CORMAC

Longdowns
Pedestrian crossing facilities

Feasibility Report

File no EDG2038

Engineering Design Group

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CORSERV GROUP
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COUNCIL COMPANY

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Issue & Revision Record

Revision	Date	Originator	Checked	Authorised	Purpose of Issue	Nature of Change
0.1	30/11/21	HG	JHJ	CS	First Issue	

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CONTENTS

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1 Introduction

1.1 Scheme Background and Objectives

1.1.1 Residents and local representatives of Longdowns have expressed concern regarding issues crossing the A394 at Longdowns.

1.1.2 Cormac Solutions have been commissioned by Cornwall Council to undertake a feasibility study to investigate options to improve pedestrian crossing facilities on the A394 at Longdowns.

2 Existing Conditions

2.1 Village Layout

2.1.1 Within Longdowns, there are a number of residential premises that front the carriageway; most of these are on the northern side of the carriageway. A petrol station, that incorporates a Premier Convenience Shop, is located on the southern side of the carriageway.

2.1.2 A post box is located on the northern side of the carriageway, just to the west of the petrol station.

2.1.3 There are two bus stops in the village, both located near the petrol station. Eastbound buses stop on the carriageway and there is a layby on the southern side of the carriageway for westbound buses.

2.1.4 There is a continuous footway on the northern side of the carriageway which narrows to 900mm over some short stretches. On the southern side of the carriageway there is a short stretch (approximately 40m) that runs from the junction to Halvasso towards the petrol station forecourt.

2.1.5 Five traffic splitter islands are located in the village; four are positioned at the right-turn facilities for Glenmore Terrace and the junction leading to Mabe Burnthouse (Corpascus). The location of the traffic islands is shown in Image 1.

2.1.6 There is a footpath from Glenmore Terrace through to the A394, near the property called 'Stonemasons'. This serves as a route for residents of premises at Glenmoore Terrace, Trolvus Vean and Treavars.

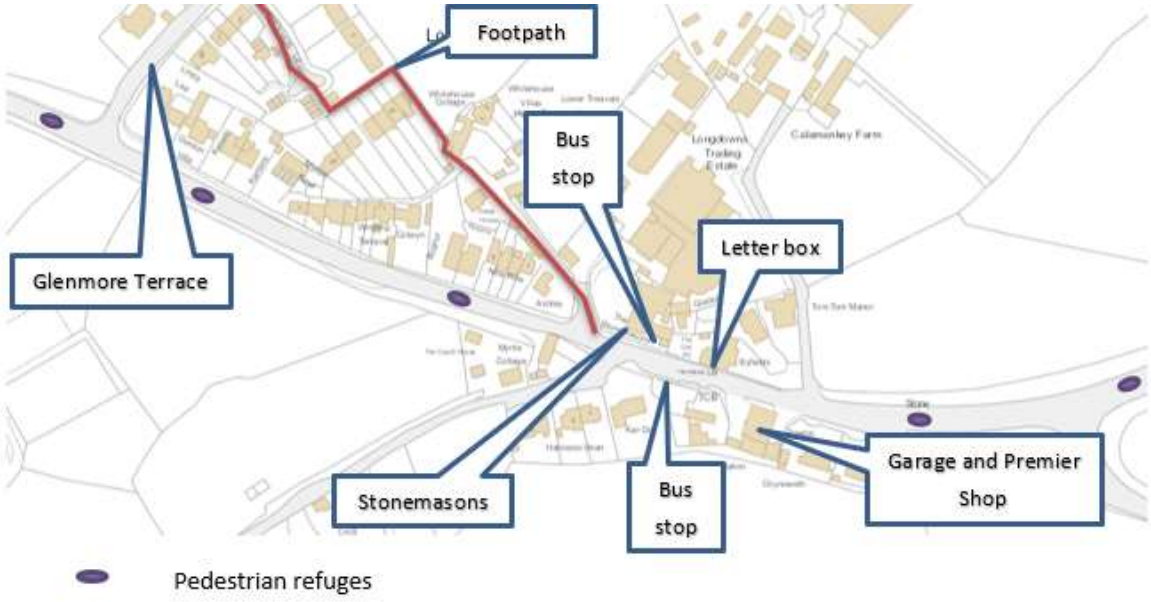

Image 1 showing the location of pedestrian refuges and key locations.

2.1.7 Central hatching is used throughout the village.

2.1.8 A fixed speed camera is located near the junction to Longdowns Trading Estate.

2.2 Speed limit

2.2.1 The village is covered by a 30mph speed limit by virtue of street lighting and extends approximately 45m west of the junction with Glenmore Terrace to 140m east of the junction to Mabe Burnthouse (Corpascus).

2.2.2 The 30mph speed limit was introduced in 2014 after a review of the speed limit in accordance with Department for Transport Circular 01/2006 'Setting Local Speed Limit's'. Before the introduction of the 30mph speed limit, the speed limit through Longdowns was 40mph and prior to 1998 was 50mph.

2.3 Speed data

2.3.1 Three speed monitoring devices were deployed soon after the introduction of the 30mph speed limit in 2014. The locations of these are shown in Image 2 with Table 1 showing the data obtained. Speed data was also collected in September this year and this is also shown in Table 1 as Site 4.

2.3.2 Speed data indicates that westbound traffic speeds are higher than eastbound speeds and that speeds are higher near the Glenmore Terrace junction. Speed readings near the junction are higher for westbound traffic, perhaps because the speed limit, to the west of the junction, soon changes to 50mph.

Image 2 showing where speed monitoring equipment has been deployed in 2014

Covert speed monitoring using RadarClass			
	Eastbound	Westbound	Date
Site 1			
Mean (mph)	31.5	36.9	May-14
85th%ile (mph)	37	42	May-14
Site 2			
Mean (mph)	27.6	34.5	May-14
85th%ile (mph)	31	39	May-14
Site 3			
Mean (mph)	29.6	33.3	May-14
85th%ile (mph)	35	38	May-14
Site 4			
Mean (mph)	26.1	29	Sep-21
85th%ile (mph)	30	33	Oct-21

Table 1 showing the speed data collected at the sites within Image 2

2.4 Collision data

2.4.1 Verified and complete collision data over a five-year period (01/01/16 to 31/12/20) plus unverified and incomplete collision data until 01/07/21 has been analysed. It should be noted that the majority of damage only collisions are no longer reported by the Police and therefore there may be other collisions which may not have been recorded. Three slight injury collisions and one serious collision have been recorded during the analysed period. The details relating to the collisions are summarised below and locations shown in Image 3:

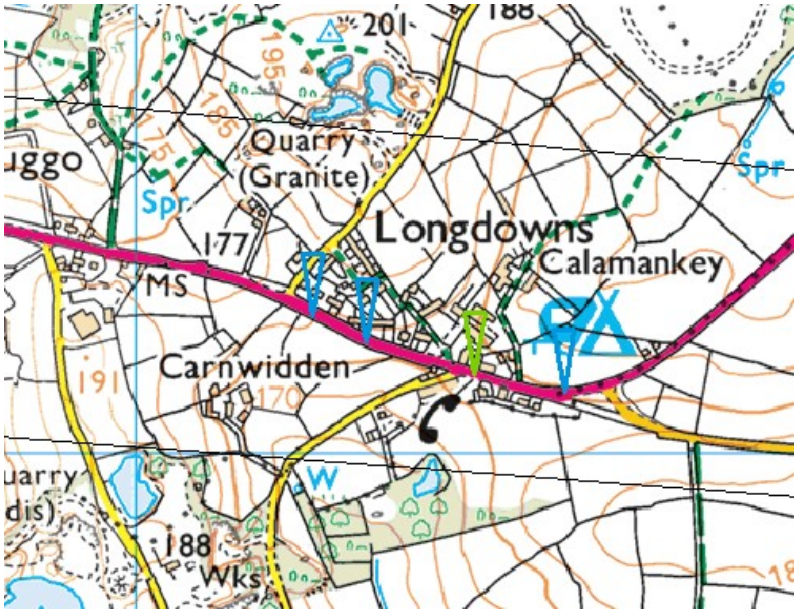

Image 3 showing where collisions have been recorded between 01/01/16 to 31/12/20 (including incomplete and unverified data until 01/07/21)

- Aggressive driver of vehicle caused cyclist to swerve onto verge and the cyclists fell.

- Vehicle pulled out of layby into path of vehicle.
- Vehicle travelling eastbound failed to slow for vehicles ahead that had stopped, this resulted in a rear-end shunt collision (serious injuries).
- Elderly driver pulled from a minor road onto the A394 and went onto the incorrect side of the carriageway. They then overcorrected and collided with a streetlight column.

2.4.2 None of the collisions specified 'exceeding speed limit' or 'travelling too fast for circumstances' as likely contributory factors.

2.4.3 None of the collisions involved pedestrians.

2.5 Land Ownership

2.5.1 Initial investigations have been made to identify land ownership within the vicinity of considered works. Cornwall Council Intranet mapping indicates that land, to the sides of the A394 through Longdowns is predominantly s publicly maintained highway (see image 4)

Image 4 Showing areas of public maintained highway.

2.6 Utilities

2.6.1 C2 searches of utilities for the scheme area have been undertaken to more accurately inform the feasibility study.

2.6.2 Western Power Distribution utilities, both over-ground and underground, are found throughout the scheme area.

2.6.3 BT underground and overground cables are located throughout the length of carriageway

2.6.4 South West Water have a water main running through the stretch of carriageway

2.6.5 Fibre-optic cable runs through this length of the A394.

2.6.6 Considering the number of utilities in the area, there may be potential difficulties associated with construction and this is likely to impact on overall costs

2.7 Other conditions

2.7.1 The section of the A394 through Longdowns is Traffic Sensitive and therefore if any works proceed to construction, thought will need to be given to the time that works are undertaken and the potential increase of construction costs.

2.7.2 The section of carriageway is designated as a Fire Brigade Strategic Route, a Primary Abnormal Load Route, and a Cornwall Strategic Freight Network. Therefore, any potential works will need to take into account the impact on large vehicles and emergency service vehicles; any works would need to be agreed with the Abnormal Load Route Officer.

3 Methodology

3.1.1 A site visit has been made and a number of measurements taken to help determine the viability of options.

3.1.2 Possible options to aid pedestrian crossing movements are given below and the suitability and practicality of them are discussed.

3.1.3 Due to the likelihood of pedestrians crossing being concentrated to the east, where most facilities are located, focus will be given to locating a pedestrian crossing to this end of the village.

3.1.4 Due to the lack of pedestrian count data for the village of Longdowns a pedestrian and traffic survey has been undertaken at the eastern end of the village.

4 Pedestrian Origin and Destination

4.1.1 It is considered that the main pedestrian draw will be to the Premier Shop. There will also be a pedestrian desire line to and from the bus stops and the post box, which is located opposite the petrol garage.

4.1.2 It is expected that many of the residents from Glenmore Terrace and Trolvus Vean use the footpath to link to the A394 rather than walking alongside the main road.

4.1.3 Due to the location of the Premier Shop, the post box, bus stops and footpath it is assumed that the majority of the pedestrian movements occur to the eastern end of the village.

4.1.4 Pedestrian counts are normally conducted over 50m stretches of carriageway either side of the proposed crossing. A pedestrian survey was requested to the eastern end of the village, over two 50m sections. The count took place in September over a 12-hour period. The month of September was chosen because it is referred to as a 'neutral' month, that is, flows are not likely to be 'skewed' by holiday traffic.

4.1.5 Data was collected from the two zones identified below in Image 5.

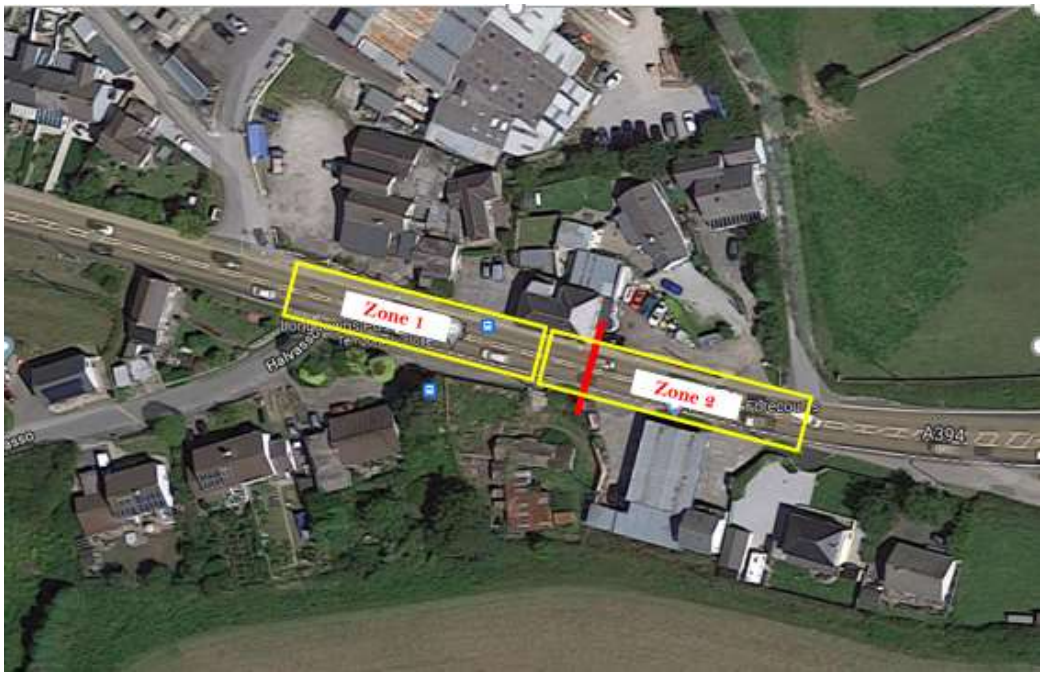

Image 5 showing zones where pedestrian crossing movements were counted.

4.1.6 The data collected is shown in Table 2 below.

TIME	Zone 1						Zone 2					
	Northbound			Southbound			Northbound			Southbound		
	Child <16	Adult	Disabled	Child <16	Adult	Disabled	Child <16	Adult	Disabled	Child <16	Adult	Disabled
0700-0759	0	0	0	0	1	0	0	0	0	0	0	0
0800-0859	0	4	0	0	2	0	0	0	0	0	0	0
0900-0959	0	0	0	0	1	0	0	2	0	0	0	0
1000-1059	0	1	0	0	1	0	0	0	0	0	0	0
1100-1159	0	1	0	0	1	0	0	1	0	0	2	0
1200-1259	0	4	0	0	4	0	0	1	0	0	2	0
1300-1359	0	1	0	0	0	0	0	0	0	0	0	0
1400-1459	0	0	0	0	0	0	0	1	0	0	1	0
1500-1559	6	2	0	0	2	0	0	0	0	0	0	0
1600-1659	0	1	0	0	0	0	0	0	0	0	0	0
1700-1759	0	4	0	0	3	0	0	0	0	0	0	0
1800-1859	0	1	0	0	0	0	0	3	0	0	4	0
P/TOT	6	19	0	0	15	0	0	8	0	0	9	0

Table 2 showing pedestrian count data collected in September 2021

4.1.7 The data indicates that more pedestrians cross within Zone 1 than Zone 2 and therefore it is prudent to locate a crossing facility within this section of carriageway. It is likely that if a crossing facility were located here that those who cross in zone 2 would take advantage of the crossing facility to the west.

5 Traffic count data

5.1.1 A traffic count was also undertaken in September 2021and showed that during a 12-hour period 0700-1900hrs that there were 8551 vehicles travelling eastbound and 8579 vehicles travelling westbound. A total of 17,130.

6 Site visit and conversations with local residents

6.1.1 Two site visits have been made and both have highlighted the difficulty that pedestrians have to cross the carriageway. Traffic volumes are high, and it is difficult to find a gap in the traffic to cross.

6.1.2 One resident who lives to the west of Zone 1 and on the northern side of the carriageway was seen walking on the southern side of the carriageway, that does not have a footway provision. The resident was walking toward the Premier Shop. When asked why she was not walking on the footway she said that there was a gap in the traffic and she thought she would use it because it normally took such a long time to cross. It is quite possible that other residents do this too.

6.1.3 Three other residents, within the vicinity of the Premier Shop, also commented how difficult it was to cross the carriageway.

6.1.4 The Premier Shop was also visited, and the shop assistant advised that the majority of pedestrian movement was from the west of the village with a little coming from Calamankey Farm.

7 Zebra Crossing

7.1 Basic Principles

7.1.1 Zebra crossings give pedestrians priority over vehicles but require pedestrians to step safely onto the crossing to initiate this. The facility is therefore completely reliant on the driver seeing the pedestrian. Generally, zebra crossings are located where there is high pedestrian movement and where the speed of traffic is low, for example within a town centre.

7.2 Discussion

7.2.1 The siting of a zebra crossing on this section of carriageway could generate difficulties. High vehicle flows would mean that pedestrians would find it difficult to establish priority on the crossings. Moreover, low pedestrian crossing movements may mean that a driver will not expect a pedestrian to cross, ignore the crossing and then find it difficult to stop. This would put pedestrians at risk when they are using the crossing.

7.2.2 Data collected shows that 40 pedestrians crossed in Zone 1 and 17 pedestrians within Zone 2; the numbers are low.

7.2.3 National guidance (LTN1/95) says that Zebra crossings should not be installed where the '85%ile' speed of traffic is 35mph or more. Speed data indicates that the 85th%ile speed with Zones 1 and 2 is within the range of 30mph -38mph.

7.2.4 Due the likelihood of pedestrians finding it difficult to establish priority on a zebra crossing, low pedestrian numbers and ultimately putting pedestrians at risk makes a zebra crossing here an unrealistic option. An alternative measure would be the use of a signal-controlled crossing but this has difficulties associated with it; this is discussed in the following section.

8 Signal-controlled crossing

8.1 Basic Principles

8.1.1 In order to establish whether a signal-controlled crossing is appropriate current pedestrian crossing movements are vital. As shown in Section 4 pedestrian crossing movements are low. If the crossing is infrequently used, then regular drivers of the road may become complacent and fail to register the crossings location or that a pedestrian is crossing. Therefore, underused crossings present a significant risk to pedestrian safety.

8.1.2 Historically, the potential for a pedestrian (P) crossing was calculated by calculating the degree of pedestrian ad vehicle (V) conflict. This was determined using the number of vehicles in both directions, in this case 17,130, and the number of pedestrians crossing the road within 50m of the proposed site. Essentially the degree of difficulty for an individual pedestrian to cross the road is considered proportional to V squared and therefore the total amount of difficulty for all pedestrians is measured by P times V squared.

8.1.3 For the purposes of the calculation children are the equivalent of two pedestrians.

8.1.4 The P times V squared are calculated for the peak four hours of conflict and then averaged. The result, for Cornwall, needs to exceed 75,000,000 and as the Table 3 below shows this falls well below the requirement. Therefore, a signal-controlled crossing is not an appropriate facility here.

Time	Unaccompanied Child	Accompanied Child	Adult Pedestrians (16 yrs &	Mobility Impaired Pedestrians	Vehicles	Pedestrians P	Vehicles V²	PV²
06:00 to 06:5	0	0	0	0				
07:00 to 07:5	0	0	1	0	1,365	1	1,863,225	1,863,225
08:00 to 08:5	0	0	6	0	1,594	6	2,540,836	15,245,016
09:00 to 09:5	0	0	1	0	1,297	1	1,682,209	1,682,209
10:00 to 10:5	0	0	2	0	1,456	2	2,119,936	4,239,872
11:00 to 11:59	0	0	2	0	1,288	2	1,658,944	3,317,888
12:00 to 12:5	0	0	8	0	1,332	8	1,774,224	14,193,792
13:00 to 13:5	0	0	1	0	1,169	1	1,366,561	1,366,561
14:00 to 14:5	0	0	0	0	1,265	0	1,600,225	0
15:00 to 15:5	6	0	4	0	1,504	16	2,262,016	36,192,256
16:00 to 16:5	0	0	1	0	1,778	1	3,161,284	3,161,284
17:00 to 17:5	0	0	7	0	1,934	7	3,740,356	26,182,492
18:00 to 18:5	0	0	1	0	1,148	1	1,317,904	1,317,904
19:00 to 19:59								
20:00 to 20:59								
21:00 to 21:59								
22:00 to 22:59								
TEM №4 Pedestrian Crossings – Section 5.3.1 (page 8) Normally, pedestrian counts for PV² calulations will consider thise crossing between the site and the next road junction, or within 50m either side of the proposed site, whichever is the lesser distance. Generally young pedestrians and those with impairments are considered to be more vulnerable and to allow for this we will count unaccompanied under 16 year olds and each pedestrian that is observed to be slow or who have apparent difficulty in crossing the road as being the equivalent of two persons. An accompanied child pedestrian is deemed under the supervision						PV² Average of 4 Highest PV²		22,953,389
						P Average of 4 Highest P		9

Table 3. PV2 calculation. Figures indicated it is well below figure required for a signalised crossing.

8.1.5 The alternative facility is a pedestrian refuge and this is discussed in the following section.

9 Pedestrian refuge

9.1.1 A pedestrian refuge would allow pedestrians to cross one stream of traffic at a time.

9.1.2 Ideally a pedestrian refuge would be located within Zone 1. The carriageway width within Zone 1 is approximately 7.5m and would allow for a 1.2m wide island to be provided.

9.1.3 Initial design indicates that a 1.2m refuge could be located near the bus stops. And shows that turning movements from nearby driveways will be unaffected. Locating a pedestrian refuge here would certainly aid pedestrian crossing movements.

9.2 Discussion

9.2.1 Pedestrian refuges require sufficient nearby illumination to help depict pedestrians waiting to cross or crossing the carriageway during the hours of darkness. A streetlight is located close to the suggested location for the pedestrian refuge and discussions with a Lighting Engineer suggest that the illumination here would suitable.

9.2.2 The proximity of the streetlight will be beneficial as this is likely to be the point of connection for the illuminated bollards on the refuge.

9.2.3 The position of the refuge would be adjacent to the bus boarder kerbs on the northern side of the carriageway. Therefore, these would need to be removed to allow dropped kerbs to be provided.

9.2.4 Changes to the existing central carriageway lining would be required if a pedestrian refuge were pursued.

9.2.5 As mentioned in Section 2.6, C2 enquiries have revealed that there are a number of utilities passing through the area. C3 enquiries are recommended to establish precise locations. This may however, result in the need for topographical surveys/utility surveys.

9.2.6 It is highly likely that the Abnormal Loads Officer will object to a pedestrian refuge being provided here due to the obstruction it may present to abnormal loads. However, it will be highlighted that splay kerbs could be used to allow some over-run by larger vehicles and that removable bollards could be used. It is important to note that westbound abnormal loads would be able to use the 2m wide bus layby if required to negotiate this section of carriageway. Ultimately, if the scheme proceeds the pedestrian island would provide a greater degree of priority to pedestrians and therefore would be in line with Cornwall Council aims.

10 Extension of footway

10.1.1 There is an area of verge just to the west of the garage forecourt. It is evident that pedestrians use this area to walk along see Image 6.

Image 6 showing area of grass verge to the east of the garage forecourt

10.1.2 Cornwall Council mapping shows this area to be public maintained highway. To aid pedestrian movement it is suggested that this area is made into footway to aid pedestrian movement as grass verge areas often become muddy and slippery underfoot.

11 Pictorial Summary

11.1.1 The Image below identifies the approximate locations of features previously discussed in the report.

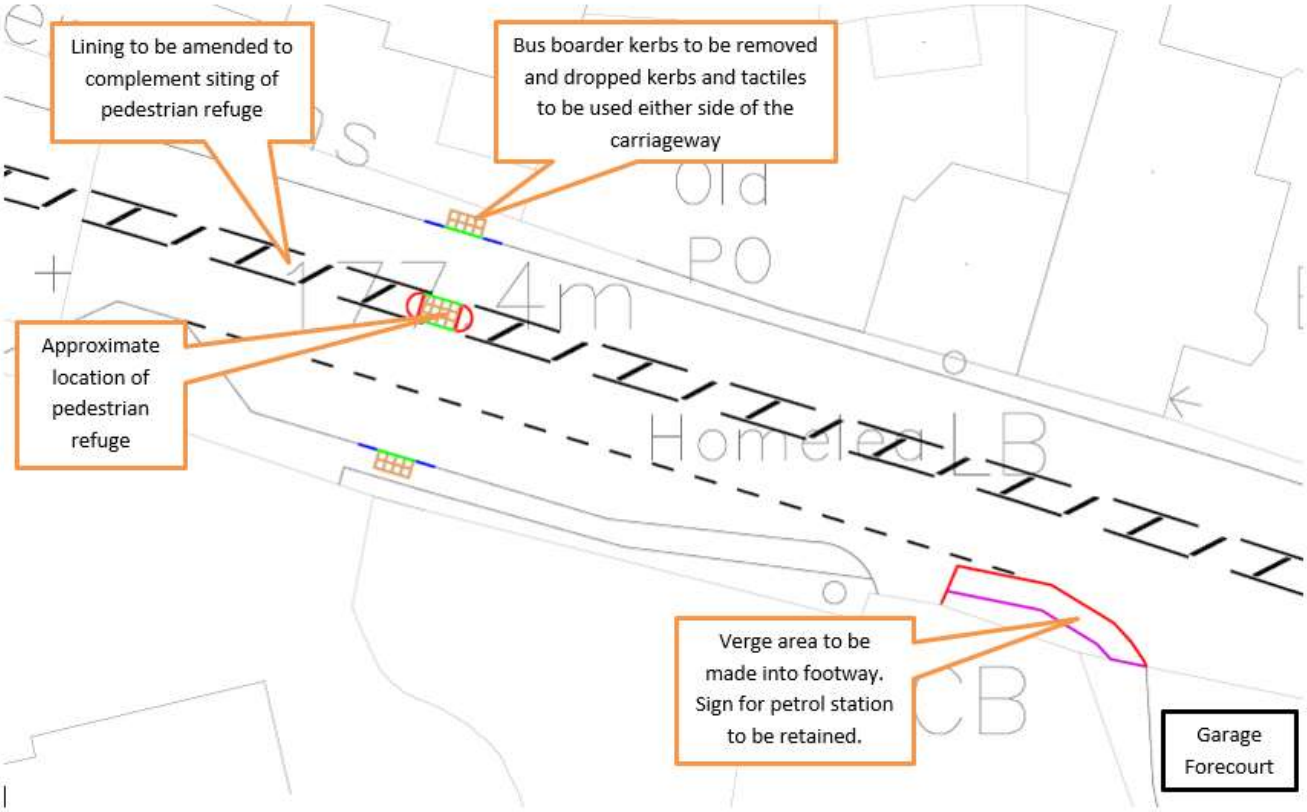

Image 7 showing approximate location for pedestrian refuge and new section of footway.

12 Cost Estimating

12.1.1 An overview of the proposals and their estimated costs is listed below.

12.1.2 Estimates have been provided for the works associated with proving a pedestrian refuge and a section of footway. The cost estimates include:

- Topographical and Utility Survey (depending on C3 enquiries)
- Construction costs required to implement on site;
- Design fee;
- Risk/Contingency (40%)

12.1.3 Due to the high-level feasibility study the costs identified are liable to change and any certainty over true costs can only be evaluated at the detailed design stage.

12.1.4 Traffic Management costs have been included within estimates this has been based on a road closure and night-time working

Proposals	Works	Design/Fee	Risk	Estimate
Pedestrian refuge inc. lining and kerbing	£25,000-£30,000	£8000 (less if Topographical Survey undertaken)	£0	£38,000-£42,000
Topographical/Utility survey (if required)	£5,000	£300	£2,120	£7,420
Replace section of verge with F2 Footway	£7000 (less if incorporated with ped refuge work)	£1500 (less if incorporated with ped refuge work)	£3,400	£10,400