



**Department of the Environment, Transport and the Regions**

**MULTI-MODAL STUDY  
A453 NOTTINGHAM TO M1 JUNCTION 24**

**WORKING PAPER No 33**

**An Overview of Public Transport**

**July 2002**

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## **1 Introduction**

- 1.1 The A453 MMS has involved a considerable amount of data assembly and research into public transport. To assist reporting, this Working Paper draws together and summarises the existing situation and suggestions or recommendations for the future.
- 1.2 Excluding taxis, public transport trips within the study area are currently undertaken on two modes:
  - Bus
  - Rail (referred to as “heavy rail”)

With the advent of the NET light rail system, future trips will also include

Light Rail

- 1.3 The Preferred Strategy outlines a new transport philosophy in which substantial investment in public transport and policies to influence travel demand and behaviour are combined to reduce overall demand for movement and bring about much greater use of public transport, walking and cycling modes.
- 1.4 The public transport networks, therefore, are planned as far as possible to have enough capacity to accommodate the predicted demand at an acceptable level of service. This is achieved by a combination of improvements in the quality and quantity of vehicles, and improvements in the infrastructure of the transport system. Perception of reliability and quality are important factors in choice of mode, and information and publicity play a critical role in the process. To the extent that these issues can be tackled at a local level, rather than national, the Study’s Preferred Option makes appropriate recommendations.
- 1.5 A number of recommendations refer to integration between modes. These include improvements in access to the rail network through park and ride and bus interchange, park and ride at light rail terminal, and a comprehensively remodelled interchange at Nottingham station.

## 2. Rail

### 2.1 The Year 2000 Network

- 2.1.1 Within the A453 corridor, the rail network (see figure 1) comprises the Midland Main Line from London and Leicester with one branch to Derby via Long Eaton and another branch to Nottingham via Attenborough and Beeston. The branches split at Trent Junction. To the North of Trent Junction, the Erewash Valley Line carries services to Chesterfield and Sheffield via Chesterfield. The Robin Hood Line and a connection from the Erewash Valley Line join the Midland Main Line between Beeston and Nottingham.
- 2.1.2 Between Trent Junction and Nottingham, the rail corridor runs to the north of the River Trent. South of the river, where it crosses the line of the A453, the new East Midlands Parkway station is to be constructed.

### 2.2 Infrastructure Problems and Constraints

#### Trent Junction

- 2.2.1 Trent Junction is a critical feature of the local/regional rail network. The present power signal box (PSB) which controls the signalling over the whole of the study area, is life expired and is in urgent need of renewal. The track layout presents a number of speed limitations and physical restrictions affecting the following routes:

Derby - Nottingham	Single track section on the east curve
Nottingham - Derby	Shares the same single track section on the east curve
	Bi-directional running on the down main line
Erewash Valley – Sheet Stores	Bi-directional running over a single track leading to the up main line. Conflict with Loughborough – Nottingham route.

#### East Midlands Parkway Station

- 2.2.3 Track modifications will be required to accommodate train movements at the new station. This includes line speed improvements and ladder junctions.

#### Nottingham Station

- 2.2.4 Both track and platform layouts at Nottingham station impose significant capacity limitations. This is exacerbated by terminating or reversing trains occupying platforms for appreciable periods.

#### Four-track capacity

- 2.2.5 Throughout the study area, the Midland Main Line is generally four-track except for the section between Meadow Lane and Mansfield Junction. Slow and fast services cannot be segregated over this section, which includes Attenborough and Beeston Stations.

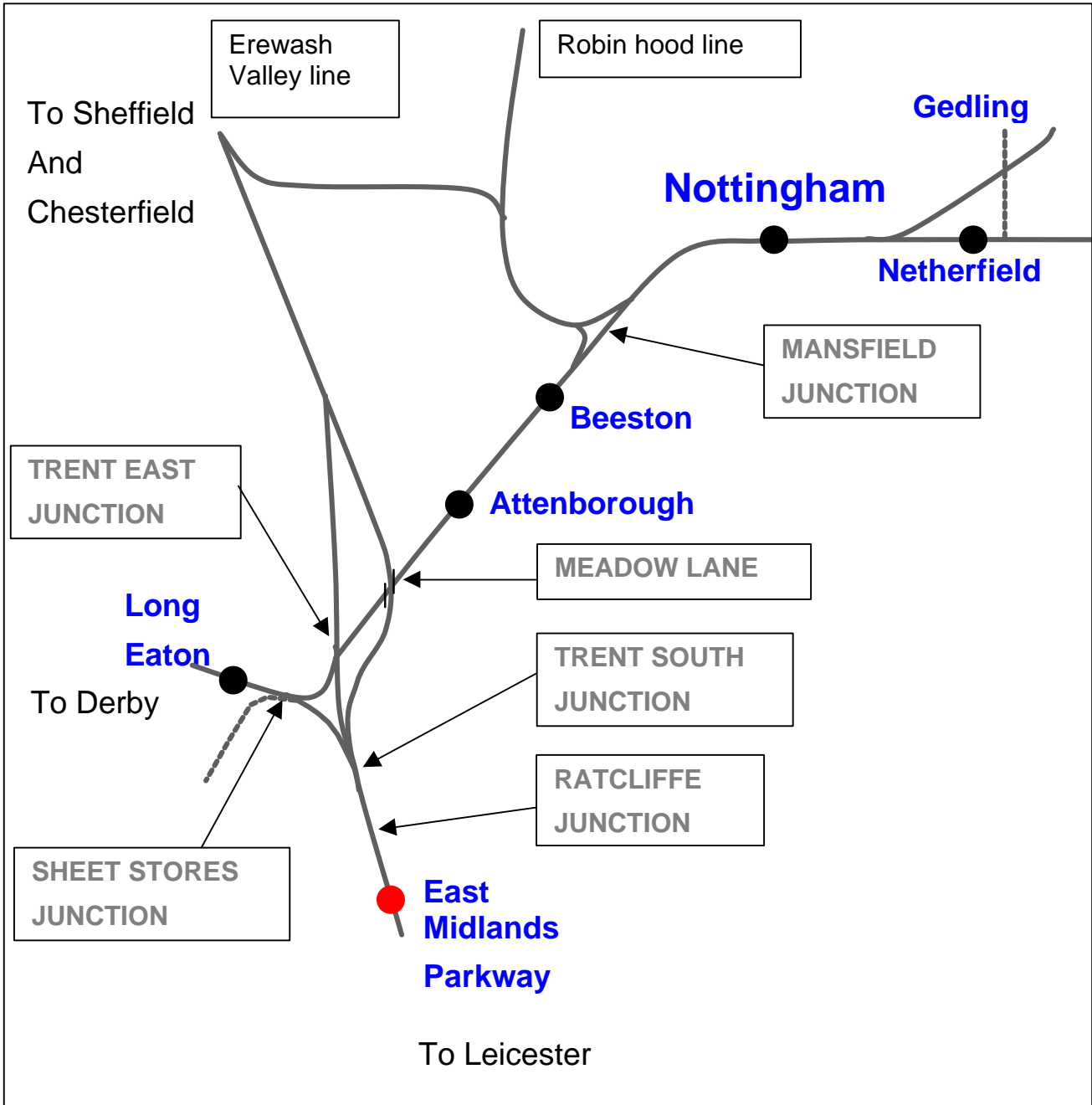


Figure 1: Diagram of Rail network in A453 corridor

### **Level Crossings**

- 2.2.6 There are three level crossings all located in the section between Meadow Lane and Attenborough. None are on heavily used road traffic routes, although Attenborough Lane is the only route to a local residential area which includes a primary school. The use of these level crossings imposes capacity restrictions on the railway.

### **Year 2000 Services**

- 2.2.7 There are at present eight trains per hour operating on the Nottingham to Trent section of the network, split as follows

Nottingham – Derby	3	Birmingham	2
		Manchester	1
Nottingham - Leicester	5	London	2
		Birmingham	2
		Norwich (occasional)	1

- 2.2.8 Other services enter and leave the line at Mansfield Junction between Beeston and Nottingham stations. These include Nottingham – Sheffield (1tph) and Nottingham – Mansfield/Worksop (2 or 3 tph).

## **2.3 Meeting Future Demand**

- 2.3.1 The preferred option contains proposals targeted at the following areas:
- Improvements in capacity
  - Improvements in quality
  - Improved access to the network
  - Better information systems

### **Capacity**

- 2.3.2 The study indicates that growth in trips on the rail network will be in the order of 20% between the base year 2001 and 2021, with growth up to 55% in particular peak directions. To accommodate this, increases in capacity will be required in the following ways.

- Additional trains
- Higher capacity trains
- Track and infrastructure enhancements

- 2.3.3 With the construction of East Midlands Parkway station, it is recommended that all intercity and local services using that line stop at the new station. This will result in 4 or 5 trains per hour (tph) between Parkway and Nottingham. It is proposed to introduce one extra train per hour between Nottingham and Derby to raise the frequency to 4 tph. However, because of the high predicted demand from East Midlands Parkway and the probable irregularity of the timetable for existing services, it is proposed that this additional service will be routed via Parkway, giving a high frequency service for P&R passengers.

2.3.4 Current trains comprise a variety of age, types and lengths, from single car Class 153 local trains to 7/8 car HST mainline trains. In the short term, there is scope to increase the capacity of existing services (in terms of seats per direction per hour) from about 1300 to 1800 in the following ways:

- Replacing the existing class 153 and 156 trains with Class 170 turbostar trains cascaded down from the MML fleet.
- Increasing the length of 2-car trains to 3 or 4 car trains.

Introducing the additional Nottingham – Derby service would further increase the capacity to 2100 seats per direction per hour.

2.3.5 Over the 20 year study period, new trains brought into service should achieve both high specification and required seating capacity.

These measures are represented in the preferred option by:

- B2a Replacement rolling stock – Midland Mainline (Do-Minimum)
- B2b Replacement rolling stock – Central Trains
- B6/B8 Nottingham – Parkway – Derby train service.

2.3.6 None of the improvements in capacity can be achieved without significant infrastructure changes. The preferred option assumes that the re-signalling of the Trent PSB area will take place in the next few years. Railtrack and the SRA are considering a major programme of track modifications designed to be integral with the signalling programme to bring about adequate capacity to handle additional trains and new timetabling of services. This study supports the following package of measures

- Improvements in line speed
- Additional junctions north and south of East Midlands Parkway station
- Upgrading of the high level goods line to carry passenger trains
- Modifications at Trent East junction to provide a parallel move facility
- Changes to the track and junctions west of Nottingham station
- A remodelling of Nottingham station with two new platforms.

2.3.7 The capacity limitations at Nottingham station will be eased by the remodelling of the track on the western approaches to allow the four tracks to be used by passenger services operating bi-directionally. As more services and longer trains are introduced, further benefits can be achieved by removing some of the terminating/reversing trains to a new terminus to the east of Nottingham. With this new terminus built as a parkway-type station, this could provide an alternative park and ride to East Midlands Parkway for trips originating to the east of Nottingham, with a consequent reduction in total vehicle-km travelled by car.

These measures are represented in the preferred option by:

- B3 Trent PSB signalling and track improvements
- B13/15 Nottingham Station masterplan redevelopment with extra platforms
- B17 Gedling Station & park and ride service.

### **Quality**

2.3.8 The strategy envisages a high standard of service quality across all modes to encourage public transport use.

- a) High standard vehicles, comfortable, clean, easy to access and safe.
- b) Reliable arrival times and journey times
- c) High standard of facilities at stations

2.3.9 Item (a) will be addressed by upgrading of rolling stock as described above, and (b) will be improved by the infrastructure capacity changes also described above, as well as national initiatives to improve overall service performance. Item (c) requires a programme of upgrades to stations to provide a uniformly high standard of comfort and convenience, security and accessibility. The works typically consist of new or refurbished waiting rooms, disability modifications, toilet facilities and real time customer information screens.

These measures are represented in the preferred option by:

B9/11 Station upgrades to modern standards including real time information.

#### **Access to the Network**

2.3.10 The study recognises the importance of providing easy and safe access to the rail network by passengers arriving or departing on foot, by bus, by car or in future years by NET. Station improvements described above will facilitate access on foot and by disabled users. Additional park and ride facilities are also included at the following locations:

**East Midlands Parkway:** The provision of spaces for park and ride customers to Nottingham.

**Beeston:** An increase from the present 21-space facility to 130(max.)-space car park for local destinations. This will require negotiations over space allocation and parking charges.

**Gedling:** A new park and ride facility to the east of Nottingham station to serve passengers from that side of the city. At the same time, this will reduce the pressure and free up capacity at Nottingham station.

These measures are represented in the preferred option by:

- B5 Car parking at local stations
- B7 Local Park and Ride facility at EM Parkway station
- B17 Gedling station and Park and Ride service
- C2/4 NET Extensions including Nottingham Station interchange

#### **Information**

2.3.11 Access to information before and during a journey is recognised as an important factor in attracting and retaining passengers on public transport systems, and this has been factored into the study options. Whilst there is comprehensive information available to passengers at Nottingham Station on arrivals and departures, the information available at local stations needs to be raised to a uniformly high standard

of real time displays and visual/audio access to help. These measures are represented in the model by:

B9/11 Station upgrades to modern standards including real time information.

## **2.4 Relationship with the M1 Multi-Modal Study**

- 2.4.1 The Report on the M1 Multi-Modal Study recommends a range of new and improved rail services. On the critical section of track between Nottingham and Trent junction, the M1 study lists six additional services per hour in each direction, bringing the total to 14. At this intensity of use, it is very likely that the existing level crossings will need to be replaced by bridges. A separate study will be required to determine how this might be achieved, the most difficult location being at Attenborough where simple replacement on the line of Attenborough Lane is likely to be unachievable because of the proximity of dwellings.
- 2.4.2 None of the additional services proposed in the M1 MMS exactly reproduces the Nottingham – Parkway – Derby service recommended here. However, two additional services are proposed between Nottingham and Derby and two further services between East Midlands Parkway and Derby. If these were introduced they would, between them, achieve the same result.

### **3 Buses and bus services**

#### **3.1 The Year 2000 Network**

- 3.1.1 The bus network in the study area can be considered in two zones:
- The urban area, from the Crusader Roundabout to Nottingham Centre, including Clifton.
  - The rural area, from Crusader Roundabout out to the M1 including the villages of Barton-in-Fabis, Thrumpton, Gotham, Ratcliffe-on-Soar, Kingston-on-Soar, Kegworth and Sutton Bonnington. Beyond the M1, a wider area includes Castle Donington, Diseworth, etc.

Most of the services in the study area are operated by Nottingham City Transport (NCT), but a few services are operated by other companies, including:

Trent/Barton (service 54: Clifton – Ruddington – Nottingham Broadmarsh)  
(service 5b Castle Donington – Long Eaton – Beeston – Nottingham)

Arriva (service X73: Birmingham – Nottingham via A453)

Paul S Winson (service 65: Kegworth – Nottingham via villages)

#### **3.2 The Urban Area**

- 3.2.1 NCT operates an extensive network of services covering the Clifton Area with 30 buses per hour in the peak and 23 in off-peak hours in each direction. Of these 22 and 19 respectively link the Clifton Area with Nottingham City Centre, the remaining services operating between Clifton and Beeston, Arnold and Netherfield via the Ring Road. In addition, Trent-Barton operate an hourly service from Clifton to Nottingham via Ruddington.
- 3.2.2 Within Clifton, services run along all the primary distributor roads in the area, so that no dwelling is more than 400 metres from a bus route delivering a scheduled 10-minute frequency or better.
- 3.2.3 This is a high level of service operated using a mixed fleet of single and double-deck buses of varied age, size and capacity. On the current mix, this delivers a total capacity of around 1200 seats per hour in the peak and 1100 in the off-peak (in one direction). On average, bus occupancy to the east of the Clifton estate is about 50% of capacity.

#### **Service Problems and Constraints**

- 3.2.4 Journey Time and reliability problems arise from general traffic conditions, particularly in peak hours. For the A453 corridor, consultations with the operators suggest that these are mostly concentrated on the approaches to the Farnborough Road/Clifton Lane junction and to a lesser extent at the Crusader roundabout.

### **Currently Planned Improvements**

- 3.2.5 In 2003 NCT propose to introduce new low-floor vehicles on routes No. 12 and 48.

### **Study Proposals**

- 3.2.6 The Preferred Transport Plan contains proposals targeted at the following areas:
- Improvements in capacity
  - Improvements in quality
  - Improved access to services
  - Better information systems
  - Lower and/or simplified fares

Most of the measures described below could be delivered through the setting up of new Quality Partnerships, building on the experience and success of existing quality partnerships in the Nottingham area.

### **Capacity**

- 3.2.7 The output from the study indicates a growth in bus passenger numbers over the next 20 years of 40% with the Preferred Option. The present frequency of bus services has scope for some further expansion in passenger numbers, but some additional capacity will need to be built into the system to handle forecast demand in reasonable comfort.

This capacity increase can be achieved by:

- increasing the size of vehicles
- increasing service frequency
- adding new routes.

- 3.2.8 The Preferred Transport Plan adds in one extra route serving Clifton Village at two buses per hour (66 seats per direction per hour) and replaces the current hourly service to East Midlands Airport with a half-hourly express service via Kegworth (an extra 114 seats per hour). Replacing 33-seat vehicles with 49-seat vehicles would add in a further 64 seats per hour, and further increases can be achieved by replacing single deck with double deck vehicles. Where demand is more concentrated, an increase in bus frequency may be achieved. These measures are represented in the preferred option by:

- |           |   |
|-----------|---|
| D5        | Clifton local bus service improvements                |
| D10c      | Bus service to Clifton Village                        |
| D15/16/17 | A453 express bus service EMA - Kegworth – Nottingham. |

### **Quality**

3.2.9 The strategy envisages a high standard of service quality across all modes to encourage public transport use.

- High standard vehicles, comfortable, clean, easy to access and safe.
- Reliable arrival times and journey times through avoidance of traffic congestion

3.2.10 These measures are represented in the preferred option by:

D1 City-bound bus lane Farnborough Road (Do-Minimum)

D2 Bus Lanes, A453 Farnborough Road – Silverdale flyover

D4 M1 junction 24 bus priority

D20a City-bound bus lane Clifton Lane (Gotham Road) to Crusader roundabout

### **Access to services**

3.2.11 Within the Clifton area, access to bus services is generally good. All the principal distributor roads carry bus routes which carry between 6 and 12 buses per hour to and from Nottingham Centre. Other services between Clifton and Beeston/QMC/ Arnold operate along Southchurch Drive and parts of Farnborough Road.

3.2.12 Clifton Village, to the north of the A453, has no dedicated bus service and therefore improved access will be gained by an additional service represented by D10c.

### **Information**

3.2.13 Access to information before and during a journey is recognised as an important factor in attracting and retaining passengers on public transport systems, and this has been factored into the study options. Advances in technology will enable real time data on bus positions to be relayed to passengers by displays at stops, within the vehicle and on mobile phones. Current systems are integrated with bus priority measures at traffic signals. The scope and application of a system of real time information will develop as the technology advances and is proven in reliability tests.

3.2.14 The strategy includes for continuing resources and effort in the marketing area, so that latest developments are brought to the attention of the whole of the travelling public.

These measures are represented in the preferred option by:

D8 Bus real time information

D12 Bus marketing

### 3.3 The Rural Area - General Issues

Providing bus services in rural areas presents a particular challenge because population densities are thin and demand is correspondingly light. However, such services are important both socially – in providing mobility for those who can't drive or don't have access to a car – and strategically – in helping to reduce the dependence on cars in rural communities. Achieving adequate provision in such circumstances frequently requires sustained levels of subsidy.

In the next 10-year period, new opportunities will be created for travel to, and interchange with, the heavy rail network at East Midlands Parkway station and the light rail network extension to Clifton.

#### **Existing Provision**

Where communities lie on routes between urban centres, bus services can be provided and operated commercially. This applies currently to **East Leake** and **Gotham** which are on the route of service no 1, running generally at 20-minute frequency between Nottingham and Loughborough. **Kegworth**, **Sutton Bonnington** and **Kingston-on-Soar** are currently on the route of service 5 between East Midlands Airport and Nottingham, running once an hour. It has been suggested in consultations that the commercial viability of this service is weak, and may be further weakened when the Airport shuttle service is introduced from East Midlands Parkway Station.

**Castle Donington** is currently served by the Trent-Barton route 5B to Nottingham via Long Eaton, running hourly off peak and half-hourly at peak times.

No bus services, other than long distance coaches currently operate along the rural section of A453. This means that the villages of **Thrumpton** and **Barton-in-Fabis** are not naturally served by inter-urban routes. Currently Nottinghamshire County Council supports a limited service through Paul S Winson Coaches which links these villages with Kegworth and Nottingham and provides four buses a day in each direction.

#### **Study Proposals**

The recommended strategy retains service 1 in its present form, with progressive improvements in vehicle quality and capacity. No changes are recommended for route 5B to Castle Donington, other than again to reflect improvements in vehicle standards and capacity.

Service 5 should be adapted to operate as a half-hourly semi-express service to Kegworth, running on to Sutton Bonnington instead of East Midlands Airport, once the Airport Shuttle has been established. This service would run via A453 calling at East Midlands Parkway. Buses would pick up alternately at Thrumpton and Barton-in-Fabis, giving these villages an hourly service. It is possible that this service could operate more effectively by terminating at the Clifton NET terminus, and the layout of this facility should include for a close, accessible and weatherproof interconnection between buses and light rail.

Throughout the next 20 years, regular surveys of need and demand will be required to point up where changes in service pattern are desirable or where innovative solutions can be adopted to fill gaps in the coverage. Innovative solutions may include demand responsive routes, car share schemes, community minibuses, taxi schemes and wheels-to-work initiatives. All such schemes may require financial support.

Further work will be needed to determine whether the modified service no. 5 would require a measure of public funding to support it, but the likelihood of this should be recognised as the demand levels forecast by the study model are fairly light. Small changes, brought about for example by marketing and publicity, could make critical differences in the financial sustainability of these routes.

It will be important to establish a rural bus network which is responsive to change in demography and public needs but at the same time provides a high degree of stability. Stability is needed to give long-term confidence to people in rural communities about lifestyle decisions and travel needs. For this reason funding agencies will need to give long-term commitments to revenue support where this is shown to be justified.

## **4 Light Rail**

### **4.1 NET Line 1**

4.1.1 The completion of NET Line 1 brings the line serving the city and north towards Bulwell and Hucknall close to Nottingham station. If no further development of the NET system were to take place then, as a minimum, the best interconnection possible would need to be created between the station and the NET terminus. This is represented in the model by:

### **4.2 B10 NET line one to Nottingham station footbridge (Do-Minimum)**

#### **System Extensions**

4.2.1 The study, however recognises the benefits of extending the system to Clifton and to Beeston, and has noted the work carried out and commissioned by Nottingham City Council to progress the development of these extensions. An extended NET system will provide the quality and capacity of public transport infrastructure needed to attract and accommodate the forecast demand. Delays in implementation of NET extensions will put additional pressure on the bus and, to a lesser extent, the heavy rail network to accommodate demand and will reduce the attraction of trips from the private car mode.

4.2.2 **The Clifton Line** comprises an extension of Line One southwards over Nottingham station, where a new interchange would be created. It terminates at a park and ride facility at the western fringe of Clifton between Gotham Road and A453. Two main alignment options for the route into Nottingham have been considered in the Nottingham City Council studies, one via Queens Road and one via Wilford. Selection of the preferred alignment is the prerogative of Nottingham City Council in consultation with local people.

4.2.3 The Park and Ride site will require a high standard access off the improved A453. It is envisaged that this will take the form of a grade-separated junction.

- 4.2.4 **The Beeston route** is also important to the A5453 MMS as it would offer a considerable improvement in the wider corridor potentially attracting substantial and reducing road traffic demand. To fulfil the objectives of this study, the route should be extended westwards to a park and ride terminus close to the M1 and the A52. This could be adjacent to the Stapleford By-Pass, either at the Toton Lane junction or the Ilkeston Road junction. Alternative routes are again under consideration by the City Council.
- 4.2.5 The NET routes are represented in the model by
- C2 NET extension to Clifton
  - C13 Clifton South P&R Access Road
  - C4 NET extension to Beeston/Stapleford
- 4.2.6 The study has not explored in detail the interaction between bus services and NET operation. It is desirable that as far as possible the modes operate in a mutually supportive way and that direct competition between services is minimised. Revisions to the bus network will be necessary to ensure effective connectivity between the modes so that trips can be attracted from and dispersed through a wide catchment area. Some provision will be included in the proposals for the NET extensions for bus interchange. To reinforce the study objective, however, a further allowance has been made for improvements to the NET/bus and the NET/rail interchanges, to cover highway and bus stop modifications and waiting area improvements.

**Summary of Estimated Scheme Costs - Heavy Rail**

All costs in £ million at 2002 prices

Scheme	Description	Capital	Lease	Maintenance /operation
B2b	Replacement Rolling Stock – Central Trains (All services)	0.00	5.40	1.00
B6/B8	Nottingham - Parkway - Derby service	0.00	0.54	0.71
B3	Trent PSB area track improvements	26.25	0.00	0.15
B13/15	Nottingham Station track and platforms	15.40	0.00	0.15
B17	Gedling Park and Ride station	8.20	0.00	0.18
	Gedling Park and Ride train services	0.00	0.00	1.13
B9/B11	Station Upgrades	0.75	0.00	0.00
B5	Car Parking at Beeston station	0.13	0.00	0.01
B7	Local P&R at EM Parkway	0.00	0.00	0.15
<b>TOTALS</b>		<b>50.73</b>	<b>5.94</b>	<b>3.48</b>

**Summary of Estimated Scheme Costs - Bus**

D5	Clifton Local Bus service improvements	1.00	0.00	0.08*
D10c	Bus service to Clifton Village	0.16	0.00	0.09
D15-17	Express bus EMA – Kegworth – Nottingham	0.16	0.00	0.30
D2	Bus lanes, A453 Silverdale - Farnboro	1.0	0.0	0.0
D20a	Bus Lane Gotham Road - Crusader	0.5	0.0	0.0
D8	Bus real-time information	2.00	0.00	0.15
D12	Bus marketing	0.00	0.00	0.25
<b>TOTALS</b>		<b>4.82</b>	<b>0.00</b>	<b>0.87</b>

**Summary of Estimated Scheme Costs - Light Rail**

Scheme	Description	Capital	Lease	Maintenance /operation
C2	NET extension: Wilford/Clifton	93.90	0.00	2.50
C13	Clifton South P&R access road	1.00	0.00	0.00
C4	NET extension QMC/Beeston/Stapleford	130.40	0.00	3.00
C3	NET Bus/Rail interchanges	1.00	0.00	0.00
<b>TOTALS</b>		<b>226.30</b>	<b>0.00</b>	<b>5.50</b>