

RSA Designer Response

ROAD SAFETY AUDIT STAGE 1/2

Project Title	Llay S278
Client	Bellway/Anwyl
Curtins Job Ref No:	065665
RSA Response Ref:	065665-CUR-00-XX-RP-D-9501-V00 Llay S278 RSA 1/2 Designer Response
RSA Report Ref:	610/2019/109/01 Llay S278 RSA 1/2 (included as Appendix A)

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
STRAIGHT MILE			
6.3.1 Location: Straight Mile at proposed junction Problem Summary: Possible narrow lane widths through junction The drawing provided for audit does not show the proposed lane widths on Straight Mile through the proposed junction. If adequate lane widths are not provided for vehicles travelling through the junction or turning right, then there may be an increased risk of side swipe collisions or head-on collisions if vehicles are overhanging into the opposing traffic lanes. Recommendation The lane widths should be checked to ensure they are wide enough to allow all vehicles travelling through the junction adequate space without overhanging into opposing lanes, and modifications made to the design if wider lanes are required.	N	Y	The through lane widths on Straight Mile are as existing at 3.3m. The right turn lane width is 3.5m. Dimensions to be added to relevant drawing(s). No design modifications required.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
STRAIGHT MILE			
6.3.2 Location: Straight Mile at proposed junction Problem Summary: Possible reduced junction intervisibility due to existing vertical road alignment on Straight Mile It was observed during the site visit that the proposed junction is located to the west of an existing blind summit on Straight Mile. This may result in the visibility splay to the east of the junction being reduced due to the blind summit. A reduction in intervisibility at the proposed junction may increase the risk of collisions between those turning out of the access road and those travelling along Straight Mile. Additionally, this may also increase the risk of rear end shunt collisions on Straight Mile due to westbound drivers unaware of vehicles braking for the junction just over the blind summit. Recommendation The appropriate junction intervisibility splays in both the horizontal and vertical planes should be checked to ensure suitable intervisibility is provided between the proposed access and those travelling along Straight Mile. Amendments to the junction location should be carried out if appropriate intervisibility cannot be provided at its current location.	N	P	The location of the junction on Straight Mile is situated on a stretch of road that falls continuously from west to east for greater than 120 metres in each direction (as indicated by the road levels on drg. 9501). Intervisibility splays, both horizontally and vertically, comply with the requirements for a 40mph speed limit. No design modifications required.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
STRAIGHT MILE			
6.4.1 Location: East of proposed junction Problem Summary: Footway may encourage pedestrians to walk along the carriageway of Straight Mile and no uncontrolled pedestrian crossing facilities provided The drawings provided for audit show a footway to the east of the proposed junction continuing for a short distance along Straight Mile. The provision of this length of footway may encourage pedestrians to walk east along the carriageway of Straight Mile increasing the risk of pedestrian/vehicular collisions. Additionally, there are no uncontrolled pedestrian crossing facilities provided on the proposed central refuge island to the east of the junction. This may increase the risk of pedestrian trips and falls due to the lack of dropped kerbs for those who may choose to cross at this island in order to carry on walking east along Straight Mile. Recommendation Uncontrolled pedestrian crossing facilities should be provided at the central refuge island to the east of the proposed junction and the footway should be terminated at this point to encourage pedestrians to cross at the island. If suitable intervisibility between pedestrians using this location to cross and drivers travelling along Straight Mile cannot be achieved (refer to 6.3.2 above) then it is recommended that the footway should be terminated at the proposed uncontrolled crossing point on the access road.	Y	P	A review by Wrexham Council has requested the removal of the central refuge islands entirely. Crossing locations from the development footways across Straight Mile onto the existing footway to the north are to be relocated further west and east beyond the extents of the junction widening. Design to be amended.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
STRAIGHT MILE			
6.4.2 Location: West of proposed junction Problem Summary: Lack of tactile paving on central pedestrian refuge The drawings provided for audit do not show any tactile paving on the proposed pedestrian refuge island to the west of the junction. A lack of tactile paving may result in confusion for partially sighted pedestrians who may directly enter the carriageway due to the lack of contrast (visual & physical) between the refuge island and the adjacent carriageway. This may increase the risk of collisions between pedestrians and motorised vehicles at this location. Recommendation Appropriate tactile paving should be provided on the pedestrian refuge island to the west of the proposed junction.	Y	P	A review by Wrexham Council has requested the removal of the central refuge islands entirely. Crossing locations from the development footways across Straight Mile onto the existing footway to the north are to be relocated further west and east beyond the extents of the junction widening. Design to be amended.
6.5.1 Location: Eastbound approach to proposed junction Problem Summary: Non-standard arrow road marking layout may result in driver confusion Two ahead/turn-right road marking arrows are proposed on the eastbound approach to the junction. The provision of these arrows on a single lane approach to this type of junction is non-standard. This may lead to drivers being confused assuming they need to enter the hatched area in order to turn right and they may collide with the pedestrian refuge island. It is also noted there is a lack of deflection arrows on both approaches to the hatched road markings, which could increase the risk of drivers colliding with the central islands. Recommendation	Y	Y	Design to be amended.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
STRAIGHT MILE			
The two ahead/turn-right road marking arrows on the eastbound approach to the junction should be removed from the design. Deflection arrows at appropriate locations should be provided on the Straight Mile approaches to the hatched road markings.			
6.5.2 Location: Both approaches to proposed junction Problem Summary: Incorrect junction warning sign shown on drawing The drawing provided for audit show the incorrect type of junction warning sign for this layout. The sign shown on the drawings is used where the major road continues into the side road and the minor road carries straight on. It is also noted that the incorrect diagram numbers are shown on the drawing (drawing reads 506.11, which should read 506.1). If the incorrect signs are installed there may be an increased risk of vehicular collisions at the junctions as an approaching driver may assume the major road continues into the side road and may not give way to oncoming vehicles. Recommendation The drawing should be amended to show the standard junction warning sign and the diagram number should be amended to read 506.1.	Y	Y	Diagram number 506.11 is a typographical error resulting in the incorrect diagram being inserted. Warning sign and diagram number should read 506.1. Design to be amended.
6.5.3 Location: Junction of proposed access road and Straight Mile Problem Summary: Lack of terminal speed limit signs The drawings provided for audit do not show any terminal speed limit signs at the junction of the proposed access road and Straight Mile. It is noted from the drawings for the Crown Crossroads that the speed limit on Straight Mile is being reduced to 40mph, and it is assumed that the	Y	P	Terminal speed limit signs not currently shown on S278 drawings as crossover to S38 design being prepared by another consultant. Signs will be added for completeness with note relating to coordination with S38 design on location. Design to be amended.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
STRAIGHT MILE			
access road will have a lower speed limit. If appropriate terminal speed limit signs are not provided, then vehicles may enter the access road at excessive speeds and may increase the severity of any collisions that may occur. Recommendation Appropriate terminal speed limit signs should be provided on the access road at the junction with Straight Mile.			

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
GRESFORD ROAD PUFFIN CROSSING			
7.1.1 Location: North-westbound approach to proposed Puffin crossing Problem Summary: Reduced intervisibility between approaching drivers and pedestrians crossing from south-western footway It was observed during the site visit that the intervisibility between north-westbound drivers approaching the Puffin crossing and pedestrians crossing from the south-western footway appears to be reduced due to the left-hand bend on the approach to the proposed Puffin crossing. This may increase the risk of collisions between these pedestrians and vehicles travelling north-west. (Photo 13.1 & 13.2) Recommendation	Y	P	The location for the Puffin crossing was selected to be as close as practicable to future pedestrian desire lines whilst trying to accommodate the existing constraints imposed by junction locations. From a point 1m from the road centre line to a point offset 0.5m from kerb face at the centre of the south-west crossing, direct intervisibility is slightly substandard at 40m. However, the design has included for a primary signal on the north-east crossing that north-westbound drivers have visibility of way in excess of 43m. This accompanied with advanced warning signage of new road layout/signalised crossing will mitigate the risk of collisions. Drawing to include intervisibility splay(s).

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
GRESFORD ROAD PUFFIN CROSSING			
The intervisibility should be checked and amendments made to the layout if appropriate intervisibility cannot be provided at this location.			
7.1.2 Location: Both approaches to proposed Puffin crossing Problem Summary: Reduced length of anti-skid surfacing The drawings show that the proposed length of high friction surfacing (HFS) on both approaches to the proposed Puffin crossing is 12.8m and the HFS does not continue to the crossing studs. This length of HFS is insufficient for the approach speeds and may result in skid type collisions including rear-end shunts and collisions between pedestrians using the crossing and approaching vehicles. Recommendation The proposed high friction surfacing on both approaches should be extended for an appropriate distance taking into account the approach speeds and should also be extended to the crossing studs.	Y	P	A review by Wrexham Council has requested the removal of the high friction surfacing entirely due to maintenance issues. They have requested that the carriageway approach is resurfaced 50m either side of the crossing location with a new 65PSV surface course. Design to be amended.
7.4.1 Location: South-eastbound approach to proposed Puffin crossing Problem Summary: Hedgerow may obscure intervisibility between south-eastbound drivers and pedestrians crossing from north-eastern footway It is unclear from the drawings provided for audit as to the extents of the hedgerow removal on the north-eastern side of Gresford Road. If an appropriate length of hedgerow is not removed, then the intervisibility between drivers travelling south-eastbound towards the Puffin crossing and pedestrians crossing from the north-eastern footway may be	Y	Y	All hedgerow in this location is to be removed. Drawings to be updated to clarify.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
GRESFORD ROAD PUFFIN CROSSING			
reduced. This may increase the risk of collisions between pedestrians and vehicles at the Puffin crossing. Recommendation The proposed length of the removed hedgerow should enable appropriate intervisibility between south-eastbound drivers and pedestrians crossing from north-eastern footway.			
7.4.2 Location: Southeast side of proposed tactile paving on south-western footway Problem Summary: Reduced footway width due to location of proposed traffic signal pole (2) The proposed position of the signal pole (2) located almost in the centre of the south-western footway to the southeast side of the tactile paving reduces the available footway width. The reduced footway width may result in pedestrians colliding with the signal pole, with this issue especially apparent for visually impaired pedestrians. Additionally, the proposed location of the signal pole will create manoeuvrability issues for those with pushchairs, wheelchairs and mobility scooters, who may need to enter the carriageway in order to continue their journey. This will increase the risk of collisions between these users and passing motorised vehicles. Recommendation The signal pole (2) should be relocated nearer to the carriageway, in order to maximise available footway width, noting that sufficient clearance should be maintained between the signals and the edge of the carriageway.	Y	Y	Signal pole to be offset 0.5m from kerb face. Design to be amended.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
GRESFORD ROAD PEDESTRIAN REFUGE			
8.2.1 Location: South-eastbound carriageway Problem Summary: Risk of vehicles colliding with kerbs due to proposed carriageway alignment The proposed carriageway alignment on the south-eastbound carriageway both sides of the pedestrian refuge creates a severe change in horizontal alignment with relatively short taper lengths. This may increase the risk of vehicles colliding with the main kerblines or the refuge island. Recommendation The taper lengths both before and after the proposed refuge island should be increased to provide a smoother horizontal alignment for south-eastbound vehicles.	Y	Y	Taper lengths to the east are restricted by ecological restraints relating to retained trees. Maximum taper length achievable of 20m. Design to be amended.
8.4.1 Location: South-eastbound approach to proposed pedestrian refuge Problem Summary: Hedgerow may obscure intervisibility between south-eastbound drivers and pedestrians crossing from north-eastern footway It is unclear from the drawings provided the extents of the hedgerow removal on the north-eastern side of Gresford Road. If an appropriate length of hedgerow is not removed, then the intervisibility between south-eastbound drivers approaching the pedestrian refuge and pedestrians crossing from the north-eastern footway may be reduced.	Y	Y	Hedgerow to the west of the refuge is to be removed over the extents of the carriageway realignment. Drawings to be updated to clarify.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO/PART)	Response/Action (describe)
This may increase the risk of collisions between these pedestrians and vehicles travelling north-west. Recommendation The proposed hedgerow removal should be a suitable length to provide appropriate intervisibility between south-eastbound drivers and pedestrians crossing from north-eastern footway.			
8.4.2 Location: Within central refuge island Problem Summary: Illuminated beacon pole located in centre of crossing area The proposed location of the illuminated beacon pole is shown to be in the centre of the tactile paving on the central island. This may result in pedestrians colliding with the pole, with this issue especially apparent for visually impaired pedestrians. Additionally, the location of the pole will create manoeuvrability issues for those with pushchairs, wheelchairs and mobility scooters. Recommendation The illuminated beacon pole should be repositioned outside of the limits of the tactile paving on the central island.	Y	Y	Illuminated beacon pole to be repositioned between tactile paving and north bollard. Design to be amended.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO)	Action (describe)
CROWN CROSSROADS			
9.3.1 Location: Within traffic signal junction Problem Summary: Proposed right-turn road markings and signal staging may increase risk of vehicular collisions The proposed dedicated right-turn road markings within the junction for Straight Mile traffic turning into Chapel Lane and Rackery Lane, combined with the signal staging, meaning right-turning traffic must give way to oncoming vehicles from Llay Road, may increase the risk of vehicular collisions within the junction. Vehicles wishing to turn right from Straight Mile must wait in the same right-turn lane for both Chapel Lane and Rackery Lane resulting in an increased risk of rear-end shunt collisions. For example, a following vehicle wishing to turn right into Rackery Lane may not realise the vehicle in front is turning into Chapel Lane. There is also a risk that a vehicle waiting to turn right into Chapel Lane may cause a following vehicle wishing to turn into Rackery Lane to try and undertake, thus entering the straight ahead/left turn lane on Straight Mile, resulting in side-swipe type collisions. Additionally, a group of vehicles or a larger vehicle wishing to turn right into Gresford Road from Llay Road will be unable to fit into the right-turn pocket within the junction and will back-up into the ahead/right-turn lane from Llay Road, increasing the risk of rear-end shunt collisions. There is also a risk that these vehicles waiting to turn right into Gresford Road may cause a following vehicle wishing to travel straight on onto Straight Mile to try and undertake, thus entering the left turn lane on Llay Road, resulting in side-swipe type collisions.	Y	Y	Staging to be reviewed. Design to be amended.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO)	Action (describe)
Recommendation The signal staging should be amended so that the Straight Mile and Llay Road arms have their own stage, as per all other arms on the junction, negating the need for right turning vehicles to give way to oncoming traffic.			
9.3.2 Location: Llay Road approach to traffic signal junction Problem Summary: Narrow lane width may result in side-swipe type collisions The drawings show two lanes are to be provided on the Llay Road approach to the proposed traffic signal junction, however the carriageway width at this location does not appear wide enough for two lanes. Vehicles attempting to enter the junction in two lanes may overhang into the adjacent lane increasing the risk of side-swipe type collisions. (Photo 13.3) Recommendation The carriageway should be widened to provide adequate width for two lanes on the Llay Road approach to the junction.	Y	Y	Staging to be reviewed. Design to be amended.
9.4.1 Location: Throughout the traffic signal junction Problem Summary: Lack of facilities for pedestrians It was observed during the site visit that there is a lack of facilities for pedestrians throughout the traffic signal junction. It is unclear how the adjacent development will tie-into the junction with regards to pedestrian movement. If there is an increase in pedestrian demand throughout the junction, the lack of appropriate facilities may increase	Y	P	This is acknowledged as an existing problem but there is limited scope within the adopted highway boundary to improve fully. It is proposed that uncontrolled crossings will be provided across Straight Mile (east of the lane widening), Gresford Road (south of signal stop line) and Llay Road (either at splitter island or west of signal stop line). This will enable pedestrians to access all routes within the limitations of the junction geometry. Design to be amended.

Problem Identified (Paragraph No)	Problem Accepted (YES/NO)	Recommendation Accepted (YES/NO)	Action (describe)
the risk of collisions between pedestrians crossing at the junction and vehicles travelling through the junction. (Photos 13.4 & 13.5) Recommendation The forecast pedestrian demand/desire lines throughout the junction following the construction of the adjacent development should be examined and appropriate pedestrian facilities at the traffic signal junction should be provided.			
9.5.1 Location: Straight Mile to east of traffic signal junction Problem Summary: Lack of associated traffic signing for proposed 40mph speed limit The drawings show that the existing 40/50mph speed limit signing on Straight Mile to the east of the traffic signal junction is to be changed to 30/40mph, however, no other speed limit signing is proposed to be changed. The new signs show that Straight Mile is to be 40mph, however, there are no 40mph terminal signs proposed at the other end of the limit on Straight Mile. Additionally, when approaching the junction from Straight Mile the new speed limit shows 30mph, however, all other approaches show the junction to be 40mph. The lack of changes to other speed limit signing may result in the speed limits being unenforceable and an increase in vehicular speeds, resulting in the increase of severity of any collisions that may occur. Recommendation The existing speed limit signing should be checked, and amendments proposed to ensure all speed limits are signed correctly.	Y	Y	30mph signs to be removed. 40mph sign retained to advise of speed change. Check termination/start speed limit signing included after Straight Mile development access junction. Design to be amended.

Signed	
Name	Richard Manock
Job Title	Associate
Date	22.03.2019

Appendix A

Llay S278, RSA 1/2 Report

STRAIGHT MILE, GRESFORD ROAD AND CROWN CROSSROADS, LLAY PROPOSED SECTION 278 HIGHWAY WORKS

STAGE 1/2 ROAD SAFETY AUDIT

610/2019/109/01

21 March 2019

six:TEN Highways & Traffic Ltd
Unit 17 Lea Green Business Park
Eurolink, St Helens
Merseyside
WA9 4TR

t 0151 510 2937
m 07985 283074
e contact@610traffic.co.uk
www.610traffic.co.uk

REV	ISSUE STATUS	PREPARED BY/DATE	CHECKED BY/DATE	APPROVED BY/DATE
0	DRAFT	Jon Preston 11 March 2019	Tristan Brooks 11 March 2019	
1	FINAL	Jon Preston 21 March 2019	Tristan Brooks 21 March 2019	Jon Preston 21 March 2019

Disclaimer note

The client has confirmed that it is entering into the agreement under which this report is being prepared on its own behalf and not on behalf of, or for the benefit of any other party and has agreed that in any event of any claim arising out of or in connection with that agreement and/or the report itself it shall be entitled to recover from six:TEN Highways & Traffic Limited only the losses, if any, it has itself suffered.

This report therefore is for the private and confidential use of the client for whom it was prepared solely for the purposes requested by the client. It should not be reproduced in whole or in part or relied upon by any third party for any use whatsoever without the express written authority of six:TEN Highways & Traffic Limited.

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1.0 INTRODUCTION

1.1 This report is a combined preliminary/detailed design Stage 1/2 Road Safety Audit (RSA) carried out on the proposed Section 278 Highway Works at Llay, at the request of Curtins, who are Project Sponsor and have approved the audit team. The local highway authority is Wrexham County Borough Council.

1.2 The RSA team, staff members from six:TEN Highways & Traffic Ltd, present at the RSA were:

Jon Preston MCIHT MSoRSA
Audit Team Leader

Tristan Brooks Bsc (Hons), MBA, CMILT, MCIHT, MSoRSA, HE RSA Cert of Comp
Audit Team Member

1.3 We confirm that no member of the Audit Team has been involved with the design process.

1.4 A site visit was carried out on 4 March 2019 between 14:15 and 15:15. The weather during the site visit was partially cloudy with a wet carriageway surface.

1.5 The RSA brief issued to the team comprised various elements listed at Appendix Two.

1.6 The terms of reference of the RSA are as described in the Design Manual for Roads and Bridges GG119 – Road Safety Audit. This standard has been used for guidance only. The RSA team has examined and reported only the road safety issues of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

1.7 All of the problems described in this report are considered by the RSA team to require action in order to improve the safety of the scheme and minimise collision occurrence. However, if any of the problems or recommendations within this Road Safety Audit report are not accepted, a copy of the signed exception report from the Overseeing Organisation should be sent to the Road Safety Audit Team Leader.

1.8 A plan showing the location of road safety problems raised in this report is included in Appendix Three.

2.0 PROPOSALS

The scheme involves the following Section 278 Highway Works:

- Straight Mile – Provision of a ghost-island right turn junction to provide access to a proposed residential development. Works include the provision of central refuge islands on both sides of the proposed access with uncontrolled pedestrian crossing facilities on the island to the west.
- Gresford Road – Provision of a Puffin crossing near to the existing access to Oakfield Park Home Estate.
- Gresford Road – Provision of a pedestrian refuge island, including carriageway realignment to the northwest of the junction with Meadow Rise.
- Crown Cross Roads – Amendments to the existing traffic signal layout, including, widening of the Straight Mile approach to two lanes, upgrade to the traffic signal equipment with MOVA control, amendments to the existing road marking layout and extension to the Llay Road central island.

3.0 PERSONAL INJURY COLLISION HISTORY

- 3.1 Personal injury collision data was for the five-year period 2013 to 2017 was obtained from www.crashmap.co.uk. The location plan is shown in Appendix Six.
- 3.2 The collision data shows two collisions have occurred at the Crown Crossroads and one collision has occurred on Straight Mile in the vicinity of the proposed access.
- 3.3 All the collisions involved two vehicles and were classed as slight in severity.

4.0 TRAFFIC FLOW AND SPEED DATA

- 4.1 Traffic flow and speed data was not provided to the audit team.

5.0 DEPARTURES FROM STANDARD

- 5.1 No Departures from Standard have been highlighted to the RSA team.

MATTERS ARISING FROM THIS (STAGE 1/2) ROAD SAFETY AUDIT**6.0 STRAIGHT MILE PROPOSED ACCESS****6.1 General**

No road safety issues identified at this stage.

6.2 Local Alignment

No road safety issues identified at this stage.

6.3 Junctions**6.3.1 Location: Straight Mile at proposed junction****Problem****Summary: Possible narrow lane widths through junction**

The drawing provided for audit does not show the proposed lane widths on Straight Mile through the proposed junction. If adequate lane widths are not provided for vehicles travelling through the junction or turning right, then there may be an increased risk of side swipe collisions or head-on collisions if vehicles are overhanging into the opposing traffic lanes.

Recommendation

The lane widths should be checked to ensure they are wide enough to allow all vehicles travelling through the junction adequate space without overhanging into opposing lanes, and modifications made to the design if wider lanes are required.

6.3.2 Location: Straight Mile at proposed junction**Problem****Summary: Possible reduced junction intervisibility due to existing vertical road alignment on Straight Mile**

It was observed during the site visit that the proposed junction is located to the west of an existing blind summit on Straight Mile. This may result in the visibility splay to the east of the junction being reduced due to the blind summit. A reduction in intervisibility at the proposed junction may increase the risk of collisions between those turning out of the access road and those travelling along Straight Mile. Additionally, this may also increase the risk of rear end shunt collisions on Straight Mile due to westbound drivers unaware of vehicles braking for the junction just over the blind summit.

Recommendation

The appropriate junction intervisibility splays in both the horizontal and vertical planes should be checked to ensure suitable intervisibility is provided between the proposed access and those travelling along Straight Mile. Amendments to the junction location should be carried out if appropriate intervisibility cannot be provided at its current location.

6.4 Non-motorised user provision

6.4.1 Location: East of proposed junction

Problem

Summary: Footway may encourage pedestrians to walk along the carriageway of Straight Mile and no uncontrolled pedestrian crossing facilities provided

The drawings provided for audit show a footway to the east of the proposed junction continuing for a short distance along Straight Mile. The provision of this length of footway may encourage pedestrians to walk east along the carriageway of Straight Mile increasing the risk of pedestrian/vehicular collisions. Additionally, there are no uncontrolled pedestrian crossing facilities provided on the proposed central refuge island to the east of the junction. This may increase the risk of pedestrian trips and falls due to the lack of dropped kerbs for those who may choose to cross at this island in order to carry on walking east along Straight Mile.

Recommendation

Uncontrolled pedestrian crossing facilities should be provided at the central refuge island to the east of the proposed junction and the footway should be terminated at this point to encourage pedestrians to cross at the island. If suitable intervisibility between pedestrians using this location to cross and drivers travelling along Straight Mile cannot be achieved (refer to 6.3.2 above) then it is recommended that the footway should be terminated at the proposed uncontrolled crossing point on the access road.

6.4.2 Location: West of proposed junction

Problem

Summary: Lack of tactile paving on central pedestrian refuge

The drawings provided for audit do not show any tactile paving on the proposed pedestrian refuge island to the west of the junction. A lack of tactile paving may result in confusion for partially sighted pedestrians who may directly enter the carriageway due to the lack of contrast (visual & physical) between the refuge island and the adjacent carriageway. This may increase the risk of collisions between pedestrians and motorised vehicles at this location.

Recommendation

Appropriate tactile paving should be provided on the pedestrian refuge island to the west of the proposed junction.

6.5 Road Signs, Carriageway Markings and Lighting

6.5.1 Location: Eastbound approach to proposed junction

Problem

Summary: Non-standard arrow road marking layout may result in driver confusion

Two ahead/turn-right road marking arrows are proposed on the eastbound approach to the junction. The provision of these arrows on a single lane approach to this type of junction is non-standard. This may lead to drivers being confused assuming they need to enter the hatched area in order to turn right and they may collide with the pedestrian refuge island. It is also noted there is a lack of deflection arrows on both approaches to the hatched road markings, which could increase the risk of drivers colliding with the central islands.

Recommendation

The two ahead/turn-right road marking arrows on the eastbound approach to the junction should be removed from the design. Deflection arrows at appropriate locations should be provided on the Straight Mile approaches to the hatched road markings.

6.5.2 Location: Both approaches to proposed junction

Problem

Summary: Incorrect junction warning sign shown on drawing

The drawing provided for audit show the incorrect type of junction warning sign for this layout. The sign shown on the drawings is used where the major road continues into the side road and the minor road carries straight on. It is also noted that the incorrect diagram numbers are shown on the drawing (drawing reads 506.11, which should read 506.1). If the incorrect signs are installed there may be an increased risk of vehicular collisions at the junctions as an approaching driver may assume the major road continues into the side road and may not give way to oncoming vehicles.

Recommendation

The drawing should be amended to show the standard junction warning sign and the diagram number should be amended to read 506.1.

6.5.3 Location: Junction of proposed access road and Straight Mile

Problem

Summary: Lack of terminal speed limit signs

The drawings provided for audit do not show any terminal speed limit signs at the junction of the proposed access road and Straight Mile. It is noted from the drawings for the Crown Crossroads that the speed limit on Straight Mile is being reduced to 40mph, and it is assumed that the access road will have a lower speed limit. If appropriate terminal speed limit signs are not provided, then vehicles may enter the access road at excessive speeds and may increase the severity of any collisions that may occur.

Recommendation

Appropriate terminal speed limit signs should be provided on the access road at the junction with Straight Mile.

7.0 GRESFORD ROAD PUFFIN CROSSING**7.1 General****7.1.1 Location: North-westbound approach to proposed Puffin crossing****Problem****Summary: Reduced intervisibility between approaching drivers and pedestrians crossing from south-western footway**

It was observed during the site visit that the intervisibility between north-westbound drivers approaching the Puffin crossing and pedestrians crossing from the south-western footway appears to be reduced due to the left-hand bend on the approach to the proposed Puffin crossing. This may increase the risk of collisions between these pedestrians and vehicles travelling north-west. (Photo 13.1 & 13.2)

Recommendation

The intervisibility should be checked and amendments made to the layout if appropriate intervisibility cannot be provided at this location.

7.1.2 Location: Both approaches to proposed Puffin crossing**Problem****Summary: Reduced length of anti-skid surfacing**

The drawings show that the proposed length of high friction surfacing (HFS) on both approaches to the proposed Puffin crossing is 12.8m and the HFS does not continue to the crossing studs. This length of HFS is insufficient for the approach speeds and may result in skid type collisions including rear-end shunts and collisions between pedestrians using the crossing and approaching vehicles.

Recommendation

The proposed high friction surfacing on both approaches should be extended for an appropriate distance taking into account the approach speeds and should also be extended to the crossing studs.

7.2 Local Alignment

No road safety issues identified at this stage.

7.3 Junctions

No road safety issues identified at this stage.

7.4 Non-motorised user provision

7.4.1 Location: South-eastbound approach to proposed Puffin crossing

Problem

Summary: Hedgerow may obscure intervisibility between south-eastbound drivers and pedestrians crossing from north-eastern footway

It is unclear from the drawings provided for audit as to the extents of the hedgerow removal on the north-eastern side of Gresford Road. If an appropriate length of hedgerow is not removed, then the intervisibility between drivers travelling south-eastbound towards the Puffin crossing and pedestrians crossing from the north-eastern footway may be reduced. This may increase the risk of collisions between pedestrians and vehicles at the Puffin crossing.

Recommendation

The proposed length of the removed hedgerow should enable appropriate intervisibility between south-eastbound drivers and pedestrians crossing from north-eastern footway.

7.4.2 Location: Southeast side of proposed tactile paving on south-western footway

Problem

Summary: Reduced footway width due to location of proposed traffic signal pole (2)

The proposed position of the signal pole (2) located almost in the centre of the south-western footway to the southeast side of the tactile paving reduces the available footway width. The reduced footway width may result in pedestrians colliding with the signal pole, with this issue especially apparent for visually impaired pedestrians. Additionally, the proposed location of the signal pole will create manoeuvrability issues for those with pushchairs, wheelchairs and mobility scooters, who may need to enter the carriageway in order to continue their journey. This will increase the risk of collisions between these users and passing motorised vehicles.

Recommendation

The signal pole (2) should be relocated nearer to the carriageway, in order to maximise available footway width, noting that sufficient clearance should be maintained between the signals and the edge of the carriageway.

7.5 Road Signs, Carriageway Markings and Lighting

No road safety issues identified at this stage.

8.0 GRESFORD ROAD PEDESTRIAN REFUGE

8.1 General

No road safety issues identified at this stage.

8.2 Local Alignment

8.2.1 Location: South-eastbound carriageway

Problem

Summary: Risk of vehicles colliding with kerbs due to proposed carriageway alignment

The proposed carriageway alignment on the south-eastbound carriageway both sides of the pedestrian refuge creates a severe change in horizontal alignment with relatively short taper lengths. This may increase the risk of vehicles colliding with the main kerbline or the refuge island.

Recommendation

The taper lengths both before and after the proposed refuge island should be increased to provide a smoother horizontal alignment for south-eastbound vehicles.

8.3 Junctions

No road safety issues identified at this stage.

8.4 Non-motorised user provision

8.4.1 Location: South-eastbound approach to proposed pedestrian refuge

Problem

Summary: Hedgerow may obscure intervisibility between south-eastbound drivers and pedestrians crossing from north-eastern footway

It is unclear from the drawings provided the extents of the hedgerow removal on the north-eastern side of Gresford Road. If an appropriate length of hedgerow is not removed, then the intervisibility between south-eastbound drivers approaching the pedestrian refuge and pedestrians crossing from the north-eastern footway may be reduced. This may increase the risk of collisions between these pedestrians and vehicles travelling north-west.

Recommendation

The proposed hedgerow removal should be a suitable length to provide appropriate intervisibility between south-eastbound drivers and pedestrians crossing from north-eastern footway.

8.4.2 Location: Within central refuge island

Problem

Summary: Illuminated beacon pole located in centre of crossing area

The proposed location of the illuminated beacon pole is shown to be in the centre of the tactile paving on the central island. This may result in pedestrians colliding with the pole, with this issue especially apparent for visually impaired pedestrians. Additionally, the location of the pole will create manoeuvrability issues for those with pushchairs, wheelchairs and mobility scooters.

Recommendation

The illuminated beacon pole should be repositioned outside of the limits of the tactile paving on the central island.

8.5 Road Signs, Carriageway Markings and Lighting

No road safety issues identified at this stage.

9.0 CROWN CROSSROADS

9.1 General

No road safety issues identified at this stage.

9.2 Local Alignment

No road safety issues identified at this stage.

9.3 Junctions

9.3.1 Location: Within traffic signal junction

Problem

Summary: Proposed right-turn road markings and signal staging may increase risk of vehicular collisions

The proposed dedicated right-turn road markings within the junction for Straight Mile traffic turning into Chapel Lane and Rackery Lane, combined with the signal staging, meaning right-turning traffic must give way to oncoming vehicles from Llay Road, may increase the risk of vehicular collisions within the junction.

Vehicles wishing to turn right from Straight Mile must wait in the same right-turn lane for both Chapel Lane and Rackery Lane resulting in an increased risk of rear-end shunt collisions. For example, a following vehicle wishing to turn right into Rackery Lane may not realise the vehicle in front is turning into Chapel Lane.

There is also a risk that a vehicle waiting to turn right into Chapel Lane may cause a following vehicle wishing to turn into Rackery Lane to try and undertake, thus entering the straight ahead/left turn lane on Straight Mile, resulting in side-swipe type collisions.

Additionally, a group of vehicles or a larger vehicle wishing to turn right into Gresford Road from Llay Road will be unable to fit into the right-turn pocket within the junction and will back-up into the ahead/right-turn lane from Llay Road, increasing the risk of rear-end shunt collisions. There is also a risk that these vehicles waiting to turn right into Gresford Road may cause a following vehicle wishing to travel straight on onto Straight Mile to try and undertake, thus entering the left turn lane on Llay Road, resulting in side-swipe type collisions.

Recommendation

The signal staging should be amended so that the Straight Mile and Llay Road arms have their own stage, as per all other arms on the junction, negating the need for right turning vehicles to give way to oncoming traffic.

9.3.2 Location: Llay Road approach to traffic signal junction

Problem

Summary: Narrow lane width may result in side-swipe type collisions

The drawings show two lanes are to be provided on the Llay Road approach to the proposed traffic signal junction, however the carriageway width at this location does not appear wide enough for two lanes. Vehicles attempting to enter the junction in two lanes may overhang into the adjacent lane increasing the risk of side-swipe type collisions. (Photo 13.3)

Recommendation

The carriageway should be widened to provide adequate width for two lanes on the Llay Road approach to the junction.

9.4 Non-motorised user provision

9.4.1 Location: Throughout the traffic signal junction

Problem

Summary: Lack of facilities for pedestrians

It was observed during the site visit that there is a lack of facilities for pedestrians throughout the traffic signal junction. It is unclear how the adjacent development will tie-into the junction with regards to pedestrian movement. If there is an increase in pedestrian demand throughout the junction, the lack of appropriate facilities may increase the risk of collisions between pedestrians crossing at the junction and vehicles travelling through the junction. (Photos 13.4 & 13.5)

Recommendation

The forecast pedestrian demand/desire lines throughout the junction following the construction of the adjacent development should be examined and appropriate pedestrian facilities at the traffic signal junction should be provided.

9.5 Road Signs, Carriageway Markings and Lighting

9.5.1 Location: Straight Mile to east of traffic signal junction

Problem

Summary: Lack of associated traffic signing for proposed 40mph speed limit

The drawings show that the existing 40/50mph speed limit signing on Straight Mile to the east of the traffic signal junction is to be changed to 30/40mph, however, no other speed limit signing is proposed to be changed. The new signs show that Straight Mile is to be 40mph, however, there are no 40mph terminal signs proposed at the other end of the limit on Straight Mile. Additionally, when approaching the junction from Straight Mile the new speed limit shows 30mph, however, all other approaches show the junction to be 40mph. The lack of changes to other speed limit signing may result in the speed limits being unenforceable and an increase in vehicular speeds, resulting in the increase of severity of any collisions that may occur.

Recommendation

The existing speed limit signing should be checked, and amendments proposed to ensure all speed limits are signed correctly.

APPENDIX ONE**10.0 ROAD SAFETY AUDIT TEAM STATEMENT**

We certify that the audit has been carried out generally in accordance with the requirements set out in GG119. The problems identified have been noted in this report together with associated safety improvement suggestions which we recommend should be studied for implementation.

AUDIT TEAM LEADER

Jon Preston MCIHT MSoRSA
Director
six:TEN Highways & Traffic Ltd

Signed:

A handwritten signature in black ink, appearing to read 'Jon Preston'.

Date: 21 March 2019

AUDIT TEAM MEMBER

Tristan Brooks Bsc (Hons), MBA, CMILT, MCIHT, MSoRSA, HE RSA Cert of Comp

Traffic & Road Safety Engineer
six:TEN Highways & Traffic Ltd

Signed:

A handwritten signature in black ink, appearing to read 'Tristan Brooks'.

Date: 21 March 2019

APPENDIX TWO

11.0 LIST OF DRAWINGS AND DOCUMENTS PROVIDED TO THE AUDIT TEAM

Straight Mile

- 065665/7501 C01 Drainage and Contours
- 065665/9501 C02 General Arrangement
- 065665/9502 C02 Site Clearance
- 065665/9503 C01 Existing Topo Survey
- 065665/9504 C01 Traffic Signs and Road Markings
- 065665/9505 C02 Surfacing Layout
- 065665/9506 C01 Kerbs and Fencing

Gresford Road Puffin

- 065665/9521 C01 General Arrangement
- 065665/9522 C01 Signal Design
- 065665/9523 C01 Kerbing, Surfacing and Road Markings
- 065665/9524 C01 Construction Details

Gresford Road Pedestrian Refuge

- 065665/9541 C01 General Arrangement
- 065665/9542 C01 Kerbs and Road Markings
- 065665/9543 C02 Surfacing
- 065665/9544 C01 Construction Details

Straight Mile

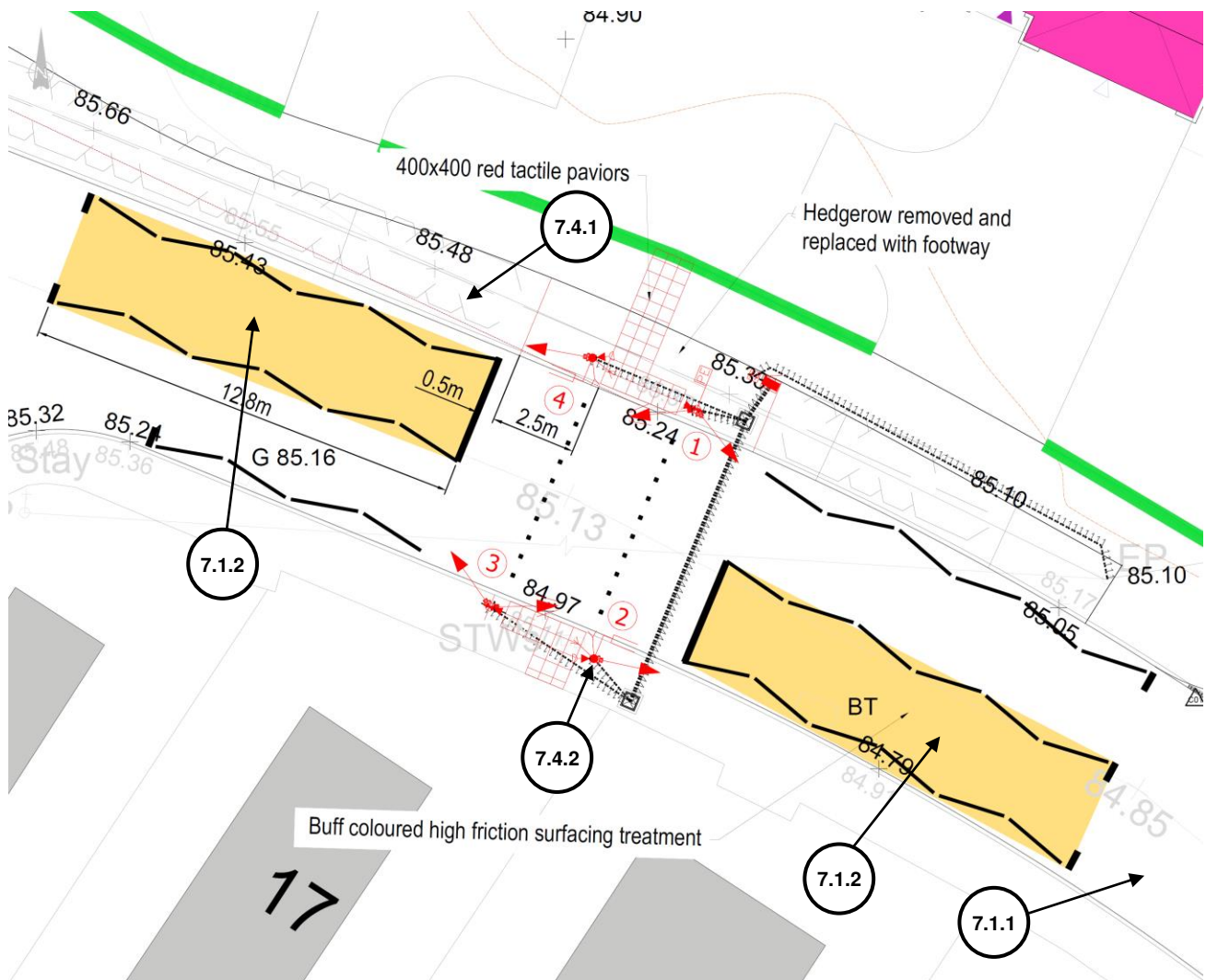
- 065665/9561 C01 General Arrangement
- 065665/9562 C01 MOVA Signal Design
- 065665/9563 C01 MOVA Magnetometer Design
- 065665/9564 C01 Traffic Signs and Road Markings
- 065665/9565 C01 Kerbs and Fencing
- 065665/9566 C01 Surfacing
- 065665/9567 C01 Vehicle Tracking
- 065665/9568 C01 Construction Details
- 065665/9569 C01 Existing Topo Survey

APPENDIX THREE

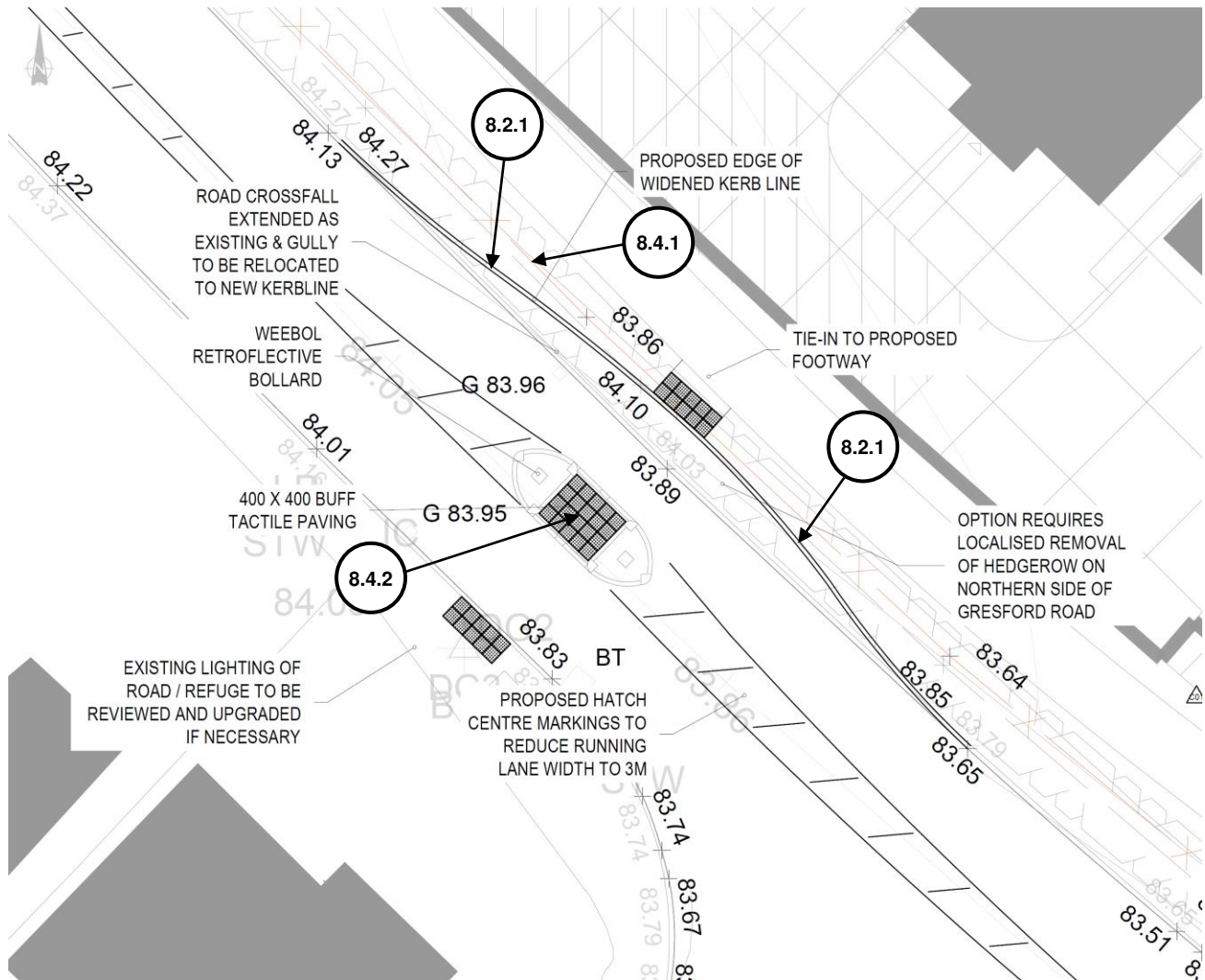
12.0 PROBLEM LOCATION PLAN



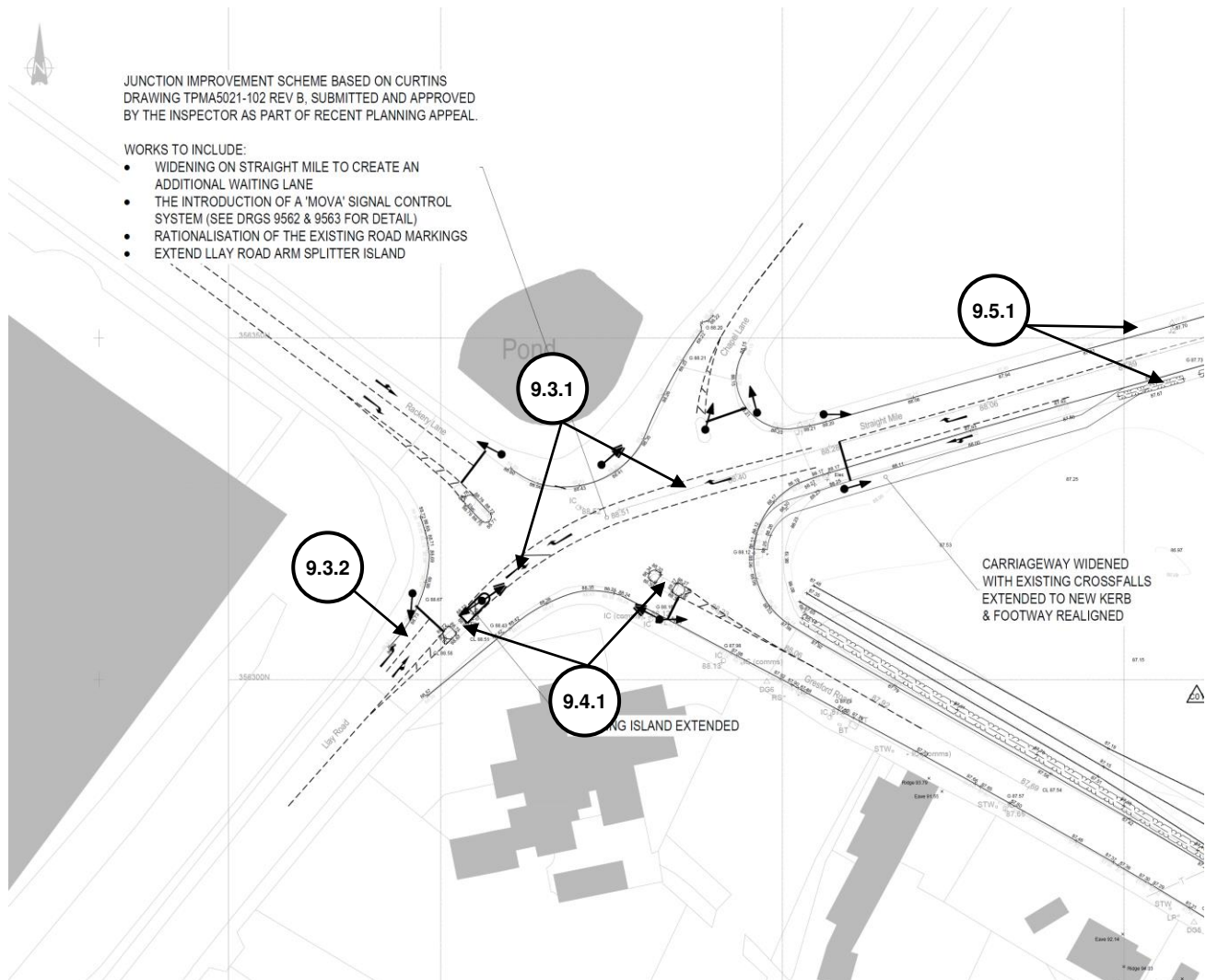
12.1 STRAIGHT MILE



12.2 GRESFORD ROAD PUFFIN



12.4 GRESFORD ROAD PEDESTRIAN REFUGE



APPENDIX FOUR

13.0 PHOTOGRAPHS



13.1 Gresford Road Puffin – Reduced north-westbound visibility



13.2 Gresford Road Puffin – Reduced visibility from southwestern footway



13.3 Crown Crossroads – Narrow carriageway on Llay Road approach



13.4 Crown Crossroads – Lack of pedestrian facilities



13.5 Crown Crossroads – Lack of pedestrian facilities

APPENDIX FIVE

14.0 PERSONAL INJURY COLLISION LOCATION PLAN

