HITRANS

HITRANS Inner Moray Firth
Park & Ride Study
Final report
September 2008

Halcrow Group Limited

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Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Signed
1		Draft Final Report	20 Jun 08	ST
2	2	Draft Final Report	4 Aug 08	ST
3		Final Report	9 Oct 08	ST

Contents

HITRANS Inner Moray Firth
Park & Ride Study

Executive Summary

Introduction.

HITRANS commissioned Halcrow to consider the potential for Park & Ride to meet the transport needs of Elgin and Inverness. This study looked at demand potential for both cities, in the context of future growth in and around the cities and current and future transport policy. For both cities we looked at potential demand analysing trips from origin and destination survey data, identifying the number of cars that could potentially be attracted to Park & Ride based on their journey patterns. Further consideration was given to the likelihood of transferring given traffic conditions, congestion and transport policy, particularly parking policy in both locations.

Careful consideration of the travel patterns and traffic conditions in Elgin was undertaken for the study, but looking at existing traffic conditions and population we concluded that P&R is unlikely to be successful in Elgin.

The current levels of traffic delay and congestion do not provide sufficient incentive to switch mode. Although congestion is expected to worsen in the future with growth around Elgin, if the proposals to expand the road network capacity in Elgin go ahead, this would be expected to further reduce the incentive to switch mode in the future. Reconsideration of P&R potential could be undertaken when further decisions are made on road network changes in Elgin.

This summarises the conclusions of the study and recommends two locations to take forward in a Park & Ride strategy for Inverness.

Inverness demand potential.

Analysis of the daily traffic movements into and around Inverness has been carried out to determine how many cars could be attracted to Park & Ride sites around Inverness. This analysis included car journeys from all approaches to Inverness. The conclusion from this is that there is a strong demand potential from the east, on the A96 corridor, and a smaller but still significant demand from the north on the A9 corridor. Both the current patterns of travel and future years were looked at to recognise the growth in travel associated with increased population, and taking account of where the growth is planned to be around Inverness.

What a Park & Ride systems needs to be successful

Based on the criteria listed below, two sites have been proposed to provide a Park & Ride service for Inverness.

- easy access to trunk road/major commuting routes
- adequate safety at site
- frequent bus service
- direct route to city centre
- bus priority to overcome congestion points
- sufficient demand to provide cost effective service
- sufficient congestion/lack of parking to give incentive to switch

East of Inverness - Smithton A96 corridor

The A96 corridor is planned for major growth to accommodate part of the population increase for Inverness. Population growth is forecast to be 30,000 more people over the next 30 years, and 10% in the Nairn ward which is the highest in the region. The anticipated car trips which could be attracted to this site are initially just over 200 vehicles a day. These calculations are based on the ability to attract approximately 20% of the cars travelling past the P&R site to destinations in the city centre. This is based on experience of Park & Ride 'capture' rates at other cities around

the UK. If traffic conditions deteriorate and habit of bus use increases it is likely that numbers using the site would increase.

Site selection

Having confirmed the A96 corridor as appropriate for a Park & Ride site, a number of sites were considered for their suitability based on key criteria – site access to the trunk road, adequate space and ability for expansion, drainage, visual impact, and planning issues. A site to the south of the A96 adjacent to the Smithton Road, and close to the junction with the A96 was selected as the preferred of three options. This site is also adjacent to the proposed junction of the Inverness Trunk Link Road (ITLR) with the A96, thus giving good access to the trunk road network at present and with proposed changes.

Exact arrangements for the access would need to be brought into discussions with Transport Scotland over the ITLR and the proposed dualling of the A96.

Site provision

The site has been designed to accommodate 400 car park spaces, with good quality bus waiting and turning areas, providing a good quality car park comprising:

- surfaced parking area and designated paved pedestrian routes;
- waiting area with heated/lit waiting room;
- moderate level of landscaping;
- lighting and CCTV;
- 2.4m high fence and lockable entrance gate;
- adjacent space for future expansion of the site.

Spaces provided: 400
Construction costs for the Smithton/A96 site total: £2,061,000

Landscaping is considered important to protect the visual landscape quality of the area. This area is zoned for a number of developments and will therefore change in character as this takes place. Discussion with the Planning Department on details will be required to determine acceptable boundaries of the site in relation to other uses, and to agree planning designations.

Bus priority

The route for Park & Ride services into Inverness is via the A96, Raigmore interchange, and then via Millburn Road through to Academy Street. Bus priority into Inverness should be provided along all stretches of this route, in order to provide advantage at traffic congestion points, including future anticipated congestion points.

For each section the bus priority requirements are:

Trunk road – inbound		
• Bus lane from Smithton Road / A96 at existing roundabout.	*bus lane, reinstate carriageway kerb, surfacing, lining*	*£100,000*
• Bus lane along A96 – recommend incorporating to dualling proposals.	*cost dependant on design being integral to A96 dualling work*	
• Pre-signals Raigmore Interchange – ahead of roundabout to allow bus priority to junction		*£90,000*
Local road – inbound		
• Signals (part time) Millburn Road Roundabout, linked to level crossing on Harbour Road		*£180,000*
• Bus lane on Millburn Road from Raigmore Interchange to Falcon Square	*lining, signing, removal of general traffic lane, no new carriageway - extension of bus lane markings;*	*existing committed work*
	additional work lining/surfacing appx	*£5,000*
Trunk road/local road – outbound		
• Signalised gyratory system on Raigmore Interchange to give priority to eastbound traffic	*signals and lining and island kerbing*	*£200,000*
Local road – outbound		
• Signals to meter flows from Harbour Road and Old Perth Road at Millburn Rd Roundabout	*signals*	*£200,000*
• Dedicated left filter lane/bus lane to access A9 northbound on-slip	*lining; splitter island*	*£13,000*

road.

• Lane markings on approach to roundabout to make more efficient use of road space.	*signing / lining*	*£1,300*

Bus frequency, fares and bus quality partnership

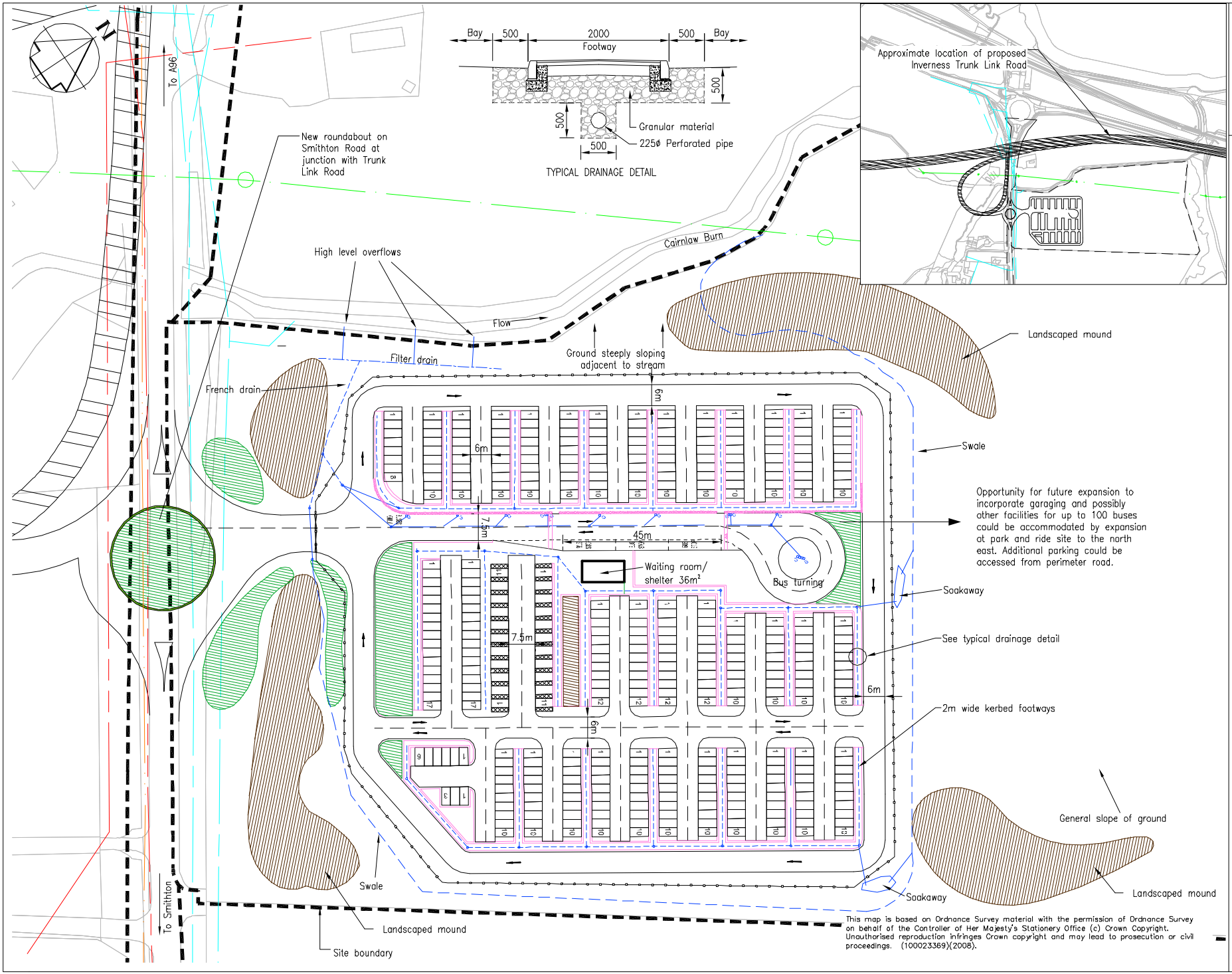
Bus services to the Park & Ride have been considered as either a dedicated service operating directly between the sites to the city centre or as an extension of existing local services. Costs for operating dedicated services are considerably higher than extending local services, and would be likely to require local authority funding. It is proposed that sites should be set up initially to be served by local buses. There are a number of services which currently operate past the proposed Smithton site, which could provide a high frequency service, potentially a higher frequency than at present in the peak periods, thus benefitting both local and P&R users. Further in the future it may be possible that a dedicated service could be commercially viable depending on the level of use at the Park & Ride site.

Minimum frequency for serving the Park & Ride sites is recommended to be every 15 minutes during the peak morning and evening periods, and at least every 20 minutes between peaks. It is possible that a bus operator could provide a higher frequency than the minimum recommended, depending on the method of procurement and discussion with operators if a commercial service. At this stage it is not possible to be more certain what the operational costs would be, but a calculation on a comparative basis for a dedicated service or an extended existing service, clearly shows that an extended service is recommended at the initial opening stage.

To be attractive to car drivers the bus fare from the Smithton site should be in the region of £1/1.50, with free use of the car park. It is also anticipated that the fare could be less if multi-ride tickets were available, as they are on other services. It is also recommended that the fare for Park & Ride does not undercut the local bus service significantly as this could encourage people to switch from existing bus services to the Park & Ride site. Further detailed consideration would be required at the time of providing the site and bus service, but services could form part of a bus quality partnership agreement for Inverness covering both buses and Park & Ride.

Bus operator depot.

Stagecoach as a local operator of bus services in Inverness is keen to be involved with the management and operation of a Park & Ride scheme. They see merit in sharing space at the A96/Smithton site at some point in the future, which would provide bus depot space. This has been suggested as a medium to long term interest, as a replacement for their current depot in Inverness. This could offer benefits in the form of a overall quality bus and Park & Ride for Inverness, providing an enhanced service for the public. It is suggested that this merits further discussion between local bus operators and the council. The site does have potential space to expand and operate this additional facility but this requires further discussion over operational, contractual and planning issues affecting the site.



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Key Plan:

Notes:

Surface Finishes

Roads – Asphalt
Parking – Bitmac
Footways – Bitmac

Anti-ped paving
Ground cover
Trees/shrubs
Turf
Carrier drain
French drain
Swale
Proposed gully
French drain
Security fence

Public Utilities

Potable Water Main
Waste Water Main
British Telecom
Street Lighting

Parking spaces – 5.2m x 2.5m

FEASIBILITY

1					
0					

Client:

HITRANS

Halcrow Group Limited

Halcrow

Project

CONGESTION
INNER MORAY FIRTH

Drawing

SITE 3B

PROPOSED PARKING LAYOUT
PREFERRED OPTION

Drawn by: K Gray	Date: April 2008
Checked by: M Innes	Date: 09-04-2008
Approved by: R Shackleton	Date: 09-04-2008

Drawing No.: CTEANL001/DRG/330

Revision: 1

Drawing Scale: 1:1250 at A3

North of Inverness – Tore A9 corridor

Traffic volumes from the north of Inverness are relatively high causing congestion at times on the Kessock Bridge and the A9 approaches to Inverness. Analysis of where people are travelling to indicates that a smaller proportion is travelling into the city centre from east of the city. There is planned growth in population to the north at Tain and Dingwall at 3-4% to 2024, although this is of a lower magnitude than east of Inverness. Given the combination of congestion on the approaches to Inverness and the expected population growth, it is recommended that a smaller scale Park & Ride site be provided north of the city.

Site selection

Sites immediately to the north of the Kessock Bridge were looked at first for suitability. Two sites were good on location at North Kessock, but existing planning permission for one, and the need for costly access arrangements to the second ruled these out. A site further north near the junction with the A832 at Tore was selected.

Whilst this is further from Inverness and therefore may be less attractive to some drivers, as experience with Park & Ride elsewhere suggests is likely, analysis of trip patterns for Inverness shows that a sufficient number of trips which would be suitable for Park & Ride are travelling from further north than Tore.

This site is able to offer a lower cost option as no changes to existing junctions are necessary.

Site provision

As demand is lower from the north it is recommended to provide a site which still covers the essential requirements but at a lower cost specification.

Provision is for 100 spaces, and as a lower cost option the design features reflect this:

- gravel type surfacing;
- lighting;
- some landscaping;
- fencing;
- no security or waiting facilities on site.

Spaces provided: 100
Construction costs for the Tore/A9 site total: £248,000

It is anticipated that users of the site would be able to use facilities at the service station where there is a cafe / truck stop. The presence of this also gives informal security to the site. Landscaping has been designed to allow this but give privacy to other adjoining property.

Bus priority

The route for Park & Ride services into Inverness is via the A9, Kessock Bridge, and then via Longman Road through to Academy Street. Congestion on the approaches to Inverness starts just north of the Kessock Bridge in the morning peak period. It is recommended that bus priority be provided on the approach to the bridge and then after the bridge the approach to the Longman Road roundabout on the A9. A bus lane could be extended to cover the full stretch of the Kessock bridge, but as there is no space to provide an additional lane to cater for this, it would require removing one of the existing lanes from general traffic. This requires further consideration, modelling the likely queuing impact and discussion with Transport Scotland. A shared use lane, including for example High Occupancy Vehicles (HOVs) may be appropriate and should be kept under consideration.

For each section the requirements are:

Trunk road – inbound		
• Bus lane from North Kessock picnic area to the north end of the Bridge;	*length of bus lane – no new carriageway, each section lane markings only*	*£3,000*
• Bus lane full length of bridge towards Longman Roundabout. (poss offside lane to maximise all vehicle movements through the roundabout.)	*length of bus lane – no new carriageway, each section lane markings only*	*£3,000*
• Bus lane from south of Kessock Bridge, (poss offside lane to maximise all vehicle movements through the roundabout) to Stadium Road.	***option 1*** *– no new carriageway length of bus lane – 250m*	*£1,600*
	option 2 *new carriageway up to 250m – minor level change*	*£150,000*
	option 3 *new carriageway up to 400m – major level change*	*£500,000*

Local road - inbound		
• Bus-controlled traffic signals Longman Roundabout	*signals-4 arm roundabout*	*£400,000*
• Realign Longman Roundabout central island and give way lines	*minor carriageway alteration; lining*	*£5,000*
• Advance signals Harbour Road roundabout	*signals in advance of roundabout*	*£200,000*
Trunk road - outbound		
• Signing to encourage zip merging on approach to Longman Rd roundabout	*signing*	*£1,000*
• Create two lanes outbound on Longman Road approach to roundabout with the offside lane marked as A9(S)	*lining/signing*	*£1,000*
• Bus lane (nearside) Longman Road, from Henderson Road to 75m from Longman Roundabout, then reverting to left filter lane. Create additional lane by using some of the central reserve, between Henderson Road and Longman Roundabout.	*removal of central reservation, carriageway work and lining*	*£150,000*
• Longman Roundabout flow improvements.	*options as listed in inbound section*	

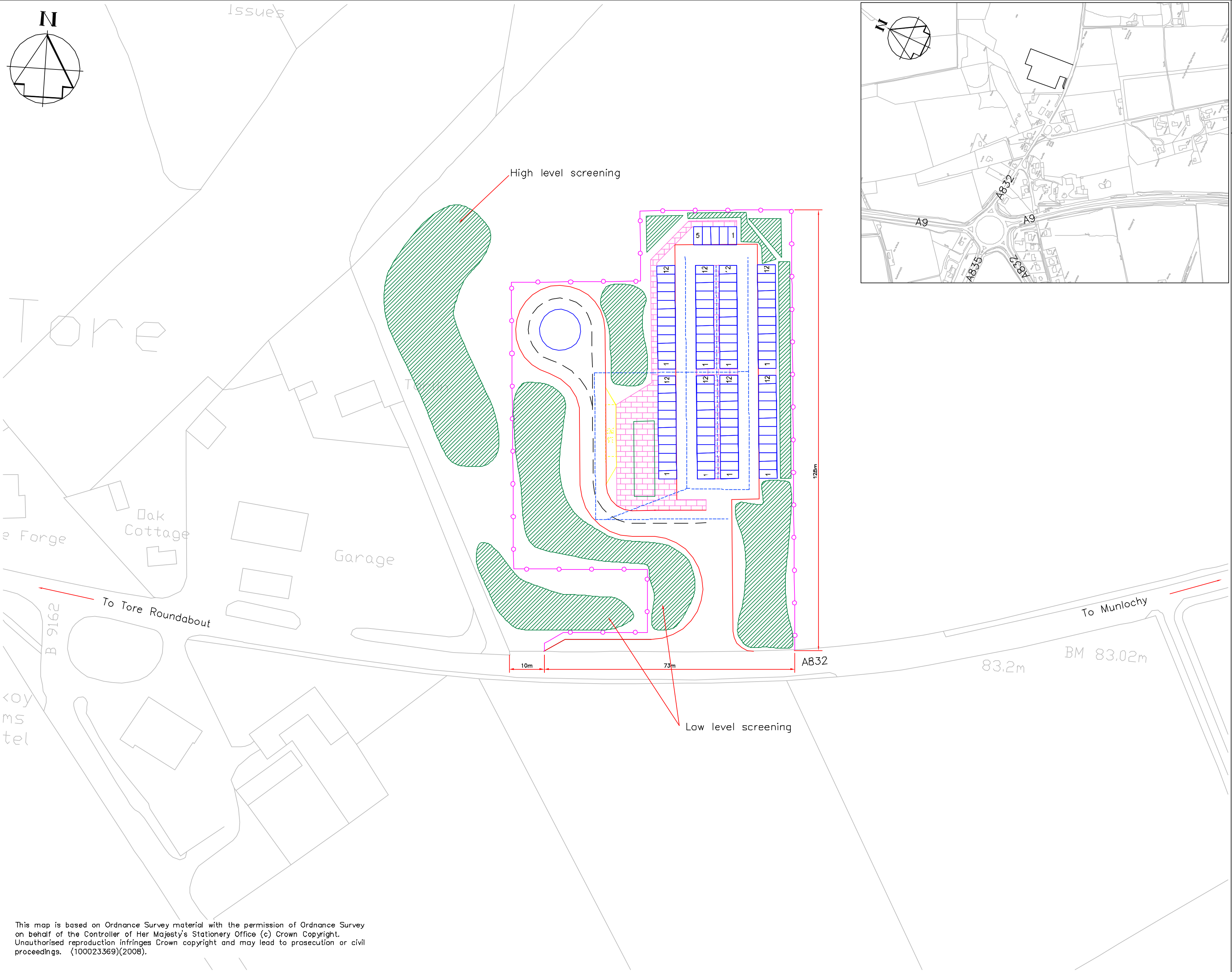
Bus frequency, fares and bus quality partnership

The distance from the Tore site to Inverness and the anticipated number of users would make it appropriate to provide a service to the Park & Ride site which is an extension of one or more of the existing local bus services, there are currently 6 services which operate this route, some with a frequency of 2 per hour. The fare structure would need to be attractive to car drivers, but should not undercut local bus fares if possible.

To be attractive to car drivers the bus fare from the Tore site should be no more than £1, with free use of the car park. It is also anticipated that the fare could be less if multi-ride tickets were available, as they are on other services. Further detailed consideration would be required at the

time of providing the site and bus service, but services could form part of a bus quality partnership agreement for Inverness covering both buses and Park & Ride.

Minimum frequency recommended for serving the Park & Ride sites would be every 15 minutes during the peak morning and evening periods, and at least every 20 minutes between that. It is possible that a bus operator could provide a higher frequency than the minimum recommended, depending on the method of procurement and discussion with operators if a commercial service. At this stage it is not possible to be more certain what the operational costs would be, but a calculation on a comparative basis for a dedicated service or an extended existing service, clearly shows that an extended service is recommended at the initial opening stage.



Key Plan:

Notes:

FEASABILITY

Client: HITRANS

Halcrow Group Limited

Halcrow

Project: CONGESTION INNER MORAY FIRTH

Drawing: SITE 5A PROPOSED PARKING LAYOUT PREFERRED OPTION

Drawing No.: CTEANL001/DRG/510

Revision: 0

Demand Management in Inverness City Centre.

The Highland Council in Inverness has been gradually implementing more central area traffic management measures which discourage and limit private car trips to the centre of the city. These measures are compatible with a policy to promote Park & Ride, but it is recommended that further restrictions on parking time limits and charges are necessary. The parking policy established in 2004 is compatible with P&R promotion. This included policy objectives to:

- **aid traffic management**;
- **reduce demand for long term parking while increasing short term parking opportunities;**
- **support alternative modes of transport and relieve congestion;**

The following measures would be necessary to support a switch to Park & Ride:

- Higher parking charges, time factored to reduce commuter trips - retain the low tariff for short stay parking at the 1, 2 and 3 hour stays of around £1 per hour, but to increase parking charges for over 4 hours to at least £5, this would also preclude any contract rates being available for commuters.
- No free parking over 1 – 2 hr stay, and limited locations
- Residents only parking controls on city periphery and centre.

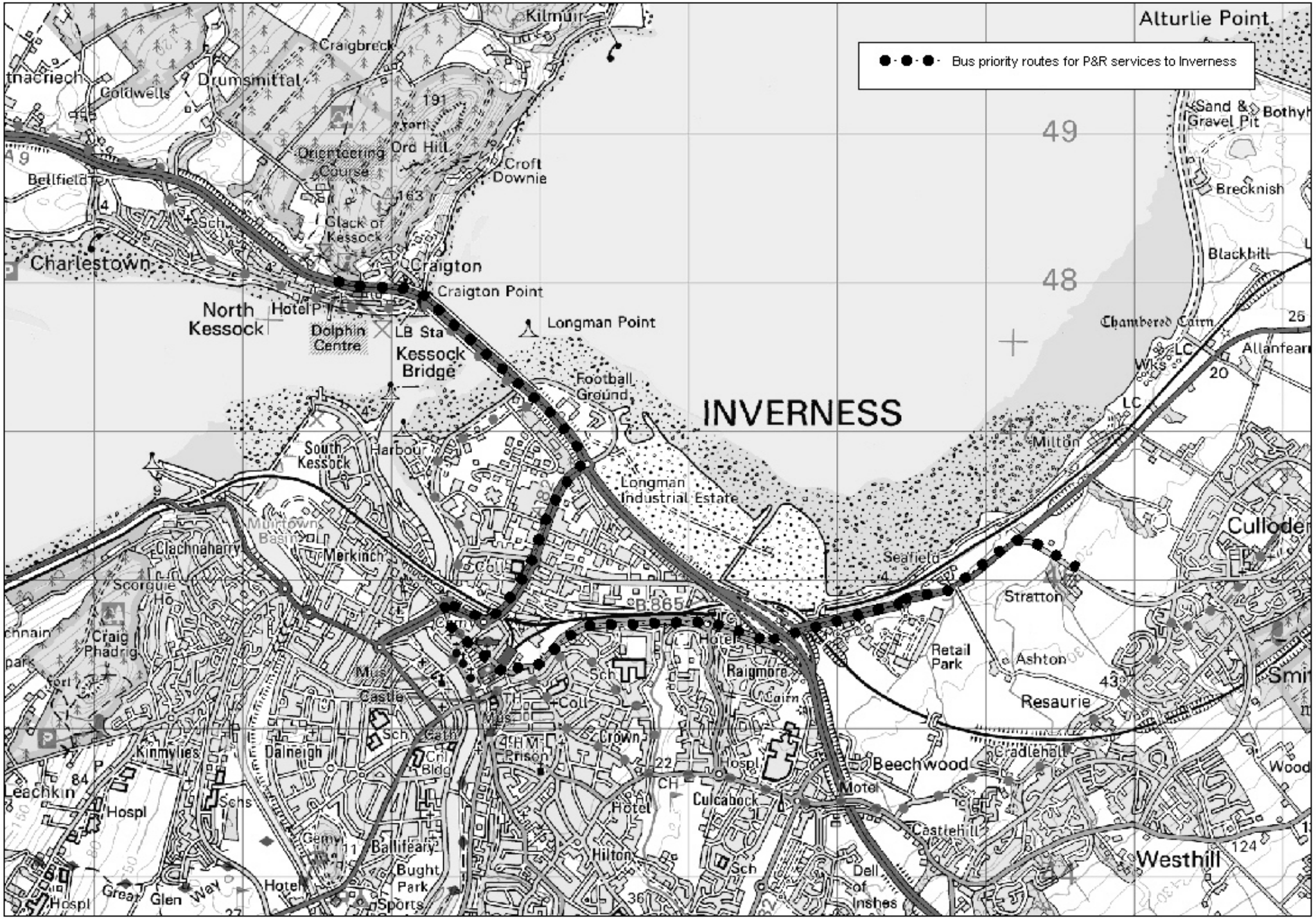
Further work required to take forward.

- Discussion with Transport Scotland to explore the detail for bus priority measures on the trunk roads. Further design work is needed to develop details of measures.
- Work with local bus operators to develop appropriate fare structure and operating requirements, including a 'quality partnership' approach. (Although normal procurement regulations would apply for supported bus services.)
- Consideration of planning issues affecting each site, with Highland Planning Department, including future zoning. Initial views have been taken into consideration in the early site selection stage, but to take a strategy forward requires further detail.

Site summary information.

A summary of the size of car park proposed, and associated cost of provision is listed in the table below.

site	**site construction cost**	**bus priority measures cost**	**initial demand potential**
East A96 Smithton (3B) 400 spaces	£2,061,000	Total £789,300 (trunk road: £390,000) (local road: £399,300)	220 cars per day
North A9 Tore (1D) 100 spaces	£248,000	Total £1,414,600 (trunk road: £809,600) (local road: £605,000)	60 cars per day


Bus priority routes for P&R services to Inverness
INVERNESS
Alturlie Point
Kilmuir
Craigbreck
Drumsmittal
Goldwells
Orienteering Course
Ord Hill
Croft Downie
Bellfield
Glack of Kessock
Charlestown
Craigton
Craigton Point
North Kessock
Hotel
Dolphin Centre
LB Sta
Kessock Bridge
Longman Point
Football Ground
Harbour
South Kessock
Longman Industrial Estate
Muirtown Basin
Clachnaharry
Merkinch
Scorguie
Craig Phadrig
Castle
Kinmylies
Dalneigh
Leachkin
Hospl
Ballifeary
Bught Park
Sports
Great Glen Way
Raigmore
Retail Park
Ashton
Resaurie
Beechwood
Culcabock
Hilton
Dell of Inshes
Westhill
Cradlehall
Castlehill
Stratton
Seafield
Milton
Culloden
Brecknish
Blackhill
Sand & Gravel Pit
Chambered Cairn
Allanfearn
B865

1 Introduction

1.1 Purpose and Scope of Report

1.1.1 HITRANS commissioned Halcrow to consider the potential for Park & Ride to meet the transport needs of Elgin and Inverness. This study looks at demand potential for both cities, in the context of future growth in and around the cities and current and future transport policy.

1.1.2 For both cities we looked at potential demand analysing trips from origin and destination survey data, identifying the number of trips that could potentially be attracted to Park & Ride, based on their journey pattern. Further consideration was given to the likelihood of transferring, given traffic conditions and transport policy, particularly parking policy.

1.1.3 In discussion with HITRANS and Moray Council it was agreed that further work to identify potential sites would not be necessary given the conclusion that Park & Ride would be unlikely to address Elgin's transport issues.

1.1.4 For Inverness following the demand conclusions sites were considered around the city for their suitability to provide Park & Ride. Indicative areas had been identified by HITRANS and a number of sites in the vicinity of these on four approaches to Inverness were looked at in more detail. Analysis included planning issues, site locations and local topography. For one of the locations, South Inshes on the A9, sites were identified but it was agreed that these would not be worked up in detail due to the uncertainty on the final designs for the route and junction arrangements with the A9 and the Inverness Trunk Link Road (ITLR).

1.1.5 Preliminary outline site design with costs were worked up for the agreed preferred options for the three remaining locations, and for a fourth option at Tore indicative design and costs were established. For each of the sites the potential for bus priority on the routes into the city centre has been set out.

1.1.6 This report includes discussion and recommendations on the necessary transport policy to support Park & Ride including parking policy and charges.

2 Demand Potential

2.1.1 HITRANS commissioned Halcrow to consider the potential for Park & Ride to meet the transport needs of Elgin and Inverness. A range of factors was considered comparing those in both Elgin and Inverness to other cities in Scotland and the rest of the UK where Park & Ride is in operation. Current conditions and anticipated future scenarios are discussed.

2.1.2 This report looks at the following for Elgin and Inverness:

- population and catchment area;
- analysis of traffic movement through origin/destination survey data;
- current traffic conditions in and around Elgin;
- future traffic conditions associated with anticipated economic and population growth.
- traffic management and parking policy – essential constraint measures.

2.1.3 Background information on current parking conditions is noted and further management/policy requirements for parking which are considered essential to support any Park & Ride schemes are outlined.

2.2 Elgin

2.3 Population and catchment area potential for Elgin.

2.3.1 Population figures for Elgin and its economic hinterland are compared against other cities with Park & Ride to consider whether on this basis Park & Ride might be feasible. Population for Elgin and Moray (source Moray Council) with projections to 2024 are shown in the table below.

2.3.2 Elgin Figures are factored up as per the ratios in the 2024 projections for Moray.

	2001	**2004**	**2024**
Moray	86940	87720	90942
Elgin	20829	22703	23550

Table 2.1 – Moray and Elgin Population Figures

2.3.3 Elgin is the major centre for a wider rural area with a relatively low population density, but close to Elgin there are a number of settlements which have strong economic links to Elgin. If Elgin plus larger settlements are added together :

- Elgin 20,829
- Kinloss 1,900
- Lossiemouth 6,800
- Forres 8,900
- Keith 4,400
- Buckie 10,000

- Total 52,829 (2001 fig)
  factored up by 4.6% to 2024 projection
- Total 55260 (2024 projection)

2.3.4 This projected population should be compared to other cities which have successful Park & Ride in operation. On this basis it is possible that Elgin plus surrounding settlements is big enough to support Park & Ride. Comparison cities are listed below.

2.3.5 The populations of the smallest cities with Park & Ride in operation are listed below. It should be noted that these locations all have additional factors supporting the feasibility of P&R.

- Perth 43,450, Perth & Kinross Council Area 137,520
- Oxford 140,000, Oxfordshire 500,000
- Cambridge 108,000, Cambridgeshire 550,000
- York 181,000, Yorkshire 314,000
- Bath & NE Somerset 169,000

2.3.6 Perth, with a city population of 43,000 is the smallest city with a successful Park & Ride system. Its Broxden site is well used, although boosted by additional use for intercity travel to Edinburgh, Glasgow, Aberdeen. Congestion at times in the centre of Perth, plus car parks reaching capacity at times during shopping periods, create conditions to make P&R viable.

2.4 Number of city bound trips in the AM period.

2.4.1 Data which was collected to create the traffic model for Elgin gives the origin and destination of vehicle trips (details of data collection in Elgin STAG report 2007). Analysis of this shows how many trips fit the pattern which could be met by Park & Ride. To consider what proportion of trips in the AM period for Elgin would potentially shift to P&R, the traffic model origins for trips from outside the city

were divided into four approximate zones, those from the West, travelling on the A96, those from the East travelling on the A96, those coming from routes from the north, and those from routes from the south. For each of these route sectors those bound for city centre zone destinations were counted as follows, with city bound totals including trips to Dr Grays Hospital (total from that route for all destinations in brackets):

- A96 from west – 551 (1453)
- A96 from east – 716 (1807)
- trips from south – 313 (952)
- trips from north – 373 (1077)

Total 1954 city bound external origin trips
(5289 total from external origins)

2.4.2 Of these a proportion will be deliveries, and other non-stopping trips, a further proportion are not likely to shift to P&R because of availability of private parking space, willingness to pay (higher) parking charges, and insufficient perceived benefit. On the assumption that with all other complimentary measures in place, P&R could attract 20% of these AM period trips, that would be a total for each of the sectors of:

- A96 from west – 20% of 551 = 110.
- A96 from east – 20% of 716 = 143
- trips from south – 20% of 313 = 62
- trips from north – 20% of 373 = 74

2.4.3 20% extraction rate was used based on other successful locations typical extraction rate of trips to P&R; some locations exhibit lower rates of extraction and are still considered viable in terms of providing part of the transport network.

2.4.4 As the data shows a higher number of city bound trips come from east of Elgin. Therefore a combination of A96 east trips with either those from the north or the south would give the best potential site locations. A 20% capture rate of east and south combined would be 200 total AM period trips. East combined with North would be approximately the same, due to pattern of dispersal to the north.

2.4.5 A site to the west of Elgin at a location that could pick up a reasonable proportion of traffic from either the north or south approaches as well is considered to have the potential to attract approximately 160-170 cars based on current travel patterns.

2.4.6 The above trip totals are calculated on 2006 base; given the AM growth to 2012 is 11%, based on future development commitments, and assuming similar patterns of movement, this would increase the total to 220 vehicles from the east, and up to

190 from the west, in the AM period which potentially could be expected to divert to P&R, given further restraint in the city centre.

2.4.7 In terms of the number of trips, the data indicates a marginal but positive position for Park & Ride to be successful. The figures indicate that a total of 400 cars per day could be attracted to Park & Ride over one site to the east and one to the west, which could be served by a bus service operating between the two via the city centre. Further prerequisites for viability are discussed further in the next paragraphs.

2.5 Traffic delays, traffic growth and suitable conditions.

2.5.1 In terms of the number of trips, the data indicates a marginal but positive position for Park & Ride to be successful. In addition to there being a core base of trips which can be catered for by Park & Ride in those locations where it is viable a number of other factors usually exist. Primarily there needs to be at least a perceived, but generally a real time advantage in switching to Park & Ride, along with a financial advantage. Time advantage can be gained in terms of finding a parking space, bus priority and journey time over general traffic on routes to the city, lack of queuing for car parks, and avoidance of congested parts of the city/town road network. Financial advantage can be managed by parking charges (or congestion charges if appropriate) discussed further below.

2.5.2 Current levels of traffic delay and congestion in Elgin are reported as a problem locally, but the pattern and length of delays are not considered a sufficient incentive to switch to P&R. Looking to future traffic conditions the forecast from the development growth to 2012 does indicate that in a 'do nothing' scenario conditions may worsen sufficiently with journey time/vehicle hours increasing by 29% in the AM peak, and for the other periods to a greater degree as listed in the table below.

	2006	**2012**	**% change, veh hours**	**% change in trip volume**
AM peak	1076	1385	29%	11%
PM peak	1354	1782	32%	12%
Sat peak	1477	2240	52%	14%

Table 1.2 - Vehicle hours with anticipated growth due to developments

2.5.3 Although Saturday delays are greater than during the working week, it is considered that the nature of retail trips on Saturday means that these are less likely

to transfer to P&R, as retail parks a) with parking; b) nature of goods purchased are a major part of the journey purpose. In addition the value drivers put on their journey time during 'leisure' shopping trips is lower than journeys to work; therefore they are prepared to experience longer delays before switching mode.

2.5.4 This analysis shows that future conditions (traffic congestion) might make Park & Ride viable, although Moray Council are currently considering expansion of the road network to meet the future traffic needs of Elgin. If these proposals are implemented they are designed to reduce traffic delay and congestion and would in simplistic terms work against the conditions required for Park & Ride. There may still be some scope for P&R but it would be advisable to reconsider alongside the final option/s most likely to be taken forward by the Council.

2.6 Traffic management and parking policy - essential constraint measures.

2.6.1 Given a potential base of trips which would switch to Park & Ride as discussed in the previous paragraphs, the current traffic management and parking policies would need changes to create the conditions to switch. The following measures would be essential to some degree to produce a switch to Park & Ride:

- Higher parking charges, time factored to restrict commuter trips predominantly.
- No free parking over 1 – 2 hr stay, and limited locations
- Residents only parking controls in city periphery and centre.
- Bus priority connections from P&R if possible, at congestion points.

2.6.2 Given the current relatively modest traffic delay and congestion it would take a very radical approach to parking in the city centre to provide an incentive to switch to P&R. Most parking spaces would have to be closed or charged at a very high daily rate (in excess of £10 per day). If the car parks are considered appropriate for alternative development there may be incentive to close them and change the use of the land. Given that the congestion created by people travelling to these car parks at present is relatively modest the question for Elgin is whether the benefit of removing car parking from the centre and relocating to the edge is desirable and gives sufficient improvement to overall quality of the city. In traffic/transport management terms the incentive is small. It should be recognised that a radical approach to limiting town centre parking may be contrary to some other aims of the council.

2.6.3 Part of the issue of traffic movement is the proportion of the trips which are generated within Elgin (ie. origins in Elgin) or travelling through Elgin, none of these would be attracted to switch to Park & Ride and therefore alternative traffic policy/measures are necessary. Further discussion and analysis of these issues is considered in the Elgin STAG report.

2.6.4 Details of what level parking charges would be required, and the locations for other parking restrictions, would need to be assessed in detail to provide the complementary restrictions to support Park & Ride. This has not been done as part of this study because we conclude that the overall conditions of the transport network do not support Park & Ride as a viable option for Elgin in the near future.

2.7 Elgin Rail Station / Interchange potential.

2.7.1 Elgin rail station car park is currently under provided for and at capacity throughout the day. Whether an expanded site linked to rail and bus P&R would have any merit has been given preliminary consideration. This could have benefits for travel to Inverness and Aberdeen as well as local trips to Elgin. However the location of the rail station still would bring car trips close to the centre of the town, and therefore not take trips off the road network sufficiently far enough from the city centre to reduce traffic on the network. This option provides no significant benefit in switching from people driving to existing car parks in the town, for those trips bound for Elgin.

2.7.2 The benefits of expanding the rail station car park and interchange with local bus services to meet the overall needs of travel for Elgin and its surroundings should not be dismissed but that is a wider consideration than looking at Park & Ride options for Elgin.

2.8 Conclusion Elgin demand potential.

2.8.1 Based on existing traffic conditions and population P&R is unlikely to be successful in Elgin, but given future growth projections for Elgin with its hinterland, P&R is potentially viable at the lower end of scale. Feasibility would critically depend on willingness to impose restraint measures in the city centre, particularly removing free long term parking, and secondly supported by bus priority at any critically congested locations on the P&R bus route.

2.8.2 The current levels of traffic delay and congestion are the primary reason why P&R is not viable at present as the incentive to switch mode is not sufficient. If the proposals to expand the road network capacity in Elgin go ahead, this would be expected to reduce the incentive to switch mode in the future.

2.8.3 Future development of a bypass for Elgin may offer a suitable location for a Park & Ride site, however if conditions of congestion do not create the pressure to switch mode, even with a suitable location it is unlikely a scheme would be viable.

2.8.4 Park & Ride may be desirable for Elgin as part of the options for the future if a culture of reduced dependence on the private car is an overall objective. As such Park & Ride can offer an alternative option which reduces the impact right in the

city centre for those without access to bus or travelling too far to switch to non motorised modes.

2.8.5 However given that the congestion created by people travelling to city centre car parks at present is relatively modest it is not considered that there is sufficient benefit for Elgin in removing car parking from the centre and relocating to the edge of the city. In traffic/transport management terms the incentive is small at present and in the foreseeable future with current plans this is not expected to change. Reconsideration of P&R potential could be undertaken when further decisions are made on road network changes in Elgin.

2.9 Inverness

2.10 Population and catchment area potential for Inverness.

2.10.1 Population figures for Inverness and its economic hinterland are compared against other cities with Park & Ride to consider whether on this basis Park & Ride might be feasible. Population for Inverness and Highland with projections to 2024, an average of 6% increase, are shown in the table below.

		Population		
Ward No.	**Ward Name**	**2004**	**2024**	**% Change**
8	Tain and Easter Ross	8745	9083	3.9
9	Dingwall and Seaforth	11906	12260	3
10	Black Isle	9231	9629	4.3
19	Nairn	10953	12148	10.9
13	Aird and Loch Ness	9554	10263	7.4
18	Culloden and Ardersier	11159	11464	2.7
20	Inverness South	7639	7906	3.5
	sub total	**69187**	**72753**	
14	Inverness West	8141	8669	6.5
15	Inverness Central	12301	13342	8.5
16	Inverness Ness-Side	10850	11635	7.2
17	Inverness Millburn	8843	9365	5.9
	Inverness wards total	**40135**	**43011**	**6.1**
	All wards in commuting area	**109322**	**115764**	**5.9**
	Highland overall	211340	217637	3

Table 2.3 – Population in Inverness and Surrounding Wards

2.10.2 Inverness is the major regional centre for North/North West of Scotland. Inverness itself has a large population for this part of Scotland, and at circa 70,000 is dominant with the next tier of settlements being around 10,000 to 12,000. The table above includes those settlements which are within regular commuting distance of Inverness, data from the journey to work figures (Census 2001) indicate the proportions of people within those locations that travel to Inverness, which is included in appendix A. An assumption of up to 1 hour journey time was made for a reasonable maximum commuting distance.

2.10.3 Inverness city population accounts for just over 60% of the total considered within the journey to work area for Inverness. The surrounding settlements have strong economic links to Inverness. Outside this area Inverness is relevant as the only major economic centre, but the distances are too great for regular daily travel.

2.10.4 This projected population should be compared to other cities which have successful Park & Ride in operation. On this basis it is possible that Inverness

plus surrounding settlements is big enough to support Park & Ride. Comparison cities are listed below, which are the smallest with Park & Ride in operation.

2.10.5 It should be noted that these locations all have additional factors supporting the feasibility of P&R.

- Inverness commuting area 69,500, total commuting area 109,300
- Perth 43,450, Perth & Kinross Council Area 137,520
- Oxford 140,000, Oxfordshire 500,000
- Cambridge 108,000, Cambridgeshire 550,000
- York 181,000, Yorkshire 314,000
- Bath & NE Somerset 169,000

2.10.6 Perth, with a city population of 43,000 is the smallest city with a successful Park & Ride system. Its Broxden site is well used, although boosted by additional use for intercity travel to Edinburgh, Glasgow and Aberdeen. Congestion at times in the centre of Perth, plus car parks reaching capacity at times during shopping periods, create conditions to make P&R viable.

2.10.7 Intercity coaches to and from Inverness may consider a new park & ride site on the edge of Inverness attractive as an interchange point, however it is unlikely to attract the same frequency of services and pattern of traveller use as Perth, the proximity of Perth to Edinburgh and Glasgow makes higher frequency trips attractive. Discussion with Stagecoach suggests that they consider this possibly viable in the future; although present data does not suggest a case, trip patterns could change and develop which would support a case, therefore we would not wish to rule it out completely.

2.11 Number of city bound trips in the AM period.

2.11.1 Data provided by The Highland Council (Faber Maunsell commission) on trip origin/destination matrices was used to assess in more detail the potential demand for Park & Ride services on each of the four main corridors into Inverness.

- Site 1 A9 North Kessock
- Site 2 A9 South - Inshes
- Site 3 A96 East - Smithton
- Site 4 A82 West (GBR)

2.11.2 The data provided gave 1 hour during the am peak, 8-9am. Surveys were undertaken during late summer, when Inverness experiences its peak traffic due to the return of schools in Scotland whilst overlapping with tourist traffic. The base matrices were for 2006. Faber Maunsell also supplied matrices for 2021 based on expected development for the Inverness area. Figures for both years are shown in the table 2.4.

2.11.3 For our analysis we assumed that the total commuting period, and therefore potential demand for P&R would extend beyond the 8-9am peak, therefore this figure was doubled as an approximate estimate of total potential commuting traffic. Of these a proportion will be deliveries, and other non-stopping trips, a further proportion are not likely to shift to P&R because of availability of private parking space, willingness to pay (higher) parking charges, and insufficient perceived benefit. On the assumption that with all other complementary measures in place, P&R could attract 20% of these AM period trips, as shown in table 2.4.

2.11.4 20% extraction rate was used based on other successful locations typical extraction rate of trips to P&R; some locations exhibit lower rates of extraction and are still considered viable in terms of providing part of the transport network. A lower extraction in the Inverness scenario would not however expect to provide a sufficient demand to operate a viable park & ride.

Definition of City Centre for trip analysis.

2.11.5 For the purposes of this analysis the city centre has been defined as the following zones.

- Zones 587, 588, 589, 603, 605, 611, 612, 6203, 7004, 7005, 7006, 7008, 7010 and 7011.

2.11.6 Figure 1 below highlights the above named zones which comprise the city centre area.

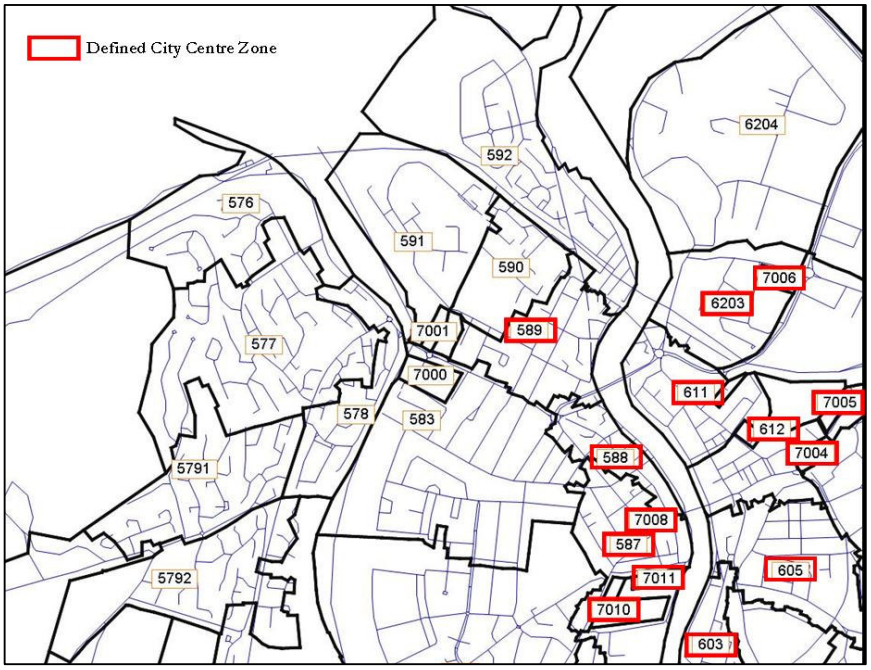


Figure 1 - Core City Centre Area

2.11.7 The defined city centre area includes the offices of major employers and trip generators, including The Highland Council offices, Inverness College and the Eastgate Shopping Centre.

2.11.8 All zone plans covering the Inverness area can be found in appendix B.

2.12 Discussion.

2.12.1 For each of the 4 potential Park & Ride sites an analysis has been carried out on the number trips passing through its corridor to the pre-defined city centre area that could make use of a Park & Ride facility.

2.12.2 In addition analysis has been carried out to include both the city centre area and another major trip generator, the Raigmore Hospital site (zone 616), which also comprises Beechwood Business Park and a number of other businesses with high staff levels. Further analysis of trips to sites around Harbour Road and Longman

Road, (zones 6202 and 6204), have been carried out as they are most significant for trips from the north and east, and have been included in the figures looked at next.

2.12.3 From all the zone data available, a total of 1913 trips were made to Inverness city centre and a total of 2476 trips when combining the city centre and Raigmore Hospital site in the AM peak period. For trips from all zones in the matrix this shows that there are over 500 additional trips to the hospital and adjoining sites. But for trips with origins along the corridors which have Park & Ride potential the additional trips to the hospital zone amount to only an a further 50 trips in the AM peak, therefore the remaining 450 are coming from within Inverness or the few routes not captured by one of the four potential sites. On these figures we have concluded that demand for a hospital service is likely to be low unless patients/visitors can be attracted to Park & Ride, which is not considered likely as the visits tend to be shorter in nature.

2.12.4 It is worth noting that 15% (287) of all trips to the city centre had both their origin and destination within the predefined core city centre area. Also, 67.2% (1285) of all trips to the city centre area came from either inside the ring of potential Park & Ride sites or on routes where using P&R will not be a likely option (e.g. trips to Inverness eastbound along the A862).

2.12.5 11 zones out of 103 account for 52% (993) of trips to the city centre. Of these 11 zones, 7 are inside the ring of potential Park & Ride sites. Of the 4 remaining major origin zones, trips from three of these (573, 574 and 627) would be captured by a Park & Ride on the A96 East at Smithton and trips from the remaining zone (1) could be captured by a Park & Ride site on the A9 at North Kessock.

2.12.6 A summary of trips for each park & ride potential corridor and the associated zones are listed below. Column f is a calculation of 2.5 hrs approximate commuting period, and is therefore a simple doubling of the peak hour from the matrix; this has then been multiplied by 20% to give the anticipated extraction rate from the trips with the suitable origin/destination pairs. (20% is based on evidence from other cities operating P&R services.)

- Site 1: Origin Zones 1, 548, 550 and 551.
- Site 2: Origin Zones 5, 6, 566, 569, 602, 608, 609, 610, 7003 and 7015.
- Site 3: Origin Zones 7, 8, 573, 574, 624, 625, 627, 628, 629, 630, 631, 634, 652 and 653.
- Site 4: Origin Zones 3, 562, 581 and 651.

a	b	c	e	f
	Destination	**Matrix Trips 2006 8-9am**	**Matrix Trips 2021 8-9am**	**2021 trips x 2 based on 2.5hr likely commuting period x 20% extraction rate** e x 2 x 20%
Site 1 A9 North (North Kessock)	City Centre	97	185	74
	Longman/Harbour Road industrial estate	428	452	180
Site 2 A9 South (Inshes)	City Centre	43	17*	18
Site 3 A96 East (Smithton)	City Centre	462	532	212
	Longman/Harbour Road industrial estate	371	175*	163
Site 4 A82 West (GBR)	City Centre	24	18*	10.4
	Note: * some destinations have reduce trip totals in the 2021 matrices due to land use changes			

Table 2.4 - Trip destinations and potential Park & Ride extraction

2.12.7 In the table above the assumption has been that the pattern of commuting will remain at current levels. It is worth considering whether the pattern of growth is likely to result in higher proportions of commuting from the East in particular and also from the North. The A96 corridor is predicted to accommodate 30,000 more people over the next 30 years, and Nairn ward 10%, which is the highest in the region, and for Tain and Dingwall growth is expected to be 3-4%. It is not expected that commuting rates will be any lower proportion of population than at present; therefore we can assume that the above figures are a conservative estimate and could potentially be higher.

2.13 Shopping trips and visitor/tourist trips.

2.13.1 It would be assumed that some shopping trips would be attracted to Park & Ride sites, as some users may find the service more convenient. To create a strong incentive significantly higher parking charges would be necessary for even short stay. The delays into the centre of the city do currently occur in locations which would give a reasonable incentive to switch to Park & Ride. Figures to assess the potential to switch are not available but a cautious estimate based on general patterns at other sites, is an additional 20% on the numbers of commuters.

2.13.2 There are substantial numbers of visitors/tourists to the Inverness area, many of whom arrive by car. Those staying in Inverness are less likely to use a Park & Ride service as they are likely to be parking at a hotel or near to a B&B overnight. Day trips into Inverness are a greater potential market, if sites are well publicised on approaches as those unfamiliar with the city are often happy to switch. The current counts of numbers of day trips to Inverness by tourists is 274,500 per annum, which if divided over 8 months of the year to give a crude daily average, gives approximately 1100 day trips to Inverness. The data does not exist to determine how many might be coming along any of the potential Park & Ride corridors. Some of these will be arriving by public transport/coach but a considerable number will be by private car.

2.13.3 The A82 site is considered likely to be most attractive to these users as it is a major route in from the west coast.

2.14 General Patterns of movement and potential P&R demand.

2.14.1 It is understood and observed that there are high volumes of trips on the identified Park & Ride corridors, however not all of these trips create demand for a Park & Ride service, the origin and destination data was analysed to understand what the general trip patterns are. The data in the table below shows that the movement from each of the corridors into Inverness has high volumes in the peak period, however the matrices also show that the number of trips to the city centre is a relatively small proportion and that a greater number are travelling to zones outside the core of the city to locations that would be difficult to serve by public transport. This table shows 1 hour peak number of trips, from each of the origin zone/corridors comparing the number going to city centre zones only with all wide area Inverness zones, and further to all trips originating from that corridor.

This shows that only 5% (678) of all trips in the matrix have the right pattern to be served by Park & Ride. To illustrate why these corridors are known to be busy with high volumes of trips to Inverness, but not necessarily suitable for a Park & Ride system we looked at what zones they were travelling to from these same origins, this demonstrates that a substantial proportion are travelling to wider area of Inverness, 4963 trips which is 34% of all trips in the matrix. Nearly 40% (5676) of all trips in the matrix come from outwith Inverness on potential P&R corridors and therefore the remaining trips have origins within Inverness.

8-9am	to Inverness city centre (% of all Inverness zones)	to all Inverness zones (incs city centre zones)	all trips (ie inc to zones outwith Inverness)	total trips in matrix
	2021 figures	*italics*		
corridor 1 North North Kessock Site	97 (9%) *185*	1154 *2210*	1483 *2748*	
corridor 2 South Inshes Junction	43 (6%) *17*	630 *1014*	803 *1701*	
corridor 3 East Smithton A96	462 (16%) *532*	2999 *3859*	3176 *4119*	
corridor 4 West A82 Torvean	24 (18%) *24*	180 *386*	214 *547*	
total percentage of all matrix trips **total 2021**	**678** 5% ***758*** 3%	**4963** 34% ***7469*** 29%	**5676** 39% ***9115*** 35%	**14629** ***26203***

Table 2.5 – All trips on Park & Ride corridors

2.14.2 These figures show the proportion of the trips which are generated within Inverness (i.e. origins in Inverness) or travelling through Inverness, none of which would be attracted to switch to Park & Ride and therefore alternative traffic policy/measures are necessary. In addition the number of trips on corridors passing the proposed Park & Ride sites which then have destinations either outwith Inverness or to the wider/peripheral areas of the city are included. These trips would be very unlikely to switch to Park & Ride, because they are likely to have parking space at their destination and the ability to provide an efficient and adequate bus service to such sites is compromised by the dispersed nature of the sites around a large area. Park & Ride is typically only successful where trips are

to the core central area where there is a sufficiently dense concentration of trip destinations. Specific sites on route or at a tangent can be served if the destination has sufficient trip generation, but locations around Inverness have more dispersed trip patterns.

2.14.3 The figures from the 2021 projected matrices, as included in the table above indicate that although the total number of trips into Inverness increases the proportion of the total using the Inverness road network decreases, presuming therefore that a greater proportion are making trips outwith the city in the AM peak.

2.14.4 The nature of a number of the businesses on the eastern periphery of Inverness, is light industrial, warehousing etc, which tend to generate a number of vehicle trips in and out during the day and are therefore not suitable to transfer to Park & Ride. The matrix data suggests that a fairly high proportion of trips are of this nature as noted in the table below.

No of trips – origin is all zones in matrix to zone number below	**Direction of travel/destination zone**
801	heading north on A9 out of Inverness
547	south west periphery / offices near Fairways golf course
364	north of Raigmore Hospital
714	immediately west of A9/A96 junction
1052	Longman Rd/Harbour Road industrial estate area
627	Industrial estate south west of A9
435	North of Tesco/east of Hospital
522	Smithton Retail Park
1913	All City Centre zones

Table 2.6 – Zones with high number of destination trips across whole matrix (2006 data)

2.14.5 In conclusion there is reasonably strong case for a Park & Ride site on the east of the city to provide for trips to the city centre; the demand from the north is smaller for city centre trips, but enough to make some service worthwhile. From the north there is a reasonable volume of trips going to Longman estate; but the ability to attract those to a Park & Ride site is low because of the nature of the sites, which tend to have their own free parking, and the likelihood that a number of the users to these sites then require vehicles during the day. Overall there is a weaker case for a northerly site but a lower cost option may be appropriate to take forward.

2.14.6 This conclusion presumes that the patterns of work trips remain the same with high numbers to the periphery of Inverness. If this changes to a greater concentration in the city centre, then the case for a site to the north could change, but data to assess this potential is not available.

2.14.7 As shown in the table above the case for the sites on the west and south of the city is not supported by data from the matrix for the peak commuting period. It is however intended that these sites would cater for off peak tourist trips to the city which are not captured in the matrix data. Further pre-requisites for viability are discussed further in the next paragraphs.

2.15 Traffic delays, traffic growth.

2.15.1 In terms of the number of trips, the data indicates a marginal but positive position for Park & Ride to be successful. In addition to there being a core base of trips which can be catered for by Park & Ride in those locations where it is viable a number of other factors usually exist. Primarily there needs to be at least a perceived, but generally a real time advantage in switching to Park & Ride, along with a financial advantage. Time advantage can be gained in terms of finding a parking space, bus priority and journey time over general traffic on routes to the city, lack of queuing for car parks, and avoidance of congested parts of the city/town road network. Bus priority recommendations are included further in this report. The potential for managing financial advantage through car parking chargers is also discussed later in this report.

2.15.2 Current levels of traffic delay and congestion in Inverness are reported as a problem locally, particularly on the trunk road network around and through Inverness. Delays at present are considered sufficient to encourage a switch to Park & Ride.

2.15.3 The A9 has had growth in trips between 2003 and 2006 as high as 32% on Kessock Bridge, and 9% between Raigmore interchange and Longman roundabout; the A96 between Raigmore and Smithton access has shown 8% growth over the last 3 years. It is well understood given the level of growth projected for the A96 Corridor east of Inverness, of 30,000 households in 30 years, that delays and congestion on the east of the city and the A9 through Inverness are predicted to increase. Proposals exist to provide a link road from the A96 to the A9 which is intended to accommodate growth and relieve existing congestion, but due to traffic growth predictions it is expected that congestion will still occur during peak periods, particularly at junctions. Kessock Bridge congestion is also expected to worsen and cause greater delay particularly during the morning peak period.

2.15.4 Delays occur in particular during the AM peak on:

- A96 at approach to Raigmore interchange
- A9 south bound crossing Kessock Bridge
- A9 between Longman Roundabout and Raigmore interchange
- Longman Road
- B9006 from Inshes Roundabout to Millburn Roundabout (Old Perth Road)
- Millburn Road from approx Morrisons to Falcon Square
- City Centre (Eastgate/foot of Culduthel Road)
- Kenneth Street/Friars Bridge (A82) (but note intention to route A82 P&R bus via Ness Walk, if priorities are changed along this route).

2.15.5 Some of the delays listed above are less relevant to all vehicle traffic but are particularly relevant to potential Park & Ride routes as discussed in chapter 6.

2.16 Traffic management and parking policy - essential constraint measures.

2.16.1 Given a potential base of trips which would switch to Park & Ride as discussed in the previous paragraphs, the current traffic management and parking policies would need changes to create the conditions to switch. The following measures would be essential to some degree to produce a switch to Park & Ride:

- Higher parking charges, time factored to restrict commuter trips predominantly.
- No free parking over 1 – 2 hr stay, and limited locations
- Residents only parking controls in city periphery and centre.
- Bus priority connections from P&R if possible, at congestion points.

2.16.2 The Highland Council parking policy was set out in a committee report in March 2004. This included policy objectives to:

- **aid traffic management**;
- encourage and support business and shopping activity in all city, town and village areas;
- be cost effective;
- **reduce demand for long term parking while increasing short term parking opportunities;**
- **support alternative modes of transport and relieve congestion;**
- direct the public's view and perception of parking charges such that they are not viewed as pernicious charges but as good traffic management.

2.16.3 Development of Park & Ride assists the overall objectives but in parallel it will be necessary to take forward complementary proposals which limit long stay parking in the city centre, by increasing the charges and by introducing maximum stay periods in central locations. One of the policy statements is that parking charges should not be at 'levels which might discourage vehicle users from visiting an area', where Park & Ride is proposed it would be necessary to increase longer stay parking charges to encourage a switch, however the Park & Ride itself would be providing spaces to encourage visitors to the city centre and should be seen as complementary.

2.16.4 The Highland Council in Inverness has been gradually implementing more central area traffic management areas which discourage and limit private car trips to the centre of the city. These measures are compatible with a policy to promote Park & Ride, but it is suggested that further restrictions on parking time limits and charges are considered to enhance the attractiveness of Park & Ride.

2.16.5 Parking charges are approximately £1 for 1 hour, up to £3 for 24hrs. It would be recommended to retain the low tariff for short stay parking at the 1, 2 and 3 hour stays. To support a Park & Ride system it would be recommended to increase parking charges for over 4 hours to at least £5, this would also preclude any contract rates being available for commuters.

2.16.6 Details of what level parking charges in specific locations would be required, and the locations for other parking restrictions, such as maximum stay restrictions, would need to be assessed in detail to provide the complementary restrictions to support Park & Ride.

2.16.7 Park & Ride fare is suggested as £1.50, with free car parking, for the local bus services to remain competitive.

2.17 Conclusion Inverness demand potential.

2.17.1 Inverness has a high volume of trips on the potential P&R corridors from the North and East. Analysis of the trip matrices for journeys to the city reveals that a relatively small proportion of these are trips for the city centre, as opposed to the wider city. As discussed trips to the wider city are difficult to cater for with Park & Ride bus services. The pattern of travel from the south and west does not show a strong demand for Park & Ride services for commuters to the city. However both of these sites were identified as potential for tourist market.

2.17.2 In conclusion there is reasonably strong case for a Park & Ride site on the east of the city to provide for trips to the city centre; the demand from the north is smaller for city centre trips, but enough to make some service worthwhile. From the north there is a reasonable volume of trips going to Longman estate; but the ability to attract those to a Park & Ride site is low because of the nature of the sites,

which tend to have their own free parking, and the likelihood that a number of the users to these sites then require vehicles during the day. Overall there is a weaker case for a northerly site but a lower cost option may be appropriate to take forward.

2.17.3 This conclusion presumes that the patterns of work trips remain the same with high numbers to the periphery of Inverness. If this changes to a greater concentration in the city centre, then the case for a site to the north could be further enhanced, but data to assess this potential is not available.

2.17.4 As shown in the table the case for the site on the west of the city is not supported by data from the matrix for the peak commuting period. It is however intended that this site would cater for off peak tourist trips to the city which are not captured in the matrix data.

3 Identification of preferred sites.

3.1 Site Selection.

3.1.1 The study brief identifies preferred general locations for Park & Ride sites to intercept traffic on the main routes into the city. These locations were identified, as part of the Inverness Connectivity STAG undertaken, by Scott Wilson Scotland Ltd (SWSL) on behalf of The Highland Council (THC). It is therefore understood the principle of introducing Park & Ride at the preferred general sites has already been through the formal STAG process.

3.1.2 The principle of implementing Park & Ride to address congestion problems in Inverness is well aligned with the objectives of HITRANS Regional Transport Strategy (RTS).

3.1.3 One of the key early tasks carried out was to gain an understanding of any other ongoing studies which would have an impact on the viability of potential sites for Park & Ride.

3.1.4 The main studies identified as having a significant impact were as follows:

- Inverness Trunk Link Road (ITLR);
- A96 Dualling to the Airport Study;
- The A96 Growth Corridor Development Framework.

3.1.5 SWSL is currently developing an outline design for the ITLR on behalf of THC for planning submission in August 2008. The project has also been submitted for consideration in Transport Scotland's Strategic Transport Projects Review. It is evident the final alignment and junction layouts will have a significant impact on the viability of all but one of the potential sites, i.e. the A9 north.

3.1.6 The A96 Dualling to the Airport Study is being taken forward by Atkins Consultants Ltd on behalf of Transport Scotland. This study is currently at DMRB Stage 2, with the identification of the preferred route option anticipated by end of summer 2008.

3.1.7 Halcrow Group Ltd is developing the A96 Growth Corridor Development Framework with THC. This document includes a framework for the proposed development and land use along the A96 corridor from 2011 onwards for a period stretching over the next 30 years.

3.1.8 The remainder of this section is structured as follows:

- Identification of Potential Sites;
- Feedback from Client Working Group;
- The Emerging Preferred Sites;
- Discussion / Way Forward.

3.2 Identification of Potential Sites - Methodology

3.2.1 The preferred general locations for the Park & Ride sites were broadly defined in the study brief. An extract from the Inverness Connectivity STAG was provided, with 4 sites identified for more detailed investigation. The general locations were subjected to a detailed study to help identify the preferred site at each of the locations. Preliminary designs and costs were then be prepared on the preferred sites.

3.2.2 The locations for the Park & Ride sites were broadly identified as follows; refer to Appendix B:

- Site 1 – A9 North (North Kessock);
- Site 2 – A9 South (Inshes);
- Site 3 – A96 East (Smithton);
- Site 4 – A82 West (near A82/General Booth Road).

3.2.3 The main objective of the first stage of the study was to confirm, within the vicinity of each site, the preferred location for the park & ride sites. The following key considerations were taken into account:

- Are there any alternative sites offering better opportunity?
- Are there any planning issues?
- Are there any technical constraints?

3.3 Findings from Initial Site Walkover

3.3.1 The initial site walkover survey focused on the following issues; accessibility/access to the sites, existing roads infrastructure, existing topography, impact on surrounding landscape/environment, existing pedestrian and cyclist facilities, services (above and below ground), current site usage, watercourses and any other significant issues.

3.3.2 The potential sites identified are described in Table 1.0, which is enclosed in Appendix B.

3.4 Feedback from Client Working Group & Transport Scotland

The Highland Council (Planning & Development Service)

3.4.1 It was recognised that the importance of understanding the planning issues at each location would be key to determining the viability of each potential site. Halcrow met with THC Planning & Development Service on the 10th January 2008 to better understand the likely planning and land use issues relating to each potential site (refer to Appendix C.) This meeting identified the planning status at each site and provided landownership details for some of the areas.

The Highland Council (TEC Services)

3.4.2 Halcrow met with TEC Services on the 6th February 2008 to discuss the proposed ITLR and the emerging preferred sites. The current status of the ITLR and its potential implications with regards to the proposed Park & Ride sites were among the issues discussed. Also, a strategy for approaching landowners was agreed and a clear indication on the preferred sites was discussed (refer to Appendix C). The agreed approach would seek to avoid sending mixed signals to the landowners.

Transport Scotland

3.4.3 Halcrow attended a meeting with Transport Scotland on the 12th February 2008 (refer to Appendix C.) This meeting was arranged to better understand Transport Scotland's views with regards to access to and from the trunk road network. In particular the potential access to Site 1C, i.e. the A9/B9161 Munlochy junction, was discussed. Transport Scotland stated a development which increased the number of right turns to the trunk road network would not likely gain support in principle. In addition, Halcrow discussed introducing bus priority to the trunk road network. This was supported in principle by Transport Scotland, but further consideration would be necessary on detailed designs at the appropriate stage of developing any measures. Detailed designs are outside the scope of this study.

HITRANS

3.4.4 Halcrow met with HITRANS on the 14th February 2008 to discuss the emerging preferred sites and to provide feedback from THC and Transport Scotland meetings (refer to Appendix C.) An agreement was reached on the preferred site at each location and Halcrow were instructed to report the study findings. HITRANS stressed that the report should clearly outline the strengths and weaknesses for each of the preferred sites.

3.4.5 In addition, HITRANS requested two additional options to be considered at Site 1 (North Kessock) and Site 3 (A96 East). It was suggested that land behind the service station at Tore is considered for a potential Park & Ride site. Also, a

further option near the A96 junction to Balloch was discussed. Both of these options discussed in the next section.

3.5 The Emerging Preferred Sites

3.5.1 The methodology adopted by Halcrow resulted in a comprehensive study of the key issues at each of the potential Park & Ride locations. The initial desk study and site walkover enabled the study team to quickly identify the potential sites.

3.5.2 A study of the planning issues was undertaken to help determine the viability of the sites. This was followed by consultation with THC, Transport Scotland and HITRANS to further inform the identification process.

3.5.3 This part of the report will discuss the 'strengths and weaknesses' of each option and identify the emerging preferred sites. The plans for each of the sites are enclosed in Appendix D.

3.5.4 The 'strengths and weaknesses' of each of the potential Park & Ride sites, are outlined in Table 3.1.

3.5.5 A further option at Site 1 (North Kessock) was put forward by the Client Working Group for consideration. This option is located behind the service station at Tore, i.e. to the east of the Tore roundabout. It is considered this option will be less attractive due to distance from Inverness. No detailed site investigation was therefore undertaken, but a site layout and cost outline has been prepared to provide indicative costs.

3.5.6 It was agreed with the Client Working Group that Site 2 (A9 South) would not be taken forward for preliminary design and costing. There is too much uncertainty surrounding the final alignment and junction layout for the proposed ITLR at this location to sensibly develop a preliminary design for a Park & Ride site. The final design of the junction layout would have to accommodate access to a potential Park & Ride site at this general location. Easy access off the trunk road network would help promote the attractiveness of this site.

3.5.7 The Client Working Group suggested another option at Site 3 (A96 East) for consideration. This option is located immediately off the local road to Balloch, i.e. near the junction with the A96 Trunk Road. It is considered that this is likely to be too far out to be attractive for Park & Ride and would unlikely attract users from the Culloden/Smithton area. In addition, the existing junction with the A96 is an at-grade T-junction and significant improvements would be required to facilitate Park & Ride. There is also some uncertainty in relation to the ongoing A96 Dualling to the Airport Study. The A96 study could make recommendations which greatly impact on the viability of a Park & Ride site at this location.

Table 3.1 Strengths and Weakness analysis of site options.

Site	General Description	Strengths	Weaknesses	Recommendation
1A	The site is located immediately to the south of the A9 Trunk Road off the existing North Kessock junction, with an approximate site area of 5.5 hectares. The site is currently derelict and is mainly overgrown with grass.	• Good access off existing grade separated junction; • Land is relatively flat; • On outskirts of congestion; • Close to existing cycling & pedestrian facilities; • Close proximity to North Kessock; • No environmental designations on this site.	• Close proximity to residential properties; • Designated for housing in the local plan; • Value of land is likely to be high; • Planning permission granted for housing/leisure development at this site;	No further design work to be taken forward.
1B	The site is located to the north of the A9 Trunk Road off the existing North Kessock junction, with an approximate site area of 9.5 hectares. The site is currently used for agriculture.	• Relatively good access off existing grade separated junction; • Land is relatively flat; • On outskirts of congestion; • Watercourse immediately adjacent to site could assist drainage; • No planning applications currently under consideration; • Close proximity to North Kessock; • No environmental designations on this site.	• Significant improvements to single track road leading to proposed site will be required; • Burn adjacent to the western boundary may effect proposals for road widening. • Attractive woodlands adjacent to existing single track road; • Land not designated for development within Local Plan.	Site 1B is to be taken forward for preliminary design and costing.

1C	This site is located to east of the B9161 to Munlochy, near to the junction with the A9, with an approximate area of 16 hectares. The site is currently used for agriculture.	• Land is relatively flat; • No planning applications currently under consideration; • No environmental designations on this site; • New grade separated junction would improve road safety and improve access to Munlochy.	• Grade separation at the A9/B9161 Munlochy junction would be expensive; • Accident history (including fatality in 2007) at the existing A9/B9161 Munlochy junction; • Greater distance from Inverness than Sites 1A & 1B.	No further design work to be taken forward.
1D	This site is located to the north of the A832 at Tore, immediately adjacent to the service station.	• Land is relatively flat; • Not aware of any planning applications currently under consideration; • No environmental designation on this site; • Facilities – waiting area, café, available at adjacent service station; • Low cost initial set up possible due to security afforded by adjacent service station; • Junction with A9 / A832 is currently a roundabout.	• Greater distance from Inverness that sites 1A and 1B.	Low cost site layout and indicative costs to be provided.

Site	General Description	Strengths	Weaknesses	Recommendation
3A	The site is located to the south of the A96 Trunk Road and to the west of Smithton Road, with an approximate site area of 12.5 hectares. The site is currently used for agriculture.	• Site is located close to the A96; • Close proximity to Inverness; • Land is relatively flat; • Close proximity to existing walking and cycling facilities; • Drainage could be assisted by the close proximity of two burns running adjacent to the site. • No environmental designations on this site;	• Access likely to be difficult and site likely to be severed by the proposed ITLR; • Site designated for housing in the A96 Masterplan and consequently the value of land is likely to be high; • Local Plan designation for business /industry. • Local Plan identifies distributor road to Smithton as having deficiencies and needing urgent improvements; • Noise & visual mitigation measures may be required due to proximity of other property .	No further design work to be taken forward.
3B	The site is located to the south of the A96 Trunk Road and to the east of Smithton Road, with an approximate site area of 11 hectares. The site is currently used for agriculture.	• Site is located close to the A96; • Close proximity to Inverness; • Land is relatively flat; • Close proximity to existing walking and cycling facilities; • Drainage could be assisted by the close proximity of Cairnlaw Burn which runs to the north of the site; • No environmental designations on this site.	• Site designated for housing in the A96 Masterplan and consequently the value of land is likely to be high; • Local Plan designation for business /industry. • Local Plan identifies distributor road to Smithton as having deficiencies and needing urgent improvements; • Noise & visual mitigation measures may be required due to the proximity of other property.	Site 3B is to be taken forward for preliminary design and costing.

Site	General Description	Strengths	Weaknesses	Recommendation
3C	The site is located to the south of the A96 Trunk Road and to the east of Smithton Road, with an approximate site area of 6.5 hectares. The site is currently used for agriculture.	• Site is located close to the A96; • Site identified in the A96 Masterplan for Park & Ride; • Close proximity to Inverness; • Land is relatively flat; • Close proximity to existing walking and cycling facilities; • No environmental designations on this site.	• Site likely to be severed by the proposed ITLR and the A96 Dualling to the Airport; • Area available is relatively small and expansion opportunities would be limited; • Local Plan identifies distributor road to Smithton as having recognised deficiencies and needing urgent improvements.	No further design work to be taken forward.
4A	The site is located to the north of the A82 Trunk Road and to the west of General Booth Road, with an approximate site area of 7.5 hectares. The site is currently used for agriculture.	• Close to the proposed ITLR & the A82; • Good access possible off General Booth Road; • On outskirts of congestion; • Land is relatively flat.	• Site to be retained by golf club due to expansion plans to the west; • Demand on this corridor is likely to be lower than the other identified corridors; • Land designated as a Green Wedge for amenity in Local Plan; • Existing houses are in close proximity to the site and may require noise and visual mitigation measures.	No further design work to be taken forward.

Site	General Description	Strengths	Weaknesses	Recommendation
4B	The site is located to the north of the A82 Trunk Road and to the east of General Booth Road, with an approximate site area of 14.5 hectares. The site is currently used for agriculture.	• Southern part of site presents as viable option; • Close to the proposed ITLR & the A82; • Good access possible off General Booth Road; • Proposed route of ITLR has minimal impact on this site; • On outskirts of congestion; • Land is relatively flat.	• Golf club to retain north part of site; • Demand on this corridor is likely to be lower than the other identified corridors; • Land designated as a Green Wedge for amenity in Local Plan; • Site is near to existing housing and is likely to require mitigation measures; • Proposed roundabout for ITLR would reduce available space available.	Site 4B is to be taken forward for preliminary design and costing.
4C	The site is located to the south of the A82 Trunk Road and to the west of Bught Road with an approximate site area of 2.5 hectares. The site is currently used by a local Rugby Club and offers overflow parking facilities for nearby leisure/sport facilities at Bught Park.	• Provides an attractive and direct route from the site to the town centre; • Close to the proposed ITLR & the A82; • On outskirts of congestion; • Land is relatively flat.	• Could be used as an overflow car parking for sports centre and Bught Park; • Demand on this corridor is likely to be lower than the other identified corridors; • Access road from the A82 is narrow and would require widening; • Within the Local Plan the land is safeguarded for construction of the ITLR.	No further design work to be taken forward.

3.6 Discussion/Way Forward

3.6.1 The analysis of the 'strengths and weaknesses' for each of the sites has clearly identified the emerging preferred sites at each of the locations. The level of consultation undertaken with the Client Working Group has ensured a robust analysis of the potential sites has been undertaken.

3.6.2 The emerging preferred sites identified in Table 4.0 were as follows:

- A9 North – Site 1B, and site 1D as low cost alternative;
- A96 East – Site 3B;
- A82 West – Site 4B.

3.6.3 The preliminary site layouts have been drafted and are described in the next section. Design detail includes:

- No. of parking spaces to be provided for all users;
- No. of buses to provide for at drop off area;
- Location for access to the site.
- Quality of surfacing materials to be used for car park and access roads;
- Quality of waiting area/shelter;
- Quality of landscaping.

4 Site Design

4.1 Introduction

Following site selection and agreement on preferred sites with HITRANS, site layouts were drafted for each of the three first choice sites. These have been designed to provide a high quality parking facility with landscaping appropriate to the area. Security issues have also been addressed in the designs with the aim of meeting the requirements of 'Park Mark' standards. A description for each site is covered in this section with site layout plans at Appendix C. In addition a low cost design has been prepared for the site at Tore, as requested by the client working group. This was prepared without a site investigation but based on local knowledge of the site.

4.2 North Kessock – Site 1B – preferred option.

4.2.1 Site 1B is located to the North of the City of Inverness near North Kessock.

4.2.2 Access to and from the site is currently via a narrow and twisty single track road which links the site to the A9 Trunk Road. This single track road will require to be upgraded to 6m wide and a new junction will be required where it meets the A9 Interchange. Running along the east side of the access road is a small stream which will need to be culverted at two locations to gain access to the site.

4.2.3 The proposed layout at this site will provide parking for 402 vehicles with 25 of those spaces reserved for Disabled Parking. The layout has been designed to have an outer ring road with access off to parking bays. The perimeter road is envisaged to be a one way system to keep the traffic flowing smoothly and prevent vehicles reversing into circulating traffic. The bus stops and bus turning area have been kept separate from any parking and laid out to provide the buses with priority over other vehicles when entering and exiting the site. A small waiting room/shelter is provided which will require water and waste water connections and electricity and telephone connections.

4.2.4 The lines of parking bays are separated by a 0.5m granular strip and 2m wide kerbed footpath. A SUDS drainage system will be employed as described below.

4.2.5 Falls will be introduced into the parking areas to drain water into these filter strips. Below the footpaths the filter strips connect to a network of french drains which convey surface water to a swale (there may also be infiltration into the ground which will reduce the volume entering the swale) which will run around the outside of the site. From here the surface water will be directed into a detention pond before being discharged into the existing stream. There are also gullies for the outer road and bus turning area to collect surface water and direct it into the swales.

4.2.6 It is proposed that a moderate level of landscaping will be provided within the site, enhanced near the waiting area. Topsoil and other unused suitable material that has been excavated from the site will be used to create landscaped mounds which will be planted with native trees and shrubs. These will also help to screen the site from the few buildings nearby.

4.2.7 Street lighting will be provided along with CCTV. A 2.4m high security fence will enclose the site and a lockable gate provided at the entrance to the site. As this site is not very visible to passers-by it is intended that the design requirements of 'Park Mark' are implemented and that the site gains and retains the 'Park Mark' award.

4.2.8 There is space for future expansion of the site which could be accessed from the perimeter road.

4.3 Tore – Site 1C - alternative.

4.3.1 An additional site has been identified by the Highland Council, adjacent to the service/petrol station at Tore on the A832. It is proposed that this would be implemented at much lower cost, with a cheaper surfacing material. Users of the site could make use of waiting facilities at the service station, during main operating hours. The presence of the service station should provide some informal security at the site.

4.3.2 The proposed layout at this site will provide parking for 100 vehicles. The proposal is for surfacing in a gravel type finish with small amount of landscaping and fencing but no security or waiting facilities A cost estimate for has been calculated at £223,000.

4.3.3 As this site is further away from the city it risks being less attractive to commuters, also if the site is of lower standard finish this could also make it less attractive,

maintenance of the site would be important to prevent it falling into disrepair more rapidly.

4.4 Smithton Road A96 Site 3B – Preferred Option

4.4.1 Site 3B is located to the East of the City of Inverness near Smithton village. Current access is along the local distributor road leading to Smithton and Culloden. There are two road schemes currently undergoing feasibility studies in the same area, the dualling of the A96 from Inverness to Inverness Airport and The Inverness Trunk Link Road. These schemes may have an impact on the access to the Park & Ride site and as such the layout has been shown with a roundabout at the access to the site.

4.4.2 The proposed site layout will provide parking for 401 cars with 22 spaces reserved for Disabled Parking. The layout has been designed to have an outer ring road with access off to parking bays. The perimeter road is envisaged to be a one way system to keep the traffic flowing smoothly and prevent vehicles reversing into circulating traffic. The bus stops and bus turning area have been kept separate from any parking and laid out to provide the buses with priority over other vehicles when entering and exiting the site. This site has been provided with a larger waiting area as there may be a requirement in the future to provide facilities for the bus company. The waiting room will require water and waste water connections and electricity and telephone connections.

4.4.3 The parking bays are separated by a 0.5m granular strip and 2m wide kerbed footpath. A SUDS drainage system will be employed as described below.

4.4.4 Falls will be introduced into the parking areas to drain water into these filter strips. Below the footpaths the filter strips connect to a network of french drains which convey surface water to a swale (there may also be infiltration into the ground which will reduce the volume entering the swale) running around the outside of the site. The surface water from the swale will be directed to outfall into the existing burn via a filter drain with high level overflows also provided further up stream.

4.4.5 It is proposed that a moderate level of landscaping will be provided within the site, enhanced near the waiting area. Topsoil and other unused suitable material that has been excavated from the site will be used to create landscaped mounds which will be planted with native trees and shrubs. These will also help to screen the site as required.

4.4.6 Street lighting will be provided along with CCTV. A 2.4m high security fence will enclose the site and a lockable gate provided at the entrance to the site.

4.4.7 There is space for future expansion of the site to incorporate garaging and other facilities for the bus provider. Additional car parking could also be provided both being accessed from the perimeter road.

4.5 Bus operator depot.

4.5.1 Stagecoach as a local operator of bus services in Inverness is keen to be involved with the management and operation of a Park & Ride scheme. They see merit in sharing space at site 3B at some point in the future, which would provide bus depot space. This has been suggested as a medium to long term interest, as a replacement for their current depot in Inverness. They would anticipate requiring space for about 100 buses if they were to use a Park & Ride site as a depot. Some of the buses could use car parking bays during the night since they would be empty of cars and the buses would be out on service before cars started using the car park.

4.5.2 Plans have not been modified for the A96/Smithton P&R site to show a proposed bus depot but have taken account of the possibility of either expansion of the parking area for more Park & Ride users and or the development of the site to accommodate a depot in the layout shown on drawing CTEANL001/DRG/330 Rev2. In this layout buses leaving the site through the pick up and drop off area will have a bus lane through to the proposed roundabout. The layout will also allow the extension of the pick up / drop off area.

4.5.3 We have assumed that the depot would be located beyond the P&R site and accessed by continuing straight through the bus turning area. Alternative access could be via the P&R perimeter road. We believe that the plot is large enough for the bus depot development, in line with the aspirations of Stagecoach.

4.5.4 The aspirations of using the site as a depot would require further comment from planning officers to consider whether this was an acceptable use and detailed consideration of any legal issues affecting tenure of the site.

4.6 A82 Torvean Site 4B – Preferred Option

4.6.1 Site 4B is located to the West of the City of Inverness at the Torvean Golf Course. Access to the site is from General Booth Road near its junction with the A82. This junction has been proposed to become a roundabout as part of the Inverness Trunk Link Road. If the Park & Ride site is constructed prior to the ITLR it may require temporary traffic lights to allow buses priority until the roundabout is in place.

4.6.2 The proposed site layout will provide parking for 241 cars with 16 spaces reserved for Disabled Parking. The layout has been designed to have an outer ring road with access off to parking bays. The perimeter road is envisaged to be a one way system to keep the traffic flowing smoothly and prevent vehicles reversing into circulating traffic. The bus stops and bus turning area have been kept separate from any parking and laid out to provide the buses with priority over other vehicles when entering and exiting the site. This site has a central footpath to the waiting area which ensures pedestrians do not have to cross any roads. A small waiting room is provided which will require water and waste water connections and electricity and telephone connections.

4.6.3 The parking bays are separated by a 0.5m granular strip and 2m wide kerbed footpath. A SUDS drainage system will be employed as described below.

4.6.4 Falls will be introduced into the parking areas to drain water into these filter strips. Below the footpaths the filter strips connect to a network of french drains which convey surface water to a swale (there may also be infiltration into the ground which will reduce the volume entering the swale) running around the outside of the site. The surface water from the swales are taken to a detention pond.

4.6.5 It is proposed that a moderate level of landscaping will be provided within the site, enhanced near the waiting area. Topsoil and other unused suitable material that has been excavated from the site will be used to create landscaped mounds which will be planted with native trees and shrubs. These will also help to screen the site as required. A footpath will also be provided from the rear of the parking area to the Loch Ness House Hotel.

4.6.6 Street lighting will be provided along with CCTV. A 2.4m high security fence will enclose the site and a lockable gate provided at the entrance to the site.

4.6.7 There is space for future expansion of the site which could be accessed from the perimeter road.

4.7 Outline Construction Costs

4.7.1 Outline costs for each of the preferred sites are summarised below:

North Kessock Site 1B

SITE 1B	SUMMARY	
100	Prelims	£ 127,610
200	Site clearance	£ 5,000
300	Fencing	£ 47,132
400	Safety Barrier	
500	Drainage	£ 225,514
600	Earthworks	£ 235,700
700	Pavements	£ 993,700
1100	Kerbing & footways	£ 199,100
1200	Roadmarkings & signs	£ 39,600
1300	Lighting	£ 43,076
1400	Electrical work for lighting	£ 6,600
3000	Landscaping	£ 93,005
3100	Statutory undertakers	£ 62,000
3200	Waiting room/shelter	£ 24,000
3300	CCTV	£ 18,000
	Sub-total	£2,120,037
	Contingency @ 10%	£ 212,004
	TOTAL	**£2,332,041**

Tore Site 1D

SITE 1D	SUMMARY	
100	Prelims	£ 20,000
300	Fencing	£ 2,550
500	Drainage	£ 35,060
600	Earthworks	£ 33,106
700	Surfacing	£ 103,950
1200	Roadmarkings & signs	£ 5,580
3000	Landscaping	£ 7,887
	Headwalls	£ 1,100
	Sub-total	£ 212,233
	Contingency @ 5%	£ 10,612
	TOTAL	**£ 222,845**

Smithton Road A96 Site 3B

SITE 3B	SUMMARY	
100	Prelims	£ 125,310
200	Site clearance	£ 1,000
300	Fencing	£ 54,404
400	Safety Barrier	
500	Drainage	£ 122,164
600	Earthworks	£ 170,200
700	Pavements	£ 920,450
1100	Kerbing & footways	£ 199,100
1200	Roadmarkings & signs	£ 39,600
1300	Lighting	£ 43,076
1400	Electrical work for lighting	£ 6,600
3000	Landscaping	£ 93,005
3100	Statutory undertakers	£ 45,000
3200	Waiting room/shelter	£ 36,000
3300	CCTV	£ 18,000
	Sub-total	£1,873,909
	Contingency @ 10%	£ 187,391
	TOTAL	**£2,061,300**

A82 Torvean Site 4B

SITE 4B	SUMMARY	
100	Prelims	£ 100,310
200	Site clearance	£ 1,000
300	Fencing	£ 49,700
400	Safety Barrier	
500	Drainage	£ 136,026
600	Earthworks	£ 129,360
700	Pavements	£ 503,520
1100	Kerbing & footways	£ 121,110
1200	Roadmarkings & signs	£ 25,630
1300	Lighting	£ 33,286
1400	Electrical work for lighting	£ 4,950
3000	Landscaping	£ 75,407
3100	Statutory undertakers	£ 31,000
3200	Waiting room/shelter	£ 24,000
3300	CCTV	£ 14,000
	Sub-total	£1,249,299
	Contingency @ 10%	£ 124,930
	TOTAL	**£1,374,229**

5 Bus Routing and Operational Costs.

5.1.1 The routes for P&R services to follow for city centre access are defined for each of the Park & Ride corridors in this section. For each of these routes we have calculated the costs for a dedicated service and for a service which 'best fits' with an existing local service. A dedicated service would be more attractive to Park & Ride users, **however it is unlikely that sufficient demand will be seen in the initial stage of the sites being opened therefore serving Park & Ride sites by existing local services is recommended.** Consideration will need to be given to whether peak loading on existing services would permit additional passengers from the sites to be picked up. A view from the bus operators would need to be sought closer to the time of opening sites. This could require additional frequency of local service which could give added benefit for local bus users as well.

5.1.2 For the purposes of calculation the existing services as noted for each site are described for each route. Annual cost of providing a service has been based on current average running costs, fuel, staff, and vehicle cost; although it should be noted that significant variations in the cost of fuel in particular could impact on these costs in the future. Potential revenue based on a £1.50 Park & Ride bus fare (with no additional charge for parking) has been calculated for each of the sites. This is set out in the table in chapter 7. This should offset some of the operational costs, but there is likely to be a subsidy requirement at set up stage, depending on the rate of take up of the service. Table 7.1 indicates likely operational costs, without any revenue reduction.

5.1.3 Depending on how a tendered service for the Park & Ride were prescribed, an operator may choose to tie in with an alternative service, depending on operating patterns at that time. It is possible that further in the future services could operate on a commercial basis but this is not anticipated in the short/medium term and it is likely that the service would need to be subsidised.

5.1.4 Combining local services with a Park & Ride stop has been calculated on a fairly simple basis as an operator may choose to operate an alternative service which still meets the Park & Ride requirements. Therefore we have a possible service for assessment purposes rather than all potential options. For each site we have assessed how many buses would be required to provide the proposed frequency, giving a peak and off peak requirement if different, the peak duration is also stated.

Existing timetables have been used as a guide to route timings, with some layover time included. This will provide a guide to operational costs based on standard average costs.

5.1.5 It is assumed that a diversion of an existing local service into any of the 3 Park & Ride sites, will take an additional 3-5 mins and give additional mileage of 0.5km. The inclusion of a loop serving the Longman industrial estate, is estimated to take an additional 10 mins, and add 4.3.km, operating from site 1; and an additional 15 mins and 5.6km, operating from site 3, as a service from site 3 would run through the city centre first.

5.1.6 The origin / destination data provided by The Highland Council does indicate potential patronage to the industrial estate, but it is recognised that this is a difficult location to serve by Park & Ride, due to the nature of the businesses and lack of control over the parking at the business sites.

5.1.7 The route for each service is described, and the existing local services which operate past each site. Rapsons services are listed as in existence at the commencement of this study, but these are anticipated to change as Stagecoach have acquired this operator.

5.2 Site 1 North Kessock

5.2.1 Option 1 Dedicated Service Route:

- A9
- Kessock Bridge
- Longman Roundabout
- Longman Road
- Strothers Lane OR
- Chapel St /Academy St
- Bus station

5.2.2 Option 2 Existing Local Services. Existing local bus services which match this route (central stop point may differ):

- 25, 25X, 27 (Stagecoach)
- 18 part of route – until Waterloo Road (Stagecoach)

- 17 – not past P&R site, but potential to link Longman industrial estate locations, which this service currently runs through (Stagecoach)
- 61, 961, 958, 26 (Rapsons)

5.2.3 Service 25/25x, has been selected to provide calculations for operational cost. Service 25 is 1 per hour and 25X is 2 per hour, and although there is a slight variation in route on the alternate 25X, the average time still should give an adequate comparison for this purpose.

Longman Estate additional loop.

5.2.4 The Longman Industrial estate loop would operate from site 1 to Longman Rd estate before the City Centre. This diversion would be likely to have an impact on passenger numbers and attractiveness of the service to the city centre and therefore could have an impact on city centre patronage, however given the potential patronage to locations within this area it could enhance the viability of the service. Alternatively it would be possible to provide a bus stop at the most convenient central point for premises in this area along Longman Road itself, but some sites are a considerable walking distance from here.

5.2.5 For local buses to serve the Park & Ride site journey distance is increased marginally for existing services. No increase in the number of buses has been calculated as necessary because the existing service should have sufficient time in its schedule to accommodate an additional 10 minutes. It is marginal though whether the additional Longman loop could be included without an additional bus, although this would then create a lot of unused time in the schedule (based on existing route/service). An operator may be able to operate this route without an additional service and may also choose to operate in combination with other services.

5.2.6 This has been calculated on a fairly simple basis as the operator may have a more complex pattern of services if combining this route schedule with another.

Assumptions for calculations of operational costs	Service frequency buses per hour	Peak bus requirement	Peak duration hours	Off-peak bus requirement	Off peak duration hours	Annual cost
Site 1 North Kessock **Dedicated service** (15 mins) **+ Longman loop during peak** (10 mins)	3	3	4	3	8	£279,231
Site 1 North Kessock						
Existing	3	9	12			
Existing + P&R	3	9	12			
Change	0	0	0	0	0	
time estimate 1 hr 20 + P&R diversion						£9,341

5.3 ***Site 3 Smithton A96***

5.3.1 Option 1 Dedicated Service Route:

- A96 / Smithton Roundabout
- A96
- A96 / Eastfield Way Roundabout (Retail Park)
- A96
- Raigmore Interchange
- Millburn Road
- Millburn Roundabout
- Millburn Road
- Academy Street
- Church Street

5.3.2 Option 2 Existing Local Services. Existing local bus services which match this route (central stop point may differ):

- 10, 305, 315 (Stagecoach)
- 11 Airport link (Rapsons)
- NB. 2 and 3 circular routes only match in one direction as circulate via Smithton, Westhill, Inshes, Hospital (Stagecoach)

5.3.3 There are a number of parallel services along the A96 or serving the Culloden, Smithton area. Route 3, Culloden to Inverness complements particularly as it has very similar routing (for the part of the route between Culloden and Inverness), and therefore minimal diversion; it is also considered less of an inconvenience than for passengers travelling from further east eg. Elgin, Nairn etc, to have a diversion; additionally should peak loadings for return journey prevent local service users boarding a shared bus occasionally, it is a lower impact for these relatively local trips, than those travelling further. This service has been chosen to illustrate a comparative cost of providing a dedicated service or combining with an existing service.

Longman Estate loop option.

5.3.4 The Longman Industrial estate loop would operate after the Site 3 to City Centre journey. This has only been shown on the dedicated service, although there may be merit in extending a combined P&R / local service 3 to serve Longman estate as well.

Assumptions for calculations of operational costs	Service frequency buses per hour	Peak bus requirement	Peak duration hours	Off-peak bus requirement	Off peak duration hours	Annual cost
Site 3 Smithton						
Dedicated service (20 mins)	4	4	2	2	6	
Dedicated service + Longman loop (15 mins)	4	5	2	3	6	£230,541
Site 3 Smithton option A - enhanced at 6 buses per hour						
Existing	3	3	4	2	6	
Enhanced local service + P&R	6	7	4	2	6	
Change in number of buses and additional distance	3	4	0	0	0	
existing service 3						£227,911
Site 3 Smithton option B - enhanced at 4 buses per hour						
Existing	3	3	4	2	6	
Enhanced local service + P&R	4	4	4	2	6	
Change in number of buses and additional distance	1	1	0	0	0	
existing service 3						£62,167

5.4 ***Site 4 A82 West***

5.4.1 Option 1 Dedicated Service Route:

Option 1.1

- General Booth Road
- A82
- Bught Road
- Ness Walk
- Young Street
- Bridge Street

Option 1.2

- General Booth Road
- A82
- Glenurquhart Road
- Tomnahurich St
- Young St
- Bridge St

5.4.2 Option 2 Existing Local Services. Existing local bus services which match this route (central stop point may differ):

- 1 (Stagecoach)
- 19, 17, 917, 919 (Rapsons)

5.4.3 This site is primarily anticipated to cater for a tourist market, and with limited demand expected from commuter traffic, it is proposed that the site is served by local service 1. No Longman estate loop has been included as the demand potential does not warrant this service.

Assumptions for calculations of operational costs	Service frequency buses per hour	Peak bus requirement	Peak duration hours	Off-peak bus requirement	Off peak duration hours	Annual cost
Site 4 A82 West option 1						
dedicated service Bught Rd	3	2	8			£143,383
Site 4 A82 West option 2						
Existing	3	6	8			
Existing + P&R	3	6	8			
change in additional distance						£2,224

5.5 Site 1 & Site 3 Dedicated service loop.

5.5.1 It is suggested that a service which operated via the city centre alternating between sites 1 and 3 would have good operating benefits. The Longman estate loop could increase patronage to locations there but have a detrimental impact on overall patronage because of the diversion for city centre users.

Assumptions for calculations of operational costs	Service frequency buses per hour	Peak bus requirement	Peak duration hours	Off-peak bus requirement	Off peak duration hours	Annual cost
Site 1 to Site 3 loop peak only						
Dedicated service (20 mins + 15 mins) *no off peak as match with existing services described above in off peak*	4	5	4	0	0	£306,016
Site 1 to Site 3 loop all day						
Dedicated service (20 mins + 15 mins)	4	5	12	0	0	
Dedicated service + Longman loop (+15 mins)	4	6	12	0	0	£453,597

5.6 Hospital service.

5.6.1 Due to the demand predicted from the trip matrices for Inverness it is not proposed to run a service via the hospital as there is insufficient demand from outside the city centre on potential P&R corridors to make this worthwhile.

5.7 Longman Estate Service

5.7.1 Whilst the trip data for journeys into Inverness shows a reasonable number of trips going to the Longman estate it is likely that these trips will be very difficult to capture at a Park & Ride site, owing to likely existence of private parking at destinations which cannot be restricted by the council; and nature of businesses requiring vehicles to carry out trips during the day. It is not therefore likely to be beneficial to provide a service which serves all the estate and runs through it, but to provide one or more stops on the Longman Road itself which will add no extra time to the bus journey, this would mean users would walk the remaining distance to their destination, which although some deterrent is thought on balance to be appropriate given the conditions described. The cost for providing such a service has been kept in the tables in this chapter but we would not recommend taking forward a service into the estate. Similar comments have been made by Stagecoach as the local bus operator.

6 Bus Priority Measures

6.1 ***Bus Priority options on P&R bus routes to Inverness.***

6.1.1 The routes as identified in the previous section have been looked at further for the appropriate opportunity to improve bus journey times, by implementing bus priority measures at locations where congestion and delay occur at peak times in and around Inverness. This section of the report sets out the conditions on the network, and suggests bus priority measures to address congestion where possible, taking into account existing and potential road widths and junction layout. Outline indicative costs have been included with recommendations, but it should be noted that these are not based on any detailed designs and should therefore be taken as a guide only.

6.1.2 References in brackets refer to drawings CTEANL001/DRG/010, 030, 040 for Sites 1B, 3B, and 4B respectively. Drawings are included at Appendix F.

6.2 ***Site 1 North Kessock Route A9***

Drwg no: CTEANL001/DRG/010

Site 1 to Inverness – southbound (inbound).

6.2.1 The route for buses into the town centre is currently via Kessock Bridge, Longman Road and Rose Street roundabout. An alternative route could be via a left turn at the Longman Road roundabout, Stadium Road, Longman Drive, Shore Street, Longman Road.

6.2.2 Consideration has been given to making Stadium Road the main access route to the city for buses, however this is a longer route, would still require some prioritisation at Harbour Road Roundabout and not serve the central point of the industrial estate.

Bus lane on approach to Kessock Bridge

6.2.3 During the morning peak there are often queues which fill both lanes on the southbound approach to the Longman Roundabout. The Bridge itself is often full of queuing traffic and the end of the queue will regularly extend to the North Kessock picnic area, (1). Whilst the queues can be quite lengthy by Inverness standards, they are rarely stationary. In extremes the queue can extend as far as the North Kessock junction.

6.2.4 There is scope to add a bus lane on the approach to the Kessock Bridge. Making such provision from the exit slip road of the North Kessock picnic area would be quite straightforward and would give an advantage to buses for a good part of the period where queues are longest. Extending a bus lane any further back is probably not necessary due to the extent of the queuing.

Kessock Bridge

6.2.5 The width of the carriageway on the Bridge is insufficient for the introduction of a bus lane in addition to the two lanes already marked. It would be possible to make one of the two lanes a bus lane only giving considerable benefit to buses in the peak, which would be likely to increase queues and create a greater incentive for people to use Park & Ride. However as there is still a considerable amount of traffic on the bridge which is travelling beyond Inverness, it is possible that there may be some resistance to longer queues beyond the bridge even if traffic is moving through the junction at least as fast as current rates.

6.2.6 The additional lane could be available to High Occupancy Vehicles (HOV), and/or HGV goods vehicles but further assessment of the likely usage and risk of delaying buses should be undertaken for this option.

Bus lane from end of Kessock Bridge

6.2.7 Immediately south of the Bridge, (2), there is currently open space between the southbound Bridge off-ramp and Stadium Road. The level difference, however, is great and the earthworks would be extensive and a structure could be expensive dependent on the length of additional lane required.

6.2.8 Two outline options for the start and end of the bridge have been suggested to indicate the range of costs associated with level differences, should the cost be prohibitive for a full bus lane option, prioritisation could be created with a bus lane as far as the end of the bridge and bus activated signals to allow a bus to the front of a queue at the roundabout (3).

6.2.9 Maximum bus priority would be achieved with a bus lane from North Kessock picnic area continuously across the bridge and to the Longman Road Roundabout. As most bus movements through the Longman Road Roundabout are right turning into the city via Longman Road, it would be beneficial to create the bus lane in the offside lane, this would require buses moving into the lane across the traffic at the start, but priority signals at the roundabout could permit more non bus traffic through at the same time, for vehicles travelling from the north. Priority signals would stop traffic from the south and west to allow buses from the north priority through the junction. An offside bus lane does have the disadvantage of buses needing to move across the traffic therefore if implementing this, the design and location of the start of the bus lane would have to be carefully considered to minimise any conflict or safety issues.

Longman Road Roundabout

6.2.10 Peak hour signals could be installed at the roundabout, (4), to give priority to southbound vehicles. This could speed up the movement of buses to and through the roundabout, whether they turn left or right. Such a system might put pressure on other junctions further down the route so signal sets would probably have to be linked and monitored in real time.

6.2.11 The entry to the roundabout has three lanes for only a short distance. The three-lane section could be extended to allow more queuing length for right turners. This would allow the left turning lane to move more quickly, particularly if southbound traffic from Longman Road could be kept to the offside lane of the roundabout.

6.2.12 A left filter lane could be added to the southbound approach to the roundabout, with a give way on Stadium Road, (5). This would move the left turn queue off the roundabout and enable a more lengthy right turn lane to be added.

Longman Road

6.2.13 The central reserve of Longman Road is quite wide, approx 4m, and could be used to provide additional carriageway space. This would be particularly useful to extend the length of the two right turn lanes at the approach to the roundabout for outbound traffic.

6.2.14 In the morning peak there can be delays. The speed limit on this section is 30mph. There are several accesses off this dual carriageway section, the most heavily used being Seafield Road, which provides access to the Longman industrial estate. The left-hand lane is slowed down by vehicles turning off Longman Road into Seafield Road, and by vehicles being allowed out of Seafield Road.

6.2.15 One effect of this is that some drivers will use the offside lane to avoid conflicts with traffic entering and leaving Seafield Road, even though they may wish to turn left at Harbour Road roundabout. The entry to the roundabout has three lanes, which are generally respected as left, straight ahead and right. There can be delay at the roundabout caused by vehicles on the roundabout exiting into the south section of Harbour Road. This can occur at all times of the day.

6.2.16 Signalisation at the Harbour Road roundabout is not possible on the roundabout itself due to the geometry, but bus priority signals could be introduced ahead of the roundabout for queue relocation to allow buses to proceed more quickly through the junction.

Inverness to Site 1 – northbound (outbound)

6.2.17 In the evening peak there are often queues extending from the Rose Street roundabout to the Longman roundabout. There are regularly long queues on the approaches to the Harbour Road roundabout from both sides of Harbour Road.

6.2.18 Working back from Longman roundabout:

6.2.19 There is a dedicated left turn lane for northbound traffic which gives priority for these vehicles at the roundabout. It starts about 50m back from the roundabout, (6). This does not operate as well as it could because there are often vehicles stopped in the nearside lane trying to break into the right turn lane. This is poor

driver behaviour. Zip merging is not very well understood here. The right turn lane at the entry to the roundabout is wide but is not marked for two lanes.

6.2.20 Henderson Road enters the dual carriageway between Longman roundabout and Harbour Road roundabout. It serves an industrial and commercial area and discharges a significant number of vehicles into Longman Road. This slows the flow of traffic to Longman roundabout, particularly if there are vehicles entering which want to get into the right turn lane. There is a tendency to try to enter the lane at the earliest opportunity, even if this means holding up left turners behind.

6.2.21 Since the opening of a DIY store whose car park exits onto Henderson Road the number of vehicles trying to enter has increased.

6.2.22 Once at Longman roundabout itself the dedicated left turn lane works well. There are rarely any delays north of the roundabout.

6.2.23 For north bound buses the recommendation is to improve the flow up to and through Longman Roundabout. By extending the wide right turn lane at the roundabout and marking as two lanes with the offside marked for A9 traffic therefore freeing space for north bound buses.

6.2.24 The nearside lane on Longman Road could be made into a bus lane from Henderson Road to approximately 75m from the roundabout.

6.2.25 If signals are installed at the roundabout this would enable the opportunity to provide additional priority for north bound buses as well as south bound.

Recommendations for further investigation

6.2.26 The recommendations below are made solely with the intention of improving journey times on the route to and from the Park & Ride site. Cost estimates are based on broad estimates, not preliminary designs, therefore should be treated as a guide only.

Recommendations A9 North Kessock – Southbound/inbound.

		cost estimate
Provide a bus lane from North Kessock picnic area to the north end of the Bridge; bus lane full length of bridge towards Longman Roundabout. (poss offside lane to maximise all vehicle movements through the roundabout.)	*length of bus lane – no new carriageway, each section lane markings only*	*£3,000* *£3,000*
Provide a bus only lane from south of Kessock Bridge, (exit point to be determined), to Stadium Road.	*length of bus lane – 250m* *option 1 – no new carriageway,*	*£1,600*
	option 2 new carriageway up to 250m – minor level change	*£150,000*
	option 3 new carriageway up to 400m – major level change	*£500,000*
Speed up flow of vehicles through Longman Roundabout.		
options		
• Bus-controlled traffic signals	*signals-4 arm roundabout*	*£400,000*
• Realign roundabout central island and give way lines	*minor carriageway alteration; lining*	*£5,000*
Speed up flow of vehicles through Harbour Road roundabout	*signals in advance of roundabout*	*£200,000*

Recommendations A9 North Kessock – Northbound/outbound

		cost estimate
Educate drivers in the technique of zip merging.	*signing*	*£,1000*
Extend the length of the wide right turn lane on Longman Road and consider marking as two lanes with the offside lane marked as A9(S) to encourage vehicles to get into that lane in preference to the centre lane.	*lining/signing*	*£,1000*
Make nearside lane on Longman Road a bus lane, from Henderson Road to, say, 75m from Longman R/A, then reverting to left filter lane. Create an additional lane by using some of the central reserve, between Henderson Road and Longman Roundabout.	*removal of central reservation, carriageway work and lining*	*£,150,000*
Speed up flow of vehicles through Longman Roundabout.	*options as listed above*	
Model effects on other junctions on route.	*no infrastructure costs*	

6.3 *Site 3 East Smithton A96 Route*
Drwg no: CTEANL001/DRG/030

Site 3 to Inverness – westbound (inbound)

A96 / Smithton Roundabout

6.3.1 Stagecoach has commented that since the completion of the roundabout, bus journey times on the route have increased slightly.

6.3.2 The reduction immediately west of the roundabout from two lanes to one does appear to cause disruption to the free flow of vehicles since conflicts and uncertainties sometimes occur which reduce speed at the exit.

6.3.3 There is queuing on the westbound approach to the roundabout. It is reported that the queue is not often stationary and is not lengthy.

6.3.4 Vehicles from Smithton joining the A96 at the roundabout currently experience some delay. There is usually a queue of traffic on Smithton Road in the morning peak. It is common practice for vehicles on the roundabout to allow vehicles on Smithton Road to join the A96.

6.3.5 With the ITLR in place, vehicle numbers using the roundabout should be reduced, which would improve movement for buses leaving the Park & Ride site heading to the A96 along Smithton Road. There is a stretch of redundant road length, which is not used since the roundabout was constructed, it would be possible to reinstate this as bus lane to give buses some advantage to access the roundabout.

A96 Smithton to Eastfield Way

6.3.6 The single lane exit to the west of the roundabout,(1), causes vehicles leaving the roundabout to slow down and although it is reported that there are few conflicts it is likely that journey speed on the link between the two roundabouts is slower than would be the case with a two-lane exit.

Eastfield Way Roundabout

6.3.7 This does not appear to present a problem for westbound traffic on the A96. The entry width is sufficient to allow a left turn lane and two additional lanes. There are also two lanes on the exits.

A96 Eastfield Way to Raigmore Interchange

6.3.8 There are diverge and merge lanes for the garden centre and offices, (2). These do not have any significant impact on traffic on the A96.

6.3.9 There is often a queue in the offside lane for vehicles heading into Inverness or northbound on the A9. It is reported that in the morning peak this queue is not extensive. The part time traffic signals and the distance between the A96, and the A9 southbound off slip road provide sufficient gaps for vehicles to enter the roundabout.

6.3.10 Although the ITLR is expected to remove trips from the A96, the growth in trips on this side of Inverness is predicted to increase sufficiently to still risk delays to inbound buses in the future. The proposed dualling of the section of A96 between Smithton Roundabout and Eastfield Way Roundabout provides the opportunity to create bus lane for the route all the way to Inverness, alongside two lanes of other traffic. This would evidently increase the cost of the dualling, but would be significantly cheaper to introduce if at the same time.

Millburn Road/Millburn Road Roundabout.

6.3.11 The closure of the level crossing on Harbour Road close to Millburn Roundabout has a big effect on traffic flow. To allow buses to flow freely through the roundabout when the level crossing is closed measures to prevent vehicles from sitting stationary on the roundabout would be necessary. A part time signal for the offside lane on Millburn Road and for Old Perth Road, linked to the crossing would be ideal if possible. This would allow the nearside lane to run virtually unobstructed and speed up flow.

6.3.12 There are already proposals with Highland Council to create a bus lane at the approach to the junction with Crown Road, which should adequately deal with the delays to buses at this junction.

6.3.13 Although there are only intermittent delays to buses along Millburn Road as described above, it is recommended to introduce an inbound bus lane all the way from the Raigmore Interchange to Crown Road, as the opportunity of a wide two lane carriageway exists at present. With the growth of trips from the east (A96 corridor) in the future it would be advisable to protect this route for buses.

City Centre junctions Eastgate/foot of Culduthel Road/Kenneth Street/Friars Bridge

6.3.14 Further priorities at some lights/junctions right in the city centre are part of the Inverness City Centre scheme which is part way through being implemented. These are also designed to give priority to any bus and would therefore benefit the routes for Park & Ride buses. Further consideration should be given to all junctions which effect most bus routes, as currently in The Highland Council forward plan.

Inverness to Site 3 – eastbound (outbound).

6.3.15 This is a busy route in the evening peak from the town centre to the Eastfield Way roundabout.

6.3.16 There are often queues from the Millburn Road roundabout to the Raigmore Interchange. This is often a stop-start queue, with a number of contributing factors:

- Speed of vehicles on the roundabout reducing gaps for vehicles entering roundabout
- Part-time traffic signals on the eastbound leg of the roundabout
- Right turn lane busy with drivers wishing to go to the retail park
- Herd behaviour of drivers joining the nearside lane on the eastbound A96 very early
- Focus of traffic from Longman industrial estate and town centre leaving Inverness, eastbound

6.3.17 Partial signalisation of Raigmore interchange to give priority to eastbound buses is recommended, this would only require signals on two arms of the junction.

A96 Raigmore Interchange to Eastfield Way

6.3.18 This section is dual two-lane carriageway, widening to three lanes at the approach to the roundabout.

6.3.19 The nearside lane does become full of vehicles wishing to travel east through the roundabout quite a long way from the roundabout itself since they are aware of the reduction down to one lane just beyond the exit from the roundabout.

6.3.20 The entry to the roundabout has three lanes but the eastbound A96 exit is a wide single lane. The road marking arrows force drivers down to a single lane quite quickly, (3).

Eastfield Way Roundabout

6.3.21 The roundabout is large and has a three-lane-wide circulatory carriageway. This allows for traffic to merge readily.

6.3.22 It is reported that vehicles coming from the retail park, heading east use the offside lane of the roundabout. The nearside lane is frequently empty but this is not taken advantage of by many drivers, preferring to wait for a completely clear gap before entering the roundabout.

A96 Eastfield Way to Smithton

6.3.23 This is single carriageway but does not seem to cause any delays at present traffic volumes. The dualling of this part of the A96 would assist traffic flow away from Eastfield Way roundabout which is likely to be required with future trip growth.

Smithton Roundabout

6.3.24 The roundabout is reported to be relatively free flowing during the evening peak since there are few vehicles from Smithton Road wishing to head east on the A96 to restrict the main eastbound A96 flow and right turners into Smithton Road.

Recommendations

6.3.25 The recommendations below are made solely with the intention of improving journey times on the route to and from the Park & Ride site. Cost estimates are

based on broad estimates, not preliminary designs, therefore should be treated as a guide only.

Recommendations Smithton A96 – Westbound/inbound.

		cost estimate
Buses exiting the Park & Ride site at the proposed roundabout on Smithton Road would have priority over commuter traffic coming from Smithton and Culloden. With the ITLR in place the volume of westbound traffic using Smithton roundabout would be reduced and delays to buses heading for Inverness would be reduced.	*no additional infrastructure cost*	
Bus lane from Smithton Road / A96 existing roundabout *dependent on levels of traffic switching to ITLR may not be required*	*bus lane, reinstate carriageway* *kerb, surfacing, lining*	*£100,000*
Bus lane along A96 – recommend incorporating to dualling proposals.	*cost dependant on design being integral to A96 dualling work*	
Part time signals Millburn Road Roundabout, linked to level crossing on Harbour Road		*£180,000*
Bus lane on Millburn Road from Raigmore interchange to Falcon Square	*lining, signing, removal of general traffic lane, no new carriageway - extension of bus lane markings;* *additional work lining/surfacing appx*	*£250,000 existing works proposed at junction;* *£5,000*

Recommendations Smithton A96 – Eastbound/outbound.

		cost estimate
The effects of the ITLR should be modelled to determine the need for bus priority if implementation goes ahead.	*no infrastructure cost*	
Increase speed of traffic between Harbour Road and Raigmore Interchange. Possible methods;		
options		
• Signalised gyratory system on Raigmore Interchange to give priority to eastbound traffic	signals and lining and island kerbing	£200,000
• Restrict contributing flows from Harbour Road and Old Perth Road at Millburn Rd R/A	signals	£200,000
• Introduce dedicated left filter lane/bus lane to access A9 northbound on-slip road, (similar to Longman R/A)	lining splitter island	£13,000
Encourage drivers to make more efficient use of road space.	*signing / lining*	*£1,300*

6.4 Site 4 West Torvean A82 Route
Drwg no: CTEANL001/DRG/040

A82 into Inverness – northbound (inbound).

6.4.1 This is the route that existing service buses use, if Park & Ride services were to tie in with these. There is very little congestion on this route into Inverness until Tomnahurich Street, in the AM peak. However one of the issues is summer time traffic heading in to Inverness in the evening peak, which could cause delays for returning buses. Outbound congestion in the PM peak is minimal.

6.4.2 No traffic counts are available for General Booth Road but it is understood that this road has low volumes of traffic, and there is only a short stretch of this road to meet the A82. On this basis a bus lane on this road is not recommended as necessary.

6.4.3 Traffic counts for the A82 in the vicinity of the site record AADT of approximately 11,500 vehicles but it is anticipated that with such volumes no specific measures will be required. Proposals to extend the Inverness Trunk Link Road (ITLR) would tie it in to the A82 close to the junction with General Booth Road, we understand that a roundabout is currently proposed at this point, although there are no definite approvals or timescale for this section of the route. With a roundabout it would be possible to provide a bus lane which would give priority to buses heading into the town centre.

6.4.4 For the first few hundred metres the A82 has no obvious impediments to delay vehicles. The swing bridge over the Caledonian Canal, (1), may be closed outside peak hours but would not be expected to stop traffic during the morning and evening peaks.

6.4.5 Beyond the junction with Bught Drive, the A82 (Glenurquhart Road), becomes more residential and parking is allowed on both sides. This narrows the road down to a single lane in each direction. Pedestrian refuges in the centre of the road can sometimes prevent other vehicles passing, if, for example, a bus has stopped to pick up passengers.

6.4.6 On the approach to Ness Bridge, (Tomnahurich Street), parking is not permitted between 08.00 and 23.00. Before 08.00 vehicles are regularly parked and sometimes not removed by 08.00. This can reduce the road width to a single lane in each direction. At this point queuing traffic regularly occurs.

6.4.7 Currently buses use the nearside lane to cross the bridge on the route to the city centre. They turn left into Bank Street and then right into Fraser Street at a traffic signal junction.

6.4.8 There can be delays at the traffic signals at the Kenneth Street junction, (2), so a bus lane to the signals would be beneficial.

6.4.9 A signal-controlled left filter lane onto Kenneth Street is available, (3), which leads to the Friar's Bridge, as an alternative to crossing the river at the Ness Bridge. There are two additional lanes, one ahead lane and one ahead/right turn, (into Kenneth Street). It is recommended that this right turn is removed, and it is understood that due to traffic management changes proposed this will be going ahead.

6.4.10 Kenneth Street is completely residential and has constant parking on both sides of the road. A traffic signal junction exists at the junction with Fairfield Road/Greig Street.

6.4.11 The reverse route out of town has little to impede traffic.

6.4.12 On the A82 at the junction with General Booth Road there is already a ghost island protected right turn, (4). Depending on traffic flows, traffic signals may be required to prevent right turning buses being unnecessarily delayed during the evening peak. The form of the ITLR junction may affect the configuration of this junction.

6.4.13 A ghost island is proposed for vehicles entering the Park & Ride site from General Booth Road. It is not thought that this junction will need to be signalised.

6.4.14 Due to the position of the queues and point of frequent delay, it is recommended to introduce a bus lane from Montague Row to Kenneth Street, this would require parking restrictions on additional stretches of the road. Parking restrictions could be part time during morning and evening peaks, but there is often congestion through the middle of the day therefore it is suggested that they should be at least 10 hour day time restrictions.

Bught Road alternative route.

6.4.15 As the site on the A82 is likely to be most attractive to tourists to the city the route in via Bught Road and Ness Walk would provide an attractive introduction to the city. There are current proposals for changes to this route, and possibly to include removal of parking, (this is linked to work on flood protection). Making this the preferred route for Park & Ride service would not be likely to require further measures, only a consideration that it was acceptable for this to be compatible with other aspirations and changes proposed.

6.4.16 This route is only suggested if running a dedicated service. A dedicated service would require high level of subsidy as the demand predictions on this route are low. It is therefore suggested that any Park & Ride service was met by local service buses, and not use the Bught Road alternative route.

6.4.17 There are no proposals for bus priority on the outbound route to Torvean/A82 as congestion is not sufficiently bad to recommend any. It should be noted that in the PM peak, particularly during summer months, it is still the inbound traffic flow into Inverness which is congested. Therefore buses in the PM peak would still benefit from the proposals put forward.

Recommendations Torvean A82 – Northbound/inbound.

		cost estimate
Consideration to be given to a bus lane, (5), from Montague Row to the traffic signals at Kenneth Street. Parking restrictions on Inverness-bound carriageway as necessary.	*lining, road-space reallocation; TROs for parking restrictions*	*£,8,000*
Removing the right turn facility from Tomnahurich Street into Kenneth Street, (6), during the morning peak hour. Whilst few vehicles have been observed to make this manoeuvre, they could delay traffic wishing to continue straight ahead.	*lining, signal adjustment*	*within current THC proposals*
Form of junction between the A82 and the ITLR and its location, (7), to be confirmed to determine whether bus priority may be required. We note that a roundabout in cutting at the current junction location is proposed.	*not likely to be required, no cost allocated as would be part of ITLR proposals if new route is implemented*	

7 Summary and Conclusions

Elgin Demand Potential

7.1.1 Based on existing traffic conditions and population P&R is unlikely to be successful in Elgin, but given future growth projections for Elgin with its hinterland, P&R is potentially viable at the lower end of scale. Feasibility would critically depend on willingness to impose restraint measures in the city centre, particularly removing free long term parking, and secondly supported by bus priority at any critically congested locations on the P&R bus route.

7.1.2 The current levels of traffic delay and congestion are the primary reason why P&R is not viable at present as the incentive to switch mode is not sufficient. If the proposals to expand the road network capacity in Elgin go ahead, this would be expected to reduce the incentive to switch mode in the future.

7.1.3 Park & Ride may be desirable for Elgin as part of the options for the future if a culture of reduced dependence on the private car is an overall objective. As such Park & Ride can offer an alternative option which reduces the impact right in the city centre for those without access to bus or travelling too far to switch to non motorised modes.

7.1.4 However given that the congestion created by people travelling to city centre car parks at present is relatively modest it is not considered that there is sufficient benefit for Elgin in removing car parking from the centre and relocating to the edge of the city. In traffic/transport management terms the incentive is small at present and in the foreseeable future with current plans this is not expected to change. Reconsideration of P&R potential could be undertaken when further decisions are made on road network changes in Elgin.

Inverness Demand Potential

7.1.5 Inverness has a high volume of trips on the potential P&R corridors from the North and East. Analysis of the trip matrices for journeys to the city reveals that a relatively small proportion of these are trips bound for the city centre, as opposed to the wider city. Trips to the wider city are more difficult to cater for with Park & Ride bus services.

7.1.6 In conclusion there is reasonably strong case for a Park & Ride site on the east of the city to provide for trips to the city centre; the demand from the north is smaller for city centre trips, but enough to make some service worthwhile. From the north there is a reasonable volume of trips going to Longman estate; but the ability to attract those to a Park & Ride site is low because of the nature of the sites, which tend to have their own free parking, and the likelihood that a number of the users to these sites then require vehicles during the day. Overall there is a weaker case for a northerly site but a lower cost option may be appropriate to take forward.

7.1.7 A site to the West/A82 is not viable based on commuting period trips alone. This site has however been promoted to cater primarily for tourist trips, although accurate figures to assess potential demand have not been available for conclusions in this study.

7.1.8 This conclusion presumes that the patterns of work trips remain the same with high numbers to the periphery of Inverness. If this changes to a greater concentration in the city centre, then the case for a site to the north could be further enhanced, but data to assess this potential is not available.

Travel patterns around Inverness.

7.1.9 A considerable number of trips on the Inverness network could not be catered for by Park & Ride, according to the analysis of origin and destination data. Investigation of improvements to local bus services is a secondary recommendation to reduce congestion and local car trips as there is a large proportion of trips which have origins and destinations within Inverness itself. Although the proportions are expected to change a certain extent with the development of the A96 corridor, it is still expected that significant number of trips will be within Inverness.

Bus priority measures.

7.1.10 Bus priority measures are a key part of creating sufficient incentive and would benefit other bus services travelling to and from Inverness.

Demand management.

7.1.11 Parking controls and demand management are essential to Park & Ride. Parking charges in Inverness city centre which are sufficiently high to make Park & Ride bus fares competitive and attractive would be essential at the time of introducing any Park & Ride car parks. It is also recommended that short stay maximum periods are introduced at more car parks to shift commuters to Park & Ride. It is also thought likely that a further shift could be achieved if employers are encouraged to implement further restrictions on privately owned car parks, possibly through Travel Plans.

Summary site information.

A summary of costs, potential demand and revenue and spaces provided is set out in table 7.1. Further detail on information in this table is included at each of the chapters.

Costs and Demand Potential overview.						
Site	**General Description**	**site construction cost**	**bus priority cost**	**operational costs for bus service** **(no maintenance cost inc)**	**demand potential per day** **(2021 matrix)**	**revenue potential per annum @ £1.50 bus fare**
1B	North Kessock A9 (north) 402 spaces The site is located to the north of the A9 Trunk Road off the existing North Kessock junction, with an approximate site area of 9.5 hectares. The site is currently used for agriculture.	£2,332,000	£1,263,000	dedicated service - £279,231 extension to existing - £9,341	City centre – 74 trips Longman est – 180 trips	£27,750 £67,500
1D	Tore A9 (north) 100 spaces This site is located to the north of the A832 at Tore, immediately adjacent to the service station.	£222,845	£1,263,000	no dedicated service recommended extension to existing - £9,341	City centre – 60 trips Longman est – 144 trips assumed a 20% reduction based on trips that will be 'inside' the P&R corridor, and reduction due to distance from Inverness	£22,200 £54,000
3B	Smithton A96 (east) 401 spaces The site is located to the south of the A96 Trunk Road and to the east of Smithton Road, with an approximate site area of 11 hectares. The site is currently used for agriculture.	£2,061,000	£949,300	dedicated service - £230,541 extension to existing - £62,167	City centre – 212 trips Longman est – 163 trips	£79,500 £61,125
4B	Torvean A82 (west) 241 spaces The site is located to the north of the A82 Trunk Road and to the east of General Booth Road, with an approximate site area of 14.5 hectares. The site is currently used for agriculture.	£1,374,000	£8,000	no dedicated service recommended extension to existing - £2,224	City centre 10.4 *(based on commuter trips only, tourist trips likely but unquantified)*	£3,900
	Longman est trips have been included although service not recommended as likely high risk to capture					

Table 7.1 Site summary.

Appendices

Appendix A

Background information on parking Elgin and Inverness.

Inverness Census Data.

Appendix B

Site Plan potential P&R locations around Inverness

Zone Plans Inverness Traffic Model

Appendix C

Note of meetings.

Bus operator comments.

Appendix D

Site option location plans.

Planning background information.

Appendix E

Photographs of potential sites.

Appendix F

Site layout preliminary designs.

Bus priority route drawings.