

Chesterton Interchange

Major Scheme Business Case

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Executive Summary

Cambridgeshire is a diverse county with many different transport needs. To the north of the county, economic regeneration and accessibility to key services are important. In the south, the Cambridge sub-region is one of the fastest growing parts of the UK and its inclusion within the London – Stansted – Cambridge growth corridor means that this growth will continue.

In order to cater for this growth the Regional Spatial Strategy (RPG14) requires that Local Development documents should provide for approximately 47,500 homes in the Sub-Region between 2001 and 2016. A further 15,000 homes will be required between 2016 and 2021. Much of this new development will be accommodated within the Cambridge built up area and in new developments on the fringes of the city.

To help deliver housing and economic growth, the County Council must ensure that future travel demand is catered for in a sustainable way; maximising accessibility whilst at the same time seeking to protect the environment and quality of life. Although this presents a difficult challenge, through the Local Transport Plan and the Long Term Transport Strategy, the County Council has identified the infrastructure required to support the growth agenda and to deliver a cohesive and integrated transport network. Chesterton Interchange (the scheme) is an integral part of this network, and a key transport node in the north-east quadrant of the city. The scheme will encompass a new railway station, on the West Anglia mainline, and an interchange facility providing access onto the wider public transport network. Chesterton Interchange will enable travellers to switch between all modes with access for pedestrians and cyclists, bus users, car drivers and passengers, and heavy rail users. In the longer term it is envisaged that the interchange will be linked into the guided bus way network, and the proposals have been designed with this in mind.

The geographic location of the scheme also supports development sites associated with the growth agenda, a significant proportion of which are located on the northern boundaries of the city. The choice of location is further enhanced by links to the city centre, its proximity to major employment and business areas, as well as to the existing residential areas of Arbury and Chesterton.

One of the larger sites identified within local planning documents, known as Cambridge Northern Fringe (East), is earmarked to accommodate approximately 2400 homes by 2016. This site includes the disused Chesterton Sidings (currently owned by Network Rail) where the new interchange facility would be located. As well as providing a key link in local transport network, delivery of the scheme would facilitate future development of, what is currently, a brown-field site.

The interchange will incorporate a main station building, with high quality passenger waiting facilities, toilets and a ticket office. Two new platforms will be constructed on the main rail line. Design of the site will incorporate access for all modes including further extension of the guided bus way network. The high quality design will include CCTV and provision of real time information.

The interchange facility will be served by through trains on the West Anglia mainline, providing 11 southbound services between 0540 and 0900, and two southbound services

per hour in the off peak period. The scheme is forecast to attract more than 2600 users daily, with the strongest demand for travel being to London, followed by Cambridge.

The location of the existing rail station to the south of Cambridge means that the introduction of the new interchange improves access to the rail network from the north of the city, reducing the number of car journeys made across the city. The interchange will also reduce pressure on the existing station and use available capacity on trains north of Cambridge station.

In economic terms, delivery of the scheme benefits both users and non-users. Users accessing Cambridge railway station that switch on to the rail network at Chesterton will benefit from journey time savings, whilst non-users on the highway will benefit from decongestion effects associated with the removal of trips from the network.

The scheme has a PVB of £148.8m, with PVC of £48.1m identified for central government. Therefore in economic terms the scheme presents 'high' value for money with a strong BCR of 3.09. A series of sensitivity tests were carried out on the economic case for the scheme. These gave consideration to changes in patronage and associated economic indicators. This included a test removing development at Cambridge Northern Fringe (East) from the land use scenario. This demonstrated that the scheme is not dependent on demand generated from the new development site, although it would facilitate its delivery. A worst case scenario with Optimism Bias applied at 100% was also tested. Under each of the sensitivity tests the scheme BCR remained within the range 1.5 – 2.0 or higher.

The wider appraisal takes into account impacts on other indicators which do not have a monetary assessment and considers the supporting analyses. In environmental terms the scheme is likely to have a negligible impact on local air quality and noise, with changes in traffic flows not triggering a detailed assessment. A net increase in greenhouse gases and accident disbenefits are brought about by the relative success of the scheme, trips accessing Chesterton Interchange on the highway network, and offsetting the benefits brought about by reductions in journeys to Cambridge station.

Adverse impacts are identified for landscape because the scheme presents a change in character, though the majority of residual impacts could be mitigated. An overall beneficial assessment is identified for townscape where the sidings and subsequent development will transform an area of derelict Brownfield land. However, this is off set by slight adverse impacts for heritage (relating to a specific listed building), biodiversity and water environment although mitigation measures would be put in place.

The scheme performs strongly when assessed against accessibility and integration indicators, delivering large benefits through the provision of a new facility, enhanced connectivity, and full integration within the wider land use and transport policy context.

No legal or technical issues are foreseen at this stage of the assessment, and the risk register will be maintained throughout the scheme development. The scheme is self enforcing insofar as it does not require any other measures to ensure it is effective. Whilst the scheme has many elements, these can all be delivered through standard highway or railway engineering methods.

As a stand alone scheme Chesterton Interchange would make a significant contribution to the transport network in Cambridge, but the benefits of the scheme are enhanced by its connectivity to the wider highway and public transport network and will be enhanced further if links to the Guided Busway are established at a later date. In the same way, whilst the scheme supports the delivery of the Cambridge Northern Fringe (East) development site, its feasibility is not dependent upon it.

The scheme has been a key element of the County Council's transport planning policy for many years, and as such is well known. In this way public consultation on the scheme was undertaken through the LTP process. Discussions with Network Rail, as the landowner, will continue as the scheme progresses.

A major scheme bid is therefore being submitted to cover the capital cost element.

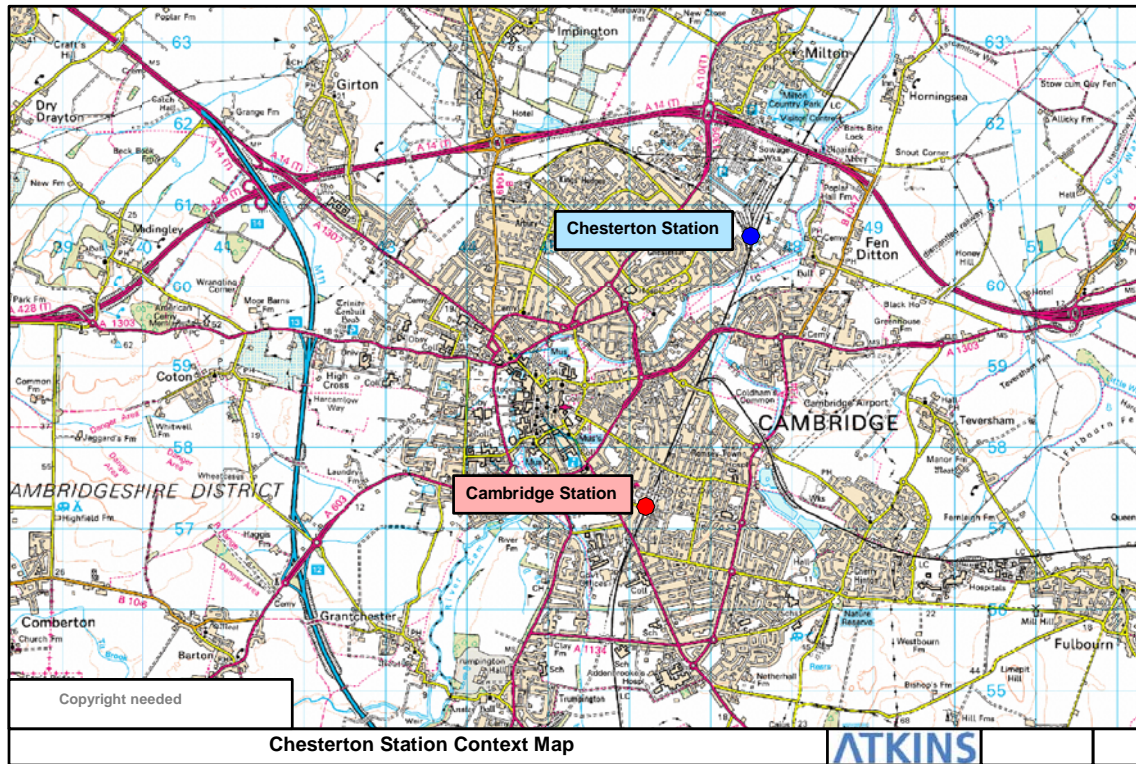
1. Strategic

CONTEXT

- 1.1 Cambridgeshire is a diverse county with many different transport needs. To the north of the county, economic regeneration and accessibility to key services are important. In the south, the Cambridge sub-region is one of the fastest growing parts of the UK.
- 1.2 In order to cater for this growth the Regional Spatial Strategy (RPG14) requires that Local Development documents should provide for approximately 47,500 homes in the Sub-Region between 2001 and 2016. A further 15,000 homes will be required between 2016 and 2021. Much of this new development will be accommodated within the Cambridge built up area and in new developments on the fringes of the city.
- 1.3 To help deliver housing and economic growth, the County Council must ensure that future travel demand is catered for in a sustainable way; maximising accessibility whilst at the same time seeking to protect the environment and quality of life. Through the Local Transport Plan and the Long Term Transport Strategy, Cambridgeshire County Council (CCC) has identified the infrastructure required to support the growth agenda and to deliver a cohesive and integrated transport network. Chesterton Interchange (the scheme) is an integral part of this network, and a key proposed transport node in the north-east quadrant of the city.
- 1.4 The scheme will encompass a new railway station on the West Anglia main line and an interchange facility providing access onto the wider public transport network. Chesterton Interchange will enable travellers to switch between all modes with access for pedestrians and cyclists, bus users, car drivers and passengers, and heavy rail users. In the longer term it is envisaged that the interchange will be linked into the guided busway network, and the proposals have been designed with this in mind.
- 1.5 Cambridge has an existing rail station located to the south of the city, as illustrated by Figure 1.1 overleaf. The existing station suffers from congestion problems caused by a single platform layout. Vehicular access to the station is inadequate, and access from the north by car requires journeys across the congested city centre. Access by public transport is also constrained and most bus journeys require interchange in the city centre. One of the Chesterton Interchange's key functions will be to provide direct public transport access to both Cambridge railway station and the wider rail network.
- 1.6 The location of the proposed Chesterton Interchange scheme (Figure 1.1) supports development sites associated with the growth agenda, a significant proportion of which are located on the northern boundaries of the city. The choice of location is further enhanced by its proximity to major employment and business areas, as well as to the existing residential areas of Arbury and Chesterton.
- 1.7 One of the larger development sites identified within local planning documents, known as Cambridge Northern Fringe (East), is earmarked to accommodate approximately 2400 homes by 2016. This site includes the disused Chesterton

Sidings (currently owned by Network Rail) where the new interchange facility would be sited. As well as providing a key link in local transport network, delivery of the scheme would facilitate future development of what is currently a brown-field site.

Figure 1.1 – Location of Chesterton Interchange

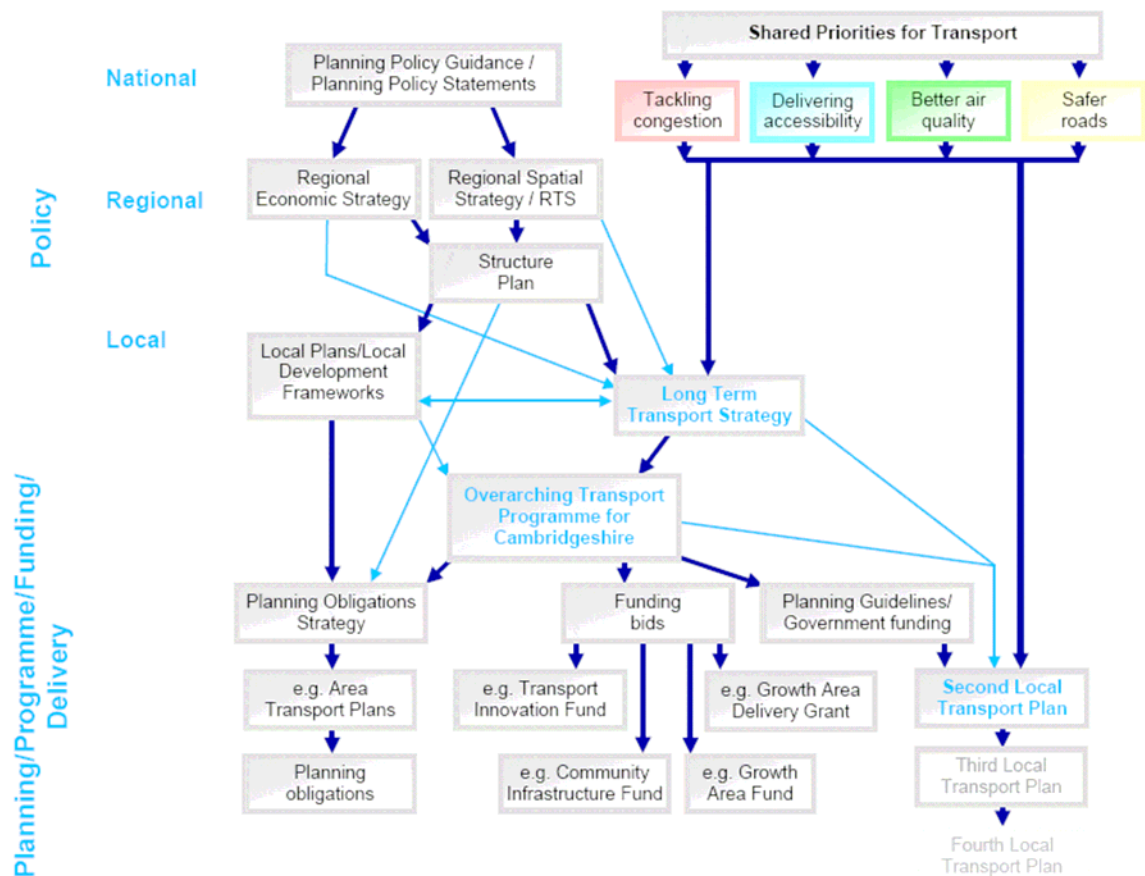


LOCAL AND REGIONAL POLICY CONTEXT

- 1.8 As an important piece of infrastructure on the local transport network, the provision of Chesterton Interchange is fully supported within all of the relevant local planning documents:
- ◆ Cambridgeshire Local Transport Plan 2006-2011;
 - ◆ CCC Rail strategy;
 - ◆ Cambridgeshire and Peterborough Structure Plan (2003);
 - ◆ Cambridge Local Plan 2006; and,
 - ◆ South Cambridgeshire Local Development Framework Submission Draft (January 2006).
- 1.9 In addition to its contribution to the delivery of *local* planning and transport objectives, the scheme also contributes to the delivery of regional objectives for transport and the economy. Figure 1.2 demonstrates how, at a strategic level, the policies contained within the LTP are developed within the regional and national planning

framework and as such have due regard to both the Regional Transport Strategy (RTS) and the Regional Economic Strategy (RES).

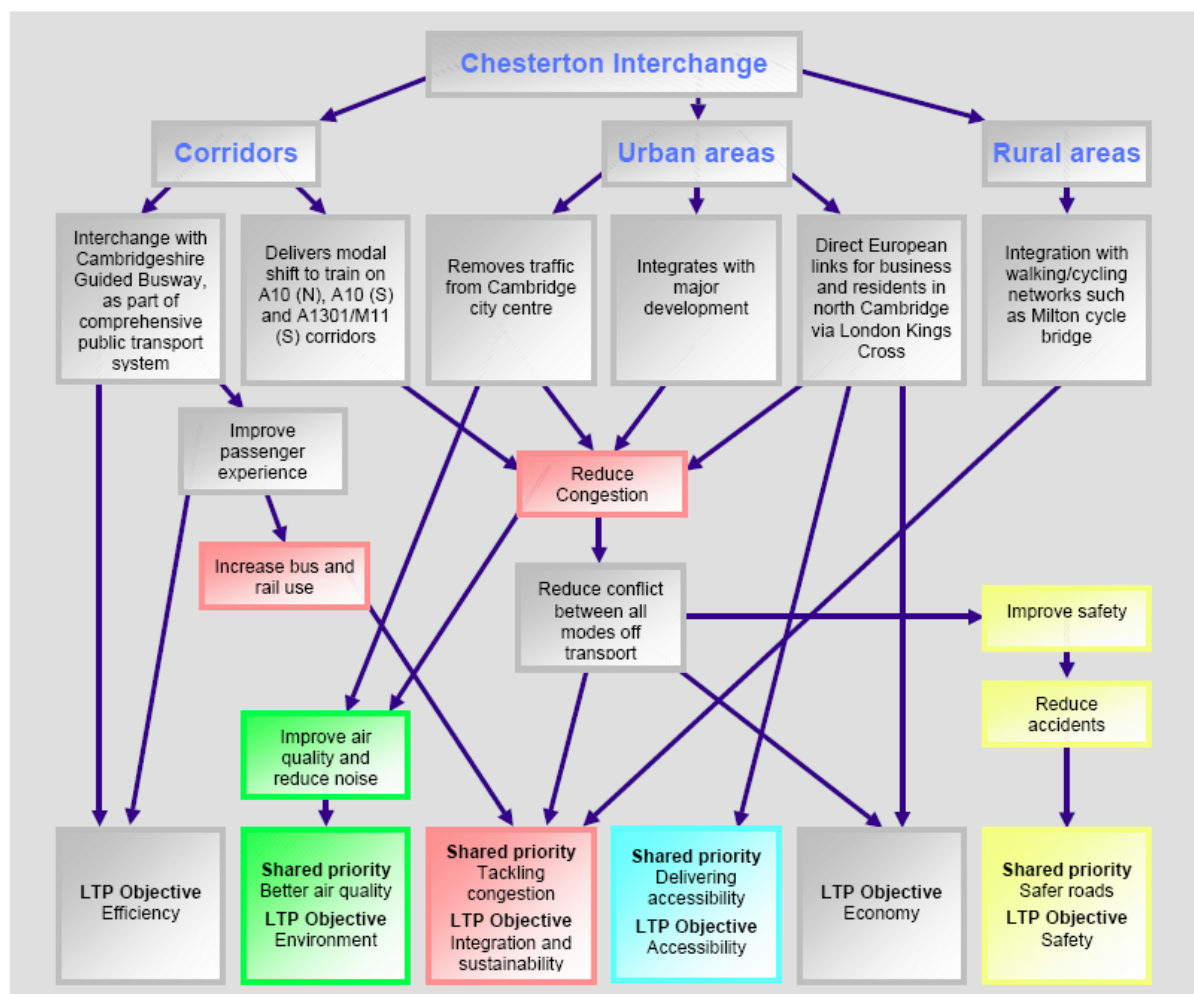
Figure 1.2 – Relationship between LTP and the current/emerging planning framework



Local Transport Plan 2006-2011

- 1.10 Figure 1.3 below illustrates the way in which Chesterton Interchange will contribute to the delivery of both LTP and central Government objectives. However, the lead in time for the delivery of the scheme means that it would not be realised until after the end of the LTP period, thus the appraisal of policy fit also reflects the longer term objectives of the County Council as set out in the Long Term Transport Strategy and which are consistent with the LTP.

Figure 1.3 – Fit with Local Transport Plan Objectives



1.11 Three strategy areas are identified within the LTP; transport corridors, urban areas and their hinterlands, and rural areas. This is supported by two main delivery mechanisms of widening choice and managing demand. The provision of a new interchange facility at Chesterton is included under the 'Transport Corridors' strategy for the A10 corridor.

1.12 The scheme would contribute to the delivery of the following LTP targets:

- ◆ ACC1 (LTP1) Accessibility
- ◆ AQ1 (LTP2) CO₂ emissions from road transport in Cambridgeshire
- ◆ CON1 (BV102) Countywide bus patronage
- ◆ CON3 (LTP3) Cycling trips
- ◆ CON6a (LTP6) Cambridge Peak hour traffic
- ◆ CON6b, c, d Trends in travel in Cambridge
- ◆ CON7a, b Trends in travel in the market towns

Rail Strategy

- 1.13 Cambridgeshire County Council's current Rail Strategy (RS) sets out the role of rail in meeting the transport needs of the county during the period 2006/07 – 2010/11. Although CCC does not have direct influence over the specification of services or operation, the rail strategy sets out the process of engagement with the industry to ensure that shared objectives are met. The strategy notes the need for integration of rail with other modes and its role in providing access at a regional and national level. In the context of catering for forecast growth, and providing a balance of services for users across the county, specific support is given to the delivery of Chesterton Interchange as a major rail investment project.

Cambridgeshire & Peterborough Structure Plan (2003)

- 1.14 The relevant Structure Plan document is the Cambridgeshire and Peterborough Structure Plan 2003 – Planning for Success (this will be superseded in mid 2007 by the East of England Regional Spatial Strategy). Policy P8/10 makes specific provision for delivery of a rail station and interchange facility at Chesterton linking in to the guided busway system. Table 1.1 identifies the contribution to other Structure Plan policies. This shows that Chesterton Interchange is central to the delivery of an integrated transport network within Cambridge and the wider sub-region.

Table 1.1 – Cambridgeshire & Peterborough Structure Plan (2003) Policies

Structure Plan Policy	Description of Policy Scheme on Policy	Effect of
Policy P1/1	Approach to Development - concentration in main centres, larger towns and a new settlement. Minimising need to use private car, encouraging walking and cycling, locating development where good public transport accessibility exists or can be provided. Selection criteria for identifying sites for development in local plans based on giving highest priority to using previously developed land/buildings in existing settlements.	Park and Ride, and non-car transport modes are central to the strategy.
Policy P5/1	Housing Distribution - provision to be made for construction of 12,500 homes in Cambridge City and 20,000 in South Cambridgeshire between 1999 and 2016.	The development will facilitate the construction of homes in the Cambridge Northern

		Fringe
Policy P8/6	Improving Bus and Community Transport Services	The proposal achieves this.
Policy P8/7	Improvements to Rail Services – priority to be given to improvements which are feasible to serve existing and planned developments or which will deliver a significant transfer from road based travel. Local plans to identify and protect former rail routes with the potential for re-use as transport corridors.	The proposal facilitates this policy.
Policy P8/10	Transport Investment Priorities – this highlights, in the Local Schemes section, Chesterton Rail Station and Interchange including link to the rapid transit system utilising the former St. Ives railway line. Also identifies improvements that will increase the efficient operation of the whole transport system with regard to Park and Ride sites for Cambridge.	The proposal delivers a specific element of this policy.
Policy P8/11	Provision for the Movement of Freight and Lorry Parking – transfer of freight from road to rail will be encouraged. Local plans will protect rail depots and private rail sidings for the transhipment of freight including sites that cease to be used.	The proposal enables freight activity to continue on the site.
Policy P9/1	Housing Distribution – Cambridge Sub-Region - provision will be made for 47,500 additional homes in the sub-region between 1999 and 2016 including 8,900 within the built up area of Cambridge and 8,000 on the edge of Cambridge subject to review of the Green Belt boundary.	As Policy P5/1 above
Policy P9/8	Infrastructure Provision	Supports policy
Policy P9/9	Cambridge Sub-Region Transport Strategy – identifies Chesterton railway station and interchange including link to the rapid transit system utilising the former St. Ives railway line and significantly improved road, cycle and pedestrian access as requirements to support the development of the Cambridge Northern Fringe.	The proposal delivers specific element of this policy.

Cambridge Local Plan (July 2006)

- 1.15 The Cambridge Local Plan was formally adopted in July 2006. The role of Chesterton Interchange is recognised in policies associated with the areas of Major Change and specifically for the Northern Fringe Development area (Policy 9/6) which identifies the delivery of a railway station in the Chesterton area and interchange facilities for rail, Cambridgeshire Guided Bus, buses, taxis, cycles and pedestrians as a high priority. Whilst the Chesterton Interchange site falls within South Cambridgeshire, access will be provided through the Cambridge City administrative area.

South Cambridgeshire Local Development Framework Submission Draft (January 2006)

- 1.16 The South Cambridgeshire Local Development Framework (LDF) Core Development Document was submitted to the Secretary of State in January 2006. South Cambridgeshire was the first Council in England to receive an Inspectors' Report declaring its Core Strategy "sound" in October 2006. Following this, South Cambridgeshire approved the adoption of the document on 25 January 2007. Subsequently, a private company has launched a legal challenge to one paragraph of the Core Strategy document so the matter has been referred to the High Court. Until such time as the High Court decides otherwise, the Core Strategy stands adopted in its entirety.
- 1.17 Policy ST/3 Edge of Cambridge identifies the Cambridge Northern Fringe as one of a number of sites where development can take place provided adequate infrastructure is provided. Policy SP/2 of the Site Specific Proposals deals with the land in detail, and refers to the need for a Masterplan to demonstrate how land at Chesterton Sidings should be developed, specifying a multi-modal interchange on the Cambridge-Ely line (West Anglia main line), which provides links to the guided bus, conventional bus, and walk and cycle networks.

Regional Planning Guidance 6: East Anglia (2000)

- 1.18 The current policy document at regional level is Regional Planning Guidance 6: East Anglia (RPG6). Policy 8 states that provision for a net increase in dwellings of 4,000 should be made within development plans. Policy 22 gives an order of preference for the location of housing and related development; firstly within the built-up area of Cambridge and second, on the periphery of the built-up area of Cambridge.

Regional Spatial Strategy (RPG14) – Draft East of England Plan (EERA)

- 1.19 RPG6 will be superseded by the Regional Spatial Strategy (RPG14), the Draft East of England Plan. The Regional Spatial Strategy highlights the need for a significantly enhanced level of public transport service provision to, from and within the Regional Interchange Centres. It also highlights the need for sub-regional transport infrastructure to support existing and forecast development with a focus on growth areas, priority regeneration areas and sustaining rural hinterlands. Located in the Cambridge Northern Fringe development area, the scheme supports many of these needs.

- 1.20 Chesterton Interchange is included within the list of infrastructure investment priorities (policy T17), and was identified as a top priority scheme for the Regional Funding Allocation submission in January 2006. Table 1.2 shows how the scheme contributes to the delivery of a number of overarching objectives for the region.

Table 1.2 – Contribution to the delivery of regional objectives

Objective	Contribution of Chesterton Interchange
Objective 5 - <i>deliver more integrated patterns of land use, movement, activity and development, including employment and housing</i>	<ul style="list-style-type: none"> • Adjacent to existing development and a site identified for further housing • Will provide direct access to existing rail network and Cambridge railway station • Will provide access to the city centre, major employment sites such as Addenbrooke's and the Science Park, and destinations to the north west of the city through its connections to the guided bus network.
Objective 7 - <i>make more use of previously developed land and existing buildings, and use land more efficiently in meeting future development needs</i>	<ul style="list-style-type: none"> • Will be on a brown-field site, the majority of which is currently un-used. • Scheme would enable the release of land for further development.
Objective 8 - <i>meet the region's identified housing needs, and in particular provide sufficient affordable housing</i>	<ul style="list-style-type: none"> • Will provide sustainable transport infrastructure to support development in the northern fringe. • Access point onto the public transport network for car-owners and non-car owners via highway, walk, cycle and existing public transport networks.
Objective 12 - <i>minimise the environmental impact of travel, by reducing the need to travel, encouraging the use of more environmentally friendly modes of transport, and widening choice of modes</i>	<ul style="list-style-type: none"> • Provides direct alternative to the private car for trips accessing Cambridge railway station. • Widens mode choice for trips originating in the area with links to the Guided Bus network and onto the wider rail network.
Objective 13 - <i>ensure that infrastructure programmes, whether for transport, utilities or social infrastructure, will meet current deficiencies and development requirements; and that the responsible agencies commit the resources needed to implement these programmes and co-ordinate delivery with development</i>	<ul style="list-style-type: none"> • Caters for existing demand, providing relief to the highway network by removing car trips currently accessing Cambridge railway station. • Caters for planned development within the growth corridor in a sustainable way, providing access point onto the public transport network. • Cambridgeshire County Council is working in partnership with other local authorities, regional agencies, Network Rail and

	central government to ensure successful delivery of this scheme.
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- 1.21 The RSS also contains regional transport objectives which the Regional Transport Strategy (RTS) seeks to deliver through a policy of widening travel choice, promoting the carriage of freight by rail and water, and stimulating the efficient use of existing transport infrastructure. The delivery of the scheme would contribute to the following specific objectives:

- ◆ improve opportunities for all to access jobs, services and leisure/tourist facilities;
- ◆ enable infrastructure programmes and transport service provision to support both existing development (addressing problems of congestion) and that proposed in the spatial strategy (economic regeneration needs and further housing growth); and
- ◆ reduce the transport intensity of economic activity, including freight.

Regional Economic Strategy – A Shared Vision: the regional economic strategy for the East of England (EEDA)

- 1.22 The Regional Economic Strategy (RES) sets out the vision for sustainable economic development for the East of England, identifying a series of objectives for the delivery of this vision. The scheme will contribute to the delivery of the following objectives:

- ◆ the need to ensure the provision of social and transport infrastructure to make communities more sustainable;
- ◆ providing access to essential services;
- ◆ ensuring that transport solutions serve economic growth in a more sustainable manner; and
- ◆ understanding and addressing the importance of transport links with London.

- 1.23 Whilst Chesterton Interchange is not dependent on development take-up in the area, one of its functions is to provide direct public transport access to both Cambridge railway station and the wider rail network, as well as access to the city centre, major employment sites at Addenbrooke's Hospital and the Science Park, along with destinations to the north west of Cambridge through its planned access to the Cambridgeshire Guided Bus network. These links will have a direct impact on sustainable access both to existing local communities and planned new developments, and will serve to enhance access to essential services.

OTHER TRANSPORT DELIVERY AGENCIES

- 1.24 Chesterton Interchange would be developed on the former Chesterton Sidings freight facility. The Office of the Rail Regulator (ORR) is responsible for the identification and protection of strategic assets on the rail network, and has identified Chesterton Sidings as an existing freight facility which should be retained. However, the ORR is aware of the proposal to provide a new station facility on this site. Retention of the freight facilities should therefore be addressed in the development of the scheme.

- 1.25 The provision of a new station at Chesterton is identified as a proposal for further development within the recent Network Rail 2006 Business Plan. It is also included on the SRA/NR Single List of Enhancements (SLOE).

Eastern Regional Planning Assessment (2006)

- 1.26 Regional Planning Assessments (RPA) are designed to inform strategy development for the railway for the next 20 years. The RPAs also inform the Network Rail Route Utilisation Strategies (RUS). Objectives for the Eastern RPA have been distilled from the wider regional planning context. Chesterton Interchange contributes to the delivery of the following objectives:
- ◆ supporting the delivery of the main locations for planned housing and employment growth across the RPA area – rail's role being to provide the link between them and other regional centres, including London;
 - ◆ supporting the spatial strategy of strengthening the main regional centres, by encouraging better use of existing rail services delivering access to and between those centres;
 - ◆ supporting integration of rail with other transport modes by encouraging the development of stations as interchanges;
 - ◆ supporting the focussing of new development at locations where convenient access to existing stations exists or can be relatively easily provided; and
 - ◆ supporting delivery of regeneration and social inclusion priorities.
- 1.27 In examining the potential range of solutions for the routes within the area, the RPA specifically acknowledged the importance of the East Coast Main Line (routes to Peterborough and Kings Lynn) in contributing to regional objectives, including the delivery of employment and housing-led growth in the London – Stansted – Cambridge – Peterborough growth area. It also identifies a series of priorities for improvements on the West Anglia route between Cambridge and Kings Lynn (considered within the RPA under the East Coast Mainline):
- ◆ Improved access to north Cambridge by opening a new station at Chesterton, or Cambridge North. This could serve new developments and link with the proposed Cambridgeshire Guided Busway, providing connections to/from St Ives, Histon and the new settlement at Northstowe. Further study is required to determine the most feasible pattern of services for the new station;
 - ◆ Increased station capacity at Cambridge. The proposed station at Chesterton could act as the terminus for some services and could free up platform capacity at Cambridge. This would allow operation of more trains through Cambridge (for example, from the north to Stansted);
 - ◆ Improvements to interchange facilities at Cambridge, the physical passenger throughput capacity of the station buildings, and the station environment – the redevelopment of Cambridge Station and adjacent railway land offers the opportunity to do this; and
 - ◆ If demand to Kings Lynn grows and provides sufficient justification, additional capacity should probably be provided through train lengthening (which would require platform lengthening and a power supply upgrade), rather than through increasing train frequencies.

- 1.28 Chesterton Interchange is identified within the RPA as a medium term priority for the West Anglia route as a “New station in north Cambridge and/or improved capacity at Cambridge” with the stated objective of “Improved access to north Cambridge and capacity to operate more trains through Cambridge, e.g. from north of Cambridge to Stansted Airport”.
- 1.29 The RPA also acknowledges higher forecast levels of growth on some of the routes within the area, proposing a potential order of priority for the examination of further options, placing the West Anglia route first in order to accommodate the impacts of the London-Stansted-Cambridge growth corridor.

Capacity Utilisation Policy/Network Utilisation Strategy/Route Utilisation Strategy

- 1.30 In December 2002 the SRA published its Capacity Utilisation Policy (CUP) Statement of Principles. The statement of principles has a threefold purpose, to formulate clear strategies for capacity utilisation, to lead the rail industry in a process to develop these strategies, and to help identify where investment is needed. The principles of the CUP are implemented through the National Network Utilisation Strategy (NUS) and Route Utilisation Strategies (RUS). The NUS sets out the policy and planning framework for 10 RUS, with the objective of making best use of network capacity to the benefit of rail customers and taxpayers.
- 1.31 In publishing its RUS programme, Network Rail highlight principal drivers of the Great Anglia RUS as the East of England Regional Planning Assessment, freight traffic growth to/from ports, and passenger growth from Sustainable Communities developments. The Greater Anglia RUS would impact on services travelling through Chesterton Interchange. Work on the Greater Anglia RUS has now begun and is due to be completed during 2007.

New Stations: A guide for Promoters

- 1.32 In September 2004 the SRA published a guide for promoters of new stations. The document was designed to set out the process which promoters should follow when engaging with the rail industry, such that proposals would then be considered on a consistent basis. This remit has now passed to the DfT's Rail Division. The document highlights the need to liaise with, and gain the support of, Network Rail, Train Operating Companies (TOCs) and the Office of Rail Regulation (ORR), as well as setting out a staged process for the consideration of proposals. It requires that proposals are consistent with the objectives set out by the SRA in both the CUP and the RUS.
- 1.33 The guidance notes that new stations must not have a negative impact on network performance. They must be affordable and must offer value-for-money, with the appraisal including an assessment of capital and operating costs taking into account the long-term impacts on rail industry finances. An economic impact of the scheme is included in Section 2 including overall impacts on rail industry finances.

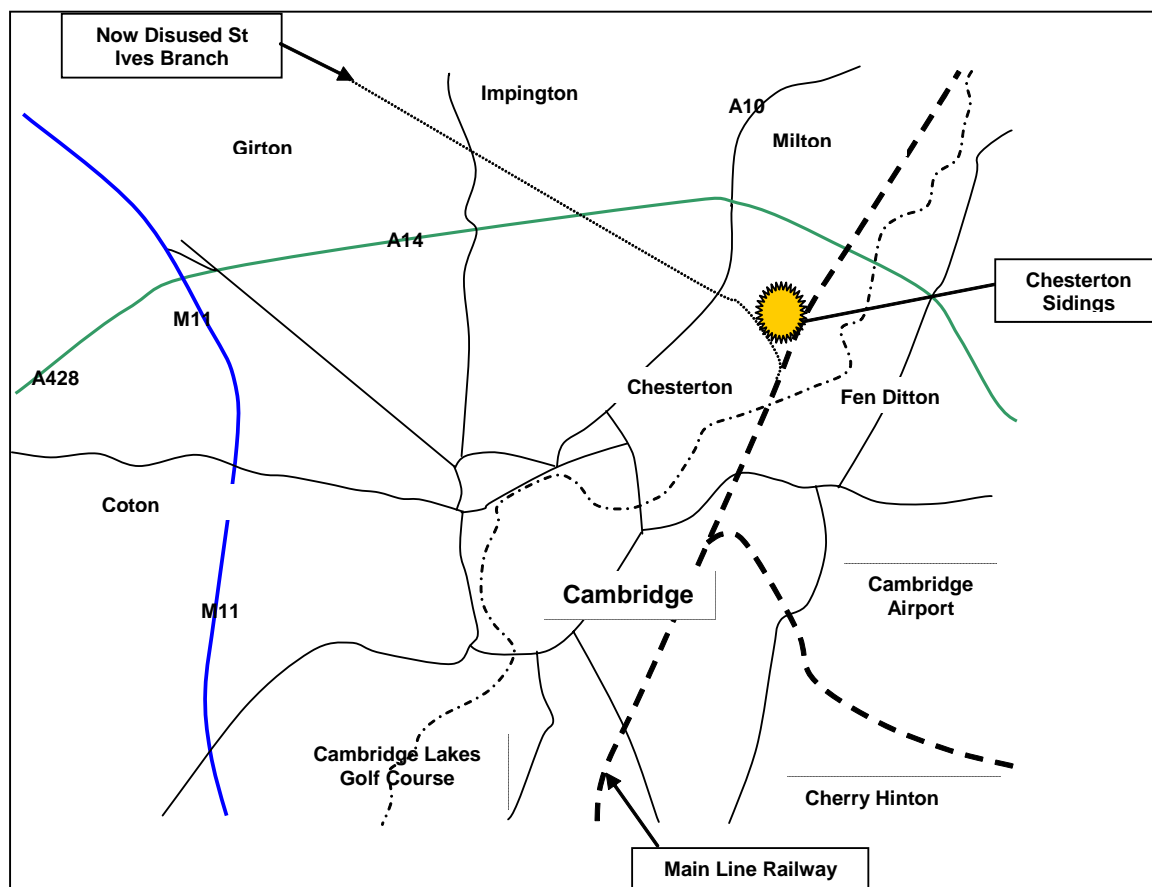
2. Appraisal and Value for Money

SCHEME DESCRIPTION

Location

- 2.1 The proposed new railway station and interchange facility will be located on the West Anglia main line in the area of Chesterton Sidings (formerly Chesterton permanent way depot), approximately three miles north of Cambridge Station, on the north-east side of the city.
- 2.2 The proposed site is on Network Rail owned land and is adjacent to the existing north-south main line running through Cambridge and providing direct services towards London and Stansted Airport (southwards) and Ely, Peterborough, Kings Lynn and Norwich towards the North.
- 2.3 Figure 2.1 **Error! Reference source not found.** shows the location of Chesterton Interchange in relation to the surrounding area.

Figure 2.1 – Chesterton Interchange and Surrounding Network



- 2.4 Part of the land is currently under a long-term lease to English, Welsh and Scottish Railway Company (EWS) and consultation is required with EWS to understand the longer term requirements for railway sidings on the site. The preferred option would involve removing the current EWS stabling sidings in order to construct the station, car park and access road. The current marshalling sidings would be retained without modification.

Site Selection

- 2.5 The selection of the former Chesterton Sidings as the preferred site for the station was driven by a number of important criteria, including that it should be located:
- ◆ adjacent to the London-Kings Lynn rail corridor;
 - ◆ with good access to the trunk road network;
 - ◆ with connections to the Guided Bus network;
 - ◆ to serve existing and proposed new developments;
 - ◆ on a brownfield site;
 - ◆ in close proximity to major employment/business areas to facilitate inbound employment/business rail trips;
 - ◆ near significant residential areas (and preferably be fully integrated into their areas) to encourage rail-based trips;
 - ◆ on a site which minimises the project's overall cost (eg; minimise the land acquisition and road and rail infrastructure upgrading costs);
 - ◆ on a site which utilises public-owned land; and
 - ◆ on a site which avoids major social or environmental impacts.
- 2.6 The selected location at Chesterton is able to meet all of these criteria, a number of which were taken forward as scheme specific objectives (see 2.38). The proposed interchange is located immediately adjacent to the London – Kings Lynn rail corridor providing direct access to services along this route. Situated on the northern edge of Cambridge, the interchange is a short journey by road to the A10 and A14, providing wider access to the trunk road network.
- 2.7 Proposals for the Cambridgeshire Guided Busway include an extension of the main corridor across Milton Road to serve the proposed Chesterton Interchange facility. In line with this, provision for interchange between rail and guided bus forms an integral part of the Chesterton Interchange proposals.
- 2.8 Chesterton Sidings is a brownfield site owned by Network Rail. The majority of the site is currently under a long term lease to English Welsh and Scottish Railway Company (EWS). A further proportion of the site is currently under a short-term lease to Lafarge (aggregate operation). This lease will end prior to the proposed opening date for Chesterton Interchange.
- 2.9 The position of the station within the site has been selected so as to minimise the operational impact on services. It has also been selected to minimise the costs associated with construction of a new station on the operational network, both in

terms of capital costs and disruption to existing passengers. The impacts of the proposed scheme on the existing occupants of the site are discussed briefly in 2.52.

- 2.10 Whilst existing freight activity takes place on the site, the incorporation of passenger services will not present a fundamental change in use, rather it will serve to enhance the area and open up a currently under-used resource. Thus the location is not deemed to give rise to adverse social and environmental impacts, the assessment of which is discussed further in 2.130.

Service Provision

- 2.11 Table 2.1 below shows a summary of the level of service provision proposed for Chesterton Interchange. This timetable delivers a total of 11 southbound services (12 including the Norwich – Cambridge service) between 0540 and 0900 hours. Of these, four are semi-fast services serving the early morning peak commuting period into London (0630 – 0730) and a further five southbound services serve the traditional morning peak commuting into Cambridge (0730 – 0830).
- 2.12 A detailed description of the train planning process can be found in the Forecasting Report at Appendix C.

Table 2.1 – Summary of services calling at Chesterton Interchange (Option B)

Time		Service
0540		Ely-Kings Cross semi-fast
0609		Kings Lynn-L'pool St semi-fast
0630		Cambridge-Kings Lynn
0634		Chesterton-Liverpool St semi-fast
0639		Kings Lynn-Kings Cross semi-fast
0702		Kings Cross-Kings Lynn
0704		Kings Lynn-L'pool St semi-fast
0709		Ely-Kings Cross semi-fast
0731		Kings Cross-Chesterton slow
0736		Kings Lynn-L'pool St semi-fast
0742		Norwich-Cambridge
0748		Chesterton-Kings Cross slow
0808		Kings Lynn-Kings Cross semi-fast
0810		Kings Cross-Kings Lynn fast
0812		Ely-L'pool St semi-fast
0831		Kings Cross-Chesterton slow
0843		Kings Cross-Kings Lynn fast
0847		Chesterton-Kings Cross slow
0909		0909 Kings Lynn-Kings Cross semi-fast
Remainder of day (minutes past the hour)	XX12	Cambridge-Norwich
	XX24	Chesterton-Kings Cross semi-fast
	XX36	Kings Cross-Kings Lynn fast
	XX39	Kings Lynn-Kings Cross fast
	XX49	Norwich-Cambridge
	XX58	Kings Cross-Chesterton semi-fast

Notes: All times refer to Chesterton Option B

Timetable based on December 2005 National Rail timetable

XX12 refers to service arriving/departing at 12 mins past the hour e.g. 11:12

Infrastructure Provision

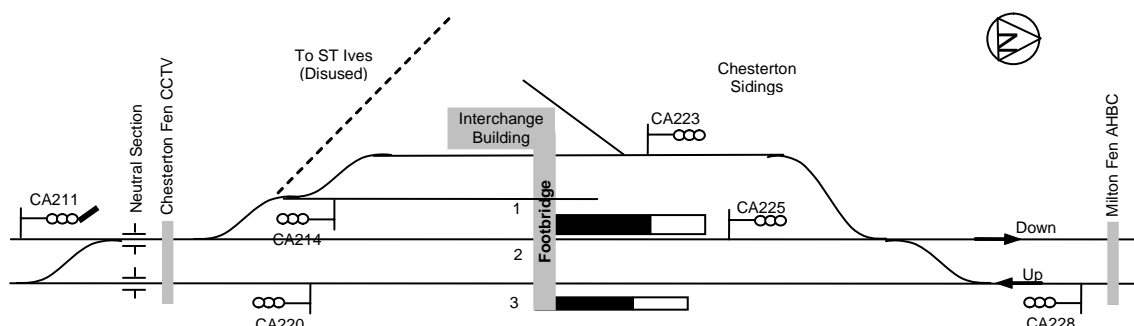
Access Arrangements

- 2.13 Road access to the station, car park and guided busway would be via Cowley Road which would require junction improvements at the boundary of the Network Rail land.

Station Infrastructure and Passenger Facilities

- 2.14 The Preferred Option would comprise a three platform station to the north of the Chesterton site.
- 2.15 A single bay platform and one island platform would be provided (see Figure 2.2) and the total length of each platform would be 300m – a length capable of accommodating a train of 12 cars.
- 2.16 Direct demand modelling has forecast the total number of passengers (boarders) in one day to be approximately 2630. A station building comprising waiting room, booking office and toilets would be provided in addition to passenger shelters on the platforms.
- 2.17 A footbridge would provide access over the main lines and operational sidings from the station to the platforms. Lift and stairs would be provided on each platform and at the station. A multi storey car park for 400 cars is also proposed and this would serve the guided bus interchange and station.

Figure 2.2 – Proposed Station Schematic Layout



- 2.18 Visual passenger information on the platforms will be provided by a Customer Information System (CIS), which can be used to relay train information and other information to assist passenger movements in waiting areas and on platforms. The

preferred method of operation for customer information systems is that they are as automated as possible, using real time train positional data to provide accurate running information to passengers, with scope for local operator input.

- 2.19 In line with typical CIS provision at a small station, it is proposed that the interchange facility incorporate three information screens within the main station building, with a further screens providing information on each of the three platforms.
- 2.20 A public address (PA) system will also be provided so that audio announcements regarding train running and other passenger information can be made. As with the CIS, the preferred method of operation for the PA system is that it provides automated announcements linked to real time train positional information so that passengers receive the most accurate train running information. The system will also have the facility for local announcements.
- 2.21 In line with typical PA system provision at a small station, it is proposed that the interchange facility incorporate two internal speakers within the main station building, with a further four external speakers on each of the platforms.
- 2.22 A closed circuit television system (CCTV) will be installed to monitor the public areas of the interchange facility and the car park. Consultation with the proposed station operator and the British Transport Police would be undertaken to establish the exact CCTV coverage patterns and minimum image sizes.

Interchange with other modes

- 2.23 The layout of Chesterton Interchange has been designed so as to permit full access by guided bus vehicles in the future, although physical extension of the guideway from Milton Road to the interchange along the disused St. Ives Branch Line is not included within the scope of this major scheme bid. The interchange will also cater for access by standard bus, and the facility will be linked in to the surrounding walking and cycling networks serving the northern parts of Cambridge and surrounding northern villages.

Parking

- 2.24 Proposed facilities at the new station include the provision of a 400 space surface-level open tarmac car park.

Forecast Demand and Revenue

- 2.25 Forecast Years of 2011 (Opening Year), 2016 and 2021 were appraised. The Forecasting and Economics report, included at Appendix C, provides full details of the application and results of the demand forecasting models. A summary of the demand for travel to and from Chesterton Interchange is set out below.
- 2.26 Table 2.2 shows that more than 2600 trips are forecast from Chesterton to other rail station destinations. Similarly, approximately 177 trips are forecast to be made to Chesterton from other rail stations.
- 2.27 The introduction of Chesterton Interchange into the rail network would result in the abstraction of trips from other stations in the vicinity. Approximately 50% of the trips

from Chesterton are forecast to be abstracted from other stations, principally Cambridge. A re-assignment of trips from Cambridge to Chesterton would lead to a desired reduction in cross-city trips and help relieve footfall and car park congestion at Cambridge.

Table 2.2 – Summary of average weekday demand results, 2011 opening year

Demand Element	Trips
Generation at Chesterton	2626
Generation changes at other stations	-1313
Attraction to Chesterton	177
Effects on through travellers	-27
Net change to UK rail	1464

Forecast trip destinations

- 2.28 Table 2.3 shows the forecast distribution of Chesterton users, presenting the results for the six principal destinations modelled. This shows the strength of the southbound market, with London dominant, then Cambridge.
- 2.29 Northbound destinations of Ely, Peterborough and Norwich are weaker, reflecting the lower economic attractiveness of these destinations.

Table 2.3 – Forecast destinations of generated trips for Chesterton, 2011 opening year, average weekday

Destination	Trips
Cambridge	830
Ely	180
Norwich	40
Peterborough	70
Stansted Airport	60
London	1,440
Sum	2,620

- 2.30 Table 2.4 shows a summary of trips attracted to Chesterton Interchange by origin.

Table 2.4 – Summary of trips to Chesterton Interchange by origin, average weekday

Origin/Route	Trips
North of Ely/Ipswich	30
Ely	45
Waterbeach	6
Royston line	24
Bishops Stortford line	32
London and south east	40
Sum	176

- 2.31 These results clearly show that the main market predicted for attracted trips to Chesterton are from Ely (commuting trips) and London (business trips).

Revenue

- 2.32 Table 2.5 below shows that the annual (opening year) revenue following the introduction of Chesterton Interchange to the rail network leads to the generation of significant additional revenue once the effects of abstraction are taken into account.

Table 2.5 – Summary of opening year (2011) revenue results, 2002 prices

Element	Cost (£s)
Generation at Chesterton	9,816,600
Generation model change to National Rail	-5,638,100
Attraction to Chesterton	435,100
MOIRA effects	-73,600
Chesterton parking	658,900
Other parking	-124,600
<i>Net change to UK rail</i>	<i>5,074,300</i>
Rail traveller lost	-5,711,700
Chesterton earnings	10,910,600

PROBLEMS AND OBJECTIVES IDENTIFIED

Problems

Access to Cambridge railway station

- 2.33 The Cambridgeshire Local Transport Plan (LTP2) notes that almost 80% of trips made by car to Cambridge railway station originate from the north/north-west of Cambridge and thus pass through the central area. These trips contribute to

increased levels of congestion and delay and associated impacts relating to safety, noise and air quality. The ability to 'capture' these trips earlier in their journey and remove them from the local highway network would bring significant benefits.

Growth Agenda

- 2.34 Cambridgeshire LTP2, submitted in March 2006, identifies a number of major challenges facing the county. Significant amongst these is the need to cater for development pressures associated with the continued economic success of the Cambridge sub-region¹ alongside the delivery of the Government's growth agenda for the south-east. The Cambridge sub-region must accommodate around 47,500 new houses in the period to 2016, and it is the intention that this growth in housing will be accompanied by a significant growth in employment. Thus, one of the main challenges facing the County Council is the need to ensure that the travel associated with this growth is catered for in a sustainable way which minimises negative environmental and quality of life impacts.
- 2.35 The Cambridgeshire and Peterborough Structure Plan (2003) (CPSP) sets out how the growth in housing should be catered for. This establishes a sequential approach which, after the built up area of Cambridge, identifies the 'edge of Cambridge (subject to Green-Belt review) on sites on the north, east, north-west and southern fringes' as the most suitable locations for development. It is within this context that an allocation of approximately 2,400 dwellings has been identified for the site known as Cambridge Northern Fringe (East) (CNF(E)).
- 2.36 To support this development the provision of sustainable links to the transport network will be important. Access will be required to the major employment and education sites to the north of Cambridge including the Science Park, St. John's Business Park and the Regional College as well as to the city centre and the south of Cambridge and major employment sites such as Addenbrooke's Hospital.

Capacity at Cambridge railway station

- 2.37 At present, platform capacity at Cambridge railway station is seriously constrained, with trains on layover between trips occupying one of the two through platforms for approximately half of every hour. The ability to alleviate this 'obstruction' would increase the number of through trains that could be handled, potentially resulting in a performance enhancement for operators serving the station and giving rise to timetable improvements to the benefit of passengers. The station buildings are also congested at peak times, constraining the movement of passengers within the station.

Objectives

- 2.38 The proposal for an interchange facility in the Chesterton area has existed for a number of years and thus the objectives for the scheme have developed over time in response to planning policy changes and development pressures. The scheme objectives can be summarised as follows:

¹ Cambridge Sub-Region – defined as Cambridge and the ring of surrounding Market Towns.

- ◆ Provide an interchange facility which forms an integral part of the high quality public transport network for Cambridge and the surrounding area including connections between rail and guided bus;
- ◆ Provide a public transport alternative to the private car for local and regional trips to and from the Science Park and to new development in the Cambridge Northern Fringe (CNF), integrating public transport provision with urban development thus promoting non-car modes of travel;
- ◆ Provide a public transport alternative to the private car for European and International trips via Eurostar at Kings Cross, Stansted Airport and, post Thameslink 2000, Gatwick Airport;
- ◆ Remove car trips from the Cambridge central area to release congestion benefits and improvements to air quality and noise;
- ◆ Facilitate connections between rail and guided bus; and
- ◆ Provide a parking resource away from Cambridge city centre potentially in conjunction with the Cowley Road Park and Ride site.

ASSESSMENT OF ALTERNATIVE OPTIONS

- 2.39 The provision of an interchange facility in the Chesterton area has long been identified as a key element of the integrated transport strategy developed for Cambridgeshire by the County Council, and as such has been supported by provision for the facility within local and regional planning documents (demonstrated in Section 1 above).
- 2.40 Preliminary appraisal work undertaken in 2003², examined a range of station (location and infrastructure) and service option combinations. Two options performed well with strong benefit to cost ratios (BCR) and high economic Net Present Values (NPV). The options were taken forward for development as part of this study, where, for the purposes of the Major Scheme Business Case development, four options in total were tested. These were:
- ◆ Option A - a new single platform station on the disused St. Ives Branch Line spur (thereby only able to be served by services from the south extended onwards from Cambridge);
 - ◆ Option B - a new three platform station on the main-line (with all passing services able to call, as well as onward extension of services beyond Cambridge to Chesterton);
 - ◆ Option C - a new two platform station on the main-line (only able to be served by passing train services); and
 - ◆ Option D (Low Cost Alternative) - an alternative mode, dedicated bus link from the Chesterton Interchange site to Cambridge railway station (akin to a bus-based park and ride service feeding heavy rail).

² Jacobs Consultancy – Chesterton Proposed New Station: Pre-feasibility study and outline business case. (2003)

- 2.41 Summary descriptions of alternative Options A, C and D (Low Cost Alternative) are presented below, following which is a more detailed account of the appraisal of Option B, the preferred option.

Option A

- 2.42 This option tested the provision of a single bay platform located on the alignment of the now disused St. Ives branch line. A full scheme description for Option A is included within the GRIP2 report at Appendix A. In all other respects, facilities within the Interchange building, on the station platforms and in the car park were assumed to be the same as those specified for the preferred Option B.
- 2.43 The construction of a single bay platform for this option means that it is only possible to serve those services which could be extended onwards from Cambridge and which would terminate at Chesterton Interchange. This results in a timetable which delivers 3 southbound slow services serving the early morning peak (0630-0730) commuting into London and a single additional southbound slow service during the traditional morning peak (0730-0830) commuting into Cambridge. Full timetable information for Option A is presented in Appendix C.

Option C

- 2.44 This option tested the provision of an island platform to the north of the site providing two platforms on the main line. Part of the EWS stabling sidings would be removed to allow space for the construction of the station, car park, access road and Guided Busway interchange. The services able to stop at Chesterton Interchange under Option C would be a reduced version of the Option B service timetable. Between 0540 and 0900 there would be a total of eight southbound services from Chesterton (nine including the Norwich to Cambridge service).
- 2.45 A full scheme description for Option C is included within the GRIP2 report at Appendix A. As for Option A, in all other respects, facilities within the Interchange building, on the station platforms and in the car park were assumed to be the same as those specified for the preferred Option B.
- 2.46 Full timetable information for Option C is presented in Appendix C.

Option D (Low Cost Alternative)

- 2.47 This option represents the provision of a bus-based park and ride solution located at the Chesterton Sidings site. A 200 space car park with waiting provision and infrastructure to enable interchange with buses would be provided. As with the rail based options a connection with the Guided Bus network was assumed. Connection back to the highway network would also be provided.
- 2.48 As the bus-based option was forecast to generate significantly lower levels of travel demand compared to that forecast for the rail based options, it was assumed that the specification for the provision of facilities would be revised accordingly. High quality infrastructure including shelters and real time information provision would be included, however, an interchange building was not provided with this option. The details of layout, landscaping and materials would be consistent with the high quality of provision made for Park & Ride elsewhere in Cambridgeshire.

- 2.49 In identifying an equivalent service pattern for Option D, to that provided by the rail based options, the following main assumptions were made about the level of service provision required between Chesterton Interchange and Cambridge Station:
- ◆ Peak hour frequency = every 20 minutes;
 - ◆ Off-peak hour frequency = every 30 minutes;
 - ◆ Buses run throughout the railway operating day (06:00-23:00); and
 - ◆ Journey time to Cambridge Railway station from Chesterton site = 25 minutes.
- 2.50 Further detailed information on the appraisal of Option D as the low cost alternative is presented in Appendix K.

Option B- Preferred Option

- 2.51 This option tested the provision of a three platform station. A single bay platform accessed from the disused St Ives Branch Line and an island platform on the main line would be provided to the north of the Chesterton site. The total length of each platform would be 300m which would be capable of accommodating a train of 12 cars.
- 2.52 The benefit of having a three platform station is that it would enable all passing services to call as well as the onward extension of services beyond Cambridge to Chesterton.
- 2.53 Direct demand modelling has forecast the total number of passengers (boarders) in one day to be approximately 2630.
- 2.54 A station building comprising waiting room, booking office and toilets would be provided in addition to passenger shelters on the platforms. A footbridge would provide access over the main lines and operational sidings from the station to the platforms. Lifts and stairs would be provided on each platform and at the station. A multi storey car park for 400 cars is also proposed and this would serve the guided bus interchange and station.
- 2.55 The construction of an additional bay platform within the station configuration means that some additional services, extended on from Cambridge to Chesterton, could also be accommodated within Option B. This results in a timetable which delivers four southbound semi-fast services serving the early morning peak (0630-0730) commuting into London and a further five southbound services serving the traditional morning peak (0730-0830) commuting into Cambridge.
- 2.56 A summary of the timetable for Option B is provided in Table 2.1.

Appraisal Results

- 2.57 An overview of the results of the appraisal process, focusing on those areas which assist in differentiating between the options, is set out below.

Forecast Demand and Revenue

- 2.58 Table 2.6 overleaf summarises the forecast average weekday demand and revenue (2011) at Chesterton for each of the four options.

Table 2.6 –Average weekday demand and revenue for all options (2004 prices, rounded)

Forecast	Option			
	A	B	C	D
Demand (boarders)	1140	2620	2420	50
Revenue (£ gross per annum)	4.1m	9.9m	9.2m	282,000

- 2.59 For Option A the combination of the overall reduced level of service and the penalty of having to head south to then change and then head north to access Ely, Peterborough and Norwich explains the much lower demand.
- 2.60 It should be noted that the results shown for Option D are in fact the incremental change at Cambridge station, but have been shown as the effect of the Chesterton remote Park and Ride site.
- 2.61 The results also reflect the higher level of service provision for Option B compared to Option C, because Option B includes the onward extension of some services from Cambridge.

Capital and Operating Costs

Table 2.7 –Capital and operating costs for all options (2004 prices, rounded)

Costs (£s)	Option			
	A	B	C	D
Capital	11,716,100	15,002,800	12,712,000	3,118,500
Maintenance/ staffing	266,000	347,000	281,000	50,000
Additional Rail Operating Costs	31,600	37,700	0	119,600
Renewals (15 years)	0	0	0	200,000

- 2.62 Table 2.7 shows the capital costs relating to each of the options. The difference in capital costs between each of the rail options is attributable to a relatively small number of factors. Situated on the St. Ives Branch Line, Option A includes the provision of a single straight platform with level access which does not require the either a footbridge or staircase. However, construction of the station at this location would require relocation of the Overhead Line Equipment Booster Overlap and a significant number of associated structures.
- 2.63 Whilst neither Option B nor Option C requires relocation of the Overhead Line Equipment Booster Overlap, Option B requires additional structures to support the additional bay platform. In both cases lift and stair structures would be needed in

order to cross the live track and access the platforms. Similarly the inclusion of the bay platform within Option B contributes to the higher capital cost of the scheme.

Economic Appraisal

- 2.64 Table 2.8 summarises the headline results from the economic appraisal.
- 2.65 Option B generates the highest Net Present Value (NPV) and the highest Present Value of Benefits (PVB). The Benefit to Cost Ratio (BCR) of 3.09 represents high value for money against DfT assessment criteria.
- 2.66 Option C has a lower Present Value of Costs (PVC) and consequently the slightly greater BCR at 3.18. However, the higher level of user benefits associated with Option B, along with a scheme BCR that, at 3.09 is only slightly lower than that for Option C, means Option B is viewed as the preferred option.
- 2.67 Option A generates approximately half of the benefits and NPV of Option B and therefore performs less well economically. Option D generates substantially lower benefits and has a negative NPV and therefore performs poorly in economic terms.
- 2.68 It is important to realise that the BCR is only one input into a decision about whether or not a project should go ahead. The BCR shows those impacts that have established monetary valuations such as user and non user time and accidents.

Table 2.8 – Summary of Economic Appraisal Results for all options

Benefits	Option			
	A	B	C	D
Time	£19,820	£46,610	£38,340	£2,590
users	£12,400	£7,320	£1,030	-£630
non-users	£7,420	£39,290	£37,310	£3,220
Accidents	-£3,890	-£6,300	-£5,830	£100
Revenues	£72,560	£123,310	£114,540	£7,060
Operating	-£11,470	-£14,820	-£10,850	-£6,880
Present Value of Benefits	£77,020	£148,790	£136,200	£2,870
Costs				
Capital	£16,300	£20,870	£17,680	£4,340
Indirect Tax Revenues	£11,540	£27,290	£25,110	£1,120
Present Value of Costs	£27,840	£48,160	£42,790	£5,460
Net Present Value	£49,180	£100,630	£93,410	-£2,580
Benefit/Cost Ratio	2.77	3.09	3.18	0.53

Service provision and network operation

- 2.69 The timetable for Option A, in particular the AM peak period proved the most difficult to plan to provide an adequate level of service. Due to the absence of a train which could subsequently be timetabled to start from Chesterton, there would no inbound arrival into Chesterton between 0730 and 0830, which is deemed to be a major disincentive to any inbound commuting to the area. The only other way to enhance the Option A timetable would be to schedule an extension of the Liverpool Street service to arrive at Chesterton at 0810, departing again at 0815. However, the instability that such a tight turnaround time would introduce into the timetable meant that this service was excluded. Similarly, enhancing the timetable during the off-peak period, such that there would be two inbound and two outbound services every hour, would mean that the single platform would be occupied by a train between 32 and 48 minutes past each hour (Kings Cross slow service) and between 58 minutes in one hour to 24 minutes past the following hour (Kings Cross semi-fast service). In this way if one service were to be running late this would present a risk of one service blocking out the next. Equally there is a risk that trains would be turned back at Cambridge in order to recover time and restore schedules, rather than continuing to Chesterton. This would have a significant adverse effect on the perception of the quality and value of a Chesterton interchange.
- 2.70 Operationally, the implications and effect of a bay platform under Option B remain as for Option A although any disruption to the extended services would be mitigated by the through services calling at the station. The allocation of train crew might also have an effect on the consistency and reliability of services scheduled to turn back at Chesterton. Train crews are likely to be based either at Cambridge or London Kings Cross and a shortage caused by service disruptions might also result in the cancellation of a Chesterton service if there was a shortage of time and resources. Thus a single terminating service is scheduled to use the bay platform under both Option A and Option B.
- 2.71 Timetabling provision for the island platform under Options B and C involved a difficult trade off between the ability to serve both Waterbeach and the new station at Chesterton Interchange in the peak and off-peak. The single track constraints on the Kings Lynn line meant that to provide a fast service to London from Chesterton it was essential to schedule the Kings Lynn to Kings Cross service to call there. The solution to this was to remove the Waterbeach stop, particularly so in the off-peak period. The morning and evening peak period services were designed to retain as many of the Waterbeach services as possible. In the off-peak the service would be reduced from hourly to every two hours on the Norwich-Cambridge service, and would no longer run direct to/from London.
- 2.72 Therefore under Options B and C, Waterbeach would see a downgrading of its current service level. However, this was deemed an acceptable trade-off due to the relative levels of demand currently experienced at Waterbeach compared with the forecast demand for Chesterton Interchange. Platform allocation between services at Cambridge would also need to be altered to permit through running northwards by the present Kings Cross-Cambridge semi-fast service.
- 2.73 When planning infrastructure works on the rail network, consideration must be given to the amount of 'possession' time that is likely to be required to undertake the work. The appraisal undertaken for the Network Rail GRIP2 analysis indicates that all three

of the rail options would require a similar number of nine or ten weekend Rules of Route (ROR) possessions.

Impacts on existing site users

- 2.74 At present, parts of the Network Rail site are leased to three separate organisations. The lease period for elements currently leased to EWS extends into the appraisal period. However, the other leases will terminate prior to the proposed scheme opening date. It is not therefore appropriate to consider these in the appraisal as future lease arrangements have not been determined.
- 2.75 Table 2.9 summarises the impacts in terms of the area of existing sidings which would need to be cleared, the impacts on EWS, and the land which would be released for development under each option.

Table 2.9 – Impact on existing site users

Impact	Option			
	A	B	C	D
Clearance of sidings	7km Network Rail sidings to south of site.	15km EWS stabling sidings.	9km EWS stabling sidings.	7km Network Rail sidings to south of site.
Impact on EWS	Marshalling and stabling sidings retained.	Marshalling sidings retained. Stabling sidings removed.	Marshalling sidings retained. Stabling sidings removed.	Marshalling and stabling sidings retained.
Development Land	Limited area released	Large area released	Large area released	Limited area released

Environmental Appraisal

- 2.76 An environmental appraisal was carried out for the site as a whole, and whilst it is likely that there would be differences in detail in the impacts for each of the alternative options, the environmental appraisal would be unlikely to differ significantly for one option over another. A more detailed environmental assessment of the chosen option will be carried out as part of the process of obtaining statutory consents.
- 2.77 Further detail is provided in Table 2.14, the NATA appraisal summary table for the preferred option.

Appraisal Summary

- 2.78 The appraisal considered the performance of each of the alternatives in the following areas:
- ◆ Delivery of scheme objectives;
 - ◆ Forecast demand and revenue;

- ◆ Capital and operating costs;
 - ◆ Economic performance;
 - ◆ Service provision and network operating impacts;
 - ◆ Impacts on existing site users; and,
 - ◆ Environmental impacts.
- 2.79 All of the options would deliver a new interchange facility on the public transport network on the north east side of Cambridge, though the bus-based option would deliver the lowest level of waiting facilities without an interchange building. Options B and C both perform strongly in terms of forecast demand and revenue, generating more than twice as many daily trips as Option A, which performs next best. This is a result of the timetable arrangements which could be provided under each option. Options B and C allow through services on the main line to call at the station, whereas Option A can only be served by services extended onwards from Cambridge. Option D is forecast to generate significantly fewer trips and therefore lower revenues.
- 2.80 The station specification and engineering requirements mean that capital and operating costs are similar for Options A and C. Option B is more expensive with the inclusion of the additional bay platform on the main line. Option D has the lowest capital costs, akin to those associated with a high quality bus based park and ride site. Operating costs reflect the level of maintenance required for each option, with Option B having the highest cost and Option D the lowest. Options A and C perform comparably.
- 2.81 Option B and Option C perform strongest in the economic appraisal, generating scheme BCRs of 3.09 and 3.18 respectively. The slightly higher BCR for Option C is brought about by lower scheme costs, as scheme benefits are greatest under Option B. Each of these options demonstrates significantly higher economic performance than either Option A or D, which generate BCRs of 2.77 and 0.53 respectively.
- 2.82 Potential difficulties in scheduling services to use the bay platform under Option B do not appear to have significantly affected forecast levels of patronage. The timetable for Option C is deemed to be robust, but it generates a lower level of demand to that of Option B.
- 2.83 Although the timetable for Option D has a similar level of service frequency this was not sufficient to generate similar levels of demand.
- 2.84 Impacts on existing site users would be comparable for Options B and C, under which a significantly larger area of land would be released for development compared to with Options A and D. However, the bay platform in Option B requires the clearance of an additional area of sidings with associated costs.
- 2.85 The current level of environmental appraisal considered the site as a whole and thus limited differences were identified between options at this stage.
- 2.86 Despite the higher scheme costs and potential timetabling difficulties associated with the bay platform, the higher level of patronage and scheme benefits meant Option B was chosen as the preferred option for a Chesterton Interchange facility. The

remainder of this document therefore focuses on the detailed appraisal of Option B. The results of the full NATA appraisal for the preferred option are presented at 2.130.

PREFERRED SCHEME CAPITAL AND OPERATING COSTS

Capital Costs

- 2.87 The capital costs for the scheme were derived using railway engineering best practice to a level of detail consistent with that required by the Network Rail GRIP2 process. Table 2.10 provides a summary breakdown of the scheme capital costs in 2004 prices. Further details of the capital costs associated are included in the GRIP2 report at Appendix A.
- 2.88 These costs exclude allowances for risk, optimism bias and scheme development, which are included in the costs presented in Table 2.7.

Table 2.10 - Summary of Option B capital costs

Discipline	Cost (£s)
Permanent Way	761,000
Civils	2,048,500
Signalling	596,000
Telecoms	174,000
M & E	651,500
OLE	734,300
Car access and parking, bus interchange	1,809,100
Network Rail Asset Protection	350,000
Contractor preliminaries and design fees	3,180,600
Total	10,935,000

- 2.89 Note that these costs do not include any allowance for possessions during the actual construction period – it has been assumed that pre-booked engineering possessions would be utilised wherever possible.

Operating Costs

Site Maintenance and Staffing Costs

- 2.90 Annual maintenance and staffing costs have also been estimated, based upon the following assumptions:
- ◆ Station open between first and last service each weekday, reduced on Sundays;
 - ◆ Staffed ticket office (open for morning peak and part of day);
 - ◆ Platform staff for train despatch and passenger assistance;

- ◆ Multiple platforms linked by footbridge;
- ◆ No buffet or shop;
- ◆ Staff/supervisors office;
- ◆ PA system and CCTV provided;
- ◆ Messing facilities for staff;
- ◆ Public waiting areas; and
- ◆ Public toilets.

2.91 Based on the application of these assumptions, an annual site operating cost of £347,000 per annum (2004 prices) was derived.

Service Operating Costs

2.92 The selection of Option B as the preferred scheme results in some additional operating costs of £37,700 over and above those already incurred by existing train operators.

RISK ASSESSMENT AND OPTIMISM BIAS

Risk

- 2.93 In accordance with the Major Scheme Appraisal guidance a Quantified Risk Register has been established for the scheme. The QRA is included at Appendix L.
- 2.94 The high level risks identified through the risk management process are listed in Table 2.11 overleaf.
- 2.95 From the initial risk exercise, risks relating to the site such as ground conditions, ecology and the condition of the rail infrastructure have been mitigated through surveys and investigations.
- 2.96 Of the remaining six high risks, three relate to the funding of the project and are to be mitigated through discussion and negotiation between CCC, NR and DfT.
- 2.97 Continuing involvement and consultation with Members will mitigate the possibility of political support for the scheme being withdrawn.
- 2.98 More detailed consideration of the construction related risks will be carried out during further scheme development but no specific individual risks have been identified at this time. To mitigate against the risk of the market overheating and insufficient resources, contact with suppliers and market testing will be adopted in order that an informed decision can be made on the programme for implementation of the project.

Table 2.11 - High Level Risks

Risk ID No	Risk Description
2	Funding restrictions as a result of the regionalisation of transport funding
16	Construction related risks
15	Funding gap cannot be made up
10	Insufficient Resources/ Market overheats due to competing projects e.g. Olympics
26	Strategic Planning Risk undermines business case for the station
1	County Council withdraw support for the scheme

Optimism Bias

- 2.99 Within the economic appraisal of the scheme, optimism bias of 66% has been applied to both the capital and operating costs. This assumes a conservative approach and is in keeping with current DfT guidance on optimism bias, which would categorise the scheme as 'non-standard' civil engineering.
- 2.100 However, it is acknowledged that the development of scheme costs to the Guide to Rail Investment Projects Pre-Feasibility (GRIP2) stage means that the rail industry would accept the application of optimism bias at 50%.

PASSENGER MODELLING AND ASSUMPTIONS**Model Development**

- 2.101 Full details of the development of the model structure for the base year demand model and the suitability of that model for assessment of future year demand are provided in the Local Model Validation Report (LMVR) at Appendix B. The models were validated to a 2004 Base Year.
- 2.102 The development of the modelling process for the models to forecast the demand for a new station at Chesterton to the north of Cambridge was driven by the expected markets which it would serve, and the various rail based options which were to be tested. Three separate models were developed/utilised, covering:
- ◆ A locally calibrated generation model;
 - ◆ An attraction model; and

- ◆ The use of the existing MOIRA model to model the effects of service journey time extensions for through rail travellers.
- 2.103 Used together, the complete suite of modelling tools enabled the effects of a new station at Chesterton, serving both the adjacent population and drive-in demand from further afield, to be assessed.

Demand and Revenue Forecasting Assumptions

- 2.104 A summary of the main assumptions applied in the demand and revenue forecast modelling is provided below.

Rail Fares

- 2.105 Fares for Chesterton were taken to be the average of those between Cambridge and Waterbeach, reflecting the mid-point location of the new station. However, for Option A, an additional fares penalty was applied to replicate the need to double back from Chesterton where a traveller is heading northwards. This has only been applied to movements to Ely, as further distance destinations (Norwich and Peterborough) would be more likely not to pick up the financial penalty of this doubling back movement.

Timetabling

- 2.106 In order to define the rail services available to call at the new station, a detailed timetabling exercise was undertaken. The basic timetable was based upon the December 2004 public timetable, with the known incremental changes to the December 2005 timetable applied (the changes mainly related to Liverpool Street-Cambridge and Stratford-Stansted Airport services). This timetable then acted as the do-minimum to which all Chesterton service options were appended. As part of this process, reference was also made to the platform docking timetable for Cambridge which shows the planned allocation of trains to platforms.
- 2.107 The timetable for Option B, incorporating the most complicated and extensive service pattern, was tested for robustness within the industry standard software Railsys. The Railsys model showed that the proposed timetable would be able to cope with normal railway timetable perturbations.
- 2.108 The timetables for Options A and C were derived based upon this analysis of Option B. As such, given that Option C features exactly the same timetable but without the terminating trains, it can be concluded that this option would also have a robust timetable. In a similar manner, Option A contains only the extended services from Option B's timetable, so again should provide a robust timetable.
- 2.109 The most significant issue for consideration in the train planning work undertaken to devise a working timetable for Chesterton Interchange was the need to estimate the extra time involved both in extending southern trains from Cambridge Station to Chesterton Interchange and in stopping existing through trains at Chesterton Interchange. To do this, consideration was given to the following factors:
- ◆ Running time between the two stations;
 - ◆ Delay/recovery time for services approaching Cambridge;

- ◆ Turnaround times at the new station; and
 - ◆ Platform occupation at the Cambridge station.
- 2.110 A further consideration was the need to accommodate services within the existing rolling stock such that no additional trains would be required.
- 2.111 For Option D, the bus based low cost alternative, services were modelled as an altered access mode to Cambridge railway station. Service schedules have already been described in paragraphs 2.47-2.50. The new mode of access was combined with that of the do-minimum using a logsum formulation to give a marginally lower set of times and costs of access to Cambridge for those zones which could access the service. Owing to its proximity, the model parameters used in this process were taken from the Park and Ride model for Cowley Road as developed for the Cambridge Guided Bus (CGB) study, with a modal constant against Park and Ride of £4.53 per inbound trip against use of Park and Ride. This value was applied to the generalised cost of using Park and Ride access before derivation of the logsum.

Development Assumptions

- 2.112 For the do-something scenario the highway times and distances were taken from skims of the Cambridge SATURN model based in turn upon outputs from the MENTOR land-use/transport model. The scenario used was that of committed highway and housing schemes in Cambridgeshire for future years.

Parking costs at Chesterton Interchange

- 2.113 To enable the different models to be applied to Chesterton, assumptions are required regarding the costs accruing to users of the new station. For the parking charges the same charging regime was assumed to apply as for Cambridge railway station, being £4.40 in the peak period and £3.30 outside the peak.

Demand and Revenue Build-up

- 2.114 The demand for a new railway station does not achieve its forecast for the first few years due to delays as the travelling public gain knowledge of the new rail facility. To reflect this, in the economic appraisal the assumption has been made that demand and revenue in the year of opening (2011) would be 50% of the forecast, and in the next year (2012) would rise to 75% of the predicted, followed by a rise to the full 100% of forecast demand from 2013 onwards.

Expansion Factors

- 2.115 For the Trip Generation Model, standard rail industry annualisation factors (daily to annual) were identified. These are shown in Table 2.12 below.

Table 2.12 – Model Expansion Factors

Market	Daily to Annual Factor
Full	252
Reduced	341
Season	252

- 2.116 The same expansion factors are applied to the Trip Attraction Model for the full and season ticket markets. This conservative assumption implies that no weekend market is expected to be attracted to the Interchange catchment.

Through Rail Travellers

- 2.117 The impact of the introduction of Chesterton Interchange on through rail travellers and associated demand and revenue forecasts were estimated using the MOIRA suite of models. However, for some movements in MOIRA there is an obvious degree of overlap between the effects of the time extension in both it and the generation model. For example, the effects of an additional stop at Chesterton in Option B upon Ely-Cambridge movements are estimated in both models, and so those from the generation model have been selected. A process of removal of such duplication was undertaken, with the generation model results preferred given that they also allowed for station choice changes, which are not included within MOIRA. By allowing for this station change to occur, the disbenefits from the generation model would be less than from MOIRA which would show a simple loss of demand due to the time extension effects.

Capital and operating costs

- 2.118 For inclusion within the economic assessment, the capital and operating costs set out in 2.7 were rebased to 2002 prices (based upon the retail prices index) and uplifted by 20.9% to reflect market pricing.
- 2.119 Optimism Bias at a rate of 66% was applied to all elements of the costs, covering construction, station operating and service operating costs. This ensures a robust assessment of scheme costs, as the completion of a detailed GRIP2 report would ordinarily allow a lower level of optimism bias (50%) to be adopted.

Decongestion calculations

- 2.120 Usage was made of the DfT Rail/SRA advice on the calculation of decongestion benefits. This provided rates per passenger car unit of 56.7p/veh km in 'congested' conditions and 12.5p/veh km in 'uncongested' conditions (both at 2002 prices).
- 2.121 For the purposes of this study the definition of 'congested' conditions was defined by the area within Cambridge bounded by the M11, A14 and the A1134 to the east of the city. Using a crow fly assessment the proportion of the distance between each origin zone and the destination was assessed to enable the proportion of the journey being valued at the 'congested' or 'uncongested' rates.
- 2.122 The traditional assumption between mode transfer from car/induced travel for new trips is a 50%:50% split. This was assumed for all movements in the generation model, with the exception of trips to London, for which a 25%:75% split (mode transfer/induced travel) was assumed. This is a more conservative assessment which has recently been used for work undertaken for Network Rail assessing the business case for station enhancements for Kings Cross and approved by DfT Rail.

- 2.123 Based on an analysis of LATS data for access to Cambridge railway station, an assumed level of 50% access by car was applied to all stations with exception of Chesterton, for which a figure of 66% was used, based on the access to Warwick Parkway, chosen as an analogous situation.
- 2.124 For short distance trips of less than 3km to the station no decongestion calculations were undertaken on the basis that such trips would most likely be slow mode walk or cycle trips.

Accident benefits

- 2.125 The assumptions used for the calculation of decongestion benefits, relating to the split between mode transfer/induced travel for new trips, and station access mode for existing trips, were also applied to the calculation of accident benefits.
- 2.126 SRA accident rates were applied to the change in split between car access and rail journey passenger kilometres between the do-minimum and the do-something scenarios.

Taxation changes

- 2.127 Effects on taxation income to the UK Treasury were estimated in accordance with SRA advice for both VAT and fuel duty adjustments. Further information is provided in the Forecasting and Economics Report at Appendix C.

Car parking revenue effects

- 2.128 To assess the likely number of self-driven car trips accessing Chesterton Interchange, and thus generating parking revenue, an analysis of LATS survey data (for Cambridge stations) as well as a recent study at Ely³, providing indications of the level of such car usage, was undertaken. Further reference was made to the level of drive in demand to Gloucester and Cheltenham stations which serve as a hub station for their respective areas in a similar manner to the expected for Chesterton Interchange.
- 2.129 Both gains and losses in parking revenue were assessed, taking account of generated demand at Chesterton Interchange and reductions in demand at other stations where diversion has occurred. Table 2.13 below shows the assumed mode split for self-drive car parking access, for the purposes of car park revenue assessment. The level of self-driven car demand at Chesterton Interchange reflects the presence of local population demand at nearby Kings Hedges, Chesterton and a little further away at Milton.

³ Atkins – Ely Public Transport Interchange Study

Table 2.13 – Assumed mode split of self-driven car parking access

Market	Cambridge	Chesterton	Ely/ Huntingdon	Small stations
Full	12%	28%	28%	12%
Reduced	10%	28%	28%	10%
Season	8%	28%	28%	8%

WORKSHEETS FOR NATA OBJECTIVES

2.130 This section summarises the results of the full NATA appraisal for Option B as the preferred scheme. The completed Appraisal Summary Table is presented in Table 2.14, below.

2.131 Supporting information for each of the Central Government Objectives and, where applicable, sub-objectives is then provided.

Environment

2.132 The Environmental Appraisal was undertaken in accordance with the Detailed Guidance on Major Scheme Appraisal in Local Transport Plans (Department for Transport) and is consistent with other relevant guidance, including the former SRA's Guide for Promoters of New Stations.

Noise & Local Air Quality sub objectives

2.133 Standard noise and air quality assessments both require the comparison of traffic flows for the do-minimum and do-something scenarios in order to identify those links on the highway network where changes, greater than a certain level, occur. The assessments are undertaken for the opening year situation.

2.134 For the purposes of noise assessment, guidance⁴ suggests that improvements or deterioration in the noise environment may be perceived when the changes are as low as 1dB(A). This is equivalent to an increase in traffic flow of 25% or a decrease of 20%. Accordingly, preliminary screening of the existing road network was carried out to identify where changes in the order of 1 decibel, and hence a significant change in noise, were expected. Road segments would only need to be included within the noise assessment if the change in traffic from the Do-Minimum to the Do-Something scenario is predicted to be significant according to these terms.

2.135 For the purposes of local air quality assessment, guidance⁵ suggests that due to the uncertainty in traffic forecasting and the size of traffic flow change needed to affect air quality, options which change traffic flows by less than 10% on existing or new routes, or elsewhere on the local network can be scoped out.

⁴ DMRB (Volume 11, Section 3, Part 7, Chapter 3)

⁵ Transport Analysis Guidance (TAG) Unit 3.3.3 The Local Air Quality Sub-objective, April 2004, Design Manual for Roads and Bridges (DMRB)

- 2.136 The suite of demand and revenue forecasting models used to test the scheme options for Chesterton Interchange do not include a local highway network model. As such an appropriate alternative methodology had to be developed for the appraisal of noise and local air quality impacts. A preliminary screening exercise was undertaken to see if detailed assessment of these indicators could be 'scoped-out' of the appraisal process.

Table 2.14 – Appraisal Summary Table – Option B (Preferred Option)

Option B (Preferred)		Description – Rail based option. Single Bay Platform & Island Platform on the Mainline (3 Working Platforms in Total).	Problems	Present Value of Costs to Public Accounts £42.8m
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT
ENVIRONMENT	Noise	Changes in traffic flows are lower than the threshold values for assessment		Neutral
	Local Air Quality	Changes in traffic flows are lower than the threshold values for assessment		Neutral
	Greenhouse Gases	Generated trips offset reduction for those trips removed between Chesterton and Cambridge railway station		688 CO ₂ tonnes per year (2011) net increase
	Landscape	The scheme would have an adverse impact on the open landscape. Changes to character and existing use of the site result in moderate adverse score.		Moderate adverse
	Townscape	Overall the scheme would improve the currently unused sidings area and would result in a moderate beneficial impact.		Moderate beneficial
	Heritage of Historic Resources	Impact on locally significant features (railway furniture) could be mitigated. Adverse impact on Old Rectory (Listed Building). Overall score is slight adverse		Slight adverse
	Biodiversity	Effects on Bramblefields Local Nature Reserve during construction and operation. Adverse residual effects during operation cannot be fully mitigated.		Slight adverse
	Water Environment	With mitigation scheme will have a negligible impact on most attributes. Impacts of low significance on Milton Drain.		Slight adverse
	Physical Fitness	Opportunity for walk and cycle access to the interchange from Cam bridge Northern Fringe area.		Slight beneficial
	Journey Ambience	Car users able to switch to PT mode earlier in journey. Depending on the delivery of other improvements, some crowding may be experienced.		Slight adverse
SAFETY	Accidents	Accident savings generated through mode switch from car to rail results offset by additional car based generation accessing new interchange facility.		PVB £-6.303m
	Security	All users will benefit from new high quality interchange, waiting and parking facilities. CCTV system would be installed to monitor interchange facilities and car park.		Moderate beneficial
ECONOMY	Public Accounts	Scheme has a BCR of 3.09, representing 'high' value for money against DfT guidance	Central Govt PVC £48.2m, Local Govt PVC £0m	PVC £48.2m
	Transport Economic Efficiency: Business Users & Transport Providers	Transport benefits arise from decongestions benefits associated with removal of car trips from the highway network. Transport operators benefit from increased revenue and patronage.	Users PVB £28.2m, Transport Providers PVB £108.5m, Other PVB £0m	PVB £136.7m
	Transport Economic Efficiency: Consumers	Transport benefits arise from decongestion benefits associated with removal of car trips from the highway network.	Users PVB £18.3m	PVB £18.3m
	Reliability	Additional stop on rail network increases journey options and reduces impacts on reliability.		Slight beneficial
	Wider Economic Impacts	Scheme does not fall within a regeneration area.		Not applicable
ACCESSIBILITY	Option values	>2400 users forecast to access the rail network at Chesterton Interchange daily. Interchange will provide new access point on to the public transport network for local population (>13000) within 1500m of facility.		Strong beneficial
	Severance	Scheme will be developed on existing rail sidings. No detrimental effect on non-motorised users. Access likely to be improved when new development takes place.		Neutral
	Access to the Transport System	28.85% of local population (non-car available) will have access to a new service 2 trains per hour in each direction in the off-peak period.		Large beneficial
INTEGRATION	Transport Interchange	New facility transport network. Provides interchange between rail, car, bus, guided bus, walk and cycle.		Moderate beneficial
	Land-Use Policy	All local and regional planning and land-use policies directly support the delivery of the scheme.		Strong beneficial
	Other Government Policies	Scheme will have limited impact on wider government policies.		Beneficial

- 2.137 The preliminary screening exercise involved an assessment of flow changes on the main highway links immediately adjacent to the site (Milton Road), and as such the area of the network most likely to be affected by the proposal. Known trips to Chesterton Station were extracted from the model. As these are daily trips identified by ticket type (full, reduced, and season) individual factors were applied to each ticket type to provide peak hour trips to the station. A factor was then applied to the peak hour trips to identify the proportion making the trip by car, i.e. those driving and parking at the station (including those travelling by car and being dropped off) and the proportion travelling by other modes.
- 2.138 The methodology then focused on car based trips using the highway network. As these additional car trips have no other choice but to access the station via Milton Road, these trips were then added to the existing traffic data available for Milton Road, and the increase in traffic analysed. Table 2.15 illustrates a summary of this procedure.

Table 2.15 – Screening procedure for Noise and Air Quality Assessment

Peak Hour	Stage 1: 2005 Milton Road Traffic Data	Stage 2: Chesterton Peak Hour Trips	Stage 3: Chesterton Peak Hour Car Trips	Stage 4: % increase in trips on Milton Road	Stage 5: Noise/Air Quality Assessment required?
AM	3184	358	186	5.8%	NO
PM	2694	72	38	1.4%	NO

- 2.139 This assessment looked at the area of the network certain to suffer the greatest impact from the proposal. Thus it was assumed that, as a worst case scenario, this could be used to indicate the impact on other areas of the network.
- 2.140 The TAG noise assessment is required to be completed for dwellings within 300m of road segments within the study area where the change in traffic between the Do-Minimum and Do-Something scenarios is significant (ie >+25% or >-20%). On this basis the road segments in the network did not qualify for analysis.
- 2.141 The TAG air quality assessment is required to be completed where the change in traffic between the Do-Minimum and Do-Something scenarios is significant (ie >10%). On this basis the road segments in the network did not qualify for analysis.
- 2.142 Therefore the overall assessment for both Noise and Local Air Quality is neutral.

Greenhouse Gases sub-objective

- 2.143 The assessment of greenhouse gas emissions and the overall change in carbon dioxide indicates a net increase of 688 tonnes of CO₂ per year at 2011. This increase results as the trip generation associated with Chesterton Interchange offsets the removal of trips elsewhere on the network.

Landscape and Townscape

- 2.144 The issues with regard to landscape and townscape will be how the visual impact of the proposed station building and car park compares with the existing derelict urban landscape, and how landscape quality could be improved as a result of the development.
- 2.145 The scheme will have a moderate adverse impact on the landscape because of the changes to the character and use of the existing site that it would bring about.
- 2.146 A number of properties are likely to experience moderate adverse visual impact from the proposed interchange building, car parking facilities and lighting. They would be more affected at night time and during winter. However, landscape mitigation measures would reduce the impact of the proposals. These would take into account the potential to extend and improve ecological diversity.
- 2.147 Overall the proposed development would improve the currently unused siding area and would give a moderate beneficial impact on the townscape of the area. The AST worksheet for Environment – Landscape is included at Appendix E.

Heritage

- 2.148 This assessment identified the known and potential cultural heritage resources that may be affected by the proposed development.
- 2.149 There are two known sites recorded on the Cambridgeshire Historic Environment Record (CHER) within the proposed development site - an Anglo-Saxon burial (AH no.2) and a prehistoric cremation burial (AH no. 3) - both discovered during quarrying between the 19th and 20th centuries. The latter also contained Roman pottery (AH no.3a) although this was most likely a result of later disturbance of the burial. However, the record of the Iron Age burial discovery can not be confidently verified and its original siting may well be outside of the limits of the development site. However, the railway sidings and associated structure, while not listed on the CHER, are of local interest and should be considered.
- 2.150 There is high potential that the proposed development could impact on as yet unknown buried archaeological remains associated with the discovery of the burials. An understanding of the extent and importance of any buried archaeological remains in this area will be developed through the undertaking of further investigations (see below). At this stage no definitive impact assessment can be made, though it is possible that these remains could be of National importance and that the scale of the impact on them could be Substantial, resulting in a Large Adverse effect. However, taking account of the information currently available the overall the impact on heritage is assessed as slight adverse. The AST worksheet for Environment – Heritage of Historic Resources is included at Appendix G.

Biodiversity

- 2.151 The main biodiversity issues to be considered at the site include the possible presence of great crested newts within the ponds, the possible presence of bats within a number of buildings which may have to be demolished as part of the scheme and the possible presence of badgers and reptiles within the site. Disturbance to nesting birds and loss of nesting habitat is also an issue to be considered.
- 2.152 Furthermore, the Chesterton Sidings site shares a boundary with the Bramblefields Local Nature Reserve (LNR). This site is important at a county level and possible damage or disturbance to this site also needs to be considered.
- 2.153 The Environmental assessment identifies a number of mitigation measures which would need to be put in place prior to construction and operation. However, assuming these are fully implemented the overall assessment for biodiversity is slight adverse. This is due to the impacts on the Bramblefields LNR. The AST worksheet for Environment – Biodiversity is included at Appendix F.

Water Environment

- 2.154 The Chesterton Interchange proposal involves creating fairly extensive areas of hard standing which will create an excess amount of run-off. Excess amounts of run-off will require attenuation by storage. There are two appropriate drainage routes for surface water. The Milton drain to the north is sensitive to flooding and the Public drain to the East is socially sensitive. An increase in un-attenuated flow could lead to flood risk in both the public drains and also the River Cam which is sensitive to flooding. Parts of the site lie within the indicative floodplain. However, the Environmental assessment identified a number of mitigation measures which could be put in place to limit the effects of the station both during construction and operation. With these mitigation measures in place, the impact on the water environment is assessed as slight adverse. The AST worksheet for Environment – Water Environment is included at Appendix D.

Physical Fitness

- 2.155 The delivery of the scheme will include facilities for access via non-motorised modes. This will benefit locally generated trips which would otherwise have accessed Cambridge railway station by car enabling them to walk or cycle to the new interchange point. Provision of secure cycle storage and links to the local walk and cycle network should encourage access by non-motorised modes. The impact on physical fitness is assessed as slight beneficial.

Journey Ambience

- 2.156 Approximately 50% of the trips from Chesterton are forecast to be abstracted from other stations, principally Cambridge. As almost 80% of trips to Cambridge station originate to the north and north-west of the city this indicates that, with the scheme in place, a large number of Chesterton users should be able to avoid travelling across the city to get to Cambridge station. Thus there is likely to be an improvement in journey ambience for those users leaving the highway network as a car driver and joining the public transport network earlier in their journey.

- 2.157 High quality car parking and waiting facilities will be provided at the interchange, and journey stress will be reduced through the provision of real time information at the station. Increased parking provision will also relieve current difficulties of parking at Cambridge station. For existing public transport users the option will represent an improvement in journey ambience. For users which transfer from car for their whole journey an additional interchange and associated waiting time will be introduced.
- 2.158 At the present time some services between Cambridge and London during the morning peak period are known to be congested, though particular concerns exist at the London end of the journey.
- 2.159 In the short/medium term a number of potential measures have already been identified within the Eastern Regional Planning Assessment for the Railway (RPA) to increase capacity along the West Anglia and East Coast Main Line corridors:
- ◆ Possible train lengthening for West Anglia Main Line Liverpool Street – Cambridge trains to 12 cars to cater for commuter demand and regional growth;
 - ◆ re-timetabling on the East Coast Main Line (ECML) to Cambridge to deliver more peak trains;
 - ◆ Ensuring the maximum number of 8-car trains run in the shoulder peak to enable peak spreading;
 - ◆ using diesel trains to overcome power supply issues south of Peterborough to deliver more peak trains; and
 - ◆ 2tph from Stansted Airport towards the north via Cambridge
- 2.160 Plans to increase capacities in terms of train lengthening and time-table optimisation would also be supported by the delivery of schemes such as Thameslink 2000 and Crossrail. The timing and delivery of these schemes is currently uncertain, however implementation of only part of these plans would bring additional capacity on-line that could accommodate the forecast demand generated by Chesterton Interchange.
- 2.161 Consideration was also given to crowding issues on southbound services to the north of Cambridge. An analysis of capacities and loadings from PLANET outputs for the Ely-Cambridge section suggests that in 2016 load factors would be approximately 31% in the morning peak period. The addition of Cambridge and London bound trips from Chesterton Interchange would increase load factors to approximately 51%.
- 2.162 It is recognised that Cambridge bound trips are likely to be more tightly concentrated between 0800 and 0900, and as such load factors may tend to be higher than the average during this time, although this is off-set by the majority of London bound commuting trips travelling earlier during the peak period.
- 2.163 The introduction of the interchange at Chesterton would also reduce the number of users at Cambridge station, which would serve to reduce the congestion of the station buildings by pedestrians. This would in turn reduce constraints on passenger movement within Cambridge station and improve journey ambience there.
- 2.164 The overall assessment for journey ambience is slight adverse. Further information on impacts on the rail network is presented in Appendix J.

Safety*Accidents*

- 2.165 Accident savings as a result of the removal of highway trips, both those accessing the rail network at Chesterton rather than Cambridge and trips using the rail network for their whole journey, are offset by disbenefits generated by additional users accessing the station on using the highway network. This results in an overall accident disbenefit of -£6.3m.

Security

- 2.166 Waiting facilities will be provided within the station building and are intended to be designed to a high quality standard and including best practice design for security and visibility, together with CCTV, lighting, and passenger help points. Though it is not intended that the ticket office will be manned all day, platform staff (present during service operating hours) will be able to provide passenger assistance and contribute to the delivery of a safe and secure waiting environment. The overall impact on security is assessed as moderate beneficial.

Economy*Public Accounts*

- 2.167 Table 2.16 shows the breakdown of costs to public accounts, including the costs of investment and lost taxation.

Wider Economic Impacts

- 2.168 Chesterton Interchange does not fall within a Regeneration Area therefore an assessment of wider economic impacts is not applicable.

Table 2.16 - Public Accounts

Public Accounts (Option B)

	ALL MODES TOTAL		ROAD INFRASTRUCTURE	BUS & COACH	RAIL	OTHER
Local Government Funding						
Revenue	0				0	
Operating Costs	0				0	
Investment Costs	0				0	
Developer & Other Contributions	0				0	
Grant/Subsidy Payments	0				0	
NET IMPACT	0	(7)	0	0	0	0
Central Government Funding						
Revenue	0				0	
Operating Costs	0					
Investment Costs	20870				20870	
Developer & Other Contributions	0				0	
Grant/Subsidy Payments	0				0	
Indirect Tax Revenues	27293		10900		16393	
NET IMPACT	48163	(8)	10900	0	37263	0
TOTAL Present Value of Costs (PVC)	48163	(9) = (7) + (8)				

Notes: **Costs** appear as **positive** numbers, while **revenues and developer contributions** appear as **negative**
All entries are discounted present values, in 2002 prices and values

Accessibility

Option Values

- 2.169 The option values appraisal must be considered where a scheme will substantially change the availability of transport services within the area, such as providing a new rail service as in the case of Chesterton Interchange.
- 2.170 Chesterton Interchange would provide excellent access to local developments such as Cambridge Science Park and St Johns Business Park as well as the A14 trunk road. A station at Chesterton would relieve some of the road traffic in this area of the city by providing an alternative location giving access to rail travel. The station would also provide an interchange opportunity with Cambridgeshire Guided Busway, giving access to an alternative mode of transport into the city centre, to Addenbrooke's Hospital, and to destinations to the north-west of Cambridge including Northstowe (new settlement), St. Ives and Huntingdon.
- 2.171 Chesterton Interchange will provide a link to those living in the area as well as those commuting to and from the area. However, for those that may not necessarily use the service with any regularity they may still value having the option to use the service if they choose. Should residents wish to travel to Cambridge and beyond, Chesterton Interchange provides an additional facility for them to do so. For those that already have means of travel to a destination provided by the new scheme, they too may value the option offered for rail travel over those already taken account of.
- 2.172 The modelling exercise has estimated that approximately 2420 passengers will use Chesterton Interchange each day; the overall assessment for option values is therefore strong beneficial.

Severance

- 2.173 Severance effects, on users of non-motorised modes in the vicinity of the scheme, must be assessed as part of the overall appraisal for the scheme. The assessment is usually undertaken as a simple comparison with and without the scheme in place, estimating the likely numbers of people to be affected. However, the Chesterton Interchange proposal makes use of existing railway sidings, and consequently the level of severance for the do-something is no different than that for the do-minimum scenario. There will be no reduction or increase in severance for users of non-motorised modes with the implementation Chesterton Interchange, thus the overall assessment for severance is neutral.

Access to the Transport System

- 2.174 As the WEBTAG methodology is designed to assess a plan or strategy, and is therefore not appropriate for the appraisal of Chesterton Interchange, an alternative methodology was adopted. Census data (2001) was used to identify population within a 1500m radius of the new station. This serves two purposes. It encompasses the accepted walk-in catchment for a rail station (approximately 800m) and includes the development area (Cambridge Northern Fringe East) which would be served by the new station. The analysis identified numbers of car available and non-car available residents in 250m annuli. Within 1500m of the proposed scheme

the average number of residents who do not have a car available is approximately 28.85%.

- 2.175 Table 2.17 shows the population numbers within 250m annuli of the station location up to 1500m. This demonstrates that even without the forecast development in place more than 3800 people who do not have access to a car will benefit from the delivery of the scheme. With the new development in place this number could rise to more than 5000. The proposed timetable for services calling at Chesterton interchange would provide two services per hour in each direction during the off peak period. The overall assessment for access to the transport system is large beneficial.

Table 2.17 – Population within 1500m of Chesterton Interchange

Distance (m)	Existing Population		Cambridge Northern Fringe (E)		Total	
	Car available	Non-car available	Car available	Non-car available	Car available	Non-car available
0 – 250	20	8	60	24	80	32
0 – 500	684	277	837	339	1520	616
0 – 750	1651	670	1315	533	2966	1203
0 – 1000	3333	1352	3586	1454	6919	2806
0 – 1250	6713	2722	3586	1454	10299	4176
0 – 1500	9513	3858	3586	1454	13099	5312

Passenger Interchange Assessment

- 2.176 Chesterton Interchange will provide access to both the heavy rail network and the wider public transport network, through connections with the Cambridgeshire Guided Bus network. It will provide a new interchange opportunity for private car users, cyclists and pedestrians to make local and regional journeys using the public transport network. Amongst other destinations users will be able to access the new development proposed for Cambridge Northern Fringe East integrating public transport provision with urban development thus promoting non-car modes of travel. The interchange facility will form an integral part of the high quality public transport network for Cambridge and the surrounding area.
- 2.177 Extensive facilities will be provided at the interchange to enhance the passenger experience, these have been described earlier in Section 2 but will include:
- ◆ Car parking capacity for 400 vehicles;
 - ◆ Capacity for 12 car trains;
 - ◆ Station building with waiting room, booking office and toilets;
 - ◆ Waiting shelters on platforms;
 - ◆ High specification communications and security equipment;
 - ◆ Lift and stair access to platforms;

- ◆ Direct links between rail and guided bus

2.178 In terms of passenger interchange the proposal has been assessed as moderate beneficial. The AST worksheet for Integration – Passenger Interchange is included at Appendix H.

Land Use Policy Context

2.179 Section 1 demonstrates that scheme is consistent with all local, regional and national planning and transport policies, contributing to the sustainable delivery of the growth agenda within Cambridgeshire, and the development of a coherent and integrated public transport network. The AST worksheet for Integration – Land-use Policy is presented in Appendix I. The assessment for the Land Use Policy Context is therefore large beneficial.

Other Government Policy

- 2.180 As well as contributing to local and regional objectives the scheme also contributes to the delivery of wider Government transport objectives, through the delivery of LTP2 objectives and contribution to the “shared priorities” for transport. The delivery of Chesterton Interchange supports sustainable development within one of the Government’s growth corridors releasing brownfield land for future development. It provides access to the public transport network and in particular facilitates movement between private car and public transport. Although the scheme has a PVC to central Government of £48 million, it demonstrates a strong economic case with a BCR of 3.09.
- 2.181 Direct contribution to wider Government policies relating to health and education is likely to be limited, however it is not anticipated that the scheme will have any negative impacts. Thus, the overall positive contribution to the delivery of wider government policies is assessed as beneficial.

TRANSPORT ECONOMIC EFFICIENCY DATA

2.182 Table 2.18 shows the Transport Economic Efficiency Benefits results for the Chesterton Interchange scheme.

Table 2.18 – Transport Economic Efficiency Benefits

Transport Economic Efficiency Benefits (Option B)							
Consumers		ALL MODES	ROAD		BUS & COACH	RAIL	OTHER
User Benefits	TOTAL		Private Cars & LGVs	Passengers	Passengers	Passengers	
Travel Time	28226		26322			1904	
Vehicle Operating Costs	0		0			0	
User Charges	0		0			0	
During Construction & Maintenance	0		0			0	
NET CONSUMER BENEFITS	28226	(1)	26322	0		1904	0
Business			Goods Vehicles	Business Cars & LGVs	Passengers	Passengers	Freight
User Benefits							
Travel Time	18380			12964		5416	
Vehicle Operating Costs	0			0		0	
User Charges	0			0		0	
During Construction & Maintenance	0			0		0	
Subtotal	18380	(2)	0	12964	0	5416	0
Private Sector Provider Impacts					Passengers	Passengers	
Revenue	123309			0		123309	
Operating Costs	-14822			0		-14822	
Investment Costs	0			0		0	
Grant/Subsidy	0			0		0	
Subtotal	108487	(3)		0	0	108487	0
Other Business Impacts							
Developer Contributions	0	(4)					
NET BUSINESS IMPACT	126867	(5) = (2) + (3) + (4)					
TOTAL							
Present Value of Transport Economic Efficiency Benefits	155093	(6) = (1) + (5)					
Notes: Benefits appear as positive numbers, while costs appear as negative numbers							

SENSITIVITY AND SCENARIO ANALYSES

2.183 A series of sensitivity tests were undertaken in order to assess the robustness of the scheme in response to changes in different internal and external factors. The following sensitivity tests were undertaken:

- ◆ Applying 100% optimism bias to construction costs (no effect upon rail demand or revenue);
- ◆ Uplifting rail fares at Chesterton by RPI+5%;
- ◆ Raising Chesterton parking charges by 15%;
- ◆ Revised land-use and highway assumptions for future years; and
- ◆ Lower levels of GDP growth based on SRA UK wide GDP growth rather than localised GVA growth.

2.184 The results of the sensitivity tests (forecast demand) are summarised below (Table 2.19) relative to the central case for Option B. The optimism bias test has no effect upon demand, being the same as the central case.

Table 2.19 – Summary of sensitivity test results, forecast weekday demand (2011)

Demand element	Central case	Rail Fares +5%	Parking Charges +15%	Land-use test	GDP growth test
Generation at Chesterton	2,626	1,820	2,381	2,634	2,535
Generation changes at other stations	-1,313	-750	-1,174	-1,321	-1,268
Attraction to Chesterton	177	146	177	177	177
Effects on through travellers	-27	-27	-27	-27	-26
Net change to UK rail	1,464	1,189	1,248	1,463	1,418

2.185 Table 2.20 then shows the changes in annual revenue (2011) for each of the sensitivity tests when compared with the central case for Option B.

Table 2.20 – Summary sensitivity test revenue results (2011), 2002 prices, rounded

Demand element	Monetised Benefits (£s)				
	Central case	Rail Fares +5%	Parking Charges +15%	Land-use test	GDP growth test
Generation at Chesterton	9,816,600	7,390,100	8,998,300	8,447,500	8,112,000
Generation model change to National Rail	-5,638,100	-2,524,300	-4,993,300	-4,757,300	-4,560,400
Attraction to Chesterton	435,100	470,300	435,100	356,800	356,800
MOIRA effects	-73,600	-73,600	-73,600	-73,600	-71,100
Chesterton parking	658,900	449,500	686,700	561,800	540,100
Other parking	-124,600	-71,100	-111,000	-111,400	-106,000
Net change to UK rail	5,074,300	5,598,500	4,901,100	4,424,500	4,272,800
Rail traveller lost	-5,711,700	-2,597,900	-5,066,900	-4,830,400	-4,631,000
Chesterton earnings	10,910,600	8,267,500	10,079,000	9,265,900	9,009,000

- 2.186 These results show that the greatest sensitivity to changes at the Interchange is caused by the uplift in rail fares at Chesterton. This test has the effect of driving passengers back to the alternative stations at Cambridge, Waterbeach and Ely, as evidenced by the reduction in the negative value of the change to National Rail.
- 2.187 It should be borne in mind that the 5% per annum uplift in real fare prices has a cumulative effect, so by 2011 from a 2004 base, the fares have risen by $(1.05)^7$ or 41% as opposed to the central case assumption of RPI+1% which would see fares rise by $(1.01)^7$ or 7%. Therefore the 31% reduction in generated demand at Chesterton should be viewed relative to the 31% increase $(1.05/1.01)^7$ in fares between the two scenarios, implying a fares elasticity of approaching unity.
- 2.188 The effects of the parking charge increase are relatively small as this forms a small part of the overall travel cost, and is not a cumulative effect i.e. 15% on any one year's parking charge.
- 2.189 The revised land-use provides for much greater growth closer to Chesterton itself and hence shows greater revenue accruing to Chesterton itself. However, the growth forecasts for further away, such as at Ely, are lower than for the Central Case and hence the change to national rail shows a slightly greater disbenefit.
- 2.190 Finally, the revised GDP growth test shows lower levels of revenue as would be expected, slightly reducing the net change to UK rail.

- 2.191 Although the optimism bias test does not have an effect on forecast demand, it does have an effect on the scheme economics. Table 2.21 presents a summary for each of the sensitivity tests compared in comparison to the central case for Option B.
- 2.192 This shows that the NPV and BCR remain at healthy levels for all sensitivity tests, with the lowest values being obtained for the 5% fares increase above RPI year on year, which drives passengers back to existing stations and impacts on the case for Chesterton. These results demonstrate that the financial and economic case for Chesterton is robust against changes in a range of internal and external factors to the scheme.

Table 2.21 – Summary sensitivity test TEE table results (2002 prices)

Economic Indicator	Central case	100% Optimism bias	£s		Land-use	GDP Growth
			Rail Fares +5%	Parking charges +15%		
Benefits						
Time	46,610	46,610	1,360	41,250	12,350	45,490
Users	7,320	7,320	-31,270	2,560	-24,020	9,240
Non-users (decongestion)	39,290	39,290	32,630	38,690	36,370	36,250
Accidents	-6,300	-6,300	-2,060	-6,010	-5,970	-5,770
Revenues	123,310	123,310	79,030	122,110	125,410	119,450
Operating costs	-14,820	-14,820	-14,820	-14,820	-14,820	-14,820
Present Value of Benefits	148,790	148,790	63,510	142,530	116,970	144,350
Costs						
Capital	20,870	25,150	20,870	20,870	20,870	20,870
Taxation lost	27,290	27,290	16,100	26,480	27,370	25,980
VAT adjustment	16,390	16,390	10,990	15,960	16,660	15,870
Fuel duty	10,900	10,900	5,600	10,520	10,700	10,100
Present Value of Costs	48,163	52,440	36,970	47,350	48,240	46,850
Net Present Value	100,630	96,350	26,540	95,180	68,730	97,500
Benefit-Cost Ratio	3.09	2.84	1.72	3.01	2.42	3.08

SUPPORTING ANALYSES**Practicality***Feasibility*

- 2.193 The scheme is legally and technically feasible. There should be no technical difficulties arising in its implementation.

Enforcement

- 2.194 The scheme is self-enforcing, Chesterton Interchange does not require other supporting enforcement measures to ensure it is effective.

Area of Interest

- 2.195 The scheme will occupy the site of the former Chesterton Sidings, to the north east of Cambridge. It is close to the Cambridge Science Park, St. Johns Business Park and A14 trunk road. The station would be an important accompaniment to developing a major brownfield site on the Cambridge Northern Fringe. Principal stakeholders in the project include:

- ◆ Network Rail – responsible for the operation and maintenance of the Railway, and landowner of the proposed station location;
- ◆ EWS – long term lease holder and user of the sidings;
- ◆ Freightliner, LaFarge – short term lease holders and user of the sidings; and
- ◆ TOC's – train operators running and operating trains on the adjacent railway.

Complexity

- 2.196 The scheme will involve a number of factors to provide the interchange package of measures. Road access to the interchange will be via Cowley Road which will require junction improvements at the boundary of the Network Rail land. The scheme proposals include the provision of a station building, intended to incorporate passenger waiting facilities, toilets, and a ticket office which will need to be constructed.
- 2.197 The proposed platform layout includes two main line platforms and an island platform along with a footbridge that will provide the passenger access between the station building and the platforms. This will be served by both stair and lifts.

Time-scale

- 2.198 The timescale for the implementation of Chesterton Interchange assumes the station opening in 2011.

Phasing and Partitioning

- 2.199 The nature of the scheme means that Chesterton Interchange can not be broken down into a series of components and adopted in stages.

Complementarity

- 2.200 Chesterton Interchange will make a significant contribution on its own, but the benefits of the scheme are enhanced by its connectivity to the wider highway and public transport network and will be enhanced further if links to the Guided Busway are established at a later date. In the same way, whilst the scheme supports the delivery of the Cambridge Northern Fringe (East) development site, its feasibility is not dependent upon it.

Conflicts

- 2.201 Chesterton Interchange does not conflict with other measures. The scheme is integrated within the County's main policy documents so that policies are consistent for effective planning.

Political Nature of Policies & Proposals

- 2.202 It has been demonstrated that Chesterton Interchange will help to achieve LTP and Government objectives, and therefore has a positive impact on these policies, in particular in reducing congestion and improving accessibility.

Public Acceptability

- 2.203 Consultation on an interchange at Chesterton was undertaken as part of the CCC first Local Transport Plan. The scheme continues to form part of Cambridgeshire County Council's second LTP as an essential element in delivering the LTP strategy and meeting LTP objectives. It is likely that further public consultation will need to be carried out as a component of developing the application for planning permission for the scheme.
- 2.204 It is proposed that the station would be constructed on land owned by Network Rail, part of which is currently under a long-term lease to English, Welsh and Scottish Railway Company (EWS). Network Rail has been involved in the development of the scheme and regular meetings have been held to keep them informed of progress.
- 2.205 Consultations are required with EWS to identify the long term requirements for the sidings on the site. Lafarge and Freightliner lease parts of the site but these are on a short term basis of up to 6 years and it will be necessary to consult Network Rail on future arrangements. It is envisaged that the completed station would be operated and maintained by franchise agreement with a Train Operating Company.
- 2.206 The district councils have also been kept informed of scheme progress, and in terms of desired outcomes, South Cambridgeshire District Council, along with Cambridge City Council and Network Rail are all supportive of the delivery of the scheme.

Affordability and Financial Sustainability

- 2.207 Table 2.22 shows the analysis of affordability and financial sustainability. The prime criterion against which the proposed scheme is assessed value for money, as expressed in the TEE Table and AST. However, it is important to have an understanding of the financial performance of the scheme and to be aware of how in this regard the scheme impacts upon the private and public sectors. The Affordability

and Financial Sustainability (AFS) worksheet demonstrates the forecast financial performance of the scheme. The role of this analysis is to provide an overall assessment of the likely public expenditure required to ensure the provision option under consideration.

- 2.208 It is important to note that financial impacts are presented against the baseline do-minimum and represent changes to costs and revenues rather than absolute values.
- 2.209 The positive net revenues and, moreover, the growth in net revenues between 2011 and 2021, demonstrate the financial affordability of the proposed scheme. Approximately 95% of operating costs and revenues will be accrued by the train operating companies, with the remaining 5% accruing to Network Rail.
- 2.210 The scheme capital costs are also presented in the AFS, 95% of which is presented as Central/Local Government grant.

Table 2.22 – Affordability and Financial Sustainability

Affordability and Financial Sustainability (AFS) - Sheet 1 of 3

Local Government Affordability and Financial Sustainability

Costs	TOTAL (undiscounted)		Breakdown by organisation/budget		
			Local highways	Light rail	Other
Investment Costs					
Year I	£1,739,019				£1,739,019
Year ii	£15,299,015				£15,299,015
Year iii	£931,440				£931,440
Year iv	£0				£0
Year v	£0				£0
TOTAL	£17,969,474	(1)	£0	£0	£17,969,474
Developer and Other Contributions	£1,796,947	(2)	£0	£0	£1,796,947
Grant from Central Government	£16,172,526	(3)	£0	£0	£16,172,526
Grant to Private Sector		(4)			
Cost to Local Government net of contributions	£0	(5)=(1)+(4)-(2)-(3)	£0	£0	£0
Public Sector Operations					
2011					
Change in operator costs	£0	(6)	£0	£0	£0
Change in operator revenue	£0	(7)	£0	£0	£0
NET IMPACT	£0	(8)=(7)-(6)	£0	£0	£0
2016					
Change in operator costs	£0	(9)	£0	£0	£0

Major Scheme Business Case

Change in operator revenue	£0	(10)	£0	£0	£0
NET IMPACT	£0	(11)=(10)- (9)	£0	£0	£0
2021					
Change in operator costs	£0	(12)	£0	£0	£0
Change in operator revenue	£0	(13)	£0	£0	£0
NET IMPACT	£0	(14)=(13)- (12)	£0	£0	£0

Affordability and Financial Sustainability (AFS) - Sheet 2 of 3
Central Government Affordability and Financial Sustainability

Costs**TOTAL (undiscounted)****Breakdown by organisation/budget****Investment Costs**

Year I

£0

Year ii

£0

Year iii

£0

Year iv

£0

Year v

£0

TOTAL

£0

(15)

Developer and Other Contributions

£0

(16)

Grant to Local Government

£0

(17)

Grant to Private Sector

£0

(18)

Indirect Tax Revenues

£2,985,594

(19)

Cost to Central Government of contributions

-£2,985,594

(20)=(15)+(17)+(18)-(16)-(19)

Operations**2011**

Change in operator costs

£1,095,087

(21)

Change in operator revenue

£3,015,500

(22)

NET IMPACT

£1,920,413

(23)=(21)-(20)

2016

HA

DfT

Network Rail

TOCs

£0

£0

£0

£0

£0

£0

£2,985,594

£0

-£2,985,594

£0

£0

HA

SRA

NR

TOCs

£398,594

£696,493

£478,313

£2,537,187

£79,719

£1,840,694

Need link to network-based file

Major Scheme Business Case

Change in operator costs	£398,636	(24)			£63,412	£335,224
Change in operator revenue	£5,583,267	(25)			£76,095	£5,507,172
NET IMPACT	£5,184,631	(26)=(24)-(23)	£0	£0	£12,682	£5,171,949
2021						
Change in operator costs	£461,791	(27)			£70,012	£391,779
Change in operator revenue	£5,994,599	(28)			£84,014	£5,910,584
NET IMPACT	£5,532,808	(29)=(28)-(27)	£0	£0	£14,002	£5,518,805

Affordability and Financial Sustainability (AFS) - Sheet 3 of 3

Private Sector Affordability and Financial Sustainability

Private Sector Investment
Costs and GrantsTOTAL
(undiscounted)

Breakdown by organisation

Investment Costs

			Network Rail	TOCs	Bus corridor 1	Bus corridor 2	Rail freight	Other
Year I	£1,739,019		£1,739,019					
Year ii	£15,299,015		£15,299,015					
Year iii	£931,440		£931,440					
Year iv	£0		£0					
Year v	£0		£0					
TOTAL	£17,969,474	(30)	£17,969,474	£0	£0	£0	£0	£0
Grants from Central and Local Government	£16,172,526	(31)	£16,172,526					

Private Sector Operators

TOTAL (undiscounted)

Breakdown by organisation

2011

			Network Rail	TOCs	Bus corridor 1	Bus corridor 2	Rail freight	Other
Change in operator costs	£1,095,087	(32)	£398,594	£696,493				
Change in operator revenue	£3,015,500	(33)	£478,313	£2,537,187				
NET IMPACT	£1,920,413	(34)=(33)-(32)	£79,719	£1,840,694	£0	£0	£0	£0
Subsidy	£0	(35)	£0	£0				

2016

Change in operator costs	£398,636	(36)	£63,412	£335,224				
Change in operator revenue	£5,583,267	(37)	£76,095	£5,507,172				
NET IMPACT	£5,184,631	(38)=(37)-(36)	£12,682	£5,171,949	£0	£0	£0	£0
Subsidy	£0	(39)						

2021

Change in operator costs	£461,791	(40)	£70,012	£391,779				
Change in operator revenue	£5,994,599	(41)	£84,014	£5,910,584				

Major Scheme Business Case

NET IMPACT	£5,532,808	(42)=(41)- (40)	£14,002	£5,518,805	£0	£0	£0	£0
Subsidy	£0	(43)	£0	£0				

Private Sector NET IMPACT

Investment net of capital grant	£1,796,947	=(30)-(31)	£1,796,947	£0	£0	£0	£0	£0
Operations net of subsidy								
Year 1	£1,920,413	=(34)-(35)	£79,719	£1,840,694	£0	£0	£0	£0
Year 5	£5,184,631	=(38)-(39)	£12,682	£5,171,949	£0	£0	£0	£0
Year 10	£5,532,808	=(42)-(43)	£14,002	£5,518,805	£0	£0	£0	£0

OVERALL VFM CONCLUSIONS

- 2.211 The scheme has a PVB of £148.8m, with PVC of £48.1m identified for central government. Therefore in economic terms the scheme presents 'high' value for money with a strong BCR of 3.09. A series of sensitivity tests were carried out on the economic case for the scheme, which gave consideration to changes in patronage and associated economic indicators. This included a test removing development at Cambridge Northern Fringe (East) from the land use scenario. The test demonstrated that the scheme is not dependent on demand generated from the new development site, although it would facilitate its delivery. Another sensitivity test included a worst case scenario with Optimism Bias applied at 100%. Under each of the sensitivity tests the scheme BCR remained in the range 1.5 – 2.0 or higher.
- 2.212 Table 2.23 shows that monetary impacts have not been calculated for the non standard indicators of noise, local air quality, greenhouse gases, option values or reliability. These areas have been included in the wider appraisal of non-monetised benefits and are discussed below.

ANALYSIS INCLUDING NON-MONETISED BENEFITS

- 2.213 With a strong economic performance, the wider appraisal of the scheme takes into account impacts on other indicators which do not have a monetary assessment and considers the supporting analyses.
- 2.214 In environmental terms the scheme is likely to have a negligible impact on local air quality and noise, with changes in traffic flows not triggering a detailed assessment. A net increase in greenhouse gases and accident disbenefits are brought about by the success of the scheme and the effects of trips accessing Chesterton Interchange on the highway network, and offsetting the benefits brought about by reductions in journeys to Cambridge station.
- 2.215 Adverse impacts are identified for landscape because the scheme presents a change in character, though the majority of residual impacts could be mitigated. An overall beneficial assessment is identified for townscape where the sidings and subsequent development will transform an area of derelict brownfield land. However, this is off set by slight adverse impacts for heritage (relating to a specific listed building), biodiversity and water environment although mitigation measures would be put in place.
- 2.216 The scheme performs strongly when assessed against accessibility and integration indicators, delivering large benefits through the provision of a new facility, enhanced connectivity and full integration within the wider land use and transport policy context.
- 2.217 No legal or technical issues are foreseen at this stage of the assessment, and the risk register will be maintained throughout the scheme development. The scheme is self enforcing insofar as it does not require any other measures to ensure it is effective. Whilst the scheme has many elements, these can all be delivered through standard highway or railway engineering methods.

- 2.218 As a stand alone scheme Chesterton Interchange would make a significant contribution to the transport network in Cambridge, but the benefits of the scheme are enhanced by its connectivity to the wider highway and public transport network and will be enhanced further if links to the Guided Busway are established at a later date. In the same way, whilst the scheme supports the delivery of the Cambridge Northern Fringe (East) development site, its feasibility is not dependent upon it.
- 2.219 The scheme has been a key element of the County Council's transport planning policy for many years, and as such is well known. In this way public consultation on the scheme was undertaken through the LTP process. Discussions with Network Rail, as the landowner, will continue as the scheme progresses.

Table 2.23 - Analysis of Monetised Costs and Benefits

Noise		
Local Air Quality		
Greenhouse Gases		
Journey Ambience		
Accidents	-6303	
Consumer Users	28226	
Business Users and Providers	126867	
Reliability		
Option Values		
Present Value of Benefits (PVB)	148790	
Public Accounts	48163	
Present Value of Costs (PVC)	48163	
OVERALL IMPACTS		
Net Present Value (NPV)	100627	NPV = PVB-PVC
Benefit to Cost Ratio	3.089	BCR = PVB/PVC
<p>Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used the sole basis for decisions.</p>		

3. Delivery

DELIVERY TO TIME AND BUDGET

- 3.1 The project will be managed in accordance with current best practice, incorporating aspects of the methodology produced by Office of Government Commerce, PRINCE2.

Governance and Staffing

- 3.2 The arrangements for project governance will be appropriate to the stage of scheme delivery reached. At present, the project is lead by the County Council's Head of Transport Policy and Strategy and Railway Development Officer with reporting lines to the Director of Sustainable Infrastructure. Regular updates are provided to Members at meetings of the County Council's SMT Cabinet. The County Council's project team are supported by a consultant team supplied by their framework consultant, Atkins. The consultant team is lead by an experienced Project Manager with expert technical support in the areas of transport and economic appraisal, engineering, risk management, cost control and environmental assessment. The combined project team meets on a monthly basis.
- 3.3 As the scheme progresses towards delivery, an appropriate project governance forum will be put in place. The forum, drawn from senior officers and Members will oversee the progress of the project, review the scope of the scheme and make appropriate recommendations to Cabinet. Delivery of the scheme will be delegated to a Project Manager who will be an officer with appropriate experience, reporting to the project governance forum. The Project Manager will in turn be supported by a consultant team with skills in project delivery including procurement, programming, cost control, risk management, design and engineering.
- 3.4 A Project Board will be constituted, comprising senior representatives from CCC, key suppliers and stakeholders. Members would include representatives from the County Council's consultants, Network Rail and in due course the scheme contractor.
- 3.5 The model of project delivery described has been successfully adopted by CCC on recent large infrastructure projects, including Cambridgeshire Guided Busway.

Risk Management

- 3.6 Risk management for the scheme has been incorporated by a process of risk workshops which identified, assessed and allocated responsibility for management of risks to the scheme. Risk workshops were attended by members of the project team including the project manager, engineering representatives and representatives from the principal stakeholder, Network Rail. The scheme risk register is regularly updated.
- 3.7 The risk management process incorporated the production of a Quantified Risk Analysis which made allowance for the financial impact of risk to the scheme budget. The QRA was derived using a Monte Carlo analysis using values estimated by the

project team. The 80th percentile value derived from the QRA was then included in the scheme cost plan.

- 3.8 The scheme risk register is included at Appendix L.

Project Plan and Milestones

- 3.9 The forward programme is inextricably linked with the acceptance of the scheme to programme entry. However, an outline of the project programme is set out below.

2007

May Submit Major Scheme Business Case

DfT Business case assessment

2008

March Programme entry

April Public consultation

Scheme Development

September Planning Application

Submit Business Case for Conditional Approval

2009

April Procurement Exercise

September Submit Business Case for Full Approval

November Award construction contract

December Detailed design

2010

January Site clearance and environmental mitigation

March Commence construction

2011

April Construction complete, station brought into service

Stakeholder Analysis

- 3.10 Identification of key stakeholders and their effective involvement in the project is an important aspect of project delivery. Table 3.1 below summarises stakeholders identified, their potential role in the project and the likely way in which their involvement will be managed.
- 3.11 Principal stakeholders, whose input is critical to the project include Network Rail, Cambridge City Council, DfT and Train Operators.
- 3.12 The stakeholder map shown below has been developed to guide dealings with stakeholders in the development of the Major Scheme Business Case. This mapping relates solely to the current stage of scheme development and will be reviewed and revised as the scheme progresses and different stakeholder engagement strategies developed.

Table 3.1 – Stakeholder Mapping

		Low	<u>Interest</u>	High
<u>Influence</u>	Low	General Public		Potential Users
	High	South Cambs DC Cambridge City DC Train Operating Companies		Network Rail CCC Members Department for Transport

- 3.13 Network Rail, CCC Members and DfT have been involved in the development of the scheme and regular meetings have been held to keep them informed of progress. At the current stage of scheme development, the district councils have been kept informed of scheme progress however as the scheme progresses a greater degree of engagement will be required. DfT rail have been consulted regarding the involvement of train operating companies and engagement with them is planned once the GRIP study has been submitted to Network Rail. Public consultation will be carried out as a component of developing the application for planning permission for the scheme.
- 3.14 In terms of desired outcomes, Cambridge City, South Cambs and Network Rail are all supportive of the delivery of the scheme. Details of the policy and organisational support are given in section 2 above.

- 3.15 In broad terms it is envisaged that CCC will continue to promote the scheme through the process of developing and verifying the business case and confirming funding. Network Rail will develop the technical aspects of the scheme in partnership with CCC and carry out a procurement exercise. Once the procurement process is complete but prior to awarding contracts, the final case for the funding of the scheme will be made to DfT. Subject to full approval being confirmed, Network Rail will assume the promotion of the scheme through to completion of construction and operation and maintenance of the station assets.

Statutory Consultees

- 3.16 Consultation responses are awaited from English Nature, English Heritage and the Environment Agency.

Gateway review

- 3.17 Successful implementation of the scheme will depend on delivery in partnership with Network Rail. It is recognised that both parties have processes to ensure scheme delivery and these will be implemented. In the case of Cambridgeshire's contribution to delivery of the scheme, the framework of milestones and gateway reviews set out in the 4Ps approach to local authority project management will be adopted. The relevant review stages are set out below:

- Gateway Review 1 – Business Justification
- Gateway Review 2 – Procurement Strategy
- Gateway Review 3 – Investment Decision
- Gateway Review 4 – Ready for Service
- Gateway Review 5 – Benefits Realisation

- 3.18 The first review, Business Justification, will be carried out on completion of the MSBC.

- 3.19 Network Rail's delivery process is based on their Guide to Rail Investment Projects (GRIP). This 8 stage process extends from feasibility and option selection through to scheme delivery and commissioning, with stage gate reviews at the end of each GRIP stage. This process will be used in the delivery of the scheme and the report produced as a deliverable for GRIP stage 2 is attached at Appendix A.

Scheme Progress Monitoring

- 3.20 Monitoring of the progress of the scheme will be carried out through a series of regular meetings with the project team, with the key delivery stakeholders and with the project board. Key delivery stakeholders will include both Network Rail and DfT.
- 3.21 Regular, monthly, reporting on progress against programme, budget and predicted completion will be carried out. Where appropriate, earned value analysis will be adopted to ensure that forecast out-turn positions are met. A record of progress in the form of a Project Manager's report will be made and retained.

- 3.22 A cost report for the scheme, incorporating all aspects of scheme costs both predicted and incurred will be maintained and updated on a monthly basis. A record of expenditure against forecasts will be kept and out-turn costs re-predicted as appropriate. A similar approach will be taken to the project programme with an integrated programme for all project activities being maintained. This approach to project progress monitoring has been successfully implemented for other CCC Major Projects including Cambridgeshire Guided Busway.
- 3.23 Regular meetings with DfT will be scheduled in the run up to submission of the business case for full approval.

POST IMPLEMENTATION MONITORING

- 3.24 CCC has a well established annual programme monitoring traffic levels crossing a radial cordon on key access routes into Cambridge and on traffic circulating within the city at screen-line points on the network. Monitoring of the levels of traffic on the network in this way allows the effectiveness of traffic management measures to be assessed and has been used in the past to evaluate for example the impact of the Cambridge core scheme. This data would help to assess the level to which the introduction of the new interchange at Chesterton has achieved the scheme objective of reducing cross-city car trips.
- 3.25 To complement the traffic data, railway patronage surveys would be carried out at the new Chesterton Interchange, Cambridge and Ely stations to assess the degree to which rail patronage was enhanced through the implementation of the scheme.
- 3.26 Further details of a post implementation monitoring programme would be developed in discussion with DfT at an appropriate point in the scheme's development.

4. Financial

FUNDING

- 4.1 Funding proposals for the scheme have been developed in the light of the recent consultation paper from the department on funding Local Authority major schemes.
- 4.2 The proposed station lies within land allocated for housing in the County Council's structure plan and in the Local Development Framework. The land is currently occupied by rail sidings and is owned by Network Rail. On completion, the station would be owned by Network Rail, who would assume responsibility for its maintenance and operation. It is anticipated that operation and maintenance of the station would then be carried out by a Train Operating Company as part of their operating franchise arrangements.
- 4.3 The principal source of funding to supplement those funds provided by the department is likely to flow from development of the remainder of the Network Rail owned site. Developer contributions are therefore anticipated to be available to meet 10% of the Quantified Cost Estimate for the scheme, as defined in the recent consultation paper on Local Authority Major Schemes. This will amount to £1.8 million based on the preferred Option B.
- 4.4 Further, should the scheme successfully achieve full funding approval, Network Rail would assume the role of promoter of the scheme. Developer contributions would also be anticipated to provide the local contribution element of any contribution to costs within the Additional Risk Layer.

FINANCIAL RISK

Risks and liabilities if funding sources are not realised

- 4.5 Progress of the scheme is contingent on Network Rail's support. The scheme will be developed in partnership with NR to achieve NR's technical and operational objectives for the project. This will proceed in parallel with development of the scheme business case in consultation with NR to ensure their continuing support. Withdrawal of technical development support by NR would mean that the project could not be delivered.
- 4.6 As noted above, NR have a property interest in the site and support its development in order to maximise its value. In this way, the interests of NR and CCC are aligned and the risk to their contribution to the scheme development is minimised.

FINANCIAL SUSTAINABILITY

Long term affordability for operation/maintenance

- 4.7 The forecasting of revenues arising as a consequence of introducing Chesterton Interchange indicates strong financial performance. The scheme is forecast to

generate sufficient revenues to cover operational costs and maintenance requirements.

- 4.8 Car parking provided at Chesterton is forecast to provide a significant source of revenue, which together with anticipated station access charges, are forecast to provide a revenue stream which will support the operation and maintenance of the station in the long term. Opening year undiscounted car parking revenues are estimated at £534,000 per annum versus operating costs of £347,000 per annum, indicating a significant surplus. Further details are shown in section 2.
- 4.9 Levels of Station Access charges are determined by Network Rail in negotiation with the Train Operating Companies and therefore are difficult to quantify for presentation in the business case. However, the forecasting indicates both a strong revenue stream for the TOCs amounting to approximately £1.8 million per annum in 2011 (undiscounted) and an alternative revenue stream in the form of car parking charges for Network Rail. This suggests that a level of station access charge could be negotiated that would be unlikely to provide a deterrent for the TOCs to serve the station.

5. Commercial

PROCUREMENT STRATEGY

Outline strategy

- 5.1 The procurement strategy for the scheme has been developed in accordance with the following objectives:
- Obtaining best value from the procurement process
 - Making best use of supplier inputs
 - Ensuring that the best placed party manages the scheme delivery and associated risks
- 5.2 In order to achieve these objectives, delivery of the scheme is best lead by an experienced rail client. It is therefore proposed that Network Rail will develop the scheme jointly with CCC to the stage of achieving outline planning consent. Following this, Network Rail would appoint consultants to develop, design and build contract documents which would form the basis of a competitive tender for the scheme. Once the scheme construction costs are finalised, an application would be made for full funding approval. Provided this is successful Network Rail will let and act as clients for the construction contract.
- 5.3 As noted in Section 4, Network Rail may consider any enhancements to the scheme which may result in operational benefits to Network Rail and these will be included in the design & build contract as appropriate. This would allow economies to be realised in comparison to procuring these elements in a separate, subsequent contract.
- 5.4 Throughout the process of developing the scheme and carrying out the procurement exercise, best practice project management techniques will be employed to control change, monitor costs and maintain delivery to programme.
- 5.5 Risk management and mitigation will continue throughout the procurement process. Assignment of risks will be made on the basis of those best able to manage them and clear assignment of risk will be enabled through the construction contract.

6. Appendix A – G.R.I.P.2 Report

7. Appendix B – Local Model Validation Report (LMVR)

8. Appendix C – Forecasting and Economics Report

9. Appendix D – AST Worksheet (Water Environment)

Description of study area	Feature	Attributes/ Services	Quality	Scale	Rarity	Substitut-ability	Importance	Magnitude*	Significance
Study Area: Chesterton Sidings	River / Cam	Water supply for potential downstream abstractions	Chemical GQA Grade B	Local	Medium	Low	Medium	Negligible	Insignificant
		Transport and dilution of waste products	Presence of surface water discharge points	Local	Medium	Low	Medium	Negligible	Insignificant
		Biodiversity	Biological GQA Grade B	Local	Low	Medium	Low	Negligible	Insignificant
		Value to economy	Value of the uses of the river for abstractions and discharges	Local	Medium	Medium	Medium	Negligible	Insignificant
		Conveyance of flow and material	Current flood risk	Local	High	Low	High	Negligible	Insignificant
	Drain(s)/ Milton and First Public Drain	Aesthetics	Contributes to landscape character	Local	Low	Medium	Low	Negligible	Insignificant
		Conveyance of flow and material	Flow monitoring	Local	High	Low	High	Minor	Low Significance
	Floodplain of the River Cam	Conveyance of flood flows	Presence of floodplain and flood flow routes	Local	Medium	Medium	Low	Negligible	Insignificant
	Groundwater	Water supply	Abstractions	Local	Medium	High	Low	Negligible	Insignificant

*with mitigation

Reference Source(s): Environment Agency, Multi-Agency Geographic Information for the Countryside (MAGIC) website.

Summary assessment score: *Slight adverse* impact

Qualitative comments:

The water environment is of high importance in terms of the conveyance of flow and material along the River Cam its associated floodplain and Milton Drain. The scheme, with proposed mitigation in place (including attenuation ponds) will have a negligible impact on most attributes.

Overall the scheme will be insignificant in terms of most attributes of the water environment, but there will be impacts of low significance on the conveyance of material through Milton Drain.

10. Appendix E – AST worksheet (Landscape)

FEATURES	DESCRIPTION	SCALE IT MATTERS	RARITY	IMPORTANCE	SUBSTITUTABILITY	IMPACT	ADDITIONAL MITIGATION
PATTERN	Extensive area of disused railway sidings with generally flat and open landscape to east and built up area to west.	Industrial- railway corridor.	Typical of railway sidings.	Typical of railway sidings.	The neglected state of the area would be changed by the development.	Moderate adverse impact on the landscape.	Screening of unattractive views from local properties through landscape mitigation measures.
TRANQUILITY	Main railway line runs along eastern boundary and busy A14 is located at north of the site. Access to the study area is limited. Although site is disused, its established planning use is not tranquil.	The scheme would open up the area where public access is restricted at present.	Undeveloped open nature of the site is locally rare.	Important locally.	Loss of tranquillity would not be substitutable.	New car park and station will have adverse impact.	
CULTURAL	There is no culturally significant feature in the area.	There is no culturally significant feature in the area.	There is no culturally significant feature in the area.	There is no culturally significant feature in the area.	There is no culturally significant feature in the area.	There is no culturally significant feature in the area.	
LANDCOVER	The former railway sidings site has been colonised by plants. To east there are fields with hedgerows.	Plant colonisation locally important.	Developed an interesting wildlife habitat.	Developed an interesting wildlife habitat.	No substantial loss of vegetation	Some of colonised plant species would be lost.	
SUMMARY OF CHARACTER	Cambridge northern fringe (east), railway corridor. The area comprises disused railway sidings adjacent to industrial/commercial and residential areas. Views to open countryside to east.	Open aspect will be changed by the development.	Typical of the landscape type.	Important for wildlife at a local level.	The local landscape would still reflect the character of the railway corridor and urban edge.	Moderate adverse impact.	Strengthening existing vegetation at east and west of site.

Reference Source (s): Guidelines for Landscape and Visual Impact Assessment, Green Belt Study, Cambridge Landscape Character Assessment.

Assessment Score: *Moderate Adverse* for impact.

Qualitative Comments:

The scheme would have an adverse impact on the open landscape.

11. Appendix F – AST worksheet (Biodiversity)

Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Magnitude of impact including mitigation	Assessment score
Bramblefields Local Nature Reserve	<p>Located adjacent to the south-west boundary of the site.</p> <p>The site consists of a mixture of grassland and scrub. A pond is also present.</p>	County	The site is noted for its importance for birds, especially song thrushes (a Biodiversity Action Plan species in Cambridgeshire).	Stable	Medium	Minor negative	Slight adverse
Five City Wildlife Sites: <ul style="list-style-type: none"> • Ditton Meadows; • Barnwell Junction Disused Railway; • Barnwell Junction Pastures; • Milton Road Hedge; and • Barnwell Pit. 	<p>These five non-statutory sites are located over 350m away from this option.</p> <p>These sites include a hedgerow, flood meadows, grassland and a flooded clay pit surrounded by neutral/calcareous grassland.</p>	County	Sites important at a county level for nature conservation, whose loss or destruction would be significant locally.	Stable	Lower	Neutral - no predicted impacts on these sites	Neutral
Stourbridge Common River Sites (City)	<p>This non-statutory site is located approximately 700m south-west of the proposal.</p> <p>A large cattle grazed common lying on the south bank of the River Cam.</p>	County	Site important at a county level for nature conservation, whose loss or destruction would be significant locally.	Stable	Lower	Neutral - no predicted impacts on this site	Neutral

Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Magnitude of impact including mitigation	Assessment score
Scrub	Buddleia, hawthorn shrubs, bramble and dog rose cover the majority of the site.	Local	Provides cover for small mammals.	Stable	Negligible	Neutral	Neutral
Woodland strip (within site)	Densely planted woodland consisting predominantly of young and semi-mature silver birch trees. Located adjacent to the south-western boundary of the site, present in part over the Network Rail sidings.	Local	Provides habitat for mammals and nesting areas for birds.	Stable	Lower	Neutral	Neutral
Woodland strips (outside site)	Mature willow woodland strips (with some mature hawthorn). Located adjacent to the north and north-eastern boundaries of the site.	Local	Provides habitat for mammals and nesting areas for birds. The more mature trees present in these areas may provide possible roosting places for bats.	Stable	Lower	Neutral	Neutral
Scattered trees	Large numbers of silver birch trees present in clusters, and also scattered, around the site.	Local	Provides habitat for mammals and nesting areas for birds.	Stable	Negligible	Neutral	Neutral
Ponds	Three ponds present within and around the site. These are located:	Local	Provide a water resource for birds and mammals in the area and provides habitat	Stable	Lower	Neutral	Neutral

Area	Description of feature / attribute	Scale (at which attribute matters)	Importance (of attribute)	Trend (in relation to target)	Biodiversity and earth heritage value	Magnitude of impact including mitigation	Assessment score
	<ul style="list-style-type: none"> • in the north-eastern corner of the site. • adjacent to the eastern boundary of the site. • in the Bramblefields LNR adjacent to the south-west boundary of the site. <p>A fourth pond may also be present within the site, located in the western corner.</p>		<p>for fish and aquatic invertebrates.</p> <p>Provide possible habitat for great crested newts.</p>				
Buildings	<p>A number of buildings are present throughout the site, many of which are disused and derelict.</p> <p>This option may result in the demolition of 3 buildings, 2 of which have a low potential for bats.</p>	Local	Provides possible habitat for nesting birds and potentially provides a roosting place for bats.	Stable	Negligible	Neutral	Neutral
Bare ground	<p>Patches of bare ground (ballast and ash) are present throughout the site.</p> <p>A large area of bare ground is present in the north-eastern corner of the site.</p>	Local	Provides suitable basking areas for reptiles.	Stable	Negligible	Neutral	Neutral

Reference Source(s): DMRB Stage 2, TAG

Summary assessment score: Slight adverse

Qualitative comments:

The scheme will directly affect the Bramblefields Local Nature Reserve during construction and operation. The magnitude of these impacts can be reduced through mitigation. However these residual adverse impacts during operation cannot be completely mitigated. The scheme will not directly or indirectly affect any of the six non-statutory sites due to their distance from the site. A large area of scrub and woodland, in addition to a number of scattered trees will be lost but there is an abundance of these habitat types left in place. Further survey will be required to determine the presence/absence of great crested newts (in the four ponds), bats (within buildings with low potential to support roosts) and badgers (within the woodland strip). Furthermore it will be necessary to take measures to avoid disturbance to breeding birds and reptiles.

12. Appendix G – AST worksheet (Heritage of Historic Resources: Plan Level)

Part 1		Part 2			Part 3
Feature	Description	Scale it matters	Significance	Rarity	Impact
Form	Buildings (inhabited), houses and farmhouses in the rural landscape 20 th century built heritage - railway sidings (existing tracks)	Grade II Listed Buildings are of national importance. 20 th century industrial remains are of local importance.	Listed Buildings are of national significance. 20 th century industrial remains are of local significance.	Listed Buildings, 20 th built heritage are not rare in this part of eastern England.	Adverse impact on the form of any of the known resources.
Survival	Listed farmhouse upstanding and in use but views across the river towards the site may be affected. Multiple railway tracks survive throughout the site.	Preserving the setting of nationally important listed buildings is as important as preserving their physical state.	Preserving the setting is of value to the local and regional communities.	Surviving setting of the listed building is not rare.	Adverse impact on views from and towards the listed building.
Condition	The construction of the railway and sidings depot has affected the setting of the farmhouse across the river Railway sidings are currently in disuse but otherwise in good condition.	The condition of setting of the farmhouse is of national importance.	Preserving the setting of the listed building is of national significance.	The present condition of the setting of the farmhouse is not rare.	No impact to condition of listed building.
Complexity	The assemblage is not complex. It comprises evidence of industrial activity from the 19 th to 20 th century.	The assemblage matters at a local scale.	The assemblage is not particularly significant in terms of railway heritage.	This type of assemblage is not rare in eastern England.	No impact on the complexity of the resource.
Context	The proposed development site is set within a late 20 th century railway sidings depot.	The 20 th century landscaping is of local importance.	This kind of context is of local significance.	This context is not rare in eastern England.	The will be a neutral impact on the historic character of the site.

Part 1		Part 2			Part 3
Period	19 th and 20 th century industrial sites.	Remains of these periods can be of national, regional or local importance.	These periods are significant in so far as they can inform on the development and its study area.	Industrial remains of these periods are not rare.	The proposed development will have a neutral impact on remains of these periods.

Reference Source(s): *Chesterton Sidings, Cambridgeshire. Stage 2 DMRB*

Summary assessment score: **Slight Adverse** (negative) Effect

Qualitative comments: The scheme will damage locally significant heritage features (specifically remnants of railway furniture) for which adequate mitigation can be specified. It will also have a detrimental impact on the context of a regionally significant asset (Old Rectory Listed Building), such that its integrity is compromised and appreciation of it diminished. There is high potential that the proposed development could impact on as yet unknown buried archaeological remains. The presence and thus extent and importance of any buried archaeological remains is unknown and as such a definitive assessment of the effect of the development can not be made. However, it is possible that these remains could be of National importance and that the scale of the impact on them (based on current designs) could be Substantial, resulting in a Large Adverse effect.

13. Appendix H – AST worksheet (Integration – Passenger Interchange)

Passenger Interchange Indicator	Without strategy (Poor/Moderate/High)	With strategy (Poor/Moderate/High)
Waiting environment	n/a	High
Level of facilities	n/a	High
Level of information	n/a	High
Visible staff presence	n/a	High
Physical linkage for next stage of journey	n/a	High
Connection time and risk of missing connection	n/a	High

Approximate numbers of users affected: 2420

Overall assessment of passenger interchange impact: moderate beneficial impact

Reference Source(s):

Qualitative Comments: The scheme would have a moderate beneficial impact as a passenger interchange.

14. Appendix I – Land Use Policy assessment and AST worksheet (Integration – Land-use Policy)

	Land-Use Policies of Proposals
Local	<p><i>Cambridgeshire & Peterborough Structure Plan (2003)</i></p> <p>The development will facilitate the construction of homes on the Cambridge Northern Fringe as outlined in Policy P5/1. The scheme facilitates the policy to improve rail services as outlined in Policy P8/7. This highlights the need to identify and protect former rail routes with the potential for re-use as transport corridors. Policy P9/9 describes how the Cambridge Sub-Region Transport Strategy identifies Chesterton Interchange as a requirement to support the Cambridge Northern Fringe.</p> <p><i>Cambridge Redeposit Draft Local Plan (2004)</i></p> <p>Policy P9/3 highlights that the development of an urban extension is required to meet certain standards and criteria. This includes the provision of higher densities around transport nodes e.g. Chesterton railway station.</p> <p><i>South Cambridgeshire Local Development Framework Submission Draft (2006)</i></p> <p>Policy ST/3 for the edge of Cambridge, allocates Cambridge Northern Fringe as an urban framework, providing that adequate infrastructure is in place. Policy SP/2 outlines site specific proposals for the development of the sidings.</p> <p><i>Cambridgeshire Local Transport Plan (2006)</i></p> <p>The provision of Chesterton Interchange is included as one of 5 identified 'Major Projects'. It considers that by providing rail facilities close to major centres of employment, this will help meet congestion targets.</p>
Regional	<p><i>Regional Planning Guidance 6: East Anglia (2000)</i></p> <p>The scheme is relevant to Policy 8 - the provision of 4,000 dwellings in the city; and Policy 22 - the location of housing on the city periphery.</p> <p><i>East of England Plan – Draft Regional Spatial Strategy (2004)</i></p> <p>Policy SS2 states that urban areas are to be the main focus for development / re-development of the region. Policy CSR1 comments on the location of housing and related development. Policy T1 outlines the Regional Transport Strategy Objectives, and Policy T2 public transport provision and regional interchange centres.</p>
National	<p><i>Planning Policy Statement 1: Delivering Sustainable Development</i></p> <p><i>Planning Policy Guidance Note 13: Transport</i></p> <p>Chesterton Interchange contributes to these national objectives by providing a more sustainable means of transport, expanding access to both the heavy rail network and the wider public transport network.</p>

Reference Source(s): (as above)

Assessment Score: **Beneficial**

Qualitative comments: In terms of land-use policies, the proposal has been assessed as beneficial.

15. Appendix J – Impacts on the rail network

- 15.1 Services calling at Chesterton Interchange will operate on the Kings Lynn – Cambridge – London corridor. The main sections of concern in this corridor are at the London end. Therefore, the impacts of additional London trips resulting from the addition of Chesterton Interchange into the network were assessed. The crowding analysis was based on a review of Passengers in Excess of Capacity (PIXC) data, the impact of estimated demand from Chesterton Interchange to crowded sections, and a review of NR/SRA/DfT documents to understand future planned capacity increases.
- 15.2 The autumn 2004 counts (the latest available) showed PIXC for WAGN trains within accepted thresholds, with 2.2% for the AM peak and 3.3% for the PM peak. The Cambridge services via the ECML show a higher PIXC value of 8.2% (SRA PIXC data 2003), with increased crowding severity on slow trains where load factors peak at Finsbury Park.
- 15.3 Analysis of the forecast Chesterton demand for Option B (the preferred option) show that an additional 198 (full and Seasons) London bound trips will be generated in 2016. This is approximately a 5% increase over the Do-Minimum London bound demand. These additional trips will have minimal impacts on the crowding, especially on the faster services, where the capacity can absorb this marginal increase. Careful timetable planning will also help to minimise the crowding impacts of the additional London bound trips for slower trains, and a proportion of the additional forecast trips to London from Chesterton Interchange will use the West Anglia route to Liverpool Street, where capacity increases are already planned.
- 15.4 The Eastern RPA reports that approximately 16,100 rail trips originated in Cambridgeshire daily (2003/04 data) and approximately 8000 of these have a central London destination. This is forecast to grow by 39% in 2016, when the RPA forecasts load factors of 82% for the Great Northern line in the AM peak. However, this forecast assumes the implementation of both the Thameslink2000 and the Crossrail schemes. Thus it should be noted that services on this route will already require intervention to mitigate crowding issues. This is recognised within the Eastern RPA which already includes a number of short/medium-term proposals to increase capacity:
- ◆ train lengthening for Liverpool Street – Cambridge trains to 12 cars;
 - ◆ re-timetabling on the ECML to Cambridge to deliver more peak trains;
 - ◆ maximising 8-car trains in the shoulder peak to enable peak spreading;
 - ◆ using diesel trains to overcome power supply issues south of Peterborough to deliver more peak trains; and
 - ◆ 2tph from Stansted Airport towards the north via Cambridge
- 15.5 It is clear that there is a need for additional capacity without the additional Chesterton Interchange demand, and that the forecast 198 trips will have a limited impact. Plans to increase capacities in terms of train lengthening, time-table optimisation and new schemes like Thameslink 2000 and Crossrail schemes are already being considered and the implementation of only part of the various plans would bring additional

capacity on-line that could accommodate the forecast demand generated by Chesterton Interchange.

- 15.6 It is anticipated that the Greater Anglia Route Utilisation Strategy, recently commissioned by Network Rail, will consider these issues further.
- 15.7 Consideration was also given to crowding issues on southbound services to the north of Cambridge. An analysis of capacities and loadings from PLANET outputs for the Ely-Cambridge section suggests that in 2016 load factors would be approximately 31% in the morning peak period. The addition of Cambridge and London bound trips from Chesterton Interchange would increase load factors to approximately 51%.
- 15.8 It is recognised that Cambridge bound trips are likely to be more tightly concentrated between 0800 and 0900, and as such load factors may tend to be higher than the average during this time, although this is off-set by the majority of London bound commuting trips travelling earlier during the peak period.

16. Appendix K – Appraisal of Low Cost Alternative

- 16.1 Table 16.1 presents the full AST for the Option D as the Low Cost Alternative. Further consideration is given to each of the indicators below.

ENVIRONMENT

- 16.2 The Environmental Appraisal for the proposed scheme was undertaken in accordance with the Detailed Guidance on Major Scheme Appraisal in Local Transport Plans (Department for Transport) and is consistent with other relevant guidance, including the former SRA's Guide for Promoters of New Stations. The environmental appraisal was carried out to determine the impacts on the site for all alternatives and where the impacts of the Low Cost Alternative differ significantly from the rail station based alternatives this is noted below.

Noise & Local Air Quality sub objectives

- 16.3 Standard noise and air quality assessments both require the comparison of traffic flows for the do-minimum and do-something scenarios in order to identify those links on the highway network where changes, greater than a certain level, occur. The assessments are undertaken for the opening year situation.
- 16.4 For the purposes of noise assessment, guidance⁶ suggests that improvements or deterioration in the noise environment may be perceived when the changes are as low as 1dB(A). This is equivalent to an increase in traffic flow of 25% or a decrease of 20%. Accordingly, preliminary screening of the existing road network was carried out to identify where changes in the order of 1 decibel, and hence a significant change in noise, were expected. Road segments would only need to be included within the noise assessment if the change in traffic from the Do-Minimum to the Do-Something scenario is predicted to be significant according to these terms.
- 16.5 For the purposes of local air quality assessment, guidance⁷ suggests that due to the uncertainty in traffic forecasting and the size of traffic flow change needed to affect air quality, options which change traffic flows by less than 10% on existing or new routes, or elsewhere on the local network can be scoped out.
- 16.6 The level of demand generated for the Low Cost alternative is significantly lower than that assessed for Option B, resulting in a correspondingly lower effect on flows on the highway network. There will be an increase in bus movements on Milton Road however the number of movements is small and lower than the threshold levels triggering a more detailed assessment.
- 16.7 Therefore the overall assessments for both Noise and Local Air Quality are neutral.

⁶ DMRB (Volume 11, Section 3, Part 7, Chapter 3)

⁷ Transport Analysis Guidance (TAG) Unit 3.3.3 The Local Air Quality Sub-objective, April 2004, Design Manual for Roads and Bridges (DMRB)

Table 16.1 – Appraisal Summary Table – Option D (Low Cost Alternative)

Option		Description	Problems	PVC £5.5M NPV £-2.6M BCR 0.526
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT
ENVIRONMENT	Noise	Changes in traffic flows are lower than the threshold values for assessment	Not Applicable	Neutral
	Local Air Quality	Changes in traffic flows are lower than the threshold values for assessment	Not Applicable	Neutral
	Greenhouse Gases	Some reduction in car emissions offset by increase from bus service	Not Applicable	tonnes of CO ₂
	Landscape	Impact of development on derelict urban landscape	Not Applicable	Moderate Adverse
	Townscape	Impact of development on townscape of derelict land	Not Applicable	Moderate Beneficial
	Heritage of Historic Resources	Two sites identified within the boundary of the potential development and potential for future finds to be mitigated through further investigation	Not Applicable	Slight Adverse
	Biodiversity	Possible presence of GCN and Badgers on site to be mitigated by survey and translocation as required. Site boundary adjacent to Nature Reserve.	Not Applicable	Slight Adverse
	Water Environment	Potential for increased run-off to be mitigated through flow attenuation	Not Applicable	Slight Adverse
	Physical Fitness	Opportunity for cycle and walk based trips in northern Cambridge	Not Applicable	Slight Beneficial
SAFETY	Journey Ambience	Improvements for PT users but additional interchange for car transfers	Not Applicable	Neutral
	Accidents			PVB £98m
	Security	Improvements for PT users but neutral for car transfers		Slight beneficial
ECONOMY	Public Accounts	Proposal has an overall NPV of £-2.6M and BCR of 0.53	Central Govt PVC £5.5M, Local Govt PVC £0	PVC £5.5m
	Transport Efficiency: Users & Providers		Users PVB £0.4M, Transport Providers PVB £0.2M, Other PVB £0M	PVB £0.5m
	Transport Efficiency: Consumers		Users PVB £2.2M	PVB £2.2m
	Reliability	Not Applicable		
	Wider Economic Impacts	Not Applicable		
ACCESSIBILITY	Option values	Not Applicable		
	Severance			Neutral
	Access to the Transport System	28.85% of local population (non-car available) will have access to a new service (2 trains per hour in each direction in the off-peak period.		Beneficial
INTEGRATION	Transport Interchange	Improved facilities and interchange opportunity but low forecast usage		Slight Beneficial
	Land-Use Policy	Accords with National, Regional and Local Government Policy		Moderate Beneficial
	Other Government Policies			Moderate Beneficial

Greenhouse Gases sub-objective

- 16.8 The Transport Analysis Guidance (TAG) Unit 3.3.5 The Greenhouse Gases Quality Sub-objective states that carbon dioxide emissions should be estimated for the present case and the opening year of a proposal as part of the environmental assessment of a scheme. The Design Manual for Roads and Bridges (DMRB) outlines the required methodology used to estimate emissions.
- 16.9 However, given the low level of patronage forecast for the option and the consequent small potential for changes in emissions of green house gases a detailed assessment has not been made. A small increase in CO₂ emissions is likely as a result of the bus operations which will be partially offset by a reduction in car emissions as journey lengths are reduced, and the overall impact on Greenhouse Gases is assessed as neutral.

Landscape and Townscape

- 16.10 The issues with regard to landscape and townscape will be how the visual impact of the proposed car park and infrastructure compares with the existing derelict urban landscape, and how landscape quality could be improved as a result of the development.
- 16.11 As with the rail based alternatives, this option is assessed as having a moderate adverse impact on the landscape because of the changes to the character and use of the existing site that it would bring about.
- 16.12 A number of properties are likely to experience visual impact from the proposed car park and lighting. They would be more affected at night time and during winter. However, landscape mitigation measures would reduce the impact of the proposals. These would take into account the potential to extend and improve ecological diversity. The degree of impact would be less than the rail based options due to the smaller size of the development.
- 16.13 Overall the proposed development would improve the currently unused siding area and would give a moderate beneficial impact on the townscape of the area.

Heritage

- 16.14 This assessment identified the known and potential cultural heritage resources that may be affected by the proposed development.
- 16.15 There are two known sites recorded on the Cambridgeshire Historic Environment Record (CHER) within the proposed development site - an Anglo-Saxon burial (AH no.2) and a prehistoric cremation burial (AH no. 3) - both discovered during quarrying between the 19th and 20th centuries. The railway sidings and associated structure, while not listed on the CHER, are of local interest and should be considered.

- 16.16 There is high potential that the proposed development could impact on as yet unknown buried archaeological remains associated with the discovery of the burials. An understanding of the extent and importance of any buried archaeological remains in this area will be developed through the undertaking of further investigations (see below). At this stage no definitive impact assessment can be made, though it is possible that these remains could be of National importance and that the scale of the impact on them could be Substantial, resulting in a Large Adverse effect. The reduced size of the development relative to the station based options would reduce the probability of an adverse impact proportionately. Taking account of the information currently available the overall the impact on heritage is assessed as slight adverse.

Biodiversity

- 16.17 The biodiversity issues to be considered at the site include the possible presence of great crested newts within the ponds, the possible presence of bats within a number of buildings which may have to be demolished as part of the scheme and the possible presence of badgers and reptiles within the site. Disturbance to nesting birds and loss of nesting habitat is also an issue to be considered.
- 16.18 Furthermore, the Chesterton Sidings site shares a boundary with the Bramblefields Local Nature Reserve (LNR). This site is important at a county level and possible damage or disturbance to this site also needs to be considered.
- 16.19 The Environmental assessment identifies a number of mitigation measures which would need to be put in place prior to construction and operation. Again, the reduced scope of the development for the low cost alternative would reduce the level of impact, however, assuming mitigation measures are fully implemented the overall assessment for biodiversity, due to the impacts on the Bramblefields LNR, is slight adverse.

Water Environment

- 16.20 The Chesterton Interchange proposal involves creating fairly extensive areas of hardstanding which will create excess run-off, which will require attenuation by storage. There are two appropriate drainage routes for surface water. The Milton drain to the north is sensitive to flooding and the Public drain to the East is socially sensitive. An increase in un-attenuated flow could lead to flood risk in both the public drains and also the River Cam which is sensitive to flooding. Parts of the site lie within the indicative floodplain. However, the Environmental assessment identified a number of mitigation measures which could be put in place to limit the effects of the development both during construction and operation. Given the reduced size of the development relative to the station based options and with mitigation measures in place, the impact on the water environment is assessed as slight adverse.

Physical Fitness

- 16.21 The option provides an opportunity for journeys to Cambridge rail station which would otherwise have been made by car from the north of Cambridge to be made by either walking or cycling to the interchange point. The effect on physical fitness is assessed as slight beneficial.

Journey Ambience

- 16.22 High quality car parking and waiting facilities will be provided at the interchange. Journey stress will be reduced through the provision of real time information and use of significant levels of bus priority existing on the route, offering a more reliable journey than that made by car. The increased parking provision will relieve the difficulties of parking at Cambridge station. For existing public transport users the option will represent an improvement in journey ambience. For users that transfer from car, the journey will however introduce an additional interchange and associated waiting time so the overall effect is assessed as neutral.

SAFETY

Accidents

- 16.23 Accident savings as a result of mode shift and the removal of highway trips are calculated to provide benefits of £98m.

Security

- 16.24 The waiting facilities proposed for the option are intended to be designed to a high standard and would include best practice design for security and visibility together with CCTV, lighting and a help point. It is not however envisaged that the car park would be staffed at all times. For current public transport users transferring to the alternative this would represent an improvement in security over the current provision however for car-based users who would have previously driven to Cambridge station, the security aspects of the journey would be neutral. Overall the effect on security is therefore assessed as slight beneficial.

ECONOMY

Public Accounts

- 16.25 Details of the effect of the option on public accounts are presented in Table 16.2 below. The option has a Present Value of Costs to the public accounts of approximately £5.5M. The option generates a negative Net Present Value of approximately £-2.6M.

Transport Economic Efficiency

- 16.26 The Transport Economic Efficiency benefits for Option D are presented in Table 16.3 below and Table 16.4 shows the Analysis of Monetised Costs and Benefits.

Capital Cost

- 16.27 The low cost alternative is envisaged to be a bus-based Park & Ride solution serving the existing Cambridge Rail Station. It is anticipated that this will achieve the scheme objectives in reducing the cross city car trips that currently access Cambridge Station as well as relieving some of the car parking constraints at Cambridge station. The same site would be used as for the rail based alternatives and similar synergies with the proposed housing developments in the vicinity are envisaged.

Table 16.2 – Public Accounts

	ALL MODES TOTAL		ROAD INFRASTRUCTURE	BUS & COACH	RAIL	OTHER
Local Government Funding						
Revenue	0				0	
Operating Costs	0				0	
Investment Costs	0				0	
Developer & Other Contributions	0				0	
Grant/Subsidy Payments	0				0	
NET IMPACT	0	(7)	0	0	0	0
Central Government Funding						
Revenue	0				0	
Operating Costs	0					
Investment Costs	4338				4338	
Developer & Other Contributions	0				0	
Grant/Subsidy Payments	0				0	
Indirect Tax Revenues	1119		66		1052	
NET IMPACT	5457	(8)	66	0	5390	0
TOTAL Present Value of Costs (PVC)	5457	(9) = (7) + (8)				
Notes: Costs appear as positive numbers, while revenues and developer contributions appear as negative All entries are discounted present values, in 2002 prices and values						

Table 16.3 – Transport Economic Efficiency Benefits – Option D (Low Cost Alternative)

Consumers	ALL MODES		ROAD	BUS & COACH	RAIL	OTHER	
User Benefits	TOTAL		Private Cars & LGVs	Passengers	Passengers		
Travel Time	2226		2158		68		
Vehicle Operating Costs	0		0		0		
User Charges	0		0		0		
During Construction & Maintenance	0		0		0		
NET CONSUMER BENEFITS	2226	(1)	2158	0	68	0	
Business			Goods Vehicles	Business Cars & LGVs	Passengers	Passengers	Freight
User Benefits							
Travel Time	361			1063		-702	
Vehicle Operating Costs	0			0		0	
User Charges	0			0		0	
During Construction & Maintenance	0			0		0	
Subtotal	361	(2)	0	1063	0	-702	0
Private Sector Provider Impacts					Passengers	Passengers	
Revenue	7065			0		7065	
Operating Costs	-6876			0		-6876	
Investment Costs	0			0		0	
Grant/Subsidy	0			0		0	
Subtotal	188	(3)		0	0	188	0
Other Business Impacts							
Developer Contributions	0	(4)					
NET BUSINESS IMPACT	549	(5) = (2) + (3) + (4)					
TOTAL							
Present Value of Transport Economic Efficiency Benefits	2775	(6) = (1) + (5)					

Notes: **Benefits** appear as **positive** numbers, while **costs** appear as **negative** numbers

Table 16.4 – Analysis of Monetised Costs and Benefits

Noise		
Local Air Quality		
Greenhouse Gases		
Journey Ambience		
Accidents	98	
Consumer Users	2226	
Business Users and Providers	549	
Reliability		
Option Values		
Present Value of Benefits (PVB)	2873	
Public Accounts	5457	
Present Value of Costs (PVC)	5457	
OVERALL IMPACTS		
Net Present Value (NPV)	-2584	NPV = PVB-PVC
Benefit to Cost Ratio	0.526	BCR = PVB/PVC

Note: This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used the sole basis for decisions.

- 16.28 Capital costs for Option D were derived based on a specification similar to that for existing park and ride sites currently operated by the County Council around Cambridge. A summary of the capital costs is presented in Table 16.5 below.
- 16.29 Facilities to be provided would include high quality, landscaped car parking provision, high quality waiting facilities with CCTV coverage and real time passenger information and off-vehicle ticketing.

Table 16.5 – Capital Cost Breakdown

Capital Cost Breakdown	Amount (£,000)
Car Parking	800
Waiting facilities	150
CCTV	150
Ticketing	35
RTPI	50
Utilities	150
Access improvements	195
Vehicles	270
Landscaping	60
Site clearance	140
Total	2,000

Site Maintenance and staffing Costs

- 16.30 Based on the known costs associated with the maintenance of existing park and ride sites, an estimate of £50,000 per annum (2004) was assumed.
- 16.31 In addition to the annual maintenance costs for Option D there would also be a need to refurbish/upgrade the Park and Ride site every 15 years at a cost of £200,000.

Operating costs

- 16.32 Option D, the bus based option, has a cost associated with its operation and this has been separately appraised using the Atkins' Bus Ops model using industry supplied costs of operation.
- 16.33 The Atkins' developed bus operating costs model OPSMODEL was applied to the Option D bus service scenario, based on the following assumptions:

- ◆ Operation between the hours of 06:00 and 21:00;
- ◆ Frequency of service every 30 minutes between 06:30 and 09:00 (AM peak) and 16:30 and 20:00 (PM peak), hourly frequency at other times of the operating day being 06:30 to 22:00;
- ◆ Service only operates on weekdays due to low demand;
- ◆ Timetabled journey time between Park and Ride site and railway station is 25 minutes;
- ◆ Minimum layover time at each end of journey is 5 minutes;
- ◆ Journey distance covered is 3.2 miles each way;
- ◆ Empty mileage to/from depot is allowed for at beginning and end of working day;
- ◆ Two vehicles required to operate service;
- ◆ Vehicle cost is £135,000 per 12m single (53 seats); and
- ◆ Vehicle life of 14 years assumed.

16.34 The results of this model gave an annual operating cost of £119,600 per annum at 2004 prices.

Wider Economic Impacts

16.35 An assessment of the wider economic impacts is not required as the scheme does not lie in a Regeneration Area.

ACCESSIBILITY

Option Values

16.36 The option values appraisal must be considered where a scheme will substantially change the availability of transport services within the area. In essence, the low cost alternative offers a new dedicated Park & Ride service to the existing Cambridge rail station. A general Park & Ride service to Cambridge City centre is provided currently from Cowley Road however this site is proposed to be moved to a location north of the A14.

16.37 The option would not significantly change the level of transport provision in the local area. However, by reducing the proportion made by car of trips to Cambridge station from the north of the city, there would be a reduction in traffic levels on the network. The forecast demand for the service is, however, relatively low. The option would relieve to a degree pressure on car parking provision at Cambridge station however this is proposed to be increased under redevelopment proposals for the Cambridge Station area.

16.38 The option would provide an interchange opportunity with Cambridgeshire Guided Busway, giving access to an alternative mode of transport into the city centre, to Addenbrooke's Hospital, and to destinations to the north-west of Cambridge including Northstowe (new settlement), St. Ives and Huntingdon.

- 16.39 The option will provide a link to Cambridge rail station for those living in the area as well as those commuting to and from the area. However, for those that may not necessarily use the service with any regularity they may still value having the option to use the service if they choose. Should residents wish to travel to Cambridge and beyond, the alternative provides an additional facility for them to do so. For those that already have means of travel to a destination provided by the new scheme, they too may value the option offered to Park & Ride to the existing station over those already taken account of.
- 16.40 The modelling exercise has estimated that approximately 50 passengers will use the low cost option to access Cambridge station each day; the overall assessment for option values is therefore slight beneficial.

Severance

- 16.41 Severance effects, on users of non-motorised modes in the vicinity of the scheme, must be assessed as part of the overall appraisal for the scheme. There will be no reduction or increase in severance for users of non-motorised modes with the implementation of the option, thus the overall assessment for severance is neutral.

Access to the Transport System

- 16.42 Analysis for the indicator 'Access to the Transport System' looked at the population in the vicinity of the proposed scheme who do not have access to a car. Therefore the assessment is the same as that presented for the preferred scheme and is scored as large beneficial.

INTEGRATION

Passenger Interchange Assessment

- 16.43 The low cost option will provide improved access to both the heavy rail network and the wider public transport network, through connections with the Cambridgeshire Guided Busway network. It will provide a new interchange opportunity for private car users, cyclists and pedestrians to make local and regional journeys using the public transport network. Amongst other destinations users will be able to access the new development proposed for Cambridge Northern Fringe East integrating public transport provision with urban development thus promoting non-car modes of travel. The interchange facility will form an integral part of the high quality public transport network for Cambridge and the surrounding area.
- 16.44 Facilities will be provided at the interchange including:
- ◆ Car parking capacity for 200 vehicles;
 - ◆ Dedicated buses;
 - ◆ High quality shelters;
 - ◆ Real time information and security equipment;
- 16.45 In terms of passenger interchange the proposal has been assessed as slight beneficial.

Land Use Policy Context

- 16.46 This assessment considers how the proposals fit with and contribute to local, regional and national planning policies. In making the assessment it was noted that the inclusion of the interchange in many of the policy documents referred to is based on a new rail station and not a Park & Ride serving the existing rail station.

National Planning Policy

- 16.47 A bus based alternative for Chesterton Interchange fits with and contributes to the aims of both Planning Policy Statement 1: Delivering Sustainable Development and Planning Policy Guidance 13: Transport. It contributes to central objectives underpinning these documents, in particular:
- ◆ Supporting sustainable development patterns that reduce travel by car;
 - ◆ Providing access to public transport; and
 - ◆ Promoting accessibility to jobs, shopping, leisure facilities and services by public transport, walking and cycling.

Regional Planning Policy

- 16.48 The provision of Chesterton Interchange is referenced directly within the draft Regional Spatial Strategy (East of England Plan). The option will accord with the need for a 'significantly enhanced level of public transport service provision to, from and within the Regional Interchange Centres, including Cambridge', and in this way supports the planned housing development within the sub-region.

Local Planning Policy

- 16.49 As an important piece of infrastructure on the local transport network, provision of a new rail interchange facility in the Chesterton area is included within all of the relevant local planning documents:
- ◆ Cambridgeshire and Peterborough Structure Plan (2003);
 - ◆ Cambridge Redeposit Draft Local Plan (October 2004);
 - ◆ South Cambridgeshire Local Development Framework Submission Draft (January 2006); and,
 - ◆ Cambridgeshire Local Transport Plan (2006-2011).
- 16.50 These policies together with the Northern Fringe Development Framework Plan give full support to the development of a station. Noting the low levels of use of the proposed option and the introduction of an additional interchange to access the rail network in comparison to the station option, in relation to land-use policies the proposal has been assessed as moderate beneficial.

Other Government Policy

- 16.51 As with the rail based options, as well as contributing to local and regional objectives the scheme also contributes to the delivery of wider Government transport objectives, through the delivery of LTP2 objectives and contribution to the "shared priorities" for

transport. The delivery of Chesterton Interchange supports sustainable development within one of the Government's growth corridors releasing brownfield land for future development. It provides access to the public transport network and in particular facilitates movement between private car and public transport. However, the bus based alternative demonstrates a considerably weaker economic case with a BCR of 0.53.

- 16.52 Direct contribution to wider government policies relating to health and education is likely to be limited, however it is not anticipated that the scheme will have any negative impacts. Thus, the overall positive contribution to the delivery of wider government policies is assessed as beneficial.

17. Appendix L – Quantified Risk Assessment

Table 17.1 – Quantified Risk Register

Risk ID No	Risk Description	Prob	Cost	Time	Cost	Time	Overall	Risk Owner	Open/Closed	Date identified	Mitigation Action 1	Action Owner	Action Date	Mitigation Action 2	Action Owner	Action Date
2	Funding restrictions as a result of the regionalisation of transport funding	5	3	5	High	High	High	County Council	Open	18/08/2005						
16	Construction Related Risks	5	5	5	High	High	High	Project Manager	Open	18/08/2005						
15	Funding gap cannot be made up	4	3	5	Medium	High	High	County Council	Open	18/08/2005	Seek alternative sources of funding	CC		Progress more than 1 scheme option at present		
10	Insufficient Resources/ Market overheats due to competing projects e.g. Olympics	4	3	5	Medium	High	High	Network Rail	Open	18/08/2005						
26	Strategic Planning Risk Undermines business case for the station	4	2	5	Medium	High	High	County Council	Open	26/07/2006						
1	County Council withdraw support for the scheme	3	2	5	Medium	High	High	County Council	Open	18/08/2005	Regular consultations with council members	County Officers		Set up Steering Group	County Officers	
13	Interface with Freight Train Operators proves problematic	3	3	4	Medium	Medium	Medium	Network Rail	Open	18/08/2005	Initiate discussions with Freight Operators	NR / CC				
20	Time taken to agree the delivery package/suite of agreements is greater than expected.	3	2	4	Medium	Medium	Medium	County Council	Open	18/08/2005						
6	Degradation of existing signalling infrastructure	2	5	3	Medium	Medium	Medium	Network Rail	Open	18/08/2005	Onsite Investigations to establish extent of problem	RL		Design to take into account output from mitigation action 1	RL	
8	Inadequate Power Supply for train requirements	2	5	5	Medium	Medium	Medium	Project Manager	Open	18/08/2005						
5	Central Government attitude to scheme alters	2	5	5	Medium	Medium	Medium	County Council	Open	18/08/2005						
14	Resolving Land Issues with Network Rail is harder than anticipated	3	2	3	Medium	Medium	Medium	Network Rail	Open	18/08/2005						
17	DFT alter their assessment criteria	3	2	3	Medium	Medium	Medium	Project Manager	Open	18/08/2005						
24	External interfaces with other works on Network	3	3	3	Medium	Medium	Medium	Network Rail	Open	26/07/2006						
25	Railway Approvals are extended greater than anticipated	3	1	3	Low	Medium	Medium	Network Rail	Open	26/07/2006						
27	Station Design Issues	3	3	1	Medium	Low	Medium	Design	Open	26/07/2006						

23	Regulatory requirements/ Railway standards change	3	2	2	Medium	Medium	Medium	Project Manager	Open	18/08/2005						
4	Planning consents for station are not received	2	2	3	Low	Medium	Medium	County Council	Open	18/08/2005						
7	OLE Booster Overlap configuration is unsuitable for new station	2	3	2	Medium	Low	Medium	Network Rail	Open	18/08/2005						
12	Ground contamination is higher than anticipated	2	3	2	Medium	Low	Medium	Project Manager	Open	18/08/2005						
18	Protected species, either plants or animals are discovered on the site	3	2	2	Medium	Medium	Medium	Project Manager	Open	18/08/2005						
19	Archaeological discovery on site	2	2	3	Low	Medium	Medium	Project Manager	Open	18/08/2005						
3	TWA is required resulting in delay and additional cost	1	5	5	Medium	Medium	Medium	County Council	Open	18/08/2005						
11	Train Operating Companies don't stop at Station	1	5	5	Medium	Medium	Medium	County Council	Open	18/08/2005						
22	RUS output changes project assumptions	1	5	5	Medium	Medium	Medium	Network Rail	Open	18/08/2005						
9	Approval is not granted for planned track configuration due to track gradient	2	2	2	Low	Low	Low	Design	Open	18/08/2005						
21	Thameslink 2000 is delayed even further (OPPORTUNITY)				Nil	Nil	Nil	Network Rail	Closed	18/08/2005						