presence of staff on vehicles and at stations.			Moderate beneficial
	Public Accounts			PVC £125.0m	
	TEE: Business Users and Transport Providers			PVB £39.6m	
	TEE: Consumers			PVB £260.7m	
ACCESSIBILITY	Reliability	The Metropolitan Line operates in complete segregation from all highway traffic and will offer significant passenger reliability benefits in comparison with the current situation.			Strong beneficial
	Wider Economic Impacts	The proposed rail link provides high quality strategic connections between Watford, London and National Rail services at Watford Junction station. The provision of a fixed track transport system will stimulate sustainable inward investment to the area.			Moderate beneficial
	Option Values	This option will result in an estimated 2,700 additional households falling within an 800m catchment area of an Underground Station. A large number of local and long-distance journey destinations will become readily accessible.		PVB £18.3m	Strong beneficial
INTEGRATION	Severance	As a segregated alignment, the Preferred Scheme will not adversely affect pedestrian or cycle movements. This option proposes opportunities for improving access, including a walkway between the Harlequin Shopping Centre and Watford High Street station.			Slight beneficial
	Access to the Transport System	Measures included within the Preferred Scheme will improve access to the transport system for households without access to a car that will fall within 800m of a new rail station. The area does however display widely developed access to the transport network.			Neutral
INTEGRATION	Transport Interchange	The proposed development will provide high standards of waiting environments, facilities and information for passengers. The new extended rail service will also improve levels of reliability and passenger security.			Strong beneficial
	Land Use Policy	The Preferred Scheme will contribute beneficially to all of the identified local and regional land use policies and strategies. Beneficial contributions will also be made to all associated locally proposed schemes.			Beneficial
	Other Government Policies	The Preferred Scheme is in line with and makes contribution to other Government policies.			Beneficial

TABLE 18.3 CROXLEY BUSWAY APPRAISAL SUMMARY TABLE (AST)

Option:	Croxley Busway	Description:	Conversion of Croxley Green Branch to segregated unguided busway linking the Metropolitan Line and Watford Junction.	Problems:	Congestion and delays on strategic and local road networks extending journey times and affecting reliability of existing public transport services. Some socio-economic deprivation in West Watford with inadequate PT access.	Total Outturn Cost of Proposal: £45.1m
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS			QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	Some temporary noise impacts along the route during construction. The introduction of frequent bus services along a disused rail link will have a significant noise impact, although mitigation measures will be used to reduce this impact.				Slight adverse
	Local Air Quality	Some temporary negative impacts on local air quality during construction/engineering to convert disused rail link into busway. Vehicle emissions from buses within segregated alignment and on-street route sections during operation.				Neutral
	Greenhouse Gases	This option will see a slight increase in CO ₂ emissions resulting from the additional bus services introduced along the route				Neutral
	Landscape	The Lower Cost Alternative will not have a significant impact on the landscape. Construction work will be contained within the currently disused branch line.				Neutral
	Townscape	This option will bring the disused branch line back into use with conversion to a busway replacing the dilapidated station buildings. However the nature and character of the branch line will change and potentially obtrusive bus priority measures introduced.				Slight beneficial
	Heritage of Historic Resources	This option will have no impact on any of the historic buildings within the vicinity of the Croxley Green Branch. Loss of railway heritage.				Slight adverse
	Biodiversity	There are some protected species of wildlife within the vicinity of the rail corridor. Engineering works are not expected to have any significant impact upon the biodiversity of the area, but some existing UKBAP priority habitats.				Moderate adverse
	Water Environment	Strict codes of practice and specifications will be adhered to during construction. This option will have a higher impact than the Preferred Scheme due to increased surface runoff from the asphalt busway.				Moderate adverse
	Physical Fitness	The overall impact on physical fitness will be positive, but not significant against the standard NATA scale.				Neutral
Journey Ambience	Journey ambience will be improved by the busway because of improved ride quality (along former branch line) and through use of newer vehicles.				Slight beneficial	
SAFETY	Accidents	An assessment of accidents is not justified because of the low level of mode shift from highway. However, what impact there is will be positive.				Slight beneficial
	Security	This option will see additional passenger information points and lighting at stops. There are safety concerns for stops along the segregated section which will be relatively isolated and with few pedestrians passing by.				Neutral
ECONOMY	Public Accounts				PVC £77.0m	
	TEE: Business Users and Transport Providers				PVB £35.9m	
	TEE: Consumers				PVB £114.1m	
	Reliability	The busway will operate in complete segregation from highway traffic along the former Croxley Green Branch, but in other locations will operate on highway – with measures to increase the level of priority given to bus.				Slight beneficial
	Wider Economic Impacts	The busway will provide high quality connections between Watford, Metropolitan Line Services at Croxley and National Rail services at Watford Junction station. A supplementary service will connect with Croxley Business Park, not directly served by the rail link.				Slight beneficial
ACCESSIBILITY	Option Values	The lower cost alternative will offer limited additional option value benefits to those living within the catchment area of the proposed busway.				Slight beneficial
	Severance	The segregated section of the busway alignment will not adversely affect pedestrian or cycle movements and includes a footway alongside the segregated route. However this is intended as an access route to stops/escape route rather than a new right of way.				Neutral
	Access to the Transport System	Many of the areas that will be served by the new Croxley Busway are served by existing bus services. The lower cost alternative will lead to an increase in frequency of bus services, however not to a significant extent.				Neutral
INTEGRATION	Transport Interchange	The Lower Cost Alternative will see some improvements in the waiting environment, passenger information and the physical linkage of journeys. These improvements will be slight in comparison with the Preferred Scheme.				Slight beneficial
	Land Use Policy	The Croxley Busway option will contribute beneficially to the majority of the identified local and regional land use policies and strategies.				Beneficial
	Other Government Policies	The Lower Cost Alternative is in line with and makes contribution to other Government policies.				Beneficial

Cost Benefit Appraisal

- 18.4 The Preferred Scheme delivers the stronger economic performance with a Benefit:Cost Ratio of **2.55:1** and an NPV of **£189 million**. A range of sensitivity test has been undertaken on the proposals; these demonstrate that the central case assessment is robust and the underlying assumptions are reasonable.
- 18.5 The Lower Cost Alternative delivers a poor economic performance with a Benefit:Cost Ratio of **1.95:1** and an NPV of **£73 million**. This assessment is also shown to be robust through the series of sensitivity tests undertaken.
- 18.6 The economic performance of the two options shows that the promoter's selection of the Croxley Rail Link over the Croxley Busway is justified on this basis; as it is demonstrably the better option.

Wider Analysis

- 18.7 Against the analysis of Distribution and Equity the Preferred Scheme proves itself to be the better scheme particularly because of the creation of direct connections to London and the improved ability to make services accessible to all in comparison with the Lower Cost Alternative.
- 18.8 Although the Preferred Scheme would require more funding in total than the Lower Cost Alternative, it delivers a significant local capital contribution towards implementation of the project. The local contribution for the Lower Cost Alternative would be dependent on HCC obtaining agreement from delivery partners to redirect development funding identified for the rail link scheme and finding an additional one million pounds of funding by reprioritising their transport commitments.
- 18.9 Both options presented in this MSBC would be broadly financially sustainable over the appraisal period; however the Lower Cost Alternative would require some initial subsidy and would deliver considerably less net revenue than the Preferred Scheme.
- 18.10 Both schemes are considered to be practical in terms of their ability to be implemented. Unlike the Preferred Scheme, the Lower Cost Alternative would require a change in planning designations - creating an additional opportunity for objections to be made. The public acceptability of the Croxley Rail Link has been consistently demonstrated during development; it is believed that there would be significantly less Stakeholder support for the busway scheme and that there are likely to be objections to the effective loss of the former branch line and/or creation of a new highway accessible only by bus.

Conclusions

- 18.11 Against all sections of the Value for Money case the Preferred Scheme of the Croxley Rail Link is the superior option. While the Croxley Busway is an attractive scheme with a good value for money case, it is not the optimum scheme, does not meet all the scheme objectives and therefore its implementation could not be justified.

19. Governance

Project Management Principles

- 19.1 During the period of project development, the scheme and its proposed arrangements have benefited from a positive approach from the key organisations: HCC; Network Rail; and Transport for London/London Underground. Continuity and support to the project's original objectives and business case has additionally been provided by the continuing engagement of Steer Davies Gleave as the 'business case custodian' for the scheme.
- 19.2 Going forward, the parties are committed to ensuring the highest possible level of compliance with the relevant investment and project management approaches of the differing organisations, i.e. Guidance to Railway Investment Projects (GRIP) for Network Rail and Transport for London and London Underground, Office of Government Commerce (OGC and 4Ps) Gateway approach for HCC and DfT. A copy of the 4Ps Project Assessment Spreadsheet is provided at Appendix N.

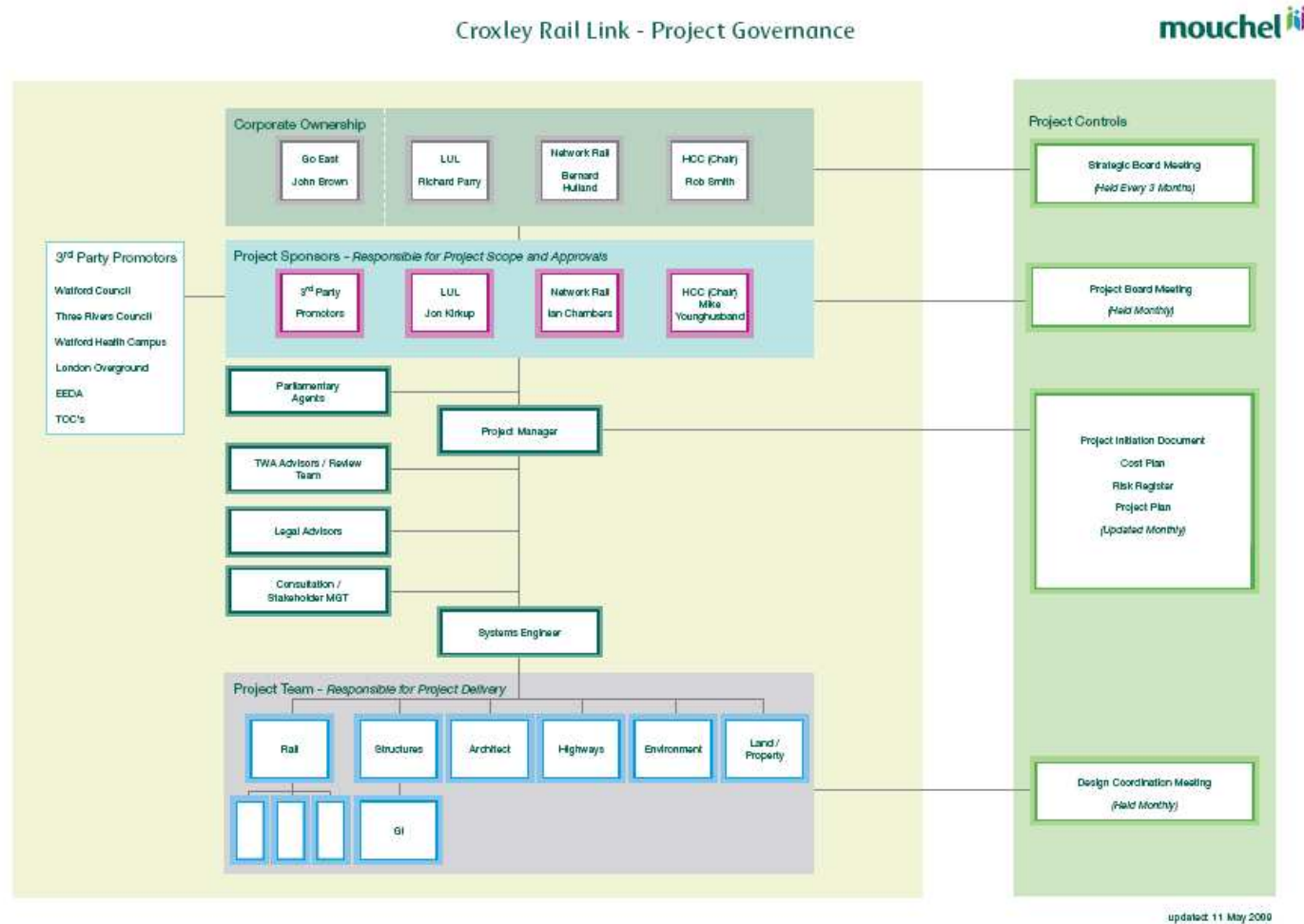
Project Phases

- 19.3 The successful delivery of the Croxley Rail Link through the coming years will require an evolving project team that is best able to respond to the specific challenges and tasks faced at any moment in time. The responsibilities and organisational arrangements for development and delivery will necessarily switch to suit the following five phases:
- **Phase Zero:** development of the business case and proposals to a level where it achieves Programme Entry;
 - **Phase One:** further development of the project and its preparation, submission and engagement with appropriate planning processes and inquiries necessary to achieve the required powers for delivery and operation;
 - **Phase Two:** following the grant of appropriate powers this phase will include detailed technical design sufficient to enable successful procurement of the necessary contracts to construct Croxley Rail Link;
 - **Phase Three:** the mobilisation of contractors and construction of the rail link; and
 - **Phase Four:** operations of services on Croxley Rail Link and post-implementation review for lessons learned from its delivery and initial comparisons with final Business Case.
- 19.4 An implementation and process map showing the proposed timeline is provided as Appendix O.

Key Roles and Responsibilities

- 19.5 The *Senior Responsible Owner* (SRO) for the project is Rob Smith (HCC). Rob Smith leads the proposed quarterly engagement with the Strategic Board which comprises HCC, LUL and Network Rail. Go East have also been invited to attend these meetings. As SRO for the project his responsibilities include:
- Ensuring that the elected members are kept informed of progress; and
 - Chairing the Strategic Board and maintain accountability for the project.
- 19.6 At a County Council level Croxley Rail Link is a committed project and is included in HCC's Forward Plan. At Executive level, its development and delivery is the responsibility of the Executive Member for Highways, Transport and Rural Affairs who will be briefed on a quarterly basis. The decision to formally seek TWA powers must be taken by the full County Council.

FIGURE 19.1 PROJECT GOVERNANCE



- 19.7 The local Members of Parliament and the Mayor of Watford, who are keen supporters of the project, are routinely informed of progress on the development of the scheme; this includes confirmation of support for this MSBC submission which can be found in Appendix E.
- 19.8 The SRO will be supported by Mike Younghusband, Head of Transport Programmes and Strategy. As *Project Sponsor* he will keep Rob fully informed of project progress and any issues that arise. Mike will chair the Project Board and his responsibilities as Project Sponsor are to ensure that the project is developed in such a way that its objectives will be met within the available budget, including ensuring:
- that the Project Board, funders and stakeholders are kept informed;
 - that project gateway reviews are appropriately timed and successfully passed;
 - that the business case is kept up to date with appropriate recognition and management of risks to the project;
 - that funding arrangements are appropriately managed to achieve successful and timely delivery;
 - that project arrangements through the project develop for the continuing and evolving responsibilities of the project partners: HCC, Network Rail and Transport for London;
 - with the SRO and the Strategic Board that informed decisions are taken where significant options for the project and its delivery need to be taken; and
 - that the project is reviewed post-implementation for learning and comparison to the original Business Case.
- 19.9 The *Lead Project Manager* for the project will initially be Tom Duckmanton, seconded to HCC and he will be supported by David Allatt from LUL. HCC and LUL will jointly appoint a project manager at the end of Phase One/beginning of Phase Two. The Lead Project Manager's responsibilities include:
- Maintenance and use of the Project Risk Register to manage risks and report material changes (all Phases);
 - Managing the production of the required deliverables (all Phases);
 - Planning and monitoring the project (all Phases);
 - Assuring appropriate change control and any required configuration management (all Phases);
 - Reporting through agreed reporting lines on project progress (all Phases);
 - Assuring that an appropriate technical and quality strategy are adopted throughout the project (all Phases);
 - With the Project Sponsor, identifying and obtaining any support and advice required for the management, planning and control of the project (all Phases);
 - Managing project administration (all Phases);
 - Conducting end project evaluation to assess how well the project was managed (at Phase 4);
 - Preparing a Lessons Learned report with the Project Sponsor (at Phase 4); and
 - Preparing any follow-on action recommendations as required (at Phase 4).

Promotion and Delivery Agreements

- 19.10 The principles of a Joint Promotion Agreement between HCC and LUL/TfL have been established. This agreement will set out the responsibilities and liabilities of each party (and to each other) in relation to advancing the scheme to a TWA submission. The agreement is currently being developed and will be presented to the Strategic Board for approval. Following a successful TWA application and the granting of the necessary powers for construction, a similar agreement between key partners (TfL, HCC) would be drawn up to cover the delivery of the project.

- 19.11 Arrangements to engage Network Rail (NR) in the development of the scheme through to TWA Application would be through NR's standard contractual frameworks agreements. A Basic Services Agreement is currently being put in place between HCC and NR. As the project progresses, the appropriate agreements would continue. HCC would also seek to develop a Partnership agreement/Memorandum of Understanding with NR to sit alongside the formal contractual arrangements.

Arrangements for Reporting and Decision Making

- 19.12 A Strategic Board has been established. The Board, chaired by the project's SRO will have an appropriate attendance including:
- Senior Responsible Owner;
 - Project Sponsor;
 - Project Manager;
 - Network Rail;
 - London Underground;
 - Go-East; and
 - Contractor (when appointed).
- 19.13 For each phase, a Project Initiation Document (PID) will be established and approved by the Strategic Board. This will be a 'working document' which will define in greater detail:
- What the project intends to achieve;
 - Who is responsible;
 - How it will be achieved;
 - When it will be delivered.
- 19.14 The PID will include a detailed project plan, which will capture the 'key tasks' to be achieved prior to the project proceeding to the next stage.
- 19.15 The Project Board's role will be to ensure that the project is developed and managed in accordance with the PID and to provide oversight and advice to the Project Manager to enable progress in a timely fashion. The Project Board will provide greater continuity and assurance, alongside project control processes, as the Project Managers transition at the end of Phase One (grant of TWA powers) and beginning of Phase Two (detailed specification and procurement).
- 19.16 The Board will meet every month and its decisions will be recorded and communicated to provide appropriate corporate governance for the project and its development. In advance of the Project Board, the Project Manager, will submit a 'highlight' report, detailing progress in accordance with the PID. The 'highlight' report will include 'progress' reports from each of the partner organisations. At pre-determined intervals, the Project Board, will invite an independent review team to check the deliverables achieved during the stage.
- 19.17 At regular intervals The Board will invite a wider audience to attend. Whilst these bodies will not have a 'say' in the project delivery, their attendance and participation is key to the successful delivery. Invitees to this Board would include:
- Department for Transport;
 - Watford Health Campus;
 - EEDA;
 - Watford Council;
 - Three Rivers District Council; and

- Station Operators for Watford Junction - London Midland, LOROL.

19.18 The Project Board would notably include the project partners to provide assurance over the budget and its use to deliver the project. More details of the wider stakeholder engagement of the project can be found in Section 22.

Project Resources

19.19 The Croyley Rail Link Project Team will be a multi-organisational team consisting of full-time or part-time representatives of HCC, London Underground and Network Rail. It will be led by the Project Manager.

19.20 It is proposed at this stage that the Project Team will utilise London Underground's project management processes and tools given:

- i. HCC and LUL will jointly appoint a project manager at the end of Phase One and beginning of Phase Two;
- ii. The processes and tools used will be appropriate for a railway project; and
- iii. The processes and tools will have a close resemblance and association with Network Rail's/RIBA processes and are therefore best placed to reduce communication risks and inefficiencies.

19.21 The Project Team will utilise additional expertise and resource from the various arrangements enjoyed by the promoters of the project. With HCC, London Underground/Transport for London and legacy arrangements from the PPP contractor Metronet all active participants in the development and delivery of the project, there are a number of avenues by which expert or additional resources can be procured.

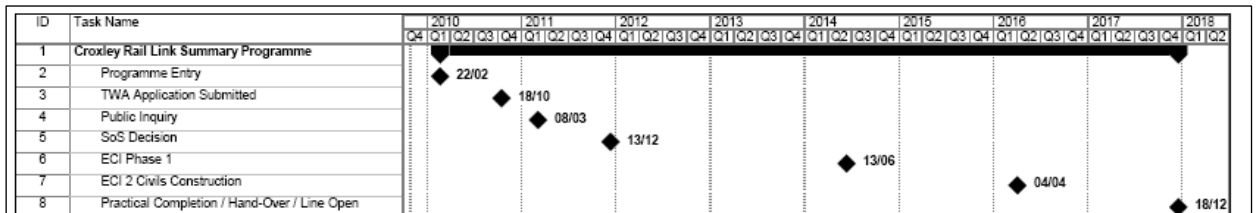
19.22 Examples for such advice may include professional public relations and TWA advice during Phase One, procurement and legal advice during Phase Two and systems engineering review during Phase Three. It is likely that HCC and LUL/TfL would jointly appoint Parliamentary Agents as part of the Joint Promotion Agreement, for example, to assist and advise in relation to the TWA Application process.

20. Project Plan and Milestones

Project Plan

- 20.1 The detailed Project Programme (attached at Appendix P in the form of a Gantt chart) shows activities and durations from submission of the MSBC to completion of works' contracts.
- 20.2 A summarised form of the project's development and phasing is provided as Figure 20.1. An implementation and process map for the project can be found at Appendix O.

FIGURE 20.1 KEY MILESTONES



- 20.3 The activities listed, and their durations and dependencies, have been based on inputs from and consultations with appropriate members of the Project Team with expertise in funding, procurement processes and construction.

Key Dependencies

- 20.4 Key dependencies include:

- DfT Programme Entry;
- Conclusion of the Development Agreements with LUL and Network Rail;
- Preparation of initial designs;
- Sale and purchase agreement completion/Preparation of initial designs;
- Evaluation and clarification of tenders/DfT approval to proceed; and
- Start of construction phases.

Tasks on the Critical Path

- 20.5 Significant tasks on the critical path include:

- Achievement of Programme Entry from DfT;
- Signing Heads of Terms with London Underground (TfL);
- Granting of necessary TWA Powers by the Secretary of State;
- Achievement of Conditional Approval from DfT including successfully completing 4Ps Gateway 2; and
- Achievement of Full Approval from DfT including successful completing 4Ps Gateway 3.

Impacts of Delay

- 20.6 A delay to achieving Programme Entry will have an immediate impact on the need for the project promoters to gain appropriate TWA Powers for the further development of the project.

- 20.7 The impact of delay to the overall programme of delivery caused by a delay in seeking and obtaining TWA Powers will translate into further delay to the development of the project as technical specification and procurement processes will be similarly delayed.
- 20.8 Without timely Programme Entry, there is a risk that stakeholder support for the scheme will reduce and that the local funding secured for the project will elapse.

Milestones

- 20.9 Key milestones include:
- DfT programme entry;
 - Issue of Design & Build OJEU Notice;
 - TWA Powers;
 - Issue of Invitations to Tender;
 - DfT approval to proceed;
 - Signing of Design & Build Contract(s); and
 - Start and completion of works.
- 20.10 Further details of these Milestones can be found on the 'implementation and process map' at Appendix O.

21. Risk Management

Introduction

- 21.1 The project has developed its consideration and management of risk into a two-fold approach:
- Governance and management of risks between the clients; and
 - Technical risks arising from the specification, procurement and delivery of the project.

Governance and Management of Risks

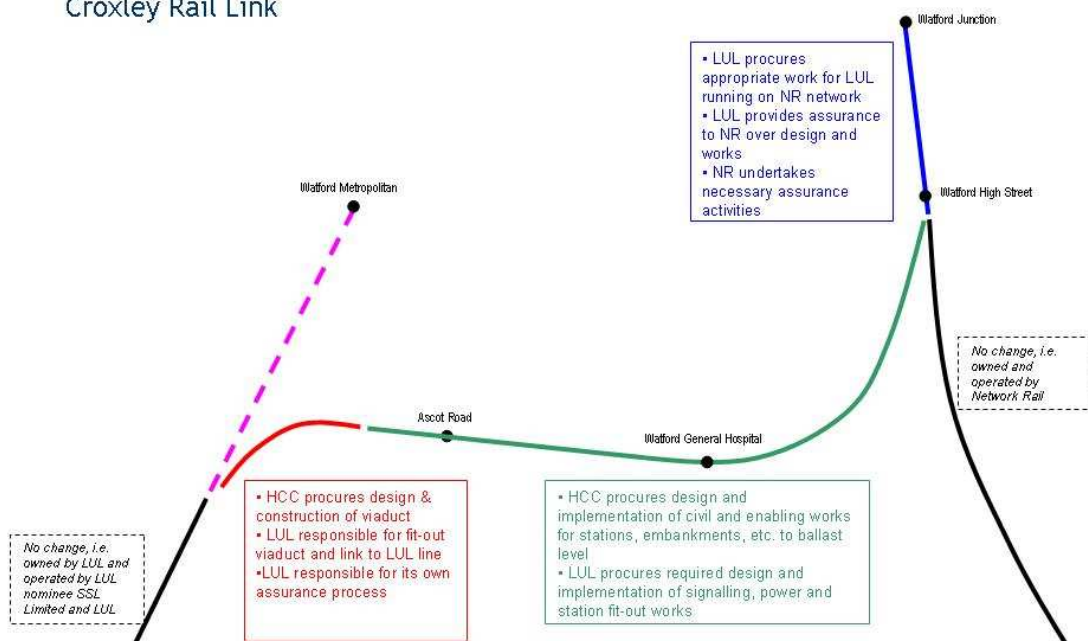
- 21.2 The client team recognise that Croxley Rail Link is a complex project in regard to its multiple interfaces and interested bodies. For example:
- LUL services using part of the National Rail network;
 - Network Rail currently owning the redundant rail element of the link; and
 - Funding coming through HCC from DfT and based on transfer of revenue from LUL.
- 21.3 To best achieve successful development and delivery of the project the parties have developed an “Assurance Risk and Control Register” (see Appendix B). It provides the high-level context for consideration of the more project-specific risks that the Project Manager is best placed to identify, understand and manage. The Assurance Risk and Control Register represents the parties’ recognition of the project management and leadership risks they jointly share and the agreement of appropriate control measures.

Development Agreements

- 21.4 Figure 21.1 illustrates the proposed arrangements for the development and construction of Croxley Rail Link. The proposed arrangements demonstrate that the promoters of the project have responded to the challenge of organisational complexity by developing and agreeing Development Agreements between themselves that identify their respective roles and responsibilities.

FIGURE 21.1 ORGANISATIONAL ASSUMPTIONS FOR THE DEVELOPMENT AND CONSTRUCTION OF CROXLEY RAIL LINK

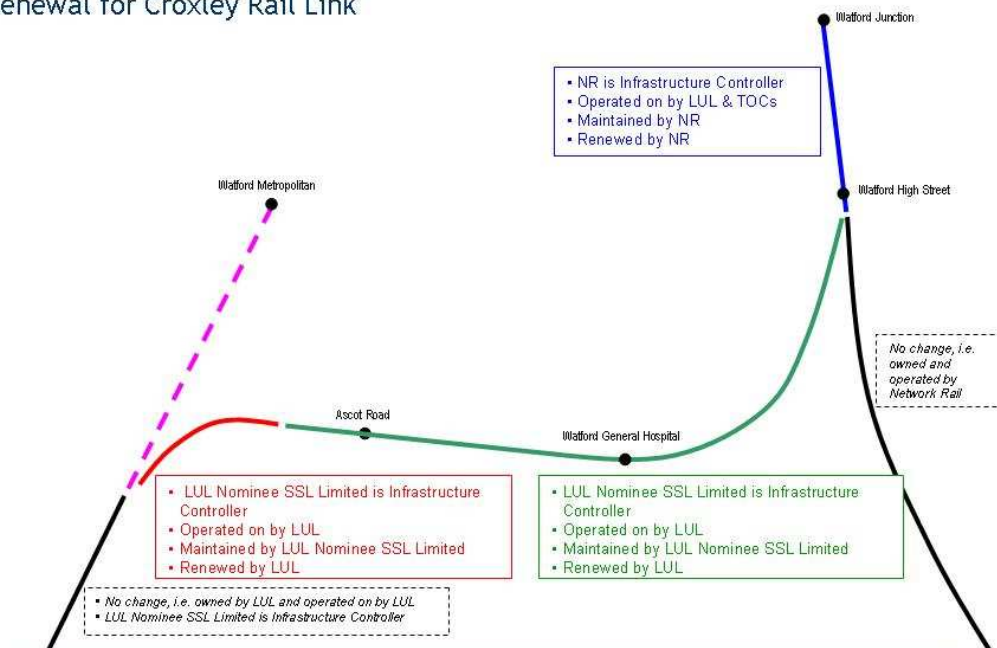
Organisational assumptions for the Development and Construction of Croxley Rail Link



- 21.5 Table 21.1 sets out the key risks relevant to the complex project delivery environment and identifies likely impacts, proposed control measures and risk owners.
- 21.6 Figure 21.2 illustrates the proposed ongoing arrangement for the operation, maintenance and renewal of Croxley Rail Link.

FIGURE 21.2 ORGANISATIONAL ASSUMPTIONS FOR THE ONGOING OPERATION, MAINTENANCE AND RENEWAL FOR CROXLEY RAIL LINK

Organisational Assumptions for the Ongoing Operation, Maintenance and Renewal for Croxley Rail Link



Risk Register

- 21.7 The risk review process (RRP) for the proposed project has been developed since the last submission to DfT and is an active part of the development of the project. The initial workshop and QRA analysis described in this application formed early stages of this process. This section sets out the how the anticipated risk management strategy will develop.
- 21.8 The current version of the risk register is attached within Appendix B to this document. This has been developed over a period of time as the scheme has developed. However, a thorough review of the risks and the register was undertaken during August 2009 as part of assuring our approach for MSBC approval and programme entry.
- 21.9 The register will be regularly reviewed by the promoters and its formal review for changes to risk profile will be an agenda item at every other Project Board meeting. The implementation and management of project risk controls will be a standard agenda item for each meeting of the Project Board.

Mitigation Plans

- 21.10 An initial assessment of potential mitigation measures is included on the risk register. The RRP will continue developing mitigation actions for all identified risks, and detailed action plans for major risks, including the identification of individual risk owners.

TABLE 21.1 KEY DELIVERY RISKS AND CONTROL MEASURES

Issue	Risk	Probability	Impact	Control Measure	Owner
Ownership of existing rail alignment rests with Network Rail	Network Rail decide to utilise the asset for alternative purposes or seek material gain from the assets disposal to LUL or HCC	Low	High	Agreement to be developed in addition to existing declared Network Rail position to transfer asset at 'minimal or no cost' to LUL	HCC/Project Sponsor
Delivery of Croxley Rail Scheme through to implementation is a complex and protracted process requiring TWA approvals and procurement	Multiple parties and protracted period give risk to changing personalities and risk of changing attitudes and capabilities to the project	Medium	Medium	Development Agreements exist or will be developed and implemented binding the parties to clear roles and responsibilities through the development process	HCC/Project Sponsor
Successful delivery of services using Croxley Rail Link requires four different pieces of infrastructure to be amended and/or created	Responsibilities for interfaces between delivery contracts and specifications maybe unclear leading to inefficient or ineffective interfaces and increased costs (re-work) and chances of delay	High	Medium	Appropriate project management and use of system engineering techniques built into procurement and delivery processes	HCC/LUL Project Manager
Successful delivery of services using Croxley Rail Link requires four different pieces of infrastructure be maintained and operated	Responsibilities for decision making are unclear and poor decisions are made which are inefficient or deliver poor service quality	Low	Low	Safety management systems will be in place for both Infrastructure Controllers (NR and LUL)	LUL

22. Stakeholder Analysis

Stakeholder Support

- 22.1 The Croxley Rail Link scheme has active support from key stakeholders, including commitment to operating services and transfer the revenue surplus from LUL. Network Rail have been engaged with the project as existing owners of the heavy rail alignment and because of the interface/interaction with the operational DC lines through Watford High Street station into Watford Junction.
- 22.2 Watford Council, Three Rivers District Council and the Watford Health Campus are keen supporters of the project. Letters of support from key stakeholders are included in Appendix E.
- 22.3 The Croxley Rail Link is supported within the following published plans & strategies:
- Eastern Regional Funding Allocation Priority 1a (January 2006);
 - "A rail strategy for London's future" - TfL 2007;
 - TfL Five Year Investment Programme 2005/06 - 2009/10;
 - TfL's website <http://www.tfl.gov.uk/corporate/projectsandschemes/2053.aspx>;
 - "Strategic Study of Rail in the East of England for Passengers and Freight" Atkins commissioned by Regional Transport Forum in July 2006;
 - HCC's Local Transport Plan 2006/7 - 2010/11;
 - HCC's South West Hertfordshire Transportation Strategy (January 1996);
 - Watford Borough Council's emerging Local Development Framework;
 - Three River's District Council District Plan 1996 - 2011; and
 - Watford Health Campus Masterplan (July 2007).

Public and Statutory Bodies Consultation

- 22.4 The Scheme Description section of this document describes the Project History and sets out the Option Selection and Scheme Development processes which have been reported in previous submissions to the Department.
- 22.5 Engagement with stakeholders has been critical to the development of Croxley Rail Link and has resulted in strong support for the scheme. Effective engagement with stakeholders and the general public will continue to play a vital part in the further development and implementation of the scheme.
- 22.6 The project has proved popular when detailed public consultation has been held at key stages during the scheme development as presented in the following documents:
- Preferred Alignment Selection by London Underground Ltd;
 - Formulation of South West Hertfordshire Transportation Strategy; and
 - Formulation of Single Regeneration Budget strategy.
- 22.7 The views of Statutory Bodies have previously been sought during project development.

Consultation Action Plan

22.8 An action plan for the consultation process leading up to the TWA Submission has been drafted and is included within the Communications Strategy at Appendix D. This sets out a clear and defined process for the approach to consultation with Stakeholders (Statutory and non-statutory) and the public. The strategy:

- Sets out the specific objectives for Stakeholder Engagement, and the key messages that will need to be communicated, reflecting the objectives of the overall project;
- Identifies key stakeholders and decision-makers to which these key messages will be communicated;
- Recommends the most effective ways of doing this;
- Provides a detailed public consultation programme; and
- Sets out a recommended high level strategy for continuing consultation, engagement, lobbying and publicity activities.

23. Monitoring and Evaluation

Local Transport Plan Monitoring

- 23.1 Indicators and targets are the key to the success of HCC's LTP, supporting policies and daughter documents. The current HCC LTP contains focussed and locally relevant indicators and targets for Hertfordshire which have been through a robust consultation process to ensure they tackle key issues and are realistic yet stretching.
- 23.2 The current LTP runs through to 2010/11, and contains 22 indicators and targets that HCC are monitoring during the Plan lifetime. Whilst the Croxley Rail Link scheme will not become operational until beyond the lifetime of the current LTP, a number of the key indicators currently in place have relevance for the project as they or their successor indicators in LTP3 will be used for evaluation of the project once it is in the operational phase. Current indicators are:
- Public Transport Patronage;
 - Passenger Transport User satisfaction;
 - Changes in area wide traffic mileage;
 - Changes in Peak Period traffic flows (Watford has a specific local target); and
 - Highway congestion.
- 23.3 It is also anticipated that Croxley Rail Link will be evaluated against some or all of the following National Indicators:
- NI 167 - Congestion
 - NI 175 - Access to services and facilities by public transport, walking and cycling.
 - NI 176 - Working age people with access to employment by public transport (and other specified modes)
 - NI 177 - Local bus passenger journeys originating in the authority area.
 - NI 198 - Children travelling to school (mode of travel usually used).

Local Transport Plan 3 Development

- 23.4 Local Transport Plan 3 is currently being developed for 2011/12. It is anticipated that there will be a close alignment between the objectives and outcomes of Croxley Rail Link and the National Indicators. As such, this work will be undertaken once Programme Entry for the project is granted to ensure the appropriate indicators can be put in place at the appropriate time.

Scheme Specific Monitoring

- 23.5 Specific quantitative rail link data will be available to the promoters through the contractual agreements put into place for operating the scheme. Patronage and revenue levels on the rail link, measured through the ticketing data that is available from HCC's partners London Underground, will provide the key local indicator of success for the scheme, measured against the expected (modelled) demand.
- 23.6 In addition baseline and monitoring surveys will be undertaken post implementation to identify any changes in travel behaviour brought about by the introduction of the scheme - specified to inform the evaluation process outlined in brief below.
- 23.7 London Underground will observe the success of the scheme through ongoing analysis of gateline data at stations in the area (including the new stations resulting from the scheme). Patronage levels will be compared against those previously experienced in the area prior to the introduction of the scheme.

23.8 Further monitoring would be carried out through the Rolling Origin and Destination Surveys (RODS). This survey is London Underground's key source of data on the number of passengers going from one station to another, flows of passengers through stations, and the load on each section of track between stations. RODS surveys are carried out each year at selected stations (approximately 10% of the network). It is also envisaged that the impacts of increased London Underground accessibility will be reflected in the results of the Customer Satisfaction Survey which is carried out quarterly. A comprehensive monitoring approach will be developed in partnership with London Underground.

Outline Evaluation Plan

23.9 The objectives of the evaluation plan will be formed from a combination of key relevant and measurable scheme objectives (from those set out in this MSBC). These will be supplemented by relevant NATA objectives, in particular the environmental sub-objective of Noise, where some detriment is anticipated, and the Economy sub-objective of Reliability, where a significant positive impact is expected.

23.10 Other impacts of significance which will be included in the evaluation plan are less suited to quantitative assessment and will therefore be considered qualitatively. The sub-objectives of the proposals with significant anticipated impacts include:

- Landscape impacts of the viaduct construction;
- Townscape impacts of station construction/renewing unsightly existing infrastructure;
- Journey ambience;
- Perceived security of the system for users;
- Option values; and
- Transport interchange impacts.

23.11 A more detailed evaluation plan will be developed following programme entry for consideration at Conditional Approval and will make reference to DfT's guidance document *The Evaluation of Local Authority Transport Schemes: A Guide*. This plan will set out details and justification of the monitoring objectives and timescales for data collection and evaluation.

24. Assurance

Independent Process Approval

- 24.1 Independent process approval will be obtained through the Office of Government Commerce's (OGC) Gateway Review process. This process appraises the Croxley Rail Link scheme at critical stages of development to provide assurance that it can progress successfully to the next stage. It will add value to the project by ensuring that appropriate skills are utilised and realistic timescales and cost targets are set and achieved.
- 24.2 Use of the independent gateway process will add additional value as the project is likely to be required to navigate its progress additionally through Network Rail's methodology and TfL's/LUL's GRIP or equivalent processes. For the proposals the reviews will be undertaken by 4Ps, who apply the OGC processes (originally set up for Central Government) in the local authority context.
- 24.3 Although there are six Gateway Reviews during the life of the project, this submission considers the requirements of the four reviews prior to contract award, as follows:
- Gateway 0: Strategic Assessment
 - Gateway 1: Business Justification
 - Gateway 2: Procurement Strategy
 - Gateway 3: Investment Decision
- 24.4 The proposals are believed to currently satisfy the requirements of Gateways 0 and 1, although Gateway 1 has not yet been formally completed. HCC is currently actively engaged with 4Ps to establish a date for this review. The 4Ps Project Assessment Spreadsheet (PAS) has been completed and can be found at Appendix N. The PAS at this stage assesses the overall level of risk associated with the project as high.
- 24.5 Gateway 2 will be undertaken in advance of conditional approval, following the receipt of TWA powers. Gateway 3 will take place following receipt of tenders but in advance of obtaining Full Approval for the proposals from DfT.
- 24.6 The enclosed Implementation work stream and process map diagram (Appendix N) identifies the timing of the reviews in relation to approval and procurement processes.

25. Procurement Strategy

Proposed Procurement Strategy

- 25.1 HCC is pursuing funding for the Croxley Rail Link as an LTP major scheme. The scheme is comprised essentially of a single element with a total outturn cost of over £135m. It could not be achieved incrementally as smaller (sub £5 million) schemes through the LTP block allocation.
- 25.2 It is also evident that a large proportion of the capital costs are related to the immediate connection of the existing Metropolitan Line to the Croxley Green rail alignment whereas many of the scheme benefits are associated with integration at Watford Junction at the other end. This provides further justification that the proposals must be implemented and funded as a single scheme.
- 25.3 Options for the procurement of the infrastructure have evolved over time and the current proposals reflect the outcome of consultation with stakeholders including TfL, LUL, Network Rail and ORR. It is envisaged that the civil engineering elements of the scheme will be procured by HCC through an Early Contractor Involvement Design and Build contract. The specialist railway related elements of the scheme will largely be procured through the Public Private Partnership (PPP) arrangements put in place for the delivery of enhancements to the LUL network by an Infrastructure Company, in this case Sub Surface Lines Infracore (Tube Lines). This is seen as the only practical and widely acceptable procurement mechanism for delivering the infrastructure, particularly given the relationship that the new infrastructure will have with infrastructure already in place and in operational use.
- 25.4 Alternative SPV and joint procurement options are viewed as too complex and/or risky to be worth seriously pursuing and do not have the benefit of providing a ready-made solution. The scheme will also require that agreement/contractual arrangements with Network Rail are secured in order to deliver the necessary upgrade of track and signalling between Watford High Street Junction and Watford Junction Station to facilitate shared use by LUL and Overground services.
- 25.5 LUL will incur the operating costs that arise from the scheme's implementation. They will also incur the non-construction related capital costs of the scheme. This covers items such as their enabling works, commissioning costs and investment in rolling stock (see above).
- 25.6 Some private sector contribution has previously been secured (s.106 agreements) through local developers although these contributions have since 'timed-out'. Further private sector contributions will be sought for the scheme as it proceeds through the Transport and Works Act application.

Capacity and Appetite of the Market to Deliver the Project

- 25.7 The structure of the procurement strategy is such that it is believed there should be no concerns over the capacity and appetite of the market to deliver the project. The particular circumstances of the project (refurbishment rather than new build) are such that the intention is not to procure a single contract for a DBFO (or similar) concessionaire; rather the rolling stock and construction works will be let as a series of discreet packages and no change from the current operator is foreseen.
- 25.8 Implementation of the project will be undertaken after the 2012 London Olympics and therefore will not be subject to the potential premium construction pricing which is expected in the run up to the event. In fact the project may benefit from the additional construction capacity which emerges for the delivery of the Olympics infrastructure and becomes available following completion.

Compliance with European Regulation

- 25.9 The procurement strategy has been developed to be in line with current European regulations and will be reviewed at key gateways to ensure that this remains the case.

Commercial Risks Identified and Allocation of Risk

Revenue Risk

- 25.10 In principle, revenue risk for the Croxley Rail Link will fall to Hertfordshire County Council through a transfer of 'Net Incremental Revenue' from the service operator, London Underground Limited/Transport for London. Net Incremental Revenue comprises Croxley Rail Link fare revenue minus an adjustment for abstraction from TfL rail services minus Croxley Rail Link operating costs. This transferred revenue forms the basis of the local contribution, although arguably LUL are in a better position to manage this risk, they are not able to contribute this funding directly or to offer any guarantee of minimum level of payments. The emerging agreement between HCC and LUL/TfL is intended to ensure that specific risks which can be managed by the service operator (for example comparative fares between LUL and Overground) are assigned to them.
- 25.11 For the Croxley Busway alternative option, it is assumed that revenue risk will fall to Hertfordshire County Council, who would contract the operation on a service-only basis, anticipating that this would be the simplest and most cost effective way to secure the level of service required. Under this option the risk will fall to the party who is believed to be best placed to manage it and mitigate it as appropriate.

Performance Risk

- 25.12 The emerging agreement between HCC and LUL assigns performance risk to the service operator (LUL), who is best placed to manage this risk. To some extent this reduces the revenue risk taken by HCC as performance is clearly linked with the attractiveness of the service. Specific arrangements will be in place for the section between Watford High Street and Watford Junction where standard Network Track Access Agreements will be in place. Track Access Charges (TAC) include penalties for poor performance to cover claims against Network Rail from other TOCs where disruption has knock-on effects on others. Any performance payments becoming due under the TAC regime will not be included within the operating costs netted off payments to HCC (NB basic non-performance TACs are included however).
- 25.13 For the Croxley Busway alternative option it is assumed that the majority of performance risk will be assigned to the service operator. However given this option's interaction with the highway network it is considered likely that some elements of performance risk would remain with HCC, for example impacts of road maintenance.

Strategy for Managing Commercial Risk

- 25.14 The promotion/development agreements with HCC's partners (LUL and Network Rail) and details of the procurement strategy have been developed taking account of the commercial risks identified so far. As this strategy develops the process for managing commercial risk will develop with it. Close links will be maintained with the general risk review process to ensure that all risks are identified and managed and to ensure that no risks fall between the two processes and are not addressed.

26. Funding Requirements

Introduction

- 26.1 This section of the application sets out the requirements for funding the project in forecast outturn values, i.e. at the values at which the costs will occur at in the future. The presentation includes all forecast spend following programme entry, including costs incurred prior to receiving full approval.
- 26.2 In the preparation of the forecast outturn figures, future base inflation has been assumed at 2.5% pa. As in the appraisal, construction costs have been assumed to increase in real terms at 2.0% pa above inflation, resulting in a total nominal growth of 4.5% pa. Forecast outturn values are only valid for the assumed phasing presented in this report and for these assumed inflation rates. Should the proposed implementation be delayed for any reason, the funding required would increase. If the base rate of inflation or the local rate of construction inflation (for example as measured by Building Cost Information Service) are different from that assumed the outturn costs will also be different from forecast.
- 26.3 The promoters welcome DfT input into the inflation and investment phasing assumptions and will work with them to agree forecast outturns, appropriate to the availability of funds.

Forecast Outturn Costs and Funding Requirement

- 26.4 Table 26.1 sets out the outturn values for the Croxley Rail Link if it is implemented in line with the current RFA allocation timescale. The total funding requirement over the period 2009/10 to 2018/19 is forecast to be £172.0 million.

TABLE 26.1 PREFERRED SCHEME – FORECAST OUTTURN COSTS (£M)

Financial Year Ending	2010-2014	2015	2016	2017	2018	2019	Total
Construction Costs	£0.0	£0.0	£0.0	£38.8	£43.6	£0.0	£82.4
Preliminaries	£0.0	£0.0	£0.0	£17.1	£0.0	£0.0	£17.1
Contractor's Profit and Overheads	£0.0	£0.0	£0.0	£3.5	£4.0	£0.0	£7.5
Design	£3.6	£0.9	£0.9	£0.0	£0.0	£0.0	£5.4
Project Management	£1.7	£0.5	£0.5	£0.9	£0.9	£0.3	£4.8
Assurance (TfL/Network Rail)	£1.5	£0.5	£0.6	£0.0	£0.0	£0.0	£2.6
Third Party Costs	£0.0	£0.0	£0.0	£5.8	£6.5	£0.0	£12.4
Possessions	£0.0	£0.0	£0.0	£0.4	£0.4	£0.0	£0.8
QRA	£1.0	£0.2	£0.3	£9.3	£8.8	£0.2	£19.9
Land Costs	£0.0	£0.0	£0.0	£5.3	£0.0	£0.7	£6.0
TWA Costs	£1.2	£0.0	£0.0	£0.0	£0.0	£0.0	£1.2
Light Rail Vehicles	£0.0	£0.0	£0.0	£0.0	£10.9	£0.0	£10.9
Third Party Compensation Costs	£0.0	£0.0	£0.0	£0.3	£0.0	£0.1	£0.4
Monitoring and Evaluation	£0.0	£0.0	£0.2	£0.0	£0.0	£0.5 ¹	£0.6
Total	£9.0	£2.1	£2.5	£81.4	£75.2	£1.7	£172.0

¹ 2021/22 Monitoring and Evaluation costs shown in 2018/19 for clarity

26.5 Table 26.2 sets out the outturn values for the Croxley Busway. The total funding requirement over the period 2009/10 to 2015/16 is forecast to be £45.1 million.

TABLE 26.2 LOWER COST ALTERNATIVE – FORECAST OUTTURN COSTS (£M)

Financial Year Ending	2011	2012	2013	2014	2015	2016	Total
Construction Costs	£0.0	£0.0	£0.0	£10.2	£10.6	£0.0	£20.8
Preliminaries	£0.0	£0.0	£0.0	£4.6	£0.0	£0.0	£4.6
Contractor's Profit and Overheads	£0.0	£0.0	£0.0	£0.9	£1.0	£0.0	£1.9
Design	£0.9	£1.2	£1.3	£0.0	£0.0	£0.0	£3.4
Project Management	£0.2	£0.2	£0.2	£0.2	£0.3	£0.1	£1.2
QRA	£0.2	£0.2	£0.2	£2.4	£1.3	£0.1	£4.4
Land Costs	£0.0	£0.0	£0.0	£5.7	£0	£1.3	£7.0
HA Costs	£0.5	£0.7	£0.0	£0.0	£0.0	£0.0	£1.2
Third Party Compensation Costs	£0.0	£0.0	£0.0	£0.3	£0.0	£0.1	£0.4
Monitoring and Evaluation	£0.0	£0.0	£0.1	£0.0	£0.0	£0.1 ¹	£0.2
Total	£1.8	£2.4	£1.7	£24.3	£13.2	£1.8	£45.1

1 2018/19 Monitoring and Evaluation costs shown in 2015/16 for clarity

27. Funding Package

Sources of Funding

Preferred Scheme

- 27.1 The proposed funding split for the Croxley Rail Link is presented in Table 27.1. It is assumed that costs up to full approval are co-funded equally by the promoters and DfT. The costs of the TWA Public Inquiry are the exception to this and would be funded entirely by the promoter as they are ineligible for DfT funding.
- 27.2 Agreement has been reached in principle between HCC and LUL for the surplus revenue (after deducting operating costs and abstraction of LOROL revenue) to be transferred in full to HCC. This revenue would support a local contribution of £25.8 million to the implementation phase of the project - to a total local contribution of 20.1% of the eligible costs of the project (comfortably in excess of the minimum requirement of 10%).

TABLE 27.1 PREFERRED SCHEME FUNDING SPLIT (£M)

Financial Year Ending	2011-2014	2015	2016	2017	2018	2019	Total
Hertfordshire County Council (Eligible)	£3.2	£0.7	£2.4	£0.0	£24.7	£1.1	£32.1
Hertfordshire County Council (Ineligible)	£1.2	£0.0	£0.0	£0.0	£0.0	£0.0	£1.2
British Railways Board Transfer (Land transfer <u>not</u> cash)	£0.0	£0.0	£0.0	£2.2	£0.0	£0.0	£2.2
Department for Transport	£4.7	£1.4	£0.1	£79.2	£50.5	£0.6	£136.5
Total	£9.1	£2.1	£2.5	£81.4	£75.2	£1.7	£172.0

- 27.3 This application is therefore for a total of £136.5 million from DfT.
- 27.4 The optimism bias for the Preferred Scheme is set at 22% and therefore the additional risk layer allowed by DfT at half this value is expected to total £18.9 million. This would be shared equally between Central Government and the promoters; therefore the maximum contribution from DfT would be £146.0 million.

Lower Cost Alternative Scheme

- 27.5 The proposed funding split for the Croxley Busway is presented in Table 27.2. It is assumed that costs up to full approval are co-funded equally by the promoters and DfT. The costs of the TWA Public Inquiry are the exception to this and would be funded entirely by the promoter as they are ineligible for DfT funding.
- 27.6 No contribution would be available from TfL for the busway scheme and therefore the minimum local contribution of 10% has been shown, equivalent to £4.4 million. In order to deliver the funding identified for development of the preferred option HCC would have to reach agreement with delivery partners to do the former and reprioritise the delivery targets within their Local Transport Plan to achieve the latter.
- 27.7 The existing Croxley Green Branch is under the ownership of the British Railways Board (BRB), who through Network Rail were instructed to retain the alignment until a firm decision was reached on the Croxley Rail Link proposals. If the lower cost alternative option was taken

forward the Rail Link proposal would have to be formally cancelled - allowing BRB to sell of the land. It has been assumed for this circumstance that HCC would have to fund the purchase of the branch line at market value - rather than it being transferred as a contribution in kind (as is included for the rail link scheme).

TABLE 27.2 LOWER COST ALTERNATIVE FUNDING SPLIT (£M)

Financial Year Ending	2011	2012	2013	2014	2015	2016	Total
Hertfordshire County Council (Eligible)	£0.7	£0.8	£0.9	£0.0	£0.3	£1.8	£4.4
Hertfordshire County Council (Ineligible)	£0.4	£0.8	£0.0	£0.0	£0.0	£0.0	£1.2
Department for Transport	£0.7	£0.8	£0.9	£24.3	£12.9	£0.0	£39.5
Total	£1.8	£2.4	£1.8	£24.3	£13.2	£1.6	£45.1

27.8 This application would therefore be for a total of £39.5 million from DfT if the Croxley Busway Alternative was pursued.

27.9 The optimism bias for the Lower Cost Alternative is also set at 22% for consistency, and therefore the additional risk layer allowed by DfT at half this value is expected to total £5.0 million. This would be shared equally between Central Government and the promoters; therefore the maximum contribution from DfT would be £42.0 million.

Funding Contingency Plans

27.10 A QRA exercise has been undertaken on the capital cost estimates and the funding sought includes this allowance. It is considered that this is adequate contingency for local and Central Government funds. Suitable allowance has been made for inflation in the calculation of forecast outturn costs. No further funding contingency is believed to be necessary at this stage.

Section 151 Officer Sign Off

27.11 The promoters confirm that their Section 151 officer has accepted the accuracy of the cost estimates and that the authority has the means to accept the financial liability of the scheme going ahead. Certification from the Section 151 officer that the authority accepts all responsibility for meeting all further cost increases will be provided with the eventual submission for full approval.

28. Summary of Appraised Options

Introduction

- 28.1 This LTP Major Scheme Business Case has set out the justification for the use of public funding for the implementation of the proposed Croxley Rail Link. It has also set out a similar assessment of a Lower Cost Alternative (the Croxley Busway) to demonstrate that equivalent or proportionately better outcomes could not be achieved for less capital investment.
- 28.2 The Croxley Rail Link and Croxley Busway schemes were selected from a long-list of options using a structured filtering process. The long-list comprised different technologies (heavy rail, underground, guided bus, unguided bus) and various alignment options including: using the former Croxley Green Branch alignment as is; extending that alignment to connect with the LUL Metropolitan Line; and running on-street. The two selected options were shown to be those with the best performance, taking into account the level of implementation risk; details of the option selection process are set out in Section 7 of this business case.
- 28.3 All options were developed to address the problems and opportunities identified in the corridor and with the intention of delivering a significant contribution to meeting the project objectives (Table 6.4). The two options presented in this business case have been demonstrated to be in line with wider policy, strategy and objectives at a local level (Section 8) and at regional level (Section 9). Both options directly serve the Watford Health Campus major regeneration project.

Preferred Scheme

- 28.4 The Croxley Rail Link would create a strategic connection between the Metropolitan Line Watford Branch and National Rail Network. The Metropolitan Line provides a frequent service (6 per hour per direction) into London from Watford; however the services terminate in the suburban fringe of West Watford with relatively poor connections to/from the town centre. Watford Met Line Station and the final section of route from Croxley would be closed under the proposals and all services diverted to terminate at Watford Junction Station.
- 28.5 The Croxley Green Branch, owned by Network Rail, was effectively closed in 1996. Under the proposals the branch line would be reconstructed and brought back into use. A new viaduct, some 400m in length including embankment, would connect the branch line with the Metropolitan Line. The branch line connects with the National Rail DC Lines loop south of Watford High Street station; Underground services would share track with Overground services to access Watford Junction station. New stations would be provided at Ascot Road (replacing Croxley Green) and Watford General Hospital.
- 28.6 Diverting/extending the Metropolitan Line is a cost effective way to provide services along the route. Revenue forecasts for the proposals prepared for this business case show that the proposals would deliver a consistent and substantial operating surplus from the first year of operations. Even allowing for the fact that a proportion of the forecast demand is abstracted from Overground services (also now under TfL control) the net TfL position is positive from year one.
- 28.7 Under the agreement in principle between LUL and HCC the revenue surplus would be transferred to HCC and forms the basis of the local capital contribution to the project of £25.8 million (outturn). The £9.7 million remainder of the proposed 20.6% local contribution to the project, principally development costs, will be made by HCC and their partners. This application is for the final £136.5 million of the total £172.0 million scheme.
- 28.8 The proposals put forward have an excellent 'Value for Money' case; the economic appraisal of the scheme demonstrates a robust Benefit:Cost ratio of **2.55:1**. While the new viaduct would have an adverse impact on the Landscape, in our view, the benefits of the scheme more than outweigh this impact. The proposals would also result in a slight increase in noise levels along the route with the re-introduction of rail services.

- 28.9 The proposals for project management and governance of the project are well developed and there is a clear and detailed implementation programme. The project plan is driving the need to achieve Programme Entry at this time in order to allow sufficient time to gain powers and take advantage of the allocation of regional funding. Programme Entry will also ensure that the current momentum behind the project continues and assures that the Croxley Green Branch Line remains intact and available for the Rail Link (Network Rail no longer being obliged to retain the link asset).
- 28.10 The key stakeholders have been consulted and involved in the project. The emerging procurement strategy is based on making best use of the capacities and capabilities of the stakeholders and optimises the control of risk. In summary the proposals are at an advanced level of development and the promoters are in a position to start the project on the next stage, obtaining powers, immediately on gaining programme entry.

Lower Cost Alternative

- 28.11 The Croxley Busway would create high quality public transport connections between Metropolitan Line services at Croxley Station, Watford Town Centre, National Rail services at Watford Junction Station and Croxley Business Park. For reasons of commercial viability the bus service would operate at the same frequency as the Metropolitan Line, with a supplementary half-hourly service between Watford Junction and Croxley Business Park.
- 28.12 The Croxley Green Branch would be converted to a segregated, but unguided, busway between Ascot Road and Wiggshall Road. Services beyond this alignment will use the highway network, with extensive bus priority measures between the busway and Watford Junction station (through the town centre) to deliver a high level of reliability.
- 28.13 The introduction of a ‘free-standing’ busway is a relatively expensive means of providing services along the corridor (in comparison with the rail link proposal - which includes the savings of removing current services between Croxley and Watford). Revenue forecasts for the proposals prepared for this business case show a modest operating surplus from the third year of operation.
- 28.14 Although the overall capital cost of the proposals at £45.1 million (outturn) is considerably less than the rail link proposal, there would be no revenue transfer in support of the local capital contribution. Agreement to use the local authority funding protected for the Rail Link project would need to be obtained between HCC and their delivery partners. The minimum 10% local contribution of £4.5 million - broadly equal to the cash contribution to the rail scheme - is the maximum which could be achieved. The remaining £40.6 million of funding would be sought from DfT.
- 28.15 The Croxley Busway proposals have a poor ‘Value for Money’ case; with a benefit:cost ratio for the scheme of **1.95:1**. This assessment does not take account of the adverse traffic and economic impacts of the bus priority measures required on approaches to the town centre. The introduction of bus services would have some minor adverse environmental impacts, although the viaduct with its adverse landscape impact would not be required for this option.
- 28.16 The project management and governance arrangements for the project would broadly follow those developed for the rail link, although a lower level of interaction with TfL and Network Rail would be required for this option. The implementation of the proposals would be undertaken to the same programme as the Preferred Scheme.
- 28.17 The Croxley Busway project does not currently have the same level of stakeholder support as the rail link proposals. It also does not meet the strategic objectives of the scheme. Implementation of the proposals would require a change of planning designation for the Croxley Green Branch - this process and the seeking of Highways Act powers are likely to receive objections from the rail lobby, taxi operators and pro/anti road building lobbies. Consistently through the comparisons set out in this business case, the Croxley Busway is inferior to the Croxley Rail Link and therefore we consider that the promotion/implementation of this option could not be justified.

Disclaimer

This report has been produced for Hertfordshire County Council. It should only be used in association with the Major Scheme Business Case of the Croxley Rail Link project.

The projections of passenger demand and revenue contained within this document represent Steer Davies Gleave's best estimates. While they are not precise forecasts, they do represent, in our view, a reasonable expectation for the future, based on the most credible information available as of the date of this report.

However, the estimates contained within this document rely on numerous assumptions and judgements and are influenced by external circumstances that can change quickly and can affect income.

In addition, it has been necessary to base much of this analysis on data collected by third parties. This has been independently checked whenever possible. However, Steer Davies Gleave does not guarantee the accuracy of this third party data.

CONTROL SHEET

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