

Island Roads




# Whitehouse Road/Forest Road junction

AIP Report

November 2020

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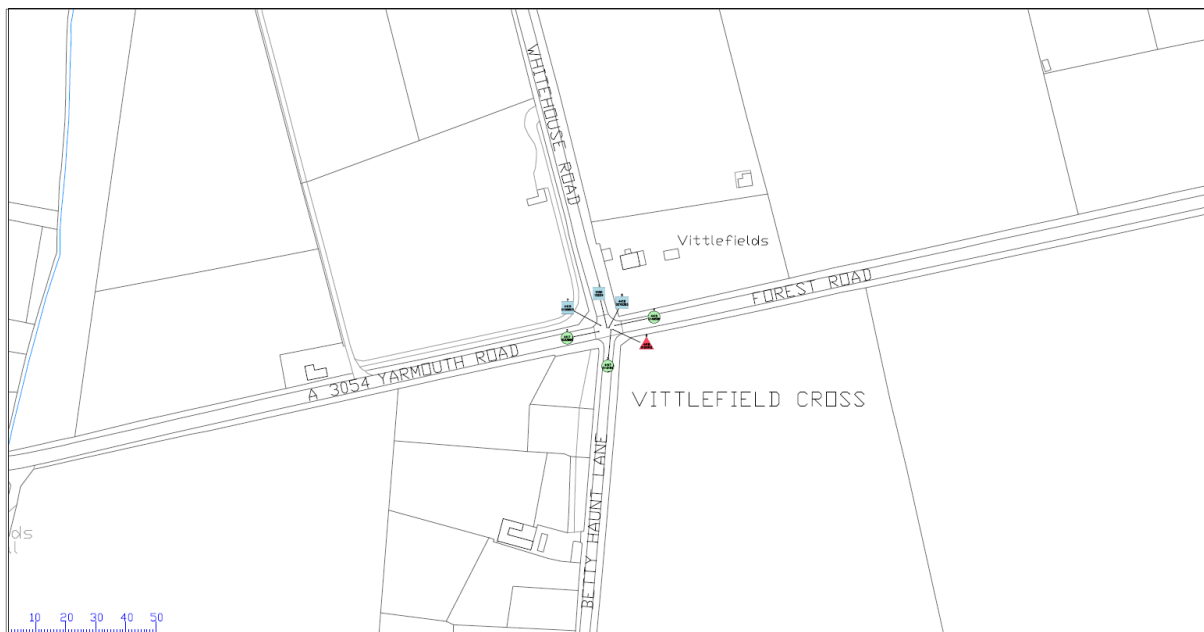
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# 1 Introduction

## 1.1 Location

The junction under consideration is that of the A3054 Forest Road and Whitehouse Road, Newport. The junction is a standard rural crossroads with the main road running approximately east/west and the side roads north/south. All roads are subject to the national speed limit.

The A3054 is the main strategic route from Newport to the West Wight and carries in the region of 10,000 vehicles per day. It is on a regular local bus route and also carries most of the large goods vehicles that travel between Newport and the West Wight.



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The two side roads are minor rural local access roads. Whitehouse Road provides a link towards Porchfield, Gurnard and Cowes and carries approximately 2,000 vehicles per day. A timber frame manufacturing facility on Colemans Lane means that a reasonable number of large vehicles use this junction.

Betty Haunt Lane is subject to a 6ft 6 width restriction and is the arm with the lowest volume of traffic, with approximately 1,000 vehicles per day using the road.

Advance Direction Signs are provided on approach to the junction on the main road. These are located approximately 90m from the junction on the eastern side and 65m from the junction on the western side.



*Image 1 – Advance Direction Sign to east of junction*

On each of the minor road approaches to the junction, advanced give way signs are provided. At the junction, upright signs and road markings are in place.



*Image 2 – Advance give way sign and slow marking on Whitehouse Road approach*



*Image 3 – Whitehouse Road, approximately 40m from give way line*

## 1.2 Site Comments

Both Betty Haunt Lane and Whitehouse Road have been resurfaced in recent years (Betty Haunt Lane – July 2015, Whitehouse Road – March 2014) and are in good condition. Forest Road, to the west of the junction was resurfaced in Autumn 2019.

Forest Road, to the east of the junction is in fair-good condition and has a WCCI score of 15.32 based on 2019/20 survey data.

Road markings are generally in good condition, with only minor wear on some of the high stress areas.

The vegetation at the junction is generally well maintained but its location does impact on visibility when approaching the A3054 from the side roads. This is discussed in more detail below.

There is evidence of vehicle overrun on both sides of Whitehouse Road.



*Image 4 – Whitehouse Road – verge overrun on eastern side of road*

The approach on each arm is generally straight and level. There is a slight rise in the road to the west of the junction that impacts on the maximum visibility that is available.



Image 5 – looking east approximately 160m west of junction

Junction count data is not available at this time, but vulnerable road users are expected to make up a very small proportion of the movements at this junction. Cyclists are likely to be the main vulnerable road user group, followed by equestrians and pedestrians using nearby bus stops.

The Design Manual for Roads and Bridges sets out the visibility requirements for new and upgraded rural junctions. Ideally, the x distance should be 9m from the nearside edge of the running carriageway on the major road. At this x distance, drivers on each of the side roads are unable to see the recommended y (see table 1) distance on the major road. The standard does allow relaxations for the x distance to 4.5m in difficult circumstances and 2.4m in exceptionally difficult circumstances.

The 'x' distance, from which full 'y' distance visibility is provided, should not be more than 9m, as this induces high minor road approach speeds into the junction, and would require excessive land take.

Design Speed of Major Road (kph)	'y' Distance (m)
50	70
60	90
70	120
85	160
100	215
120	295

Table 1 – 'y' distance for priority junctions taken from Design Manual for Roads and Bridges

Ideally, on each side road approach, a y distance of 160m should be available from a point 9m back from the give way line. This is not currently available. Visibility to the right when approaching the junction is restricted by third party vegetation. However, when a vehicle is waiting at the give way line, visibility is good. The visibility could be improved slightly by realigning the private hedge.

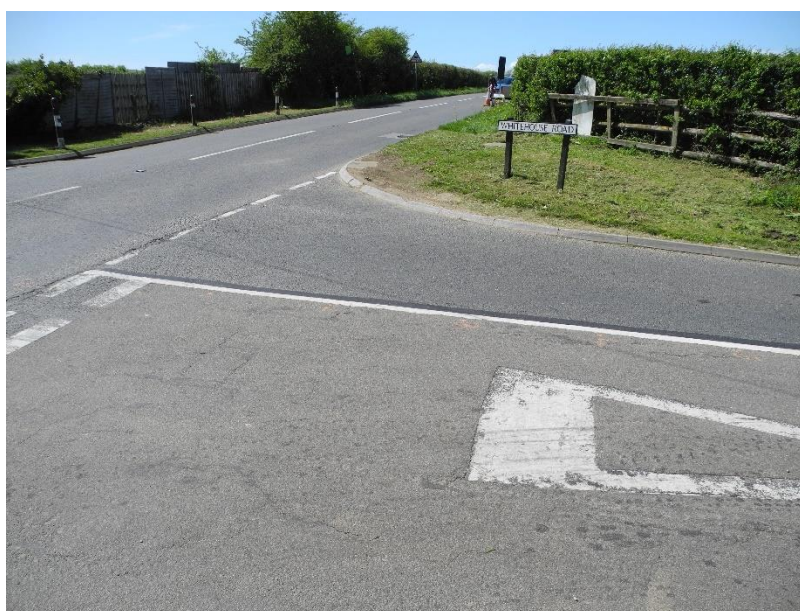


Image 5 – visibility to west from Whitehouse Road

## 2 Collision Investigation

There have been 7 recorded injury collisions at this junction in the last five years, 1 fatal, 3 serious and 3 slight.

The ten year average for collisions at this junction is 1.28 collisions per year. Over the most recent five years the rate is slightly higher at 1.4 per year. The long-term severity rate is 27% KSI but the rate over the most recent five years has been substantially higher at 57%.

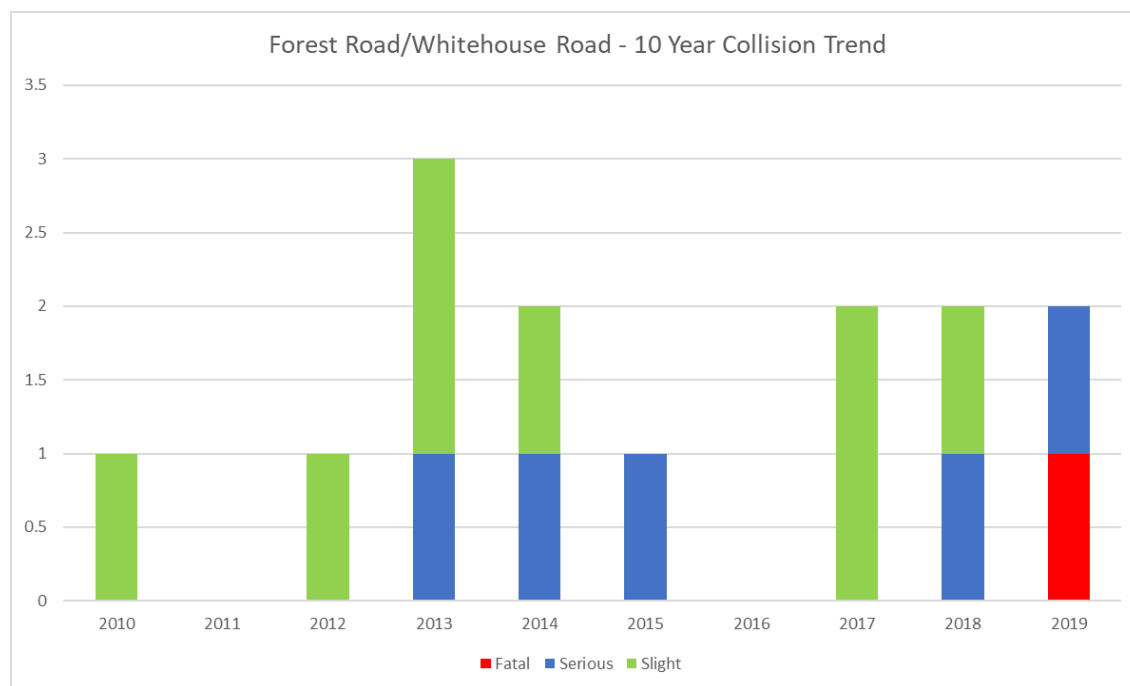


Chart 1 – 10 Year Collision Trend

Six of the seven collisions involved vehicles exiting Whitehouse Road on to Forest Road. One involved a vehicle turning right across the path of a vehicle travelling east on Forest Road.

86% of collisions occurred on dry roads in fine weather conditions. 86% of collisions occurred in daylight. 87% of vehicles involved were cars. Other vehicles involved were PTW (1) and PSV (1)

Two of the collisions were recorded as a failure to give way. Two collisions were recorded as starting/moving off.

34% of drivers involved were over 60 and 3 of the 7 collisions have the older driver as being at fault for the collision. Two turning out of Whitehouse Road and one tuning into it.



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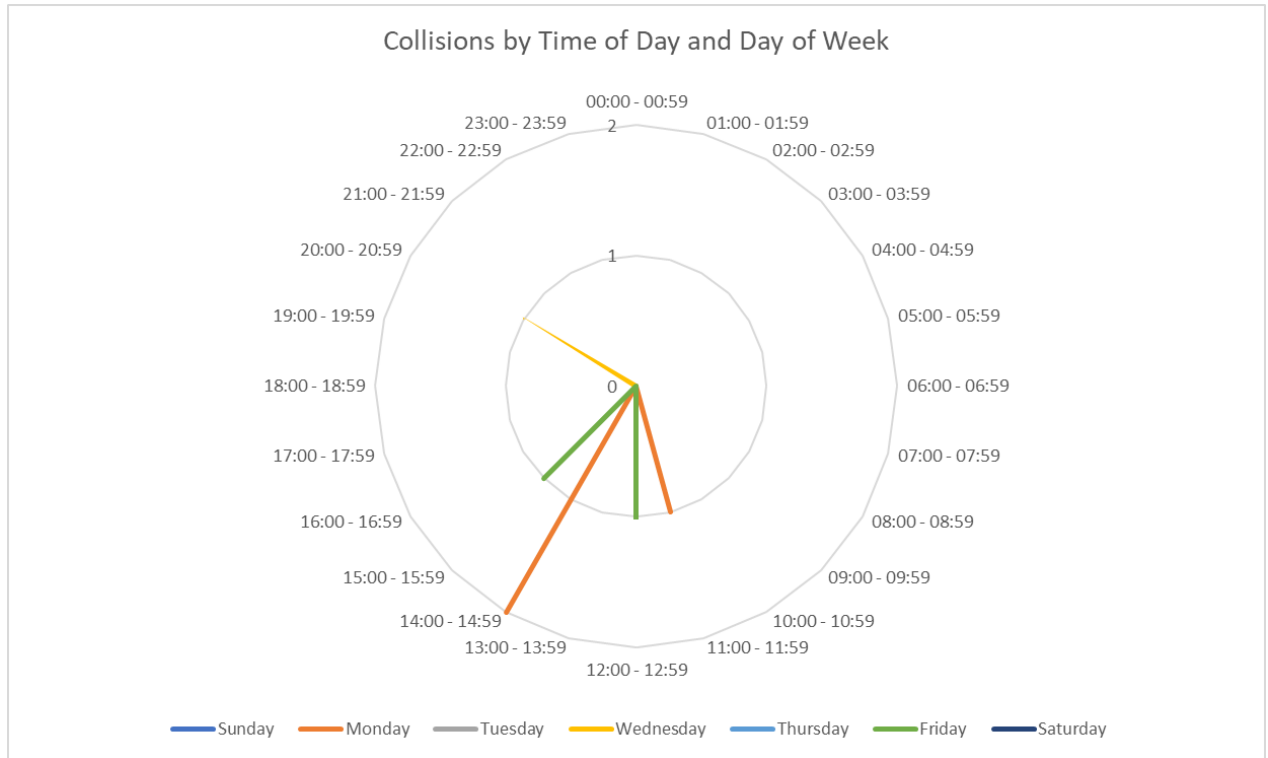


Chart 2 – collisions by day and time

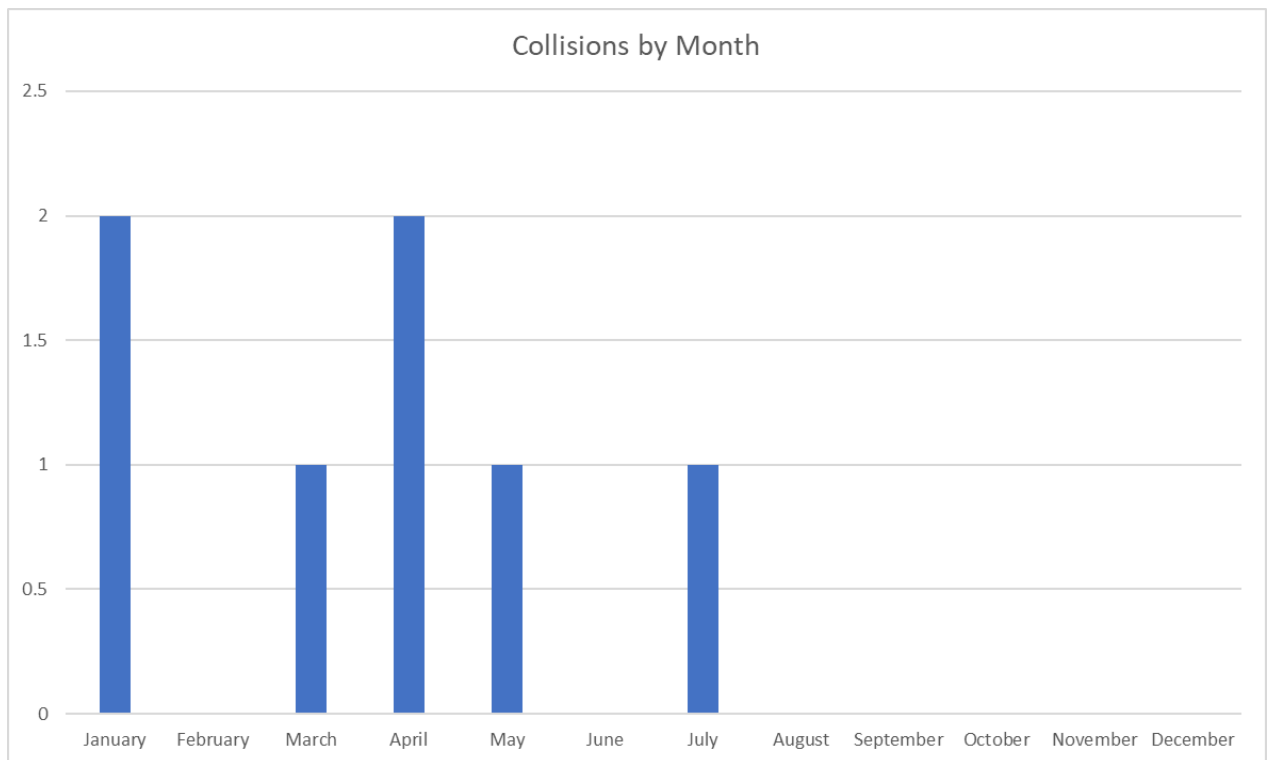


Chart 3 – collisions by month



The time of day and time of year when most of the collisions have occurred indicate that the position of the sun may have an effect on the driver’s interpretation of the junction. Between 11am and 3pm in March, April and May, the sun will be almost directly opposite drivers exiting Whitehouse Road. The suns altitude increases from 16 degrees from the horizon in January to 60 degrees at the end of May.

Reference Number	1500 15234	4417 0033996	4417 0110184	4418 0149588	4418 0278383	4419 0129002	4419 0155605
Date / Day	Wed 14	Fr 27	Fr 24	Mo 23	Mo 23	Su 14	Mo 06
Month	Jan	Jan	Mar	Apr	Jul	Apr	May
Year	2015	2017	2017	2018	2018	2019	2019
Time	2025	1227	1508	1415	1136	1245	1421
Severity	Se	Sl	Sl	Sl	Se	Fa	Se
Dark / Lit							
Weather Conditions							
Road Surface							
Special Conditions							
Carriageway Hazards							
Vehicle Manoeuvres							
Vehicle	1 5 e						
Vehicle	2 6 t						
Vehicle	3 7 c						
Vehicle	4 8						
Casualty /age							
Failed to Give-Way							
Signal Ignored							
Loss of Control							
Hit Object IN C'way							
Hit Object OFF C'way							
Vehicle Left C'way	SO				N	N N	
Breath Test							
Contributory Factors	1/2 V1** V1* 405 406	V1** 403	V1* V1* 401 403	V1** 403	V1** V1** 302 405	V1** 302	
	3/4 V1* 509		V1** V1** 405 406				
* possible, ** very likely	5/6 V1** 602						
Sched No./Ref.							
User fields:	1						
	2						
	3						
	4						

Chart 4 – Stick diagrams of collisions

## 2.1 Junction Movements

All approaches to the junction are subject to the national speed limit and historic data indicates average vehicle speeds on approach are below the posted speed.

- Whitehouse Road (advance give way sign) – Average = 39mph, 85th percentile = 46mph

- Forest Road (slippery road warning sign) – Average = TBCmph (device in place Oct 2020), 85th percentile = TBCmph
- Betty Haunt Lane – average 35mph and 85<sup>th</sup> percentile 40mph

During the time this report has been written, it has not been possible to undertake meaningful surveys as the Covid-19 pandemic has resulted in traffic flows that are not representative of the normal situation.

### 3 Summary

The collision types do not indicate an issue with overtaking through the junction or poor right turn movements from the main road on to the minor road. The main collision type involves vehicles exiting Whitehouse Road colliding with vehicles on Forest Road.

The high friction surfacing on the minor road approaches provides enhanced skid resistance for drivers approaching on these roads.

There are no junctions of a similar nature on the island that would allow a direct comparison of collision rates. Either the geometry of the junction or the relative traffic flows are different.

A possible historic junction comparison would be Fighting Cocks Cross in Arreton. Prior to a safety scheme being implemented at this rural crossroads the collision rate was 3.2 per year. The scheme to provide protected right turn lanes and reduce the speed limit has resulted in a 10 year average of 0.2 collisions per year. No collisions have been recorded at the junction since 2012. However, the collision types at this junction were mainly rear end shunts on the main road rather than vehicles turning out of side roads.

Considering the age of some of the drivers involved in collisions at this junction, this report has considered information contained within Supporting Safe Driving into Old Age – A National Older Driving Strategy. This showed that uncontrolled T junctions and cross roads have a higher proportion of older driver collisions.

Signal controlled junctions or uncontrolled roundabouts have similar collision rates across all age groups.

*This suggests that a change to a roundabout or a traffic signal controlled junction would make the junction easier to negotiate for older drivers. As the age of the local population increases, the benefit of these changes will be greater over time.*

### 4 Improvement Options

Any of these improvement options could be combined with a reduction in speed limit to 50mph. However, the difficulty with reducing the speed limit is determining where it should start and stop. Speed limits should not be set to address a particular hazard or site and would therefore need to

extend over the full length of the route with similar highway characteristics. Considering this, if the limit was reduced, it would probably need to be changed on the section of the A3054 between Gunville Road and Shalfleet. The speed limit on the side roads could remain the same as the terminal signs will help to highlight to drivers not familiar with the area that there is a junction.

### 4.1 Option 1 – Improve Visibility

This would involve removing/realigning some private hedge to provide the full 'y' value distance from a point 9m back from the give way line.

This would provide a level of visibility in accordance with the Design Manual for Roads and Bridges.

### 4.2 Option 2 – Stagger

Introducing a stagger would reduce the risk of a driver failing to recognise the priority at the junction.

However, the collision history for the site and the signs already provided indicate that this is not a significant issue at this location. Therefore, this solution is unlikely to have a measurable impact on the number of recorded collisions at the junction.

Bridlesford Road and Knights Cross has a right/left stagger. The 10 year average collision rate for this location is 1.1 per year and severity rate of 45%.

The volume of straight across movements on the Betty Haunt Lane and Whitehouse Road is expected to be much lower than the flows on Bridlesford Road. Therefore, a direct comparison cannot be made.

### 4.3 Option 3 – Traffic signals

The installation of traffic signals would greatly reduce the risk of conflict at the junction. However, modelling would need to be undertaken to assess the expected queue lengths to ensure that it does not increase the risk of rear end shunts as vehicles exit the bend to the west of the junction. There is 325m between junction and bend and during peak periods the risk of rear end shunts may increase.

To ensure the junction was safe and efficient, dedicated right hand turn lanes would be required. This would increase the cost and land take required for the scheme.

The transit of the sun may reduce the drivers view of the traffic signals on clear days during some periods of the year. Failure to recognise the signals may result in junction overshoots.

### 4.4 Option 4 - Roundabout

The installation of a four-armed roundabout would potentially result in a 20% reduction in the number of recorded injury collisions based on the five year average for the site. The typical collision rate on a four-armed roundabout on a single carriageway road is 1.08 per year.

Rural roundabouts tend to have a much lower severity rate than this junction currently has. National studies indicate that rural single carriageway roundabouts with four arms have a KSI severity rate of 7%. The five-year severity rate for this junction is 57%.

Like the traffic signal scheme, a roundabout would result in the urbanisation of a rural area as the installation of a roundabout, would also require the installation of a system of street lighting.

The installation of a roundabout with a suitable inscribed circle to accommodate the type of traffic using the road would require substantial land take.

### 4.5 Option 5 – Protected Right Hand Turn Lane

Although a right-hand turn lane was successful on the A3056, the collision types were different to this junction. The collisions primarily involved vehicles waiting to turn off the main road.

A right-hand turn lane would also allow visibility improvements and would improve traffic flows on the main road.

The installation of a reduced speed limit and physical islands to protect the right turn lane should also reduce approach speeds.

Like the option for a roundabout, this scheme would require a significant amount of third-party land.

### 4.6 Option 6 – Do Nothing

The number of collisions that have occurred in the last three years have been above the long-term average for the site. The severity rate in recent years has also been above the long-term average.

There is a high probability that one collision per year will occur at this location in future years. Based on the historic data, it is likely that 25% - 50% of these collisions will result in a KSI.

## 5 Expected Collision Savings and Economic Evaluation

The aim for single sites is to achieve a first year rate of return (FYRR) of 200%. Figures used for the calculation are taken from Reported Road Casualties Great Britain 2019. This values the average cost per accident by severity at;

Accident/casualty type	£ (2019 prices)	
	Cost per casualty	Cost per accident
Fatal	2,029,237	2,260,633
Serious	228,029	261,498
Slight	17,579	26,840
Average for all severities	76,267	105,156
Damage only	-	2,425

1 The costs were based on 2019 prices and values

2 The number of reported road accidents were based on 2019 data

Source: STATS19, Transport Analysis Guidance - WebTAG

The figures in this table are National Statistics

£ (2019 prices)

Accident Type	Road Type			All Roads
	Built-up roads <sup>3</sup>	Non Built-up roads <sup>4</sup>	Motorways <sup>5</sup>	
Fatal	2,209,212	2,310,628	2,274,784	2,260,633
Serious	252,181	285,401	290,553	261,498
Slight	25,445	31,124	37,055	26,840
All injury accidents	86,497	175,957	131,993	105,156
Damage only	2,306	3,372	3,240	2,425
<b>All accidents</b>	<b>6,809</b>	<b>22,984</b>	<b>18,211</b>	<b>8,667</b>

1 The costs were based on 2019 prices and values

Source: STATS19, Transport Analysis Guidance - WebTAG

2 The number of reported road accidents were based on 2019 data

The figures in this table are National Statistics

3 Roads with speed limits of 40pmh or less, excluding motorways and A(M) roads

4 Roads with speed limits greater than 40mph, excluding motorways and A(M) roads

5 Includes motorways and A(M) roads

Expected annual cost with current junction - £147,218 based on average for all severities. The expected annual cost based on actual severity rate over the last five years - £625,129.

The assumed scheme prices below do no account for any potential utility apparatus diversions.

## 5.1 Option 1

It is expected that the realignment of the private hedge and associated accommodation works would cost in the region of £15,000-£20,000. This does not include land purchase and associated legal fees.

It is not possible to be certain of the collision reduction that would be achieved by improving visibility to the west. The report will consider the likely collision savings over the range of 10-30% reductions.

10% reduction in collisions – 0.14 collisions per year – savings of £62,512

20% reduction in collisions – 0.28 collisions per year – savings of £125,025

30% reduction in collisions – 0.42 collisions per year – savings of £187,538

First year rate of return range – 400-1200%

## 5.2 Option 2

The installation of a stagger would likely cost in the region of £400,000. This does not include land purchase and associated legal fees.

Considering the data for Briddlesford Road, and the associated improvements that would be made to the junction as part of this scheme, it is estimated that a stagger would result in a 20% reduction in collision numbers.

This would result in an annual saving in the region of £125,025 per year and a first-year rate of return of 31%.

### 5.3 Option 3

The installation of traffic signals at this junction is expected to cost in the region of £400,000. This does not include land purchase and associated legal fees.

The traffic modelling would need to confirm that the queue would not create a hazard to the west of the junction.

A signal scheme has the potential to achieve the greatest collision savings. It is therefore estimated that the reduction will be in the region of 50%.

50% = £312,564

First year rate of return is expected to be in the region of 78%. The whole life costs of this scheme would need to be considered as the ongoing maintenance of traffic signals will result in higher costs than the other options.

### 5.4 Option 4

A roundabout is likely to help with capacity and may remove some of the collision types at this location. However, the introduction of a roundabout may generate other issues, particularly for cyclists and motorcyclists. When taking into consideration local roundabouts that carry similar traffic volumes, the collision savings may not generate an acceptable level of return.

A typical collision rate for a four-armed rural roundabout is 1.07 per year with a severity rate of 7%.

The estimated cost for installing a roundabout at this location is £500,000. This does not include land purchase and associated legal fees.

The range of collision saving considered is between 20% and 50%

20% = £125,025

50% = £312,564


The potential first year rate of return for a roundabout is expected to be in the region of 25% and 62.5%.

### 5.5 Option 5 Protected Right Turn Lanes

The estimated cost of installing a protected right-hand turn lane is expected to be in the region of £400,000. This does not include land purchase and associated legal fees.

It is expected that this scheme would result in a 10-30% reduction in collisions. This will largely be driven by the visibility improvements that could be implemented as part of the scheme.

10% = £62,512



30% = £187,538

Based on this, the potential first year rate of return is expected to be between 16% and 47%.

## 5.6 Option 6 – Do Nothing

Doing nothing is not considered an acceptable option for this junction, the long-term collision and severity rate indicate that other serious injuries are likely to happen in future years if no action is taken.

However, the schemes that will achieve the greatest reduction in collisions are likely to cost £400,000 or more to implement and may take some time to design and build. More minor short-term improvements to improve visibility and highlight the junction could be implemented while these are being developed.

## 6 Recommendation

It is recommended that feasibility designs for both the signal-controlled junction and the roundabout are undertaken, as these could realise collision reductions in the region of 50% and significantly reduce the probability of future KSI collisions.

The feasibility designs will allow more accurate costs to be determined and the cost/benefit of the schemes established.

Modelling of these schemes will need to be carried out to ensure that the queue lengths do not result in rear end shunts to the west of the junction.

In the short term it is recommended that action is taken to realign the hedge to improve visibility when entering Forest Road from Whitehouse Road, but it is understood that this may be cost prohibitive as a short term solution. Additional measures to highlight the junction and reduce vehicle speeds could be installed to support these changes.

It is recommended that a junction movement survey is carried out to support the design and modelling of the possible improvements.

An automatic traffic counter has been deployed on Forest Road to determine the speed of vehicles on approach to the junction.





