EVALUATING THE URBAN ACCESS STRATEGY IN DONCASTER, UNITED KINGDOM

S. MORIARTY AND T. WANG
Mouchel Parkman, United Kingdom
Stephen.Moriarty@mouchelparkman.com
Terry.wang@mouchelparkman.com
Z. Khan
Doncaster Metropolitan Borough Council, United Kingdom
Zafran.Khan@doncaster.gov.uk

ABSTRACT

The town of Doncaster has undergone considerable changes in employment patterns over the last two decades. The closure of coal mines in the area has led to a decline in local employment in the mining industry, which has largely been replaced with new employment in service based and high technology industries. As a result of these changes the travel behaviour in Doncaster has evolved considerably. In the past, many of the local people employed in mining would often work at coalmines located close to their homes, now workers tend to travel further by cars to new employment areas in the town centre. Consequently, levels of traffic congestion have increased on urban roads in the town centre and adjacent inter-urban motorway network. In order to mitigate the impact of the severe traffic congestion the local authority, Doncaster Metropolitan Borough Council, has adopted a strategic accessibility policy within the urban area.

This note presents the findings of a study in Doncaster, England, where various access strategies were considered to evaluate a package of measures targeted at reducing traffic congestion within the urban area. The various access strategies have been developed in consultation with the key stakeholders in the town including the Local Authority, the Passenger Transport Executive, local bus and rail operators, business community, and local interest groups.

The various access strategies assessed the merits of providing park and ride facilities at the edge of town, reducing the quantity of long stay parking within the town centre, redistributing parking locations, improvements to bus services through the provision of quality bus partnership contracts, and the creation of bus corridors on radial routes into the town centre. The strategies were assessed using an assessment framework approach which included the development of a CUBE Voyager multi-modal transport model to evaluate the benefits and dis-benefits of the various strategies.

The main findings of the study are that the preferred urban access strategy required an integrated package of public transport improvements, local road improvements, and park and ride facilities in order to mitigate the impacts of the changes in travel behaviour and traffic congestion on urban roads and adjacent motorways.

1. INTRODUCTION

Doncaster is the second largest metropolitan in South Yorkshire, after Sheffield, with a population of over 280,000. The town's economic roots were in the mining Industry, but with the decline in this industry in the 1980's, the town showed signs of economic decline. The town is in a deprived area in terms of employment (ranked 13 out of 354 local authority areas) and deprivation (ranked 44 out of 354 local authority areas). In recent

years the Doncaster Metropolitan Borough Council has successfully attracted investment to the area and the main industry employers now include manufacturing, construction and service industries. Doncaster is well placed on the strategic transport network, in terms of road and rail, and more recently airways with the introduction of the Robin Hood Doncaster Sheffield International Airport in the Finningley area.

As a consequence of the investment in the area, the people are travelling further to work, and the vehicular road traffic growth in Doncaster has been at a faster rate than those at the regional and national levels, since 1993 as shown in Figure 1.

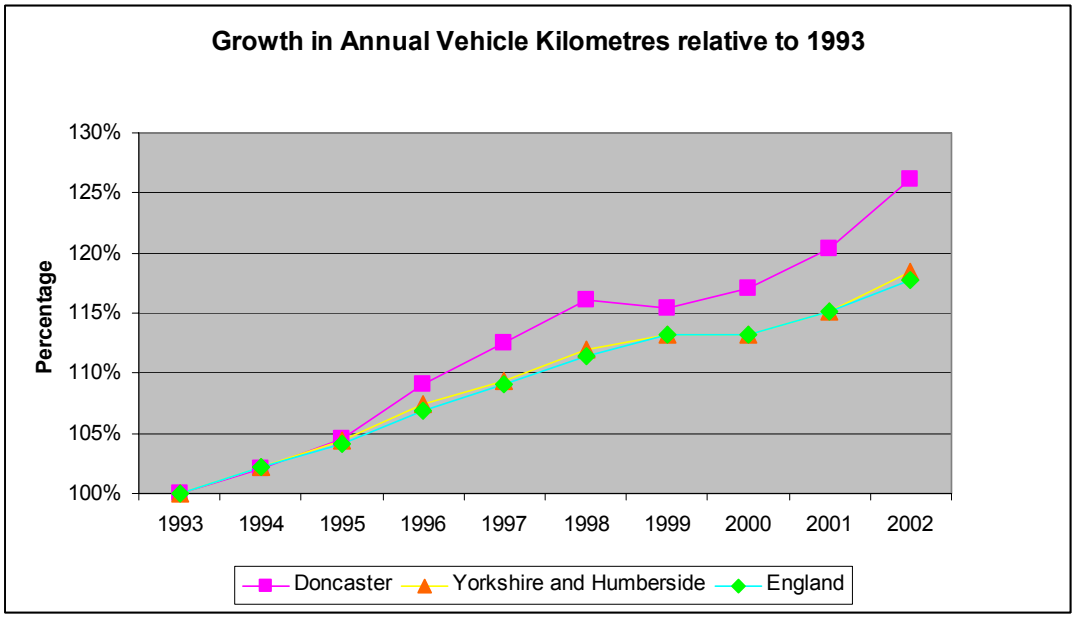

Figure -1 - Growth in road traffic since 1993 [1]

In Doncaster, the time spent travelling and number of journeys has remained relatively stable but the average length of journey has increased significantly as shown in Figure 2.

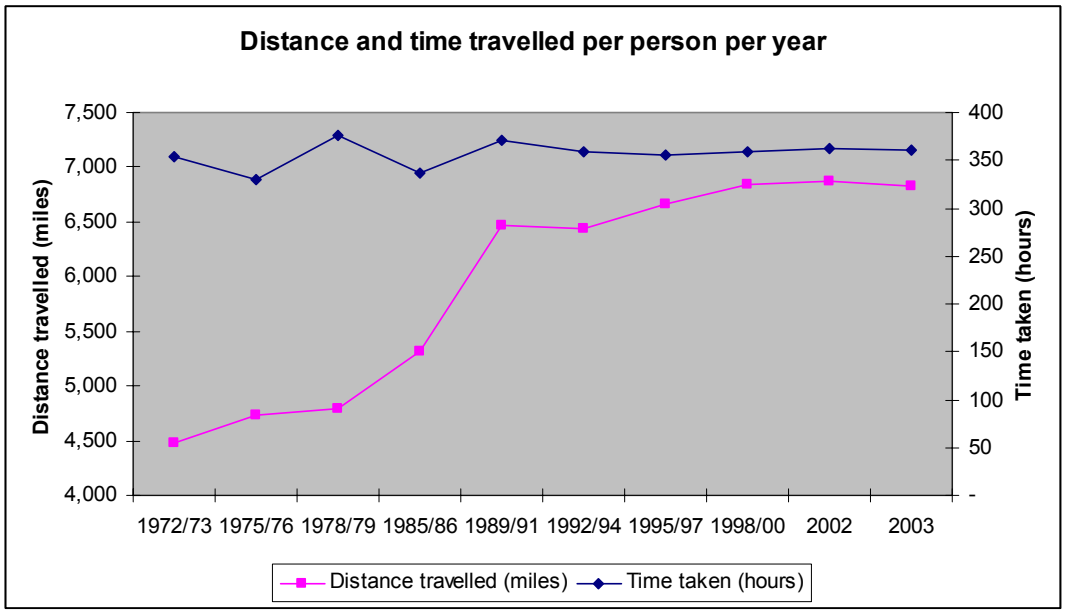

Figure -2: Distance travelled and time taken per annum 1972 to 2003 [1]

This reflects the greater use of car compared to more sustainable modes of transport and out of town and edge of town land use development patterns. The trends in traffic growth

shown in Figures 1 and 2 are expected to continue. The levels of car ownership in Doncaster are lower than the national average and as prosperity in the area increases, the level of car ownership and use is expected to catch up with surrounding areas. If unchecked, the increased use of cars is expected to lead to an increase in level of congestion in the borough. Recognising that severe traffic congestion is a threat to the local economy, Doncaster Metropolitan Borough Council, has adopted a strategic accessibility policy within the urban area to mitigate the impact.

2. THE ACCESS STRATEGY

The access strategy was developed by Doncaster Metropolitan Borough Council in consultation with local stakeholders including business representatives, transport providers, and interest groups. The strategy has the overall objective of supporting economic growth and regeneration, increasing access to opportunity, and improving sustainability in the borough.

The access strategy consists of three key themes:

- A viable town centre
- Access to major developments
- Sustainable and safe communities

The vision for the strategy recognised that town centre vitality was essential for continued economic growth in Doncaster. In order to reduce congestion, the strategy outlined that there should be restricted traffic circulation in the town centre, with reallocation of road-space to public transport and pedestrians. This would provide greater space for pedestrian movements in the town centre and priority for sustainable modes. All day parking in the town centre would be discouraged through a combination of restricting the parking supply to commuters and parking pricing regime.

Access to major developments would be provided through strategic road network improvements. There would also be greater use of bus based park & ride facilities on the edge of the urban centre in order to encourage a modal shift of trips onto buses accessing the town centre. The town centre and access to developments would be supported with an improved public transport services.

Sustainable and safe communities would be provided by relocation of services from the town centre to district centres so that residents would not have to travel as far to access health, welfare and personal services. The traffic speeds in residential areas would be reduced through provision of traffic calming.

3. MODEL DEVELOPMENT

In order to evaluate the access strategy a CUBE Voyager multi-modal transport model was developed [2]. The Doncaster Multi-modal Model (DMM) model operated hierarchically with the existing South and West Yorkshire Multi-Modal Model (SWYMMS), which was developed as part of the Government's multi-modal studies that took place in 2000. The SWYMMS model covered the regions of South and West Yorkshire and was used to model regional movements for both private and public transports.

The Doncaster Multi-modal Model was a cordon model and covered the Doncaster district and operated at a tier below the SWYMMS model. External traffic flows were represented by cordon points crossing the district boundary. The impact of regional strategic schemes were tested in the SWYMMS model and the effects passed down to the DMM model

The DMM model is a conventional four stage with separate sub-models for trip generation, trip distribution, modal choice and trip assignment. Key features in the model include the following:

- The trip generation model includes a sub-model to allow new developments to be assessed. The trip end sub-model has been calibrated to local data, which allows for variation in local growth rates in Doncaster.
- The trip distribution model is tied to national forecasting framework provided by the TEMPRO model. Consequently, traffic growth in Doncaster is constrained at a national level but the distribution of trips is based on local data.
- The modal choice sub-model includes sub-models for parking choice such as town centre parking and park & ride facilities. Also, the modal choice includes elements to model fares, parking charges and other travel costs.
- The assignment model covers the morning peak (08:00 to 09:00) the average inter-peak hour (10:00-16:00) and the evening peak hour (17:00 to 19:00). The model includes a sub-model to model the effect of peak spreading in the morning and evening peak periods. The assignment model includes light vehicles (cars and light goods vehicles), heavy goods vehicles, and public transport assignment to bus and rail services. Capacity restraint is included in the highway assignment and key junctions in Doncaster are modelled explicitly. The public transport assignment included crowding models to distribute passengers between bus and rail services.

The multi-modal mode was calibrated using local data and validated to national standards for a 2005 base year.

4. MODELLING THE ACCESS STRATEGY

A key element in assessing the effectiveness of the access strategy was to assess the impact that the strategy would have on congestion on the highway network. It was recognised that not all elements in the access strategy could be modelled in detail and that some elements such as reduced speeds in residential areas could only be assessed through qualitative measures.

For the evaluation of the access strategy [3] two scenarios were considered, namely the Do Minimum and the Do Something scenarios. The Do Minimum scenario includes schemes that are considered to be essential for the access strategy, while the Do Something scenario includes additional schemes to reinforce the access strategy. In addition Do Nothing scenario was considered. Effectively the Do Nothing scenario is a continuation of existing travel trends and comparison with the Do Minimum and Do Something strategies allows their impact to be assessed.

For the access strategy the key elements modelled were:

- Town centre parking
- Improved park & ride facilities
- DMBC staff parking

- Enhancements to local bus services
- Town centre improvements
- Rail service improvements
- Network improvements
- New developments

4.1. Town centre parking

The redevelopment of the Town Centre will impact on the current car parking provision. The aim of the access strategy is to maintain the overall number of Town Centre car parking spaces. However, the mix of parking will increase the number of short stay parking spaces and decrease the number of long stay parking spaces. The reduction in long stay parking will be implemented alongside the introduction of Park and Ride sites throughout the Borough.

The location and quality of car parks will be considered to ensure that there is opportunity to park on all approaches to the Town Centre and that drivers will utilise the appropriate car park rather than seek out specific car parks

The aim of the town centre parking policy is to increase existing levels of short-stay parking provision to support shoppers, businesses, visitors and residents while supporting phased reductions in town centre long stay parking as more park and ride spaces become available and/or significant improvements are made to public transport. A summary of the total number parking spaces for each of the future year scenarios are given in Table 1.

Table 1 - Town centre parking provision

Scenario	Parking type	2005	2008	2011	2026
Existing	Long stay	2,883			
	Short stay	1,082			
Do minimum	Long stay		1,990	823	823
	Short stay		2,012	2,734	2,234
Do something	Long stay		1,890	723	723
	Short stay		2,412	3,384	2,984

4.2. Park & ride facilities

Table 2 summarises the park & ride provision.

Table 2 - Park and ride provision

Scenario	Parking type	2005	2008	2011	2026
Existing	Rail park & ride	363			
	Bus park & ride	250			
Do minimum	Rail park & ride		363	363	363
	Bus park & ride		1,200	1,200	1,200
Do something	Rail park & ride		622	872	872,
	Bus park & ride		1,200	1,200	1,200

The aim of the park & ride policy is subject to the availability of resources, to provide park and ride sites on all the main corridors into Doncaster Town Centre. The existing bus park and ride sites are under-utilised but the rail P&R sites are well used. The policy will be supported in the town centre with increased parking charges for all day parking.

Dedicated bus services will run at frequent intervals between the park & ride sites and the town centre.

4.3. Council staff parking

At present, many DMBC services are located in the town centre and DMBC staff car parks at various sites are close to their office or depot. The aim of this strategy is to consider the impact of a reduction in the provision of parking for council staff in the town centre and to encourage them to use either public transport or the Park and Ride using dedicated council employee Park and Ride Sites. Dedicated bus service will run between each GTP sites and the town centre. These would operate with a headway of 5 to 7 minutes at peak times (0730-0930) and (1600-1800), and with a headway of 10 minutes for the rest of the day. Table 3 summarises the DMBC staff parking provision.

Table 3 - DMBC staff parking space provisions

Scenario	Parking type	2005	2008	2011	2026
Existing	Town centre	1,675			
	Green travel plan	0			
Do minimum	Town centre		1,226	544	429
	Green travel plan		0	400	500
Do something	Town centre		881	544	829
	Green travel plan		400	700	900

4.4. Enhancement to local bus services

The town centre has undergone major redevelopment in recent years. The development of the Frenchgate Centre has provided the opportunity to rationalise and improve bus services and improve the interchange with railways by closing the existing Northern Bus Station and Southern Bus Station and replacing them with a modern purpose bus and rail interchange. Following the opening of the new Doncaster Interchange, bus routes in the city centre would require revision to operate from the interchange.

The new Interchange will allow cross town bus services to be operated more efficiently. This will reduce the requirement to interchange in the town centre, which was a disincentive to users of bus services.

In addition DMBC propose to introduce quality bus contracts (QBC) with operators on key corridors in order to improve services and offer higher bus service frequencies.

4.5. Town centre improvements

Town centre improvements will complement the car park strategy. The closure of some of the town centre car parks provides the opportunity of extending the existing pedestrianised areas between the new Frenchgate Centre/ Market Place and other town centre streets.

Table 4 shows which streets are affected for each scenario and year.

Table 4 - Town centre improvements

Scheme	2008		2011		2026	
	DM	DS	DM	DS	DM	DS
Waterdale pedestrianisation				✓		✓
Hallgate pedestrianisation				✓		✓
Wood Street pedestrianisation				✓		✓
Cleveland Street pedestrianisation				✓		✓
Silver Street bus-only street				✓		✓
College Street bus-only street				✓		✓

4.6. Rail service improvements

There are proposals for a new railway station to serve Robin Hood Doncaster Sheffield Airport. In the short term it is proposed to include the station on the Lincoln Line, in the medium term to include a spur into the airport and in the longer term, to include a Parkway Station on the East Coast Main Line (ECML). However this proposal would have regional effects and has to be assessed using the SWYMMS model (which was not undertaken in this commission).

4.7. Network improvements

There are a number of highway schemes which are currently being developed to improve the road network in Doncaster. These are listed in Table 5 for each scenario and year.

Table 5 - Network improvements

Scheme	2008		2011		2026	
	DM	DS	DM	DS	DM	DS
Christchurch Gyratory	✓	✓	✓	✓	✓	✓
FARRRS Phase 1				✓		
FARRRS Full Scheme						✓
White Rose Way Interim Scheme		✓		✓		
White Rose Way Full Scheme						✓
Potteric Carr Road	✓	✓	✓	✓	✓	✓
A1 Skellow Junction						✓
Catesby New Link Road			✓	✓	✓	✓
Frenchgate Interchange Highway Improvements	✓	✓	✓	✓	✓	✓
St George's Gyratory Interim Scheme	✓	✓	✓			
St George's Gyratory				✓	✓	✓
Holmes Market Gyratory				✓		✓

4.8. New developments

The final element included in the access strategy was the impact of new housing developments and employment sites [4]. The trip generations were estimated independently for each development site using local trip generation rates. Table 6 summarised the trip arrivals and departures for each forecast year. It should be noted that the development trips apply to both the Do Minimum and Do Something scenarios.

Table 6 – Trip arrivals and departures from development sites

Year	Morning peak		Inter-peak		Evening peak	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
2008	3,279	1,719	2,125	2,020	1,936	3,357
2011	5,710	2,953	3,567	3,410	3,282	5,849
2026	9,978	7,901	6,633	6,280	8,158	10,497

5. EVALUATING THE ACCESS STRATEGY

The components of the access strategy outlined in the previous section were modelled using the DMM model for the Do Nothing, Do Minimum and Do Something scenarios for the forecast years 2008, 2011 and 2026. The access strategy has been evaluated at a global level, covering the whole of Doncaster, and at a local level on four key corridors, namely:

- Northern corridor – York Road
- Eastern corridor – Armthorpe Road
- Southern corridor – Bawtry Road
- Western corridor – Balby Road

Each corridor contains a park & ride site, which means that the localised effects of park & ride can be examined.

5.1. Global assessment

At the global level the key statistics to examine are as follows.

- Changes in demand and the impact of mode choice.
- Changes in vehicle kilometres, vehicle hours and passenger kilometres.
- Demand for town centre parking and park & ride.

These effects are discussed below.

5.1.1. Changes in demand

Figure 3 shows the forecast weekday traffic growth in Doncaster. This is expected to increase considerably between 2005 and 2026, with the majority of the traffic growth by car in Doncaster by 2026. The increase in demand, if unchecked could be expected to lead to worsening conditions on the road network in Doncaster, particularly in the congested town centre and the traffic corridors approaching the town centre.

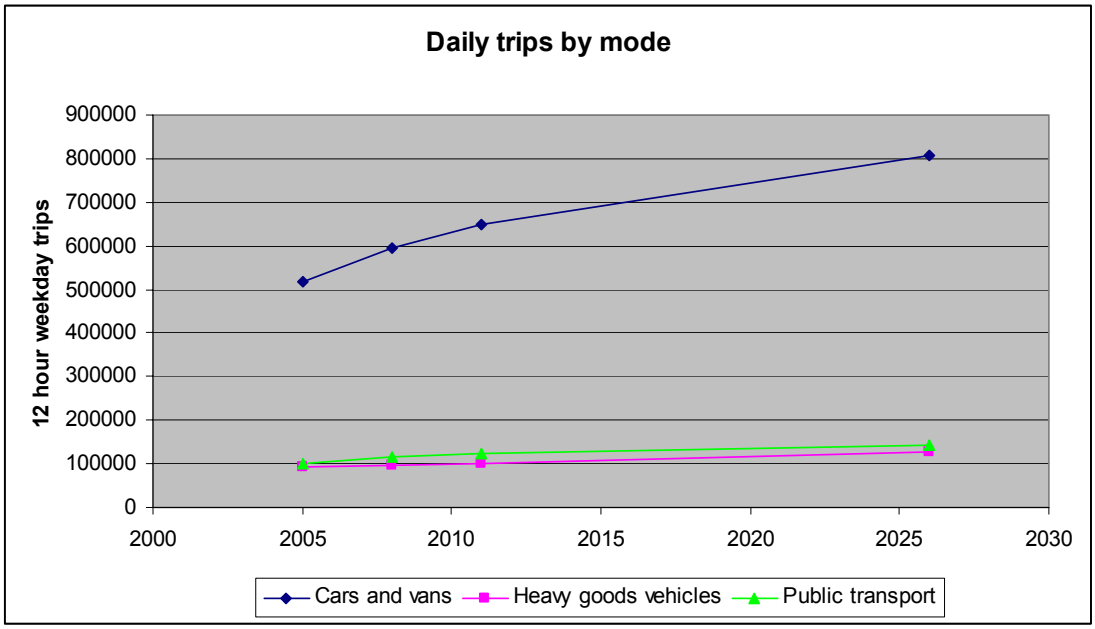

Figure 3 - Forecast traffic growth in Doncaster

For the access strategy to be considered effective, trips should be attracted from cars onto public transport. The post modal choice trip matrix totals shown in Table 7 and Table 8 show that the access strategy reduces cars trips and increases public transport trips for the Do-Minimum and Do-Something scenarios. The increase in passengers is attributable to the combination of trips switching completely to public transport and increasing use of the park & ride facilities.

Table 7 - Changes in car trips for each scenario and time period

Scenario	Year	Car and van trips (vehicles)			Change relative to the Do Nothing scenario		
		AM	IP	PM	AM	IP	PM
Do Minimum	2008	55,541	41,024	62,856	-438	-693	-1,263
	2011	60,518	44,674	68,322	-564	-834	-1,610
	2026	75,484	55,304	83,683	-1,792	-1,210	-3,038
Do Something	2008	55,546	40,952	62,818	-433	-765	-1,300
	2011	60,046	44,089	67,811	-1,035	-1,419	-2,120
	2026	75,342	54,957	83,273	-1,935	-1,557	-3,448

Table 8 - Changes in public transport trips for each scenario and time period

Scenario	Year	Bus and rail trips (persons)			Change relative to the Do Nothing scenario		
		AM	IP	PM	AM	IP	PM
Do Minimum	2008	11,136	11,048	10,407	1,137	782	1,519
	2011	12,887	12,033	12,734	2,366	1,220	3,035
	2026	16,902	14,041	17,658	3,910	1,889	5,671
Do Something	2008	11,613	11,269	10,862	1,614	1,003	1,973
	2011	13,509	12,942	13,456	2,988	2,129	3,757
	2026	17,628	15,146	18,259	4,636	2,993	6,273

5.1.2. Changes in vehicle hour, vehicle kilometres and passenger kilometres

The changes in vehicle hours expended, the vehicle kilometres travelled, and the passenger kilometres are conventionally used to express global changes in behaviour. Table 9 shows the vehicle hours expended, Table 10 shows the vehicle kilometres travelled, and Table 11 shows the passenger kilometres.

Relative to the Do-Nothing scenario the access strategy shows reductions in vehicle hours and vehicle kilometres but an increase in passenger kilometres. This indicates that the access strategy has achieved a model shift from car to public transport as a combination of trips switching entirely to public transport for the journey, or a combination of driving to the park & ride sites and completing their journeys by public transport.

Table 9 - Changes in vehicle hours for each scenario and time period

Scenario	Year	Vehicle hours			Change relative to the Do-Nothing scenario		
		AM	IP	PM	AM	IP	PM
Do Minimum	2008	16,302	12,224	15,567	-81	214	-298
	2011	17,662	12,885	16,888	-153	-1,111	-348
	2026	22,425	16,590	21,090	-2,321	-597	-867
Do Something	2008	16,224	11,788	15,420	-159	-222	-445
	2011	17,528	12,754	16,761	-287	-1,242	-475
	2026	22,005	16,102	20,490	-2,741	-1,085	-1,467

Table 10 - Changes in vehicle kilometres for each scenario and time period

Scenario	Year	Vehicle kilometres			Change relative to the Do-Nothing scenario		
		AM	IP	PM	AM	IP	PM
Do Minimum	2008	1,036,753	801,127	965,181	-4,347	-1,997	-13,752
	2011	1,106,980	849,384	1,031,417	-4,020	-39,337	-15,402
	2026	1,341,565	1,039,435	1,232,540	-86,739	-24,718	-32,741
Do Something	2008	1,034,978	792,200	961,027	-6,122	-10,924	-17,906
	2011	1,101,120	845,203	1,026,551	-9,880	-43,519	-20,268
	2026	1,325,785	1,022,232	1,209,574	-102,519	-41,922	-55,707

Table 11 - Changes in passenger kilometres for each scenario and time period

Scenario	Year	Passenger kilometres			Change relative to the Do-Nothing scenario		
		AM	IP	PM	AM	IP	PM
Do Minimum	2008	92,186	81,429	88,013	7,428	6,289	12,955
	2011	102,083	86,888	99,107	16,449	10,365	20,719
	2026	123,180	95,056	128,408	29,754	14,357	41,993
Do Something	2008	94,273	82,906	89,673	9,515	7,766	14,616
	2011	106,022	96,200	107,261	20,389	19,678	28,873
	2026	125,895	110,842	135,724	32,469	30,143	49,310

5.1.3. Demand for town centre parking and park & ride

Table 12 and 13 show the changes in demand for town centre car parking and the proposed park & ride services respectively. The changes show that demand for parking in the town centre decreases in the morning peak considerably and demand for park & ride increases. This indicates that commuters are transferring their trips to take advantage of the park & ride services during the congested morning peak period. As such the Town centre car parking in the inter-peak and evening peak are increased with more parking available for shopping and leisure related trips.

Table 12 - Changes in town centre parking demand for each scenario and time period

Scenario	Year	Town Centre parking spaces			Change relative to the Do-Nothing scenario		
		AM	IP	PM	AM	IP	PM
Do Minimum	2008	2,271	1,337	1,025	-333	144	261
	2011	1,765	1,359	1,116	-1,012	108	298
	2026	1,928	2,064	1,423	-1,079	385	572
Do Something	2008	1,961	1,300	1,025	-643	107	261
	2011	1,708	1,295	1,063	-1,069	44	245
	2026	1,945	1,981	1,359	-1,062	302	508

Table 13 - Changes in park & ride demand for each scenario and time period

Scenario	Year	Park & ride spaces			Change relative to the Do-Nothing scenario		
		AM	IP	PM	AM	IP	PM
Do Minimum	2008	170	25	7	170	25	7
	2011	551	49	19	551	49	19
	2026	615	75	28	615	75	28
Do Something	2008	188	34	7	188	34	7
	2011	560	56	19	560	56	19
	2026	658	88	27	658	88	27

5.2. Local assessment

At a local level on the four key corridors, the statistics that are relevant to whether the access strategy results in reduced congestion are:

- Journey time in minutes; and
- Delays in seconds per kilometre.

5.2.1. York Road Corridor

Table 14 shows the modelled journey times for the Do- Nothing and the access strategy scenarios (Do-Minimum and Do-Something). Table 15 shows the total delay on the routes expressed in second per kilometre.

The York Road corridor runs along the Great NorthRoad from the Redhouse junction on the A1 southwards through Adwick-le-Street. The proposed park & ride site is located just south of Adwick-le-Street at the junction between the Great North Road and Green Lane. The route continues southwards through Bentley to the York Road roundabout, where it

continues over the River Don to the St Georges Gyratory. The corridor is characterised by numerous junctions most of which are priority controlled in Adwick-le-Street but signalled controlled south of Bentley.

During the morning peak the Do-Nothing scenario indicates that the journey time and delays in the corridor will increase between 2008 and 2026. The access strategies show lower journey times and delay, which indicates that the strategy reduces congestion in this corridor.

Table 14 - Journey times in the York Road corridor for each scenario and time period

Scenario	Year	Inbound			Outbound		
		AM	IP	PM	AM	IP	PM
Do Nothing	2008	14.5	12.3	12.3	10.1	9.6	10.6
	2011	15.5	10.0	12.2	10.6	9.7	10.2
	2026	23.3	15.3	16.8	10.6	9.9	12.5
Do Minimum	2008	13.4	11.4	11.8	10.1	9.6	10.6
	2011	13.0	10.2	12.1	10.2	9.6	10.9
	2026	17.3	13.9	14.5	10.8	10.4	11.8
Do Something	2008	12.8	11.1	11.9	10.2	9.6	10.5
	2011	13.5	11.1	12.3	10.2	9.7	10.4
	2026	16.0	13.1	13.4	10.7	10.2	11.8

Table 15 - Delays in the York Road corridor for each scenario and time period

Scenario	Year	Inbound			Outbound		
		AM	IP	PM	AM	IP	PM
Do Nothing	2008	56.3	39.5	39.3	21.3	17.4	25.0
	2011	64.1	21.9	38.4	24.7	18.1	21.6
	2026	123.2	62.6	73.3	25.1	19.5	39.2
Do Minimum	2008	47.4	32.6	35.6	21.3	17.4	24.8
	2011	44.5	23.3	37.8	21.5	17.0	27.0
	2026	77.6	51.7	56.4	26.4	23.3	34.1
Do Something	2008	43.2	30.4	36.1	21.9	17.4	24.0
	2011	48.6	30.3	39.5	22.0	17.7	23.7
	2026	67.4	45.3	47.8	25.7	21.5	33.9

5.2.2. Armthorpe Road corridor

The Armthorpe Road corridor starts in the village of Armthorpe to the east of Doncaster and continues westward along Doncaster Road to the junction of Leger Way. The park & ride site is located on the A630 West Moor Road adjacent to the superstore and there is a dedicated DMBC Green Travel Plan site on Leger Way. The route continues westwards along Armthorpe Road through the suburb of Wheatley to the town centre. The route has frequent bus services along the corridor, which provide high capacity alternative to car usage.

Tables 16 and 17 show the journey times and delays respectively for the Armthorpe Road corridor. The access strategy scenarios show slightly lower journey times and delays than the Do Nothing scenario. The access strategy may be less effective in this corridor as there is already a high take up of public transport usage.

Table 16 - Journey times in the Armthorpe Road corridor for each scenario and time period

Scenario	Year	Inbound			Outbound		
		AM	IP	PM	AM	IP	PM
Do Nothing	2008	12.4	10.1	10.6	9.0	9.9	11.8
	2011	13.1	11.2	10.7	9.2	10.3	11.7
	2026	16.6	11.1	11.7	11.0	10.0	14.9
Do Minimum	2008	12.2	10.2	10.3	9.7	10.4	12.1
	2011	12.5	10.3	10.5	9.9	10.2	12.8
	2026	14.2	10.6	11.1	10.7	11.5	15.0
Do Something	2008	12.0	9.7	10.1	9.7	10.1	11.9
	2011	11.4	9.1	9.5	10.0	10.1	12.5
	2026	12.8	9.7	10.2	10.5	11.0	14.6

Table 17 - Delays in the Armthorpe Road corridor for each scenario and time period

Scenario	Year	Inbound			Outbound		
		AM	IP	PM	AM	IP	PM
Do Nothing	2008	50.2	30.5	35.0	23.9	32.9	51.4
	2011	56.1	40.0	35.5	25.4	36.7	51.1
	2026	85.3	39.2	44.6	44.1	34.2	82.6
Do Minimum	2008	48.4	31.5	32.8	30.9	37.4	54.8
	2011	51.2	32.4	34.4	33.2	35.6	61.7
	2026	65.2	34.7	39.6	40.5	48.3	83.1
Do Something	2008	46.9	27.6	30.9	30.8	34.4	52.4
	2011	41.9	22.5	26.0	33.9	34.9	58.5
	2026	53.5	27.3	31.9	38.8	43.4	79.6

5.2.3. Bawtry Road corridor

The Bawtry Road corridor starts in the village of Bawtry to the south of Doncaster and continues northwards along the A638 Great North Road. The proposed park & ride site is located at Parrots Corner, close to the village of Rossington about halfway along the corridor. The route continues over the M18 along Bawtry Road and through Bessacarr to the Belle Vue roundabout, where it crosses Leger Way and continues along Bennetthorpe to the town centre. The route is mainly rural in nature but suffers from long delays at the roundabouts in the urban area.

Tables 18 and 19 show the modelled journey time and delays respectively. The Do Nothing scenario indicates that the journey times and delays will increase significantly during the morning and evening peaks. The access strategy scenarios show reduced journey times and delay but of the two scenarios, the Do Something is more effective.

Table 18 - Journey times in the Bawtry Road corridor for each scenario and time period

Scenario	Year	Inbound			Outbound		
		AM	IP	PM	AM	IP	PM
Do Nothing	2008	19.2	14.9	15.3	14.6	14.9	17.4
	2011	22.3	15.0	15.5	15.1	15.5	17.9
	2026	30.8	18.4	20.9	21.5	18.4	20.8
Do Minimum	2008	18.8	14.5	15.3	14.7	14.4	17.1
	2011	20.5	15.3	15.9	15.1	15.1	17.3
	2026	24.4	17.5	21.0	18.3	18.3	19.3
Do Something	2008	18.8	14.6	15.2	14.7	14.7	16.8
	2011	19.5	14.5	15.3	15.0	15.0	17.4
	2026	18.5	15.1	15.9	17.1	16.2	17.1

Table 19 - Delays in the Bawtry Road corridor for each scenario and time period

Scenario	Year	Inbound			Outbound		
		AM	IP	PM	AM	IP	PM
Do Nothing	2008	38.1	18.7	20.3	17.0	18.1	29.5
	2011	52.4	19.4	21.7	18.9	20.9	31.8
	2026	90.8	34.5	45.8	47.6	33.8	44.6
Do Minimum	2008	36.2	17.1	20.5	17.3	16.0	28.1
	2011	44.2	20.4	23.5	18.9	19.0	28.8
	2026	61.7	30.7	46.5	33.2	33.6	37.9
Do Something	2008	36.3	17.2	20.3	17.3	17.4	26.6
	2011	39.4	16.8	20.4	18.6	18.6	29.4
	2026	35.1	19.5	23.3	28.0	24.0	27.9

5.2.4. Balby Road corridor

The Balby Road corridor starts at the junction of the A1 (M) and continues eastwards along the A630 Warmsworth Road through Balby to the junction with Sandford Road. The route then continues eastwards to Hyde Park and then along Cleveland Street to the town centre. This is a relatively short corridor but suffers from congestion along its entire length particularly during the morning peak hour. The proposed park & ride site is located just west of the A1(M) junction and is intended to intercept trips using the A1(M) to access Doncaster and trips from Conisbrough and Mexborough.

Tables 20 and 21 show the journey times and delays respectively. The Do Nothing scenario shows considerable increase in corridor journey times and delays in 2026 particularly during the morning peak. The access strategies show smaller journey times and delays, demonstrating that both access strategy scenarios would be effective in this corridor.

Table 19 - Journey times in the Balby Road corridor for each scenario and time period

Scenario	Year	Inbound			Outbound		
		AM	IP	PM	AM	IP	PM
Do Nothing	2008	8.0	6.2	6.6	5.8	6.0	6.9
	2011	9.1	8.7	6.8	6.3	7.4	7.0
	2026	35.2	7.5	9.6	7.4	6.7	8.3
Do Minimum	2008	7.4	6.3	6.4	5.7	6.4	6.5
	2011	7.8	6.2	6.8	5.6	6.1	6.8
	2026	10.6	7.6	8.6	6.7	6.4	7.7
Do Something	2008	7.3	6.0	6.3	5.8	6.0	6.5
	2011	7.6	6.2	6.7	5.8	6.0	6.8
	2026	9.7	7.0	7.6	6.8	6.1	7.7

Table 20 - Delays in the Balby Road corridor for each scenario and time period

Scenario	Year	Inbound			Outbound		
		AM	IP	PM	AM	IP	PM
Do Nothing	2008	78.1	48.3	54.7	39.6	43.4	58.0
	2011	95.6	89.3	57.8	47.7	65.8	59.0
	2026	533.4	69.2	104.8	65.9	55.5	81.0
Do Minimum	2008	68.2	49.3	51.4	37.6	49.4	52.3
	2011	75.1	48.4	57.5	37.3	44.1	56.9
	2026	121.1	70.5	88.2	54.1	49.5	71.9
Do Something	2008	66.5	44.3	49.4	39.2	42.4	52.3
	2011	71.1	46.9	55.5	39.9	43.6	56.4
	2026	106.8	61.1	70.8	56.4	44.3	71.7

6. CONCLUSIONS

The Do Minimum and Do Something scenarios (used to assess the access strategy) indicate that the combination of town centre parking restraint, park & ride, and public transport service improvements result in attracting car trips to use the public transport and the out-of-town parking facilities. The network improvements would conventionally have been expected to result in inducing additional trips onto the road network. However it appears that the extra capacity provided was successfully taken up by trips generated by new developments.

The results show that some drivers will switch their trip making from the peak hour to the shoulder peak hours resulting in peak spreading, which reduces congestion in the peak hour but lengthens the time that peak conditions will occur on the road network. An examination of the local effects on key corridors indicate that the proposed park & ride sites located at the edge of the urban area may be particularly effective in mitigating the impact of congestion, particularly where bus services are less frequent.

Overall the access strategy package has the potential to offer car drivers an alternative to car use in the congested town centre by allowing them to park & ride and continue their journey by dedicated public transport. The change in behaviour mitigates the impact of the increased demand for travel and the changes in travel behaviour result in mitigating the traffic congestion on urban roads and adjacent motorways.

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