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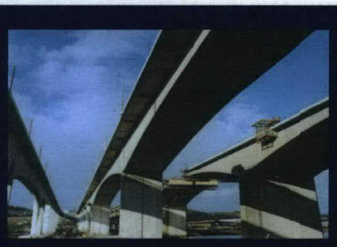
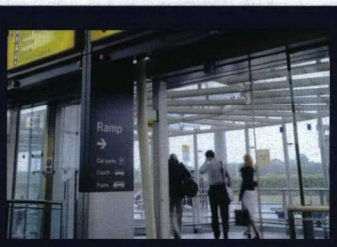




York Central
Transport Masterplan Study – Draft Final Report

City of York Council
16 November 2005

Table of Contents

Executive Summary **1**

1 Introduction **7**
1.1 The York Central Context 7
1.2 Report Structure 8

2 Background **9**
2.1 The Site 9
2.2 Proposed Development 10
2.3 Transport Constraints 11
2.4 Sub-Objectives 11

3 Highway Access **13**
3.1 Strategic Road Network 13
3.2 Access Feasibility 13
3.3 Overview of Saturn Model 14
3.4 Model Validation 14
3.5 Future Year Forecasting 14
3.6 York Central 16
3.7 Highway Access Options 18
3.8 Discussion of Modelled Scenarios 20
3.9 Summary and Recommendation 21

4 Junction Feasibility and Design **22**
4.1 Introduction 22
4.2 Water End Access 22
4.3 Holgate Park Access 23
4.4 York Station Access 24
4.5 Operational Assessment 25
4.6 York Central Site Access 26
4.7 Parking 26

5 Linking York Central to the City Centre **29**
5.1 Introduction 29
5.2 Pedestrian and Cyclist Links 29
5.3 Marble Arch / Leeman Road 29
5.4 York Station Footbridge 29
5.5 Wilton Rise 30
5.6 Proposed Walk and Cycle connections 30

6 Public Transport Model **33**
6.1 Introduction 33
6.2 Overview of Modelling Process 33
6.3 Base Year Model 33
6.4 Development of Public Transport and Walk/ Cycle Network 34
6.5 Base Year Validation 35
6.6 Mode Choice Model Formulation 36
6.7 Future Year Growth 38

7 Public Transport Options **40**
7.1 Introduction 40
7.2 Public Transport Options 40
7.3 Public Transport Options 41
7.4 Public Transport Option Conclusions 42
7.5 A59 Park & Ride Site Selection 42
7.6 Transport Interchange 44

7.7 Conclusions 48

8 Air Quality 51
8.1 Introduction 51
8.2 Air Quality in York 51
8.3 Pollutants of Concern 51
8.4 Particles (PM10) 52
8.5 Pollutant Monitoring 53
8.6 PM10 Monitoring 55
8.7 Modelling Methodology 55
8.8 Conversion of NOX to NO2 57
8.9 Results 58
8.10 Conclusions 63
8.11 References 64

9 Option Appraisal 67
9.1 Introduction 67
9.2 Options Considered 67
9.3 Treatment of AST Objectives 67
9.4 Capital and Operating Costs 68
9.5 Appraisal Findings 70
9.6 Conclusions 70

10 Summary and Conclusions 74
10.1 Introduction 74
10.2 Highway Access 74
10.3 Cycling and Walking 75
10.4 Public Transport 75
10.5 Air Quality 76
10.6 Conclusions 76

Appendix A - SATURN Model Validation 78

Appendix B – Future Year Forecasts 81

Appendix C – Highway Access Drawings 84

Appendix D – Public Transport Model Validation 85

Appendix E – UK Air Quality Objectives 87

Appendix F - Maps 89

Appendix G – Aaquire Description 90

Appendix H – Meteorological Parameters 92

Appendix I – Air Quality Plots 93

Table 1 – Comparison of Matrix Totals 15
Table 2 – Do Minimum Comparison of Assigned Vehicles 16
Table 3 – York Central : Predicted Employee Numbers and Vehicle Trips (2011 and 2021) 16
Table 4 – York Central : Predicted Employment Trip Generation (08:00 – 09:00hrs, 11:00 – 12:00hrs and 17:00 – 18:00hrs) 17
Table 5 – York Central : Predicted Residential Units and Population (2011 & 2021) 17
Table 6 – York Central : Predicted Trip Generation (08:00 – 09:00hrs, 11:00 – 12:00hrs and 17:00 – 18:00hrs) 17
Table 7 – Comparison of Do Minimum and Do Something Matrix Totals 18
Table 8 – Comparison of Assigned Vehicles with Elastic Assignment 18
Table 9 – Access Options 19
Table 10 – 2021 AM Peak : Model Summary Statistics (Elastic Assignment) 19
Table 11 – 2021 PM Peak : Model Summary Statistics (Elastic Assignment) 20
Table 12 – Comparison of Highway Access Options 20
Table 13 – Summary of Capacity Assessment of New Accesses under the Different Access Options 25

Table 14 – 2004 Matrix Totals 34
Table 15 – Summary of Validation Results for PT and walking/ cycling modes (Screenline : All radials between Blossom St and Clarence Street) 35
Table 16 – Mode Choice Parameters 36
Table 17 – Mode choice Model Parameters : Mode Constants (using 2004 Values of Time) 37
Table 18 – Mode Choice Model Parameters : Logsums 37
Table 19 – TEMPRO Growth Factors 2004 - 2021 38
Table 20 - Percentage Mode Share of Public Transport Options, Mode Split (Passenger Numbers) 43
Table 21 – Continuous Monitoring Summary for NO_2, 2004 53
Table 22 - CoYC NO_2 Diffusion Tube Results Summary ($\mu g/m^3$) 54
Table 23 – Monitoring summary for PM_{10}, 2004 55
Table 24 – Background Concentrations for Study Area ($\mu g/m^3$) 56
Table 25 – Ratio of Emissions of Cold Engines Relative to Hot Engines 57
Table 26 – NO_2/NO_x Relationship 57
Table 27 – Industrial Emissions Data 58
Table 28 – Monitored and Modelled Results used for Model Verification ($\mu g/m^3$) 58
Table 29 - Nitrogen Dioxide Modelled Results ($\mu g/m^3$) 60
Table 30 – PM_{10} Modelled Results ($\mu g/m^3$) 62
Table 31 – Appraisal Summary Table – Option A 71
Table 32 - Appraisal Summary Table, Option B 72
Table 33 - Appraisal Summary Table, Option C 73

Plan 1 28
Plan 2 28
Plan 3 28
Plan 4 28
Plan 5 28
Plan 6 28

Executive Summary

This is a Transport Master Plan for the York Central development site, located in the City of York. This Master Plan considers the nature of development at York Central, the transport implications of development and recommends a series of interventions that will provide a standard of transport infrastructure and services commensurate with the needs of the development site, the city centre and the wider City. It is not a detailed Transportation Assessment necessary to support a full planning application for individual development proposals on the site.

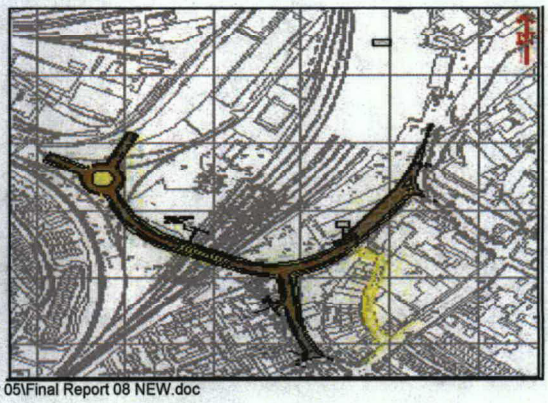
York Central is a development proposal of regional significance. It presents a unique opportunity to provide high quality residential, commercial and tourist facilities in the heart of the historic City of York, supported by excellent transport links across a range of travel modes. Once completed, York Central will change the face of York, bringing new business and commercial opportunities to the city, expanding the city centre, drawing the centre of gravity of activity westwards towards the railway station and helping to reduce the emphasis in the city on out of town office developments.

The development site is a teardrop shape, located on former railway lands to the west of the railway station and enclosed by the East Coast Main Line (ECML) to the north and east and the station Freight Avoiding Line (FAL) to the south and west. It currently has on its northern flank a number of small residential areas, some light industrial units and the National Railway Museum complex, all of which are accessed from Leeman Road, the only public highway that passes through the site at present. The majority of the site comprises large areas of operational and disused railway sidings associated with York's role as a major railway centre, as well as the railway station itself to the east.

Although encircled by railway lines and being immediately adjacent to York's railway station, the site nevertheless presents significant transport challenges that this Master Plan must tackle. Road and public transport links into the site are poor and will require a major upgrade to meet the demands of new development. Cycling and walking links, both internally and to external areas, will also need to be upgraded. The way in which proposals at York Central relate to the transport needs of the rest of the City Centre will also be vital, with particular emphasis on public transport interchange, car parking supply and car park pricing.

The York Central planning brief sets out the development framework and key planning, economic development, environmental, highways and transport objectives for the site. These are:

- A comprehensive development for the entire site, not piecemeal development;
- High quality development that incorporates high standards in the design of buildings and the spaces between them;
- A quality of development whose design and architecture will make people want to visit it in its own right;
- The creation of a modern mixed use office core that comprises well designed buildings and provides for the City's growing economy;



- Grouping of office buildings around attractive, distinctive and well-landscaped public spaces, designed for people;
- At street level providing uses such as restaurants, bars, shops, leisure and cultural facilities, needed to animate the public realm and enliven the central business district;
- The provision of high quality hotels to promote and support the valuable business and tourism sectors;
- Inter-mixing residential uses within and surrounding the commercial core;
- Making the railway station a focal point for the scheme and also a focal point for transport interchange;
- Placing the NRM within a setting that will help it to fully develop its potential to act as an emblem for the City and a catalyst for the development of a new iconic cultural attraction;
- Creating a sustainable transport development designed around people not cars; and
- Ensuring the site is well connected, city wide, by all forms of transport.

The overarching transport requirements for York Central include:

- Meeting a 20% modal share limit for drivers arriving to work at the York Central site by car;
- Promoting connectivity between York Central and the walled city, with particular emphasis on cycling and walking, to help limit trip generation and traffic congestion;
- Promoting connections between York Central, the railway station and a new transport interchange to maximise the advantage of public transport connections to the site;
- Protecting the rail infrastructure for both present and future uses including station car parking, taxi facilities, drop-off points and short stay parking;
- Promoting connectivity between York Central and the River Ouse, with links to the riverside walk into the City Centre;
- Serving the site in ways that will minimise the impact on the highway network and air quality beyond the immediate vicinity of the development;
- Reducing reliance on the car;
- Providing opportunities for dedicated public transport corridors to serve the city centre and wider city; and
- Promoting connectivity to the surrounding areas by foot and cycle.

It is these objectives that have set the scene for the consultancy work undertaken by Faber Maunsell to develop this Master Plan. The study objectives are to:

- Advise on how the highway network needs to be modified to cater for the traffic generated by the development;
- Advise on the development of a major public transport scheme to access the York Central site; and
- Advise on the scope for developing a public transport interchange which links with the rail station.

The work that has been undertaken has followed a logical process to deliver these objectives. Our work has been structured to:

- Identify the travel demands that will arise as York Central is fully developed;
- Understand where people travel to and from to get to York Central, and what routes they will take;
- Understand how the choice of travel mode can be influenced by future transport investment;
- ensure that any transport investment has a strong business case that is capable of attracting funding; and
- Determine the optimal transport investment strategy for York Central that not only covers road and public transport access into the site, but also pays regard to the wider transport impacts that will arise across the city, including the congested A1237 Outer Ring Road.

The Development at York Central

Precise proposals for development at York Central will ultimately be influenced by an assessment of current railway operational needs. Nevertheless a significant developable land area is envisaged that is of such a scale that it will have an impact at a city-wide, sub-regional and regional level. For the production of this Master Plan it has been assumed that there will

be a mix of development that represents a "maximum case" in terms of floor areas, residential units and consequential generation of additional transport demand.

Work for this Transport Masterplan has assumed that the York Central development comprises of:

- Commercial development for office-based uses amounting to 173,000 square metres gross floor area (GFA) by 2021. This could accommodate 9,600 employees when complete;
- Residential development comprising 3,000 units. This could house 7,000 residents;
- Associated ancillary retail and leisure uses that will support the commercial and residential aspects of the mixed use development; and
- Expansion of the current National Railway Museum operation.

It is clear that the development is of a scale that will generate significant new transport demands within the City. Whilst many of these demands will be of short distance and generated within the York Central development itself, there will be other transport demands that will require improvements to be made to the highway, public transport, cycling and walking infrastructure connecting York Central to the wider city networks.

Highway Access Proposals

A traffic model has been developed over recent years by the City of York Council, which uses the SATURN assignment software suite developed by the University of Leeds. Improvements to the traffic model have been made during the course of this study, in order that it can provide an accurate representation of road-based journey volumes, routes and travel times across the City, within the area enclosed by the Outer Ring Road and York Bypass.

The traffic model has been used to determine and assess the optimal combination of potential new highway options into the York Central site. The three options that have been considered are at Water End to the North West, at Holgate Park to the South and at Queen Street to the East. All three require the provision of new bridges over existing operational railway lines.

At Holgate Park any bridge will also need to span several sidings adjacent to the FAL, which are to be retained. At Queen Street the bridge will cross the southern throat of the railway station platform approaches, and it is likely to be an "iconic" bridge with a design that is in sympathy with the listed buildings that will surround it. We have also considered the role of the existing highway access into York Central, at Leeman Road.

We recognise that in the future the traffic network in York is likely to be more congested than current levels. In this context the addition of new highway capacity in the York Central site could provide an attractive route for traffic that is simply passing through on its way to the City Centre and other destinations, rather than traffic that has either an origin or destination in the York Central. The presence of this through traffic is contrary to the Council's policy to manage demand for car traffic, and is also likely to have an adverse effect on accessibility within the York Central site, which in turn may decrease the attractiveness and viability of York Central development.

Our analysis of highway access options has therefore centred on ensuring good access to the York Central site for road traffic from key directions of approach, whilst as far as possible eliminating the potential for the new access routes to provide rat-runs across the York Central site for through traffic entering and leaving the city centre. We have also sought to ensure that good public transport access into the York Central site is provided, both for existing bus services and any new services that the development may generate.

The table below shows the level of through traffic attracted to the York Central highway network under various combinations of the three main access points.

Highway Access Scenario		Through Traffic (AM peak hour, 2021)
Water End Access	✓	1,100
Holgate Park Access	✓	
Queen Street	✓	
Restrictions on Leeman Road	×	
Restrictions on Station Road	×	
Water End Access	✓	1,100
Holgate Park Access	✓	
Queen Street	✓	
Restrictions on Leeman Road	✓	
Restrictions on Station Road	×	
Water End Access	✓	600
Holgate Park Access	✓	
Queen Street	✓	
Restrictions on Leeman Road	✓	
Restrictions on Station Road	✓	
Water End Access	×	400
Holgate Park Access	×	
Queen Street	✓	
Restrictions on Leeman Road	✓	
Restrictions on Station Road	✓	
Water End Access	×	300
Holgate Park Access	✓	
Queen Street	✓	
Restrictions on Leeman Road	✓	
Restrictions on Station Road	✓	

Source: York Central Transport Masterplan Report, Section 3, Table 10

The conclusion of this work is that the optimal combination of highway accesses is to provide bridges into the site from Holgate Park and Queen Street, but not from Water End, and to restrict through traffic on Leeman Road. Such a package of highway measures will also result in the need to restrict through private vehicle traffic on Station Road across the face of the station entrance. This restriction is recommended in order to reduce through traffic in York Central, alleviate traffic problems in this key area of the city and to allow a new transport interchange to be built adjacent to the current station entrance. Good public transport access in York Central is provided, from the A59 corridor via Holgate Park and from the A19 corridor via Leeman Road. Our work demonstrates that the rest of the highway network in the city can cope with the traffic diversions that will arise as a result of this restriction, recognising the fact that traffic congestion and accessibility by car in the city are set to worsen even if the York Central proposals do not proceed.

The particular requirements of cyclists and pedestrians have also been considered as part of our review of highway access options. Cycling and walking access will be provided at the two new highway entrances at Holgate Park and Queen Street. Further cycle and pedestrian access will be available at either end of Leeman Road, where traffic restrictions on the road will provide an opportunity to improve the environment for those on-foot or on a bicycle. The provision of an improved link between the eastern end of Leeman Road (Marble Arch area, in the vicinity of the Post Office sorting depot) and the banks of the River Ouse is also recommended, together with the provision of a new pedestrian and cycle bridge across the Ouse between Scarborough Railway and Lendal Bridges to improve access into York Central from north of the River. The existing pedestrian access into York Central at Wilton Rise to the South East of the site should also be upgraded for cycle access.

Public Transport Proposals

A wide range of public transport options has been examined in the development of this Master Plan, with consideration being given to the types of public transport service provided, the method of vehicle traction and the routes to be taken. The principal component of all options has been to provide a high quality public transport link between a new Park & Ride site near the A59/A1237 junction (to serve the A59 Boroughbridge Road corridor as well as the Outer Ring Road), the York Central site, York Railway Station and York City Centre.

Initial analysis has seen three principal options emerge:

- an on-street bus-priority link along the A59 corridor that enters York Central at Holgate Park and continues past the station to the City Centre;
- a segregated guided bus option that skirts the eastern end of the York-Knaresborough branch line before passing on the western flank of the ECML and FAL, then entering the York Central Site at Holgate Park via the new highway bridge. Buses would then continue through York Central on the highway to the station and City Centre.
- a segregated tram option that follows the same alignment as the guided bus.

A public transport and mode choice model for York has been developed using the EMME/2 proprietary software suite. The model has been based on limited readily available input data but is nevertheless appropriate for testing and comparing broad public transport options in the A59/ECML corridors. The findings of the modelling, and a subsequent review of operational considerations, scheme costings and revenue forecasting, revealed that:

- the most appropriate location for a new Park & Ride site to serve the A59 corridor and York Central would be within the Outer Ring Road to the north of the A59 corridor. This would provide the greatest flexibility in terms of being able to serve the Park & Ride site via a segregated public transport route alongside the ECML and York-Knaresborough branch in the future.
- the capital and operating cost of the tram option are very high (£55 million capital costs, net loss on operating costs per annum) and outweigh its potential benefits making it unfeasible in the context of the York Central development and future travel demands in the City;
- the guided bus option does not provide significant extra benefits in terms of public transport modal share when compared to the on-street bus option and is more expensive (overall bus modal share to York Central is 30.6% with guided bus option, 28.8% with on-street bus priority option);
- the guided bus option would perform better if it were part of a wider network of guided buses and more intensive bus priority measures across major transport corridors in the City (38% bus mode share to City centre with service terminating in City, 41% with service extended to University); and
- the mode choice model suggests that the lowest car mode share that could be achieved at York Central is 40% which, whilst very low in both absolute and relative terms, is substantially above the 20% aspiration set out by the York Central Steering Board.

On the basis of this work it is recommended that the on-street bus option is adopted for the York Central Transport Master Plan, with priority measures implemented in the A59 corridor wherever possible, as set out in previous work commissioned by the Council.

Public Transport Interchange

The provision of a single public transport interchange that brings together at one place access for the York Central site, the railway station and the City centre has also been considered. Four options have been reviewed, which are adjacent to the railway station to the north, west, south or east of the current train shed. A qualitative analysis against study objectives suggests that two options show promise. Firstly, to the east of the station on Station Road, exploiting the through traffic restriction at this location as recommended as part of the highway proposals. Secondly, to the north of the station at Marble Arch, providing a subterranean bus interchange beneath the railway tracks within a reconstructed Marble Arch, with direct links provided to the station platforms above.

Both options provide good opportunities for interchange and integration between buses, railways, York Central and the city centre. Marble Arch would provide a superior interchange location and interchange facilities, but would be costly and disruptive to build. Station Road

would provide good – but not necessarily optimal – interchange and would be far less costly. It would also introduce new passenger flows through York railway station for access to York Central which would require a review of how pedestrian movements are accommodated within the station confines.

In summary, the Station Road interchange is recommended as the preferred and most readily deliverable option at this time, but further work on the feasibility of an interchange at Marble Arch should be undertaken to determine whether this potentially superior operational option is feasible in engineering terms and is affordable.

Recommendations

This transport master plan recommends a package of physical measures and management initiatives that could be adopted as part of the wider planning and development of the York Central proposals. This package includes:

- two new highway accesses into York Central at Holgate Park and Queen Street;
- improvements and changes to the operation of Leeman Road and Station Road;
- new and improved cycle and pedestrian links around Marble Arch;
- a new on-street bus based public transport link that would serve the A59 corridor running between a new Park & Ride site adjacent to the Outer Ring Road, York Central, the railway station and the city centre; and
- a new transport interchange at the current station entrance on Station Road.

It is also recommended that further considerations should be given to the following issues:

- the cost and engineering feasibility of a bus-rail interchange at Marble Arch, to the north of the railway station;
- the location, cost and feasibility of a new bridge for cyclists and pedestrians across the River Ouse, between the Scarborough Railway Bridge and Lendal Bridge;
- the implementation of a segregated guided bus system between the A59 Park & Ride, the York Central and York City centre; in the context of implementing a wider network of segregated and on-street bus corridors serving major demands in the City; and
- the further development and upgrade of the public transport model, both to support any future major scheme bid for transport funding for infrastructure, and to assess the impact of improved public transport networks in the City's major transport corridors.

1 Introduction

1.1 The York Central Context

York Central is a development proposal of regional significance. It presents a unique opportunity to provide high quality residential, commercial and tourist facilities in the heart of the historic City of York, supported by excellent transport links across a range of travel modes. Once completed, York Central will change the face of York, bringing new business and commercial opportunities to the city, expanding the city centre, drawing the centre of gravity of activity westwards towards the railway station and helping to reduce the emphasis in the city on out of town office developments.

Transport access is critical to the fulfilment of aspirations for York Central. The site is located adjacent to York railway station, this affords the site many transport advantages but also raises transport access issues that need to be resolved. While the railway station will provide an excellent opportunity for travel to and from work, leisure and education for many people attracted to York Central, it does not represent a total solution. People who live at York Central and work elsewhere in the City, and people who will travel to work at York Central from across the City, will require transport links that the railway station alone cannot fulfil. In this context the importance of road access and public transport access – be it by bus or by LRT – into the site is evident.

The City Council has therefore commissioned Faber Maunsell to prepare a transport masterplan for the site. This master plan is the focus of this report, and follows a logical process that:

- Identifies the travel demand that will arise as York Central is fully developed;
- Understand where people travel to and from to get to York Central, and what routes they will take;
- Understand how the choice of travel mode can be influenced by future transport investment, ensuring that any investment has a strong business case that is capable of attracting funding; and
- Determine the optimal transport investment strategy for York Central that not only covers road and public transport access into the site, but also pays regard to the wider transport impacts that will arise across the city, including the congested Outer Ring Road.

It is noted that this document does not provide a detailed Transportation Assessment necessary to support a full planning application for individual development proposals on the site. Any plans in this report are for feasibility purposes only and do not reflect any final agreed proposals for the site.

The start point for our analysis is the Council's transport vision for York Central that only 20% of peak hour commuters enter and leave York Central as a car driver. This ambitious target for non-car access is greater than that currently observed in the city centre, and will require significant investment in a range of transport modes to achieve this, including cycling and walking as well as public transport. The Council aspires to provide a rapid transit scheme to achieve this transport vision, however it is critical that a strong business case for such a scheme exists if Government funding is to be secured. Any rapid transit scheme will also need to be demonstrably compliant with national and regional transport objectives and priorities. A high level assessment of whether such a business case exists is a central outcome of this master planning exercise. This assessment examines the role of public transport options on the whole of the City, not just the impact on access to York Central.

A further vital consideration is the environment impact of transport arising from the development of York Central. In this context we have used an air quality assessment as a proxy for the environmental impact of the proposals. Air quality is a major issue in the City, with Air Quality Management Areas (AQMAs) having been designated in recent years, so this is a very

appropriate way of testing the environmental worth of the transport master plan developed for York Central.

The study has been conducted in accordance with the City Council's consultancy brief, which sets out the overarching transport requirements that the Council has in relation to the site. These are:

- Meet a 20% modal share limit for drivers arriving to work at the York Central site by car;
- Promote connectivity between York Central and the walled city, with particular emphasis on cycling and walking, to contain trip generation and traffic congestion;
- Promote connections between York Central, the Railway Station and the proposed transport interchange to take advantage of suitable public transport connections to the site;
- Protect the rail infrastructure for both present and future uses including station car parking, taxi facilities, drop-off points and short stay parking;
- Promote connectivity between York Central and the riverside area, with links to the riverside walk into the City Centre;
- Serve the site in ways that will minimise the impact on the highway network and air quality beyond the immediate vicinity of the development;
- Reduce reliance on the car;
- Provide opportunities for dedicated public transport corridors to serve the city centre and wider city; and
- Promote connectivity to the surrounding areas by foot and cycle.

This report details the work carried out in respect to defining a transport access strategy for the site.

1.2 Report Structure

There are nine further sections to this report as follows:

- **Section 2** provides a background to the York Central development proposals;
- **Section 3** details the highway access design and modelling;
- **Section 4** provides details of the junction feasibility and gives some outline designs;
- **Section 5** looks at the walk and cycle links to the city centre
- **Section 6** details the development of the public transport model and Section 7 looks at the public transport options; and
- **Section 8** provides details of the air quality assessment;
- **Section 9** provides details of the Option Appraisal; and
- **Section 10** gives the summary and conclusions.

2 Background

2.1 The Site

York Central is located in the central area of York, west of the Railway Station. The station is within the Central Historic Core Conservation Area and the adjacent York Central site has a number of listed buildings within it and on its periphery that relate to the site's railway past. Part of York Central lies within the City Centre Area of Archaeological Importance.

The teardrop shaped site is bounded to the North and East by the East Coast Main Line (ECML), and to the South West by the Freight Avoiding Line (FAL). It is therefore entirely enclosed by busy operational railway lines, a factor which presents unique transport problems that this master plan must resolve. **Figure 1** (on page 12) shows the identified area that we have determined as the York Central site for the purpose of this study.

While the site has a long history that stretches back to Roman times, the current development pattern on the site is inextricably linked to its railway past over the last 170 years. The establishment of the National Railway Museum (NRM) in 1975 rejuvenated former locomotive sheds to the North East of the site. Elsewhere the site is a mixture of operational and abandoned railway sidings and yards which will need to be rationalised as part of the development master plan for the site.

Along Leeman Road, which also serves the NRM, there are a number of local businesses in the light industry and trade sectors. There is also a significant new residential development centred on Phoenix Boulevard, and two adjacent older streets of terraced housing.

The history of the site means that access by road into York Central is poor. The only public highway within the development area is Leeman Road, which skirts the northern fringe of the site. To the North West, Leeman Road passes beneath the ECML to access the Salisbury Terrace housing area. To the East, Leeman Road again passes beneath the ECML under what is known locally as the "Marble Arch", a long Victorian dual access bridge beneath the northern end of York railway station that is clad with white tiles and provides separate road traffic and pedestrian links into the York Central site. Leeman Road itself is used by public transport services, most notably the city centre bound bus service from A19 Rawcliffe Bar Park & Ride site.

Until recently access to the passenger railway station from York Central was similarly poor, but the construction of a new bridge connecting the NRM area with the station overbridge that connects between platforms has improved pedestrian access to the west of the station. That said, the new bridge only provides pedestrian access to the North East quadrant of York Central, the rest of the site has no pedestrian access to either the railway station or the surrounding highway and footway network.

While the York Central site is only directly served by Leeman Road, it is surrounded by a network of local roads on the periphery that provide access to the city centre from outlying areas of York and its surrounding hinterland. South of the York Central site, the A59 Boroughbridge Road corridor links the city centre to the Outer Ring Road, the A1(M) motorway, Knaresborough, Boroughbridge and Harrogate. Beyond Leeman Road, the ECML and the River Ouse to the north of York Central, the A19 Bootham corridor links the city with the Outer Ring Road and a number of commuter villages north of York. Between the A59 and A19 and running north-south to the west of the York Central site is Water End, which provides an orbital function for traffic that wishes to move between outlying areas of the city without entering the congested city centre. East and North East of York Central lies the city centre, which is heavily congested during much of the weekday, especially in the vicinity of Lendal Bridge and Bootham Bar.

2.2 Proposed Development

York Central has a developable area of approximately 30 to 35 hectares and is located in close proximity to the city centre core, providing an opportunity to extend the city centre area. The site has been identified for strategic development within the City's Local Plan and a Planning Brief was issued by the Council for the site in March 2004.

The planning brief sets out a vision and objectives for the development:

"... the [vision for] development of York Central is that it will provide high quality of life opportunities for future generations, through the creation of a modern, central business district, attractive, exciting, sustainable in its design, mix of activity and transport system, complementary to the city's Historic Core, expanding and diversifying the City's urban economy, housing choice and cultural life."

The key objectives for the site include:

- A comprehensive development for the entire site, not piecemeal development;
- High quality development that incorporates high standards in the design of buildings and the spaces between them;
- A quality of development whose design and architecture will make people want to visit it in its own right;
- The creation of a modern mixed use office core that comprises well designed buildings and provides for the City's growing economy;
- Grouping of office buildings around attractive, distinctive and well-landscaped public spaces, designed for people;
- At street level providing uses such as restaurants, bars, shops, leisure and cultural facilities, needed to animate the public realm and enliven the central business district;
- The provision of high quality hotels to promote and support the valuable business and tourism sectors;
- Inter-mixing residential uses within and surrounding the commercial core;
- Making the railway station a focal point for the scheme and also a focal point for transport interchange;
- Placing the NRM within a setting that will help it to fully develop its potential to act as an emblem for the City and a catalyst for the development of a new iconic cultural attraction;
- Creating a sustainable transport development designed around people not cars; and
- Ensuring the site is well connected, city wide, by all forms of transport.

York Central is seen as an employment led development scheme, which includes a substantial element of housing. However, to achieve a satisfactory mix of uses on the site, the following elements are likely to be included as part of any development plan:

- A minimum of 100,000m2 of office accommodation as a Central Business District;
- A maximum of 3,000 residential units with around half to be designated as affordable housing;
- A maximum of 3,000m2 of ancillary retail development to provide local convenience in a variety of units;
- A maximum of 20,000m2 of ancillary retail and leisure provision located at ground floor level dispersed across and well integrated into the Central Business District; and
- A transport interchange to suit the requirements of the City.

The York Central planning brief also sets out the aspirations that the Council has for the transport networks into and around York Central, and relates these to the networks across the whole of the City. The transport aspirations include:

- A 20% mode share limit for car drivers arriving to work at the York Central site;
- Promote connectivity between York Central and the walled City with an emphasis on cycling and walking;
- Promote connections between York Central, the railway station and the proposed transport interchange;
- Protect rail infrastructure for both present and future uses;
- Promote connectivity between York Central and the riverside area;

- Serve the site in ways that will minimise impact on the highway network and air quality beyond the immediate vicinity of development;
- Significantly reduce reliance on the car;
- Significantly improve accessibility to the site by public transport and provide opportunities for dedicated public transport corridors to the serve the city centre and wider city; and
- Promote connectivity to surrounding areas by foot and cycle.

A number of specific requirements are also listed, which include the retention of Marble Arch, the creation of a new western entrance to the railway station, the downgrade of the traffic route through Salisbury Terrace by placing restrictions on Leeman Road and the provision of 2 or 3 new highway routes into York Central that will provide facilities for cyclists and pedestrians as well as motor vehicles. The need to investigate a new public transport corridor between the City Centre, York Central and the Outer Ring Road is also highlighted. A hierarchy of transport users is set out on which design issues should be based, this hierarchy is:

1. Pedestrians;
2. People with mobility problems;
3. Cyclists;
4. Public transport and taxi users;
5. Powered two wheelers;
6. Commercial/business users;
7. Car borne shoppers and visitors; and
8. Car borne commuters.

Advice is also provided on car parking standards and the need to provide a travel plan for employers and employees at York Central.

In conclusion, there is a strong context that this transport master plan is founded upon, the principal focus of that context being the creation at York Central of a sustainable mixed use development that has a much lower reliance on the private car for its access needs when compared to similar sites elsewhere in York and beyond, within the region. This master plan seeks to achieve the vision and objectives for York Central stated above within the context of scheme feasibility and fundability in the medium and long term.

2.3 Transport Constraints

Public transport and walking/cycling access to the York Central site will need to be significantly improved in order to achieve the 20% car driver modal share of trips into the site in the morning peak. This target is constrained by a number of factors:

- The East Coast Mainline (ECML) railway bounds the site on all sides, with very few crossing points;
- The City Centre is severed from the site by the railway; access is currently only available via Marble Arch/ Leeman Road, a dark and unattractive foot and road tunnel to the north of the station; and
- The size of the site: The site is approximately 1.5 km in length, making the Millennium Green end of the site beyond walking distance of the City Centre for many people.

A number of other transport constraints exist in the vicinity of the York Central site:

- Bus-rail interchange at the railway station is limited;
- Accessing southbound bus stops on Station Road (opposite the main entrance) is difficult due to high traffic volumes and inadequate pedestrian crossing facilities; and
- The site lies along the A59 corridor, running to the north west of York City Centre. The road is currently congested at peak times.

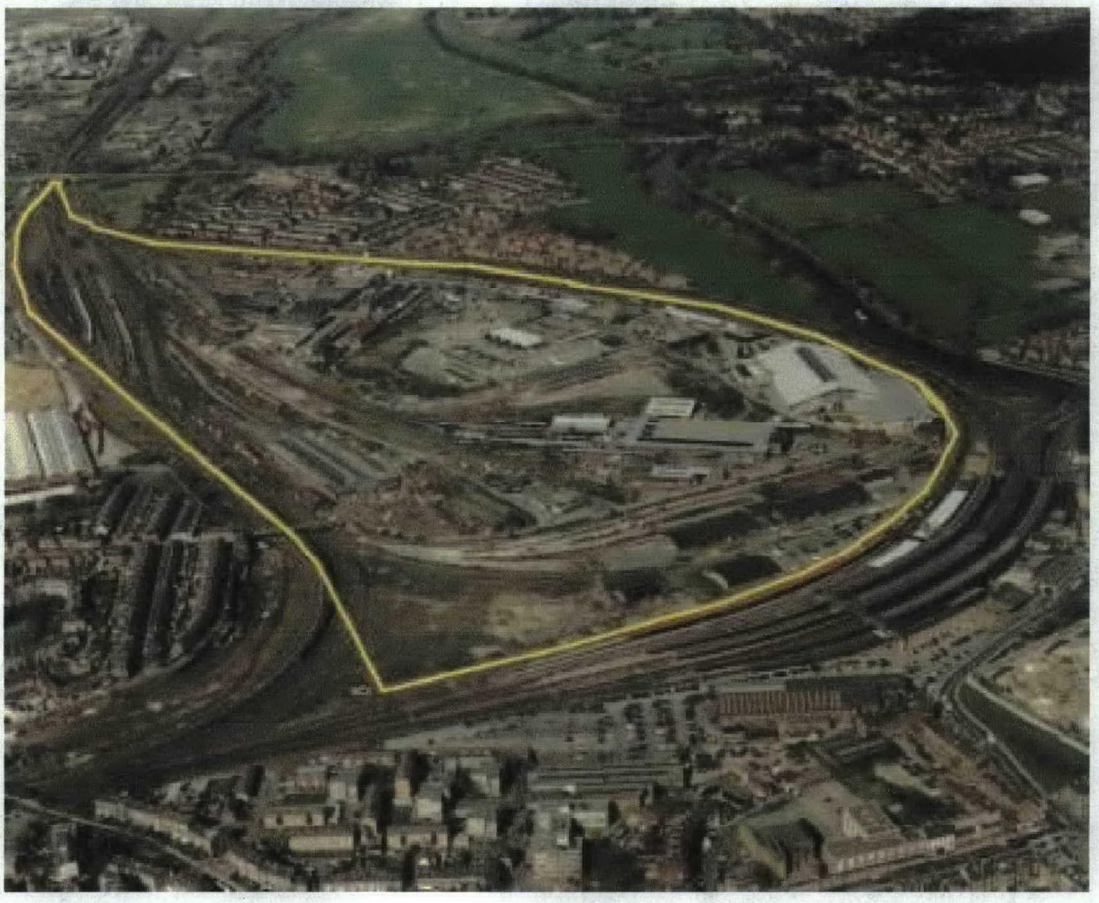
2.4 Sub-Objectives

Given the above constraints, a number of sub-objectives have to be met by the improved public transport/non-motorised access to York Central:

- Providing a 'mass transit' route, linking York Central with a Park and Ride facility on the Outer Ring Road for long distance trips into York Central;

- Take advantage of the Council's proposed Park and Ride facility along the A59 corridor between the Outer Ring Road and the City Centre to further reduce congestion on the A59;
- Improving walking and cycling access from the City Centre into the site;
- Linking the railway station with the York Central site; and
- Providing a better bus-rail interchange at York Station.

Figure 1 - York Central Site



3 Highway Access

3.1 Strategic Road Network

Over recent years there has been an increase in the level of traffic on roads within York, this is in part due to the amount of new car-dependent development on the edges of the city. As a result the Outer Ring Road is congested for large parts of the day. The specific problems on the Outer Ring Road are being addressed in the Outer Ring Road Study that is currently being undertaken by the City of York Council.

The Council's policy expressed in its Local Transport Plan is to manage demand, reduce the need to travel and encourage a modal shift away from the car to public transport, cycling and walking. This is to be achieved through improved land-use planning, appropriate traffic management and demand restraint measures – any access strategy for the York Central Site should take due cognisance of these strategies.

Figure 2 shows the strategic road network in York and includes the existing traffic levels on the key roads at peak times. These have been taken from the City of York Council's existing SATURN model. The York Central site is located between the A59 and A19 radials.

Figure 3 shows the levels of congestion currently found on these links reported volume to capacity ratios (V/Cs). It is clear that several routes in the City Centre, on the City's approaches and on the Outer Ring Road are already carrying traffic volumes that are either approaching or exceeding their capacity.

Although the York transport strategy seeks to create a modal shift away from the car, detailed traffic modelling has been undertaken to show how the York Central development can fit into the existing network and to determine the best highway access arrangement.

3.2 Access Feasibility

Presently the only vehicular access to the York Central site is via Leeman Road. At the northern end of Leeman Road, the road passes through a residential area and under the East Coast Mainline through a low bridge. This is considered unsuitable for primary vehicular access to the York Central development. At the southern end, Leeman Road joins the Inner Ring Road through Marble Arch bridge, which would require environmental improvements were it to be used for a primary pedestrian and cyclist access to York Central in the future.

Previous transport studies of York Central have identified potential highway accesses into the site, these have been utilised to determine an initial access strategy for this study. Three access locations have been identified as follows:

- A new link from Water End into the site;
- A link from Holgate Park; and
- A new link from Holgate Road/Queen Street.

Figure 4 shows the site constraints in terms of the East Coast Main Line (ECML), the Freight Avoiding Line (FAL) and vertical alignments. At the outset of the study, it was considered essential to confirm that all elements of the proposed access strategy are feasible and deliverable in terms of horizontal and vertical alignment.

The highway access strategy has been modelled using City of York Council's SATURN model to show the effect of the proposed highways infrastructure and the York Central development traffic on York's overall highway network. The environmental impact of these accesses has not been assessed individually. As part of future studies, these individual environmental impacts should be assessed and measured with mitigating measures considered if necessary.

3.3 Overview of Saturn Model

The York Saturn model has been used to assess the strategic impact of the York Central development and covers the whole of the City of York within the Outer Ring Road. The network representation of the modelled area is entirely in simulation mode. Thus all key junctions are modelled in detail including turning and signal staging where appropriate.

The morning, evening and inter-peak periods have been defined as follows:

- AM Peak 0800-0900;
- Inter-Peak 1100-1200; and
- PM Peak 1700-1800.

For the AM and Inter-peak periods, 5 matrix user class categories have been adopted:

1. All other trips;
2. HGV;
3. Trips to a short stay car park (up to 3 hours);
4. Trips to a medium stay car park (up to 5 hours); and
5. Trips to a long stay car (over 5 hours).

Only matrix user classes 1 and 2 have been adopted for the PM peak model.

3.4 Model Validation

In terms of model validation, analysis of the original base model showed:

- Counts achieved a good level of validation across the network; however
- Modelled journey times on key radials were considerably faster than those observed.

Poorly modelled journey times will prove critical in the future year assessments particularly in relation to assessing the viability of any public transport option. Therefore, a process of revalidation was carried out on the AM and Inter Peak models. As the PM peak model is not critical to the public transport assessment no revalidation of this model has been carried out.

It is customary to segment multi-modal models into AM peak and average Inter-peak models alone, as a proxy to differentiate between the behavioural characteristics of commuters and other travellers, e.g. shoppers. The PM peak travel market will comprise a combination of both shoppers and commuters, but their trip making behaviour, that is whether to travel by car or public transport, will have been defined on their outward leg. Therefore, the demand for public transport in the PM peak can be estimated by taking the demand from these other time periods and applying appropriate factors.

Details of the model validation are contained within **Appendix A**.

3.5 Future Year Forecasting

3.5.1 *Introduction*

Future year highway and public transport models are required to produce transport flows and to provide inputs to any public transport, financial and economic appraisal. Two forecast years have been developed to facilitate the assessment of transport scheme options. The first forecast year theoretically reflects the scheme opening year, which in the case of York Central is assumed to be 2011. The development of a second forecast year reduces the level of uncertainty particularly with respect to the effects of traffic congestion and the level of car transfer. It is assumed the second forecast year would be 2021, 10 years after the opening year. Future year forecasting models have been developed for a do minimum scenario and incorporate assumptions on:

- Employment and population growth in York;
- Future growth in underlying travel demand by mode; and
- Changes in the highway network and travel costs.

3.5.2 *Future Year Travel Demand*

In order to ascertain the likely movement of traffic in the future assessment years it is necessary to have a realistic view of the proposed future year developments in York.

Appendix B details the assumptions made with regard to estimating the likely trip generation of proposed developments for the forecast assessment years of 2011 and 2021. The Do-Minimum scenario for both of the assessment years has been defined as excluding the York Central development. Details of the Do-Minimum matrix development are contained with **Appendix B**. The resultant matrix sizes and a comparison with the 2004 figures are provided in **Table 1**.

Table 1 – Comparison of Matrix Totals

	2004	Do Minimum	
		2011	2021
AM Peak	36,350	41,200	44,650
Off peak	26,500	30,750	35,250
PM Peak	36,500	40,400	43,550

3.5.3 *Future Year Highway Network*

In order to accommodate the York Central development and other major proposed developments across the city, committed and expected amendments have been made to the current year base network to create the future year Do-Minimum network. These can be summarised as follows.

- The A59 proposed Park and Ride site has been included at a location in the vicinity of the A59/A1237 junction;
- The proposed residential development to the west of the Grimston Bar Park and Ride site has been included;
- The recently opened Park and Ride site at Monks Cross has been added to the base model;
- A59/A1237 Junction - an initial run of the model highlighted significant capacity problems at this junction. The junction is heavily congested in the 2004 base situation and, as there are large employment sites planned in the immediate area, it can safely be assumed that an improvement would be required to accommodate these developments. As this is a critical link in terms of the York Central model outputs, a theoretical capacity improvement was modelled to ensure a realistic situation (that is, adjustments to junction characteristics in the model were made without the provision of a scheme drawing or design).

3.5.4 *3.5.4. Do Minimum Traffic Forecasts*

Based on local knowledge, survey data, site observations and model outputs, it is reasonable to conclude that the core highway network in York is generally congested during peak periods. Consequently, it can be assumed that implementation of the Council's future year development aspirations will lead to significantly increased levels of congestion.

However, in reality, as peak hour congestion increases, the resulting journey time increase and average speed reduction leads to drivers considering travel alternatives such as public transport, walking or cycling, or travelling outside of the peak hours. A standard SATURN assignment would not take this into consideration and would attempt to assign all vehicles to the road network independent of the road costs that emerge from the assignment.

Therefore, the elastic assignment module in Saturn has been implemented to replicate the likely future year driver behaviour. The elastic assignment module assumes that the trip matrix depends on the generalised cost of travel and that the assignment attempts to reach equilibrium between demand and supply. This reflects the fact that demand decreases as travel costs increase and that travel costs increase as demand increases. **Table 2** overleaf shows the resultant reduction in matrix totals when the elastic assignment procedure is invoked.

Table 2 – Do Minimum Comparison of Assigned Vehicles

	Standard Assignment		Elastic Assignment	
	2011	2021	2011	2021
AM Peak	41,200	44,650	39,800	41,750
Off Peak	30,750	35,250	30,350	34,100
PM Peak	40,400	43,550	39,500	41,300

Figures 5 to 8 show the Do-Minimum forecast traffic flows and V/C ratios for 2011 and 2021. These demonstrate that the A1237 will be at capacity in the future year particularly between the A59 and A19.

3.6 **York Central**

The residential and employment elements of York Central have been kept separate within the model with the employment element being assigned to the zone previously allocated for York Central.

The planning brief allows for a maximum of 3,000m² of ancillary retail which should provide local convenience and will not be a traffic generator in its own right. A maximum of 20,000m² of ancillary retail and leisure provision is contained within the planning brief, this use should be dispersed across and well integrated within York Central and has been assumed not to attract specific trips as customers will either already be within York Central or the City.

3.6.1 *York Central Employment Trip Generation*

In order to estimate the likely trip generation of the employment element of York Central, the following assumptions have been agreed with CoYC:

- It has been assumed that there would be one employee for every 18m2 of office space;
- The York Central Planning Brief states that the transport solutions for the site must "meet a 20% modal share limit for drivers arriving to work at the York Central site by car". Car arrivals were therefore simply calculated as being 20% of the predicted number of workers on the site; and
- The TRICS database was used to find the ratio of arrivals to departures in each of the peak periods for similar sites (by comparing trip rates per unit of floor area) in order to calculate the levels of traffic departing the site in peak periods. A ratio of 0.23 was calculated (i.e. AM peak - departures would be 0.23 of arrivals, PM peak – arrivals would be 0.23 of departures). The trip rates derived from TRICS are included in Appendix B.

Table 3 shows the total number of trips assumed in each of the assessment years. These figures are cumulative and represent the total development completed by the relevant assessment year.

Table 3 – York Central : Predicted Employee Numbers and Vehicle Trips (2011 and 2021)

Year	GFA (M2)	No. Emp	Car Arr.	Car Dep.
2011	23,589	1,311	262	61
2021	172,976	9,610	1,922	449

The report issued by Alan Baxter & Associates "York Central – Transport Report for Stage 2 Masterplan" also suggests that a further 7% of the workforce would be expected to arrive as car passengers. This implies a car occupancy level of 1.35 people per car.

Annex B (Table B7) of the York Local Transport Plan 2003 Annual Progress Report (APR) provides modal splits for people arriving in York city centre in the AM peak period. In 2003, this was 38.2% by car/taxi/LGV with 10.9% as passengers, implying a car occupancy level of 1.29. The target set in the APR is to increase this to 1.32 by 2006.

Given that specific measures such as restricted car parking and Green Travel Plans would be applied in York Central, the assumption of 7% of the workforce arriving as car passengers appears reasonable. This equates to an additional 92 people by 2011 and 673 people by 2021.

TRICS was also used to find the profile of arrivals and departures throughout the peak periods (07:00-10:00 hours and 16:00-19:00 hours) based on the assumption that all employees make

their work trip between these two periods. This was used to estimate the total vehicle trips arriving and departing the York Central site during the peak modelled hours of 08:00-09:00 hours and 17:00-18:00 hours. Table 4 below summarises the AM and PM peak hour trips to the York Central employment zone.

However, the same assumption cannot be applied to the inter-peak period, as only a proportion of the total number of employees will make trips between 11:00 and 12:00 hours. Therefore, the off-peak generation was based on the trip generation of sites where developer aspirations with regard to predicted employee numbers and trip generation are known (e.g. A59 Site, Monks Cross South, and University of York Campus 3). These sites suggest that inter-peak hour arrivals are 7% of AM peak hour arrivals and departures are 10% of AM peak hour arrivals. These proportions were subsequently applied to the York Central zones with the resulting generation summarised in **Table 4**.

Table 4 – York Central : Predicted Employment Trip Generation (08:00 – 09:00hrs, 11:00 – 12:00hrs and 17:00 – 18:00hrs)

	2011		2021	
	Arr	Dep	Arr	Dep
AM Peak (08:00 – 09:00)	122	20	896	147
Inter Peak (11:00 – 12:00)	9*	12**	63*	90**
PM Peak (17:00 – 18:00)	14	112	106	822

Source: TRICS ver. 2004a
(*7% of AM arrivals, **10% of AM arrivals).

3.6.2 *York Central Residential Trip Generation*

The likely trip generation of the residential element of York Central has been estimated based on an assumed occupancy of 2.3 persons per residential unit.

The TRICS database was interrogated for sites similar in nature and location to York Central and the relevant trip rates were extracted. It is assumed that since the number of units is high (approximately 3,000) it is likely that the majority of dwellings would be flats. Sites described in the database as "Town Centre", "Edge of Town Centre", and "Edge of Town" were selected based on the location of the York Central site. The level of public transport provision would also be high. If the TRICS search is restricted in these two ways, three sites were available for selection.

Table 5 below summarises the levels of residential development for the two assessment years of 2011 and 2021. Again these figures are cumulative and represent the total development completed by the relevant assessment year.

Table 5 – York Central : Predicted Residential Units and Population (2011 & 2021)

Year	Households	Population
2011	584	1,343
2021	3,025	6,958

The number of arrivals and departures is summarised in **Table 6** below.

Table 6 – York Central : Predicted Trip Generation (08:00 – 09:00hrs, 11:00 – 12:00hrs and 17:00 – 18:00hrs)

	2011		2021	
	Arr	Dep	Arr	Dep
AM Peak (08:00 – 09:00)	23	134	121	696
Inter Peak (11:00 – 12:00)	2	13	8	69
PM Peak (17:00 – 18:00)	64	23	333	121

Source: TRICS ver. 2004a
(*7% of AM arrivals, **10% of AM arrivals).

3.6.3 *Distribution of Development Traffic*

The distribution of the York Central development traffic has been based upon equivalent zones within the SATURN model, which resulted in a distribution as shown in **Figure 9.** The figures in red show the distribution of traffic from outwith the ring road whereas those in blue show the route of the traffic from within the ring road.

3.6.4 *Do Something Travel Demand*

Table 7 contains a comparison of matrix totals between the Do Minimum and the Do Something (with York Central traffic), which indicates that by 2021 there is the potential for an additional 1,800 vehicle trips to travel on the York highway network in the morning peak associated with the York Central development.

Table 7 – Comparison of Do Minimum and Do Something Matrix Totals

	Do Minimum (i.e. No York Central)		Do Something (i.e. With York Central)	
	22011	2021	2011	2021
AM Peak	41,200	44,650	41,500	46,450
Inter Peak	30,750	35,250	30,800	35,500
PM Peak	40,400	43,550	40,600	44,800

Table 8 shows a comparison of the assigned vehicles when the elastic assignment procedure is used to reflect changing travel behaviour. The totals show that York Central trips add a net additional 1,000 vehicle trips to the network in the AM peak in 2021.

Table 8 – Comparison of Assigned Vehicles with Elastic Assignment

	Do Minimum (i.e. No York Central)		Do Something (i.e. With York Central)	
	22011	2021	2011	2021
AM Peak	39,800	41,750	39,960	42,800
Inter Peak	30,350	34,100	30,350	34,200
PM Peak	39,500	41,300	39,650	42,050

3.7 Highway Access Options

The proposed vehicular access points have been described briefly at the start of this chapter. Future year modelling has taken place for two forecast years, 2011 and 2021, assuming a 20% modal share limit for drivers arriving at the York Central site by car.

The aim of the highway modelling exercise is to:

- Provide sufficient capacity to cater for 20% of York Central arrivals to do so by car;
- To minimise the impact on the surrounding highway network;
- Explore the possibility of severing Leeman Road and Inner Ring Road to through traffic;
- Pay due regard to air quality; and
- Minimise through traffic on York Central internal road layout.

Five access options have been developed and modelled using the SATURN model as shown in **Table 9**.

Table 9 – Access Options

	Scenario						
	1	2	2A	2B	3	4	5
Access at Water End	✓	✓	✓	✓			
Access at Holgate Park	✓	✓	✓	✓		✓	✓
Access at Holgate Road	✓						
Access at Queen Street	✓	✓	✓	✓	✓	✓	✓
Leeman Road severed at Kingsland Terrace			✓	✓	✓	✓	✓
Leeman Road severed at Marble Arch				✓	✓	✓	✓
Station Road severed at Station entrance				✓	✓	✓	✓
Access Restrictions on Lendal Bridge							✓

The elastic assignment procedure has been used to compare the access options. The standard Saturn assignment has only been run in order to extract time and distance matrices for input to the public transport assessment.

A number of indicators were used to assess the relative benefits of each option. These are:

- Through traffic within the York Central site;
- Vehicles not assigned in the peak hour as a result of the elastic assignment;
- Transient queues;
- Over-capacity queues;
- Link cruise times;
- Total vehicle travel times;
- Travel distance; and
- Overall average vehicle speed.

These indicators are reported in **Tables 10 and 11** and show that each of the options has minimal difference in terms of the global network parameters in 2021. However, in terms of one of CoYC's main objectives - minimising through traffic –significant differences can be observed.

Table 10 – 2021 AM Peak : Model Summary Statistics (Elastic Assignment)

	Scenario						
	1	2	2A	2B	3	4	5
York Central through traffic (pcu/hr)	1,506	1,078	1,101	578	385	282	305
Non-assigned vehicles (pcu hrs/hr)*	3,614	3,632	3,780	4,079	4,166	4,180	4,599
Transient queues (pcu hrs/hr)	3,020	2,984	2,973	2,899	2,909	2,916	2,868
Over-capacity queues (pcu hrs/hr)	1,434	1,533	1,558	1,585	1,553	1,519	1,644
Link cruise time (pcu hrs/hr)	4,738	4,711	4,686	4,679	4,683	4,700	4,678
Total travel time (pcu hrs/hr)	9,192	9,228	9,218	9,163	9,145	9,135	9,190
Travel distance (pcu km/hr)	278,913	277,864	277,182	277,132	277,287	277,935	276,862
Overall average speed (kph)	30.3	30.1	30.1	30.2	30.3	30.4	30.1

Source: 2021 AM peak York Saturn Option Models

* Vehicles not assigned in the peak hour as a result of the elastic assignment

Table 11 – 2021 PM Peak : Model Summary Statistics (Elastic Assignment)

	Scenario						
	1	2	2A	2B	3	4	5
York Central through traffic (pcu/hr)	1,193	934	929	479	255	106	101
Non-assigned vehicles (pcu hrs/hr)*	2,797	2,792	2,802	3,107	3,147	3,201	3,495
Transient queues (pcu hrs/hr)	2,425	2,433	2,437	2,482	2,466	2,472	2,452
Over-capacity queues (pcu hrs/hr)	850	885	875	846	903	847	890
Link cruise time (pcu hrs/hr)	4,627	4,619	4,624	4,637	4,620	4,648	4,643
Total travel time (pcu hrs/hr)	7,901	7,938	7,936	7,695	7,989	7,967	7,985
Travel distance (pcu km/hr)	280,244	280,033	280,080	280,484	279,784	280,813	280,441
Overall average speed (kph)	35.5	35.3	35.3	35.2	35.0	35.2	35.1

Source: 2021 AM peak York Saturn Option Models
* Vehicles not assigned in the peak hour as a result of the elastic assignment

Analysis of the models suggest two major opportunities for minimising through traffic:

- Removal of the highway access on Water End. Options 4 and 5 show considerably lower levels of through traffic when compared with Options 1 to 3; and
- Removal of the general traffic route from York Central to city centre via Marble Arch. Comparison of Option 1 (1,506 through trips in AM peak, 1,193 in PM peak) and Option 4 (282 through trips in AM peak, 106 in PM peak) highlights this.

3.8 **Discussion of Modelled Scenarios**

Table 12 gives a summary comparison of the 6 highway access options. Options 3 and 4 show the best results in terms of through traffic and cost implications. The two solutions offer very similar implications in terms of network congestion and therefore the forecast traffic flows and V/C ratios for Option 4 are presented in **Figures 10 and 11**. The levels of flow and congestion forecast in the vicinity of the York Central site are very similar to those forecast for the do-minimum case and therefore queues and delays at junctions along the A19 and A59 will be very similar with and without the addition of the York Central traffic.

Table 12 – Comparison of Highway Access Options

Option	Through Traffic	No. of New Accesses	Cost Implication	Non Assigned Vehicles	Potential for Modal Transfer	Comment
1	Very High	4	High	Low	Low	-
2	High	3	Moderate	Low	Low	Min. diff made by severing Leeman Rd
2a	High	3	Moderate	Low	Low	
2b	Moderate	3	Moderate	Moderate	Moderate	-
3	Low	2	Low	Moderate	Moderate	Water End j/c close to capacity. Signal co-ordination issues on Water End.
4	Low	2	Low	Moderate	Moderate	
5	Low	2	Low	High	High	Access Restrictions on Lendal Bridge

Both Options 3 and 4 could be combined with the access restrictions on Lendal Bridge if this solution was to be taken forward by the Council.

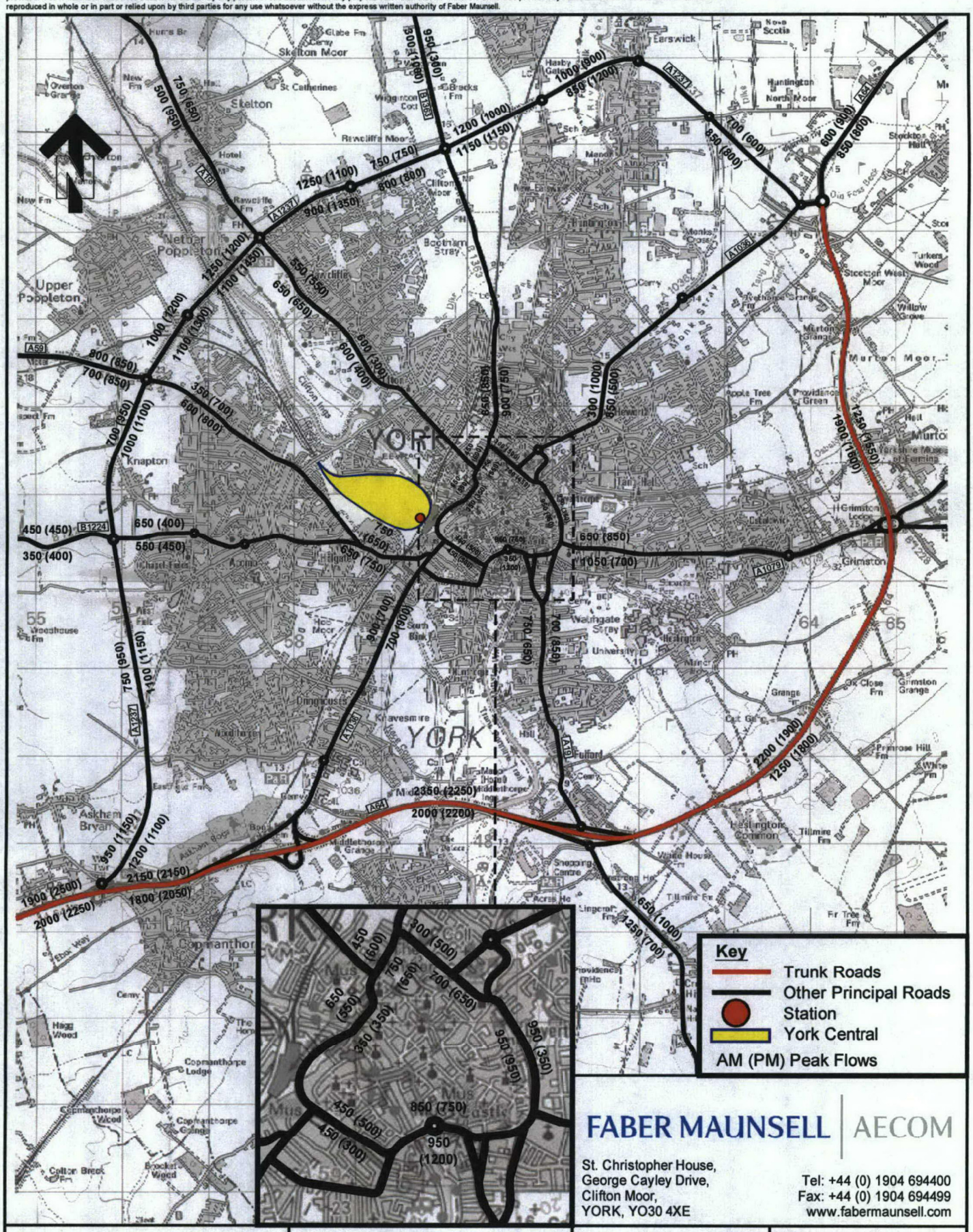
3.9 **Summary and Recommendation**

We have examined the range of influences on traffic behaviour that will arise in future years across the City of York. These include the development of the highway network, the impact of new residential and commercial development across the City and the impact that increasing traffic congestion will have on traffic flows in the City. We have then overlaid the traffic demands generated by the York Central development to understand what the incremental implications of this additional traffic will be, and how best we can introduce this traffic to and from the existing highway network.

The conclusions of this work are that:

- Morning peak hour traffic flows across the City of York will increase from 36,350 to 41,200 between 2004 and 2011, with further growth to 44,650 by 2021, without the York Central development;
- The provision of full development at York Central will, by 2021, introduce a further 1,800 vehicles to the highway network during the morning peak hour;
- Broadly similar impacts are forecast with and without York Central in the evening peak hour;
- An examination of a range of access options, all with multiple entry and exit points to York Central, has concluded that the optimal package of highway measures is:
  - New accesses, formed by new bridges over the railway, between York Central and Holgate Park (37670/P/105A) and Queen Street (37670/P/107A).
  - The removal of access for general traffic to York Central from Leeman Road at both ends of the current highway; and
  - The closure to general traffic of Station Road outside the main entrance to York Railway Station as a through route.

Access restrictions on Lendal Bridge can also be considered as a sub-option of this preferred strategy, this would bring additional benefits to the City in terms of air quality and intrusion that, while not contributing directly to the access arrangements for York Central, will have relatively minor impacts on traffic movement across the City provided the other components of the preferred strategy listed above are in place.



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Client: CITY OF YORK COUNCIL	Title: 2004 AM & PM Modelled Flows	Design: GS	CAD: KM
		Chk'd: GS	App'd: AMC
Project: York Central		Date: 30 March 2005	Scale: NTS
		No. Figure 2	Rev: -

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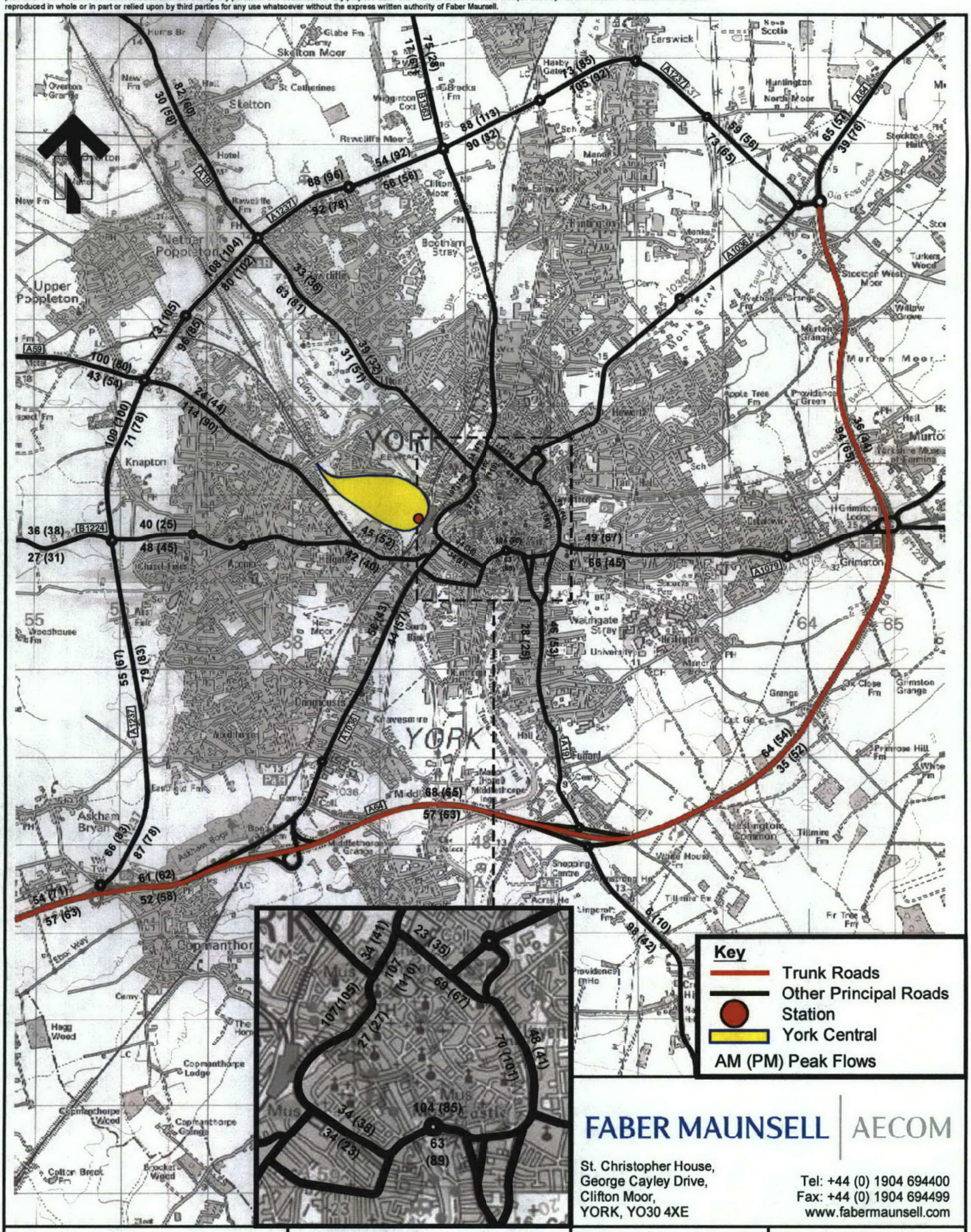

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Client: CITY OF YORK COUNCIL	Title: 2004 AM & PM Volume / Capacity Ratio (%)	Design: GS	CAD: KM
		Chk'd: GS	App'd: AMC
Project: York Central		Date: 30 March 2005	Scale: NTS
		No. Figure 3	Rev: -

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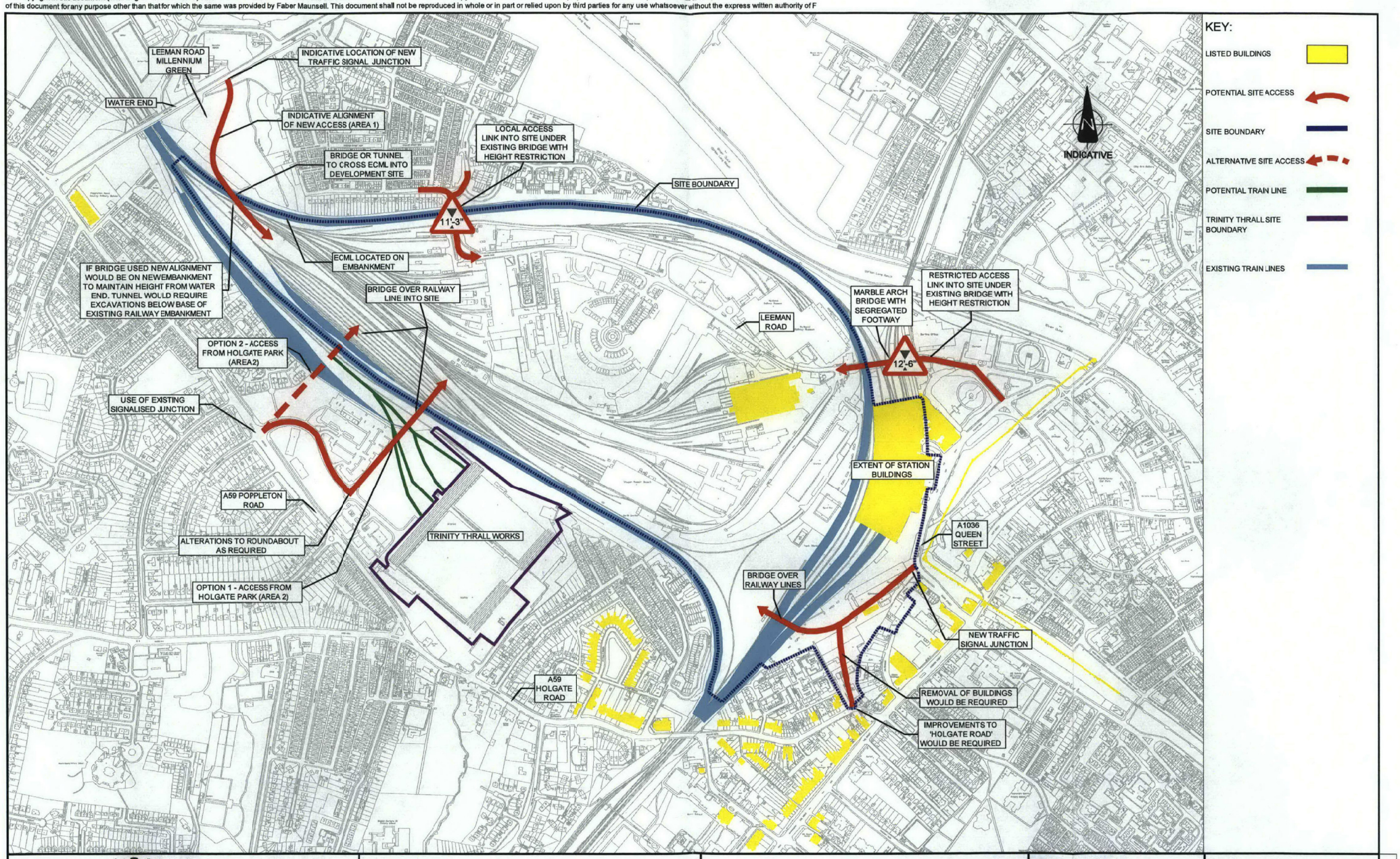

Client: CITY OF YORK COUNCIL

Project: YORK CENTRAL TRANSPORT MASTERPLAN

Title: DEVELOPMENT SITE ACCESS CONSTRINTS

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Design:	SD	CAD:	MW
Chk'd:		App'd:	
Date:	01/04/2005	Scale:	NTS
No.	FIGURE 4	Rev:	-

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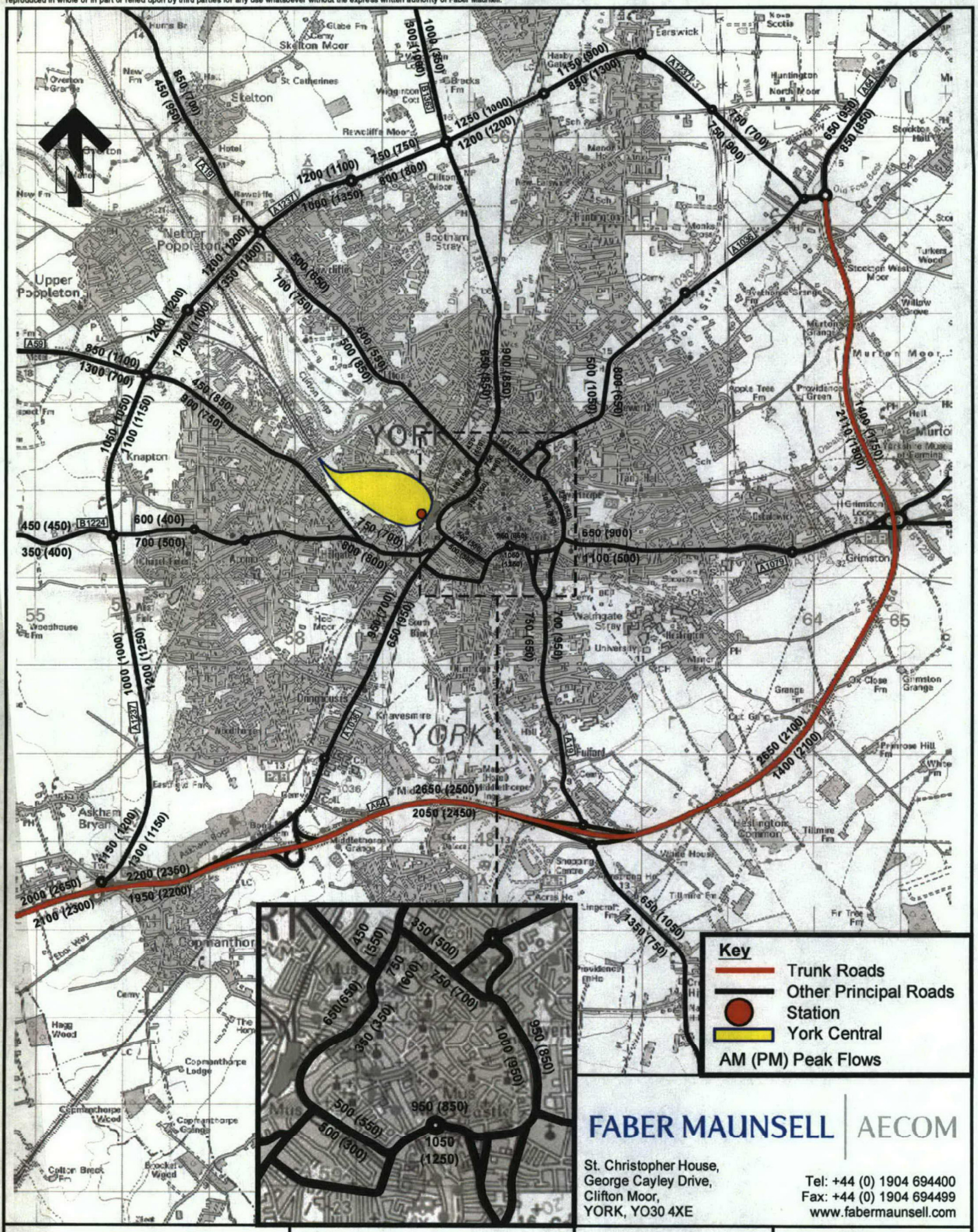

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Client: CITY OF YORK COUNCIL	Title: 2011 AM & PM Do Minimum Forecast Traffic Flows	Design: GS	CAD: KM
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Project: York Central		Date: 30 March 2005	Scale: NTS
		No. Figure 5	Rev: -

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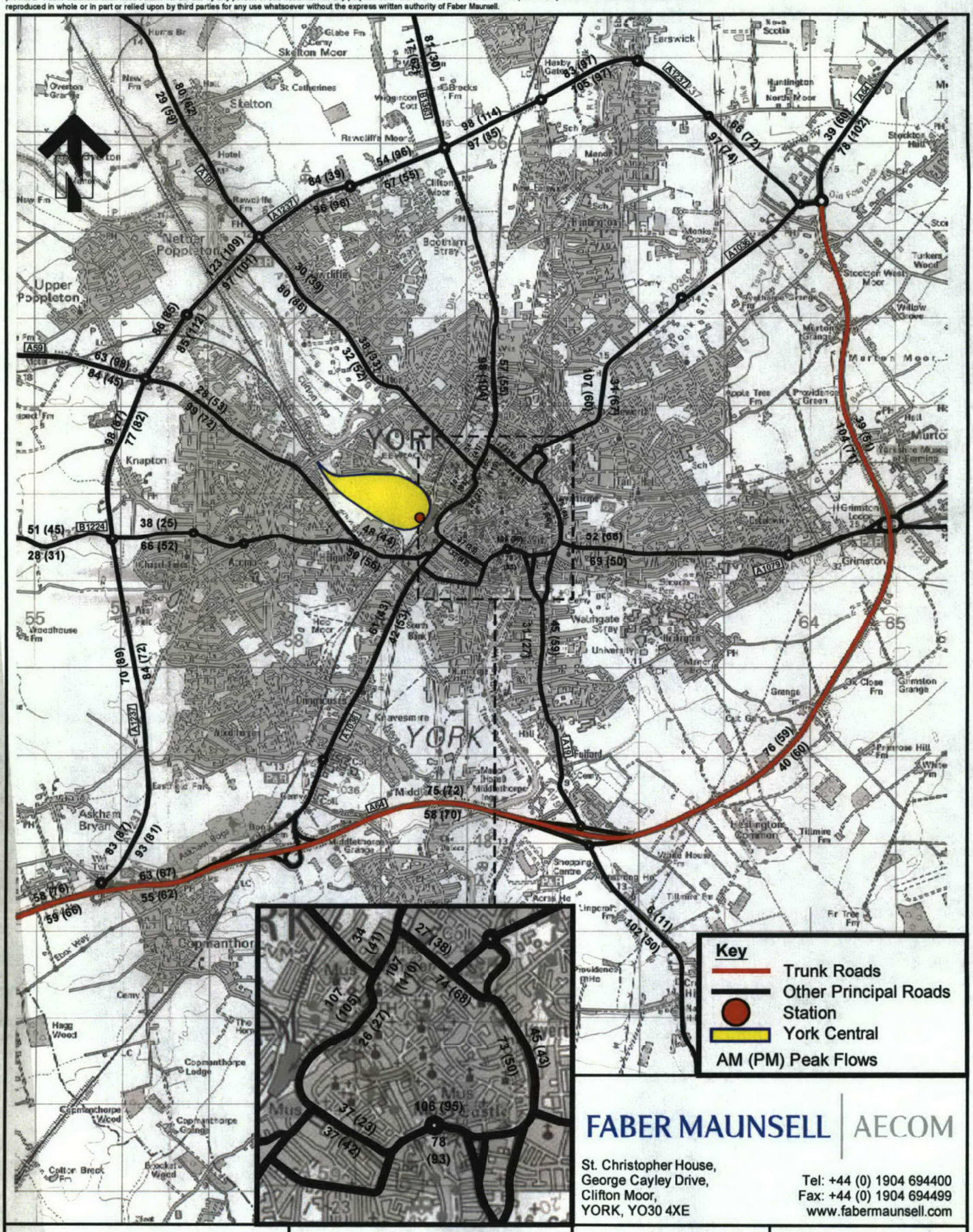

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Project: York Central		Date: 30 March 2005	Scale: NTS
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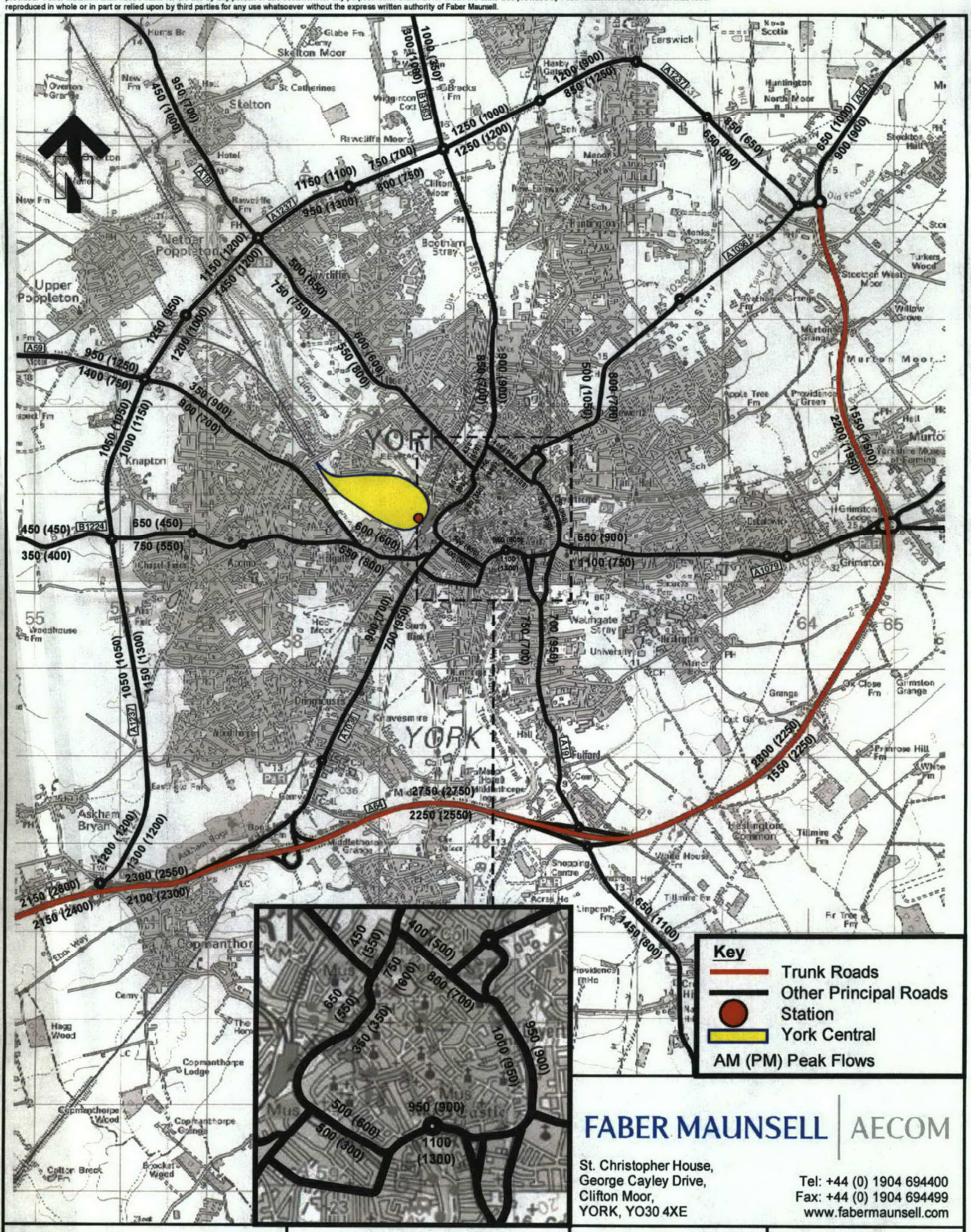

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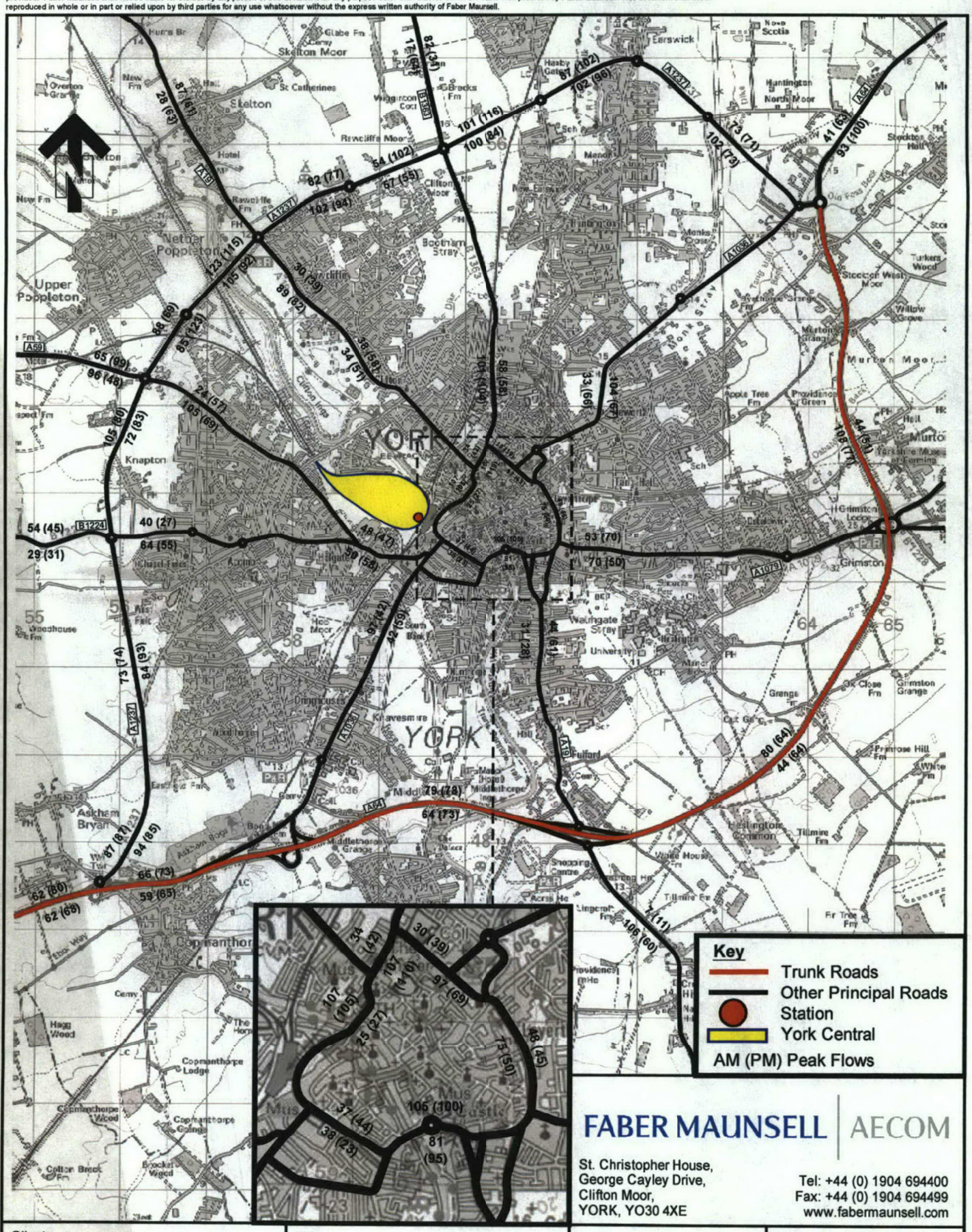

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Project: York Central		Date: 30 March 2005	Scale: NTS
		No. Figure 8	Rev: -

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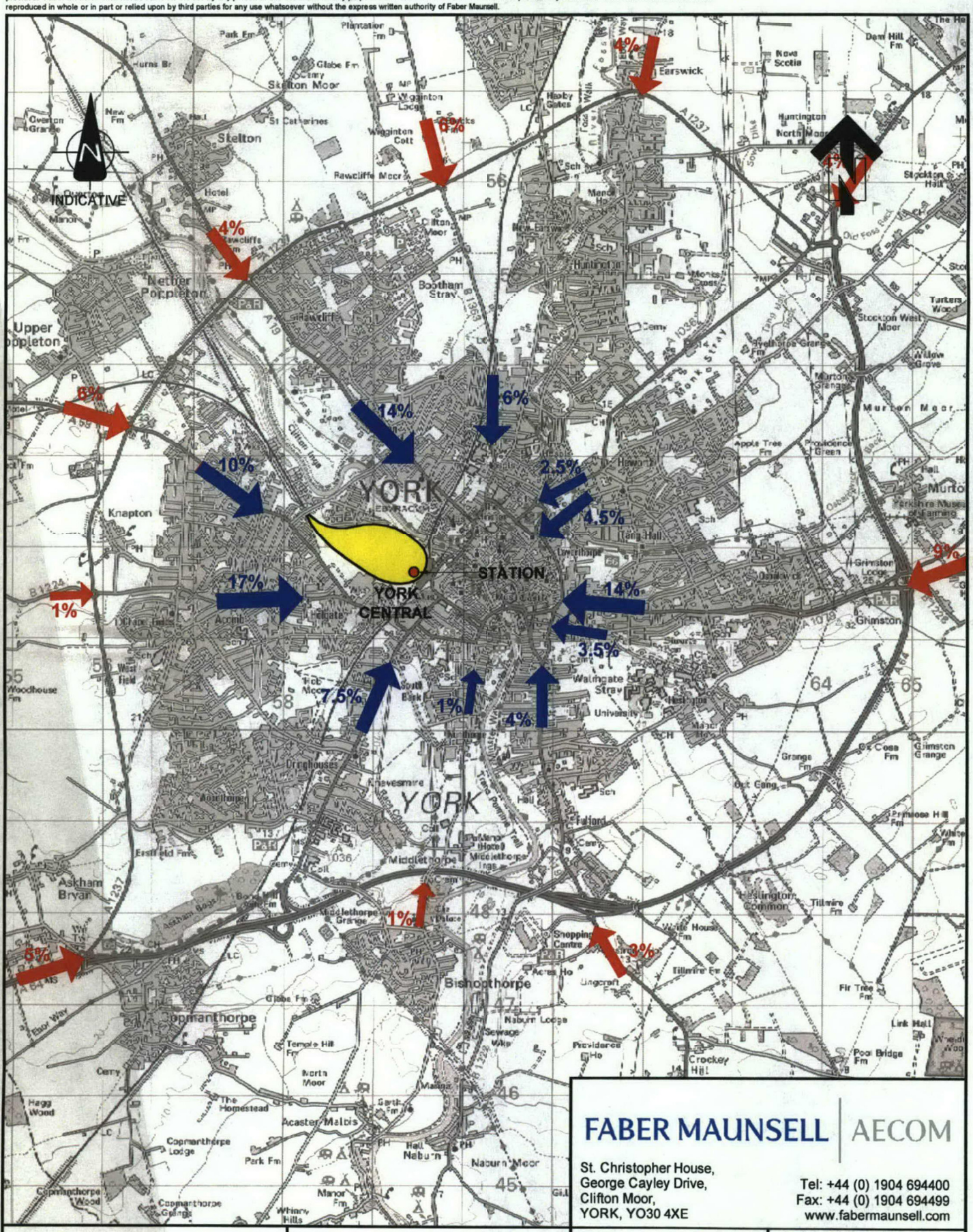

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Client: City of York Council	Title: Distribution of York Central Trips	Design: AMC	CAD: KM
		Chk'd: GS	App'd: AMC
Project: York Central		Date: March 2005	Scale: NTS
		No. Figure 9	Rev: -

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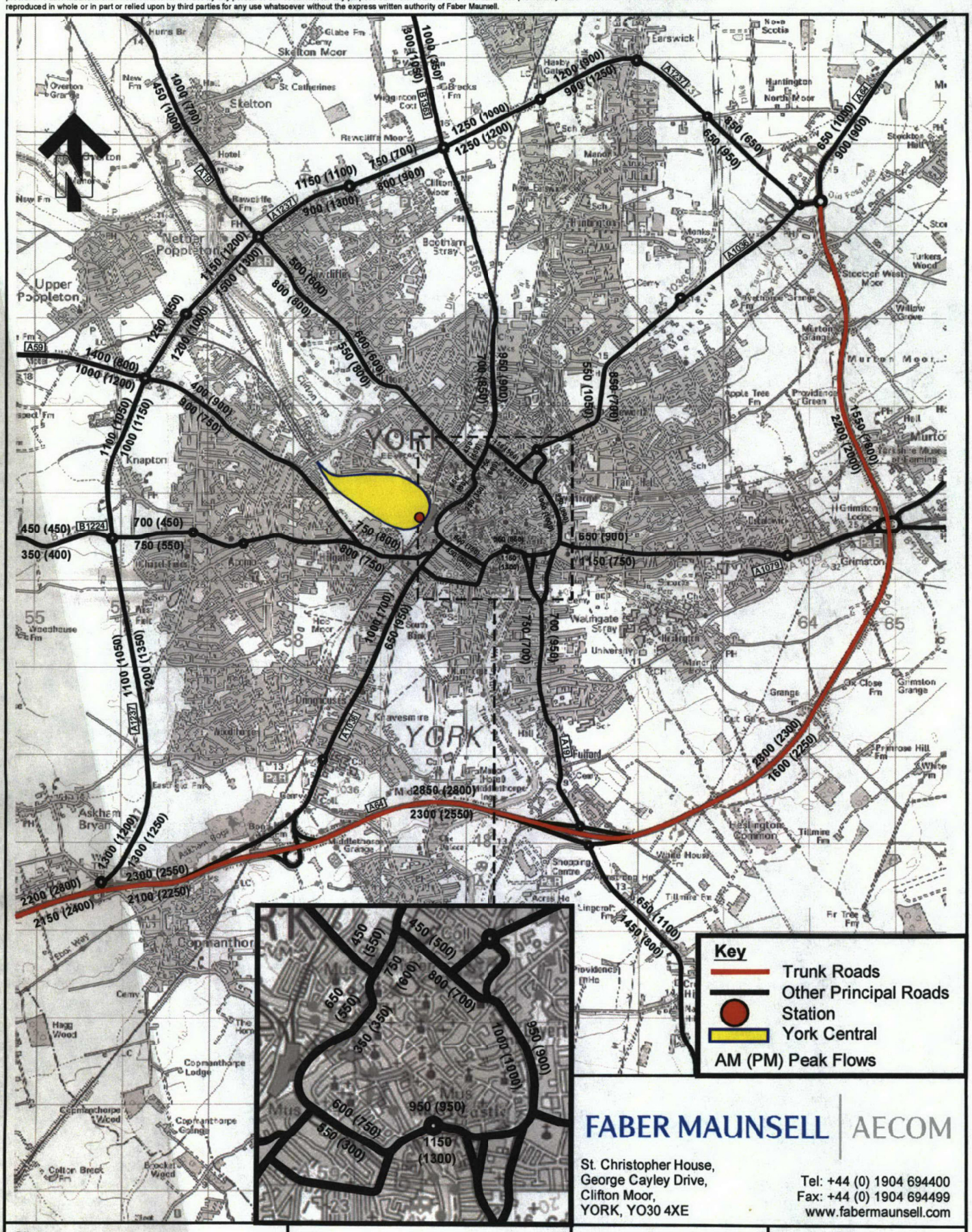

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Client: CITY OF YORK COUNCIL	Title: Access Option 4 2021 AM & PM Forecast Traffic Flows	Design: GS	CAD: KM
Project: York Central		Chk'd: GS	App'd: AMC
		Date: 30 March 2005	Scale: NTS
		No. Figure 10	Rev: -

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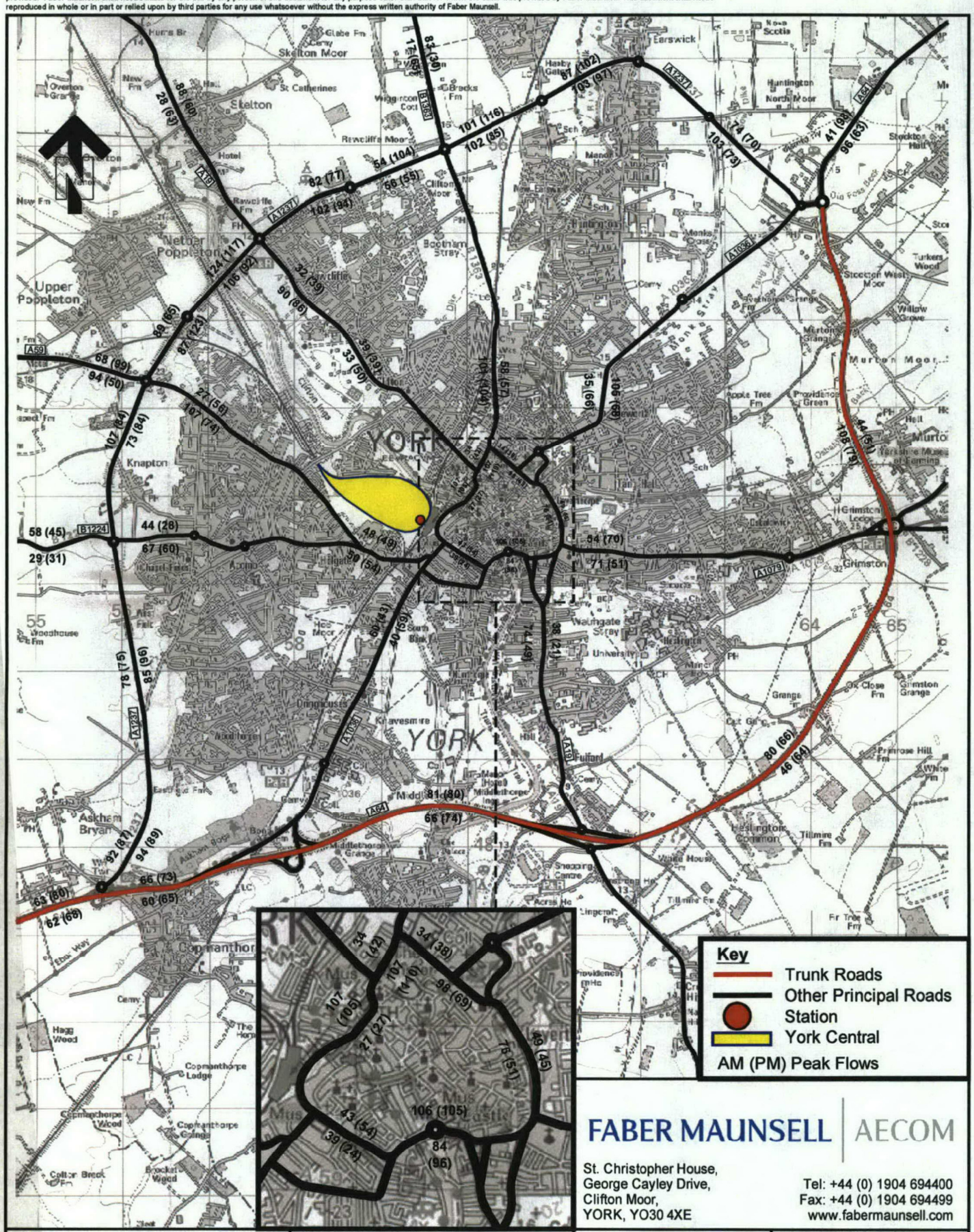

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Client: CITY OF YORK COUNCIL	Title: Access Option 4 2021 AM & PM Volume / Capacity Ratios (%)	Design: GS	CAD: KM
		Chk'd: GS	App'd: AMC
Project: York Central		Date: 30 March 2005	Scale: NTS
		No. Figure 11	Rev: -

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4 Junction Feasibility and Design

4.1 Introduction

In this chapter we consider the impact of forming new junctions at all three of the potential new access points into the York Central site. All drawings referred to in this chapter are contained within **Appendix C**.

Any plans in this chapter are for feasibility purposes only and do not reflect any final agreed proposals for the site.

4.2 Water End Access

4.2.1 Site Description

Water End is a single carriageway road, which is some 7.3m wide. The footway on the opposite side to the site is some 1.85m wide. The footway on the site side is some 3.6m with a segregated footway/cycleway. The development site is located 200m to the South East. In between the site and Water End are Leeman Road Millennium Green (LRMG) and the East Coast Main Line (ECML).

Water End is above LRMG and is constructed on an embankment. There are significant level differences between the current road, the adjacent railway lines and the LRMG in between.

The Leeman Road Housing Estate bounds LRMG to the east. This residential area is above LRMG.

An access at Water End would be located between the A59 Boroughbridge Road/A59 Poppleton Road/Water End and Water End/Salisbury Road traffic signal junctions. The junctions are some 560m apart with the bridge over the ECML in between.

4.2.2 Choice of Junction Type

Observations of traffic flows and the operation of Water End would suggest that a ghost island priority junction would not have sufficient capacity to cater as a major development access to the existing highway network. There are pedestrian and cycle amenity disbenefits with providing a priority junction as a major development access.

A roundabout could be provided, however forward visibility from the A59 to the roundabout and deflection will need to be addressed satisfactorily. A roundabout junction would be sited between two traffic signal controlled junctions and would be disruptive to any UTMC control strategy. A roundabout can cater for both pedestrian and cyclists but priority can be difficult to achieve on heavily trafficked roads.

A traffic signal junction can offer the best balance of capacity, pedestrian and cyclist amenity and network control. A signal junction would need to be linked to the A59 Boroughbridge Road/A59 Poppleton Road/Water End and Water End/Salisbury Road junctions to aid efficient operation.

4.2.3 Preferred Junction Layout

The proposed traffic signal junction at this location consists of two through lanes and a right turn lane on Water End. Two traffic lanes from the development site for left and right turning traffic have been provided, to increase capacity and allow the junction to operate at cycle times operated by the adjacent junctions, which will aid effective co-ordination. An additional left turn lane into the York Central site can be provided to increase junction capacity.

The junction can also cater for the existing cycle lane on Water End and those from within the site. Controlled pedestrian facilities will be provided across Water End and the development access road.

The ECML is the major barrier to the development site. This could be crossed by either bridging over or tunnelling through the railway embankment. Bridging is considered to be the most straightforward in terms of construction and reaching agreement with Network Rail.

Tunnelling under the ECML could be undertaken using traditional tunnelling/excavating methods or by jacking precast concrete tunnel sections. Either option is potentially disruptive and Network Rail has indicated a preference for bridging over the ECML, due to the possible construction impact on the railway line tunnelling is not favoured by Network Rail. In addition tunnelling could result in drainage issues. Overall tunnelling will be an expensive option, with no support from Network Rail.

A maximum vertical alignment of 1 in 12 (8.3%) has been assumed for all highway access options. This gradient is the maximum recommended for use by pedestrians with a disability.

Two access options using the same form of junction with Water End have been produced. The layout indicated on drawing number 37670/P/101A has a skewed bridge over the ECML. The option has a bridge with a span of some 26.5m. This is shown in **Plan 1**.

As an alternative the road could cross the ECML at less of an angle, however the road on the York Central site side is closer to the FAL. This option is indicated on drawing number 37670/P/102A. The maximum resulting gradient of the Water End access is less than 1 in 12 (8.3%). **The deciding factor as to which one option is best may be span and proximity to any retained rail lines.** Please see **Plan 2**.

CoYC has provided details of landfill sites in the Leeman Road area. The section of LRMG, which is utilised for the development access road, is not part of a landfill site.

4.3 Holgate Park Access

4.3.1 *Site Description*

Access from the west was identified by Alan Baxter & Associates through the Holgate Office Park site. The Office Park is not completely developed and is bounded by Trinity Thrall works to the southeast. Holgate Park Road dissects the office park and forms a traffic signal controlled junction with the A59 Poppleton Road.

Holgate Park Road is some 7.3m wide, with footway/cycleways on either side. The road is also lit. At present Holgate Park Road provides direct access to a number of office buildings and car parks. There is a road parallel to the Trinity Thrall works' North Western boundary connecting onto Holgate Park Road, but at its junction with the A59 Poppleton Road it is physically closed. A secondary access to the Trinity Thrall works site is via Holgate Park Road.

There is a large area of land (known as "the 5 acre site") between the office buildings, the freight bypass line and the Trinity Thrall Works, which has been identified as a site to relocate Jarvis from the York Central site. However it is understood that Jarvis do not now intend to relocate to "the 5 acre site". A Planning Application has been received from Holgate Rail Industries to utilise "the 5 acre site" as part of a proposal to use the Trinity Thrall works for the repair and maintenance of rail vehicles. A number of rail lines would be laid within "the 5 acre site".

Network Rail has identified four railway siding lines to the north of the FAL to be retained to ensure future operation of the rail network around York. The Klondike sidings, which are to the South West of the FAL, have also been identified for retention by Network Rail. The rail lines that are to be retained extend the width of any crossing into the York Central site, which will increase the cost of any access from Holgate Park.

4.3.2 *Preferred Junction Access*

Access to the "5 Acre Site" is currently available from an arm off a 23 metre diameter mini-roundabout. This area of land is at a similar level to the York Central site. Access has been considered either by bridging over or tunnelling under the FAL. The requirements of Network Rail and for the Trinity Thrall works result in a distance of some 79 metres of railway lands to be crossed. Gradient, drainage and Network Rail's comments relating to tunnelling have resulted in this option being discounted, in favour of bridging. This option is indicated on drawing number 37670/P/104. Please see **Plan 3**.

The use of the spur on the existing mini-roundabout junction for access will result in the major movements being the left turn towards the bridge and the right turn from the bridge. This may have an impact on road safety depending upon the volume of traffic.

An alternative access to the York Central site is indicated on drawing number 37670/P/105A. This option bridges over the FAL, Klondike sidings and sidings identified by Network Rail to be retained. Please see **Plan 4**.

The road would be located between the office park and Renshaw Gardens. The access road connects into the A59 Poppleton Road/Holgate Park junction, and as a result the access into Holgate Road would be from a new junction with the York Central access road.

If required, to provide additional capacity, a left turn in lane could be provided at the A59 Poppleton Road/Holgate Park junction.

The bridge would span some 100m. The length of the span is as a result of the bridging over Klondike and the other sidings to be retained. The bridge could however have multiple spans.

The access at this location is the best solution as it segregates Holgate Park uses from York Central. However a large structure is required to bridge over the railway. The access option utilising the Holgate Park Road results in a smaller structure, but requires York Central traffic to negotiate a development estate road and a mini-roundabout, at which the major vehicle movement will be the left turn towards the bridge and the right turn from the bridge.

4.4 York Station Access

4.4.1 *Site Description*

Access to the York Central site near York Station has a number of challenges, namely crossing the ECML close to York Station (which is a Listed Structure), retaining access if possible to properties near Queen Street bridge, and producing suitable connections to the existing adjacent highway network. Any access solution in this area will clearly require the demolition of a large number of buildings to provide a route to a bridge over the ECML and form adequate junctions to cater for the route being a principal point of access.

Alan Baxter & Associates identified a route from Queen Street to Holgate Road, which primarily traversed through the NCP car park, rail club and railway offices. Queen Street is significantly higher than the ECML and will aid bridging it. Holgate Road is lower. The access road connects to both of these roads. The vertical alignment between the two accesses points is within the maximum recommended for people with disabilities.

A Listed Water Tower and Workshop are located near to the Rail Workers' gymnasium. The proximity of these buildings and the station clearly introduces issues relating to the impact on the environment.

The junction with Queen Street would be traffic signal controlled. This junction would need to be co-ordinated with the Blossom Street and Leeman Road junctions. The proposed layout consists of a right turn lane on Queen Street and a left and right turn lane on the access road. Controlled pedestrian facilities would be incorporated into the junction to strengthen the link with City Centre. Removing Queen Street Bridge has not been considered.

4.4.2 *Preferred Junction Access*

The first option indicated on drawing number 37670/P/106A indicates the alignment of an access road, which dissects the listed Workshop and Water Tower, but creates a large site, which could potentially be used for development. Although access is maintained to the properties fronting Queen Street, servicing may be restricted. Please see **Plan 5**.

The access road bridges over the rail lines at the station. The span of the bridge is some 62m. The maximum resulting gradient of the access from Queen Street is less than 1 in 12 (8.3%).

The second option illustrated on drawing number 37670/P/107A avoids the listed Workshop and Water Tower and does not restrict access or servicing to the properties fronting onto Queen Street. However the alignment creates two small potentially developable sites. Please see **Plan 6**.

It should be noted that priorities at the Queen Street access junction may need to be altered should the road immediately outside the railway station entrance be closed to through traffic.

This access option results in a bridge spanning some 61m. The vertical alignment of the road from Queen Street is less than 1 in 12 (8.3%).

4.5 Operational Assessment

The Practical Reserve Capacity (PRC) of the proposed access junctions has been calculated by LINSIG and is measure of the overall operational performance of the junction. PRC within LINSIG utilises Degrees of Saturation, a value of 90% is considered to be at capacity.

4.5.1 Holgate Park Junction Site Access

The existing Holgate Park / Poppleton Road / Tisbury Avenue signalised junction has been assessed using the computer program LINSIG. Results are shown in **Table 13**. Predicted 2021 demand traffic flows are taken from the City of York Saturn Model. It has been identified that the modified existing junction can accommodate the levels of traffic predicted for all traffic options, other than option 4. This option does not provide enough junction capacity, in the AM peak, however, the PRC of the junction is only –1.1 and it has been identified that with minor amendments to the Poppleton Road North arm, adequate capacity can be provided at the junction.

Table 13 – Summary of Capacity Assessment of New Accesses under the Different Access Options

		Water End	Holgate Park	Queen Street
Option 1	AM	50	93.4	10.5
	PM	11.7	142.2	71.6
Option 2	AM	37.1	96.7	-2.4
	PM	14	102.3	52.3
Option 2A	AM	0.5	81.7	-2.3
	PM	0.5	106.2	57.9
Option 2B	AM	27.8	92.3	51.4
	PM	-0.5	101.7	73.2
Option 3	AM	12.8		52.3
	PM	4.6		79
Option 4	AM		-1.1	67.4
	PM		68	96.5
Option 5	AM		1.2	55.5
	PM		45.2	95.8

4.5.2 Queen Street Site Access

A LINSIG Model has been created for the proposed layout of the Queen Street junction. Predicted 2021 demand traffic flows have been taken from the City of York Saturn Model. The model indicates that for most options, this junction can operate effectively. Options 2 and 2A however, in the AM peak, have been shown to have slight capacity issues on the northbound Queen Street arm, with the degree of saturation slightly above 90%, and junction PRC values of –2.4 and –2.3 for Options 2 and 2A respectively.

The internal site access can be adjusted as necessary to accommodate the predicted volumes of traffic. However, for the Queen Street North and South arms this may prove more difficult due to the associated site constraints and adjacent properties. Given that options 2 and 2A are not recommended for selection, it is considered that Queen Street will be able to provide enough capacity to accommodate the development.

Predicted flows are demand flows and given that adjacent junctions to the Queen Street junction experience capacity problems, questions can be raised as to whether or not the demand flows will be reflective of the actual traffic levels at the Queen Street Junction. Given that the capacity issues are slight with PRC values of –2.4 at worst, it is expected that capacity will be adequate at Queen Street.

4.5.3 Water End Site Access

A LINSIG model has demonstrated that an access can be provided to the site that will accommodate the levels of traffic demand predicted in 2021 for all of the options.

A left turn flare with capacity for four or more PCUs on the Water End westbound arm is required to accommodate development traffic when the junction is at or over capacity.

4.5.4 *Operational Assessment - Conclusion*

Overall, it is considered that the site can be adequately accessed and egressed from Water End and Holgate Park in 2021 for all options. Queen Street may have slight capacity issues based on the demand flows predicted for options 2 and 2A in the AM peak. However, options 2 and 2A are not amongst the favoured options.

However, as discussed in Section 3 of this document, the inclusion of Water End as an access option results in a significant increase in traffic using the York Central development as a through route to the city centre. This is contrary to the requirements of the study brief and would lead to congestion, road safety problems and severance within the site. For this reason, an access from Water End has not been included as part of the preferred strategy.

4.6 York Central Site Access

The accesses into York Central from Water End and Holgate Park would have footways and cycleways, which would connect into the existing footways and cycleways along the A59 Poppleton Road and Water End. Controlled pedestrian facilities would be provided at the two new junctions (Water End and Queen Street), whilst facilities already exist at Holgate Park.

The internal layout of York Central, although not set, should accord with the aims contained within the planning brief. Routes should be direct, safe, attractive and encourage movement between different areas of the site. The layouts of pedestrian routes within the development are extremely important as they act with development access routes as the interface to areas outside York Central. The planning brief states that non-principal traffic routes should be designed to 'home zone' principles to ensure pedestrian primacy. The use of 'home zone' principles would assist in creating an environment, which encourages walking. The access links into York Central will have cycleways, which will connect into on-carriageway routes within the site.

A network of off-road cycle routes should be provided as well to form a quality network to encourage cycling and connect to all areas within the site. The planning brief states that Toucan crossings or raised tables should be provided where a principle traffic route severs a pedestrian/cycle route.

High quality cycle parking will be required within York Central. Cycle parking should be provided for all the different land use types contained within York Central, to promote cycling as an alternative mode of transport. The cycle parking provided will need to be located very close to buildings, be covered and secure. Shower and changing facilities need to be incorporated within the development to provide good cycle amenity.

The proposed pedestrian routes into York Central should provide for access for people with disabilities. Crossings with coloured and tactile surfaces should be provided. The proposed accesses into York Central can accommodate the requirements of people with disabilities.

4.7 Parking

York Central is adjacent to the City Centre, the train station and a new proposed bus interchange, which taken together with the public transport route from the Ring Road, will provide sustainable links to the development site, reducing the need to travel by private car. However to ensure that these sustainable alternatives to the private car are used and the transport targets of the development site are met, parking will have to be limited and controlled.

The Government's current guidance on residential parking of 1.5 spaces per dwelling, would lead to a substantial level of parking and would be inappropriate for a development site adjacent to the City Centre and the targets set by CoYC. In the planning brief CoYC has set a maximum parking provision of 1 space per dwelling. However, even 1 space per dwelling would lead to a large parking provision, and opportunities of reducing the level of parking to below 1 space per dwelling should therefore be explored. The possibility of providing car free and low car dependency housing, as outlined in the planning brief would assist in facilitating a lower overall provision. Travel initiatives such as car clubs, allow car penetration, but on a lower level, as often people living within a City do not need to use a car every day.

Similarly high levels of parking could be provided for the offices, and would also frustrate the Council's targets. The parking standard quoted in the planning brief is 1 space per 90m². Based on the Office GFA used within this study, the provision would equate to some 1920 spaces, which is a considerable number. The planning brief states that it is intended that only

20% of Central Business District on-site parking will be provided specifically for each building, on this basis some 380 spaces will be allocated, leaving some 1540 spaces unallocated and provided centrally to serve public and development needs. The use of Travel Plan initiatives such as car sharing throughout the York Central development will assist in reducing private car use and hence parking provision. However, a comprehensive parking study for the development and its surrounds will be required.

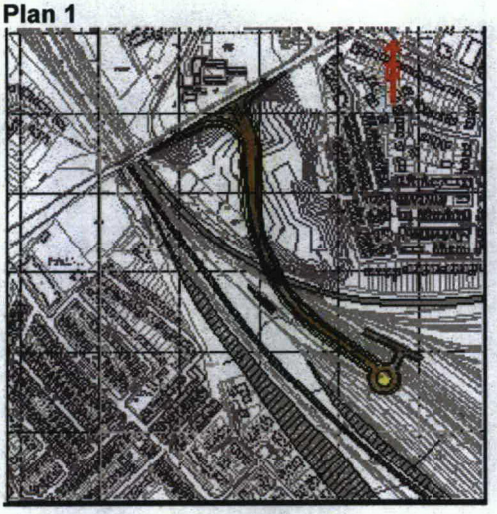
The planning brief also allows for 600 spaces for public car parking. Public car parking should be short or medium stay. Public long stay parking should not be provided as it could be utilised by commuters, and as such frustrate the aim of reducing private car use.

However, simply setting parking levels for the York Central development, without any wider consideration for York will not produce the desired results. Therefore a parking study is required not only for the York Central site, but for the City Centre and its surrounds.

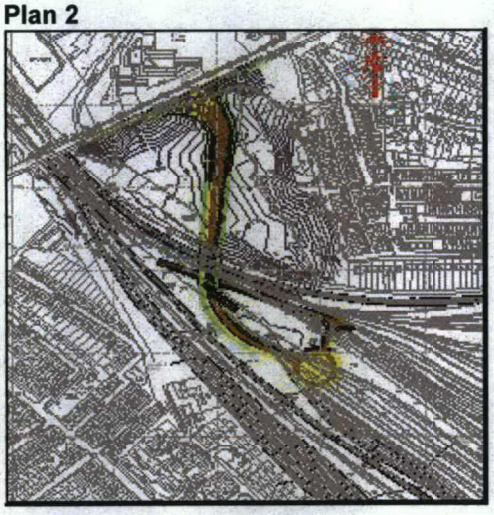
The car parking within the development should provide sufficient spaces for those with disabilities to ensure that they are not disadvantaged in terms of accessibility.

By providing fewer parking spaces with strict parking controls, the ability to access York Central by car will be greatly reduced. The provision of high quality pedestrian, cycle and public transport infrastructure will facilitate travel, and compliment the parking restrictions.

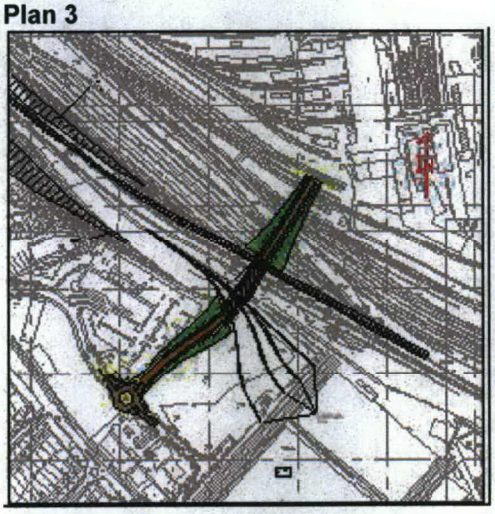
Plan 1



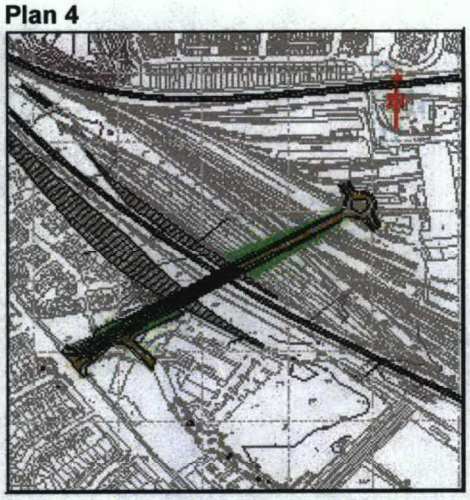
Plan 2



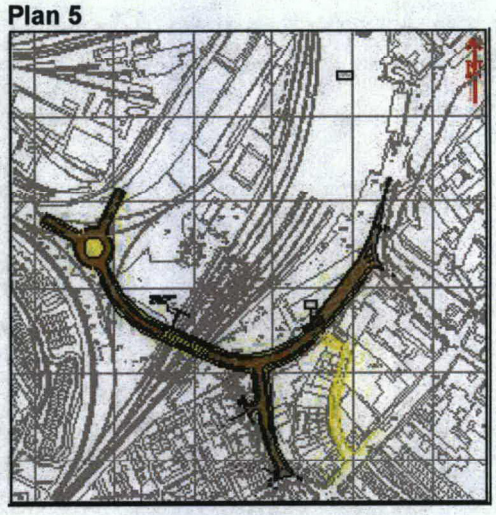
Plan 3



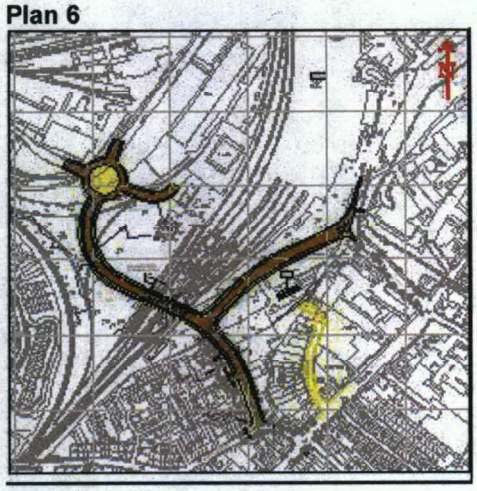
Plan 4



Plan 5



Plan 6



5 Linking York Central to the City Centre

5.1 Introduction

Whilst the York Central site will have good links with the railway station, it is poorly connected to the City Centre and areas to the east and north of the City Centre.

The East Coast Main Line severs the York Central site from the City Centre. Currently, pedestrian access is only possible by Leeman Road, the station or Wilton Rise.

5.2 Pedestrian and Cyclist Links

There are three possible walking and cycling routes linking the City Centre to the site:

- Marble Arch/ Leeman Road with connections to the riverside footpaths;
- The existing footbridge through the station (extended from Platform 10/11 into the site); and
- The new access bridge from Queen Street/The Crescent into the site.

5.3 Marble Arch / Leeman Road

This is currently the only pedestrian access linking the City Centre and railway station and the York Central site, and is the most direct route into the site.

Leeman Road passes under the railway in a 50 metre tunnel. There is a pedestrian footway adjacent to the eastbound carriageway, and a separate foot tunnel to the south of the road tunnel, which is shared between cyclists and pedestrians.

The route is well used by pedestrians accessing the National Railway Museum, but the route is unattractive and dark. There may be a perceived personal security threat in using the route at night. In its current form it is unacceptable as a 'gateway' to the site – both failing to attract pedestrians into the site, and maintaining the separation of the site and the City Centre.

Nevertheless, this is the shortest route between the City Centre and the site, and thus is likely to be the strongest desire line for pedestrian movements.

The Marble Arch route provides access to the City Centre. A pedestrian/cycle route adjoins Marble Arch and passes north alongside the railway line to the south bank of the River Ouse. From here a route crosses the River Ouse via the footbridge attached to the Scarborough Bridge. This route links to the A19 Bootham and then onwards to York District Hospital, the York to Haxby cycle link and the National Cycle Network Route to the north. There are steps from the route down to the footway/ cycleways on either bank of the River Ouse. To fully comply with DDA requirements these steps would have to be replaced.

The footbridge is attached to the Scarborough Bridge but at a lower level to the railway. The bridge is also narrow. Therefore when crossing the bridge in the presence of a train, the route has an intimidating feeling. Overall it is considered that a new pedestrian/cycle crossing of the river should be considered between Scarborough Bridge and Lendal Bridge, and the link from Marble Arch to the river bank improved.

Figures 12 to 15 (page 31), show some views of the existing conditions at the tunnel.

5.4 York Station Footbridge

The main station footbridge spans the whole station, and is shown in **Figure 16** (page 31). The original structure runs between Platforms 3 and 8 and is in art deco style. Beyond platform 8, a more recent extension has been built to reach Platforms 10 and 11. A further addition was recently added linking platform 11 to the car park to the rear of the station.

The bridge is narrow – approximately 4m wide – and may not be able to cope with additional footfall of people accessing the York Central site as well as rail users (**Figure 17)** (page 31). Due to its architectural significance, scope for altering or replacing the bridge is likely to be limited. The bridge is not served by lifts or escalators (disabled users must use a subway).

The bridge is also south of the main desire line for pedestrians walking between York Central and the City Centre. This route is contained within the Station and the operators do not want pedestrians from York Central using the station to access the city centre.

5.5 **Wilton Rise**

The pedestrian route from Wilton Rise utilises a footbridge over the FAL into the York Central site. Wilton Rise is within Holgate, which is effectively adjacent to the City Centre. Although York Central residents would not use this route to access the centre it provides a link to the Holgate area, which consists of a mixture of land uses including residential, employment and schools. The current pedestrian route within the York Central site has sections with poor forward visibility, which would give rise to personal security issues, but could be improved as they are within the site.

5.6 **Proposed Walk and Cycle connections**

Marble Arch

Depending upon the location of the public transport interchange and NRM requirements it would be possible to use the main Marble Arch route for pedestrians and cyclists only. The use of the main arch, free from motor vehicles, would provide a large high capacity route to the City Centre for both pedestrians and cyclists. If either the existing route or the main arch is to be used by pedestrians/cyclists to York Central, CCTV and improved lighting could be provided to improve the quality of the route.

Queen Street

The proposed York Central access to the west of the station, which connects into Queen Street, would also be a pedestrian/cyclist route. The Queen Street access would provide a pedestrian/cycle route to the City Centre via Queen Street and Micklegate. The Queen Street access would link cyclists with the on-road cycle lane on Queen Street and hence the wider cycle network within York.

An opportunity also exists to introduce access restrictions on Lendal Bridge which would encourage modal shift to public transport due to improvements in bus reliability and reduction in journey times. There would also be benefits to the walking and cycling networks promoting slow mode linkages between York Central and the city centre.

Station Access Bridge

An alternative to using either Marble Arch or the station to link York Central and the City Centre would be to use the proposed southern access bridge to the south of the station.

However, this would lie very far south of the station and cause people to go 'out of their way'. It is foreseeable that pedestrians and cyclists would continue to use the Marble Arch tunnel, at least during daylight hours, since this is a shorter route.

A solution would be to open up the currently privately owned route past the City Business Centre, as shown in **Figures 18 to 20** (page 32). This route is along the line of the trackbed to the original railway station within the city walls. If access restrictions were to be removed, it would be possible to walk from Station Rise to the station car park without needing to cross any roads. There is a gate through the city walls, and Queen Street is grade separated by the 'redundant' overbridge, thus making this an attractive walking/ cycling route with minimal severance. By moving the 'centre' of York Central to the south, pedestrians could be 'coerced' into using this bridge – so that this becomes the natural desire line between the City Centre and York Central.

Figure 12 - Marble Arch / Leeman Road Tunnel, Eastern Portal

Figure 13 - Marble Arch Foot Tunnel, Eastern Portal

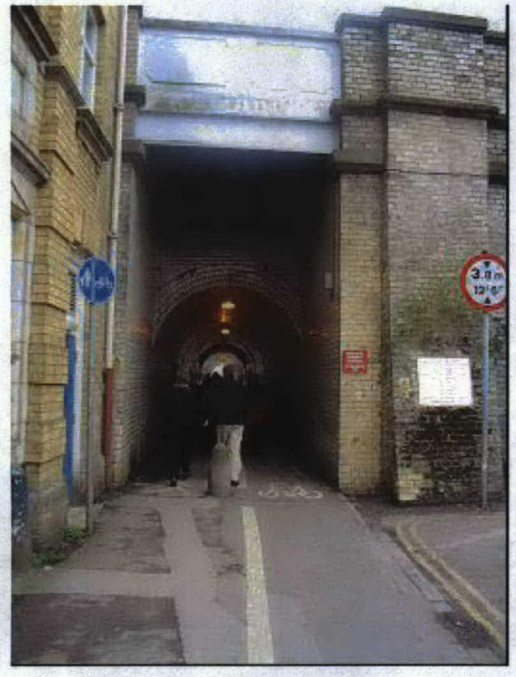


Figure 14 - Marble Arch Foot Tunnel

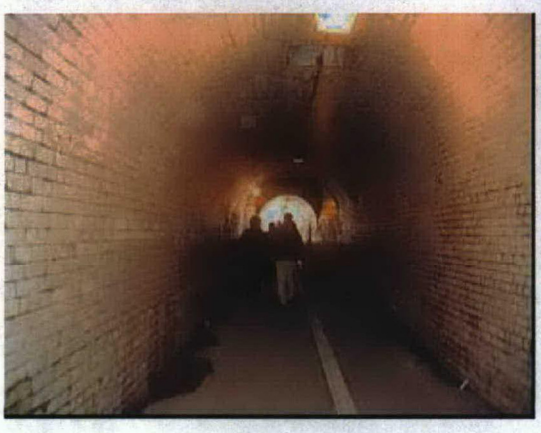


Figure 15 - Marble Arch / Leeman Road Tunnel, Western Portal

Figure 16 - York Station Footbridge

Figure 17 - York Station Main Footbridge, with Extension to Platforms 10/11 in Background

Figure 18 - Queen Street Bridge, Towards Station Car Park

Figure 19 - Gate Through City Walls Leading

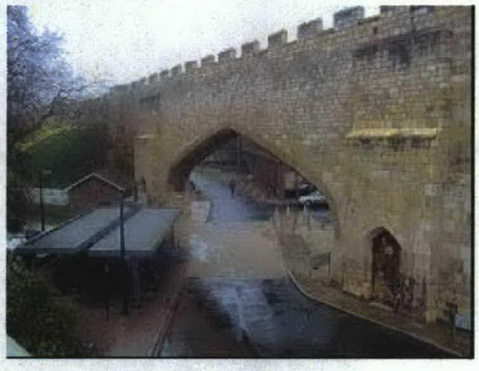
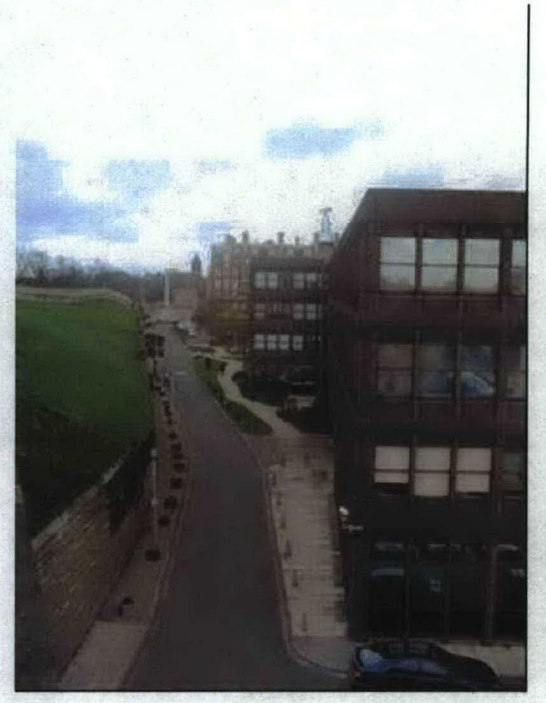


Figure 20 - City Business Centre Access Road, Leading To Station Rise



6 Public Transport Model

6.1 Introduction

This chapter outlines the development of the public transport model that has been used as the basis for evaluating public transport options for York Central.

6.2 Overview of Modelling Process

A new mode choice model has been developed to assess the public transport access options to the York Central site. The model draws on the SATURN highway model, maintaining the same network and zoning system, but has been extended to include public transport, park and ride and walking and cycling using the EMME/2 modelling suite.

A hierarchical logit mode choice model has been developed, which was founded on an existing model structure that has been calibrated for the Cambridge - Huntingdon Multi Modal Study (CHUMMS).

The base year is 2004, and the forecast year is 2021. A public transport model has been constructed for the AM peak only.

The mode choice modelling process is shown in **Figure 21**, and is described in greater detail in Section 6.3.

6.3 Base Year Model

6.3.1 Study Area and Zoning

The study area and zoning system adopted are identical to that used within the SATURN highway model, and thus extends to the outer ring road/ A64 bypass, including the villages of Bishopthorpe, Poppleton and Copmanthorpe.

Although this was considered to be the most robust approach, since highway data and costs would be consistent with the SATURN model, it does mean that the exact origin of trips starting from outside the study area cannot be determined, and so it has not been possible to assess heavy rail trips within the mode choice model with any degree of reliability.

6.3.2 Collation of Trip Data

Trip data for each mode was collected from the following sources:

- Highway - The SATURN highway matrices (divided into free/long stay/ medium stay/ short stay car parking and HGVs);
- Bus (including Park and Ride) - Electronic Ticketing Machine data; and
- Walking/ Cycling - 2001 Census 'Journey to Work' data.

These data sources are discussed below.

6.3.2.1 Highway Matrices

Highway matrices were imported directly from the SATURN model for the 2004 base year, and a car occupancy factor of 1.35 applied to convert from vehicle trips into person trips.

6.3.2.2 Bus Matrices

Bus demand matrices were obtained from Electronic Ticketing Machine (ETM) data supplied by FirstYork. These data give an approximate matrix of movements derived from the fare stage where the passenger boarded and the fare paid, in order to determine the destination. These boarding stages were then mapped to SATURN zones using GIS.

This methodology was somewhat coarse, for a number of reasons:

- Due to the small geographical size of the city, there are relatively few fare stages for each route – typically four or five on each radial route. On the other hand, each radial route may pass through up to ten SATURN zones. The GIS conversion means that all bus trips may be clustered together in a handful of SATURN zones, whereas passengers are more likely to be evenly spread along the radials.

- The boarding stage does not reflect the true origin of the passenger as they may have walked from another zone to the bus stop, if for example, a better service was available there. In addition, passengers may have transferred from another service or another mode (e.g. rail in York City Centre).
- Similarly, the alighting stage may not reflect the final destination. This is particularly relevant to inbound trips, where a bus service may not penetrate through the city centre, and passengers may be forced to undergo a lengthy walk to their ultimate destination.

For these reasons, the base bus data may not very well reflect passengers' behavioural choices adequately, and it is recommended that onboard surveys be undertaken at the next stage of any analysis of public transport measures associated with York Central (and measures elsewhere across the City).

Park and Ride trips were included with the ETM data, but it was not possible to distinguish between trips that were genuine park and ride or bus only passengers. For example, the Askham Bar Park and Ride site is adjacent to York College, some of the recorded boarding at the Askham Bar site will be made by students and staff of the college.

6.3.2.3 Walking and Cycling

Journey pattern matrices for these modes, which constitute a significant mode share of trips to York City Centre, were developed using 2001 Census Journey To Work Data. As part of the Census, respondents were asked to give the postcode of their residence and their workplace. This allowed trip matrices based on sub-ward Output Areas (OAs) to be developed. These are similar in size if not smaller than the SATURN zones, and through using GIS, it was possible to accurately map the OAs to SATURN zones to derive walking and cycling demand matrices. TEMPRO growth factors were applied to these matrices in order to convert from 2001 to 2004.

Analysis of the Journey to Work trip data revealed that a substantial number of trips were made that were over 2km in length, some across the city. Whilst these accounted for a low number of trips we found that for some origin-destination movements, there were a higher proportion of walk trips than trips by other modes. We felt that trips of such length were questionable, and since they would distort the mode choice proportions, trips over 1km in length were removed.

6.3.2.4 Rail

Rail trips were excluded from the model, for the following reasons:

- With the exception of York and Poppleton, all rail stations lie outside the SATURN model. No data for other competing modes was available outside the SATURN model area.
- No independent station counts were available, making any Poppleton to York trips difficult to validate.
- CAPRI data, the most readily available rail data suffers from the same problems as bus ETM data: only station to station movements are recorded. It does not take into account a passenger's origin or final destination, which could be some distance from the station, incurring substantial access-egress time.

6.3.2.5 Trip Matrix Totals

Table 14 shows the matrix totals by mode.

Table 14 – 2004 Matrix Totals

[redacted]	45901
	3644
	3171
	14551

6.4 Development of Public Transport and Walk/ Cycle Network

6.4.1 *Network Development*

The public transport (PT) network model was created from the SATURN model. The SATURN network was converted for use within the EMME/2 modelling suite, and is thus both the network and zoning system are identical spatially to the highway model.

A few modifications were made: key off-street walk/cycle routes such as the Riverside Route, Cinder Lane and the Millennium Bridge were added to the network, together with city-centre foot streets. This ensured that pedestrians, cyclists and public transport users used the most direct route to access their destination, rather than being forced to follow a circuitous route dictated by the highway network. Off-street cycle routes were artificially reduced in length to reflect their attractiveness over on-street routes.

6.4.2 *Bus Route Coding*

Bus services are overlaid onto this network. Bus routes were coded into both SATURN and EMME/2 from Summer 2004 timetables. It has been assumed that bus routes will not change in the future year, except for the introduction of the Monks Cross and A59 Park and Ride routes.

Journey times and junction delays were extracted from the SATURN highways model for each bus route.

6.5 Base Year Validation

The validation process focussed on key screen lines across the city centre. The observed data were taken from the 2004 Inner Cordon Data, supplied by CoYC. These data provided counts of people using each mode crossing a cordon defined as the entry points onto the Inner Ring Road.

The GEH statistic has been used as a guide to goodness of fit between the modelled and observed trips by mode. The GEH statistic is a form of chi-squared statistic commonly used to validate transport models. Standard practice for public transport models requires that a GEH value of less than 10 is achieved for at least 85% of the individual flows, and that across the screenline as a whole the GEH should be less than 5. This is rather less onerous than the GEH requirements for highway models as set out in the Highways Agency's Design Manual for Roads and Bridges.

One common problem encountered with the data was that it was not possible to discern between flows from the Holgate Road and Tadcaster Road corridors, since the cordon count is taken on Blossom Street, beyond where these two roads meet.

The base year highway validation is given in Chapter 3, with no changes made. The validation tables for bus, cycle and walking are in **Appendix D**.

The base year bus data shows a satisfactory level of validation across all links within the corridor, with individual GEH flows within 10 and the overall GEH below 5. Where flows are lower than counted, this is attributable to non-First York services, for example East Yorkshire Motor Services buses from Hull, which operate inbound via Hull Road. No patronage data was available for these services.

Cycle and walk data also shows a satisfactory level of validation, with the overall GEH lower than 5 for the corridor as a whole. The flow validation on individual links do not validate as well due to the level of spatial aggregation of the network, but the overall GEH on parallel routes is satisfactory. For example, the difference between the total observed and modelled flows on Cinder Lane and Leeman Road is statistically insignificant.

Table 15 – Summary of Validation Results for PT and walking/ cycling modes (Screenline: All radials between Blossom St and Clarence Street)

Mode	Study Corridor	Cordon
Bus	5	20
Cycle	2	1
Walk	1	12

The bus, cycle and walk matrices were split into car available and non-car available trip matrices using car ownership data taken from 2001 census data. Using GIS to map output areas to SATURN zones, the proportion of households without a car was obtained for each zone. This was taken as a proxy for the proportion of trips for which a car was not available to make that trip. These factors were converted to 2004 and 2021 using Tempro growth factors.

For residential zones, the factor was applied to all trips originating from the zone. For the city centre, York Central and other 'destination zones', the mean of the residential zone factors was taken and applied to all trips originating from these 'destination zones'. For all external zones beyond the Outer Ring Road/ A64, it was assumed that all trips had a car available.

6.6 **Mode Choice Model Formulation**

The car/public transport mode split is performed using a hierarchical logit model, which has been developed from the Cambridge-Huntingdon Multi Modal Study (CHUMMS). This model was considered the most appropriate of the 'off-the-shelf' models available, in that it considered car, public transport, park and ride, walking and cycling mode shares, all of which are prevalent in York.

The original CHUMMS model parameters were calculated from stated preference data collected from household and in vehicle surveys, and represent behavioural choices in a market where all the above modes are used.

The parameters derived for the CHUMMS model were used as starting values for the York Central model and minor adjustments were made in the calibration process to reflect observed differences in market shares in York. The calibration of the model involved its application to the total travel demand to produce modelled patronage by mode and comparisons with observed modal shares from which adjustments to the modal constants were derived. It is inevitable when a model is transferred from one area to another that some adjustments will be required to the modal constants to reflect differences in the quality of the competing systems in the area under investigation. The final parameters used in the model are shown in **Tables 16 to 18**.

Table 16 shows the value of time experienced by trip-makers during the various stages of their trip. Out of vehicle time (waiting and access/egress time) is weighted at double the value of in-vehicle time. Interchanges incur the equivalent of 10 in-vehicle minutes. Since no locally calibrated values of time were available, the CHUMMS values of time for car available and non-car available markets were retained. These were adjusted for the base year of 2004 and the modelled year of 2021 in accordance with DfT Transport Analysis Guidance. The effect of increasing values of time on the propensity to choose more expensive modes to secure higher quality of service is reflected in the model by adjusting cost coefficients.

Tables 17 and 18 show the mode constants (together with the equivalent generalised cost in both monetary and time units) and the scaling factors (logsums) used in the model. These were calibrated from the stated preference data obtained in Cambridge, and reflect respondents' perceptions of different kind of mode. There is a marked difference in perception between different types of public transport vehicle amongst those with a car available, with light rail being perceived as best and conventional bus the worst. However, amongst people with no car available, cost is more relevant than the type of mode, and so for all modes other than conventional bus the same mode constant is applied, which equates to a slight overall generalised cost reduction.

Table 16 – Mode Choice Parameters

	Car Available		No Car Available	
	Coefficient	AM Peak Value of Time (2004) (p/min)	Coefficient	AM Peak Value of Time (2004) (p/min)
Cost (2004)	-0.00592		-0.00832	
Cost (2021)	-0.00442		-0.00622	
In Vehicle Time	-0.0514	8.68	-0.0539	6.47
Access / Egress Time	-0.1028	17.36	-0.1078	12.95
Waiting Time	-0.1028	17.36	-0.1078	12.95
Interchange Time	-0.514	86.82	-0.539	64.75

Table 17 – Mode choice Model Parameters : Mode Constants (using 2004 Values of Time)

	Car Available			No Car Available		
	Utility	Pence	Minutes	Utility	Pence	Minutes
Car	0	0	0			
Traditional Bus	-2.6494	448	51.5	0	0	0
Heavy Rail	-2.1475	363	41.8	0.324	-38.9	-6.01
Guided Bus	-2.0953	354	40.8	0.324	-38.9	-6.01
Light Rail	-1.7998	304	35.0	0.324	-38.9	-6.01

Table 18 – Mode Choice Model Parameters : Logsums

	Car Available	No Car Available
Public Transport	0.5026	1
Slow Modes	0.80	1

The mode choice model is calculated for two populations, with or without car available. In the former, a hierarchical logit model is implemented, with the choice between motorised and non-motorised modes being computed at the top level. Below, the split between walk and cycle is computed for non-motorised trips, and the choice between car, park and ride and public transport for motorised trips. In future year scenarios, public transport is split into bus and a 'new mode' such as light rail or guided bus where this exists. The non-car available model takes the same form as the car available model, except that car and park and ride modes are not included.

Inputs to the mode choice model are skimmed from the EMME/2 and SATURN models. On the basis of these times and costs, the mode choice model determines the proportion of overall demand for each zone to zone movement that would be made by each mode.

Car generalised times are made up of:

- Car in-vehicle time;
- Car walk time (assumed to be 5 minutes in the city centre/York Central, 2 minutes elsewhere);
- Car distance (to which a price per km is applied to reflect vehicle operating costs); and
- Car parking charges.

A value of time of £5.21 pence per hour was used to convert the costs into generalised time.

Current York City Centre car parking charges were taken from the CoYC website/NCP website. Due to the high level of free (private non-residential parking), it was assumed that those in user class 1 in the SATURN model were unlikely to change their travel behaviour in response to improvements to public transport or increases in congestion. Thus only user classes 3, 4 and 5 were taken into account – user classes 1 (free) and 2 (HGVs) were assumed to remain unchanged.

The public transport generalised time was made up of:

- In-vehicle time;
- Wait time;
- Walk time;
- Interchange penalty; and
- Fare.

Again, values of time as for car were used to convert the fares into generalised time.

Fare data were provided by FirstYork. Since this was only available for zones along existing bus routes, a distance-based function was developed from performing a linear regression on the existing fare data so that a fare for all zone-to-zone movements could be calculated. The distance was skimmed from the public transport assignment and reflects the actual bus-mileage taken as opposed to the 'crow-fly' distance.

Both the public transport fare and parking charges were assumed not to change in real terms in the future years.

6.7 **Future Year Growth**

Future year matrices for 2021 were created by the application of growth factors on the base 2004 trip matrices. The development of the future year highway matrices have been described previously in Section 3 using predications of future land uses within York. The growth factors for the bus walk and cycle matrices were undertaken using TEMPRO growth factors as shown in **Table 19**.

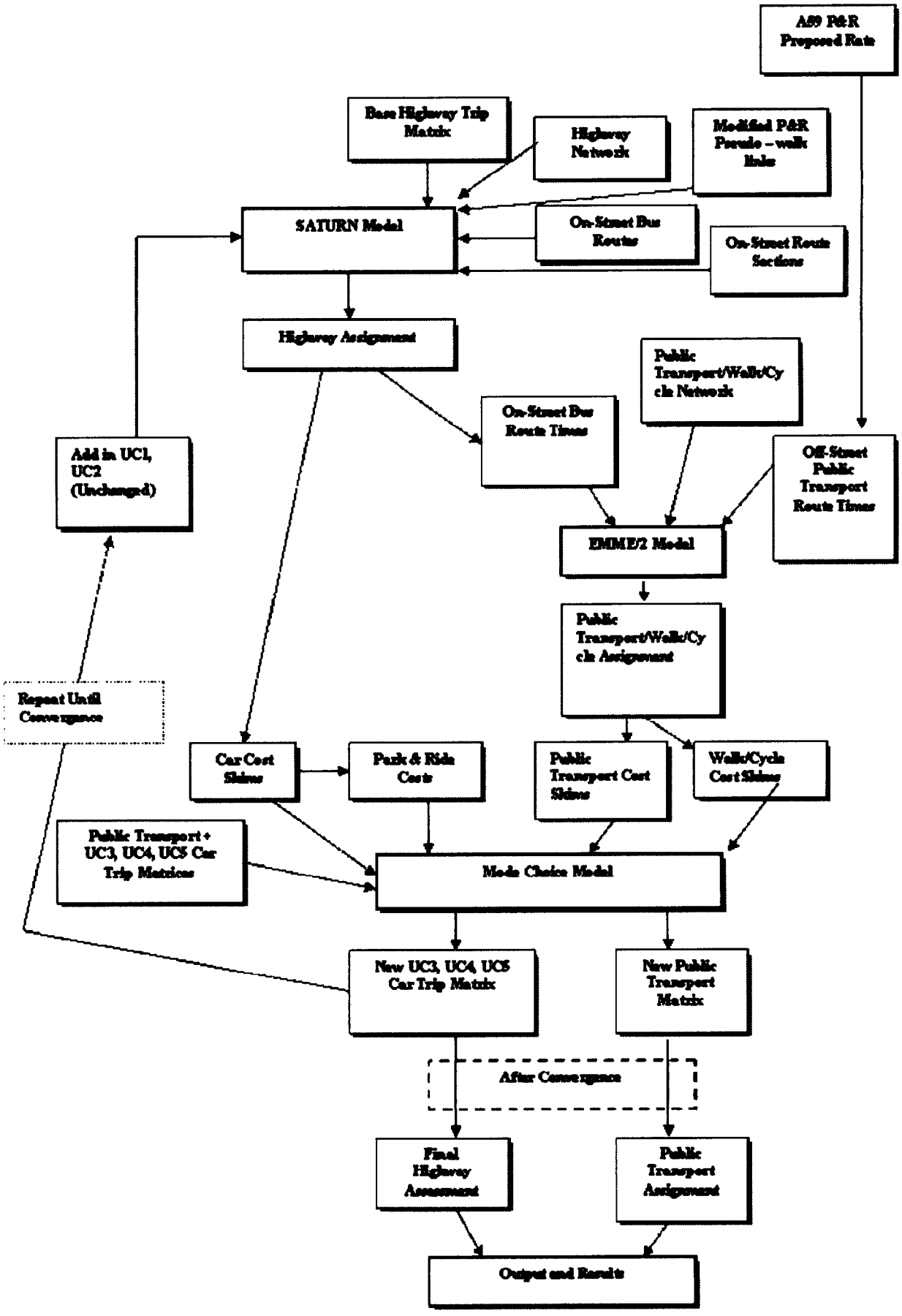
Values of time were taken from standard DfT Transport Analysis Guidance. Values of time are assumed to increase with income (GDP per capita, with an elasticity of 0.8). Therefore the growth in the values of time was calculated as being a change of 1.339 from 2004 to 2021.

The resultant public transport (car available and non car available) and highway matrices were then assigned and run through the mode choice model to determine the future year demand.

Table 19 – TEMPRO Growth Factors 2004 - 2021

Mode	Productions	Attractions
Cycle	0.978	0.998
Walk	0.952	0.963
Bus	0.962	0.971

Figure 21 - Modelling Process



7 Public Transport Options

7.1 Introduction

The York Central site lies between the A19 and A59 radial routes to the north west of the City Centre. It has been proposed to build a Park and Ride site on the A1237 Outer Ring Road close to its junction with the A59 (currently without a Park and Ride site) and build a new public transport corridor into the York Central site.

This new route would cater primarily for longer-distance trips originating beyond the Outer Ring Road, though may be able to capture intermediate trips within the city from residential areas along the route as well as residents of Poppleton and employees accessing the proposed Northminster Business Park.

7.2 Public Transport Options

The public transport linkages required for York Central can be summarised by **Figure 23** (page 49).

In order to transport as many people as possible by public transport into the York Central site, different types of trip have to be addressed. These can be categorised as follows:

- Long distance trips;
- Intermediate distance trips; and
- Short distance trips.

7.2.1 Long Distance Trips

These can be classed as trips that originate outside the Outer Ring Road. Typically, these trips would be made by the following public transport modes:

- Heavy Rail;
- Bus (long distance/ inter-urban); and
- Park and Ride.

These modes are fast and stop infrequently. A potential route for a new Park and Ride/ Mass Transit route is shown in **Figure 24** (page 49).

7.2.2 Intermediate Distance Trips

These can be classed as trips that originate within the Outer Ring Road. These trips would typically be made by the following public transport/sustainable modes:

- Bus (urban);
- Cycle; and
- Park and Ride (for origins adjacent to Outer Ring Road, dependent on proximity to Park and Ride sites).

York Central would be best served by re-routing as many existing urban bus services as possible into the York Central site.

7.2.3 Short Distance Trips

These can be classed as local trips, for example York Station to Millennium Green, City Centre to York Station, City Centre to Town Square. In the context of York Central, these types of trip are shown in **Figure 25** (page 49). These trips need to stop at short intervals, and be high frequency to be effective.

7.3 Public Transport Options

A series of assumptions were made when modelling the public transport option.

The park and ride location is fixed at a nominal location in the vicinity of the A59/A1237 junction and highway access option 4 has been used in all the public transport modelling scenarios. This means that access will be taken from Queen Street and Holgate Park.

The following public transport options have been appraised:

Do Minimum

- A 1,000 space Park and Ride site has been included in the vicinity of the A59/A1237 roundabout. The bus services are not diverted through York Central although a bus stop is included at Holgate Park, which is approximately a 800 metre walk link to York Central. The bus service along the A59 has been assumed to operate on a 10-minute headway with a capacity of 100 passengers per bus.

On Street Bus Service with Bus priority

- This option is the same as the do minimum except that the bus service is diverted through the York Central site in a segregated route. The route taken runs on existing roads and is based on the bus based Park and Ride service developed by Atkins. Bus priority is really only possible on Boroughbridge Road.

Segregated Bus

- Based on the Mouchel east-west mass transit route and would run parallel to the East Coast Main Line / Harrogate railway line between York Central and the A1237 near Poppleton. The route would require major enabling works to be undertaken on the Harrogate Line and potentially the ECML, which has not yet been appraised.

Segregated Tram

- This is based on the same line as the Guided Bus.

The public transport model outputs can be seen in **Table 20** (on page xx) and are displayed as percentage mode splits for each modelled scenario. Results are shown in two different ways, firstly as mode share to the city centre and secondly as mode share to York Central. All options are compared against the Do-Minimum, which shows that 53% of person trips would use the car for York Central trips with 29% using the bus. All the options show a marked increase in the use of Askham Bar Park and Ride for York Central trips. The reason for this is that trips going to the York Central site from Leeds are not diverting onto the Outer Ring Road to use the A59 Park and Ride site due to the congestion on the ring road.

The On Street bus with Bus Priority option shows very little change when compared to the do-minimum.

The introduction of a segregated bus service would lead to a 4.2% (4.3% to York Central) mode share. However, this has been primarily extracted from other bus services with only a minimal impact on the car mode share when compared to the Do Minimum scenario.

Although the Segregated Tram is a faster mode than the bus, Table 20 shows that the segregated tram option only has a minimal impact on the predicted mode share. This is due to the relative short length of the segregated section making significant journey time savings difficult. The increase from 4.2% to 4.4% is more likely attributable to public perception of a tram when compared to a guided bus.

It is unlikely that any new public transport route would serve York Central alone therefore three further options have been examined.

- Extension of the on-street bus service to Piccadilly;
- Extension of the segregated bus service to Piccadilly; and
- Extension of the segregated bus to the University (no specific route has been defined).

Extending the on-street bus service through to Piccadilly in the city centre has a minimal impact on the mode share of trips. This is perhaps unsurprising given that there is little opportunity to introduce bus priority measures within the central core. However if the segregated bus service is extended to the city centre, the mode share of this option rises to 8.5% (8.8% to York

Central) when extended to the city centre. However, only 1.4% (1.6% York Central) has been extracted from the car. The remainder come from existing bus services.

The final test was to run the segregated bus service out to the University on both 6-minute and 10 minute headways. This demonstrates that 14.4% of all trips rather than simply city centre trips can be captured by the new mode. Again the trips are primarily extracted from existing bus services rather than from car journeys.

7.4 Public Transport Option Conclusions

The following conclusions can be drawn from the modelling of the public transport options.

- If a link between the A59 P&R, York Central and the city centre is considered alone then an on-street bus-based service that provides the maximum level of bus priority on the A59 route before entering the York Central at the Holgate Park access, is the most cost-effective means of providing public transport access. Neither a segregated guided busway nor the tram services between A59 and the city centre alone attract enough patronage to justify the cost of construction and subsequent operation.
- The aspiration to achieve a 20% modal share for car drivers can only be met with the implementation of significant traffic restraint measures across the City. With an improved public transport link in place to directly serve York Central and the city centre, the car driver modal share is estimated to be around 45%. Only a substantial imposition of car parking charges at York Central, or the introduction of a congestion charge across the City, would provide the transport conditions to achieve this mode share target.
- The development of a public transport system for York Central must be seen in the context of wider network improvements in the city. Our preliminary work considered extending the segregated guided bus proposal across the City Centre to the University area of the city (please note that no specific guided bus corridor has been identified east of the City centre as part of this work). This test suggests that while non-car mode share to York Central is not affected significantly, total ridership on such a mass transit system is significantly enhanced. In the event that a network of guided bus corridors can be identified that serve most or all major transport corridors in the City, a level of ridership growth could be achieved that may start to match the capital and operational costs of installing such a system.
- Our work has highlighted that problems of congestion on the A1237 Outer Ring Road means that York Central trips originating on the A64 are choosing to use Askham Bar Park and Ride as opposed to the new A59 Park and Ride facility. If the Outer Ring Road were improved then this could increase usage of the A59 corridor.

7.5 A59 Park & Ride Site Selection

City of York Council is currently considering options for the location of the proposed Park & Ride site at the intersection of the A59 Boroughbridge Road and the A1237 Outer Ring Road (ORR). Previous work has considered a range of options within the different quadrants surrounding this junction. Key issues for the decision regarding the location of this facility include the impact on local residential areas, the impact of queuing and delays forecast at the A59/ORR roundabout and the availability of land.

The Council is now considering two options for this Park & Ride site. One is on the City side of the Outer Ring Road to the north of the A59 on land that has been acquired by the Council. This site would either be accessed directly from a remodelled A59/ORR roundabout, or from a new junction on the A59 to the east of the ORR junction. The other site option is "outside" the Outer Ring Road to the south of the A59 adjacent to the Northminster Business Park. It is likely that access would be from the A59 west of the ORR, there is an option to provide a limited access directly from the Outer Ring Road to the south of the A59 using the alignment of Northfield Lane that is currently stopped up.

In the context of the York Central Study, it has not been possible for a recommendation to be made on site selection based on the EMME/2 multi-modal transport model developed during this study. This is due to the relatively coarse nature of the model at the edges of the built-up area, which in turn is a function of the data limitations experienced when developing the model. The model can provide a high level estimate of Park and Ride use for the A59 and Rawcliffe Bar P&R sites combined – this is 411 vehicles per day without York Central and 618 vehicles per day with York Central and the on-street bus priority package in place.

Table 20 - Percentage Mode Share of Public Transport Options, Mode Split (Passenger Numbers)

	Do Minimum	On-Street Bus with Bus Priority	Segregated Bus	Segregated Tram	On-Street Bus to Piccadilly	Segregated Bus to Piccadilly	Segregated Bus to University	
							10 Min Headway	6 Min Headway
To City Centre								
Car	40.6	40.8	39.9	39.8	41.1	39.2	38.6	38.6
Bus	36.4	36.2	33.5	33.3	35.7	30.6	27.4	26.4
Segregated route	0	0	4.2 (409)	4.4 (430)	0	8.5 (835)	13 (1274)	14.4 (1419)
Walk	14.8	14.8	14.5	14.5	14.9	14.2	13.9	13.6
Cycle	8.2	8.2	7.9	7.9	8.3	7.5	7.2	7.0
To York Central								
Car	53.1	53.5	52.1	52.2	54	51.5	50.9	50.9
Bus	29.0	28.8	26.3	26.3	28.4	23.2	21.3	20.5
Segregated route	0	0	4.3 (214)	4.4 (216)	0	8.8 (433)	11.7 (578)	12.8 (633)
Walk	10.9	10.8	10.6	10.6	10.8	10.3	10.2	9.9
Cycle	6.9	6.8	6.6	6.6	6.8	6.2	6.0	5.8

Therefore we have undertaken a qualitative analysis of the two site options from the perspective of the York Central Transport Master Plan, reported below, that is based on the objective of maximising the attractiveness of the Park & Ride facilities to a range of potential users. We have also considered issues relating to flexibility of access options between the Park & Ride site and York Central.

7.5.1 *Inside A59 (NE Quadrant)*

Advantages

- Public transport access from the site to the city centre and York Central is not hampered by a need to cross the Outer Ring Road
- This site is capable of being served by a segregated route alongside the ECML and Harrogate Branch should this option come forward as part of a wider public transport strategy for the City
- Location within the Outer Ring Road is consistent with other P&R sites in York

Disadvantages

- Access by car to the Park & Ride site will require motorists to pass through the congested A59/ORR roundabout from all directions of approach

7.5.2 *Outside A59 (SW Quadrant)*

Advantages

- Access for motorists approaching from the Harrogate/Knaresborough direction, and potentially from the ORR Northbound, would not be required to pass through the congested A59/ORR roundabout.

Disadvantages

- The site would be difficult to access by any future segregated public transport route without either an at-grade or grade-separated crossing of the Outer Ring Road.
- For an on-street option, all Park & Ride buses would need to pass through the A59/ORR roundabout, which may give rise to delays.

In conclusion, we feel that the better access opportunities afforded to the "Inside A59 (NE)" site as a result of its proximity to a potential future segregated link alongside the ECML, means that this site is favoured in the context of maximising benefits to the York Central Transport Master Plan.

7.6 Transport Interchange

7.6.1 *Context*

Section 2 sets out the importance that is placed on the provision of a new integrated transport interchange as part of the York Central proposals. Key objectives set out in the transport master plan include:

- Promote connections between York Central, the Railway Station and the proposed transport interchange to take advantage of suitable public transport connections to the site;
- Serve the site in ways that will minimise the impact on the highway network and air quality beyond the immediate vicinity of the development;
- Reduce reliance on the car; and
- Provide opportunities for dedicated public transport corridors to serve the city centre and wider city.

It is therefore clear that interchange proposals to be considered within the transport master plan should be capable of serving the whole of the city centre, not just York Central. This inevitably leads to the conclusion that any new transport interchange should be located between York Central and the city centre, which in turn suggests a location in the vicinity of the railway station as being an optimal solution to interchange issues.

The current railway station area already provides some interchange opportunities for public transport users. A number of bus services are available at bus stops on Station Road, immediately outside the station frontage, which is currently undergoing improvements. These include some – but not all – of the Park & Ride services currently provided in the city. While

access for people entering and leaving the railway station to the northbound stops is easy, the layout of the road network on Station Road means that access to/from southbound stops on Station Road requires a significant diversion to access pedestrian crossing facilities on the eastern flank of Station Hotel. This is seen as a significant constraint on interchange between bus and rail for some users, especially people with mobility difficulties.

Interchange between rail and those bus services that do not stop on Station Road – which includes services to several of the City's major Park & Ride sites – is more problematic. While there are several bus stops within a short walk of the station that bus services serve – such as Museum Street, Station Avenue and Rougier Street – these stops again provide access problems for people with mobility difficulties and the walk will dissuade many people from making linked rail-bus trips.

The conclusion is therefore that existing interchange provision in the city centre – bus-bus interchange and bus-rail interchange – is patchy and suffers from not having a single focal point that most, if not all, services can serve. The new transport interchange associated with York Central offers the chance to provide this single focal point for public transport access to the city centre.

7.6.2 *Interchange Options*

A number of packaged options exist to solve both problems of poor bus/rail interchange and poor pedestrian/cycle linkage.

An interchange could be built at the station that would serve existing rail and bus services as well as any new transit route to be provided between the city centre, York Central and the Outer Ring Road Park & Ride site on the A59 corridor. A link that provides public transport access across the railway will need to be maintained in order to allow the new York Central transit service to serve York Central, the station and also the city centre, and also allow other bus services (for example the existing Park & Ride routes, and bus services which terminate in the city centre) to extend from the city centre and run into the York Central site.

A cross-city 'bus spine' has been identified by a previous study undertaken by MouchelParkman. This runs along Rougier Street, George Hudson Street, Ouse Bridge, Coppergate, Pavement and Stonebow/Piccadilly. A new transit service that serves York Central could access this cross-city spine route via a retained/new railway crossing and the existing Station Avenue/Station Rise gyratory.

There are four interchange options for the York Central site, these are explained below.

Option 1 – East/West Interchanges

This option would provide a new bus interchange either to the west or east of station, or possibly both. Providing an interchange of each side of the current station would match aspirations to both provide a new entry and interchange on the western side for York Central, and also to provide an improved interchange between bus and rail to serve the city centre. These east and west interchanges would require pedestrian links either via the existing footbridge extended from platforms 10 and 11, or via a new pedestrian link through the station building and over the operational railway. Having two interchanges would dilute the integration benefits of a single multi-modal interchange facility.

A new western station entrance would act as gateway to York Central for rail passengers and bus users. Taxis and all private car access (long/short stay parking/drop offs) could also be displaced to a new western entrance to ensure the maximum possible public transport and pedestrian priority is maintained at the eastern interchange.

Any new transit service associated with York Central could serve the western interchange, continuing beneath the railway station at Marble Arch and accessing the city centre bus spine at Rougier Street. Current bus services in the city centre could also be extended into either the Western Interchange via Rougier Street and Marble Arch, or the Eastern Interchange via Station Road.

In order to improve the pedestrian and cyclist environment in Marble Arch and provide sufficient capacity for the increase in bus movements through this link, we propose that the pedestrian tunnel at Marble Arch is widened and the road tunnel is designated for buses and access only. The possibility of routing traffic to/from the NRM away from Marble Arch should also be

considered, alternative arrangements could be available via the Queen Street access into York Central.

This option exhibits a number of advantages:

- It meets the aspirations of the York Central Planning Brief, notably the provision of an improved western access to the station to serve York Central;
- The public transport access to NRM is improved by a new western access;
- Pedestrian linkages across the railway can be provided within the station and/or via an improved Marble Arch pedestrian tunnel; and
- The opportunity exists to relocate car parking, drop off and taxi facilities to an improved western entrance, allowing the closure of Station Road outside the station's front entrance to all through vehicles except buses and freeing this area for pedestrian and public transport activity.

There are also a number of disadvantages with this option:

- The existing footbridge within the station is likely to require replacement or major improvement in order to meet the needs of the station operator and cater for the expected levels of pedestrian demand. The footbridge is likely to be of architectural significance;
- With a split interchange there would be long walks for some interchange movements between the west and east bus stops;
- The station operator does not favour the use of the station facilities as a through pedestrian route, at least not without significant and potentially costly upgrades of facilities; and
- The upgrade of the Marble Arch pedestrian tunnel would be costly.

Option 2 – Queen Street Bridge Interchange

The highway access strategy for York Central will provide a new road bridge over the East Coast Main Line to the south of the current railway station shed and platforms, linking into the current road network at Queen Street. There is an opportunity to expand this structure to also provide bus (and perhaps mass transit) boarding and alighting facilities on the bridge, with direct pedestrian links from the bridge to the railway platforms below. Similar facilities have been constructed in Freiburg and Basel. The new bridge could provide a means of vehicular access to York Central for all traffic, or by public transport vehicles only. In the latter case general traffic would access York Central to the east via Marble Arch.

This option exhibits a number of advantages:

- Good multimodal interchange; and
- Combined opportunity to improve both pedestrian and cycle access to York Central, alongside public transport improvements.

There are also a number of disadvantages with this option:

- The cost of such a structure to accommodate an interchange of sufficient size above the railway lines, would be extremely costly and difficult to build above a live railway; and
- The improved cycle and walk links into York Central associated with this option are well away from the main pedestrian desire line further north.

Option 3 – Marble Arch Interchange

In this option a subterranean interchange on the current site of the Marble Arch would be provided underneath the station. This would provide facilities similar to those found at St Laurent station on the Ottawa Transitway in Canada (**Figure 26**) and Ghent Railway Station in Belgium (**Figures 27-29**). The new facility would be dedicated to use by public transport vehicles, all other traffic would access York Central via the new highway facilities at Holgate Park and Queen Street.

The interchange would provide covered stands for buses and mass transit vehicles beneath the current railway lines at the northern extremities of the current platforms. Escalators and lifts would provide direct connection between the bus stand area and the platforms. In this option we would envisage that the Marble Arch facility would become the new main pedestrian

entrance to the station, situated as it would be rather closer to the city centre and the main pedestrian desire lines than the current front entrance on Queen Street. It would also afford the opportunity to transform pedestrian – and perhaps cycling – facilities beneath the railway at Marble Arch.

This option exhibits a number of advantages:

- An excellent, landmark multimodal interchange;
- Opportunity to improve both pedestrian and cycle access to York Central, alongside public transport improvements, at the most popular pedestrian desire line that serves the city centre well as well as York Central;
- The opportunity to transform the whole Marble Arch area and provide improved connections by foot and cycle to the Ouse riverfront and the Scarborough Bridge crossing; and
- Excellent public transport links to the National Railway Museum.

There are also a number of disadvantages with this option:

- The cost and disruption associated with building an entirely new facility beneath live railway lines;
- There may well be times when closure of the northern throat of the station is necessary to facilitate construction of the interchange. In these circumstances through rail services will need to be diverted via the FAL, with access to York achieved either by provision of temporary platforms on the FAL or by the provision of shuttle services from upstream stations on all services. As the temporary station is unlikely to offer sufficient capacity to deal with the number of train movements at York station, the shuttle service option is perhaps the only feasible solution when the northern throat of the station is closed; and
- Potential impacts on Station Hotel gardens and car park.

Option 4 – East of Station Interchange

This would entail the closure of Queen Street to general traffic in the vicinity of the current station entrance, and the provision of a new interchange in the wide expanse of carriageway that will be released by this closure. Current bus services on Queen Street could serve the new facility as well as other services that serve and terminate at other parts of the City Centre. Any new mass transit route associated with York Central would also serve this interchange, accessing York Central via the new Queen Street access bridge to be provided just south of the new interchange. In order to enhance the accessibility of this eastern interchange for York Central users, improved linkages across the ECML – either through the existing station or diverted south to the new Queen Street bridge – will need to be provided. With this link in place the provision of facilities for taxis, drop-offs and car parking could be provided west of the current station.

This option exhibits a number of advantages:

- It provides an interchange facility at a location that is already established for this purpose, with the road closure allowing the opportunity to significantly enhance the current facilities and alleviate the current pedestrian access problems experienced on Queen Street; and
- It will allow all buses and mass transit services to stop at a single interchange, with simple access to all railway platforms via current facilities.

There are also a number of disadvantages with this option:

- The walk from York Central to the new interchange is relatively lengthy, having to either pass through the current station or via the new Queen Street bridge. The current operator at the station does not favour the use of current station facilities for large volumes of pedestrian through movements, and enhancing current pedestrian facilities may well be costly and problematic; and
- The removal of through traffic on Queen Street could have some impacts on other streets in the City Centre. Our highway modelling of this option to date, suggests that these impacts will be moderate.

7.7 Conclusions

It is recommended that the most promising options to be given further consideration are:

- Option 3 – Marble Arch Interchange; and
- Option 4 – East of Station Interchange.

In the case of Option 3, this offers the optimal interchange facilities at the best location for both York Central, the City Centre and general pedestrian and cycle access to the development site. However these benefits must be weighed against the potentially high cost and disruption that will be associated with construction. In the case of Option 4 the facilities will be more modest and will be more achievable in terms of cost and disruption. On the other hand the East interchange is not so ideally placed in terms of pedestrian desire lines and access for York Central users.

On balance we recommend that both options are given further consideration as the overall package of measures for York Central is developed further by the Council, but that the more achievable Option 4 is adopted as a preferred option for the time-being.

Figure 23 - York Central Public Transport Connections

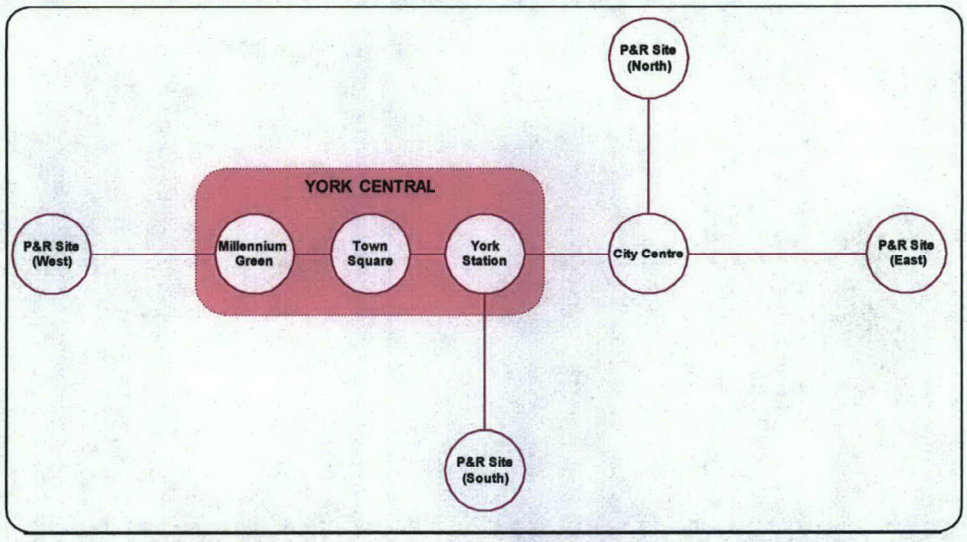


Figure 24 - Mass Transit Route (Long Distance Trips)

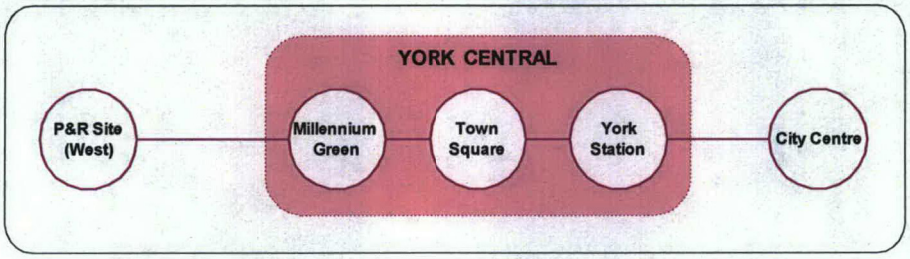


Figure 25 - Short Distance Trips

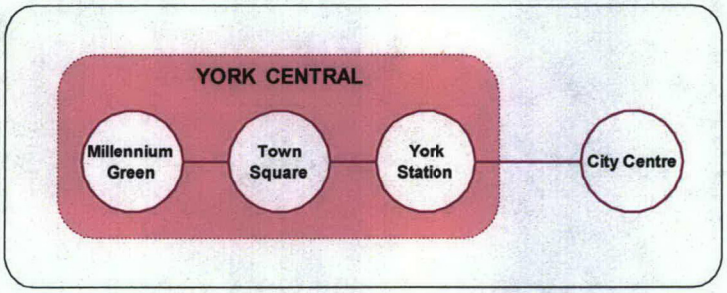


Figure 26 - Ottawa Transitway, Saint Laurent subterranean Bus Station