

LNMS Evaluation Report

A63 Garrison Road Roundabout



June 2010

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Glossary of Terms

Term	Abbreviation	Description
Annual Average Daily Traffic	AADT	Average of 24 hour flows, seven days a week, for all days within the year.
Annual Average Weekday Traffic	AAWT	As AADT but for five days, (Monday to Friday) only.
Accessibility	-	Accessibility can be defined as 'ease of reaching'. The accessibility objective is concerned with increasing the ability with which people in different locations, and with differing availability of transport, can reach different types of facility.
Automatic Traffic Count	ATC	An automated method of recording the volume (and sometimes classification) of vehicles passing a particular point on a road.
Appraisal Summary Table	AST	This records the impacts of the scheme according to the Government's five key objects for transport, as defined in DfT guidance contained on its Transport Analysis Guidance web pages, WebTAG
Average Weekday Traffic	AWT	The 24hr total traffic flow on an average weekday (Monday – Friday)
Benefit Cost Ratio	BCR	Benefit Cost Ratio is a ratio identifying the relationship between cost and benefits of a proposed project.
Capitalisation	-	The process by which benefits for a scheme are factored to give an estimate for the appropriate appraisal period.
Chi-Square	-	A statistical test to determine whether the observed values of a variable are significantly different from those expected on the basis of a null hypothesis. Variables are categorised to determine whether a distribution of scores is due to chance or experimental factors and tests whether one variable is independent of another.
Department for Transport	DfT	A Government department whose objective is to oversee the delivery of a reliable, safe and secure transport system that responds efficiently to the needs of individuals and business whilst safeguarding our environment. The Highways Agency is an executive of the DfT .
Discounting	-	A technique used to compare costs and benefits that occur in different time periods and is the process of adjusting future cash flows to their present values to reflect the time value of money, e.g. £1 worth of benefits now is worth more than £1 in the future. A standard base year needs to be used which is 2002 for the appraisal used in this report.
Evaluation Summary Table	EST	In POPE studies, this is a summary of the evaluations of the TAG objectives using a similar format to the forecasts in the AST .

Term	Abbreviation	Description
First Year Rate of Return	FYRR	First Year Rate of Return is the ratio of money gained on an investment relative to the amount of money invested.
Highways Agency	HA	An Executive Agency of the Department for Transport (DfT), responsible for operating, maintaining and improving the strategic road network in England.
Journey Times Database	JTDB	Journey times for the Highways Agency's core network. Consists of junction to junction time segments for each 15 minute period.
Killed or Seriously Injured	KSI	A term used to describe the number of people killed or seriously injured as a result of PIAs .
Local Network Management Scheme	LNMS	LNMS are improvement schemes whose total overall estimated cost (including design, land, works, supervision, risk and VAT) is less than £5 million. They are categorised by the Government under Safety, Economy, Accessibility, Integration and Environment.
Local Transport Plan	LTP	LTPs set out the Local authority transport strategies and policies, and an implementation programme
Managing Agent Contractor	MAC	Responsible for the operation, maintenance, and improvement of the motorway and trunk road network of a Highways Agency area.
Microprocessor Optimised Vehicle Actuation	MOVA	MOVA signal timings vary in response to traffic conditions
New Approach to Appraisal	NATA	Used for transport scheme appraisal since 1998
Non Motorised User	NMU	Includes pedestrians, cyclists, horse riders and disabled people, whose needs must be addressed. An NMU audit considers the specific needs of these road users.
Project Appraisal Report	PAR	A key document summarising the need for a project, plus its costs and benefits (including those that cannot be quantified in monetary terms).
Personal Injury Accident	PIA	A term commonly used to refer to road accidents
Post Opening Project Evaluation	POPE	Before & after monitoring of all highway schemes in England.
Present Value of Costs	PVC	Present Value of Costs is a term used in cost-benefit analysis and project appraisal that refers to the discounted sum, or Present value, or a stream of costs associated with a project or proposal.
Severance	-	Community severance is the separation of adjacent areas by road or heavy traffic, causing negative impact on non-motorised users, particularly pedestrians.

Term	Abbreviation	Description
-	STATS19	A database of injury accident statistics recorded by police officers attending accidents.
Traffic Database System	TRADS	Traffic count database developed by the Highways Agency, to hold data from the countries traffic monitoring sites.

1. Introduction

Background to Scheme

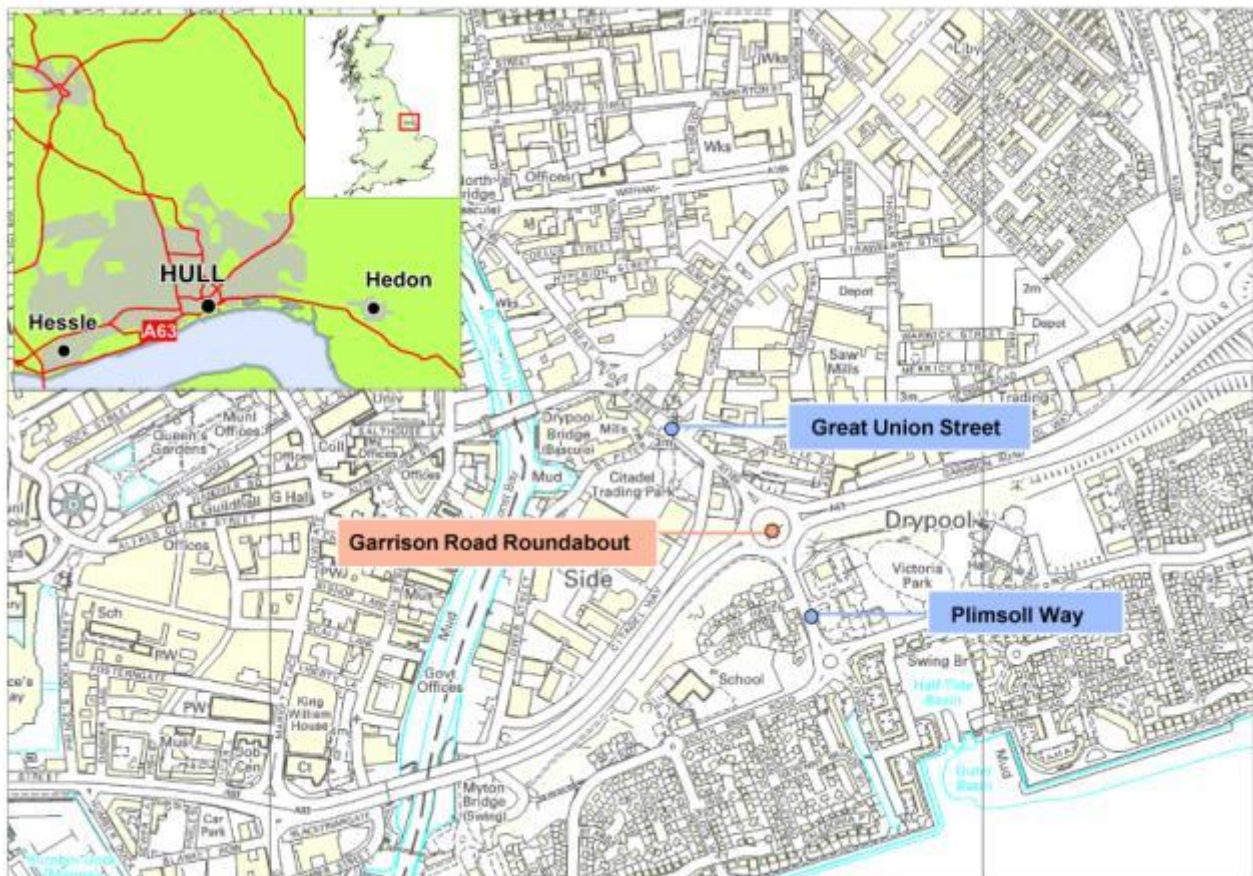
1.1 The A63 is a major road between Leeds and Hull and, prior to the opening of the M62, was the main route out of Hull to the Midlands and South of England. The A63 Garrison Road Roundabout improvement is a Highways Agency Local Network Management Scheme (LNMS), the objectives of which were to improve safety and accessibility at the junction of the A63/A1165. The scheme opened on 19th December 2008.

Scheme Location

1.2 The Garrison Road Roundabout is located on the section of the A63 between Hessle and Hull. The A63 runs south of Hull City Centre and terminates west of Hedon. The scheme is approximately 0.5 miles southeast of the City Centre and forms the junction of the A63 with the A1165 Great Union Street. The scheme is located within the East Riding of Yorkshire, and Highways Agency Area 12.

1.3 The location of the scheme is shown in Figure 1.1

Figure 1.1 – Scheme Location



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History of the Scheme

- 1.4 The need for the scheme arose out of safety concerns at the roundabout and a need to improve crossing facilities for pedestrians.
- 1.5 Following studies of the junction in the early 2000s, a quick win scheme was implemented in 2005. The improvement included reinstatement of the existing lining at the junction and the provision of 'Keep Clear' markings at the exit from Plimsoll Way to deter queuing traffic from blocking traffic entering the roundabout. Hatched areas were also provided on the circulatory carriageway adjacent to the islands and central reserves, to limit circulating traffic to two lanes.
- 1.6 Developments in the area near the junction were expected to increase the flow of traffic on the A63. As a result, the Highways Agency commissioned a study into design options to improve the roundabout in 2005 (A63 Garrison Road Roundabout Junction Improvement Study, 2005). The study assessed a number of options recommending a preferred option of signalisation of the junction.
- 1.7 During the design process, the scheme which is the subject of this report, was modified to omit signal control of Great Union Street as it was predicted extra traffic from developments in the area would cause congestion on that arm; omitting signals allowed a flare to 3 lanes to be provided.
- 1.8 Construction of the scheme started on 1st September 2008 and the scheme opened on 19th December 2008.

Problems prior to the Scheme

- 1.9 Prior to the scheme opening, the problems identified at the A63 Garrison Road roundabout were:
- Accidents occurring on the approaches to and on the roundabout; and
 - Poor accessibility.
- 1.10 The Scheme's Project Appraisal Report (PAR) stated that the construction of Victoria Dock Village to the south added to the issues already faced at the junction. This would be compounded by the re-development of the hospital site in Great Union Street situated to the north of the junction.

Scheme Description

- 1.11 The A63 Garrison Road Roundabout improvement involved the following improvement measures:
- Part signalisation of the roundabout including the A63 arms (eastbound and westbound), exits and circulatory; and
 - Improved pedestrian crossing facilities.
- 1.12 Other options considered in order to address the delay problems at the roundabout were discounted during the development phase of the scheme. These included:
- Conversion of the Garrison Road roundabout to a signal controlled crossroads:
 - This option would have incurred high construction costs and failed to provide capacity to accommodate future growth in traffic. Although pedestrian facilities could have been incorporated, these would not have been particularly convenient for pedestrians.
 - Signalled controlled 'late right turn' junction:
 - This option was found to have capacity problems and low levels of convenience for pedestrians.
 - Signal controlled 'through about':
 - A "through-about" would allow ahead traffic to proceed through the junction rather than use the circulating carriageway of the roundabout. This option was shown not to provide adequate capacity for the movement from Great Union Street. Again,

pedestrian facilities could have been incorporated but would not have been very convenient.

Scheme Categorisation

- 1.13 Local Network Management Schemes (LNMS) are categorised according to which of the five assessment objectives of safety, economy, environment, accessibility and integration are primarily addressed by the scheme. As detailed in the Project Appraisal Report (PAR) document, the scheme has been categorised as a **safety scheme**.

Scheme Objectives

- 1.14 The objectives of the scheme were:
- To improve safety; and
 - To improve accessibility.
- 1.15 The Highways Agency Project Manager of the scheme said that, *"This scheme will improve safety for both pedestrians and drivers using Garrison Road roundabout. Traffic will be better controlled through the junction and drivers from Great Union Street and Plimsoll Way should have easier access onto the roundabout. The pedestrian crossings will help make the A63 safer and easier to cross."*

Purpose of this Report

Post Opening Project Evaluation (POPE)

- 1.16 As part of an ongoing requirement of the Highways Agency (HA) to evaluate the impacts of trunk road schemes, Atkins are commissioned to undertake post-opening evaluations of Local Network Management Schemes (LNMS) with an implementation cost of between £25k and £10m. The aim of this process is to:
- Quantify the outturn benefits and dis-benefits accruing from new schemes and to ascertain which schemes offer the greatest value for money;
 - Develop the pre-scheme appraisal processes (PAR Guidance) and ensure that accurate predictions are made about the possible impacts of highway schemes on safety, economy, environment, accessibility and integration in the future;
 - Enable the HA to select schemes that offer the greatest value for money and that are the most effective solutions to problems on the trunk road network; and
 - Make recommendations for the appraisal process in particular to facilitate and increase the accuracy of future PAR appraisals for schemes similar to that implemented.
- 1.17 This report specifically sets out the results of the Post Opening Project Evaluation (POPE) of the A63 Garrison Road Roundabout improvement scheme as implemented in December 2008. More specifically, this report examines the economic and safety impacts resulting from the improvements, with consideration also given to the main environmental, accessibility and integration impacts.

POPE Methodology Overview

- 1.18 This evaluation report presents the forecast and outturn impacts of the A63 Garrison Road improvement scheme in accordance with the POPE methodology. POPE is based on an evaluation of the scheme's outturn impacts against the five core New Approach to Appraisal (NATA) objectives as listed below:
- **Economy** – concerned with improving the economic efficiency of transport, for example, journey time savings and reliability;

- **Safety** – concerned with reducing the loss of life, injuries and damage to property resulting from transport incidents and crime;
- **Environment** – reducing the direct and indirect impacts of transport facilities on the physical and social environment of both users and non-users;
- **Accessibility** – concerned with the ability with which people can reach different locations and facilities by different modes; and
- **Integration** – aims to ensure that all decisions are taken in the context of the Government's integrated transport policy.

1.19 Furthermore, this report presents the following:

- A comparison of the 'before' and 'after' traffic volumes and journey times at the junction to illustrate how overall traffic conditions have changed following scheme opening;
- An outline of changes in the number of accidents and accident rates at the junction following scheme opening;
- A comparison of predicted and outturn environment, accessibility and integration impacts;
- A summary of scheme performance from the perspective of key stakeholders engaged in the original scheme development including the Highways Agency Project Manager;
- The PAR assessment which forecast the benefits of the scheme. Where required, values are converted to 2002 prices and discounted to 2002; and
- An Evaluation Summary Table (EST) based on the outturn effects of the scheme using a methodology consistent with the PAR assessment undertaken prior to the scheme opening.

Structure of this Report

1.20 Following on from this introduction, this report shall include:

- **Section 2 – Scheme Detail:** Provides details of the scheme including photos illustrating the scheme key features;
- **Section 3 – Data Collection and Stakeholder Feedback:** Contains an outline of the data which has informed the evaluation and the responses from key stakeholders regarding the scheme;
- **Section 4 – Traffic Impacts:** Outlines the traffic changes in the study area;
- **Section 5 – Safety Impacts:** Outlines the safety impacts of the scheme through analysis of personal injury accidents;
- **Section 6 – Economy:** Outlines the economic impacts of the scheme in respect to predicted and outturn works costs, traffic volume changes and journey delay analysis;
- **Section 7 – Environmental, Accessibility and Integration Issues:** Summarises the scheme impacts on these issues; and
- **Section 8 – Summary of Findings and Recommendations:** Summarises the impact of the scheme based on the data available to evaluate the scheme.

1.21 It is intended that the findings from this report shall feed into a wider summary of the outcomes of POPE evaluations, as reported in the LNMS annual report.

2. Scheme Detail

Introduction

- 2.1 This section of the report examines the details of the scheme and compares the pre and post opening scheme layout. The aims of this section are to identify and provide further details of the measures implemented, as described in the previous section.

Previous Layout

- 2.2 The previous layout of the Garrison Road roundabout was a four arm priority controlled roundabout. The roundabout provided for all movements between A63 Garrison Road West, Great Union Street, A63 Garrison Road East and Plimsoll Way. The junction had the following key features:

- A63 (West of the roundabout):
 - Dual carriageway providing three lanes in each direction. There was a wide central reserve with a footway creating a crossing point for pedestrians. No tactile paving was provided at the crossing point.
- Great Union Street (North of the roundabout):
 - Single carriageway providing one lane in each direction. There was a short flare to two lanes at the roundabout entry. A splitter island was provided, incorporating an uncontrolled pedestrian crossing with tactile paving.
- A63 (East of the roundabout):
 - Dual carriageway with two lanes in each direction. A footway was provided across the wide central reserve, creating a pedestrian crossing point. No tactile paving was provided.
- Plimsoll Way (South of the roundabout):
 - Single carriageway providing one lane in each direction. There was a short flare to two lanes at the roundabout entry, and a splitter island with an uncontrolled crossing point with buff tactile paving.
- Circulatory Carriageway:
 - The circulatory carriageway provided two wide lanes. Hatched areas adjacent to the central reserves and splitter islands reduced the effective width of the circulatory carriageway.

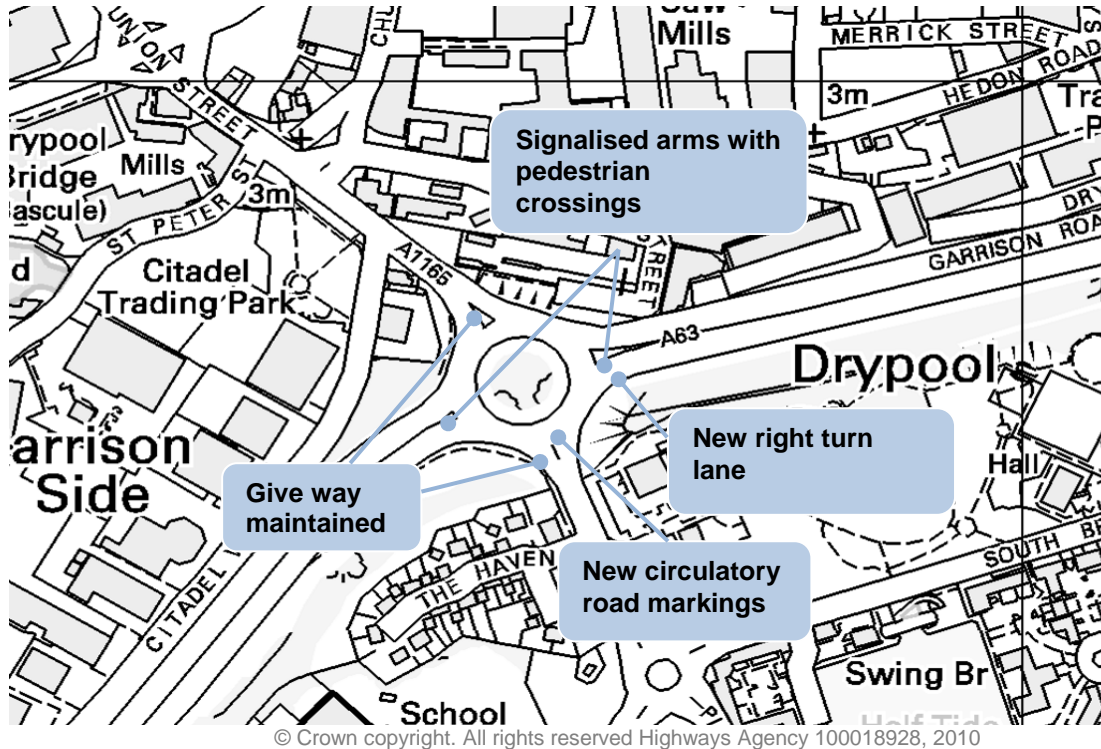
Scheme Features

- 2.3 The key features of the scheme are as follows:
- Signalisation of the A63 approaches;
 - Carriageway re-surfacing and new road markings;
 - New pedestrian crossing facilities built into the traffic signal arrangement on both east and west sides of the roundabout;
 - New guard railing and street lighting to help create safe places for pedestrians to cross the A63; and

- A right turn lane in westbound approach to the junction, creating a dedicated lane for traffic wishing to travel along Great Union Street.

2.4 The key features of the scheme are illustrated in Figure 2.1:

Figure 2.1 – Key Scheme Features



Signalisation of the A63 approaches

2.5 The eastbound and westbound approaches and exits on the A63 have been signalised (see Figure 2.2), with the traffic Signals controlled by MOVA (Microprocessor Optimised Vehicle Actuation) which changes signal times in response to changing traffic flows. The duration of the green phase changes according to the volume of traffic entering the roundabout from the A63 approaches and on the circulating carriageway. This ensures internal blocking is kept to minimal levels, and can respond flexibly to traffic and pedestrian demands.

Figure 2.2 – A63 (W) Approach Before and After Scheme opening



Before Scheme Opening (Looking East)



After Scheme Opening (Looking West)

Circulatory Carriageway

2.6 The circulatory carriageway has been remarked to provide 3 circulatory lanes to the north and south of the junction. This is shown in Figure 2.3.

Figure 2.3 – View of Circulatory Carriageway (Looking West with Great Union Street to right)



Before Scheme Opening (Looking West)



After Scheme Opening (Looking West)

Pedestrian Facilities

2.7 Prior to the scheme being constructed, the roundabout was un-signalised. There were no formal pedestrian crossing facilities on the A63 or other arms of the junction, with pedestrians making use of gaps in the central reserve.

2.8 Figure 2.4 shows views of the pedestrian crossing facilities on Plimsoll Way before and after the scheme was implemented.

2.9 Figure 2.5 shows the pedestrian crossings on the A63 before and after scheme opening.

Figure 2.4 – View of roundabout from Plimsoll Way (south of roundabout) showing pedestrian refuge



Before Scheme Opening (Looking West)



After Scheme Opening (Looking West)

Figure 2.5 – View of Pedestrian Crossings on A63 (west of roundabout)



Before Scheme Opening (Looking South)



After Scheme Opening (Looking North)

Dedicated Right Turn Lane (A63 Westbound)

- 2.10 A dedicated right turn lane has been provided for vehicles travelling westbound on the A63 (E), intending to travel northbound on Great Union Street. This is illustrated in Figure 2.6.

Figure 2.6 – Dedicated Right Turn Lane (east of roundabout)



Before Opening (Looking East)



After Opening (Looking East)

Summary – Section 2:

The scheme appears to have been implemented as per the proposals set out in the Implementation PAR.

3. Data Collection and Stakeholder Feedback

Introduction

3.1 This section of the report sets out the data collection process and sources of data that have been used to support this scheme evaluation. Specifically, this includes:

- Lists of the datasets used to undertake the POPE assessment;
- A summary of the findings from a site visit undertaken by Atkins in April 2010; and
- A summary of the feedback from interested parties regarding the overall effectiveness of the scheme in achieving the intended objectives.

Datasets used to Support this Evaluation

3.2 The following datasets and information have been used to support this evaluation:

- Project Appraisal Report v4.1d (PAR) – 28/08/2008;
- Data from permanent ATC sites on A63 from the Highways Agency (HA) TRADS database;
- A63 Garrison Road Roundabout Junction Improvement Study (2005);
- Journey times on A63 from the HA Journey Time Database (JTDB); and
- Accident data supplied by Hull City Council for a geographical area shown in Figure 5.1 (Section 5) for a period before opening covering 1st September 2003 to 18th December 2008 (including construction phase) and for a period after opening covering 19th December 2008 to 18th December 2009.

Site Visit

3.3 A site visit was conducted at the junction on 20th April 2010. The aims of the site visit were as follows:

- To ensure that the scheme was implemented as per the PAR (Project Appraisal Report); and
- To observe the post opening junction operating conditions with regards to traffic flow, NMU (Non Motorised User) flow and safety.

Summary of Site Observations

3.4 The following observations were made during the site visit:

- The scheme appeared to have been implemented as per the PAR;
- Traffic flows on the A63 were high but relatively free flowing, with little congestion or queuing at the junction (in off peak conditions); and
- Pedestrians were observed making use of the new crossing facilities.

Stakeholder Feedback

- 3.5 A number of stakeholders provided feedback on the scheme at the conception stage. In order to inform this evaluation, in addition to the project manager, feedback was sought from the following stakeholders:
- Managing Agent Contractor (MAC);
 - Hull City Council;
 - Victoria Dock Resident Association;
 - Hull Forward (formerly Hull City Build); and
 - CTC Right to Ride Network.
- 3.6 Comments were received from the MAC only.
- Managing Agent Contractor (CarillionWSP - Area 12 MAC at time of scheme design and construction)**
- 3.7 During the scheme commissioning / validation the MAC received several positive comments from pedestrians regarding the improved crossing facilities.
- 3.8 The junction was seen at the time of validation to be effective in managing traffic with minimal queues and delay, although it was affected at times by queuing back from the Mytongate through-about and concerns have been expressed regarding the queuing on the internal links under these conditions.

Summary – Section 3:

- A site visit confirmed the scheme has been implemented as per the PAR;
- Feedback suggests the scheme has been well received by pedestrians; and
- The junction can be affected at times by queuing back from the Mytongate through-about.

4. Traffic Impacts

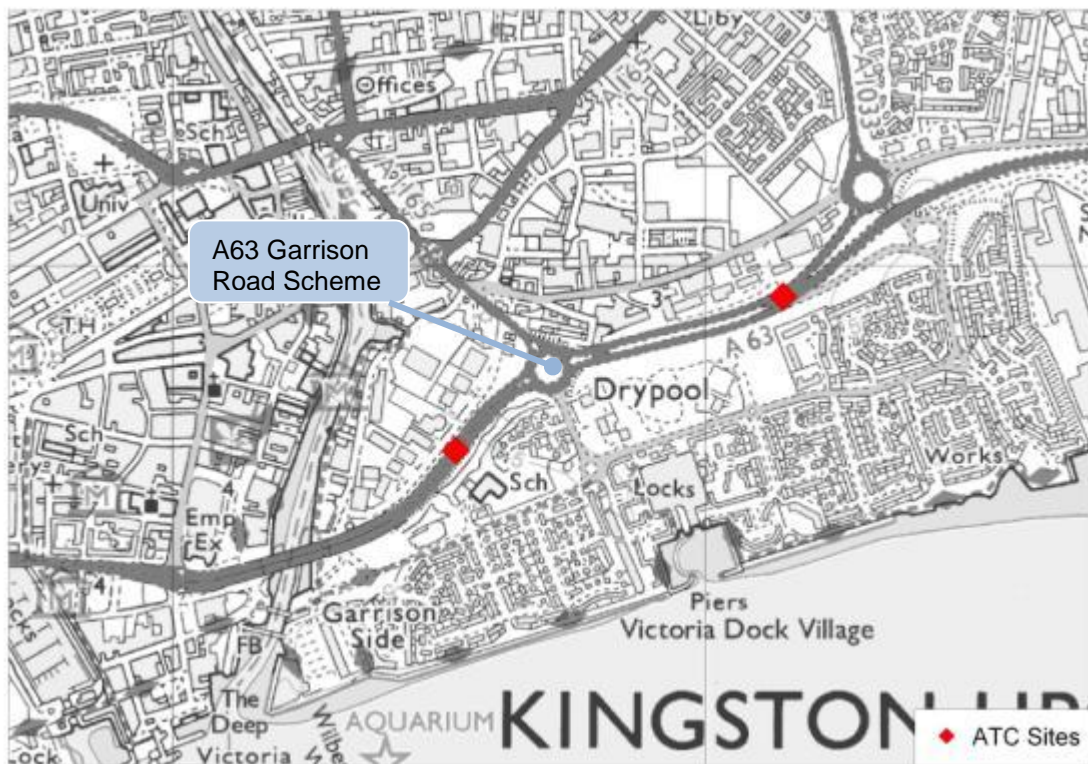
Introduction

4.1 This section of the report summarises the analysis that has been undertaken in order to assess the impacts of the scheme on traffic. Data collected before and after the scheme opened is assessed in order to establish changes that have occurred as a result of the scheme. This information on traffic flows, journey times and delays has also then been used to inform the economic assessment of the scheme which is presented later in Section 6 of this report.

Traffic Volumes

4.2 Long term traffic count data was available from the Highways Agency TRADS database for the A63. Figure 4.1 shows the locations of the count sites in relation to the scheme.

Figure 4.1 – TRADs Count Site Locations



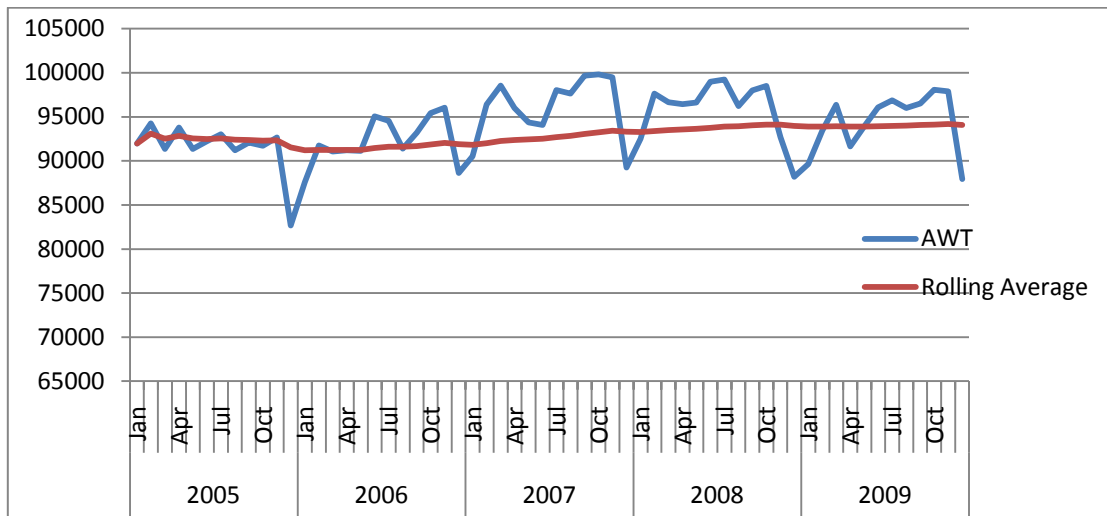
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4.3
4.4
4.5

4.6 Figure 4.2 shows the trend in two-way Average Weekday Traffic (AWT) by month for the A63 east and west of the roundabout. Analysis of recent trends in traffic flows in the vicinity of the

roundabout not only help to establish the context in which any changes have occurred, but also helps to set the scene in relation to traffic conditions before the scheme was constructed.

Figure 4.2 – Long Term Traffic Trends (AWT) on A63



From

4.7 Figure 4.2, the following observations can be made regarding trends in traffic on the A63:

- Traffic volumes reduced in the third quarter of 2008 and during 2009 compared to the same months in previous years. This is likely to be related to the economic climate, as this period coincides with what has now been widely agreed as the start of the recent recession and has witnessed widespread reductions in motor vehicle traffic;
- During 2009, the A63 Garrison Road Roundabout was used by around 96,000 vehicles on an average weekday during the summer months; and
- The A63 has exhibited little traffic growth since 2005, but does however show distinctive seasonal variation.

4.8 Table 4.1 shows the trend in two-way Annual Average Weekday Traffic (AAWT) and Annual Average Daily Traffic (AADT) for the A63 either side of the junction between 2005 and 2009.

Table 4.1 - Change in Two Way AADT and AAWT 2005 to 2009

Year	Location	AADT	Annual % Change in AADT (on previous year)	AAWT	Annual % Change in AAWT (on previous year)
2005	West of Junction	47,581	-	51,111	-

	East of Junction	37,785	-	40,414	-
2006	West of Junction	47,583	-	51,300	0.4%
	East of Junction	38,064	0.7%	40,961	1.4%
2007	West of Junction	50,882	6.9%	55,078	7.4%
	East of Junction	38,155	0.2%	41,079	0.3%
2008	West of Junction	50,310	-1.1%	54,744	-0.6%
	East of Junction	38,051	-0.3%	41,235	0.4%
2009	West of Junction	49,341	-1.9%	53,910	-1.5%
	East of Junction	37,335	-1.9%	40,630	-1.5%
2005 to 2009	West of Junction	-	3.7%	-	5.5%
	East of Junction	-	-1.2%	-	0.5%

4.9 The table shows that:

- Traffic using the A63 west of the junction has increased by 5.5% between 2005 and 2009 on an average weekday, with most of the growth related to a large increase in traffic during 2007, likely to be linked to developments in the Docks area during that time. East of the junction flows have remained relatively unchanged; and
- There has been a reduction in traffic in 2008 and a further reduction in 2009.

4.10 The DfT produces annual statistics for all motor vehicles by local authority. At present, data is available up to year 2008.

4.11

4.12

4.13

4.14 Figure 4.2 shows data between 2005 and 2008 in million vehicle kilometres (mvkm) for the Kingston Upon Hull Local Authority area and the Yorkshire and Humber region.

Table 4.2 - Trends in million vehicle kilometres (mvkm)

Year	mvkm			
	Kingston Upon Hull	% Change(on previous year)	Yorkshire and the Humber	% Change(on previous year)
2005	1,236	-	41794	-
2006	1,224	-1.0%	42612	+2%
2007	1,243	+1.5%	43128	+1.2%
2008	1,228	-1.2%	42525	-1.4%

Taken from: Estimated traffic for all motor vehicles by Local Authority: 1993-2008, DfT

- 4.15 It can be seen that the number of vehicle kilometres in Kingston Upon Hull and the wider Yorkshire and the Humber areas increased between 2005 and 2007. However both areas witnessed a reduction of over 1% in 2008. This is broadly in line with local traffic trends.

Journey Times

- 4.16 POPE methodology states that the re-evaluation of scheme benefits should use observed journey time savings. Observed data provides a much more accurate representation of actual traffic conditions compared to modelled outputs. As no journey time benefits were predicted, and no before data was collected as part of the scheme appraisal, journey time data has been taken from the Highways Agency Journey Times Database (JTDB). Whilst this is not the preferred method for assessing journey time changes, due to issues with the quality of the data, it will give an indication of any changes that have occurred since scheme opening.
- 4.17 Journey time data was available for the following sections of the A63:
- A63 between the A1033 Hedon Road/Mount Pleasant junction and A1165 Great Union Street junction (east of junction); and
 - A63 between A1165 Great Union Street junction and A1079 Ferensway/Castle Street junction (west of junction)
- 4.18 Data was not available for Plimsoll Way, Great Union Street or the circulatory carriageway. There will have been an element of induced delay associated with the provision of traffic signals on the circulatory carriageway; however in the absence of observed data this cannot be quantified.
- 4.19 Data for the A63 has been extracted for a one year period before scheme construction (September 2007 to August 2008) and after opening (January 2009 to December 2009). The quality of the data is generally assessed as 'low', although for some sections and time periods is rated as 'medium' or 'high'.
- 4.20 Data has been analysed for three time periods over the year:
- 07:00-09:00 (AM peak);
 - 10:00-12:00 (Inter-peak); and
 - 16:00-18:00 (PM peak).
- 4.21 The data is displayed in Table 4.3 for the sections of the A63 most likely impacted upon (i.e., westbound and eastbound approaches to the junction).

Table 4.3 – A63 Before and After Journey Times (mins:secs)

Section	Before			After			Difference		
	AM	IP	PM	AM	IP	PM	AM	IP	PM
A63 Westbound (A1033 to A1165)	1:28	0:54	1:35	1:09	0:45	0:59	-0:19	-0:09	-0:36
A63 Eastbound (A1079 to A1165)	1:25	1:30	2:09	1:59	1:27	2:09	0:34	-0:03	0:00

- 4.22 The table shows:
- Overall, journey times have remained relatively unchanged since the opening of the scheme, with little change for either direction of travel;
 - However, on the A63 westbound (A1033 to A1165 east of junction) journey times have fallen for all time periods, with a saving of around 36 seconds in the PM Peak. This is likely to be due to the dedicated right turn lane implemented as part of the scheme;

- Given the level of traffic on the A63 this would be likely to bring significant monetary benefits, particularly in the PM Peak;
- On the A63 eastbound (A1079 to A1165 west of junction) journey times have increased by around 34 seconds for the AM Peak, but are unchanged in the PM Peak; and
- Overall, the increased AM Peak eastbound journey times would be likely to balance out monetary benefits in the PM Peak westbound.

4.23 As stated above no before journey times were collected in the scheme appraisal and no impacts were envisaged. Economic benefits in terms of improved journey times although possible, are not quantifiable within the confines of this study. Whilst the JTDB can provide an appreciation of the scheme's likely impact on journey times it does not offer a substitute for scheme specific observed data.

Summary – Section 4:

- The A63 has exhibited only low background growth since 2005;
- Traffic volumes on the A63 reduced in 2008 and again in 2009 compared to the same months in previous years. This is likely to be related to the economic climate;
- Local trends are broadly in line with regional and national trends in traffic growth over the same period; and
- Journey times are relatively unchanged since scheme opening. However, a small saving has been observed on the westbound approach likely to be due to the dedicated right turn lane implemented as part of the scheme.

5. Safety Impacts

Introduction

- 5.1 This section examines the accidents both 'before' and 'after' scheme opening to establish whether the scheme has resulted in a post opening safety benefit or dis-benefit. The aims of the section are:
- To determine whether the scheme has achieved its safety objectives;
 - To determine whether there has been any change in the number, location and causation of Personal Injury Accidents (PIAs) following scheme opening; and
 - To determine if the scheme has resulted in an overall safety benefit or dis-benefit.
- 5.2 The accident data referred to in this report has not necessarily been derived from the national validated accident statistics produced by the DfT. As such, the data may subsequently be found to be incomplete or contain inaccuracies. The requirement for up to date and site specific information necessitated the use of data sourced from the local authority. Thus the data is judged to be sufficiently robust for use in this study, but it may be subject to change. However, it is not anticipated that this would be significant in terms of the analysis of accident numbers presented in this report.

PAR Analysis and Assumptions

The PAR

- 5.3 In the PAR assessment, PIA data was collected for the A63 Garrison Road roundabout and its approaches. However, the exact area used for the purposes of the PAR analysis is unclear, but it is known that the assessment used a 5 year period from 1st January 2002 to 31st December 2006.
- 5.4 Based on the information available, the PAR assessment of traffic accidents revealed the following:
- 22 accidents occurred over a period of 5 years, amounting to an observed average accident rate of 4.4 PIA per year;
 - The KSI¹ severity index was 4.5% over the same 5 year period, with no fatal accidents, and 1 serious accident;
 - 29 casualties resulted from the accidents;
 - The accident saving in the first year after opening was predicted to be 2.5; and
 - The accident saving over the full assessment period (60 years) was predicted to be 134.
- 5.5 A summary of the accident analysis as detailed in the PAR is included in Table 5.1.

Table 5.1 - Summary of Accident Numbers as detailed in the PAR

	Period	PIA No./Rate	Slight	Serious	Fatal	Total	Severity Index
'Before' scheme Opening (PAR)	1 st January 2002 to 31 st December 2006	PIA Number	21	1	0	22	4.5%
		PIA rate per year	4.2	0.2	0	4.4	

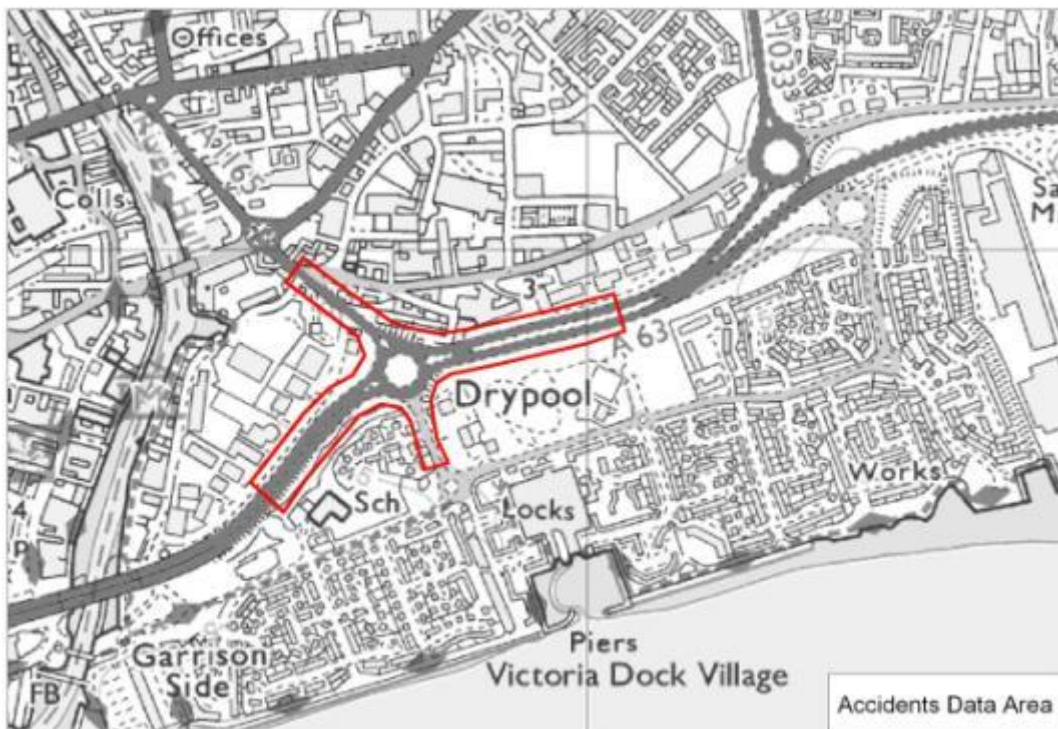
¹ Fatal accidents and serious accidents as a percentage of all accidents.

Post Opening Evaluation

PAR Predicted Corrected

- 5.6 In order to ensure a like-for-like comparison of the predicted and outturn safety impacts of the scheme, a PAR predicted corrected appraisal of the scheme is usually undertaken. In this instance, this has been done for the following reasons:
- For an appropriate geographical area to be used to allow for the possible length of queues forming in the pre-scheme opening period, to take account of shunt and congestion related accidents;
 - To ensure that the same geographical area is used for both the 'before' and 'after' periods; and
 - To make certain the time period over which the 'before' accidents were based (which should be the latest full five years prior to construction).
- 5.7 The PIA data was obtained from Hull City Council, and is based on the records of personal injury accidents recorded in the STATS19 data collected by the police when attending accidents. Damage only accidents are not included. It is considered that traffic management during the period of construction may have affected driver behaviour; therefore this period has also been excluded (this was between 1st September to 18th December 2008).
- 5.8 The area for which data was obtained is shown in Figure 5.1. It covers the roundabout and approaches to the junction (200 metres from junction on A63 approaches). Accidents that cannot be attributed to the previous or new design of the roundabout, e.g. tyre blow-outs or mechanical failures have been removed for the purposes of this analysis. Whilst no queue length data was available the area of analysis is deemed appropriate to capture accidents attributable to the junction both before and after scheme opening.

Figure 5.1 – Accident data collection area



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5.9 Table 5.2 provides a summary of the accident numbers occurring in the study area both before and after the scheme opened. Unlike the PAR analysis presented in Table 5.1, the data presented below is based on the same geographical area as indicated in Figure 5.1 and is therefore directly comparable. The table presents two predicted corrected scenarios, one utilising the years as detailed in the PAR, referred to from this point forward as 'PAR Years' and one using the most recent data prior to construction, referred to as 'Most recent'.

Table 5.2 – Summary of Accident Numbers before and after scheme opening

Scheme Opening	Period	PIA No./Rate	Slight	Serious	Fatal	Total	Severity Index
Before (PAR)	1 st January 2002 to 31 st December 2006	PIA Number	21	1	0	22	4.5%
		PIA rate per year	4.2	0.2	0	4.4	
Before (PAR Predicted Corrected)	PAR Years (1 st January 2002 to 31 st December 2006)	PIA Number	33	1	0	34	2.9%
		PIA rate per year	6.6	0.2	0	6.8	
	Most Recent (1 st September 2003 to 31 st August 2008)	PIA Number	30	0	0	30	N/A
		PIA rate per year	6	0	0	6	
After scheme opening	19 th December 2008 to 18 th December 2009	PIA Number	4	0	0	4	N/A
		PIA rate per year	4	0	0	4	
Annual Accident Saving (per year)*			2	-	-	2	

*Saving compared to Predicted Corrected using most recent data prior to Construction as per POPE methodology

5.10 Key points to note from Table 5.2 include:

- An accident rate of 6 PIAs per year was observed in the most recent 5 year period before scheme construction. The PAR predicted corrected area used must be larger than that used in the PAR as more accidents have been recorded;
- No serious or fatal accidents were recorded in the PAR predicted corrected study area in the most recent before or after period;
- In the year since scheme opening the accident rate reduced to 4 PIAs with no serious or fatal accidents;
- When using the most recent data prior to construction the number of accidents per year is greater than in the PAR at 6 per year as compared to 4.4, but slightly less than the PAR predicted corrected (PAR Years) at 6 per year as compared to 6.8; and
- The outturn savings of 2 accidents is also less than the PAR predicted at 2.5. However, the exact area covered in the PAR is not known.

5.11 It should also be borne in mind that the full impact of a scheme, particularly with regard to safety can only be fully evaluated at least three years after opening, therefore using a much larger

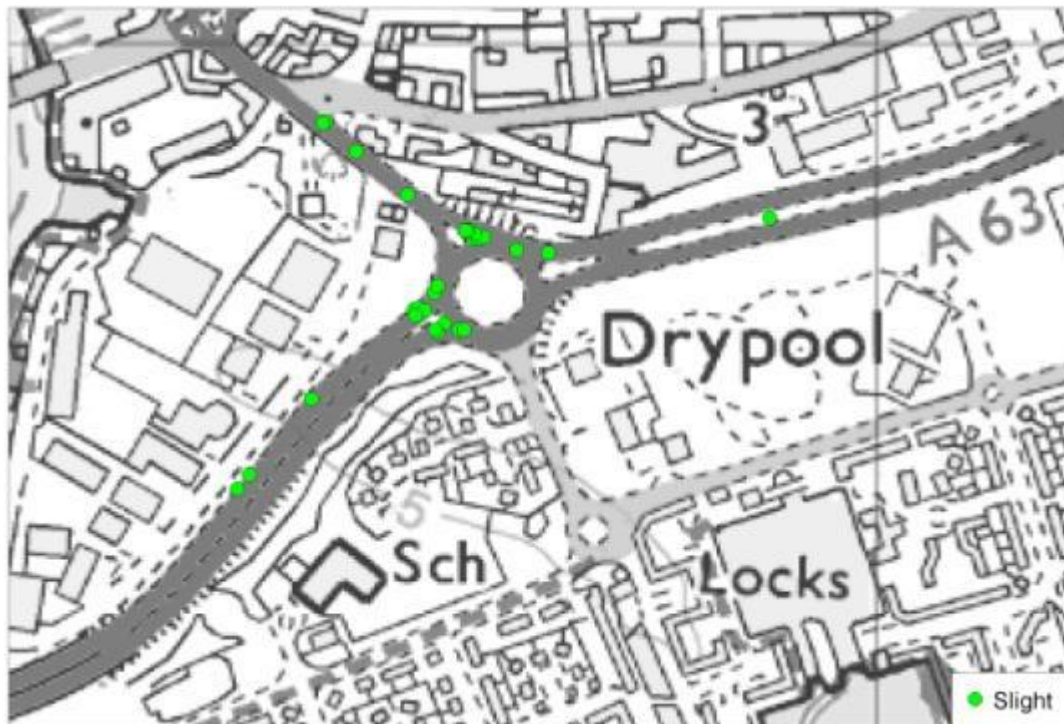
sample of 'after' data. The analysis presented here is therefore only an indication of emerging trends to date.

5.12 The location of the most recent five years of accidents prior to construction are shown in Figure 5.2. Figure 5.3 presents the accidents which have occurred since the scheme opened (19th December 2008 – 31st December 2009).

5.13 Although there are clearly more accidents shown in Figure 5.2 which contains accidents over a five year period compared to Figure 5.3 which shows accidents over a period of just one year, the following comments can be made with regards to changes in the clusters and location of accidents:

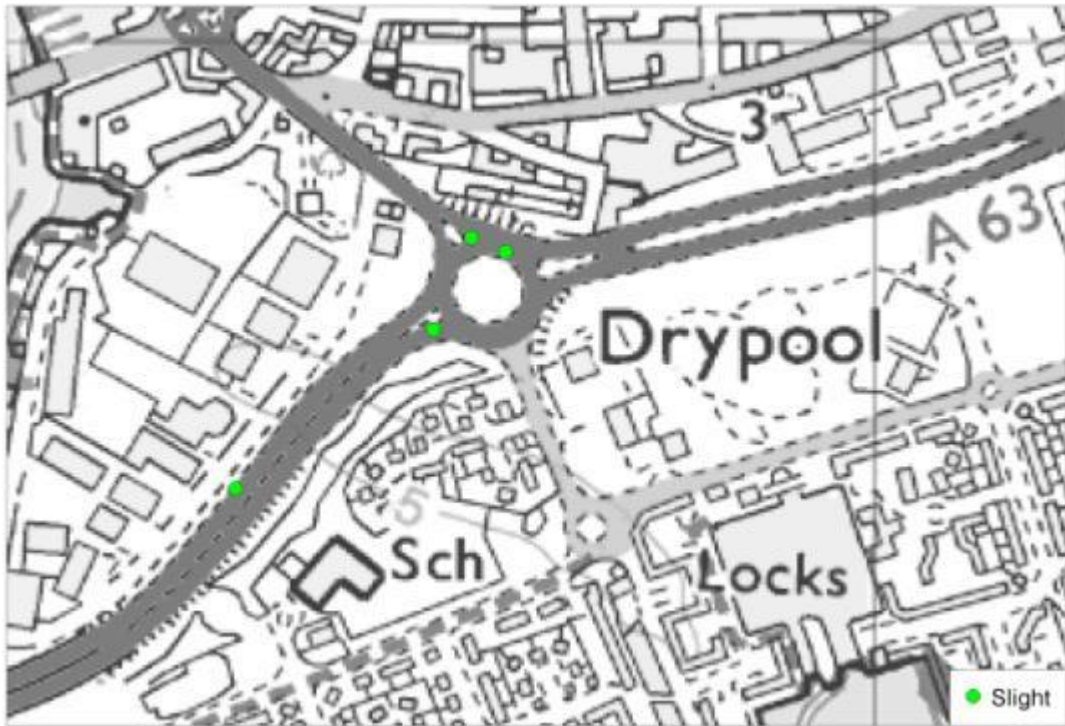
- In the five years before scheme construction, there were a number of accidents occurring on the A63 eastbound approach to the roundabout and north of the junction (A1165 Great Union Street);
- Only one accident was located on the westbound approach, and none south of the junction;
- A number of accidents occurred on the roundabout; and
- A similar pattern but with fewer accidents, can be seen after opening, with accidents located north and west of the roundabout

Figure 5.2 – Accident Locations (Before)



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Figure 5.3 – Accident Locations (After)



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Accident Causation

- 5.14 By using the STATS19 data collected by the police when attending accidents, it is also possible to make some broad observations relating to the cause of accidents in the before and after periods. When recording the details at the scene of an accident, it is possible to select up to 6 contributory factors and to indicate whether each factor is ‘very likely’ or could ‘possibly’ have caused the accident.
- 5.15 Table 5.3 summarises the most frequently listed factors which were considered a very likely cause of each accident before scheme construction compared to the numbers since opening. It also shows the likely cause of accidents in the after period (although it should be noted that this is based on a very small number of accidents). Each accident could have a number of very likely causes, and therefore the totals do not equate to the same number of accidents in Table 5.2.

Table 5.3 – Causes of Accidents before scheme construction and since opening

Period	Causes of Accidents	No. of Accidents (proportion of all accidents)
Before (Predicted Corrected)*	Failed to judge other people's path or speed	14 (47%)
	Failed to look properly	14 (47%)
	Poor turn of manoeuvre	7 (23%)
After	Failed to look properly	3 (75%)

*Predicted Corrected refers to most recent data prior to construction

- 5.16 The table shows:
- Before opening, almost half of accidents were caused by drivers failing to judge other people’s path or speeds and/or failing to look properly; and
 - After opening, over 75% of accidents were caused by drivers failing to look properly.
- 5.17 Further analysis of the accident data shows that before opening 11 (37% of the total) accidents were rear-end shunts on the approaches to the roundabout, whilst a further 11 (37%) were accidents on the circulatory, generally caused by failing to give way or making lane changes.
- 5.18 After opening one accident (25% of total) was a rear-end shunt on the approach to the roundabout, whilst a further 2 (50%) were accidents on the circulatory, caused by failing to give way. This may indicate a reduction in rear-end shunt type accidents. However, there are probably too few accidents to make a robust conclusion.

Chi-squared Statistical Test

- 5.19 In order to determine whether the changes in accident rates observed before and after the scheme opened are statistically significant, a Chi-Square test has been undertaken. This test uses the before and after numbers of accidents and traffic flows to establish whether the change is significant or likely to have occurred by chance. A Chi-squared value greater than 3.84 suggests a 95% confidence that the results have not occurred by chance alone.
- 5.20 A Chi Squared value of 0.574 has been calculated here, therefore we can be 95% confident that the change in accident rate could have occurred by chance alone and therefore the change in accident rates is not necessarily a direct impact of the scheme. This result may be due to the limited amount of post opening data available rather than any failings of the scheme itself to reduce accidents.

Comparison of PAR, PAR Predicted Corrected and Outturn Accident Analysis

- 5.21 By comparing the PAR and PAR Predicted Corrected with the outturn accident savings presented in this section, we can comment on the scheme’s accident savings compared to those forecast. Table 5.4 summarises this information. The Predicted Corrected accident savings have been calculated by using the same proportion of savings as in the PAR, but applied to the ‘before’ number of accidents in the PAR Predicted Corrected geographical area.

Table 5.4 – PAR Predicted, PAR Predicted Corrected & Outturn Accident saving

	Period	Opening Year Saving (PIAs)	60 Year Saving (PIAs)
PAR Predicted*	PAR Years	2.5	134
Predicted Corrected	PAR Years	3.9	208
	Most Recent	3.4	182
Outturn (compared to predicted corrected)	PAR Years	2.8	150
	Most Recent	2.0	107

**Note: geographical area of analysis differs to Predicted Corrected and Outturn*

- 5.22 It can be seen that the opening year outturn accident savings of 2.0 PIAs is lower than the original PAR forecast of 2.5 and lower than the PAR Predicted-corrected forecast of 3.4.

Summary – Section 5:

- There have been 4 accidents at the junction since the scheme opened compared to the average of 6 PIAs/yr before opening, a reduction of 2 accidents. However, the change is not statistically significant;
- The accident saving in the first year after opening was predicted (corrected) to be 3.4 amounting to 182 over the full assessment period (60 years); and
- The actual outturn accident saving was 2.0 PIAs/year amounting to 107 over the full assessment period (60 years).

6. Economy

Introduction

6.1 This section of the report presents information regarding the forecast economic impacts of the scheme and the outturn economic impacts of the scheme based on observed data collected before and after the scheme opened. A review of the outturn scheme costs against those predicted is also undertaken.

6.2 Economic benefits presented in this section of the report are derived from safety benefits only associated with the reduction in the number of accidents. The scheme appraisal did not consider journey times or any changes that may result from any reduced delay from queuing at the junction. As a result, predicted or outturn journey time benefits cannot be calculated or monetised and our preliminary results confirm that journey time improvements are minor.

Safety Benefits

6.3 In scheme appraisal, the economic impact of changes in safety, are calculated by assigning monetary benefits to the predicted reduction in the number and severity of personal injury accidents over the appraisal period.

Forecast Safety Benefits

6.4 The forecast safety benefits for the scheme have been derived from the PAR and are presented in the table below alongside a PAR predicted-corrected safety benefit which has been calculated based on the revised geographical area used in the accident analysis in the Safety section of this report.

Table 6.1 – Calculation of Forecast Safety Benefits: PAR and PAR predicted corrected

	PAR	PAR Predicted Corrected (PAR Years)	PAR Predicted Corrected (Most Recent)
Opening year accident saving (a)	2.5	3.9	3.4
Average cost of accident in opening year (b)	£71,970	£71,970	£71,970
Undiscounted Accident benefit in opening year (a) x (b) = (c)	£0.180m	£0.281m	£0.245m
Accident Benefits Capitalisation factor (d)	50.641	50.641	50.641
Discount rate from opening year to 2002 (e)	0.814	0.814	0.814
Accident Numbers Capitalisation factor (f)	53.424	53.424	53.424
60 year accident saving (a) x (f)	134	208	182
Accident benefit in opening year discounted to 2002 (c) x (e)	£0.146m	£0.228m	£0.199m
Accident benefits over 60 year assessment period, discounted to 2002 (c) x (d) x (e)	£7.412m	£11.563m	£10.081m

Note: Capitalisation factors, average cost of accident in opening year and discount rates derived from PAR v4.1d guidance

6.5 It can be seen from Table 6.1 that the PAR predicted-corrected safety benefits (PAR years and most recent) are higher than the PAR prediction.

Outturn Safety Benefits

- 6.6 As with the forecast safety benefits, a 60 year monetary benefit has been calculated for the outturn, based on the accident saving observed since the scheme opened compared to before scheme construction and this is shown in Table 6.2

Table 6.2 - Calculation of Outturn Safety Benefits: Compared to PAR and Predicted Corrected

	Outturn Compared to:	
	PAR Predicted Corrected (PAR Years)	PAR Predicted Corrected (Most recent)
Opening year accident saving (a)	2.8	2.0
Average cost of accident in opening year (b)	£71,970	£71,970
Undiscounted Accident benefit in opening year (a) x (b) = (c)	£0.202m	£0.144m
Accident Benefits Capitalisation factor (d)	50.641	50.641
Discount rate from opening year to 2002 (e)	0.814	0.814
Accident Numbers Capitalisation factor (f)	53.424	53.424
60 year accident saving (a) x (f)	150	107
Accident benefit in opening year discounted to 2002 (c) x (e)	£0.164m	£0.117m
Accident benefits over 60 year assessment period, discounted to 2002 (c) x (d) x (e)	£8.302m	£5.930m

Note: Capitalisation factors, average cost of accident in opening year and discount rates derived from PAR v4.1d guidance

Comparison of Outturn and Forecast Safety Benefits

- 6.7 A summary of the calculated forecast and outturn 60 year safety benefits is provided in Table 6.3.

Table 6.3 – PAR Predicted, PAR Predicted Corrected & Outturn Accident saving

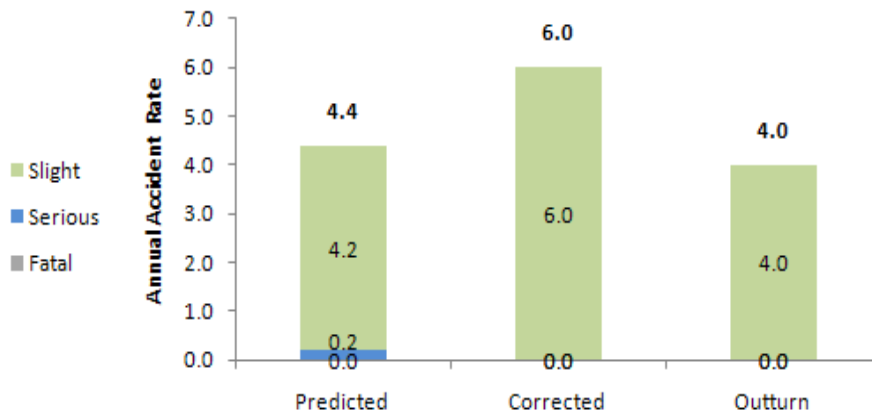
<i>Accident benefits in 2002 prices, discounted to 2002</i>	Period	Opening Year Safety Benefits (£m)	60 Year Safety Benefits (£m)
PAR Predicted		£0.146m	£7.412m
Predicted Corrected	PAR Years	£0.228m	£11.563m
	Most Recent	£0.199m	£10.081m
<i>Outturn (compared to predicted corrected)</i>	PAR Years	£0.164m	£8.302m
	Most Recent	£0.117m	£5.930m

- 6.8 For the purposes of this evaluation and in line with POPE methodology it is deemed appropriate that the economic benefit of the scheme be derived from the comparison of the outturn accident savings with that of the PAR predicted corrected utilising the most recent 5 years of data prior to construction.

6.9 The predicted corrected safety benefit of the scheme is therefore £0.199m in the opening year and £10.081m over 60 years compared to an outturn benefit of £0.117m in the opening year and £5.930m over 60 years. Figure 6.1 shows the accident savings and monetised benefits:

Figure 6.1 – Summary of Forecast and Outturn Safety Benefits

	Predicted	Corrected	Outturn
Date Range	01/02 to 12/06	09/03 to 08/08	12/08 to 11/09
Opening Year Benefit	£0.146m	£0.199m	£0.117m
60 Year Benefit	£7.412m	£10.081m	£5.930m
Accident Saving	2.5	3.4	2.0



Scheme Costs

6.10 This section compares the forecast cost of the scheme with the outturn cost. The opening year was forecast to be 2008. The forecast cost has been derived from the PAR and outturn costs provided by the scheme project manager. Predicted corrected cost has been included due to an error in discounting in version 4.1d of the PAR on which the PAR predicted assessment has been based. Unlike the PAR predicted, the predicted corrected costs in the table below utilise the correct discount factors and are therefore directly comparable to the Outturn costs.

Table 6.4 – Scheme Costs (2002 Prices)

Costs	PAR Predicted	Predicted Corrected	Outturn
Total Project Costs (<i>undiscounted</i>)	£1.194m	£1.433m	£1.343m
Total Project Costs (<i>discounted to 2002 at 3.5% discount rate</i>)	£1.175m	£1.409m	£1.093m

6.11 The outturn costs at £1.343 million (2002 prices, undiscounted) are lower than the corrected predicted of £1.433 million (2002 prices, undiscounted).

Summary of Economic Benefits

6.12 Table 6.5 provides a summary of the monetised benefits of the scheme.

6.13 All scheme benefits (predicted and outturn) are derived from safety benefits only, attributed to a reduction in accidents. The Benefit-Cost Ratio (BCR) is used as a summary of the overall value for money of a scheme over the life of the scheme (60 years). The First Year Rate of Return (FYRR) is the ratio of money gained on an investment in the first year relative to the amount of money invested in the first year after opening

Table 6.5 - Summary of Scheme Benefits (Predicted, Predicted Corrected and Outturn)

	Predicted	Predicted Corrected	Outturn
First Year Benefits	£0.146m	£0.199m	£0.117m
60 Year Benefits	£7.412m	£10.081m	£5.930m
First Year Costs	£1.175m	£1.409m	£1.093m
Total 60 Year Costs	£1.175m	£1.409m	£1.093m
Benefit Cost Ratio (BCR)	6.3	7.2	5.4
First Year Rate of Return (FYRR)	12%	14%	11%

Note: All costs are in 2002 prices and discounted to 2002 at 3.5%

6.14 Key points to note from the above include:

- The total first year benefits of the scheme were £0.117m, equating to a 60 year benefit of £5.93m, this is less than predicted in the PAR and predicted corrected;
- The scheme was delivered at a Present value Cost (PVC) of £1.093m compared to the predicted corrected of £1.409m;
- Overall, with benefits that are lower than predicted and lower scheme costs the FYRR was 11%, slightly less than the predicted 12% in the PAR and the predicted corrected of 14%; and
- The outturn BCR at 5.4 is also less than the PAR and the predicted corrected, but still represents high value for money.

Summary – Section 6:

- Economic benefits have been derived from safety benefits only associated with a reduction in the number of accidents;
- The outturn annual accident benefit in the opening year is £0.117m, which is lower than the PAR predicted (£0.146m) and PAR predicted corrected saving of £0.199m;
- The scheme was delivered at a PVC of £1.093m which is lower than the predicted corrected cost of £1.409m;
- The FYRR is 11% which means it will take just over 9 years to recoup the cost of the scheme; and
- The BCR is 5.4 compared to the predicted corrected of 7.2.

7. Environment, Accessibility and Integration

Introduction

- 7.1 This section of the report presents an evaluation of the scheme's impacts on the Environment, Accessibility and Integration objectives, against the forecast impacts stated in the scheme's full PAR and Appraisal Summary Table (AST). For this scheme, the AST assessed all objectives as not applicable, apart from journey ambience. However, outturn impacts can be assessed.
- 7.2 The scheme's predicted impacts and outturn evaluated impacts on the environment have been summarised by sub-objective in the table below:

Table 7.1 – Summary of Predicted and Outturn Environmental Impacts

Sub-Objective	Predicted Impact (PAR/AST)	Outturn Impact (EST)
Noise		There has been no significant change in the volume or composition of traffic using the A63. If the change in traffic is less than 25% it is considered to be of 'no impact' on noise.
	N/A	Neutral
Local Air Quality		There has been no significant change in the volume or composition of traffic using the A63. Options that result in a change in traffic flow by less than 10% can usually be assessed as having 'no impact'.
	N/A	Neutral
Greenhouse Gases		There has been no significant change in the volume or composition of traffic using the A63. If the change in total distance travelled on roads affected by the scheme is less than 10% the scheme can be regarded as having 'no impact'.
	N/A	Neutral
Landscape		Impacts apply to projects in rural areas.
	N/A	Neutral
Townscape		No change in traffic flows in area. Project included additional highway infrastructure, signals, guard railing and street lighting
	N/A	Slight adverse

Heritage of Historic Resources		No evidence of impact on archaeological or noteworthy built heritage sites.
	N/A	Neutral
Biodiversity		There is no evidence to indicate any protected species or habitat has been affected by the scheme.
	N/A	Neutral
Water Environment		There is no evidence to indicate that the scheme has had any impact on the water environment.
	N/A	Neutral
Physical Fitness		Previously, there were no formal safe crossing points for pedestrians. Scheme included new crossing facilities on both sides of A63 as part of the traffic signals. New guard railing and lighting to help pedestrians crossing on other approaches.
	N/A	Beneficial
Journey Ambience		Accident numbers have decreased; therefore the fear of potential accidents has been reduced. Traveller stress will be reduced by improved ease of crossing of the A63 at the roundabout, due to signalisation of the A63 approaches.
	Moderate beneficial	Moderate beneficial

Accessibility Impacts

7.3 The **Accessibility** objective consists of three main elements:

- Option values;
- Severance; and
- Access to the Transport System.

7.4 This section will examine each of these elements in relation to the scheme.

Option Values

7.5 For the option values sub-objective, the AST states that the impact on option values is not applicable. There has been no change in the availability of transport services within the study area and therefore it is agreed that outturn impact on option values is neutral in this case.

Severance

7.6 For the severance sub-objective the AST states the impact is not applicable. However, the Impacts Assessment Page (short PAR) states:

'By installing pedestrian phasing on the signals severance between all the arms of the junction will be greatly reduced.'

7.7 The predicted impact on severance was therefore assessed as beneficial.

- 7.8 Severance is concerned with the affects of traffic on those using non-motorised modes, especially pedestrians but also includes cyclists and equestrians.
- 7.9 Prior to the scheme opening there were no formal facilities for pedestrians or cyclists to cross the A63 at this location, with pedestrians making use of gaps in the central reserve on the A63 (see Figure 7.1 that shows a crossing point on the east of the junction). Figure 7.1 also shows the pedestrian crossing that is now located at the same point on the A63. The crossings have been widened and made considerably safer by the introduction of a signalised pedestrian crossing.

Figure 7.1 - A63 crossing point (east of roundabout)



Before Scheme Opening



After Scheme Opening

- 7.10 For the outturn situation, therefore, it is considered there has been a beneficial impact on severance.

Access to the Transport System

- 7.11 For the access to the transport system sub-objective the AST states that the impact is not applicable. The scheme had no impact on access for private cars nor on proximity to a public transport service therefore the impact is considered to be neutral.

Integration

- 7.12 The **Integration** objective consists of the following elements:

- Interchange with other transport modes;
- Land Use Policies; and
- Other Government Policies.

- 7.13 Integration is aimed at ensuring that all decisions are taken in the context of the Government's integrated transport policy.

Transport Interchange

- 7.14 The impact of the scheme on the integration with other transport modes sub-objective was predicted to be not applicable as there was no material impact.

- 7.15 The scheme does not affect access to park and ride, bus or rail stations and does not affect interchange facilities and therefore the impact can be considered to be neutral.

Land Use and Other Government Policies

- 7.16 The impact of the scheme on the land use policy and other Government policies sub-objectives was predicted to be not applicable as there was predicted to be no material impact.

7.17 The Hull City Council Local Transport Plan (LTP) 2006 – 2011 has the following objectives to which this scheme positively contributes:

- **Accessibility** - To ensure that good levels of accessibility are integrated with planned changes to the city in the health, housing, education, and employment sectors;
- **Safety** - To maintain and improve road safety on the city's roads; and
- **Quality of Life** – To ensure that transport provision contributes towards the promotion of sustainable and prosperous communities. Promotion of accessibility especially to the Port, City Centre and other employment areas, plus reductions in levels of congestion should all help stimulate the economy of the City and reduce the existing high levels of deprivation. Better access to all facilities in the City is being promoted to create sustainable communities.

7.18 The impact of the scheme on this sub-objective is considered to be slight beneficial.

Summary – Section 7:

Summary of PAR predicted and outturn environment, accessibility and integration impacts:

	<u>PAR Predicted</u>	<u>Outturn</u>
Noise	<i>Not Applicable</i>	<i>Neutral</i>
Local Air Quality	<i>Not Applicable</i>	<i>Neutral</i>
Landscape	<i>Not Applicable</i>	<i>Neutral</i>
Greenhouse Gases	<i>Not Applicable</i>	<i>Neutral</i>
Townscape	<i>Not Applicable</i>	<i>Neutral</i>
Heritage of Historic Resources	<i>Not Applicable</i>	<i>Neutral</i>
Biodiversity	<i>Not Applicable</i>	<i>Neutral</i>
Water Environment	<i>Not Applicable</i>	<i>Neutral</i>
Physical Fitness	<i>Not Applicable</i>	<i>Neutral</i>
Journey Ambience	<i>Moderate Beneficial</i>	<i>Moderate Beneficial</i>
Option Values	<i>Not Applicable</i>	<i>Neutral</i>
Severance	<i>Beneficial</i>	<i>Beneficial</i>
Access to the Transport System	<i>Not Applicable</i>	<i>Neutral</i>
Transport Interchange	<i>Not Applicable</i>	<i>Neutral</i>
Land Use Policy	<i>Not Applicable</i>	<i>Slight Beneficial</i>
Other Government Policies	<i>Not Applicable</i>	<i>Neutral</i>

8. Conclusions and Recommendations

Introduction

8.1 This POPE assessment of the A63 Garrison Road Roundabout LNMS scheme has utilised available data to evaluate the outturn impacts of the scheme compared to those forecast in the PAR. The purpose of this section of the report is:

- To summarise if the scheme has met its objectives;
- To summarise the key findings of the scheme; and
- To suggest recommendations that will facilitate and increase the accuracy of future PAR appraisals for schemes similar to that implemented at the A63 Garrison Road Roundabout.

Scheme Specific Objectives

8.2 The evaluation of the scheme’s specific objectives as reported in this study are summarised in Table 8.1.

Table 8.1 - Success against Scheme Objectives

Objective	Success	
To Improve Safety	Reduction in traffic accidents in first year. Improved crossing facilities have improved conditions for pedestrians and cyclists.	✓
To Improve Accessibility	The scheme has reduced severance for NMU’s through improved crossing facilities.	✓

Key Findings

8.3 The key findings from this evaluation are as follows:

- The safety objective of the A63 Garrison Road Roundabout Scheme has been met;
- Fewer accidents have occurred in the period since the scheme opened compared to the average for five years before. However, it should be noted that this is based on just one year of post scheme opening data;
- Outturn accident savings are lower than the original predictions;
- A lack of before data means that it is not possible to fully assess the scheme’s impact on journey times. However, with relatively unchanged traffic flows and journey times it is expected that journey reliability through the signalised junction will have improved; and
- The schemes BCR is lower than predicted but still represents high value for money

Recommendations

8.4 The following are recommendations that will facilitate and increase the accuracy of future PAR appraisals of schemes similar to the A63 Garrison Road Roundabout scheme:

- Accidents should be considered to the maximum extent of the queues observed in the 'before' situation. This is particularly the case for schemes with a high proportion of shunt type congestion related accidents;
- Where a scheme is likely to have an impact upon traffic congestion, the economy sub-objective should be quantified and surveys (journey times/queues length) should be conducted before construction so the impact can be fully evaluated and monetised after scheme opening;
- To enable a full evaluation of scheme impacts, the PAR/AST should be completed fully for all objectives and sub-objectives; and
- On renewal of contracts, when a new supplier is appointed MAC for an area, the new MAC should have access to all archived scheme data and information, and this should be made available to POPE.

Appendix A - Appraisal Summary Table (AST)

Objective	Sub Objective	Qualitative Impacts	Quantitative Measure	Assessment
Environment	Noise	Not Applicable	N/A	N/A
	Local Air Quality	Not Applicable	N/A	N/A
	Greenhouse Gases	Not Applicable	N/A	N/A
	Landscape	Not Applicable	N/A	N/A
	Townscape	Not Applicable	N/A	N/A
	Heritage of Historic Resources	Not Applicable	N/A	N/A
	Biodiversity	Not Applicable	N/A	N/A
	Water Environment	Not Applicable	N/A	N/A
	Physical Fitness	Not Applicable	N/A	N/A
	Journey Ambience	None		Moderate Beneficial
Safety	Accidents	None	134 Accidents Saved	Accident PVB: £7.412m
	Security	Scheme will provide a safer area for pedestrians by improving the crossing facilities and street lighting through the hours of darkness	No figures available	Moderate Beneficial
Economy	Public Accounts	Not Applicable	N/A	N/A
	Business Users & providers	Not Applicable	N/A	N/A
	Consumer Users	Not Applicable	N/A	N/A
	Reliability	Not Applicable	N/A	N/A
	Wider Economic Impacts	Not Applicable	N/A	N/A
Accessibility	Option Values	Not Applicable	N/A	N/A
	Severance	Not Applicable	N/A	N/A
	Access to the Transport System	Not Applicable	N/A	N/A
Integration	Transport Interchange	Not Applicable	N/A	N/A
	Land Use Policy	Not Applicable	N/A	N/A
	Other Government Policy	Not Applicable	N/A	N/A

Appendix B - Evaluation Summary table (EST)

Objective	Sub Objective	Qualitative Impacts	Quantitative Measure	Assessment
Environment	Noise	There has been no significant change in the volume or composition of traffic using the A63 as a result of the scheme.		Neutral, as expected
	Local Air Quality			Neutral, as expected
	Greenhouse Gases			Neutral, as expected
	Landscape	Impacts apply to projects in rural areas.		Neutral, as expected
	Townscape	No change in traffic flows in area. Project included additional highway infrastructure, signals, guard railing and street lighting.		Slight Adverse, worse than expected
	Heritage of Historic Resources	No evidence of impact on archaeological or noteworthy built heritage sites.		Neutral, as expected
	Biodiversity	No evidence to indicate any protected species or habitat has been affected by the scheme.		Neutral, as expected
	Water Environment	No evidence to indicate that the scheme has had any impact on the water environment.		Neutral, as expected
	Physical Fitness	Scheme included new crossing facilities on both sides of A63 built into the traffic signals. New guard railing and lighting to help pedestrians crossing on other approaches.		Beneficial, better than expected
	Journey Ambience	Accident numbers have decreased; therefore the fear of potential accidents has been reduced. Traveller stress will be reduced by improved ease of crossing of the A63 at the Garrison Road Roundabout.		Moderate beneficial, as expected
Safety	Accidents	Reduction in accidents in first year of opening.	107 Accidents Saved	£5.93 million
	Security	Pedestrian facilities and street lighting improved.		Moderate beneficial
Economy	Public Accounts	Outturn costs are lower than predicted.		PVC £1.093m
	Transport Economic Efficiency	Generally no impact on journey times. Journey time impacts were not considered in the PAR.		Neutral, as expected
	Reliability			
	Wider Economic Impacts			Neutral, as expected
Accessibility	Option Values	There has been no change in the availability of transport services within the study area.		Neutral, as expected
	Severance	Severance reduced as it is easier for NMU's to cross the A63 at the roundabout.		Beneficial, as expected
	Access to the Transport System	The scheme had no impact on access to a car or proximity to a public transport service.		Neutral, as expected
Integration	Transport Interchange	The scheme does not affect access to park and ride, bus or rail stations and does not affect interchange facilities.		Neutral, as expected
	Land Use Policy	The scheme positively contributes to the Hull City Council LTP 2006 – 2011.		Slight beneficial, better than Expected
	Other Government Policy			

