

Coral Reef Signalised Junction

12 Month Evaluation Report



1.0 Introduction

1.1 Background

- 1.1.1 The Coral Reef junction is located on the busy A322 / A329 corridor. This route provides a key strategic link between the M3 and M4 motorways, and runs through the centre of Bracknell, linking Surrey and Hampshire in the South, to Berkshire and Oxfordshire in the North. The route is forecast to see considerable growth in traffic over the next five to ten years, as Bracknell and the region see significant new development generating more trips, and increasing the population of the area as a result of the adopted Site Allocations Local Plan and also a new regenerated Town Centre.
- 1.1.2 In response to this forecast demand Bracknell has invested heavily over the last 5 years to improve the A322 / A329 corridor, as shown in **Appendix 1**, and provide more reliable journey times and create more capacity for growth in the borough. Much of these improvements so far have centred on improving capacity at key junctions and the application of Intelligent Transport Systems to allow us to manage movement along and across the corridor for all users. To date this work has been funded by a mix of Borough capital, government funding initiatives such as the Local Pinch Point Programme and the Local Growth Deal as well as developer contributions.
- 1.1.3 The Coral Reef Junction is the most significant as it involved the complete removal of a large roundabout, replaced with a signalised 4-way junction. These works took just under a year to complete, and as expected did result in some disruption and likely diversion of traffic, however the works were delivered ahead of schedule and on budget.

1.2 Travel Demand on the Corridor

- 1.2.1 The A329/A322 corridor is the one of the region's busiest and most important routes, passing through Bracknell's urban areas, carrying in excess of 50,000 vehicles per day.
- 1.2.2 Although the route serves as a primary means of access into Bracknell, it is also used by through traffic as an "outer orbital" link between the M3 and M4 motorways with up to 25% of the total vehicles in the PM peak travelling from the M3 corridor and onwards to the M4.

- 1.2.3 This high percentage of through traffic puts a tremendous strain on the Borough's highway network and creates delays at major junctions, including Coral Reef, for both residents of Bracknell and commuters travelling further afield. With the Highways Agency planning improvements to both the M3 and M4 Bracknell could see an increase in traffic travelling along this route.
- 1.2.4 In response to this the Council has developed a corridor plan showing proposed improvements to the major junctions along the route and details the benefits in journey times before and after.
- 1.2.5 This report has been prepared to evaluate the '12 month' performance of the new signalised junction at the intersection of the A322 Bagshot Road / Nine Mile Ride / New Forest Ride.
- 1.2.6 The report has been prepared in line with the Department for Transport Guidance 'Monitoring and Evaluating Framework for Local Authority Major Schemes' September 2012, and in agreement with Thames Valley Berkshire Local Enterprise Partnership.

1.3 Report Structure

- 1.3.1 The report has been split into eight sections as detailed in section 3 of the aforementioned report;
- Scheme Build;
 - Delivered Scheme;
 - Costs;
 - Scheme Objectives;
 - Travel Demand;
 - Travel Times and Reliability of Travel Times;
 - Impacts on the Economy, and
 - Carbon Impacts

1.3.2 The report is then summarised and conclusions are drawn and in the final section of the report.

2.0 Scheme Build

- 2.1 The project programme detailed an 18 month construction period to complete the introduction of a signalised junction.
- 2.2 It was planned that the works would start in March 2015 with the removal of trees and vegetation within the boundaries of the scheme prior to the bird nesting season which started in April 2015.
- 2.3 To enable all the works to be undertaken safely and to assist in keeping two lanes of traffic through the works whenever possible, the speed limit was temporarily stepped down to 40mph throughout the works area. *This was implemented in April 2015 and remained in place for the duration of the works.*
- 2.4 The first part of the construction programme saw the existing roundabout being removed. This took approximately two months due to the large volume of earth that needed to be removed.
- 2.5 Once the roundabout was removed and laid to road surface, a temporary roundabout was to be left in place affording the opportunity to alter its size and position to suit while the majority of the works were undertaken. The next part of the programme involved widening the carriageway into the central reserves and installing all of the new infrastructure to the final layout. It was anticipated that this work would take the scheme into 2016.
- 2.6 Once the central reserves had been completed there was sufficient carriageway to swap the traffic onto the middle of the A322 using the newly constructed carriageway. Then the near side works could take place. It was expected this would take to the summer of 2016. Up to this stage of the works it was planned to keep the junction running as a roundabout with two lanes of traffic running in both directions along the A322 for the majority of the time.
- 2.7 The final stage of the works involved the extension of the central island into the cross roads junction and installation of the traffic signal infrastructure before the junction could be given its final surface and the traffic lights turned on. It was planned that these works would be completed by autumn 2016.
- 2.8 Due to a mild winter and a number of double shifts the scheme was completed 6 months ahead of schedule. **Appendix 2** shows the completed programme in detail.

3.0 Delivered Scheme

Coral Reef Roundabout from the pedestrian bridge – April 2015



Coral Reef Signalised Junction from the pedestrian bridge – August 2017



4.0 Costs

- 4.1 The project commenced in 2014-15 with a budget of £100k (£52k of which was Developer 106 funding and £48k of LTP grant funding). This initial budget was allocated for the detailed design and site preparatory works in anticipation of receipt of further funding.
- 4.2 In 2015-16, BFC received £2.1m from the Thames Valley Local Enterprise Partnership to fund the junction improvements.
- 4.3 The project was completed in 2016-17 with an additional budget of £895k comprised of £265k of S106 contributions and £630k of additional Council funding.
- 4.4 The total project budget was £3,095,030 and upon completion, the total cost of the project was £3,094,892.04

5.0 Scheme Objectives

- 5.1 The scheme has improved access by providing management of movement, thus removing the delays on side arms that historically had to give way to the dominant flow along the A322.
- 5.2 By improving movement at this busy junction and reducing delays, we have also contributed towards a reduction in carbon emissions and removed a significant barrier to development in the area including the TRL housing project commenced on site in June 2017. Benefits will also be felt by neighbouring LEP areas and assist in the overall control and co-ordination of the strategic corridor network within the Borough.
- 5.3 The introduction of the proposed signalised junction is predicted to significantly reduce the level of queuing and delay on all approaches to the existing roundabout, but particularly on the side arms of New Forest Ride and Nine Mile Ride. All movements from these arms were affected by the dominant east-west movement along the A322.
- 5.4 The key measure of success of the proposed improvements will be further realised as development continues in the borough as part of the adopted Site allocations and the completion of the Town Centre regeneration in September 2017.

6.0 Travel Demand

6.1 Observed Turning Counts

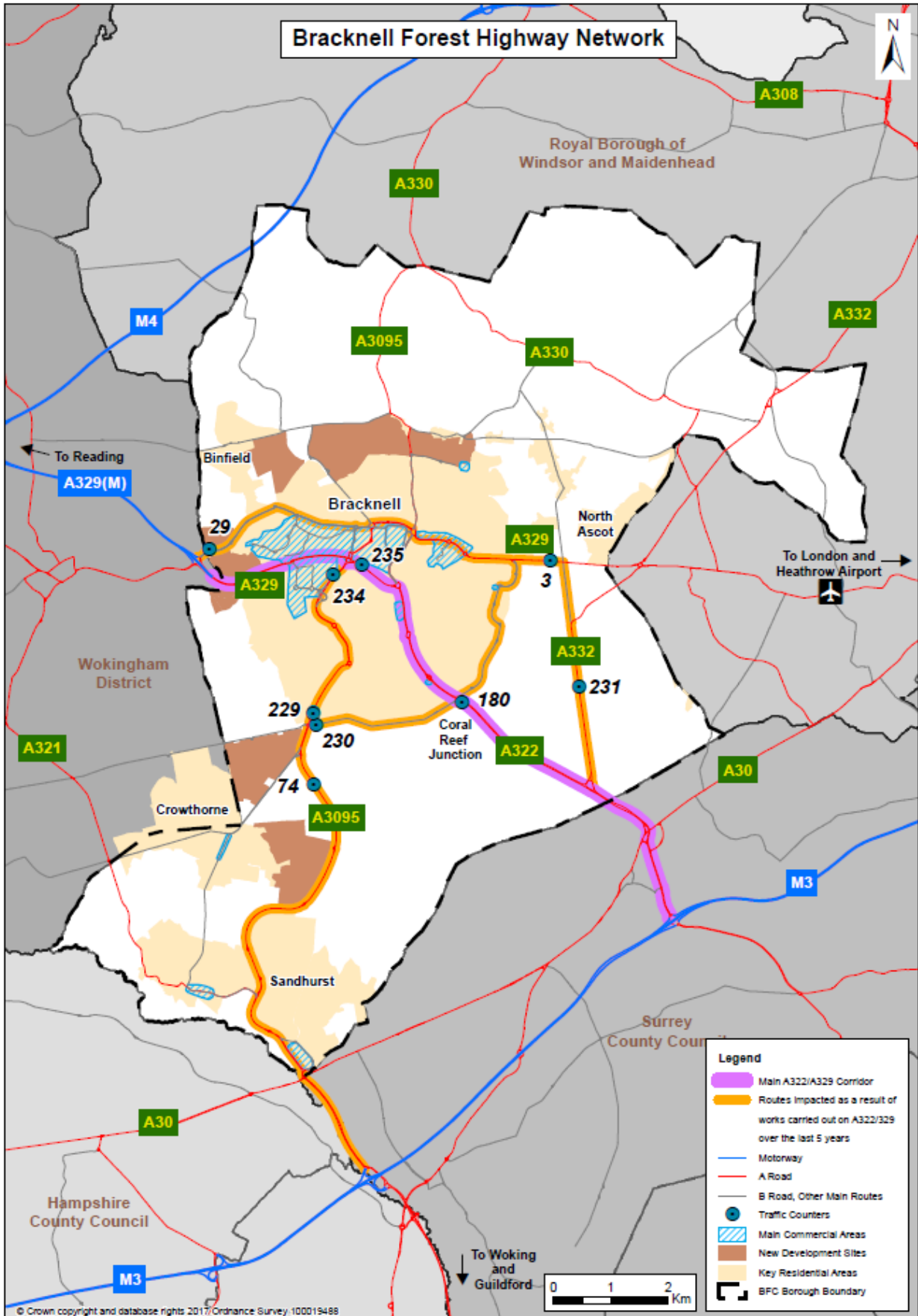
- 6.1.1 Junction turning counts were undertaken in March 2013 and again in May 2017 to illustrate the pre and post implementation effect of the improved junction layout.
- 6.1.2 When surveyed in 2013, a total of 4,874 vehicles were observed in the AM peak period and a total of 5,277 vehicles in the PM peak period.
- 6.1.3 The surveys undertaken in 2017 showed a figure of 4,907 vehicles observed in the AM peak period and 5,015 in the PM peak period.
- 6.1.4 It is noted that in both peak periods, the movements to and from the minor arms of Nine Mile Ride and New Forest Ride improve significantly, particularly the right turn movement which was the cause of a high level of queuing and delay on these arms in the previous roundabout layout. This indicates that the introduction of the signalised junction has relieved the pressure on these arms to allow equal opportunity for movements across the whole junction as set out in section 5 – Scheme Objectives.
- 6.1.5 In terms of the A322 Bagshot Road (and considering the junction as a whole), there has been a small reduction in traffic levels since the scheme was completed due to the impact of traffic management linked to highway improvement works carried out over the last 5 years. This is explored and explained further in section 6.3.

6.2 Traffic Monitoring

- 6.2.1 Traffic in the Borough is monitored by both the Council and the Department for Transport (DfT). The Council has 51 Automatic Traffic Counter (ATC) sites on a variety of roads across the Borough including key strategic routes. The DfT periodically carry out day counts at set points on key routes, devising a figure accordingly.
- 6.2.2 Data obtained from the Borough's 51 ATC sites has shown a cross-borough increase over the 2014 – 2016 period of 4% (verified by DfT count traffic count data which has shown a similar increase). This follows a period of decline in traffic from a high point in 2006, observed in Bracknell Forest and nationally.

6.2.3 It should also be noted that although traffic has increased across Bracknell Forest over the past two years, the locations where it has done so vary. Some sites have actually shown a decrease in traffic. In the case of the Coral Reef junction and A322 / A329 corridor, this is a result of other routes becoming more attractive due to the ongoing impact of traffic management linked to road works as the corridor is improved. Figure 1 shows the location of numbered traffic counters used for the purposes of this report and alternative routes impacted from these works. Tables 6.1 – 6.3 provide the figures demonstrating this.

Figure 1: A322 / 329 Corridor and Alternative routes



6.3 A322 / A329 corridor

- 6.3.1 Tables 6.1, 6.2 and 6.3 present data from traffic counter sites of relevance to the Coral Reef Junction between 2013 and 2017, considering the average annual traffic figures for the full day, the AM peak, and the PM peak.
- 6.3.2 Site 180 Bagshot Road is the most relevant site to the Coral Reef junction, and provides a good indicator of traffic using the junction on the key strategic A322. It is located just to the South of the junction.
- 6.3.3 Considering the timeframe 2013 – 2017*, ATC site 180 figures suggest a reduction in traffic using the Coral Reef junction through the period that works were taking place. Given the significant works carried out to the junction, it is theorised that route switching probably occurred to avoid it.
- 6.3.4 This theory can be substantiated when considering traffic flows on alternative routes, particularly the A3095 which is the most obvious alternative North-South route. ATC site 74 Crowthorne by-pass has seen an 11.3% increase in traffic over the time frame that site 180 Bagshot Road saw a 5.1% decline. Further sites along the A3095 approaching Bracknell (229, 234) also recorded increases of 9.5% and 11.8% respectively.
- 6.3.5 Another alternative route is to use the A332 Swinley Road, which takes drivers off the A322 before the Coral Reef junction and towards Ascot. This route has seen a 6.7% increase in traffic over the monitoring period, although it should be noted that the route is a less obvious alternative to the A3095 as it takes strategic through-traffic a considerable distance away from the key A322 / A3095 routes. Traffic is probably further deterred given peak time queues on the A329 London road.
- 6.3.6 The route-switching theory is further verified given that turning counts carried out across the full Coral Reef junction suggest that traffic has remained broadly the same through the junction when comparing 2013 and 2017, and observations suggests that on Nine Mile Ride B3430, queuing is significantly reduced following the revised junction reopening. Counts from site 230 are included for reference, and show only a 1.34% reduction in traffic using the route between 2013 and 2017. 5.8% less traffic used the route the previous year 2016 compared to 2013, suggesting traffic is 'coming back' with drivers realising that queue time is much improved. In the AM peak traffic has increased by 4.3% over 2013.

6.3.7 In summary, traffic through the Coral Reef junction is broadly sustained, and the network as a whole is handling more traffic. It is expected that drivers will continue to revert back to the A322 Coral Reef route, and forecast increases in traffic across the Borough will in no doubt be better accommodated through the junction in the longer term.

Table 6.1 – Average Annual Daily Flow

*2017 data up to 23 June 2017.

	Site 180	Site 74	Site 229	Site 231	Site 230	Site 234	Site 235	Site 29
AADT 2013	49858	20511	26360	15987	14987	24440	30954	26813
May 2013	50908	(17889)	26724	16270			31137	24155
AADT 2014	50333	21262	27592	15880	15147	24516	32320	23961
May 2014	50608	20711	27137	16222	15482	24183		26898
AADT 2015	47450	22210	28771	16381	15023	26605	32949	24877
May 2015	48403	21864	28522	16861	14845	26144	32907	
AADT 2016	47217	23143	29718	16620	14119	27242	33780	25537
May 2016	47698	23386		17374	14757	27801	33638	26236
AADT 2017	47304	22830	28860	17065	14786	27313	32756	25244
May 2017	47156	23121	29084	17704	14909	28382	32973	25093
2013 – 2017 AADT change	-5.1%	+11.3%	+9.5%	+6.7%	-1.34%	+11.8%	+5.82%	-5.85%
	A322	A3095	A3095	A332	B3430	A3095	A322	B3408

Table 6.2 – Average AM Peak 7am – 10am

	Site 180	Site 74	Site 229	Site 231	Site 230	Site 234	Site 235	Site 29
AADT 2013	10651	3763	5820	3867	3241	4755	5848	6288
May 2013	10922	(4476)	6067	3966			5957	5107
AADT 2014	10779	4758	6166	3655	3407	4952	5922	6046
May 2014	10684	4591	6093	3761	3480	5087	5696	6471
AADT 2015	10251	4939	6552	3833	3306	5544	6700	6097
May 2015	10173	4786	6316	3837	3172	5287	6470	
AADT 2016	10347	5109	6641	3938	3110	5645	6930	6246
May 2016	10009	5155		4029	3079	5793	6822	6403
AADT 2017	10618	5078	6550	4201	3381	5796	6813	6210
May 2017	10286	5115	6662	4214	3333	5850	6627	6223
2013 – 2017 AADT change	-0.3%	+13.4%	+12.5%	+8.6%	+4.3%	+21.9%	+16.5%	-1.24%
	A322	A3095	A3095	A332	B3430	A3095	A322	B3408

Table 6.3 – Average PM Peak 4pm – 7pm

	Site 180	Site 74	Site 229	Site 231	Site 230	Site 234	Site 235	Site 29
AADT 2013	11589	4199	6284	3815	3573	5680	6760	6964
May 2013	12056	(5012)	6425	3892			6455	6291
AADT 2014	11535	5308	6583	3702	3454	5795	6742	6372
May 2014	11495	5237	6523	3812	3534	5709		7038
AADT 2015	10749	5544	6776	3938	3441	6427	7098	6113
May 2015	10943	5466	6798	4006	3342	6204	7116	
AADT 2016	10898	5742	6924	3895	3181	6332	7348	6791
May 2016	11274	5841		4070	3238	6439	7454	6874
AADT 2017	11173	5609	6620	4098	3360	6293	7161	6669
May 2017	11071	5632	6524	4140	3379	6144	7143	6627
2013 – 2017 AADT change	-3.6%	+12.4%	+5.3%	+7.4%	-6.0%	+10.8%	+5.9%	-4.2%
	A322	A3095	A3095	A332	B3430	A3095	A322	B3408

6.4 Junction Modelling Summary

6.4.1 The industry standard modelling programme ARCADY was used to calculate the capacity and estimate vehicle queuing on the previous roundabout. LINSIG was used on the subsequent signalised junction to illustrate the simulated effect of introducing a signalised junction.

6.4.2 The introduction of a signalised junction demonstrated significant reductions in queuing and delay when compared with the previous roundabout.

7.0 Travel Times and Reliability of Travel Times

7.1 Introduction

7.1.1 This section details the journey times now experienced on the A322/A329 corridor as a result of the introduced improvements. The signalised junction at Coral Reef is a key part of this corridor.

7.1.2 The journey time route was between Peacock Farm Roundabout and Swinley Bottom Gyrotory, with timing reference points at key junctions along the route. The journey times were recorded in both the north and southbound directions and for the AM and PM peak periods.

7.1.3 Journey times were recorded in 2013 as part of the refresh of the Bracknell Multi Modal Transport Model. These were used as a baseline with the surveys being repeated post implementation in June 2016 to record the impact of the improvements introduced to the corridor. Furthermore, journey times were extracted from the BMMTM 2026 Reference Case model to illustrate the predicted future journey times as a result of the proposed developments within Bracknell.

7.2 Analysis of Journey Times

7.2.1 Tables 7.1 and 7.2 illustrate a summary of the journey times recorded in the listed time periods for both the AM and PM peaks. They also illustrate the percentage improvements between 2013 and the post implementation survey undertaken.

Table 7.1 – AM peak Journey Time Comparison

AM Peak	Northbound	Southbound
2013	00:14:29	00:15:52
2016 June	00:13:48	00:12:15
change from 2013	-4.7%	-22.8%

7.2.2 Table 7.1 shows the improvements along the have resulted in a significant improvement in journey times in both the northbound and southbound directions in the AM peak period. This is particularly noticeable in the southbound direction, resulting in an improvement of almost 23%.

Table 7.2 – PM peak Journey Time Comparison

PM Peak	Northbound	Southbound
2013	00:14:27	00:15:46
2016 June	00:13:53	00:14:20
change from 2013	-3.9%	-9.1%

7.2.3 Again, the journey times recorded post implementation illustrates that the improvements to the corridor improve journey times in both the northbound and southbound directions.

8.0 Impacts on the Economy

- 8.1 The economic benefits of the scheme were based on a forecast year of 2026 however as traffic begins to switch back to the A322/A329 corridor this will have a significant positive impact on the other main corridors impacted as a result of traffic management delay over 5 years
- 8.2 There is significant development due to come forward within Bracknell Forest Borough which requires suitable infrastructure to mitigate any impacts of the development on the road network.
- 8.3 By improving movement at this busy junction and reducing delays we have assisted in reducing carbon emissions and removed a significant barrier to development in the area including the TRL housing project which commenced on site in June 2017 and also the Town Centre regeneration which opened in September 2017.
- 8.4 Benefits will also be felt by neighbouring LEP areas and assist in the overall control and co-ordination of the strategic corridor network within the Borough.

9.0 Carbon Impacts

- 9.1 By improving movement at this busy junction and reducing delays we have assisted in reducing carbon emissions. Further improvements along the corridor and overall management of movement using Intelligent Transport Systems will help co-ordinate movement more efficiently with positive impacts to the Air Quality.

10.0 Summary and Conclusions

- 10.1 With the benefits of the scheme based on a forecast year of 2026 it is too early to report on the real impact of the scheme, but it is clear that overall movement and capacity at the junction has been improved and forms an important part in the overall management of this busy corridor linking the M3-M4.