Northern Corridor:
Derriford Transport Scheme

Option Assessment Report

Plymouth City Council

Strategic Planning & Infrastructure
Directorate for Place

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Document Purpose

This report has been produced in order to identify, assess and appraise transport interventions (including individual or packages of measures, strategies and plans) to address an identified transport need along the A386 Tavistock Road between Derriford Roundabout and William Prance Road Junction.

STAGE 1 - OPTION DEVELOPMENT

1. SCHEME CONTEXT

1.1. Description of Scheme Location

1.1.1. The Derriford Transport Scheme (DTS) area is located along the A386 Tavistock Road, between Derriford Roundabout and William Prance Road Junction in the north of Plymouth, Devon. Grid Reference: E249028, N059524.

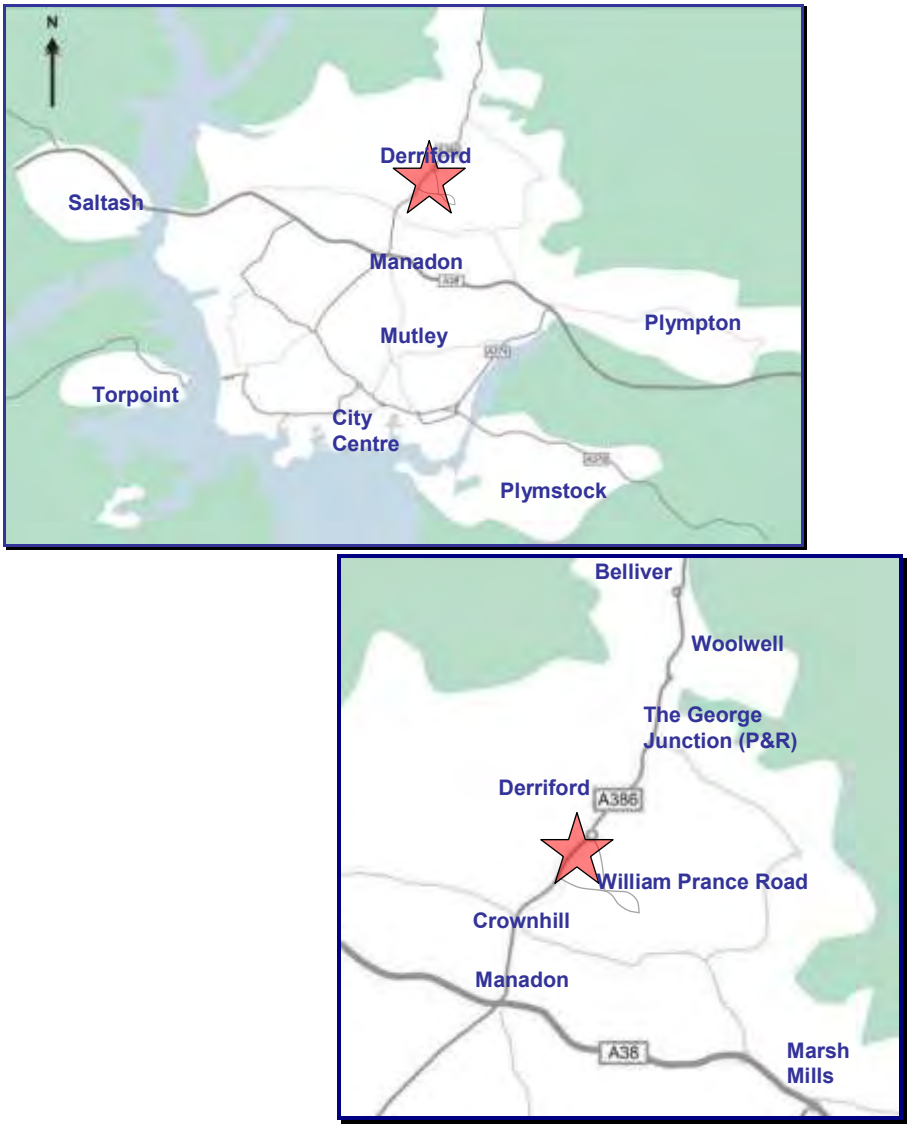


Figure 1 Location Plan

1.1.2. This section of the A386 is a National Primary Route and has been identified as being one of the key strategic locations on the Northern Corridor and for the city as a whole. The A386 links the north of the city to the A38 Trunk Road network and the large residential areas of Woolwell, Estover and Crownhill as well as the large business, technical and medical sectors located in the Derriford area.

1.1.3. Derriford Roundabout is a fully signalised large diameter 5 arm roundabout. Pedestrian and cycle crossing facilities are provided across some of the arms and through the middle of the roundabout itself. The roundabout incorporates a number of established mature trees and there are also large areas of grass landscaped areas within the roundabout, verges and central reservation.

1.1.4. William Prance Road junction is a 4 arm fully signalised cross-road junction. Pedestrian and cycle crossing facilities are provided on some of the arms however

they incur a large time penalty as the facilities fit in with the other stages of the traffic signals.

1.1.5. The section of the A386 that links these two junctions is dual carriageway in both directions. The William Prance Road junction is linked to the south by the continuation of the dual carriageway while Derriford Roundabout is linked by single carriageway roads to the north.

1.1.6. The ability to offer fast and reliable sustainable travel that is competitive to the private car is critical for this corridor in order to achieve the vision of creating a High Quality Public Transport (HQPT) priority corridor along with improved facilities for pedestrians, cyclists and general traffic.

2. CURRENT TRANSPORT AND OTHER POLICIES - NATIONAL, REGIONAL AND LOCAL

2.1.1. The options produced for the DTS must be strategy led and grounded in national, regional and local policies. The following section discusses the key policy areas and identify main areas that solutions will need to consider.

National Policies

2.1.2. A number of national policies and plans can be used to inform and shape the option development and design process. The key most recent documents have been summarised below.

Delivering A Sustainable Transport System (DfT, 2008)

2.1.3. In November 2008 the Department for Transport issued a consultation document on Delivering a Sustainable Transport System (DaSTS), which sets the policy context for transport in England. The document developed the new National Transport Goals, from the previous shared priorities developed through the 2004 white paper, to the framework for implementing transport improvements of all scales following advice from Eddington and Stern.

2.1.4. The National Transport Goals are to tackle climate change; support economic growth; promote equality of opportunity; contribute to better safety security and health; improve quality of life.

National Infrastructure Plan (HM Treasury October 2010)

2.1.5. This is the coalition Government's broad vision of the infrastructure investment required to underpin the UK's growth.

2.1.6. The plan identifies reliable infrastructure: energy, water, transport, digital communications and waste disposal networks and facilities, are essential to allow businesses and industries to grow.

2.1.7. In relation to transport, in order to achieve this the plan identifies that key areas for investment include maximising the potential of existing road and rail networks; transforming energy and transport systems to deliver a low carbon economy; transforming the UK's strategic rail infrastructure;

2.1.8. Investment in the transport system and in transport infrastructure projects is a key theme throughout the document which acknowledges the contribution that improved transport facilities can have in helping to drive the economy and stimulate the right conditions for economic growth.

2.1.9. The plan seeks to promote greater localism through local authority major transport schemes and by Local Sustainable Transport Fund.

Growth, Cutting Carbon – Making Sustainable Local Transport Happen (DfT, January 2011)

2.1.10. The need for people to make more sustainable transport choices, reducing the need to travel and the role of transport in accessing key services have been on the UK government's agenda for many years.

2.1.11. The Government's recent White Paper, Creating Growth, Cutting Carbon – Making Sustainable Local Transport Happen (DfT, January 2011) sets out its clear intentions for a locally-led approach to meeting two key government objectives: helping create growth in the economy and tackling climate change by reducing carbon emissions.

The Carbon Plan: Delivering our low carbon future (HM Government December 2011)

2.1.12. This document sets out a strategy for achieving the Governments vision to cut carbon emissions by 80% by 2050. A number of sectors are considered within this strategy including transport.

2.1.13. The document focuses on emissions from vehicles and the part that alternative fuel sources will have to play in de-carbonising transport however it does also reference the important role of local sustainable travel and new technologies such as teleconferencing in reducing the demand for travel.

2.1.14. The report identifies that:

> *"encouraging the use of local public transport, cycling or walking, will enable people to make lower carbon travel choices. In doing so they will reduce emissions, boost the local economy through reduced congestion, and improve air quality and health".*

Investing in Britain's future (HM Treasury July 2013)

2.1.15. This document builds on the National Infrastructure Plan, first published in 2010 and updated yearly. This is the coalition Government's long-term strategic plan to deal with the challenges of economic growth over the next decade to build a strong economy, necessary for a fairer society.

2.1.16. The document has a key focus on national infrastructure priorities and identifies that the UK needs transport and communications networks that connect people and businesses, which are resilient, cost effective and are derived from sustainable energy supplies.

2.1.17. The document also considers the importance of local infrastructure investment and re-emphasises the importance of localism to inform investment decisions and delivery. The document summarises significant investment opportunities to be facilitated through Local Enterprise Partnerships (LEP's) over the coming years.

Regional Policies

2.1.18. Plymouth City Council is a member of the 'The Heart of the South West' (HotSW) Local Enterprise Partnership (LEP) for Devon, Plymouth, Somerset and Torbay. The LEP is a new strategic partnership organisations formed under the leadership of the private sector and supported by the local authorities to create a powerful economic alliance.

2.1.19. The HotSW is a partnership managed by a voluntary board consisting of business leaders, alongside representatives from local government and educational institutions. They work together to lead and influence the economy of Devon, Somerset, Plymouth and Torbay by improving economic growth and job creation.

2.1.20. The HotSW LEP has a vision to:

> *"To create more sustainable jobs by supporting and promoting our enterprises and capitalising upon the unique opportunities existing in the Heart of the South West".*

2.1.21. To achieve this vision, the LEP has four strategic priorities to drive productivity and enterprise; attract new business and investment; maximise employment opportunities; promote infrastructure to connect with markets.

2.1.22. A Strategic Economic Plan has been developed by the HotSW LEP to inform and shape the transport priorities across the region.

Local Policies

Plymouth's Corporate Objectives

2.1.23. The Council and its partners in Plymouth 2020, the Local Strategic Partnership (LSP), have committed to a clear shared vision for Plymouth:

> *"To be one of Europe's finest, most vibrant waterfront cities, where an outstanding quality of life is enjoyed by everyone".*

2.1.24. To achieve this the city aspires to be a healthy place to live and work; a wise city that is a place for learning, achievement and leisure; a wealthy city which shares and creates prosperity; a safe and strong city.

2.1.25. Plymouth City Council's Corporate Plan sets out the council's strategic direction for 2013/14 to 2016/17 and beyond. It focuses on the vision and the four priorities that have been developed to deliver the vision:

- Pioneering

  We will be pioneering by designing and delivering better services that are more accountable, flexible and efficient in spite of reducing resources.

- Growing

  We will make our city a great place to live by creating opportunities for better learning and greater investment, with more jobs and homes.

- Caring

  We will promote a fairer, more equal city by investing in communities, putting citizens at the heart of decision-making, promoting independence and reducing social inequality.

- Confident

  We will work towards creating a more confident city, being proud of what we can offer and growing our reputation nationally and internationally.

Plymouth's Local Transport Plan 2011-2026

2.1.26. Plymouth's Third Local Transport Plan (LTP) was adopted in 2011. The LTP sets out the transport strategy for the city and provides a framework for the Council to deliver a high quality transport network enabling the transformation of the city over the next 15 years and beyond.

2.1.27. The vision for transport is one for a more efficient network which capitalises on the aspiration for growth and provides users with a better journey experience.

2.1.28. The LTP was developed by engaging with a wide range of residents, Councillors and stakeholders and adopted through a unanimous vote of the City Council. The fundamental priorities identified in the LTP are to link communities together; provide high quality transport standards for a vibrant economy; make walking, cycling and public transport the desirable choice; maximise the transport contribution to Plymouth's carbon reduction target; use transport to drive the local economy.

2.1.29. A scheme for Derriford area has been included with the LTP Implementation Plan.

Plymouth's Local Development Framework, Core Strategy 2006 – 2021 (Adopted April 2007)

2.1.30. The Local Development Framework (LDF) provides the current spatial planning framework for the development and growth of the city up to 2021. Together with the LTP it provides the strategic framework for the spatial development of the city.

2.1.31. The LDF consists of a set of strategies of which the Core Strategy, which was formally adopted in 2007, sets out the overall vision for the city and the means by which this will be delivered.

2.1.32. The LDF proposes for the Derriford and Seaton area significant growth of employment, as well as new retail (including a completely new district centre), housing, and enhancements to the area as a gateway to the city.

2.1.33. The long term vision for the area is:

> *"to create a thriving, sustainable, mixed use new urban centre at the heart of the north of Plymouth, which is well connected to surrounding communities and to the city's High Quality Public Transport network."*

The Emerging Plymouth Plan

2.1.34. A new policy direction is currently being developed to guide the future development of the city.

2.1.35. The Plymouth Plan will be a single strategic plan for the city, looking ahead to 2031 and beyond and will bring together all the city's long term strategic plans into one place and will deliver a full review of the current Local Development Framework Core Strategy.

2.1.36. It will incorporate the strategic policy elements of the Local Transport Plan; Local Economic Strategy; Waste Strategy; Health and Wellbeing strategies; Children and Young Peoples Plan; Sustainable Communities Strategy; Visitor Plan; Vital Spark Cultural Strategy. The Plymouth Plan will also incorporate a range of other longer term plans and planning processes that have previously been developed separately.

Plymouth's Local Economic Strategy – Revised Centres Action Plan 2011

2.1.37. Planned changes to Plymouth's economy are set out in the Local Economic Strategy (LES), another document with a strong link to the LTP. The focus of the LES is on delivering the LSP's strategic objective of developing a prosperous economy.

2.1.38. The LES identifies the economic development priorities necessary to deliver a step change in economic growth to 2026. Its aspirations are to increase competitiveness, diversify knowledge, improve the skills base of the workforce, build sustainable, well connected and inclusive communities and intensify the overall business base of the city. This will in turn attract private investment, raise incomes and help tackle economic and social exclusion.

2.2. Policy Summary

2.2.1. The options developed for this project will need to be grounded in the above national, regional and local policy. The key messages within this policy to consider with the development of options centre on the need to deliver growth in homes and employment through the provision of key strategic infrastructure. Central to this infrastructure is the need to encourage sustainable travel to reduce negative impacts of increased trips arising from new developments.

3. CURRENT SITUATION

3.1.1. This section describes the current conditions along this section of the Northern Corridor and identifies the key issues and pressures placed upon it.

3.2. Route Segmentation

3.2.1. This section of the northern corridor has a number of different functions and land uses all served by the A386 Tavistock Road. Table 1 below identifies the route segmentation along the A386 Tavistock Road.

Section	Current main land Use	Priority users
Belliver roundabout to Woolwell roundabout	Medium density residential Undeveloped land Retail supermarkets B1 employment	Vehicular traffic Pedestrian / cycle crossing facilities
Woolwell Roundabout	Medium density residential	3 arm un-signalised roundabout
Woolwell Roundabout to The George junction	Medium density residential Automotive retail	Public Transport, Vehicular traffic, Pedestrian / cycle crossing facilities
The George junction to Derriford Roundabout	Low density residential Public house / hotel	Public Transport, Vehicular traffic, pedestrian / cycle facilities
Derriford Roundabout	Office, Medical, Research & Development, Retail, Automotive retail, public house/hotels, low density housing,	5 arm fully signalised roundabout. Public transport, Vehicular traffic, Pedestrian / cycle crossing facilities. Emergency Services access.
Derriford Roundabout to William Prance Road	Office, Medical, Research & Development, Retail, hotel.	Dual carriageway with bus lanes. Public transport, Vehicular traffic, Pedestrian / cycle crossing facilities. Emergency Services route.
William Prance Road Junction	Office, Medical, Research & Development, Retail, hotel.	4 arm signalised junction. Public transport, Vehicular traffic, Pedestrian / cycle crossing facilities. Emergency Services route.
William Prance Road to Crownhill	Listed building (Crownhill Fort) Office, Retail. Low density housing. Emergency services access.	Dual carriageway with bus lanes. Public transport, Vehicular traffic, Pedestrian / cycle crossing facilities. Emergency Services route.

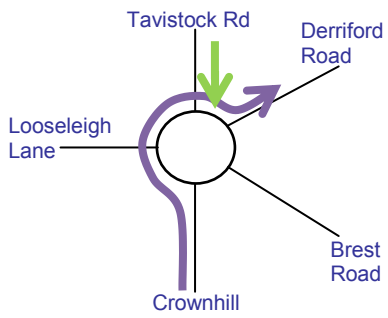
Table 1 Route Segmentation

3.3. Current Travel Demands and Level of Service

Existing Traffic Flows

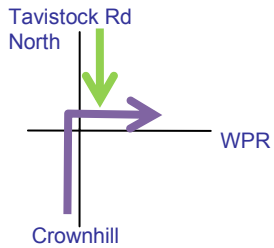
3.3.1. Figure 2, summarises a 2012 traffic survey which shows that 19,013 vehicles and a further 670 (3.42%) HGV's travel north along the A386 Tavistock Road between William Prance Road and Derriford Roundabout in a 12 hour period. 19,814 vehicles were observed travelling south between Derriford Roundabout with a further 700 (3.43%) HGV's, in a 12 hour period.

3.3.2. Approximately 43,787 vehicles use Derriford Roundabout in a 12 hour period with 4,225 in the morning peak hour and 4,090 in the evening peak hour. The dominant flows come from the south and travel either north on Tavistock Road or to Derriford Road along with traffic coming from the north heading south along Tavistock Road. The right turn movement from Tavistock Road to Derriford Road is very important as this opposes the other major movement towards the south.

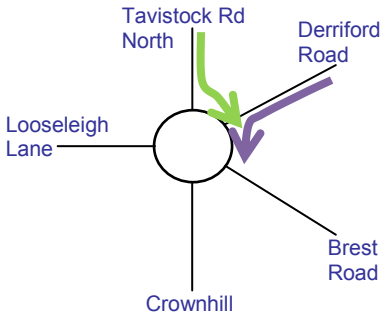


3.3.3. Figure 3 shows that in the morning peak hour at Derriford Roundabout, 798 vehicles travel south to north, 816 vehicles travel north-east turning right from Tavistock Road into Derriford Road and 1,236 vehicles oppose this latter movement by travelling south leading to congestion, delays and unreliable journeys. 253 vehicles were observed in the morning peak travelling through Derriford Roundabout in order to reach Brest Road however it is not known if some of these vehicles are using this as an alternative route to the A386 during periods of congestion. A total of 109 vehicles were observed exiting Brest Road.

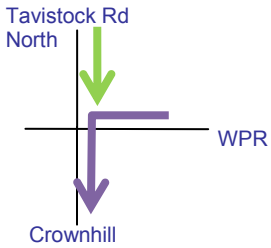
3.3.4. Figure 3 also shows that in the morning peak hour 4,687 vehicles pass through the William Prance Road junction with 1,964 vehicles travelling from south to north and a further 838 turning right from Tavistock Road into William Prance Road. This is opposed by 1,613 vehicles travelling from north to south. This movement fundamentally restricts the amount of time that can be given through the traffic signals between right turners and southbound traffic at this location again leading to congestion, delays and unreliable journeys.



3.3.5. Figure 4 shows that in the evening peak hour at Derriford Roundabout, 973 vehicles exit Derriford Road between 17:00 and 18:00. Excluding left turners into Derriford Road, this is opposed by 1,024 vehicles from Tavistock Road North.



3.3.6. Figure 4 also shows that in the evening peak 516 vehicles turn left out of William Prance Road which is opposed by 2,147 vehicles travelling southbound towards Crownhill / Manadon.



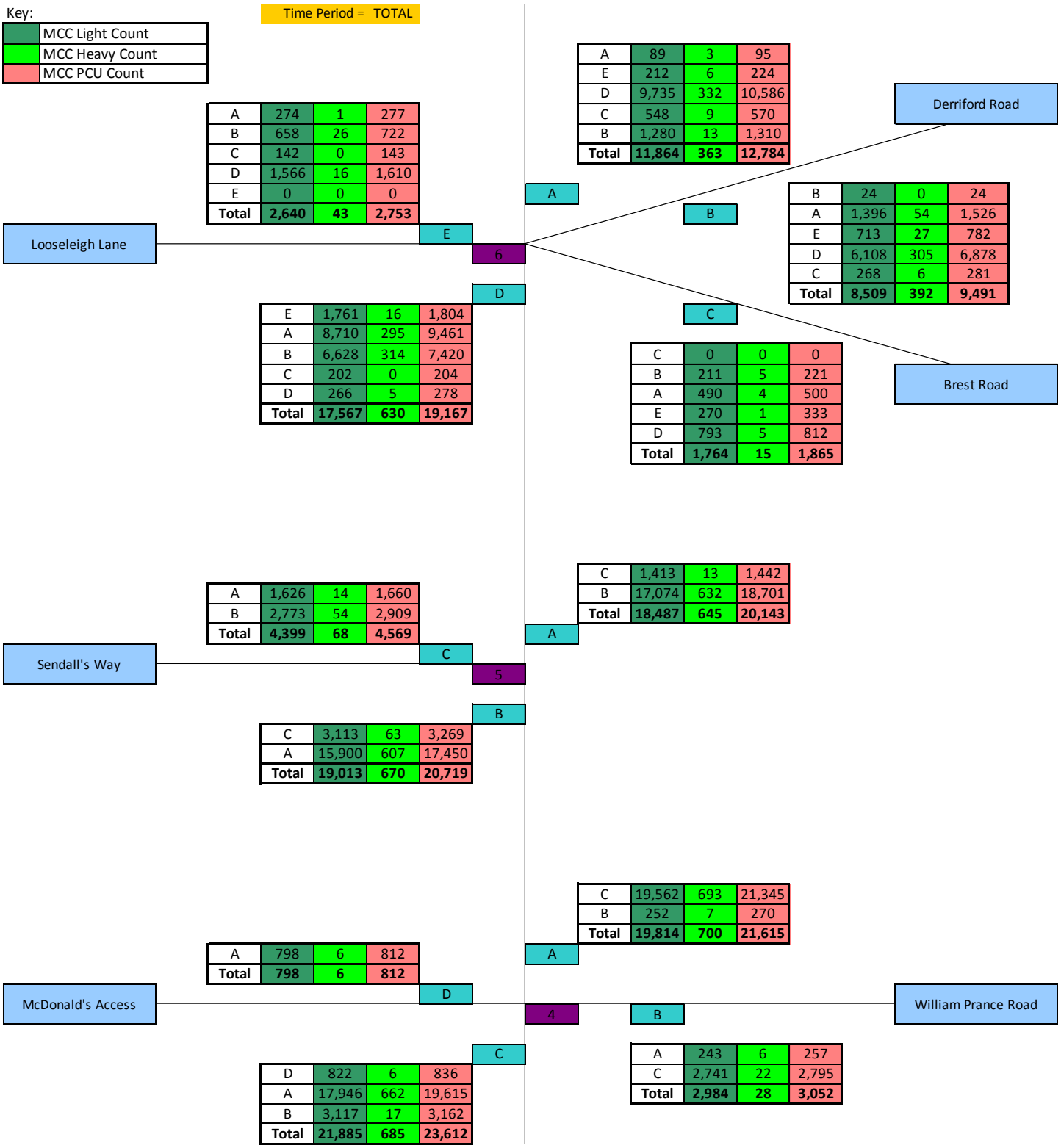


Figure 2 Derriford to William Prance Road Traffic Flows 12-hours (December 2012)

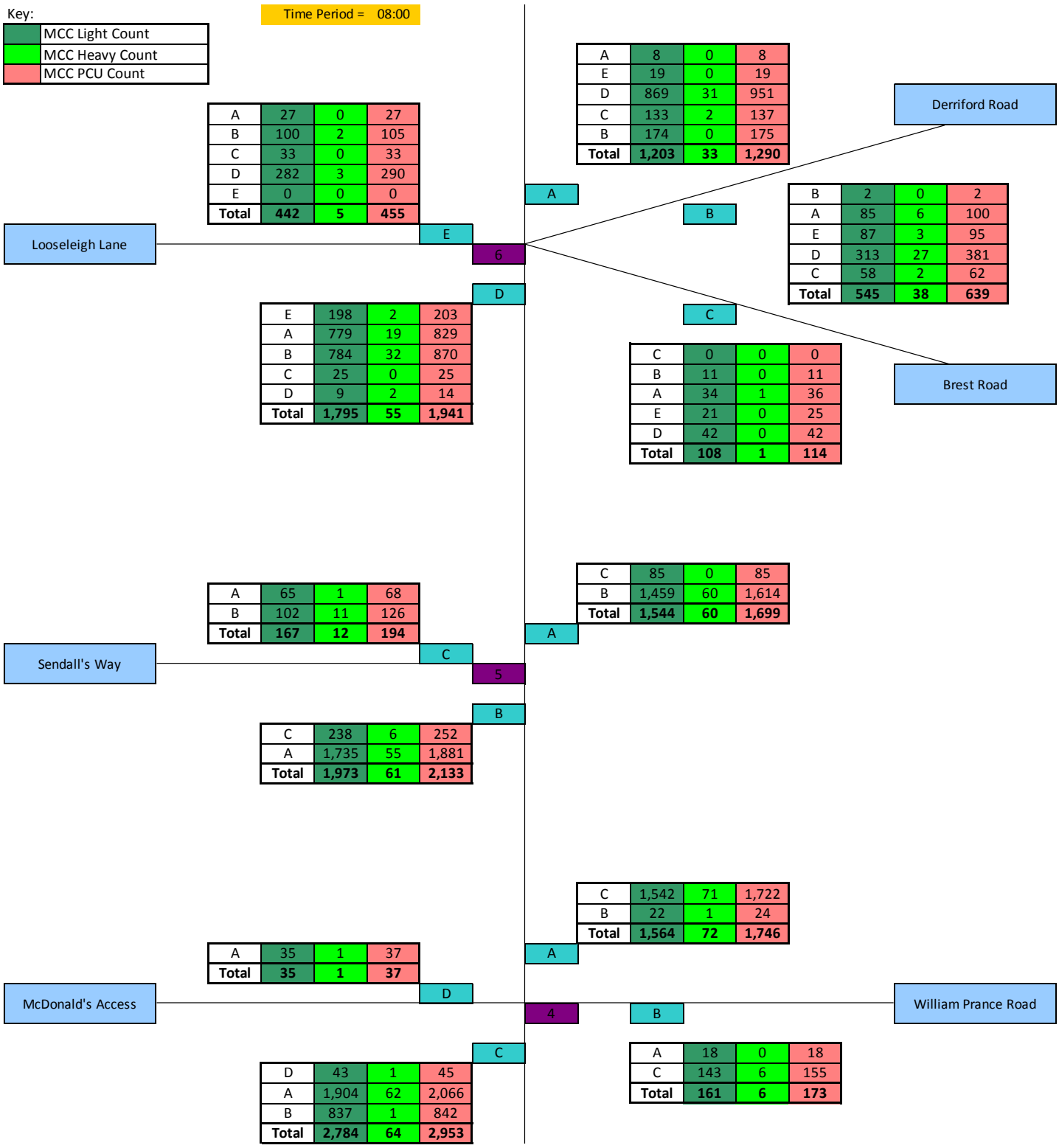


Figure 3 Derriford to William Prance Road Traffic Flows 8am – 9am (December 2012)

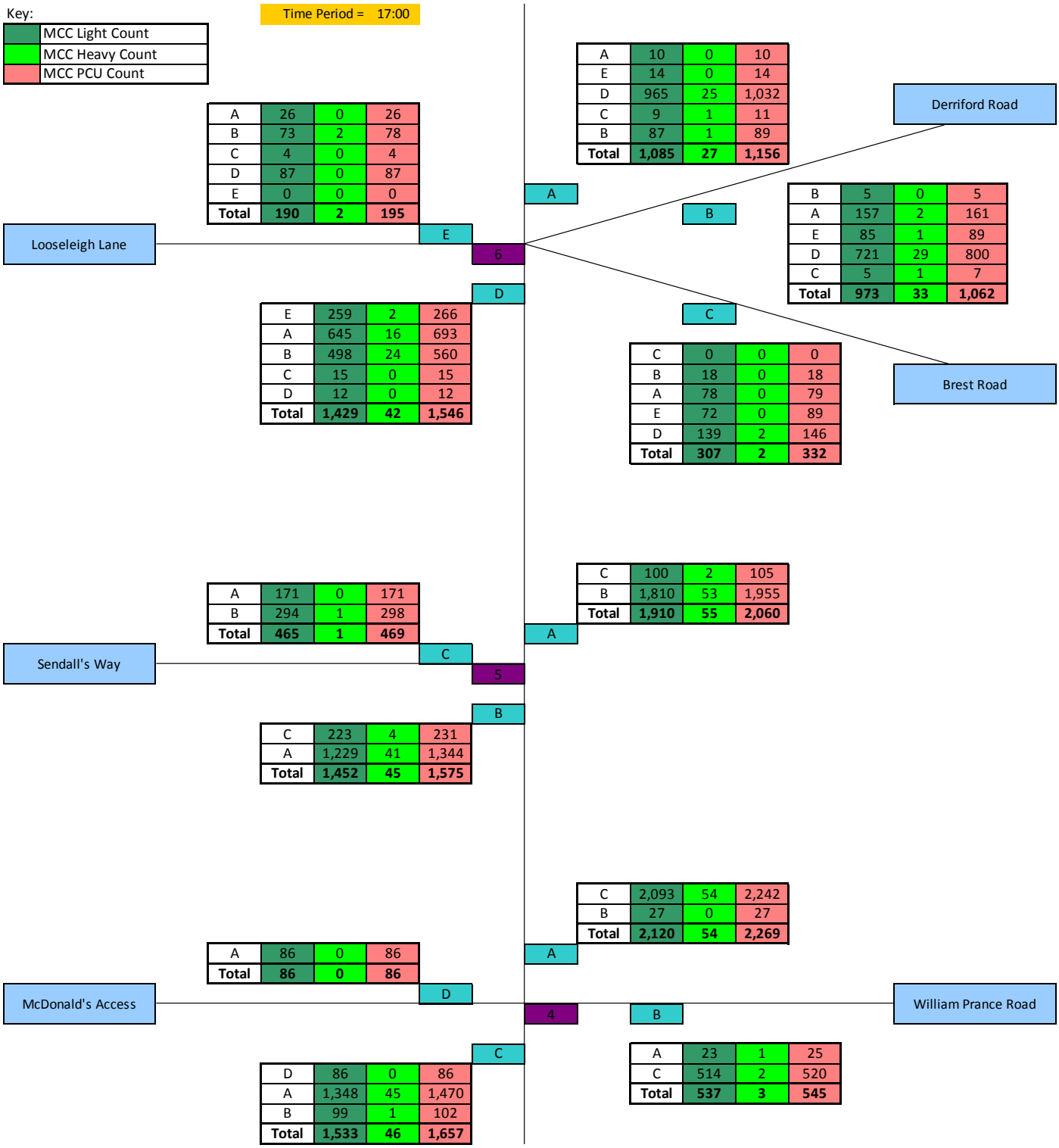


Figure 4 Derriford to William Prance Road Traffic Flows 5pm – 6pm (December 2012)

Cyclist Data

3.3.7. A 12 hour cycle survey was undertaken in 2009 to establish the number of people using Tavistock Road south of Boniface Lane. The results of this survey are summarised in Figure 5 below:

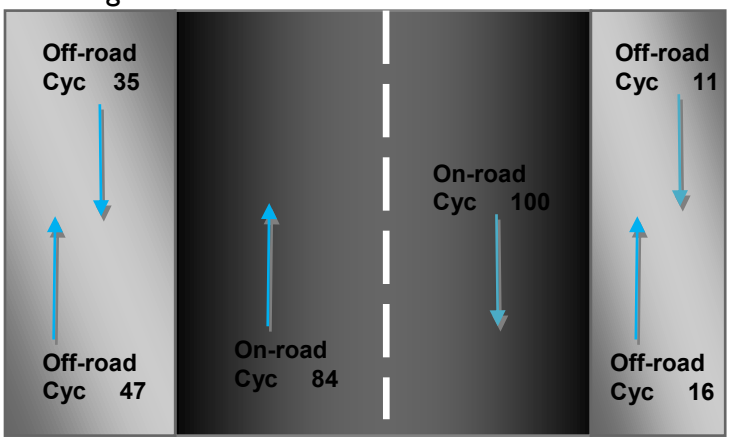


Figure 5 Pedestrian and Cycle off-road survey

Queue Data

3.3.8. A video survey of the northern corridor between Manadon and Belliver was undertaken over a 12 hour period in December 2012 to establish the extent of queuing in the area. The video survey does represent some good quality data however, the nature of this key route means some of the key intricacies and interrelationships such as queuing resulting from lane changing or queuing in one lane blocking another, could be overlooked.

3.3.9. The video survey identifies that in the morning peak period, the maximum queue on Tavistock Road in the northbound direction extends back from William Prance Road by 115 vehicles past Budshead Road.

3.3.10. In the evening peak period, the video survey identified that queuing on Tavistock Road occurs on the southbound approaches to all of the main junctions effectively creating a continuous queue/slow moving traffic stream. Queuing also occurs on William Prance Road with a maximum queue of 38 vehicles however by 17:30 the peak queuing for this road has receded.

3.3.11. Figure 6 and Figure 7 below summarise the data obtained from the video survey.

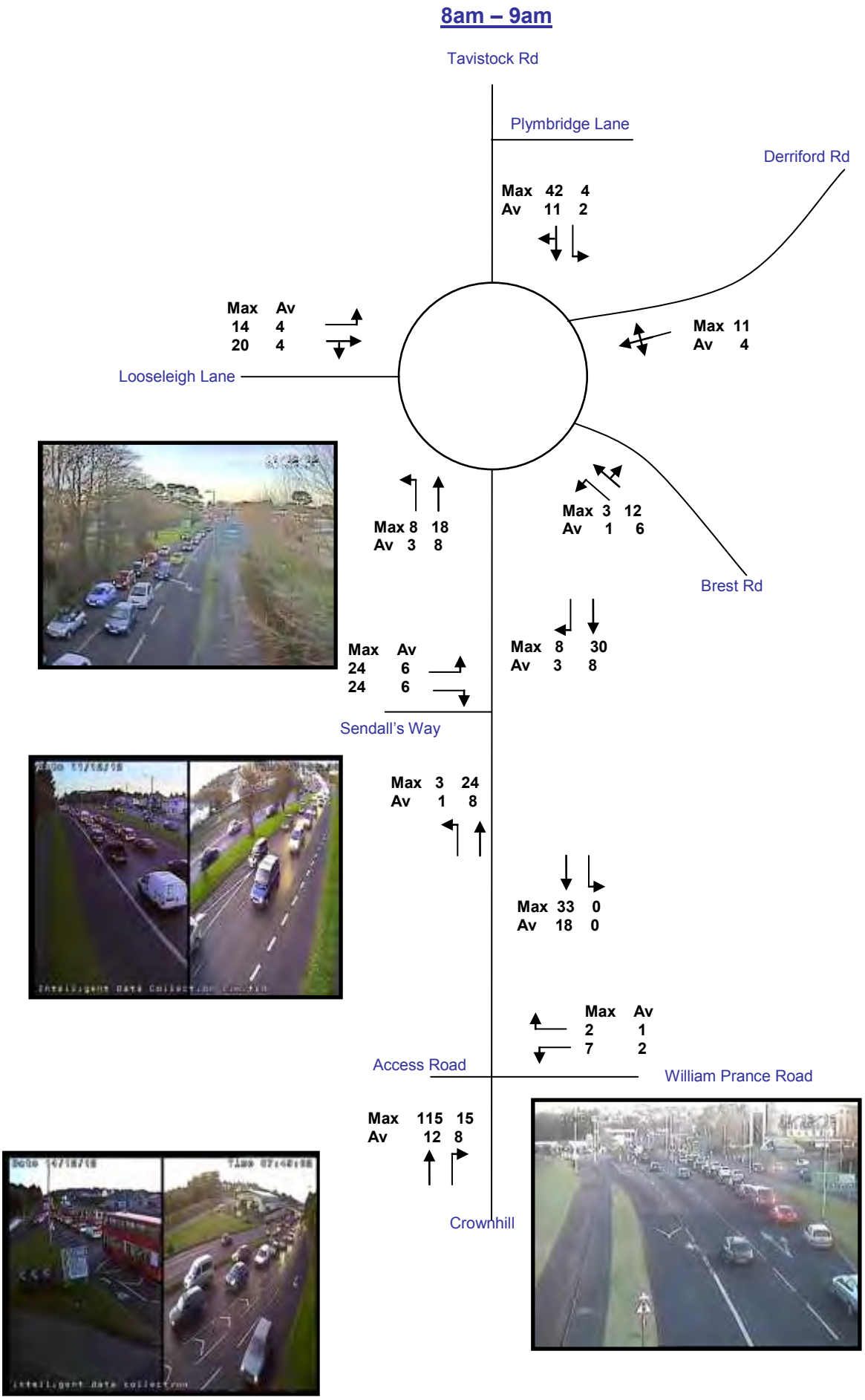


Figure 6 AM Peak Queue Length Data (Survey December 2012)

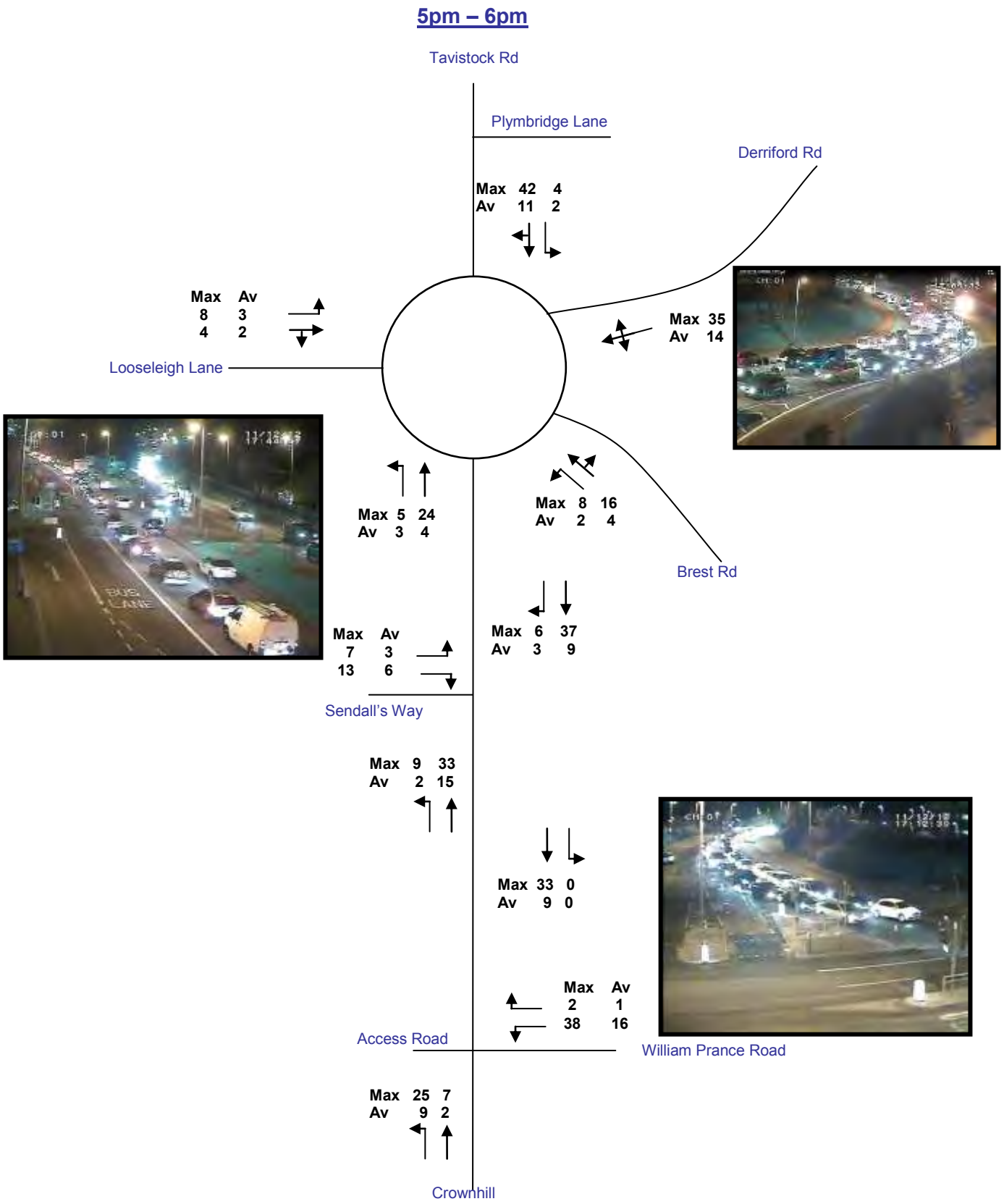


Figure 7 PM Peak Queue Length Data (Survey December 2012)

Existing Bus Service Frequencies

3.3.12. Figure 8 and Figure 9 below identities the bus service frequencies within the scheme area as at 24/04/2014.

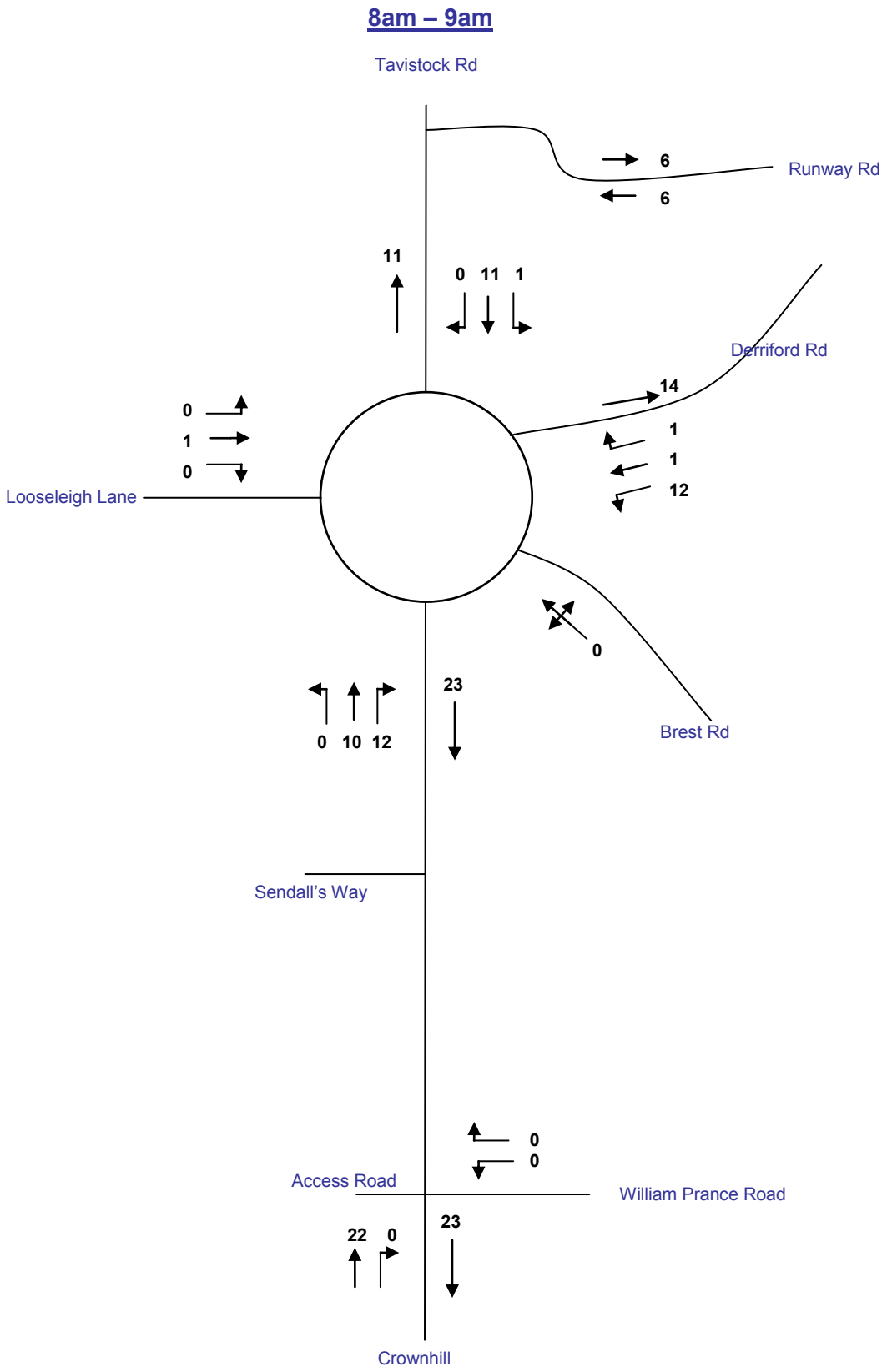


Figure 8 AM Peak Bus Service Frequency Data (April 2014)

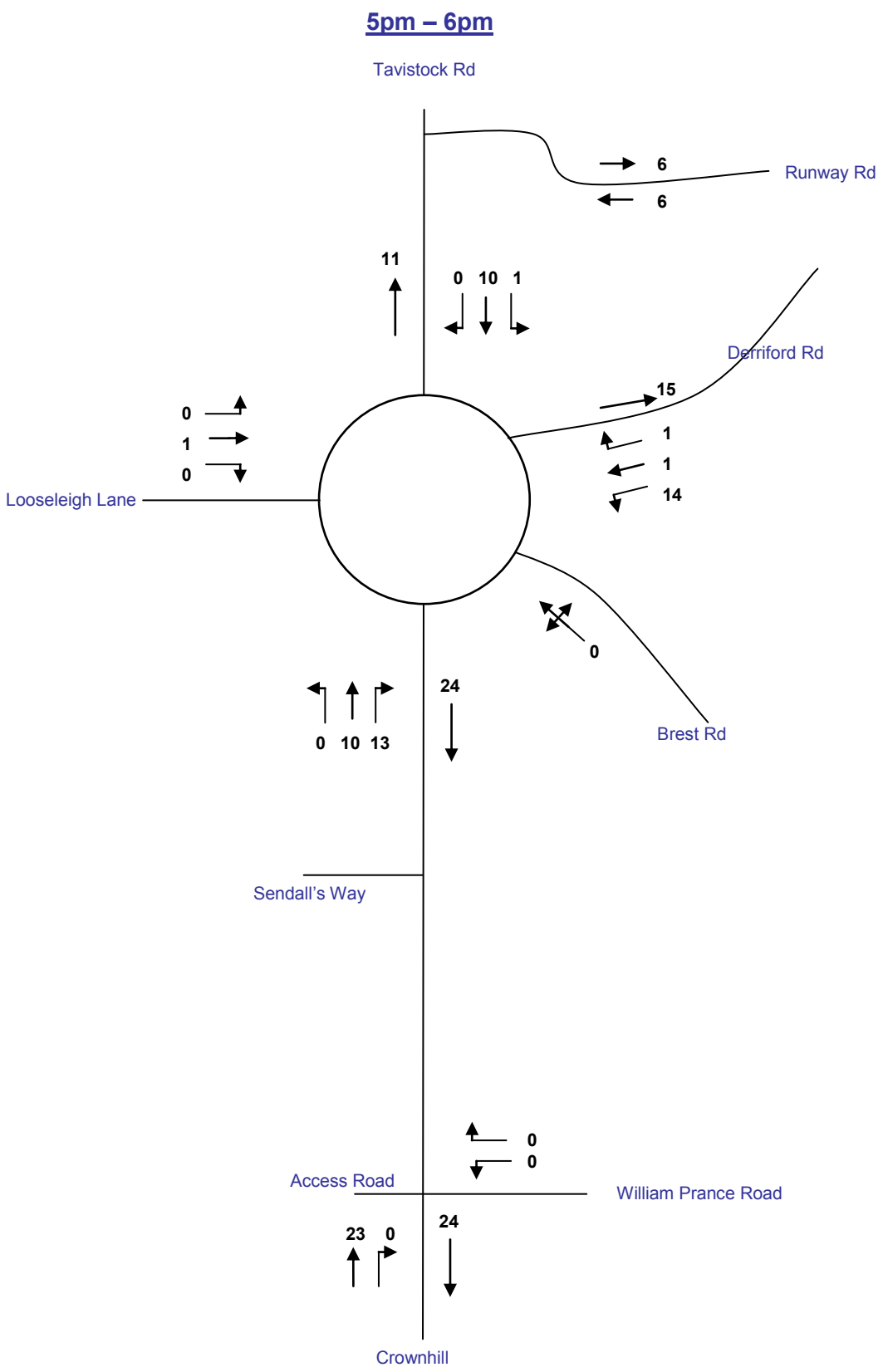


Figure 9 PM Peak Bus Service Frequency Data (April 2014)

Social Demographics

3.3.13. The Derriford to William Prance Road Improvement scheme lies between the neighbourhoods of Derriford West & Crownhill and Estover, Glenholt and Derriford East. The neighbourhood of Manadon and Widey is in the south with Widewell to the north.

Figure 10 Study area Neighbourhood & Ward Boundaries

3.3.14. In 2011 Widewell had a population of 3,543. Of these 46.5% were male and 53.5 were female. 8% of the population was aged 0-4 years and 1.5% was aged over 85. In the same period, the neighbourhood of Estover, Glenholt and Derriford East had a population of 7,918. Of these 48.5% were male and 51.5% were female. 4.4% of the population was aged 0-4 and 2.2% was aged over 85.

3.3.15. The index of multiple deprivation 2010 score ranks Widewell at number 31 and Estover, Glenholt and Derriford East at 23 in terms of deprived neighbourhoods in the city (where 1 is the most deprived and 39 is the least). Life expectancy in 2009-11 was 84.8 years in Widewell and 82.2 years for the Estover, Glenholt and Derriford East neighbourhood. Both are above the city-wide average of 80.3 years.

3.3.16. Both neighbourhoods seem to be performing well when compared to other neighbourhoods in the city; however the need for improvement in some areas is apparent. Adult obesity and the high percentage of over 50s claiming employment benefits are of particular concern.

3.3.17. The scheme offers benefits in terms of encouraging and enabling walking and cycling by providing improved pedestrian and cycle infrastructure – improving the user experience and reducing journey times by those modes. This in turn will offer health benefits to the city population, and the economic benefits associated with them.

Destination Analysis

3.3.18. Figure 11 below identifies from the 2001 census that the majority of trips to the Moor View ward originate internally from within the same ward. The next highest ward within Plymouth is Southway in the north of the city and Eggbuckland.

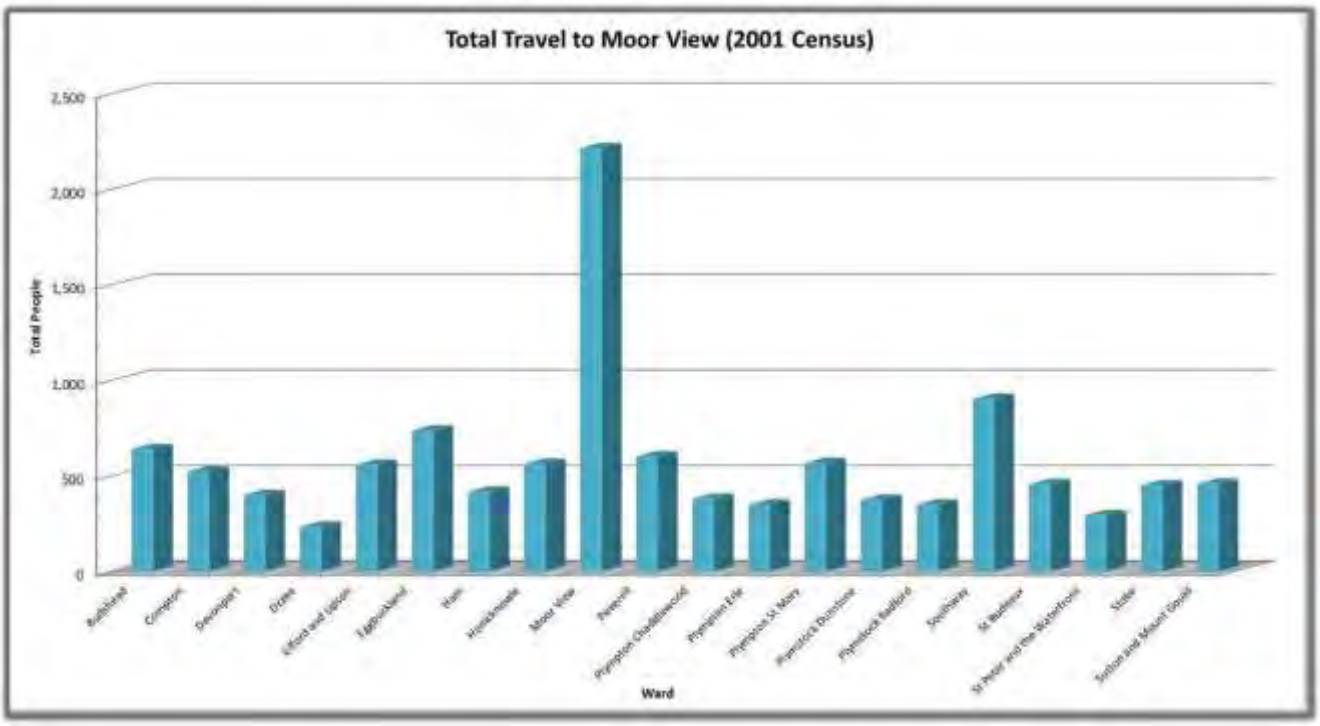


Figure 11Travel to Moor View Ward

3.3.19. As shown in Figure 12 below, the 2001 census identifies that the predominant method of travel to Moor View is car driver based at 63% of the mode share. Bus passenger accounts for 13% with 7% arriving on foot and 2% cycling.

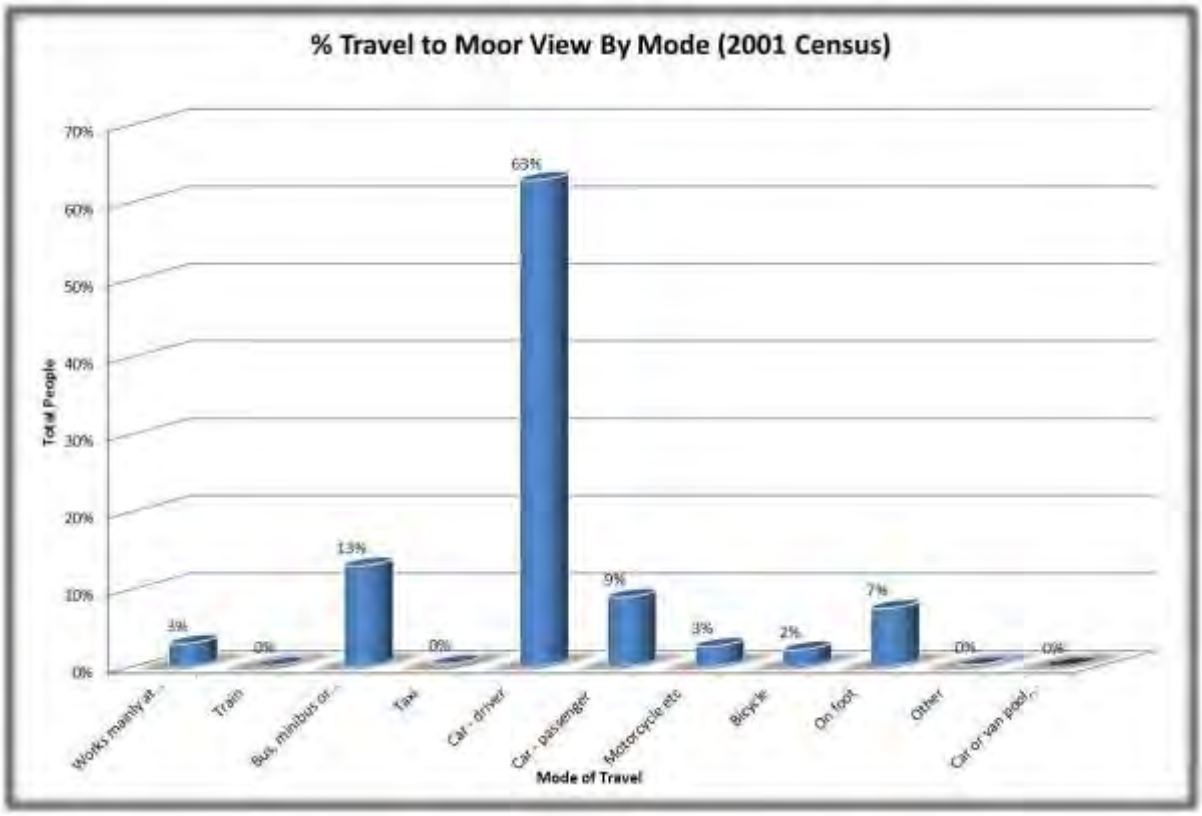


Figure 12 % Travel to Moor View by Mode

3.4. Opportunities and Constraints

Local Environmental Considerations

3.4.1. An Environmental Assessment has not yet been completed, but will be undertaken as part of the project development process.

Landscape

3.4.2. There are a small number of Tree Preservation Orders (TPO's) to the north of the scheme area which will require liaison with Plymouth City Council's Tree Officer in order to understand if the impact on these can be minimised or mitigated.

3.4.3. Some mature trees are located on the roundabout island and in the central reserve to the south of the exiting junction are likely to be lost.

3.4.4. Policy DS01 of the draft Derriford and Seaton AAP sets the framework to which the transport routes will need to conform in terms of integration into the new environment and maintaining existing landscape features.

3.4.5. Proposal DS21 of the draft Derriford and Seaton AAP is the Glacis Park Green Corridor which crosses the A386 between Derriford junction and William Prance Rd junction. This is an important part of the Green Infrastructure Network that will enable people and wildlife to move between green spaces as well as providing an attractive natural feature within the urban form.

Heritage

3.4.6. Crownhill Fort and Glacis and Drake's Leat are both significant historical assets. All works should be carried out in accordance with Policy DS03 of the Derriford and Seaton AAP and in consultation with PCC's Historic Environment Officer.

Ecology

3.4.7. The scheme area is neighboured land characterised by a mix of green open space around the Crownhill Fort area, light industrial and retail. A full assessment will be undertaken in order to determine any ecological impacts.

Air Quality

3.4.8. Air quality data is not currently available within the immediate study area, however, Plymouth's 2012 Air Quality Updating and Screening Assessment report

identifies that the annual mean concentration for Nitrogen Dioxide levels from the kerbside diffusion tube monitor near no. 422 Tavistock Road (next to The George P&R site), was 39.3µg/m3 (Bias adjusted figure) for 2011. This is close to the 40µg/m3 which would trigger an Air Quality Management Area to be declared. A neighbouring diffusion tube attached to the building of 424 Tavistock Road is felt to represent exposure levels recorded annual mean concentrations for Nitrogen Dioxide levels of 28.70 µg/m3 in 2011, which is under the criteria for declaring an AQMA.

Noise Emissions

3.4.9. The area of the scheme is not currently a DEFRA noise action priority site, however there is one in close proximity to the south of the site. The scheme aims to manage traffic such that noise levels do not deteriorate.

Carbon

3.4.10. Plymouth has set itself a challenging target to reduce carbon emissions by 60% by 2020. In order to make a significant contribution to achieving this target, there needs to be a substantial mode shift to more sustainable travel. Consideration of low energy equipment should be given along with the principles of sustainable construction to reduce, re-use and recycle in order to reduce the amount of embedded carbon the scheme produces.

Flood Risk

3.4.11. Environment Agency data confirms that Derriford Junction, William Prance Road Junction and the A386 between them do not fall within a flood warning area or a flood alert area. The A386 at this location runs along a high ridge of land that drains west to the River Tamar and east to the River Plym. Figure 13 below illustrates that the area of flood risk for the watercourse running through Whitleigh Valley (to the west) is approximately 200m from the A386 and the area of flood risk for the watercourse running through Bircham Valley is approximately 250m from Derriford Junction

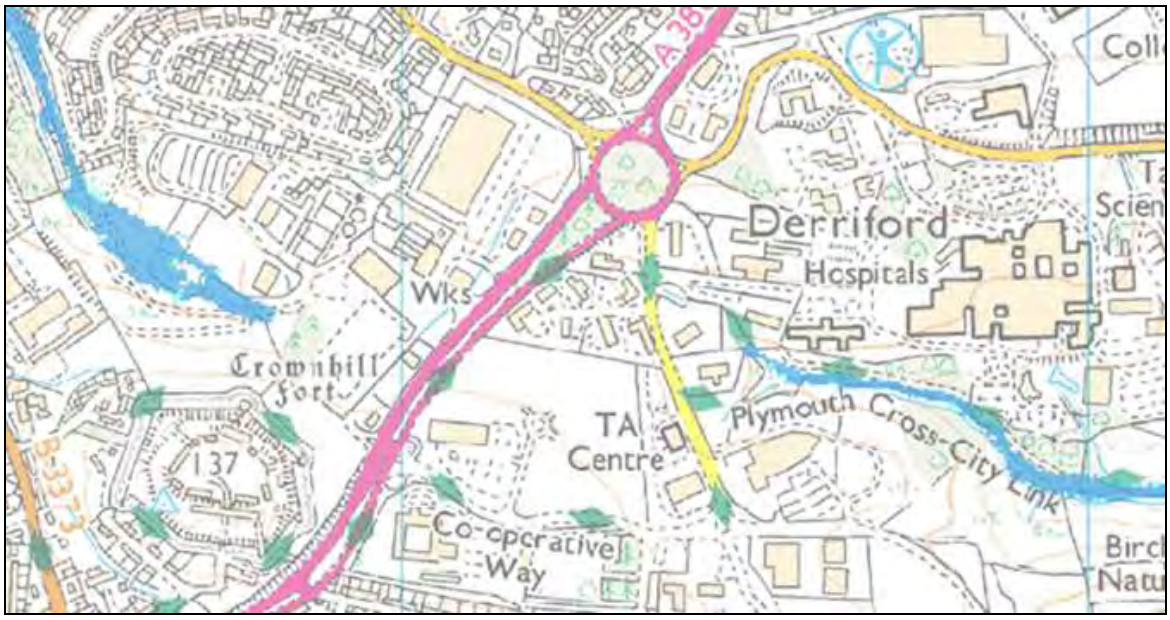


Figure 13 Environment Agency Flood risk from rivers for the Derriford area

Environmental Enhancement Opportunities

3.4.12. Opportunity to provide environmental enhancements should be undertaken as part of the scheme proposals development including:

- landscaping and/or tree planting.

- minimising street clutter through the rationalisation of new and existing equipment / infrastructure.
- utilise more environmentally sustainable resources such as reduce/reuse/recycle principles and the potential for locally sourcing materials.
- opportunities to reduce energy consumption both during construction and operation. Where measures are available to design out the need for energy consuming aspects to the scheme.
- address any identified noise and air quality problems.

Land Constraints and Opportunities

3.4.13. The scheme area is not constrained by any physical features such as rivers, railways or hilly terrain, however the heritage site of Crownhill Fort and the Devonport Leat restricts the availability of land to the west of William Prance Road and comparatively new buildings restrict land on the eastern side of Tavistock Road near William Prance Road.

3.4.14. In the first instance proposals should seek to provide a suitable solution which is within the Highway Boundary and/or PCC owned land. If this cannot be achieved, consideration to the utilisation of third party land may be appropriate. The acquisition of third party land should be kept to a minimum and should only be considered where there are likely to be significant benefits to the city to warrant its purchase from affected parties.

3.4.15. It is acknowledged that if there is a need to acquire third party land, this could be controversial, particularly if Compulsory Purchase powers are required. The impact on private landowners should be carefully considered throughout the option development and design process and the impact on third party land should be minimised as far as is possible to do so.

Economic Opportunities

3.4.16. This project represents an opportunity to provide infrastructure to support the large scale development planned along the Northern Corridor particularly in the Derriford area.

4. FUTURE SITUATION

4.1. Growth in Plymouth

4.1.1. The travel to work area (TTWA) for Plymouth covers an estimated population of approximately 750,000 people and extends into Devon and Cornwall, as far as Ivybridge and Liskeard respectively. It is important that people have convenient, fast and cost effective transport choices.

4.1.2. Plymouth is the major city of the far south west, with a population of 258,000 people this is over twice the size of the next largest city (Exeter, which has a population of 119,397), and second only in size to Bristol in the region at 259,000. Plymouth has a radical growth agenda, driven by its ambition to become one of the most vibrant waterfront cities in Europe where an outstanding quality of life is enjoyed by all of its citizens. The city is on a course to see increase its population, through economic growth, by over 20 percent. This would see the population grow by 50,000 to over 300,000 by 2031.

4.1.3. Plymouth's transport scheme priorities are directly focussed to ensure the delivery of the above growth in a sustainable manner. The strategy for managing this demand is to provide High Quality Public Transport (HQPT), pedestrian and cycle facilities throughout the city with a focus on the Northern Corridor.

4.1.4. The proposals will need to directly contribute to Plymouth's growth agenda by delivering part of the essential infrastructure needed to allow development sites along the Northern Corridor to come forward.

4.2. Growth along the Northern Corridor

4.2.1. The scheme will directly support future development sites most notably those identified in the Draft Derriford and Seaton Area Action Plan and the mixed use development planned for Bickleigh Down. This large scale development will generate significantly increased travel demand and place great pressure on the A386 and its key junctions.

4.2.2. The Draft Derriford and Seaton AAP area contributes 16% of the overall growth in residential dwellings to the city along with 23% of proposed employment space and 15% of the city's proposed retail space.

4.2.3. This development will provide 2,950 new homes, 116,000 sq m of commercial and healthcare development, 26,000 sq. m of employment space including a new district shopping centre, and new community facilities including a new primary school. All of which will create approximately 8000 new jobs - many of which will be in economic growth sectors set out in the city's Local Economic Strategy.

4.2.4. Figure 14 below identifies the key planned development sites in the Derriford Area which is likely to lead to increased demand for travel. Further development is proposed at the Bickleigh Down site to the north of the city which will feature a mix of uses including residential and commercial space.

4.2.5. Within the Travel To Work Area (TTWA), but outside of the city boundary, the West Devon Borough Council Local Development Framework Core Strategy (2006-2026) identifies 1,500 additional new homes across Tavistock. Trips generated from these new housing developments outside the city are likely to use this section of the A386 adding further pressure to the existing transport network within Plymouth. This growth, combined with development areas within Plymouth such as Derriford and Bickleigh Down, could result in congestion and delays that could compromise public transport services and reduce the potential of achieving

modal switch on the northern corridor. The 2001 Census identifies that out of 4,693 workers who live in Tavistock, 987 (21%) work in Plymouth and out of these, 817 (83%) drive.

4.2.6. The latest available information from the 2011 Census shows that Tavistock has an average of 0.97 employees per household, so based on the additional 1,500 planned houses you could reasonably anticipate 1,455 workers, of which around 250 might be expected to drive to Plymouth.

Figure 14 Key Development Sites in the Derriford Area

5. ESTABLISHING THE NEED FOR INTERVENTION

5.1. Current Transport Related Problems

Congestion

5.1.1. The A386 from Derriford Roundabout to William Prance Road currently experiences high traffic flows, congestion and delays during peak traffic periods and handles very large traffic flows in the inter-peak periods. It also handles a very large number of bus movements (888 per weekday) as Derriford Hospital is the location served by most buses in the city after the city centre. Bus operators report that congestion is causing difficulties for them in terms of maintaining reliable punctual services during the peak periods. Congestion contributes to a poor pedestrian and cycle environment and noise pollution and air pollution. Pedestrian and cycle severance is a problem at and between Derriford junction and William Prance Road junction.

5.1.2. Figure 15 summarises output from the Council's StrateGis programme which monitors vehicle speeds across the city. This identifies low average vehicle speeds indicating queuing on all five approaches to and within, Derriford Junction during the morning peak. It shows the same on the southbound approach to William Prance Road Junction.

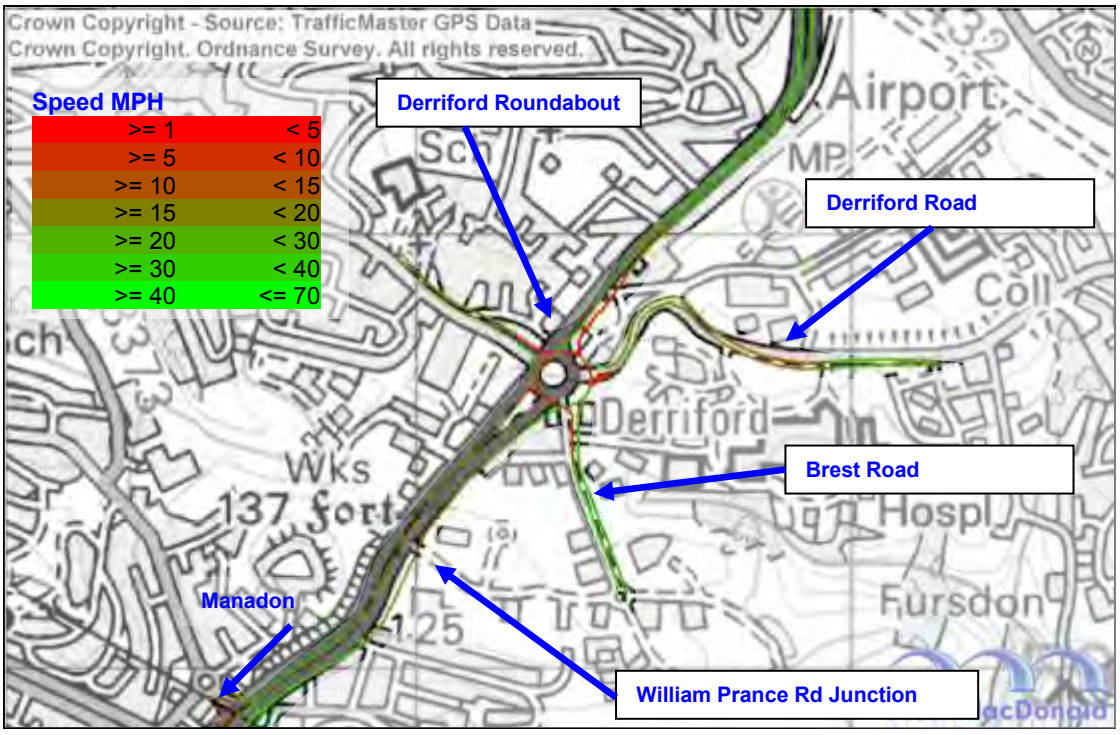


Figure 15 Average Speeds (all vehicles) 1/910 to 31/8/11 Mon to Fri 0800-0900

5.1.3. Figure 16 illustrates low average vehicle speeds and queuing on all five approaches (especially Derriford Road) to, and within, Derriford Junction during the evening peak.

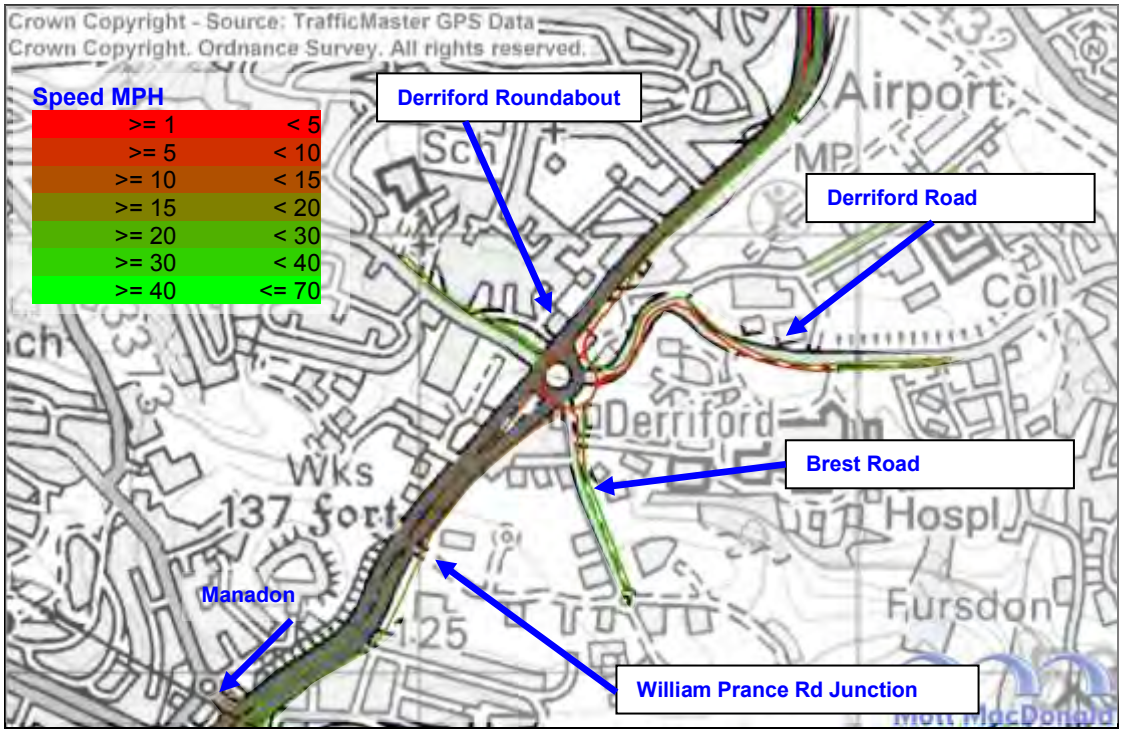


Figure 16 Average Speeds (all vehicles) 1/910 to 31/8/11 Mon to Fri 1700-1800

5.1.4. This section of the Northern Corridor regularly suffers from congestion in the morning and evening peaks. In addition to the direct economic costs, this impacts negatively on the quality and attractiveness of local bus services in respect of journey times, journey times relative to the car, bus service reliability and punctuality.

5.1.5. This congestion compromises the efficiency of the transport network including bus services travelling from outside the city boundary from Tavistock and the Woolwell area.

5.1.6. Congestion along this route also generates many ancillary problems such as a poor pedestrian and cycle environment, poor road safety, and a worsening of air quality and noise emissions.

Bus Reliability

5.1.7. The congestion identified in the above StrateGIS information is also evident within the Real Time Passenger Information (RTPI) bus journey time data. Figure 17 and Figure 18 below identify the journey time variability from Plymbridge Lane (immediately north of Derriford Roundabout) and Great Berry Road (north of Manadon Roundabout).

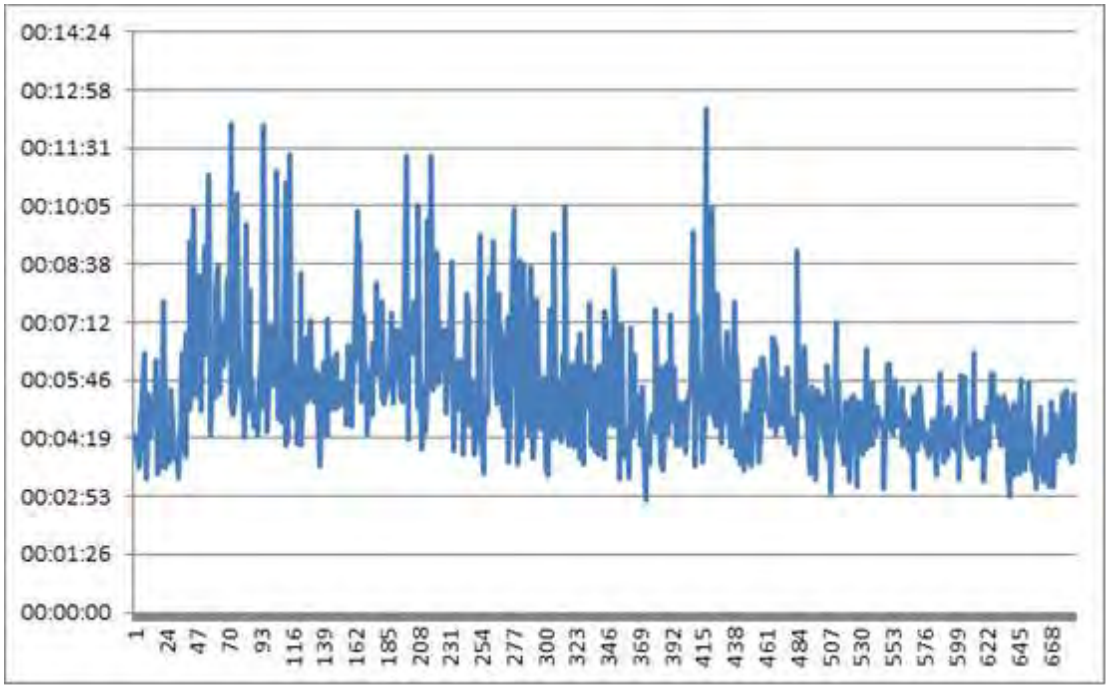


Figure 17 Bus journey time variation, Derriford Road to Great Berry Road (a.m. peak)

5.1.8. Figure 17 illustrates the high degree of journey time variation for buses travelling southbound from Derriford Road, through Derriford Roundabout and William Prance Road Junction in the morning peak. The average journey time is 5:25 minutes. The maximum recorded journey time is 12:30 minutes and the lowest recorded journey time is 2:44 minutes.

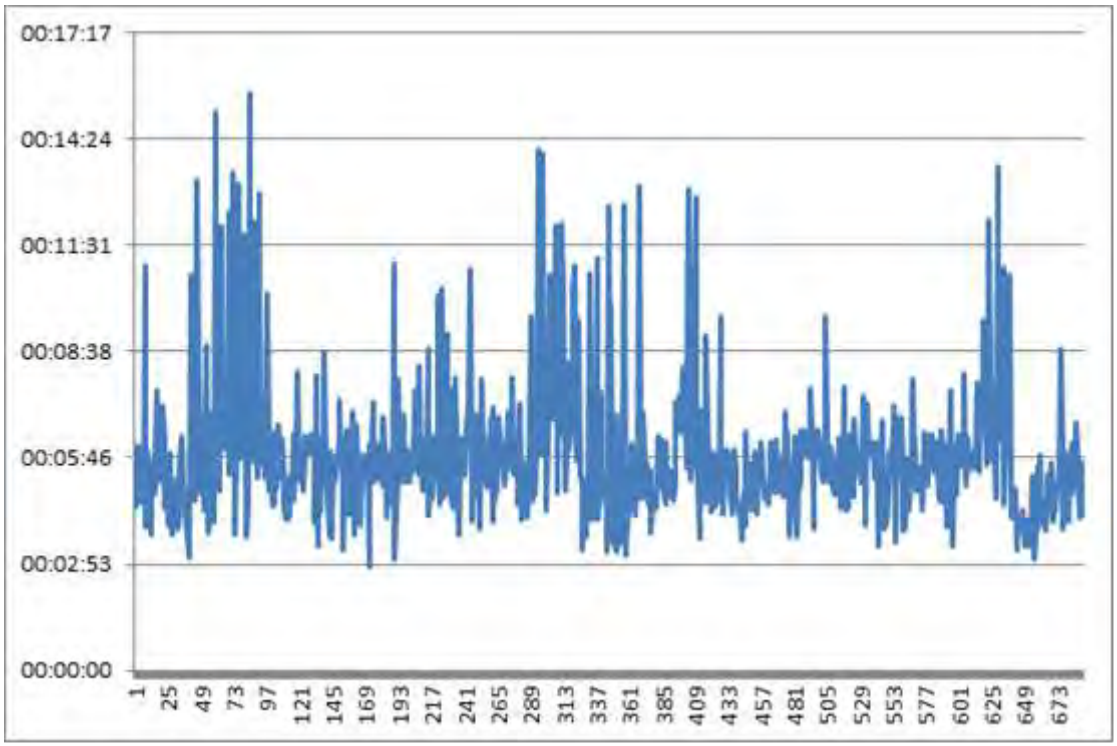


Figure 18 Bus journey time variation, Derriford Road to Great Berry Road (p.m. peak)

5.1.9. Figure 18 illustrates the high degree of journey time variation for buses travelling southbound from Derriford Road, through Derriford Roundabout and William Prance Road Junction in the evening peak. The average journey time is 5:53

minutes. The maximum recorded journey time is 15:38 minutes and the lowest recorded journey time is 2:48 minutes.

Walking and Cycling Facilities

5.1.10. The busy A386 can act as a barrier for pedestrians and cyclists accessing either side of Tavistock Road due to the high volume of traffic, speed and congestion deterring users. Any scheme brought forward should seek to reduce this effect and assist pedestrians and cyclists in crossing where possible.

5.1.11. The supply and quality of walking and cycling facilities even along this short section of the northern corridor varies considerably. Improvements to the route will need to bring the walking and cycling facilities to the same higher standard. The table below shows observed gaps or issues in the walking and cycling networks along the corridor, however a more detailed assessment of facilities in specific areas will be required to inform any design work.

Location	Provision	Issue
Tavistock Road (North of Derriford Roundabout)	Shared use footpath on western side of Tavistock Road. 	Narrow shared use facility Hedgerow limits available width.
Derriford Roundabout	Off-highway segregated footway and cycleway links around perimeter and through circulatory. Pedestrian crossing points on most arms of roundabout. 	Crossing points are not Toucan and have large diversions.
Derriford Road	Shared use facility on western side of Derriford Road, pedestrian footway on eastern side. On-road cycleway marked within bus lane downhill southbound towards Derriford Roundabout.	Eastern footway very narrow. No uphill on-road cycle lane

		
Derriford Roundabout to William Prance Road	Off-highway segregated footway and cycleway links on western side of Tavistock Road. Pedestrian crossing facilities at Sendall's Way	A386 acts as a barrier to pedestrian and cyclist crossing. Existing facilities suffer from non-direct crossing movements and long wait times.
William Prance Road Junction	Off-highway segregated footway and cycleway links on western side of Tavistock Road. Pedestrian crossing facilities at junction. Bus lanes allow on-road cycle use. 	A386 acts as a barrier to pedestrian and cyclist crossing. Existing facilities suffer from non-direct crossing movements and long wait times. No cycle lane markings within bus lanes.
William Prance Road to Crownhill	Off-highway segregated footway and cycleway links on western side of Tavistock Road.	A386 acts as a barrier to pedestrian and cyclist crossing.

Table 2 Walking and Cycling Facilities

Accident Analysis

5.1.12. A review of accidents along Tavistock Road between Crownhill Interchange and Powisland Drive between 2009 and 2013 has shown a total of 52 collisions at junctions of which 30 have been classified as slight, 2 serious with 1 fatality and 19 Damage Only. This has been summarised by junction in the Figure 19 below:

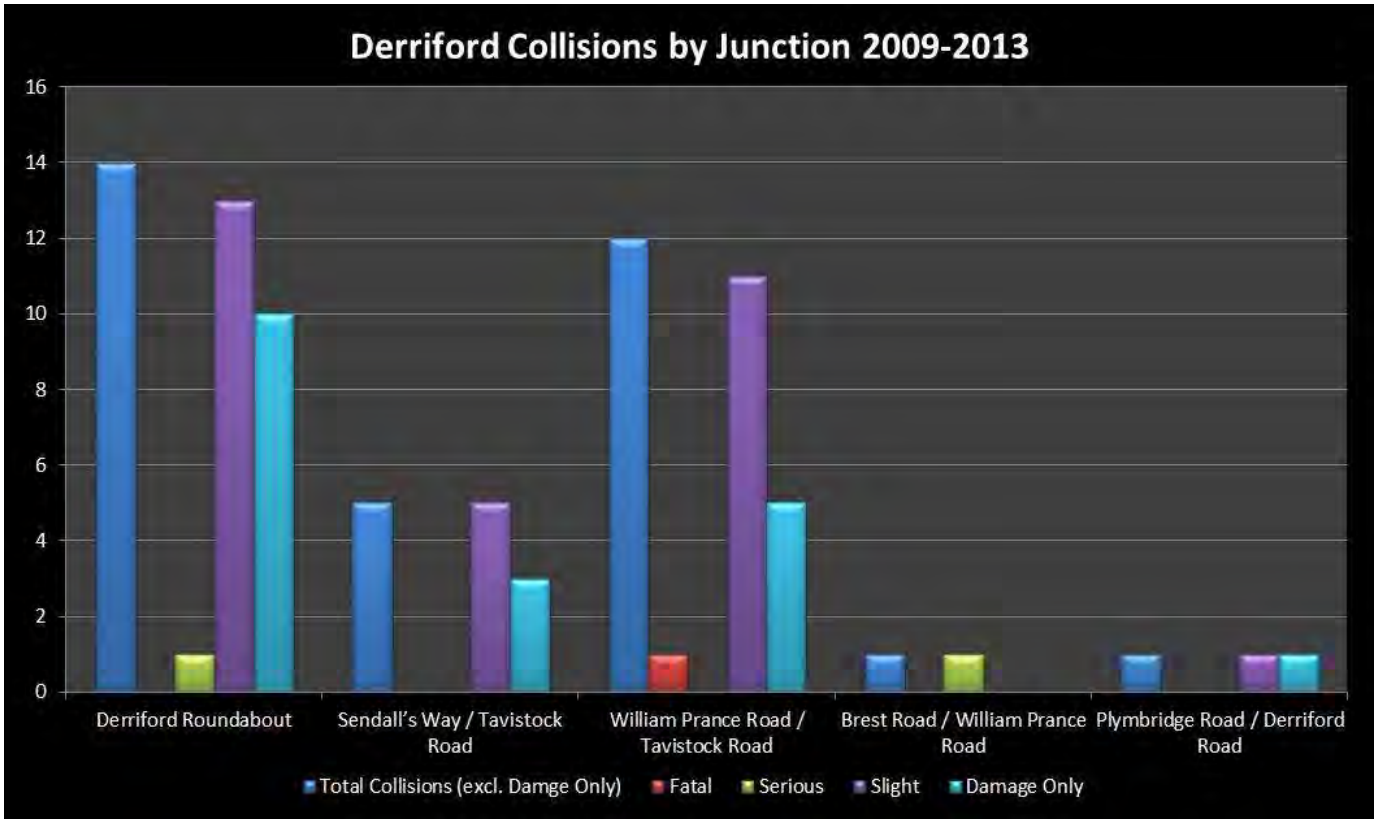


Figure 19 Collision Statistics along Tavistock Road between Crownhill Interchange and Powisland Drive

5.1.13. A further 57 collisions have occurred on the links between the junctions of which 31 have been classified as slight, 5 serious with 1 fatality and 20 Damage Only. This has been summarised by junction in the Figure 20 below:

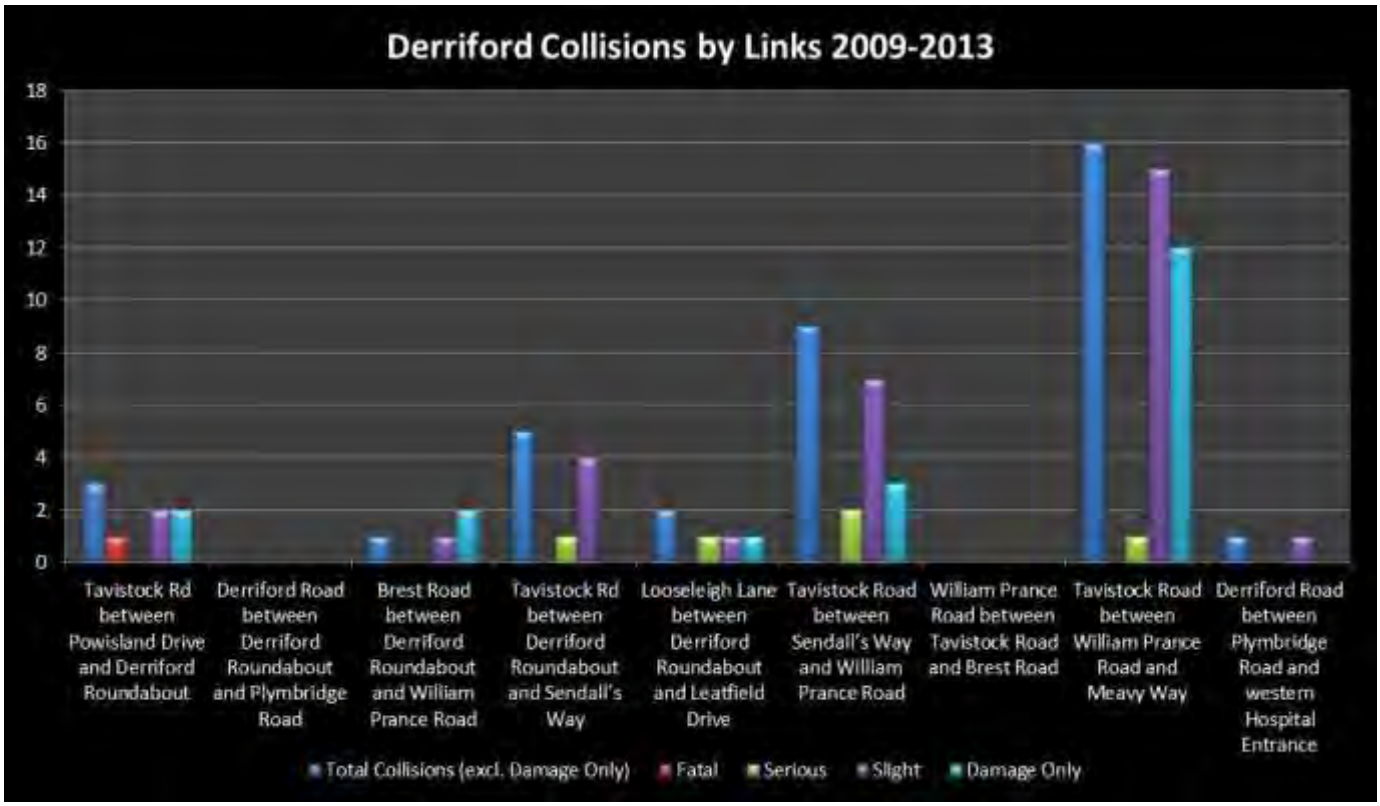


Figure 20 Collision Statistics along Tavistock Road between Crownhill Interchange and Powisland Drive

5.1.14. In the same period there were a total of 50 causalities at the junctions within the study area of which 47 were classified a slight, 2 serious and 1 fatality. This has been summarised junction in the Figure 21 below:

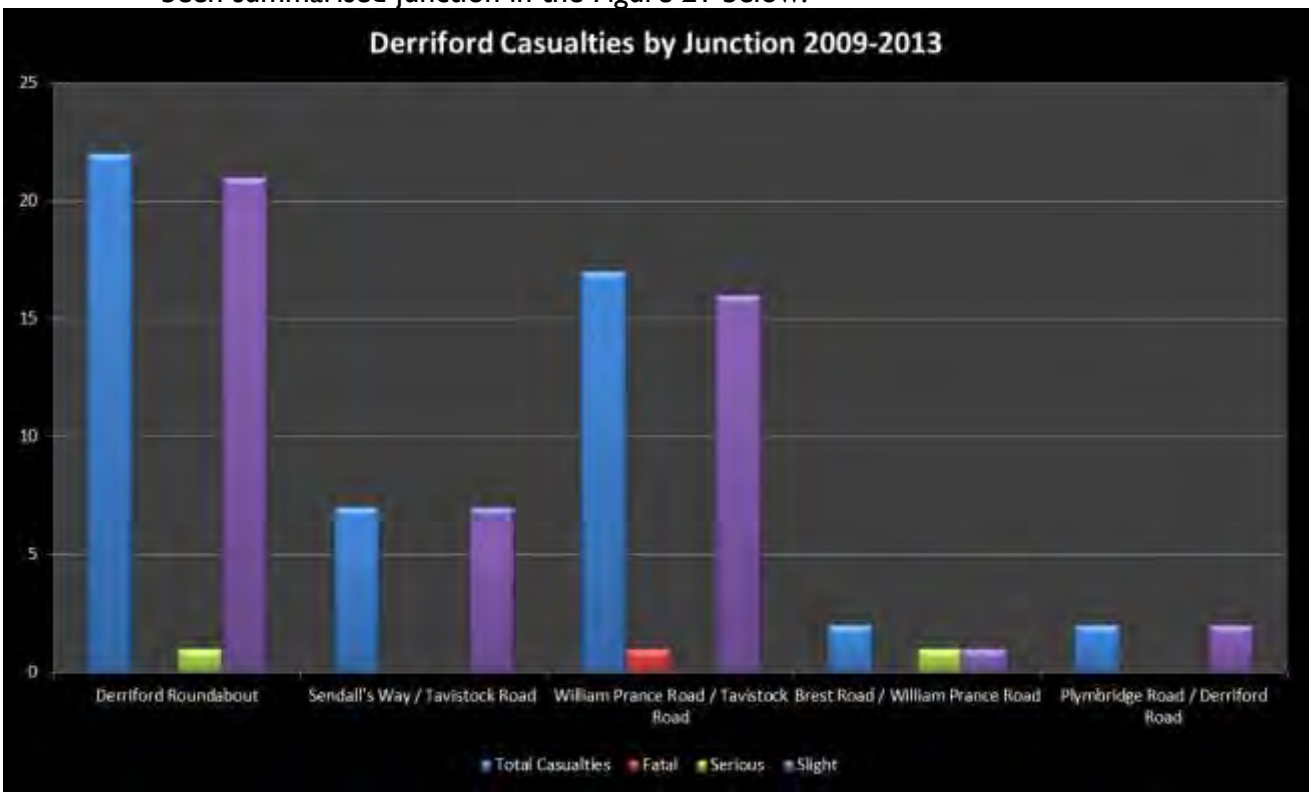


Figure 21 Causality Statistics along Tavistock Road between Crownhill Interchange and Powisland Drive.

5.1.15. A further 50 causalities have been identified on the links between the junctions of which 44 have been classified as slight, 5 serious with 1 fatality. This has been summarised by junction in the Figure 22 and Figure 20 below:

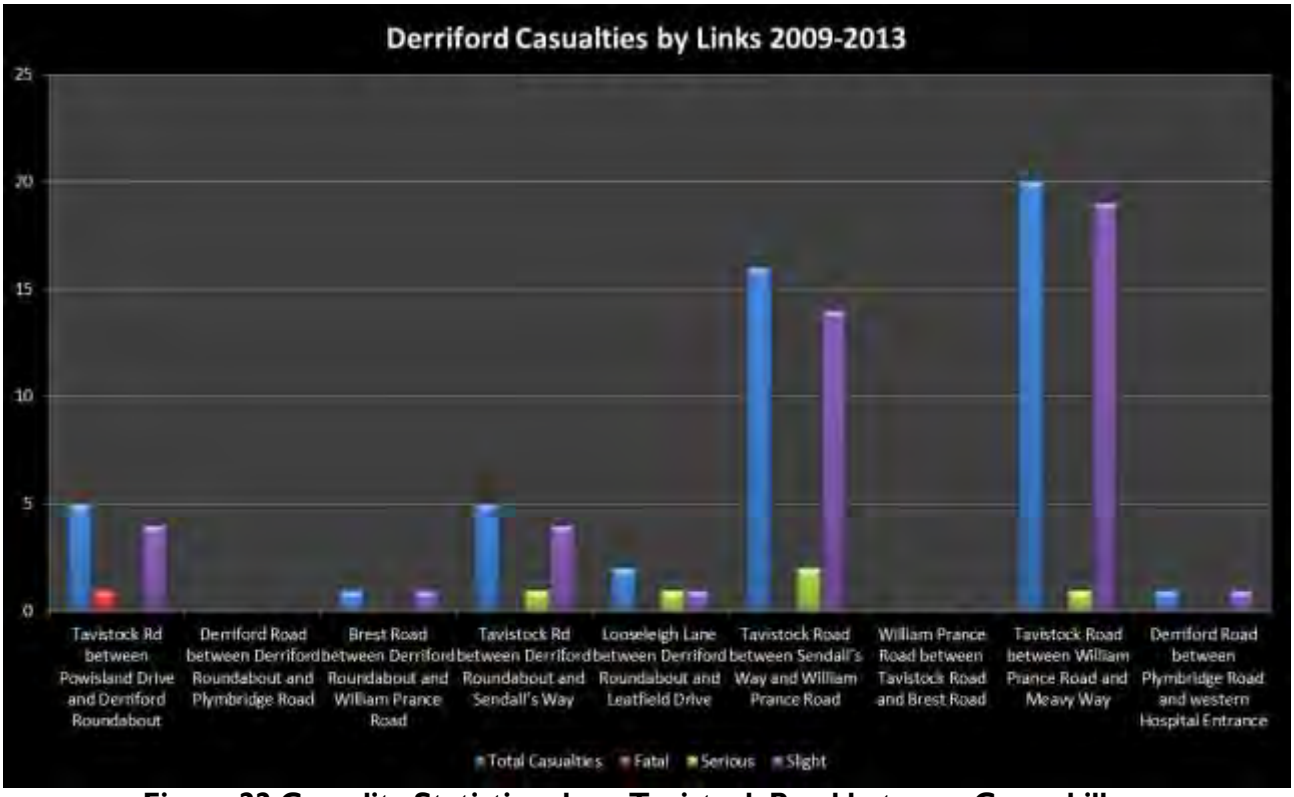


Figure 22 Causality Statistics along Tavistock Road between Crownhill Interchange and Powisland Drive.

Informing Options

5.1.16. Plymouth's LTP clearly sets out that the focus for improvements from 2011 to 2026 will be on corridors, and infrastructure improvements prioritised towards travel by sustainable modes. The Northern Corridor, which includes the A386 between Derriford and William Prance Road, is identified as one of the city's largest areas of planned growth and it is recognised that a number of infrastructure projects will be required to accommodate the levels of growth predicted. Delivery of an improvement scheme for Derriford to William Prance Road is included within the LTP Implementation Plan in the medium to long term transport programme 2016 - 2026. Plymouth's LTP was subject to a thorough and wide ranging public and stakeholder consultation.

5.1.17. Many stakeholders (including Highways Agency, Chamber of Commerce, others) are supportive of the proposed outcomes.

Public Consultation

5.1.18. In July 2007 a bus user survey was carried out on the Northern Corridor to gather people's views about using local bus services. This was followed by a wider public consultation relating to all modes of transport taking place over a period of a week in the form of roadshows in August of the same year.

5.1.19. The feedback from this consultation identified the section of Tavistock Road as being a key area of concern for the public. Issues raised included congestion at Derriford Roundabout; number and sequencing of traffic lights; access to Derriford Hospital; unreliable bus services; gaps in cycle and bus lanes. Public suggestions for this location included targeted widening, simplification of junctions, review of phasing and priorities of traffic lights.

5.1.20. Changes to Tavistock Road in the Derriford area are included within the LTP3 Implementation Plan in the medium to long term transport programme 2016 - 2026. LTP3 was subject to a thorough and wide ranging public and stakeholder consultation.

5.2. Impact of Growth

5.2.1. The Local Economic Strategy foresees 42,000 new jobs being created in the city's TTWA by 2026 increasing the number of jobs from 135,604 in 2003 to 178,104 by 2026. This planned growth will inevitably increase the demand for travel by public transport and private car.

5.2.2. A significant amount of trips generated from these sites are expected to use this section of the A386. The route already operates close to capacity at peak times with only relatively minor events needed to push the route over its operating capacity. Without intervention, the existing infrastructure will not be able to cope with the additional demand that trips from the future development sites will produce.

5.2.3. The DTS is one part of the overall solution for the Derriford area to allow additional development to come forward on this corridor. The scheme should therefore be seen as complimentary to other major schemes being proposed for the Forder Valley Link Road and Widening and the Woolwell to The George schemes rather than as in competition or that only one is needed to support the proposed growth in jobs and housing. Figure 23 below shows the 'Derriford Jigsaw' and demonstrates the interrelationships between each of the infrastructure proposals.

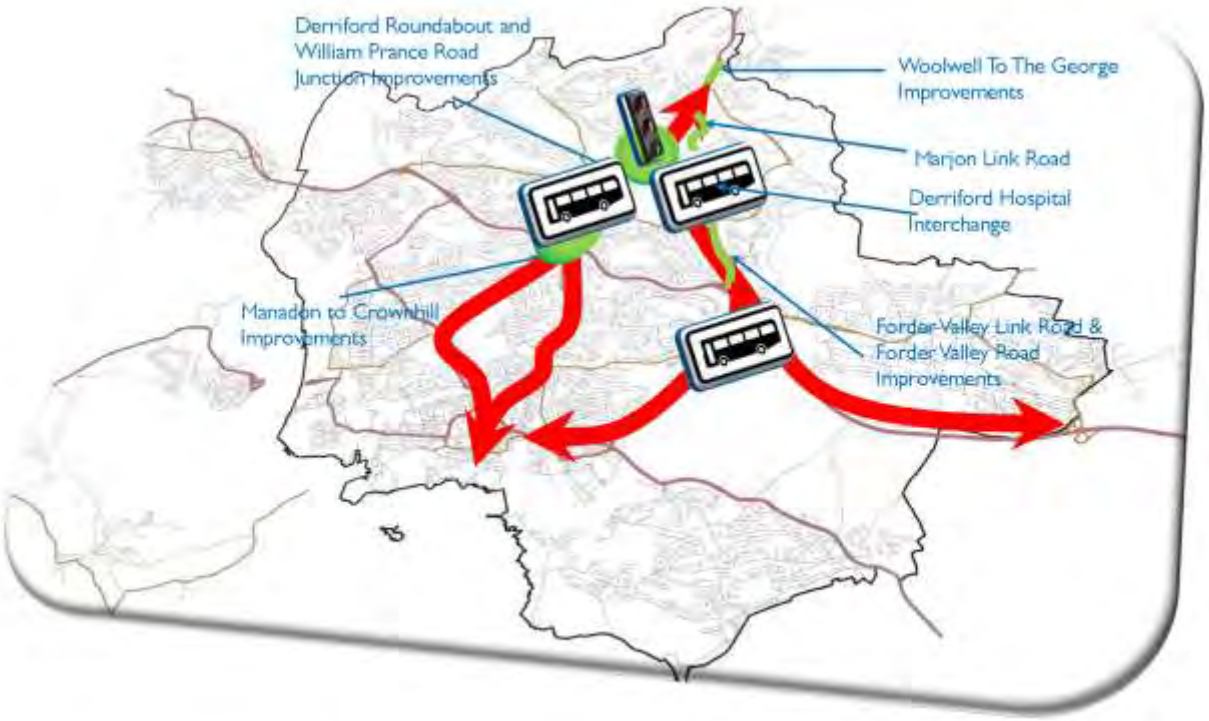


Figure 23 The Derriford Jigsaw

5.2.4. If the supporting transport infrastructure is not in place, employers and developers may be deterred from investing due to the negative economic and quality of life impacts associated with increased congestion. There is also the risk that developments may be delayed, or prevented through the planning system, if the highway network is unable to cope with the additional trips generated without a choice of viable alternatives.

5.3. Acceptable Congestion

5.3.1. The highway network as identified in section 3 of this report is already often close to or exceeding capacity. Whilst a scheme for this section of the northern corridor will seek to reduce the impact that new development sites have on the highway network it is likely that a level of congestion will be unavoidable. The key question is what is an acceptable level of congestion?

5.3.2. Sustainable transport is fundamental in delivering modal shift and encouraging trips to be made away from the private car. To this end, for the Derriford Transport Scheme, an acceptable level of congestion has been determined to be a level that can be accommodated before it starts to impact on neighbouring roads and streets outside of the main scheme corridor where bus priority mitigation cannot be provided.

5.3.3. For this scheme, the extent of this should be considered to be south of Manadon Roundabout as this would start to negatively impact on the A38 trunk road and Mannamead Road where road space to provide priority for buses is much more limited. The northern extent is The George Junction as this would start to have a negative effect on the side roads of Morgan Road and Southway Drive as well as the side roads along the corridor including Fort Austin Avenue, Budshead Road and Derriford Road, the main access to the regionally important Derriford Hospital.

6. FUTURE TRANSPORT RELATED PROBLEMS

6.1. Modelling Methodology

6.1.1. In order to understand the impacts of future growth along the northern corridor and particularly in the Derriford area, a two tiered modelling approach using both Saturn and S-Paramics microsimulation was utilised.

6.1.2. A comprehensive survey of traffic flows and queues along the northern corridor was undertaken in 2012. This was used to provide the reference case data for all of the modelling work.

6.1.3. The strategic Plymouth Saturn Model was used to derive 2012 base demands and flows and was then factored to provide 2018 Do-Minimum and 2026 Do minimum scenarios to take into account planned growth both within the city and outside. The development assumptions used for this process are based on the anticipated build-out rate of local development sites along with general background growth and these can be viewed in Appendix A.

6.1.4. The flows that were derived from this were then used for the demand inputs into a cordoned S-Paramics model of the Northern Corridor which extended from Manadon in the south to Belliver in the north and included the key junctions and feeder roads along this route.

6.1.5. The advantage of this two stage methodology is that the impacts of re-routing can be captured when growth is added to the base scenario. The advantage of using a corridor model in S-Paramics to test the differences between scheme options is that this is a better tool to understand the exact operation of the scheme and understand how it interacts with other locations in the area.

Core Scenario (Without Intervention)

6.1.6. The S-Paramics model examined a 2012 base condition and a future 2026 growth scenario without any scheme interventions. A 2018 growth scenario was also assessed to represent a midpoint between the base and future year test. Table 3 below summarises the overall difference between the 2012 base and the two forecast years. A full breakdown for each origin zone can be viewed in Appendix A.

	2012 AM	2018 AM	2026 AM	2012 PM	2018 PM	2026 PM
All Origin Zones Total	10,850	12,127	13,701	10,259	11,226	12,516
Increase from 2012 Base		12%	26%		9%	22%

Table 3 Total S_Paramics Modelled Trips

6.1.7. The above demand increase has been summarised below for the key origin zones within the model.

6.1.8. Figure 24 below shows that the majority of demand passing through the Derriford model in the morning originates from Manadon Roundabout with other key origins of Belliver and Woolwell. Figure 24 also shows that most zones will incur some additional growth in traffic from 2012, 2018 and 2016.

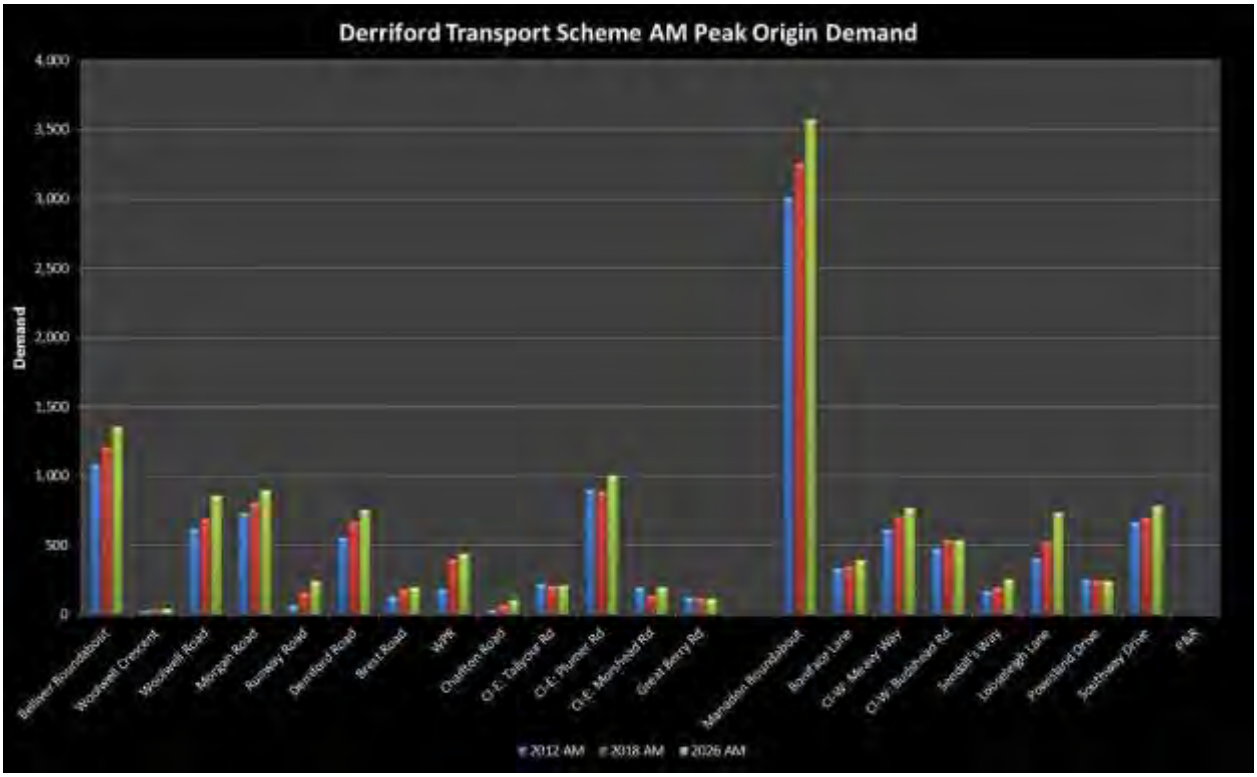


Figure 24 AM Peak Demand in S-Paramics Model

6.1.9. Figure 25 below clearly shows that the majority of demand passing through the Derriford model originates from Manadon Roundabout with other key origins including Derrifrod Road, Belliver and Woolwell. Figure 24 and Figure 25 also shows that most zones will incur some additional growth in traffic from 2012, 2018 and 2016.

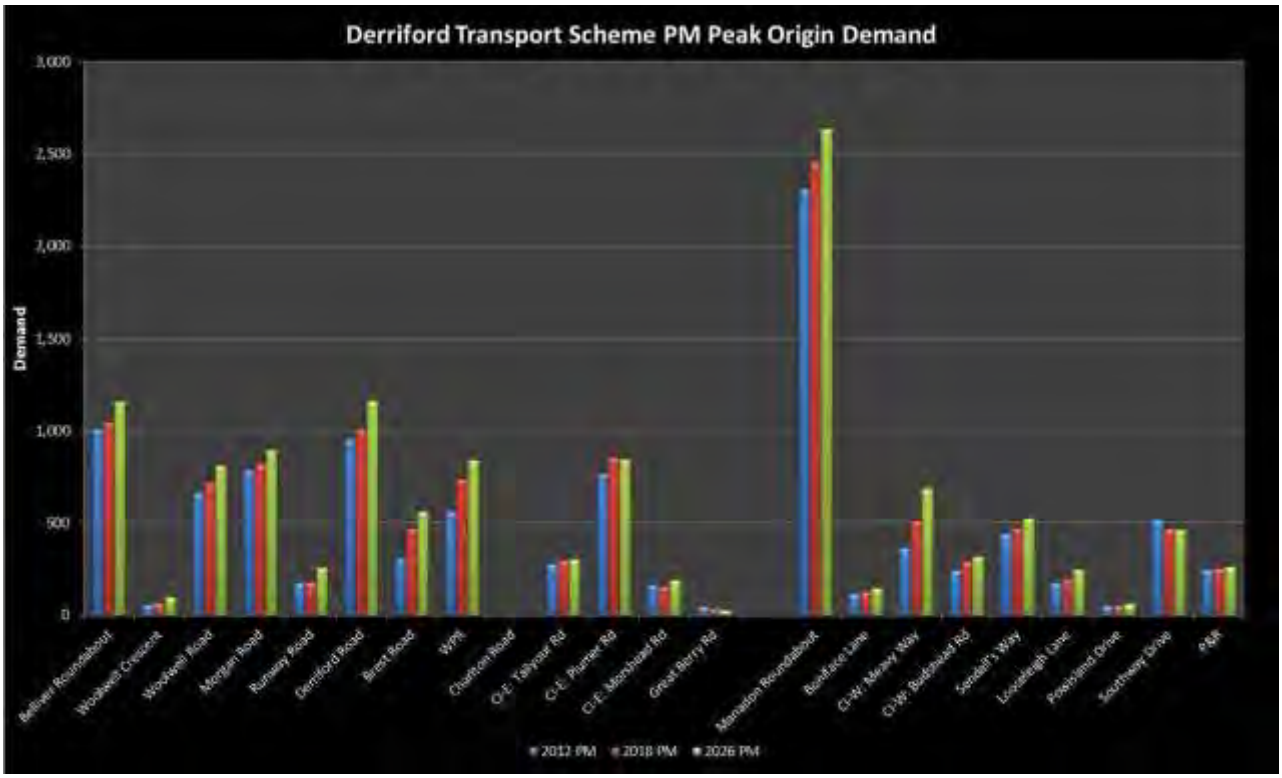


Figure 25 PM Peak Demand in S-Paramics Model

6.1.10. Figure 26 below displays screenshots taken from the 2026 Do-Minimum scenario model which includes all of the planned growth along the northern corridor. The yellow circles identify areas of queuing and it is evident that most of the network is suffering from severe congestion and queuing in both the morning and evening peak periods, as reflected by the increases in journey times above.

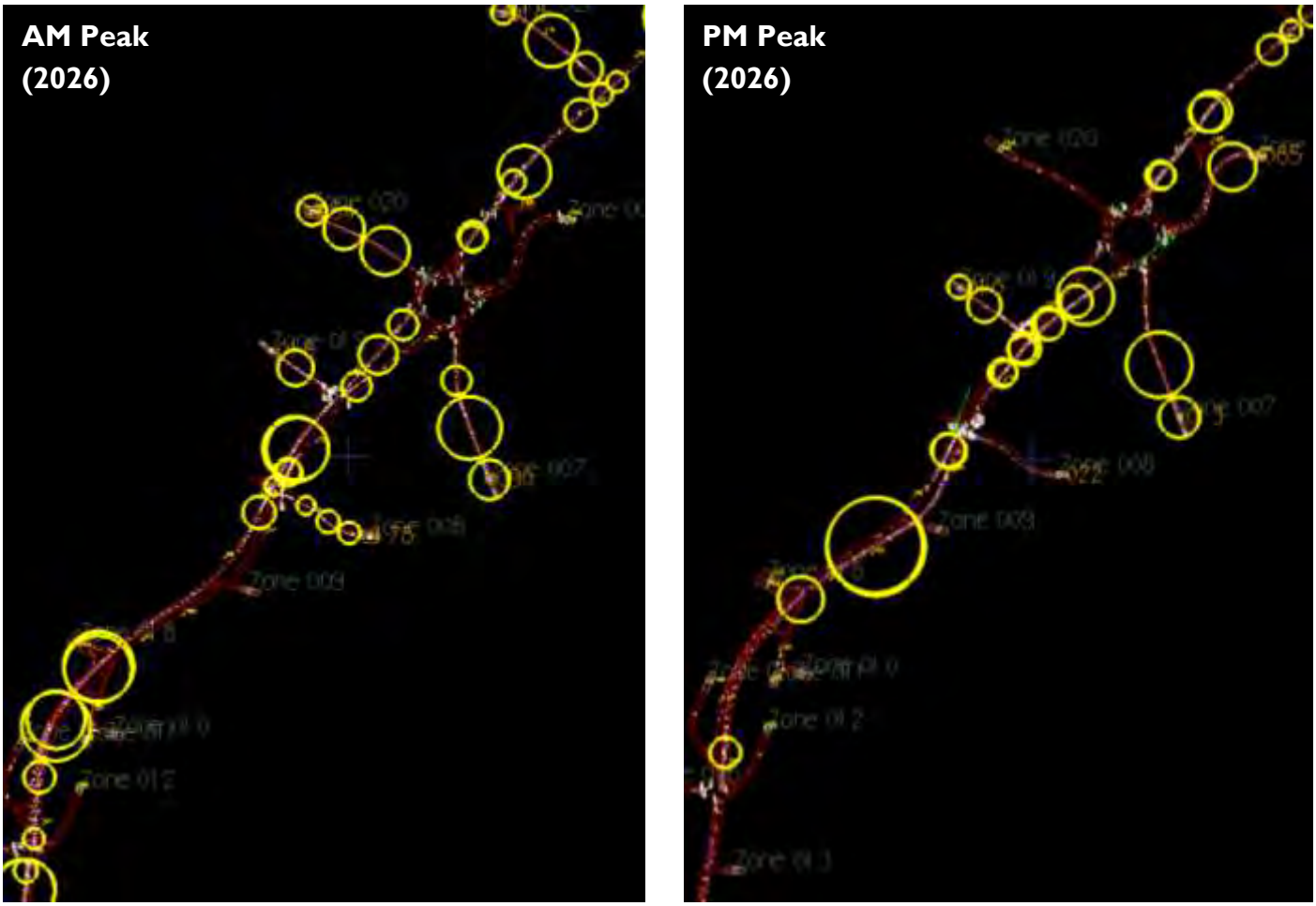


Figure 26 S_Paramics Model Screenshots – 2026 Do Nothing Congestion

6.1.11. This congestion extends off the model past Belliver in the north and Manadon Roundabout in the south. Adverse impacts on Manadon Roundabout will have implications on the A38 and the strategic bus corridor along the B3250 Mannamead Road.

6.1.12. At the end of the modelling period the numbers of unreleased vehicles are recorded. These are vehicles that have not made it onto the model to start their journey at the origin zone due to congestion within the model network.

6.1.13. Table 4 below, shows the number of unreleased vehicles for the 2012 base model as well as the growth scenarios for 2018 and 2026 and indicates that if unchecked even relatively small increases in traffic are likely to have a severely detrimental impact on the highway network particularly in the Derriford area.

	AM			PM		
	2012 PM	2018 PM	2026 PM	2012 PM	2018 PM	2026 PM
Belliver Roundabout			16			
Derriford Road		17	93		110	278
Brest Road					2	56
WPR					19	107
Manadon Roundabout		894	1310		68	562
CI-W: Meavy Way						92
Looseleigh Lane		1	215			
Powisland Drive		2				
P&R						29

Table 4 Unreleased Vehicles

6.1.14. If no interventions are made and growth is simply allowed to develop unchecked, journey times will increase along the A386 Tavistock Road in the southbound direction between Belliver and Manadon in the morning peak by approximately 5 minutes 46 seconds by 2026 as can be seen in Figure 27 below which shows modelled journey times relative to a 2012 base.

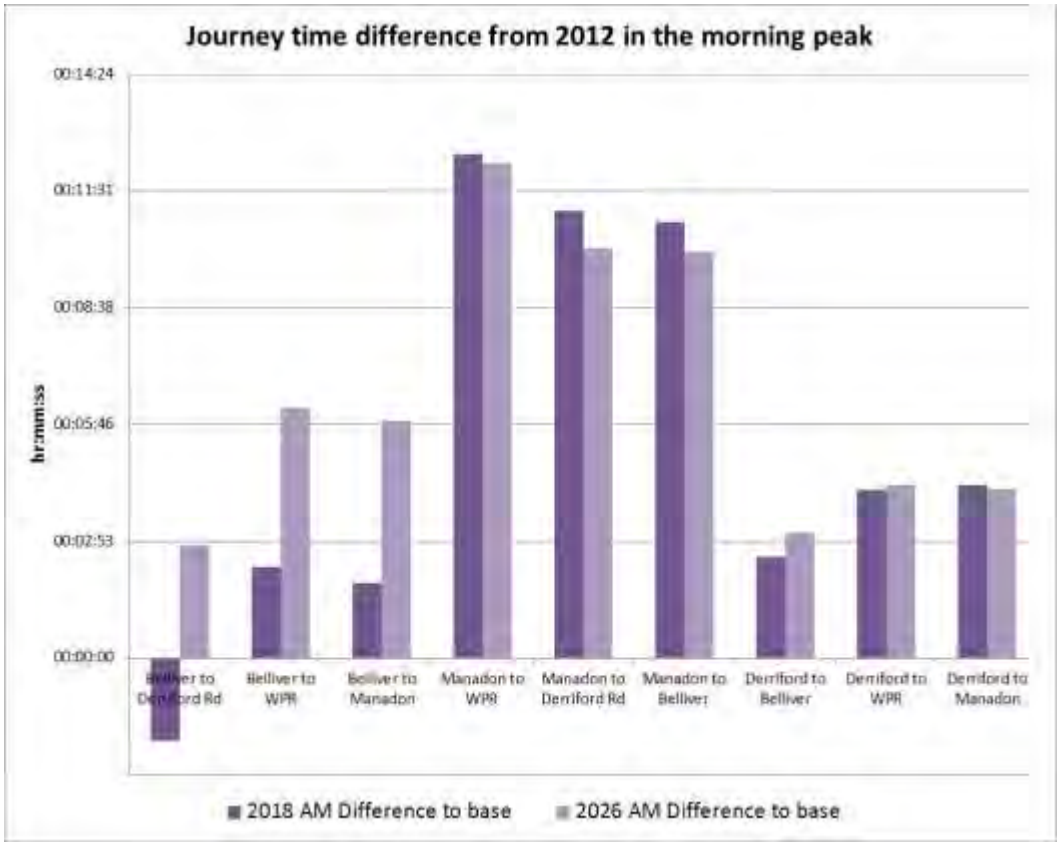


Figure 27 Journey time difference from 2012 in the morning peak

6.1.15. The journey times shown in Figure 27 for Belliver to Derriford Road show that ina 2018 Do-minimum scenario journey times will be quicker compared to the 2012. This is due to the improvements made to Woolwell Roundabout exit under a

developer funded scheme opened in 2013, however delays south of Derriford Road offset this advantage.

6.1.16. Traffic travelling northbound between Manadon and William Prance Road incur approximately 12 minutes extra delay in 2018 compared to 2012. A similar figure in 2026 suggests that this part of the network between Manadon and William Prance Road is already at saturation point and therefore journey times cannot increase further in the morning peak, however further delay off of the model area will add overall additional delay. Derriford Road also experiences approximately 2 minutes delay northbound and approximately 4 minutes delay southbound in the morning peak.

6.1.17. The difference between the 2012 base and 2018 in the PM peak is also apparent with a journey time increase in the northbound direction along the 3km route of the A386 Tavistock Road between Derriford Roundabout and Belliver Roundabout. In 2026 journey times again increase in the northbound direction however southbound journey times are also now affected and result in additional delays as can be seen in Figure 28.

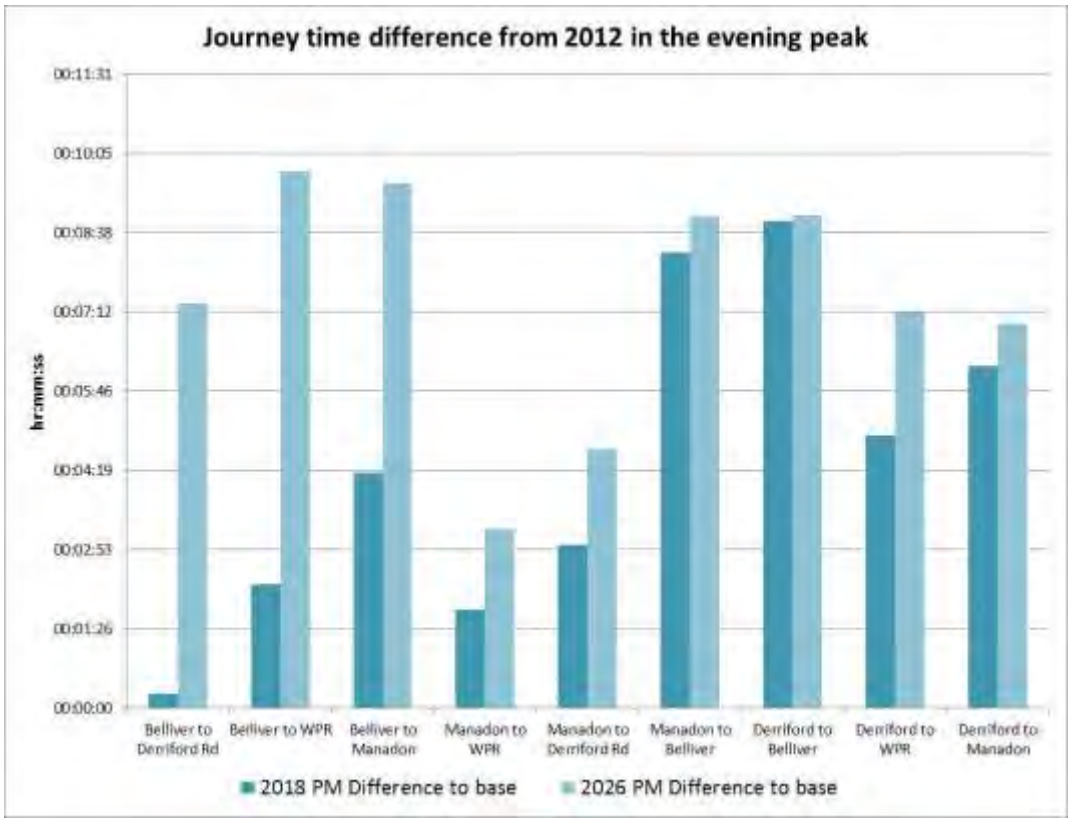


Figure 28 Journey time difference from 2012 in the morning peak

6.1.18. Figure 28 above shows that southbound journeys between Belliver and Manadon suffer approximately a 9 ½ minute delay in 2026 compared tot eh base. Journeys also increase in the northbound direction by approximately 8 ½ minutes in 2018 and 2026 relative. This again suggests that the network between these points is at capacity in 2018 and additional delays therefore occur further south. Traffic travelling north from Derriford Road also experiences an approximate delay of 8 ½ minutes.

6.1.19. This level of delay is unacceptable as this will likely stifle the economy and the ability to attract new business and investment into the area and the city as a whole

but will also worsen many of the ancillary problems of high levels of congestion such as worsening air quality, noise increases and accidents among others.

6.1.20. Just as worrying is the ability for the public transport network to remain effective as services will be delayed by the same congestion along this corridor and will be prevented from reaching the bus priority measures provided elsewhere along this corridor if not resolved. This may undermine many of the assumptions of the planned growth proposals which are based around encouraging a high level of sustainable transport to deter even more car based trips on the network.

6.2. Underlying Drivers or Causes

6.2.1. The evidence displayed in section 5 shows that without intervention this section of the northern corridor is likely to suffer from severe congestion and unacceptable delays which is in turn likely to stifle development along the northern corridor and in particular in the Derriford area.

6.2.2. The level of demand in excess of the available capacity will be exacerbated as Plymouth's population grows and new employment, education and leisure facilities are delivered along the corridor. By 2026, without measures to reduce the need for travel or to increase the use of public transport, walking and cycling, demand for travel by car will far exceed the capacity of the road network.

7. OBJECTIVES & SCOPE OF INTERVENTION

7.1. Informing Objectives

7.1.1. In developing a set of scheme objectives the following sources, which have been discussed in this report, have been considered regional planning guidance; local plans; local transport plans; development plans; the plans of transport providers in the study area; and aspirations of local residents, businesses and other interested groups.

7.2. Strategic Outcomes

7.2.1. It is essential that the outcomes and outputs are aligned with the city's vision and growth agenda identified in section 1 of this report. In achieving this, the following strategic outcomes will guide the project and objective identification:

- Improved economic growth and prosperity.
- Improved transport network efficiency enabling improved productivity.
- Improved health and wellbeing of Plymouth residents.
- Affordable, practical and acceptable transport solutions which provide value for money.

7.3. Specific Objectives

7.3.1. The objectives developed for this scheme have been informed by information collated in this report relating to problems and opportunities within the scheme area. They have also been informed the feedback received from public consultations.

7.3.2. In order to overcome the problems and issues outlined in this report, the following objectives have been identified for the scheme area:

Objective 1	Provide additional transport capacity to support growth along the Northern Corridor and in the City Centre.
Objective 2	Improve accessibility to employment, education and leisure facilities in the Derriford area particularly by bus and active modes.
Objective 3	Improve journey times and reliability for all modes on the Northern Corridor.
Objective 4	Increase bus patronage and active travel to raise their mode share in the Derriford area.
Objective 5	Reduce the negative impacts of transport on the environment and public health.

Table 5 Objectives to be applied to the scheme options

8. OPTION GENERATION

8.1. Strategic Options Development

8.1.1. Over a number of years, various options have been considered along this section of the northern corridor.

Strategic Option A: Light Rapid Transit

8.1.2. A light rapid transit/tram system could form part of a citywide transport solution concentrating on the key corridor routes. The A386 would likely be the key spine for any such route and would take in key destinations along the route.

Strategic Option B: Reopening of the Drake line

8.1.3. The old branch line between Bere Alston and Tavistock would be utilised to reopen the Drake Line, which has been an aspiration for Plymouth City Council and Devon County Council for many years. This scheme may remove some trips from the A386 by intercepting people's journey in advance of the city boundary.

Strategic Option C: Improve existing bus services (frequency and Routing)

8.1.4. Increasing the frequency and routing of existing bus services may be able to encourage modal shift and reduce congestion on the existing highway network.

8.1.5. The bus services that currently operate between Plymouth and Tavistock are commercial routes without subsidy. The current frequency of service is 6 buses per hour in the AM peak and 10 in the PM peak for northbound services along with 7 buses an hour in the AM Peak and 10 buses an hour in the PM peak for southbound services. It may be possible to increase this if services were subsidised.

8.1.6. A further sub option to provide a more direct park and ride service between The George Junction and the City Centre may encourage greater uptake of services and remove trips from the network as the existing time penalty incurred by passengers to stop and at Milehouse may deter some users.

Strategic Option D: Enhanced Strategic Walking and Cycling Network

8.1.7. Improving sustainable transport links along this corridor may help to encourage modal switch towards active travel thereby freeing up capacity on the highway network. Complimentary on and off-highway facilities on identified desire lines may help to improve the attractiveness of walking and cycling as a realistic alternative to the private car.

Strategic Option E: Highway Capacity Improvements

8.1.8. Options to improve the existing highway network through reallocating road space or localised widening may offer the potential to address many of the current and future problems identified in this report. Additional highway capacity is likely to be able to remove the current bottlenecks and therefore remove many of the ancillary problems caused by congestion.

Strategic Option F: Personalised Travel Planning

8.1.9. Programme of targeted promotion, Personalised Travel Planning and training initiatives to increase awareness, and use, of new and existing sustainable travel options.

Strategic Option G: Increased Parking Charges

8.1.10. Increased parking charges for public car parks. Increased parking charges is thought to alter the balance of willingness to pay helping to balance the costs of driving against more sustainable modes such as public transport, walking or cycling.

9. INITIAL SIFTING

9.1. Early Assessment and Sifting Tool (EAST)

9.1.1. Each of the proposed options was considered using the Dft's Early Assessment and Sifting Tool (EAST).

9.1.2. The EAST provides decision makers with relevant, high level, information to help them form an early view of how options perform and compare. The tool can be used to:

- help refine options by highlighting adverse impacts or unanticipated consequences;
- compare options, for example, within or across modes, geographical areas and networks;
- identify trade-offs between objectives aiding package development;
- filter the number of options, i.e. discount non-runners early on to ease the appraisal burden and avoid resources being spent unnecessarily; and
- identify key uncertainties in the analysis and areas where further appraisal effort should focus.

9.1.3. The scheme options were also considered using a scoring matrix in terms of their fit with local objectives (Appendix B) in order to feed into the EAST. The EAST output is summarised in Table 6.

	Overall			Strategic					Economic						Managerial				Financial				Commercial
Unique Ref. No.	Name/No.	Description	Scale of impact	Scale of impact - Comments	Fit with wider transport and government objectives	Fit with other objectives	Key uncertainties	Degree of consensus over outcomes?	Economic Growth	Carbon emissions	Socio-distributional impacts and the regions	Local environment	Well being	Expected VfM Category	Implementation timetable	Public acceptability	Practical feasibility	What is the quality of the supporting evidence?	Affordability	Capital Cost (£m)?	Revenue Costs (£m)?	Overall cost risk	Flexibility of option
1	Light Rapid Transit	A light rapid transit/tram system could form part of a citywide transport solution concentrating on the key corridor routes. The A386 would likely be the key spine for any such route and would take in key destinations along the route.	3	Only benefit users whose origin is close to the route. Tavistock Road traffic origins form much further afield.	4	2	Cost, level of construction risk, access to an LRT system, disruption during construction, practical implementation.	1. Little	4. Amber/green	4. Amber/green	4. Amber/green	3. Amber	3. Amber	4. Low 1-1.5	6. 5-10 years	4	1. Low	1. Low	1. Not affordable	07. 100-250	02. 0-5	1.High risk	1. Static
2	Drake Line	Utilisation of the old branch line between Bere Alston and Tavistock to reopen the Drake Line. This scheme may potentially remove some trips from the A386 by intercepting people's journey in advance of the City boundary.	1. Small impact	This option will help to remove some of the trips from the network but the impact likely to be small on its own.	4	2	Costs, construction risks	3	3. Amber	4. Amber/green	3. Amber	3. Amber	3. Amber	4. Low 1-1.5	5. 2-5 years	4	3	4	2	04. 10-25	02. 0-5	2	1. Static
3	Bus Frequency & Routing	Increasing the frequency and routing of existing bus services may be able to encourage modal shift and reduce congestion on the existing highway network.	3	Large benefits could be achieved in terms of bus patronage however unlikely to overcome problems on its own.	4	4	Availability of land/road space, congestion may prevent buses getting to priority infrastructure thereby limiting impact.	4	4. Amber/green	4. Amber/green	5. Green	4. Amber/green	3. Amber	2. High 2-4	4. 1-2 years	5. High	5. High	4	5. Affordable	02. 0-5	02. 0-5	5. Low risk	4
4	Walking & Cycling	Complimentary on and off-highway facilities on identified desire lines to help improve the attractiveness of walking and cycling as a realistic alternative to the private car.	2	Walking & cycling initiatives have the potential to offer increase modal switch away from the private car however, the scale required to support the level of development in the Derriford area is unlikely.	4	3		4	4. Amber/green	5. Green	4. Amber/green	4. Amber/green	5. Green	1. Very High >4	4. 1-2 years	4	4	4	5. Affordable	02. 0-5		3	5. Dynamic
5	Highway Capacity	Improve the existing highway network through reallocating road space or localised widening. Additional highway capacity is likely to be able to remove the current bottlenecks and therefore remove many of the ancillary problems caused by congestion.	5. Significant impact	This option has the potential to significantly relieve congestion in order to re-prioritise road space in favour of buses, cyclists and pedestrians through the provision of wider capacity improvements.	4	4	Costs, construction risks e.g. ground conditions, disruption during construction.	4	5. Green	4. Amber/green	5. Green	7. Green	4. Amber/green	1. Very High >4	5. 2-5 years	4	4	4	4	03. 5-10		3	4
6	Personalised Travel Planning	Programme of targeted promotion, Personalised Travel Planning and training initiatives to increase awareness, and use, of new and existing sustainable travel options.	2	Plymouth's Personalised Travel Planning as part of the LSTF has yielded very positive results and can play a large role in promoting public transport and active travel. The scale required to support the level of development in the Derriford area means PTP is unlikely to be able to resolve all of the problems on its own.	4	3		3	3. Amber	4. Amber/green	4. Amber/green	4 Amber/green	4. Amber/green	2. High 2-4	4. 1-2 years	4	5. High	4	5. Affordable	01. None	02. 0-5	4	5. Dynamic
7	Increased Parking Charges	Increased parking charges for public car parks. Increased parking charges thought to alter the balance of willingness to pay helping to balance the costs of driving against more sustainable modes such as public transport, walking or cycling.	1. Small impact	charges in the Derriford area as the vast majority of parking supply is privately owned. The option may only be able to influence through traffic destined for the city centre parking who may choose to use Milehouse Park and Ride as an alternative which wouldn't reduce trips through the Derriford area.	3	1. Low	Economic impact of existing and new businesses.	2	1. Red	3. Amber	1. Red	3. Amber	3. Amber	3. Medium 1.5-2	4. 1-2 years	1. Low	1. Low	2	Don't know	01. None	Don't know	2	2

Table 6 EAST Output Summary Table

Strategic Option A: Light Rapid Transit (including Drake Line)

9.1.4. This option demonstrated a high positive contribution under economic considerations however was weak under the managerial and financial heading largely due to the considerable costs and value for money, risks and practical feasibility of delivering such a scheme.

9.1.5. Plymouth commissioned AEA Technology (Rail) in 2001 to undertake a desktop appraisal of demand for Light Rapid Transit in the Plymouth area. The analysis was based on the (positive) relationship between household trip-rates and proximity to rail stations. The report provided a journey and revenue forecast for each of the proposed LRT routes based on a desktop trip-rate methodology, allowing for the access/egress advantages of light rail in Plymouth city centre.

9.1.6. The conclusion of the development of an LRT route with good penetration of Plymouth city centre, was that these routes would involve significant new construction and alterations to the rail network and that such a route would only be developed later than other rail initiatives in the sub-region, such as the re-opening of the line to Tavistock. The conclusion is that the Council will protect potential LRT alignments for future implementation but at this stage this is not being considered as a viable option.

9.1.7. This option is therefore not proposed to be taken forward under this process.

Strategic Option B: Reopening of the Drake line

9.1.8. The reopening of Drake Line was demonstrated to have a positive impact in terms of the wider area however in terms of meeting the specific needs of the project in allowing large scale development to come forward in the Derriford area it unlikely to relieve enough through traffic to provide the capacity needed due to new trips from the planned development sites.

9.1.9. This option therefore achieved low/medium scores under the managerial and financial headings in relation to this project.

Strategic Option C: Improve existing bus services (Frequency and Routing)

9.1.10. This option demonstrated a positive impact in relation to the economic, managerial and financial headings however the biggest hurdle to this option is that it would require Revenue funding as opposed to Capital funding.

9.1.11. Perhaps one of the most likely successful methods for removing vehicle trips via improved bus frequency is through the park and ride services. The current park and ride services have in recent years become a viable commercial concern after initial subsidy as a kick start included with the original park and ride scheme. Additional subsidy would provide added pressure on the Council's revenue funds and may divert resources away from more socially necessary services elsewhere.

9.1.12. This option is therefore not proposed to be taken forward on as a scheme in isolation under this process however it could form part of a package of complimentary measures to a larger scheme.

Strategic Option D: Enhanced Strategic Walking & Cycle Network

9.1.13. This option demonstrated a very high benefit under the economy, managerial and financial headings. Walking and cycling schemes often have the potential to offer very high value for money largely due to lower delivery costs. Improving sustainable transport links along this corridor will help to encourage modal switch thereby freeing up capacity on the highway network.

9.1.14. While such provision can help in this regard, in isolation it is unlikely to be able to provide the level of modal switch needed to address the current and future problems identified and this is reflected under the scale of impact heading in the EAST. Instead, such provision should be seen as core to any proposals.

9.1.15. This option is therefore not proposed to be taken forward on as a scheme in isolation under this process however it could form part of a package of complimentary measures to a larger scheme.

Strategic Option E: Highway Capacity Improvements

9.1.16. This option scored very highly under all headings within the EAST. Potential options can be improved upon further if combined with measures considered under Option C and D.

9.1.17. Options to improve the existing highway network through reallocating road space or localised widening can offer the potential to address many of the current and future problems identified in this report.

9.1.18. This option is considered appropriate to be taken forward under this process.

Strategic Option F: Personalised Travel Planning

9.1.19. This option scored well under many of the sub-headings within the Economic classification of the EAST as well as managerial and financial.

9.1.20. Behavioural change measures have been demonstrated to yield good benefits with much lower costs than equivalent infrastructure schemes. Whilst this is unlikely to address all of the problems on its own, PTP often works best when combined as a package to support infrastructure facilities. This proposal should therefore be considered to be taken forward as part of a package of measures.

Strategic Option G: Increased Parking Charges

9.1.21. This option scored poorly under the Economic headings of the EAST. While this may deter some trips to be made by private car and may encourage modal shift, it may also have far wider reaching economic impacts in determine whether new businesses would like to relocate to the area or for existing ones to stay. The scale of impact for the Derriford area is also limited as the majority of the existing parking supply is on private land and outside of the Council's influence. Future development sites can be influenced by parking standards and this will be done via the usual planning process.

9.1.22. The potential to reduce vehicle trips by a change in parking standards in the city centre may also have limited impact on the Derriford area as drivers may choose to switch to the existing park and ride service at Milehouse, thereby continuing to drive through the Derriford area.

9.1.23. This option is therefore not proposed to be taken forward under this process.

9.2. Summary

9.2.1. The result of the sifting process using the DfT's EAST has guided the direction of the project and demonstrated that a highway based intervention is most likely to have the greatest impact in Derriford area and this section of the A386 northern corridor.

9.2.2. The EAST process has also demonstrated that while some of the other options may not be sufficient in scale to achieve the level of impact required by themselves, they can make a positive contribution to an overall package of measures. It is therefore considered appropriate to consider including these options to form a package of complimentary measures wherever possible.

10. DEVELOPMENT & ASSESSMENT OF OPTIONS

10.1. Scheme Identification and Option Selection

10.1.1. Following the initial sifting identified in section 9 of this report, it is clear that for this section of the A386, Option E – a highway based scheme that would consider all users including public transport, pedestrians and cyclists, is likely to be the most viable option in terms of addressing the project objectives. With this in mind, a number of variants or sub options were considered with a view to developing a preferred and next best scheme.

10.1.2. A workshop was held to review the issues, problems and potential solutions in the study area. As a result of the issues and options workshop, a number of design options for the William Prance Road junction and Derriford Roundabout were developed.

10.1.3. All of the proposals produced sought to improve public transport journey times and reliability as well as reduce current and future congestion and provide high quality pedestrian and cycle facilities.

10.2. Initial Options

10.2.1. Various options were discussed at the above workshop and identified regardless of cost and buildability considerations so as not to prejudice any potential options from being unfairly ruled out at an early stage or stifle ideas from coming forward. Table 7 and Table 8 summarise the options considered at both William Prance Road and Derriford Roundabout.

William Prance Road Junction

Option	Summary
A.	**Extended right turn lane and bus lane.** Existing right turn lane on Tavistock Road extended to provide more stacking capacity. 3 southbound lanes. Bus lane extended over Budshead Road to provide improved priority particularly in the AM Peak.
B.	**Upgraded Junction.** Third lane proposed in Option A removed to remove merging conflicts.
C.	**Additional capacity on WPR.** As Option B with additional capacity for left and right turns out of WPR.
D.	**Shortened bus lane** As Option C with bus lane shortened to provide additional right turn out capacity.
E.	**Northbound approach bus gate** As Option C but revised to include a north-east bound bus gate from Tavistock Road into WPR.
F.	**Bus lane extended through junction.** As Option E but revised to include a bus gate on approach and through the junction. Traffic merges on WPR.
G.	**Bus lane extended on WPR exit** As per Option F with WPR exit bus lane extended to hotel entrance
H.	**Capacity improvements in Option D combined with Option E bus priority.** This option took the capacity improvements identified in Option E and combined it with the bus priority improvements identified in Option E.
I.	**Roundabout at William Prance Road junction** The existing signal junction would be replaced by a 4-arm roundabout.

Table 7 William Prance Road Junction Options

Derriford Roundabout

Option	Summary
A.	**Signal Cross Road Junction. (Brest Road Removed).** This option removes the existing roundabout and replaces it with a signalised cross road junction. Brest Road is removed from the junction in order to remove a phase of the signals.
A v1	**Signal Cross Road Junction (Brest Road access included).** Traffic from Brest Road links into Derriford Road where it can then travel west or north if desired.
A v2	**Signal Cross Road Junction (Brest Road access included).** Access to Brest Road to/from Derriford Road only.
A v3	**Signal Cross Road Junction (Brest Road access included).** Left turn into Tavistock Road from Brest Road southbound only.
A v4	**Signal Cross Road Junction (Brest Road access included).** Brest Road added into main junction.
A v5	**Northbound bus gate.** As Option A with the northbound approach bus gate brought up to the main junction stop line.
B.	**Signal Cross Road Junction. (Brest Road Removed). Variant to provide access to NWQ.** As per Option A. Bus lane on the northbound approach to the junction is relocated to the third lane in order to provide bus priority into the NWQ site.
C.	**Roundabout retained with additional capacity.** Northbound approach and exit to existing roundabout widened to provide additional capacity.
C v1	**Roundabout retained with additional capacity and northbound bus gate on roundabout approach.** As Option C with additional widening on the Tavistock Road roundabout exit and circulatory. Northbound bus gate relocated to approach rather than at the circulatory similar to Option A.
D.	**Flyover (2 lanes)** Roundabout as Option C with a 2 lane flyover provided above for the north south movement.
D v1.	**Flyover (1 lane)** Roundabout as Option C with a 1 lane flyover provided above for the north south movement.
E.	**Roundabout retained with Bus Gate at Plymbridge Lane.** This option utilised the design in Option C however relocated the bus gate to allow access to Derriford Road further north to Plymbridge Lane.
F.	**'Hamburger' layout at the junction of Tavistock road / Derriford Road** This option would give the marginal advantage of improved traffic flow for the inbound / outbound main corridor without having to negotiate the roundabout.
G.	**Signalised Junction – Local Routes Greater priority** This option makes the A386 through-route appear less straightforward, prioritising the local routes particularly towards Derriford Hospital.

Table 8 Derriford Roundabout Options

10.2.2. During the scheme feasibility development, 8 options were initially considered for the William Prance Road junction and a further 11 options were also considered for Derriford Roundabout. 4 options at William Prance Road were initially taken forward to the first round of testing in a corridor S-Paramics model. The best performing option would then form a consistent part of the scheme package in all of the Derriford junction options, of which 8 were tested.

10.2.3. The performance of each option is discussed in the following chapter.

11. OPTION ASSESSMENT

11.1. Sifting Methodology

11.1.1. Following the collation of the options identified at the issues and options workshop, those thought to present feasible solutions were taken forward for design. These options were designed up to feasibility standard to enable an initial sifting to be undertaken to establish which of these options would be suitable to be carried forward to traffic modelling analysis.

11.1.2. Junction improvements at William Prance Road were tested first with the best performing option being applied to all Derriford Roundabout options to give a fair and consistent comparison.

11.2. Initial Options considered and rejected

11.2.1. Some options were discounted before the first phase of modelling, as it was clear from the design development process that they would not be suitable / deliverable. Table 9 summarises all options considered for the William Prance Road junction and Table 10 summarises options for Derriford Roundabout.

Option	Summary	Taken Forward to modelling?
WPR - A.	Extended right turn lane and bus lane.	No. Not modelled as previous work has shown that this will not be of a sufficient scale to address the problems.
WPR - B.	Upgraded Junction.	**Yes.**
WPR - C.	Additional capacity on WPR.	No. Felt that buses would be compromised turning right into WPR by joining the back of the queue rather than getting to the front.
WPR - D.	Shortened bus lane	**Yes.**
WPR – E.	Northbound approach bus gate	**Yes.**
WPR - F.	Bus lane extended through junction.	No. Felt that if Option E worked then the additional bus lane wouldn't be required which saves land take and retaining walls.
WPR - G.	Bus lane extended on WPR exit	No. Felt that if Option E worked then the additional bus lane wouldn't be required which saves land take and retaining walls.
WPR - H.	Capacity improvements in Option D combined with Option E bus priority.	**Yes.**
WPR - I.	Roundabout at William Prance Road junction	No. Land constraints such as Crownhill Fort prevent this option being taken forward.

Table 9 WPR Options Summary

Option	Summary	Taken Forward to modelling?
A.	Signal Cross Road Junction. (Brest Road Removed).	**Yes.**
A v1.	Signal Cross Road Junction (Brest Road access included).	No. Potential safety concerns and signal timing issues. Potential to block back through left slip from Derriford Road and back on to Brest Road. More land take required from NWQ site.
A v2.	Signal Cross Road Junction (Brest Road access included).	**Yes.**
A v3.	Signal Cross Road Junction (Brest Road access included).	No. Limited benefit over Option A in providing left turn only from Brest Road as traffic would likely use WPR.
A v4.	Signal Cross Road Junction (Brest Road access included).	**Yes.**
A v5.	Northbound bus gate.	**Yes.**
B.	Signal Cross Road Junction. (Brest Road Removed). Alternative layout to provide access to NWQ.	No. This option only reallocates right turn lanes and bus lanes and therefore no need to model.
C.	Roundabout retained with additional capacity.	**Yes.**
C v1.	Roundabout retained with additional capacity and northbound bus gate on roundabout approach.	**Yes.** The modelling of Option C identified these areas for improvement.
C v2.	Roundabout retained with additional capacity and northbound bus gate on roundabout approach. Southbound bus gate omitted at roundabout. Brest Road third lane at roundabout added.	**Yes.** The modelling for Option C v1 identified these areas for improvement.
D.	Flyover (2 lanes)	**Yes.**
D v2.	Flyover (1 lane)	**Yes.**
E.	Roundabout retained with Bus Gate at Plymbridge Lane.	No. Large land-take from 273 Tavistock Road. Restricts the ability for buses to serve the NWQ site in the future.
F.	'Hamburger' layout at the junction of Tavistock road / Derriford Road	No. Rejected as priority for cyclists and pedestrians are difficult to achieve and complicates the junction needlessly.
G.	Signalised Junction – Local Routes Greater priority	No. Rejected as considered to be too complex a junction for this location.

Table 10 Derriford Roundabout Options Summary

11.3. Scheme performance results – Signalised Junction Options

Option A

11.3.1. In 2018 Option A improves upon the Do-minimum scenario both in the morning and evening peaks. In the morning peak, large benefits are gained from the Belliver

zone in the north, saving 3 minutes 42 seconds to Manadon. In the northbound direction journey times are reduced by 8 minutes 26 seconds between Manadon and Derriford Road and 12 minutes 20 seconds between Manadon and William Prance Road.

11.3.2. In the evening peak Option A results in longer journeys from Belliver with an increase of 2 minutes 18 seconds to Manadon compared to the Do-minimum. This option reduces journey times from Derriford Road to Manadon by 2 minutes 48 seconds. No improvement is made for southbound journey times from William Prance Road due to the increase in trips using this route following the closure of Brest Road. Northbound journey times from William Prance Road are improved by 2 minutes 39 seconds to Belliver.

11.3.3. In 2026 Option A performs better than the Do-minimum in both the morning and evening peaks however the journey time savings are not to the same degree as in 2018. In the morning journey times between Belliver and Manadon are reduced by 1 minute 17 seconds. Northbound journey times between Manadon and Derriford Road are reduced by 6 minutes 34 seconds and between Manadon and William Prance Road by 7 minutes 47 seconds.

11.3.4. In the evening peak journey times between Belliver and Manadon increase by 3 minutes 24 seconds. Journey times between Derriford and Manadon are reduced by 1 minute 19 seconds compared to the Do-minimum however increased from William Prance Road to Manadon by 49 seconds. Journey times north from William Prance Road to Belliver are now reduced by 1 minute 34 seconds.

Option A v2

11.3.5. In 2018 there is little difference in journey times from the referenced in Option A, albeit further improvement in journey times from Derriford Road.

11.3.6. In 2026, Option A v2 offers further reduced journey times from Derriford Road relative to Option A and therefore the Do-minimum scenario however the largest time savings come from being able to provide more priority to Looseleigh Lane traffic due to savings elsewhere in the signals saving 6 minutes 22 seconds.

Option A v4

11.3.7. In 2018 Option A v4 performs worse overall than both Option A and Av2 and therefore the Do-minimum. In the morning peak journey times to Belliver and Manadon are 1 minute 45 seconds slower in A v4 compared to Option A, however journey times from Manadon to Derriford Road and William Prance Road improve by 1 minute 16 seconds and 59 seconds respectively. The reallocation of time to Brest Road means that Looseleigh Lane particularly suffers with increases of 7 minutes 25 seconds to Manadon relative to Option A.

11.3.8. Journey times in the evening peak are comparable with Option A.

11.3.9. In 2026 journey times are comparable with Option A in both the morning and evening peaks which is reflective of the congested network.

Option A v5

11.3.10. In 2018 Option A v5 results in a significant deterioration in the transport network in the morning peak relative to the Do-minimum scenario. Additional delays occur from all origin zones with particular problematic areas from Manadon and Belliver.

11.3.11. In the evening peak in 2018, the option again performs worse than the Do-minimum scenario. Severe delays occur from Manadon with journey time increases

of 13 minutes and 17 seconds to Belliver and 22 minutes 53 seconds to Derriford Road relative to the Do-minimum scenario.

11.3.12. In 2026 the above problems are again replicated in both peak periods and therefore as conditions are worse than the effectively doing nothing, this options was not taken any further forward.

Summary of best performing signal option

11.3.13. All of the signal junction options considered employed the same overarching principles for the main general arrangement. The main differences between the options surround the inclusion of Brest Road and how bus priority is facilitated.

11.3.14. Option A v2 performs the best overall in terms of journey times in both 2018 and 2026. This option provides additional capacity to Derriford Road and allows a re-prioritisation of time within the main signal junction.

11.3.15. Option A v2, which provides access from Brest Road to Derriford Road was therefore taken forward as the preferred arrangement for a signal junction option.

11.4. Scheme performance results – Roundabout Enhancement Options

Option C

11.4.1. In 2018 Option C provides journey times saving over the Do-minimum scenario in both the morning and evening peaks. Option C also performs better overall than any of the signal junction options in the morning peak however in the evening peak the signal junctions perform better. Option C is compromised to a degree by congestion on the roundabout circulatory caused by a small amount of traffic travelling to Looseleigh lane blocking back in to the offside southbound lane on Tavistock Road.

11.4.2. Even with the circulatory issue Option C still achieves a reduction in journey times of 2 minutes 27 seconds between Belliver and Manadon in the morning peak. In the northbound direction journey times are reduced from Manadon to Derriford and William Prance Road by 12 minutes 21 seconds and 14 minutes 50 seconds respectively compared to the Do-minimum scenario.

11.4.3. In the evening peak journeys from Belliver to Manadon are 3 minutes 6 seconds longer compared to the Do-minimum. Journey times from Manadon Belliver however are 50 seconds quicker compared to the Do-minimum, 1 minute 22 seconds quicker to Derriford Road and 1 minute 18 seconds quicker to William Prance Road.

11.4.4. In 2026 Option C provides a large improvement overall against the Do-minimum scenario. In the morning peak journeys from Belliver to Manadon are 2 minutes 4 seconds quicker than the Do-minimum. Journeys from Manadon to Belliver, Derriford Road and William Prance Road are 6 minutes 52 seconds, 8 minutes 13 Seconds and 10 minutes 5 seconds quicker than the Do-minimum respectively.

11.4.5. In the evening peak journeys from Belliver to Manadon are 3 minutes 38 seconds slower. Journeys from Derriford Road are broadly comparable with Do-minimum scenario and are quicker from William Prance Road to Belliver by 5 minutes 26 seconds and Manadon by 3 minutes 41 seconds.

Option C v1

11.4.6. Option C v1 improves journey times further over Option C and therefore the Do-minimum scenario. Journeys between Belliver and Manadon are reduced by 3 minutes 3 seconds compared to the Do-minimum in the morning peak while

journeys from Manadon to Derriford Road and William Prance Road are reduced by 13 minutes 27 seconds and 14 minutes 24 seconds respectively.

11.4.7. In the evening peak, journey times between Belliver and Manadon increase by 2 minutes 22 seconds, journey times from Derriford Road are comparable to the Do-minimum while from William Prance Road journeys to Manadon are reduced by 2 minutes 30 seconds. Journey times from Manadon to Belliver in the evening peak are improved by 1 minute 23 seconds.

11.4.8. In 2026, overall Option C v1 performs better than the Do-min in the morning and evening peak. Option C v1 performs better than the signal junction options in the morning peak, however in the evening peak it does not perform as well. Overall the combined journeys of both the morning and evening peak, Option C v1 performs better than the signal junction options.

11.4.9. Journey times in the morning peak between Belliver and Manadon are quicker by 3 minutes 34 seconds with savings between Manadon and Derriford Road and William Prance Road of 9 minutes 14 seconds and 10 minutes 14 seconds respectively.

11.4.10. In the evening peak journeys between Belliver and Manadon are 3 minutes 11 seconds slower. Journeys from Derriford Road to Manadon are 2 minutes 10 seconds slower however from William Prance Road to Manadon they are 2 minutes 53 seconds quicker compared to the Do-minimum scenario. Northbound journeys from Manadon are broadly comparable with the Do-minimum, which is reflective of the delay caused north of Derriford between Woolwell and The George which masks some of the benefits of the scheme. Northbound journeys from Brest Road in Option C v1 are worse than the Do-minimum by 1 minute 37 seconds to Belliver.

Option C v2

11.4.11. In 2018 the performance of Option C v2 is broadly similar to that of Option C v1 in the morning peak with modest additional time savings of 22 seconds from Belliver to Manadon.

11.4.12. In the evening peak however the changes made to the roundabout provide an enhancement overall addressing specific issues at Brest Road reducing journey times by 41 seconds south to Manadon and 51 seconds north to Belliver compared to Option C v1.

11.4.13. In the evening peak journeys from Brest Road to Belliver and Manadon are reduced by 1 minute 18 seconds and 3 minutes 34 seconds respectively compared to the Do-minimum while journeys from William Prance Road to Belliver are reduced by 4 minutes 27 seconds from William Prance Road to Manadon by 2 minutes 45 seconds. Journeys from Manadon to Belliver, Derriford Road and William Prance Road are reduced by 56 seconds, 1 minute 16 seconds and 1 minute 25 seconds respectively.

11.4.14. In 2026 Option C v2 produces journey times broadly similar to Option C v1 and therefore represent an improvement over the Do-minimum scenario. An improvement is specifically made to Brest Road which removes much of the congestion on the link experienced in the evening peak for Option C v1.

Summary of Best Performing Roundabout

11.4.15. In 2018 Option C v2 performs the best overall providing the largest journey time savings in both the morning and evening peaks. In 2026 the journey times are much

more comparable between Option C v1 and C v2 however the latter results in less breakdown of the roundabout circulatory and the overall network.

11.4.16. Option C v2 was therefore taken forward as the preferred arrangement for a roundabout based option.

11.5. Scheme performance results – Flyover Options

Option D

11.5.1. In 2018 Option D has the largest overall reduction in journey times in the morning peak and very large savings in the evening peak. Journeys from Belliver to Manadon are reduced in the morning peak by 7 minutes 34 seconds. Journeys from Manadon to Belliver, Derriford Road and William Prance Road are reduced by 13 minutes 45 seconds, 13 minutes 22 seconds and 14 minutes 51 seconds respectively.

11.5.2. In the evening peak journeys from Belliver to Manadon are reduced by 3 minutes 33 seconds. Journeys from Derriford Road are slower than the Do-minimum largely due to congestion arising from traffic merging from the access slip roads in both the north and south direction. Journeys from Derriford Road to Belliver are 1 minute 36 seconds slower and to Manadon 4 minutes 37 seconds slower. Journeys from Manadon to Belliver are reduced by 2 minutes 8 seconds and to Derriford Road 2 minutes 42 seconds.

11.5.3. Given the scale of the infrastructure provided in this option these journey time savings are relatively modest. This is due to wider congestion both north and south of Derriford which masks the scheme benefits, however also due to specific issues such as traffic merging from the slip roads.

11.5.4. In 2026 the same merging issues are experienced. In the morning peak journeys from Belliver to Manadon are 5 minutes 48 seconds quicker. Journeys from Manadon to Belliver, Derriford Road and WPR are 7 minutes 20 seconds quicker, 9 minutes 33 seconds and 10 minutes 30 seconds quicker respectively.

11.5.5. In the evening peak journeys from Belliver to Manadon benefit from a significant reduction of 20 minutes 5 seconds relative to the Do-minimum scenario. Journeys from Derriford Road to Belliver are reduced by 16 minutes 38 seconds and to Manadon by 4 minutes 21 seconds. Journeys from William Prance Road to Belliver and Manadon are reduced by 2 minutes 4 seconds and 7 minutes 51 seconds respectively. Journeys from Manadon to Belliver, Derriford Road and William Prance Road are reduced by 22 minutes 23 seconds, 8 minutes 58 seconds, 5 minutes 28 seconds respectively.

Option D v2

11.5.6. Option D v2 offers significant journey time benefits over the Do-minimum in 2018 in both the morning and evening peaks. Option D v2 performs marginally worse than Option D in the morning however in the evening peak Option D v2 performs better largely due to the removal of the need to merge which was previously had a negative impact on journeys from Derriford Road and Brest Road.

11.5.7. Similarly In 2026 Option D v2 is again a significant improvement on the Do-minimum scenario in both the morning and evening peaks and performs marginally worse that Option D in the morning peak however in the evening peak Option D v2 performs much worse than Option D. Although Option D v2 offers some large journey time reduction in the evening peak from Derriford Road this is offset by significant increases in journey times from other zones such as William Prance Road and Manadon due to the relative reduction in capacity on the flyover.

Summary of Best Performing Flyover

11.5.8. In the 2018 morning peak, a two lane flyover performs marginally better than a single lane flyover while in the evening peak the single lane flyover performs better. In 2026 as a two lane flyover performs best in both peaks.

11.5.9. In summary a two lane flyover benefits traffic on the main A386 corridor but is to the dis-benefit of the traffic from the side roads such as Derriford Road due to congestion associated with the associated merges.

11.5.10. Option D, consisting of 2 lanes offers marginally better journey times and was therefore taken forward as the preferred Flyover.

11.6. Comparative Performance

11.6.1. Once the best performing signalised junction, roundabout and flyover had been selected it was possible to compare the different principles to understand which offers the greatest overall benefit by totalling all of the average journey times for the key OD pairs. The results are summarised in Figure 29 and Figure 30 below.

	Do-min	Signal	Roundabout	Flyover
Combined AM & PM	32:08:08	26:36:16	26:03:00	23:21:08
AM	15:29:51	12:09:06	10:32:30	08:28:16
PM	16:38:17	14:27:10	15:30:30	15:05:52

Figure 29 Summary 2018 Results (hr:mm:ss)

	Do-min	Signal	Roundabout	Flyover
Combined AM & PM	35:43:54	32:38:04	31:24:34	28:25:56
AM	16:47:22	14:56:01	12:56:40	11:57:02
PM	18:56:32	17:42:03	18:27:53	16:28:54

Figure 30 Summary 2026 results (hr:mm:ss)

11.6.2. Figure 29 shows that in the 2018 morning peak all of the options represent an improvement relative to the Do-minimum scenario with the flyover option offering the best overall journey times. The next best option is an enhanced roundabout followed by a signalised junction. In the evening peak, again all options improve upon the Do-minimum however this time the signal junction is the best performing option with the flyover marginally better than the roundabout option.

11.6.3. With no single option performing better in both peaks the journey times from both were combined to enable the total benefits to be captured. This identifies that the flyover performs the best with the roundabout and signal junction fairly similar although the roundabout is marginally better than the signal junction option.

11.6.4. Figure 30 shows that in 2026 morning peak all of the options improve upon the Do-minimum scenario with the flyover again offering the best performance overall. The roundabout is again the next best performing option followed by the signal junction. In the evening peak with more growth applied, this time the flyover performs the best followed by signal junction and then the roundabout.

11.6.5. Again taking the combined morning and evening peak journey times for 2026, the flyover is the best performing option followed by the roundabout and then the signal junction option.

11.7. Sensitivity Testing

11.7.1. The results identified above can enable some meaningful conclusion to be made regarding the performance of each option however the realities of working within a constrained highway network mean that some of the benefits and relative performance between the options may be masked by congestion on neighbouring sections of the network for example between Woolwell and The George Junction in the north and at Manadon in the south.

11.7.2. Following the results from the 2018 and 2026 scenarios, a sensitivity test was undertaken to understand how the options perform with other pieces of key infrastructure identified as required to support growth in the Derriford area.

11.7.3. This test included the Woolwell to The George scheme which provides a dual carriageway along the link along with the part signalisation of Woolwell Roundabout in order to create targeted gaps in the traffic.

11.7.4. The test also included the proposed Forder Valley Link Road scheme which provides a new link from the east to the Derriford area.

11.7.5. The 'with infrastructure' test was first coded in the Saturn model to generate the demand information and capture traffic re-routing. The schemes were then tested in a 'with infrastructure scenario in the S-Paramics model, the results of which are presented in Figure 31.

	Base	Best Signal	Best Roundabout	Best Flyover
Total	35:01:14	34:21:04	26:18:48	25:57:06
AM	21:22:52	19:18:53	13:47:46	13:26:04
PM	13:38:21	15:02:11	12:31:02	12:31:02

Figure 31 Summary 2026 with infrastructure results (hr:mm:ss)

11.7.6. In the tests without the additional infrastructure, the flyover had provided a significant advantage in journey time, however in 2026 with the additional infrastructure the journey time savings relative to the roundabout are relatively modest. Both offer significant improvements compared to the signal junction.

11.7.7. In the morning peak the flyover is still the best performing option however this is relatively marginal in comparison to the roundabout option. In the evening peak however, there is no difference between the flyover and roundabout options and both show a further improvement over the Do-minimum scenario. The signal junction conversely is worse than the Do-minimum scenario.

11.8. Modelling results Summary

11.8.1. The results from the modelling scenarios for 2018, 2026 and 2026 with infrastructure have provided meaningful data that can enable a preferred option to be selected from a performance perspective.

11.8.2. There are clearly higher journey time benefits from the flyover in 2018 and 2026 however the roundabout option performs very well relative to the flyover for a quarter of the price. As well as the financial cost difference there is also a much higher environmental cost associated with the flyover for example from visual intrusion, ecological disturbance, noise emissions among others.

11.8.3. Given that when the additional infrastructure needed for the Derriford area included, the roundabout and flyover perform very similarly and therefore it would be difficult to pursue the flyover as the preferred option in light of the additional financial and environmental costs.

12. PUBLIC CONSULTATION 2014

12.1. Background

12.1.1. A four week consultation was held between 10 February and 10 March 2014 with residents in the scheme area and stakeholders invited to review the options being considered and provide their comments.

12.1.2. The total number of consultees was 3,840. A total of 514 responses were received, a response rate of just over 13%.

12.1.3. The consultation asked seven questions which invited general feedback on each of the options presented in the leaflet for Derriford Roundabout and the proposal for William Prance Road. The full consultation report is available as a supporting document to this report however the general themes from the consultation have been summarised below.

12.2. Consultation Response Summary

Option 1: Enhanced Roundabout

12.2.1. The option to upgrade the existing roundabout was generally received positively and negative comments were mostly associated with a view that the changes would not be sufficient to deliver the required improvements. The potential to retain all current access routes, the ability to U-turn and the minimised impact on trees and green space were all highlighted as particular advantages to this option along with the fact that it is the cheapest scheme. Some respondents added that the upgraded roundabout would not preclude the construction of the flyover in the future if required.

Option 2: Signalised Junction with no access to Brest Road

12.2.2. The negative response to Option 2 was mostly associated to the dislike of traffic signal junction arrangements in general with comparisons made to examples of similar junctions elsewhere in the city, most notably the George Junction. The impression of these junctions according to the responses received seems to be that they do not address congestion.

12.2.3. The loss of access to Brest Road was not favoured by those respondents who made reference to it and concerns were raised about the potential implications if traffic signals fail.

Option 3: Signalised junction with limited access to Brest Road

12.2.4. The response to Option 3 was very similar to that for Option 2. This isn't surprising given that the junction arrangement is the same, the only difference in Option 3 being the restricted access to and from Derriford Road from Brest Road. The Brest Road access wasn't referred to in many comments so it is difficult to gauge whether this was considered to be an improvement although the negative response highlights a dislike of the principle of the junction in itself.

Option 4: Flyover

12.2.5. Responses to the flyover option were generally either strongly in favour or strongly against this as a solution. Those who favoured it were of the view that investment is required in order to properly address the issues in this area and the increased cost is therefore justified. Many felt that in the long run the flyover would prove to provide value for money as it will ultimately be required at some point and therefore funding spent on any other option would be wasted.

12.2.6. Those against the flyover proposal had particular concerns about the environmental impact, notably noise and the negative visual effect, the cost of the scheme and its ability to address the issues on this section of the corridor. A number of respondents indicated that with traffic having to merge back in to the existing carriageway particularly in the northbound direction, the benefits of the flyover would not be realised.

William Prance Road junction

12.2.7. The response to the William Prance Road junction scheme was mixed. One of the main reasons for respondents not supporting the scheme was that they considered it to be unnecessary and therefore the cost was considered to be excessive for perceived benefits.

12.2.8. Positive comments related to the William Prance Road junction were largely very general with respondents stating that they supported the scheme but not providing the reasoning for that support. Those who did provide more detail highlighted the extension of the right-turn lanes and associated improved access as of particular benefit.

13. PREFERRED OPTION SELECTION

13.1. Lessons learnt from Initial Sifting Modelling

13.1.1. The results of the various tests demonstrate the value of an iterative approach to option development and selection. The traffic modelling showed how solving a problem in one area of the scheme could, if not addressed, result in the creation of a new problem elsewhere. This had to be carefully assessed to make sure that any such instances were addressed as part of the scheme development process.

13.1.2. In developing the proposals to identify the preferred option, in practice no one option tested was to be taken forward as per the exact original option as the best performing parts of a number of options have been utilised to develop each proposal.

13.2. Preferred Option Selection

13.2.1. It is evident from the modelling that the best performing option in operational terms is the flyover however this is at the expense of a large economic and environmental cost. The benefits of this option are not considered significant enough to outweigh these costs over and above the next best performing scheme which is the improved roundabout.

Option	Summary	Cost	Land	Performance	Environment	Public Opinion
Best Signal	Conversion of roundabout to signalised cross road junction. Upgraded junction at WPR.	£9m (+£6.5m WPR)	Medium amount of land take	Overall worst performing option with lowest journey times in 2018, 2016 and with other infrastructure.	Large loss of green space. Visual intrusion of large junction layout.	Negative
Best Roundabout	Increased capacity on approaches, exit and circulatory. Upgraded junction at WPR.	£5.5m (+£6.5m WPR)	Low amount of land take required.	2nd best performing option in 2018, 2026. Only marginally worse than flyover with infrastructure.	Least visual and ecological impact. Least loss of green space.	Mixed positive & negative
Best Flyover	Upgraded roundabout with north south flyover. Upgraded junction at WPR.	£22m (+£6.5m WPR)	Low amount of land take required.	Best performing option however only marginal with infrastructure scenario.	Severely negative visual impact. Like ly to increase noise level sdue to elevated road surface.	Mixed positive & negative

Table 11 Option Summary Table

13.2.2. The improved roundabout offers favourable journey time benefits in both 2018 and 2026. With the long term infrastructure in place in 2026, identified as being required to deliver the growth in the Derriford area, the roundabout performs very comparably with that of the Flyover.

13.2.3. This suggests that investment would be better targeted at bringing forward these other pieces of infrastructure in addition to the upgraded roundabout scheme for example delivery of the upgraded Roundabout and the Woolwell To The George scheme would still be cheaper and achieve better results than just delivering the flyover option.

14. OPTIONS ASSESSMENT REPORT SUMMARY

14.1.1. This report has assessed the issues and problems along the northern corridor in the Derriford area and identified key congestion hotspot areas, poor journey times and poor bus reliability areas along with other negative effects of congestion.

14.1.2. A range of options to resolve the problems and issues identified at a strategic level have been considered and the conclusion of the work undertaken is that a highway based scheme with elements of the other proposals considered is the best option.

14.1.3. Once it was established that a highway based scheme was most appropriate, consideration was given to the type of solution and a number of options were developed to address the issues identified in this report.

14.1.4. These options considered the relative merits between a signalised junction, an improved roundabout or a flyover with a number of sub options helping to shape the preferred for each type.

14.1.5. The comparison of each type of junction was considered including sensitivity testing to understand how each option performs with other key pieces of infrastructure identified as being required to support the growth in the Derriford area.

14.1.6. The conclusion of this work is that an upgraded roundabout solution will offer the best value for money and should be taken forward as the preferred option for this location.

APPENDIX A

Modelling Assumptions

15. MODELLING ASSUMPTIONS

15.1. Development Quantums

15.1.1. Table 12 below identifies the development assumptions used for the modelling forecasting to develop matrices for 2018 and 2026.

Policy Ref	Site Name	Type	2018			2026		
			Resi units	Amount Office	Amount Retail	Resi units	Amount Office	Amount Retail
NP01	Plymstock Quarry	Housing	648			1,684		
NP01	Plymstock Quarry	Office		4,038			10,500	
NP01	Plymstock Quarry	Bus Park		4,038			10,500	
NP01	Plymstock Quarry	Local Retail			769			2,000
MS07	Millbay Marina	Housing	75			90		
DP01	South Yard Enclave	Housing	150			150		
DP01	South Yard Enclave	Office		3,500			3,500	
DP01	South Yard Enclave	Local Retail			1,860			1,860
CC08	Colin Campbell Court	Housing	265			265		
CC08	Colin Campbell Court	Local Retail			9,750			9,750
DS06	Plymouth Int. Medical & Tech Park	Housing	60			100		
DS06	Plymouth Int. Medical & Tech Park	Office		14,700			24,500	
DS06	Plymouth Int. Medical & Tech Park	Hospital		12,000			20,000	
DS06	Plymouth Int. Medical & Tech Park	Local Retail			300			500
DS07	Tamar Science Park	Office		11,111			20,000	
DS09	Derriford Hospital	Hospital		20,000			20,000	
DS13	Seaton Neighbourhood	Housing	462			770		
DS13	Seaton Neighbourhood	Office		0			0	
DS13	Seaton Neighbourhood	Local Retail			900			1,500
DS14	North West Quadrant	Housing	363			580		
DS14	North West Quadrant	Office		3,125			5,000	
DS14	North West Quadrant	Local Retail			938			1,500
	Plymouth Airport (401K)	Housing	300			300		
	Plymouth Airport (401K)	Office		3,000			3,000	
	The Lozenge	Housing	123			123		
	North Prospect Phase 1A & 1B	Housing	360			405		
	Tesco Transit way	Large Food Retail			15,000			15,000
	Princess Yachts (South Yard)	Office		31,935			31,935	

MS01	Mills Bakery, Royal William Yard	Housing	79			79		
SNC1	Sherford (Sherford AAP adopted)	Housing	1,594			5,180		
SNC1	Sherford (Sherford AAP adopted)	Bus Park		20,615			67,000	
SNC1	Sherford (Sherford AAP adopted)	Large Food Retail			5,182			16,840

Table 12 Development assumptions used the modelling forecasting

15.2. Modelled Trips

15.2.1. The development assumptions in Table 12 above were used to derive the forecast trips for the 2018 Do-Minimum and 2026 Do-Minimum scenarios. The summary of demands from the origin zones can be seen in Table 13 below.

Origin Zone		2012 AM	2018 AM	2026 AM	2012 PM	2018 PM	2026 PM
Belliver Roundabout	1	1,090	1,208	1,353	1,005	1,047	1,160
Woolwell Crescent	2	32	36	44	60	69	100
Woolwell Road	3	625	696	861	666	718	811
Morgan Road	4	738	809	898	788	822	895
Runway Road	5	66	167	239	175	179	260
Derriford Road	6	560	670	755	953	1,005	1,165
Brest Road	7	133	185	194	307	471	564
WPR	8	186	402	440	560	737	839
Charlton Road	9	37	72	109	0	0	0
CI-E: Tailyour Rd	10	224	206	210	278	296	305
CI-E: Plumer Rd	11	904	892	1,007	767	856	845
CI-E: Morshead Rd	12	197	142	195	164	158	189
Great Berry Rd	13	125	120	112	50	38	32
	14	0	0	0	0	0	0
Manadon Roundabout	15	3,012	3,261	3,574	2,308	2,453	2,635
Boniface Lane	16	333	352	395	117	127	147
CI-W: Meavy Way	17	619	709	771	367	514	688
CI-W: Budshead Rd	18	475	538	534	246	293	316
Sendall's Way	19	172	196	252	447	473	527
Looseleigh Lane	20	406	522	736	176	193	247
Powisland Drive	21	253	246	244	56	54	62
Southway Drive	22	665	698	780	518	471	467
P&R	23	0	0	0	248	253	263
Origin Total		10,850	12,127	13,701	10,259	11,226	12,516
Increase from 2012 Base			12%	26%		9%	22%

Table 13 Modelled Demand Analysis

APPENDIX B

Early Assessment & Sifting Tool Output

16. OPTION ASSESSMENT AGAINST SCHEME OBJECTIVES

Weighting			Option A LRT	Option B Drake Line (Heavy Rail)	Option C Bus Frequency & Routing	Option D Walking & Cycling	Option E Highway Improvements (incl. Bus Priority)	Option F Personalised Travel Planning	Option G Increased Parking Charges
	Pass (≥2) / Fail (<2)?		**FAIL**	**FAIL**	**PASS**	**PASS**	**PASS**	**PASS**	**FAIL**
100.0%	**Overall Score**		**0.4**	**-0.1**	**3.1**	**3.3**	**3.4**	**2.9**	**1.3**
	Objectives Score		0.9	0.7	1.3	1.5	2.4	0.7	0.1
	Risks Score		-0.5	-0.8	1.8	1.8	1	2.2	1.2
	Objectives								
20.0%	Objective 1	Provide additional transport capacity to support growth along the Northern Corridor and in the City Centre.	0.8	0.4	0.4	0.4	0.8	0.4	0
10.0%	Objective 2	Improve accessibility to employment, education and leisure facilities in the Derriford area particularly by bus and active modes.	0.2	0	0.6	0.6	0.6	0	0
10.0%	Objective 3	Improve journey times and reliability for all modes on the Northern Corridor.	-0.2	0.2	0	0.2	0.6	0	0
5.0%	Objective 4	Increase bus patronage and active travel to raise their mode share in the Derriford area.	-0.1	0	0.2	0.2	0.3	0.2	0.1
5.0%	Objective 5	Reduce the negative impacts of transport on the environment and public health.	0.2	0.1	0.1	0.1	0.1	0.1	0
	Objectives Commentary		Large impact however catchment likely to miss a lot of NC travellers	Large impact for Tavistock Residents travelling to city centre however unlikely to resolve all of the issues.	While positive benefits, unlikely to overcome problems fully on its own.	While positive benefits, unlikely to overcome problems fully on its own.	Scheme to incorporate NMU's	Potentially positive impact. Complimentary to infrastructure.	Limited public car parks to influence scale of impact in Derriford area.
	Risks								
20.0%		Scale of Impact (on A386 in the Derriford Area)	0.8	0.4	0.4	0.4	1.2	0.4	0
5.0%		Complexity of Delivery / Implementation	-0.3	-0.3	0.3	0.3	0	0.3	0.3
20.0%		Affordability (Scheme Costs)	-1.2	-1.2	0.8	0.8	-0.4	1.2	1.2
2.5%		Stakeholder Acceptability	0.1	0.15	0.15	0.15	0.1	0.15	-0.15
2.5%		Public Acceptability	0.1	0.15	0.15	0.15	0.1	0.15	-0.15
		Risks Commentary	Complexity of scheme likely to increase costs. Unaffordable as part of this process	Complexity of scheme likely to increase costs. Contribution may be affordable however benefits largely outside area	Low risk schemes however unlikely to have the significant impact required on its own.	Low risk schemes however unlikely to have the significant impact required on its own.	Strong scale of impact. Generally likely to be support of schemes	Low risk schemes, however unlikely to have the significant impact required on its own.	Scale of impact low due to the ability to control private parking supply. Public and political acceptability likely to be low.

17. EAST OUTPUT

17.1. Option A

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**Light Rapid Transit**
Date	01/09/2014
Description	A light rapid transit/tram system could form part of a citywide transport solution concentrating on the key corridor routes. The A386 would likely be the key spine for any such route and would take in key destinations along the route.

Strategic

Identified problems and objectives	- Provide additional transport capacity to support growth. - Improve accessibility to employment, education and leisure facilities. - Improve journey times and reliability for all modes on the Northern Corridor. - Increase bus patronage and active travel. - Reduce the negative impacts of transport on the environment and public health.	
Scale of impact	3	Only benefit users whose origin is close to the route. Tavistock Road traffic origins form much further afield.
Fit with wider transport and government objectives	4	The option will provide an attractive public transport network which would be fast and reliable sue to the nature of LRT.
Fit with other objectives	2	Fits with sustainability objectives identified in LTP and LDF as the option would encourage modal shift away from the private car however limited ability to penetrate away from the main corridor route.
Key uncertainties	Cost, level of construction risk, access to an LRT system, disruption during construction, practical implementation.	
Degree of consensus over outcomes	1. Little	Only high level studies undertaken to consider the principle. These would need refreshing.

Economic

Economic growth	**4. Amber/green**	The option would likely enable a reduction in travel for users on the main corridor, however other road users may be disadvantaged.
Carbon emissions	**4. Amber/green**	Modal shift should reduce overall carbon emissions.
Socio-distributional impacts and the regions	**4. Amber/green**	Further work will need to be undertaken in this area however for a system to be commercial, fares my less competitive than for example the bus?
Local environment	**3. Amber**	New infrastructure likely to negatively impact on environment and townscape however the option may potentially have positive impacts for air quality through modal switch.

Well being	**3. Amber**	
Expected VfM category	4. Low 1-1.5	Extremely high costs to implement. Studies identify Plymouth doesn't currently have the critical mass to enable an LRT system to provide value for money.

Managerial

Implementation timetable	6. 5-10 years	Likely to involve a lengthy process for land assembly.
Public acceptability	4	An LRT system is likely to have a high level of public support.
Practical feasibility	1. Low	Extremely complex option due to current physical constraints such as topography, alignment and the need to acquire a large amount of third party land and property.
What is the quality of the supporting evidence?	1. Low	
Key risks	Costs, local cost contribution, deliverability	

Financial

Affordability	1. Not affordable	Scheme costs anticipated to be extremely high making a 30% local contribution difficult.
Capital Cost (£m)	07. 100-250	
Revenue Costs (£m)	02. 0-5	Minor operating and maintenance cost of new infrastructure including platforms and signalling.
Cost profile		
Overall cost risk	1.High risk	
Other costs	Early stage of conception means limited information is available in relation to alignments, ground conditions, land and general construction costs.	

Commercial

Flexibility of option	1. Static	
Where is funding coming from?	DfT/LEP and local contribution through developer contributions etc.	
Any income generated? (£m)	No	

17.2. Option B

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**Drake Line**
Date	01/09/2014
Description	Utilisation of the old branch line between Bere Alston and Tavistock to reopen the Drake Line. This scheme may potentially remove some trips from the A386 by intercepting people's journey in advance of the City boundary.

Strategic

Identified problems and objectives	- Provide additional transport capacity to support growth. - Improve accessibility to employment, education and leisure facilities. - Improve journey times and reliability for all modes on the Northern Corridor. - Increase bus patronage and active travel. - Reduce the negative impacts of transport on the environment and public health.	
Scale of impact	1. Small impact	This option will help to remove some of the trips from the network but the impact likely to be small on its own.
Fit with wider transport and government objectives	4	Fits with sustainability objectives identified in LTP and LDF as the option would encourage modal shift away from the private car.
Fit with other objectives	2	This option may offer a viable alternative to the private car trips originating in Tavistock however the majority of trips passing through the Derriford area do not originate there so the impact is likely to be limited.
Key uncertainties	Costs, construction risks	
Degree of consensus over outcomes	3	DCC and the developer have undertaken a number of detailed studies for the whole route.

Economic

Economic growth	**3. Amber**	Removal of some trips from Plymouth network which would provide capacity to allow development to come forward however this will be offset by an increase in car-based trips from the new developments in Tavistock.
Carbon emissions	**4. Amber/green**	Removal of some trips from Plymouth network which would reduce Carbon emissions however this will be offset by an increase in car-based trips from the new developments in Tavistock however additional trips likely to offset this removal.
Socio-distributional impacts and the regions	**3. Amber**	Positive impacts for Tavistock Residents however limited ability to impact upon socio distributional impacts for Plymouth based residents.

Local environment	**3. Amber**	
Well being	**3. Amber**	
Expected VfM category	4. Low 1-1.5	Positive benefits for Tavistock residents however low VfM in relation to objectives set for this project and to allow the level of new development to come forward in the Derriford area.

Managerial

Implementation timetable	5. 2-5 years	
Public acceptability	4	Likely to have a high level of public support for Tavistock Residents however Plymouth residents may not see the direct benefit to them?
Practical feasibility	3	
What is the quality of the supporting evidence?	4	DCC and Developer detailed studies, local contributions
Key risks	Cost, NR approvals,	

Financial

Affordability	2	Significant costs that could not be afforded by PCC alone.
Capital Cost (£m)	04. 10-25	
Revenue Costs (£m)	02. 0-5	Minor operating and maintenance costs of the infrastructure and new stations.
Cost profile		
Overall cost risk	2	
Other costs		

Commercial

Flexibility of option	1. Static	
Where is funding coming from?	DfT/LEP and local contribution through developer contributions etc.	
Any income generated? (£m)	No	

17.3. Option C

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**Bus Frequency & Routing**
Date	01/09/2014
Description	Increasing the frequency and routing of existing bus services may be able to encourage modal shift and reduce congestion on the existing highway network.

Strategic

Identified problems and objectives	- Provide additional transport capacity to support growth. - Improve accessibility to employment, education and leisure facilities. - Improve journey times and reliability for all modes on the Northern Corridor. - Increase bus patronage and active travel. - Reduce the negative impacts of transport on the environment and public health.	
Scale of impact	3	Large benefits could be achieved in terms of bus patronage however unlikely to overcome problems on its own.
Fit with wider transport and government objectives	4	Fits with national sustainability objectives as the option would encourage modal shift away from the private car.
Fit with other objectives	4	Fits with sustainability objectives identified in LTP and LDF as the option would encourage modal shift away from the private car.
Key uncertainties	Availability of land/road space, congestion may prevent buses getting to priority infrastructure thereby limiting impact.	
Degree of consensus over outcomes	4	Support from PCC, bus operators and key stakeholders.

Economic

Economic growth	**4. Amber/green**	Large benefits could be achieved however unlikely to overcome problems on its own.
Carbon emissions	**4. Amber/green**	Large benefits could be achieved however unlikely to overcome problems on its own.
Socio-distributional impacts and the regions	**5. Green**	Flexibility of routing options enables greater accessibility to areas previously unserved by bus.
Local environment	**4. Amber/green**	This option is likely to encourage modal shift and therefore result in positive benefits on the local environment.
Well being	**3. Amber**	

Expected VfM category	2. High 2-4	Relatively small investment costs with potentially high value for money.

Managerial

Implementation timetable	4. 1-2 years	Relatively short timeframes to implement new services, routes or extensions to existing services.
Public acceptability	5. High	Many previous public consultations around the city have identified that the public would like to see more bus services with greater frequency and more reliable.
Practical feasibility	5. High	Relatively simple to implement with no or limited infrastructure requirements.
What is the quality of the supporting evidence?	4	Cost benefits analysis and VDM modelling can demonstrate the impact of providing more bus services.
Key risks	Low risks in terms of procurement and delivery.	

Financial

Affordability	5. Affordable	
Capital Cost (£m)	02. 0-5	Some minor infrastructure improvements may be required such as additional bus stops, bus stop boarders etc. however these are anticipated to be low costs.
Revenue Costs (£m)	02. 0-5	Revenue costs to fund unprofitable but socially necessary routes and for kick-start services.
Cost profile		
Overall cost risk	5. Low risk	
Other costs	Cost to run additional / expanded services generally low risk.	

Commercial

Flexibility of option	4	Unfixed nature of bus services means existing services can be altered and new services can break through into areas currently unserved.
Where is funding coming from?	DfT/LEP and local contribution through developer contributions etc.	
Any income generated? (£m)	Don't know	

17.4. Option D

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**Walking & Cycling**
Date	01/09/2014
Description	Complimentary on and off-highway facilities on identified desire lines to help improve the attractiveness of walking and cycling as a realistic alternative to the private car.

Strategic

Identified problems and objectives	- Provide additional transport capacity to support growth. - Improve accessibility to employment, education and leisure facilities. - Improve journey times and reliability for all modes on the Northern Corridor. - Increase bus patronage and active travel. - Reduce the negative impacts of transport on the environment and public health.	
Scale of impact	2	Walking & cycling initiatives have the potential to offer increase modal switch away from the private car however, the scale required to support the level of development in the Derriford area is unlikely.
Fit with wider transport and government objectives	4	Fits well with national sustainability objectives and improved active travel to improve physical health.
Fit with other objectives	3	Modal shift towards more sustainable and active travel contributes to a number of local LTP & LDF objectives including those of health partners.
Key uncertainties		
Degree of consensus over outcomes	4	Strategic cycle network has been widely consulted upon.

Economic

Economic growth	**4. Amber/green**	Modal shift towards more sustainable and active travel will help to free capacity enabling further growth however on its own it is unlikely to be of the scale required to support all of the planned growth in the area.
Carbon emissions	**5. Green**	Modal shift towards more sustainable and active travel will help to remove trips from the network and therefore contribute to reducing carbon emissions however on its own it is unlikely to be of the scale required to support all of the planned growth in the area.
Socio-distributional impacts and the regions	**4. Amber/green**	Walking and cycling initiatives can improve accessibility to employment, health, education, leisure and other essential service particularly for those without access to a car.

Local environment	**4. Amber/green**	Modal shift towards more sustainable and active travel will help to remove trips from the network and therefore contribute to improving the local environment.
Well being	**5. Green**	Modal shift towards more sustainable and active travel can improve people's health and wellbeing helping to reduce obesity and the negative health effects it can bring.
Expected VfM category	1. Very High >4	Walking & cycle schemes often yield large benefits for relatively low capital costs.

Managerial

Implementation timetable	4. 1-2 years	
Public acceptability	4	Many previous public consultations around the city have identified that the public would like to see more improved walking & cycling facilities.
Practical feasibility	4	Walking and cycling scheme tend to be less complex in terms of their delivery and are often delivered with minimal disruption during construction.
What is the quality of the supporting evidence?	4	
Key risks	Low risks in terms of procurement and delivery.	

Financial

Affordability	5. Affordable	
Capital Cost (£m)	02. 0-5	
Revenue Costs (£m)		
Cost profile		
Overall cost risk	3	
Other costs		

Commercial

Flexibility of option	5. Dynamic	The package of measures has a great deal of flexibility in terms of the amount that can be delivered and the routing of facilities.
Where is funding coming from?	DfT/LEP and local contribution through developer contributions etc.	
Any income generated? (£m)	No	

17.5. Option E

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**Highway Capacity**
Date	01/09/2014
Description	Improve the existing highway network through reallocating road space or localised widening. Additional highway capacity is likely to be able to remove the current bottlenecks and therefore remove many of the ancillary problems caused by congestion.

Strategic

Identified problems and objectives	- Provide additional transport capacity to support growth. - Improve accessibility to employment, education and leisure facilities. - Improve journey times and reliability for all modes on the Northern Corridor. - Increase bus patronage and active travel. - Reduce the negative impacts of transport on the environment and public health.	
Scale of impact	5. Significant impact	This option has the potential to significantly relieve congestion in order to re-prioritise road space in favour of buses, cyclists and pedestrians through the provision of wider capacity improvements.
Fit with wider transport and government objectives	4	The reallocation of road space fits well with national government objectives. Localised capacity improvements fits well with resolving existing and future pinch points on the highway network and utilises existing infrastructure rather than providing new.
Fit with other objectives	4	This option has the potential to provide additional transport capacity to enable the future growth aspiration in the Derriford area to be realised. The ability to provide priority for modes other than the car will help encourage greater use of buses and encourage more people to walk and cycle.
Key uncertainties	Costs, construction risks e.g. ground conditions, disruption during construction.	
Degree of consensus over outcomes	4	Support from PCC, bus operators and key stakeholders.

Economic

Economic growth	**5. Green**	This option has the potential to provide significantly more capacity in the transport network enabling more development to come forward thereby stimulating local and regional economic growth.
Carbon emissions	**4. Amber/green**	While a positive contribution to carbon reduction is likely to be achieved through less delay and improved efficiency, this may be offset by additional trips from the proposed developments or induced demand.

Socio-distributional impacts and the regions	**5. Green**	Improved accessibility to employment, education and leisure facilities.
Local environment	**5. Green**	Reduced congestion will have a positive effect on noise and air quality and the perception of the local environment.
Well being	**4. Amber/green**	Severance may be increased if high quality walking & cycling facilities are not provided.
Expected VfM category	1. Very High >4	High investment costs however very high benefits anticipated.

Managerial

Implementation timetable	5. 2-5 years	
Public acceptability	4	Many previous public consultations around the city have identified that the public would like to see more highway capacity improvements principally to improve the reliability of the network.
Practical feasibility	4	The delivery of this option is likely to be relatively straight forward however it is more than likely that it will result in significant travel disruption during construction.
What is the quality of the supporting evidence?	4	
Key risks	Costs, construction risks, disruption during construction	

Financial

Affordability	4	
Capital Cost (£m)	03. 5-10	
Revenue Costs (£m)		
Cost profile		
Overall cost risk	3	
Other costs		

Commercial

Flexibility of option	4	
Where is funding coming from?	DfT/LEP and local contribution through developer contributions etc.	
Any income generated? (£m)	No	

17.6. Option F

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**Personalised Travel Planning**
Date	01/09/2014
Description	Programme of targeted promotion, Personalised Travel Planning and training initiatives to increase awareness, and use, of new and existing sustainable travel options.

Strategic

Identified problems and objectives	- Provide additional transport capacity to support growth. - Improve accessibility to employment, education and leisure facilities. - Improve journey times and reliability for all modes on the Northern Corridor. - Increase bus patronage and active travel. - Reduce the negative impacts of transport on the environment and public health.	
Scale of impact	2	Plymouth's Personalised Travel Planning as part of the LSTF has yielded very positive results and can play a large role in promoting public transport and active travel. The scale required to support the level of development in the Derriford area means PTP is unlikely to be able to resolve all of the problems on its own.
Fit with wider transport and government objectives	4	Fits well with national sustainability objectives and improved active travel to improve physical health.
Fit with other objectives	3	Modal shift towards more sustainable and active travel contributes to a number of local LTP & LDF objectives including those of health partners.
Key uncertainties		
Degree of consensus over outcomes	3	New area of research, however promising results have been generated from Plymouth's LSTF PTP.

Economic

Economic growth	**3. Amber**	Modal shift towards more sustainable and active travel will help to free capacity enabling further growth however on its own it is unlikely to be of the scale required to support all of the planned growth in the area.
Carbon emissions	**4. Amber/green**	Modal shift towards more sustainable and active travel will help to remove trips from the network and therefore contribute to reducing carbon emissions however on its own it is unlikely to be of the scale required to support all of the planned growth in the area.
Socio-distributional impacts and the regions	**4. Amber/green**	PTP initiatives can improve awareness of accessibility to employment, health, education, leisure and other essential service particularly for those without access to a car.

Local environment	**4. Amber/green**	Modal shift towards more sustainable and active travel will help to remove trips from the network and therefore contribute to improving the local environment.
Well being	**4. Amber/green**	Modal shift towards more sustainable and active travel can improve people's health and wellbeing helping to reduce obesity and the negative health effects it can bring.
Expected VfM category	2. High 2-4	PTP initiatives can yield large benefits for relatively low investment costs.

Managerial

Implementation timetable	4. 1-2 years	
Public acceptability	4	Feedback from previous PTP in the city has indicated that respondents have found the initiatives very helpful and opened up new transport options to them which they were previously unaware of.
Practical feasibility	5. High	PTP initiatives are less complex in terms of their delivery. Plymouth has already had a large amount of success with PTP elsewhere in the city.
What is the quality of the supporting evidence?	4	
Key risks		

Financial

Affordability	5. Affordable	
Capital Cost (£m)	01. None	
Revenue Costs (£m)	02. 0-5	
Cost profile		
Overall cost risk	4	
Other costs		

Commercial

Flexibility of option	5. Dynamic	The area covered by PTP can be amended to suit the requirements of the initiative. The option has the potential to be able to be scaled back or expanded depending on the need.
Where is funding coming from?	DfT/LEP and local contribution through developer contributions etc.	
Any income generated? (£m)	No	

17.7. Option G

Early Assessment and Sifting Tool (EAST) - *Expanded Print View*

Option Name/No.	**Increased Parking Charges**
Date	01/09/2014
Description	Increased parking charges for public car parks. Increased parking charges thought to alter the balance of willingness to pay helping to balance the costs of driving against more sustainable modes such as public transport, walking or cycling.

Strategic

Identified problems and objectives	- Provide additional transport capacity to support growth. - Improve accessibility to employment, education and leisure facilities. - Improve journey times and reliability for all modes on the Northern Corridor. - Increase bus patronage and active travel. -Reduce the negative impacts of transport on the environment and public health.	
Scale of impact	1. Small impact	Limited opportunity to influence parking charges in the Derriford area as the vast majority of parking supply is privately owned. The option may only be able to influence through traffic destined for the city centre parking who may choose to use Milehouse Park and Ride as an alternative which wouldn't reduce trips through the Derriford area.
Fit with wider transport and government objectives	3	Fits with national objectives for reducing travel by car and demand management, however it is arguable as to whether the benefits will be felt in the Derriford area.
Fit with other objectives	1. Low	Fits with national objectives for reducing travel by car and demand management, however it is arguable as to whether the benefits will be felt in the Derriford area.
Key uncertainties	Economic impact of existing and new businesses.	
Degree of consensus over outcomes	2	This option has not been discussed with any key stakeholders and is likely to have limited political support.

Economic

Economic growth	**1. Red**	Limited opportunity to influence parking charges in the Derriford area as the vast majority of parking supply is privately owned. The option may only be able to influence through traffic destined for the city centre parking who may choose to use Milehouse Park and Ride as an alternative which wouldn't reduce trips through the Derriford area.
Carbon emissions	**3. Amber**	Limited opportunity to influence parking charges in the Derriford area as the vast majority of parking supply is privately owned. The option may only be able to influence through traffic destined for the city centre parking who may choose to use Milehouse Park and Ride as an alternative which wouldn't reduce trips through the Derriford area.
Socio-distributional impacts and the regions	**1. Red**	Increased costs of travel may negatively impact on those who rely on a private car with limited alternative choices.

Local environment	**3. Amber**	Limited opportunity to influence parking charges in the Derriford area as the vast majority of parking supply is privately owned. The option may only be able to influence through traffic destined for the city centre parking who may choose to use Milehouse Park and Ride as an alternative which wouldn't reduce trips through the Derriford area.
Well being	**3. Amber**	Limited opportunity to influence parking charges in the Derriford area as the vast majority of parking supply is privately owned. The option may only be able to influence through traffic destined for the city centre parking who may choose to use Milehouse Park and Ride as an alternative which wouldn't reduce trips through the Derriford area.
Expected VfM category	3. Medium 1.5-2	Although this option may encourage some modal shift, it may deter future inward investment in the city centre and may negatively impact on Council revenue streams.

Managerial

Implementation timetable	4. 1-2 years	
Public acceptability	1. Low	Unlikely to be acceptable to the general public.
Practical feasibility	1. Low	Due to the likely lack of public and political support it is unlikely that agreement will be reached in order to obtain the necessary approvals to allow the change in tariff.
What is the quality of the supporting evidence?	2	
Key risks		

Financial

Affordability	Don't know	May have undesirable impacts on the economy and Council revenue streams.
Capital Cost (£m)	01. None	
Revenue Costs (£m)	Don't know	
Cost profile		
Overall cost risk	2	
Other costs		

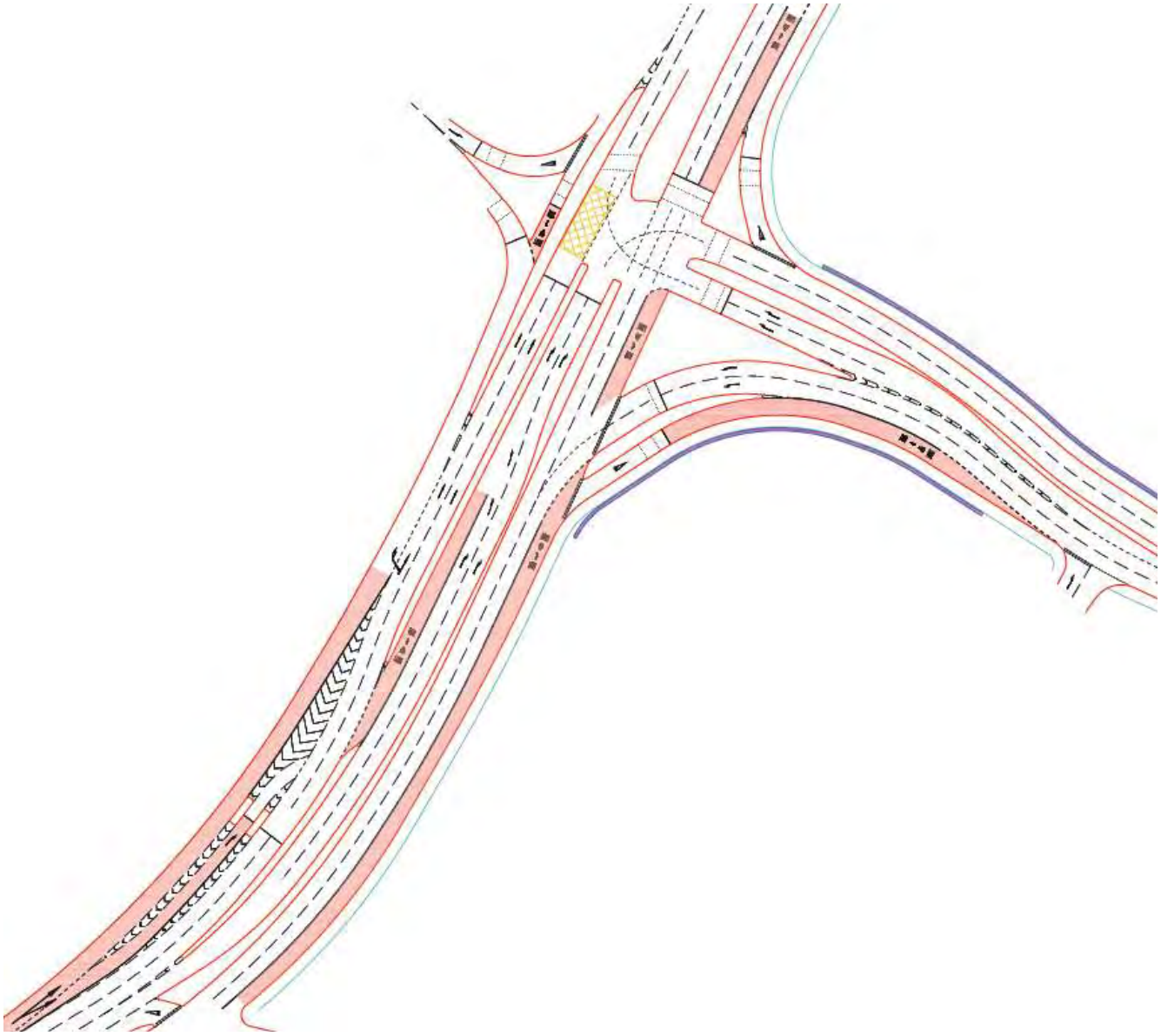
Commercial

Flexibility of option	2	Flexibility in the amount charged
Where is funding coming from?	DfT/LEP and local contribution through developer contributions etc.	
Any income generated? (£m)	Yes	Don't know

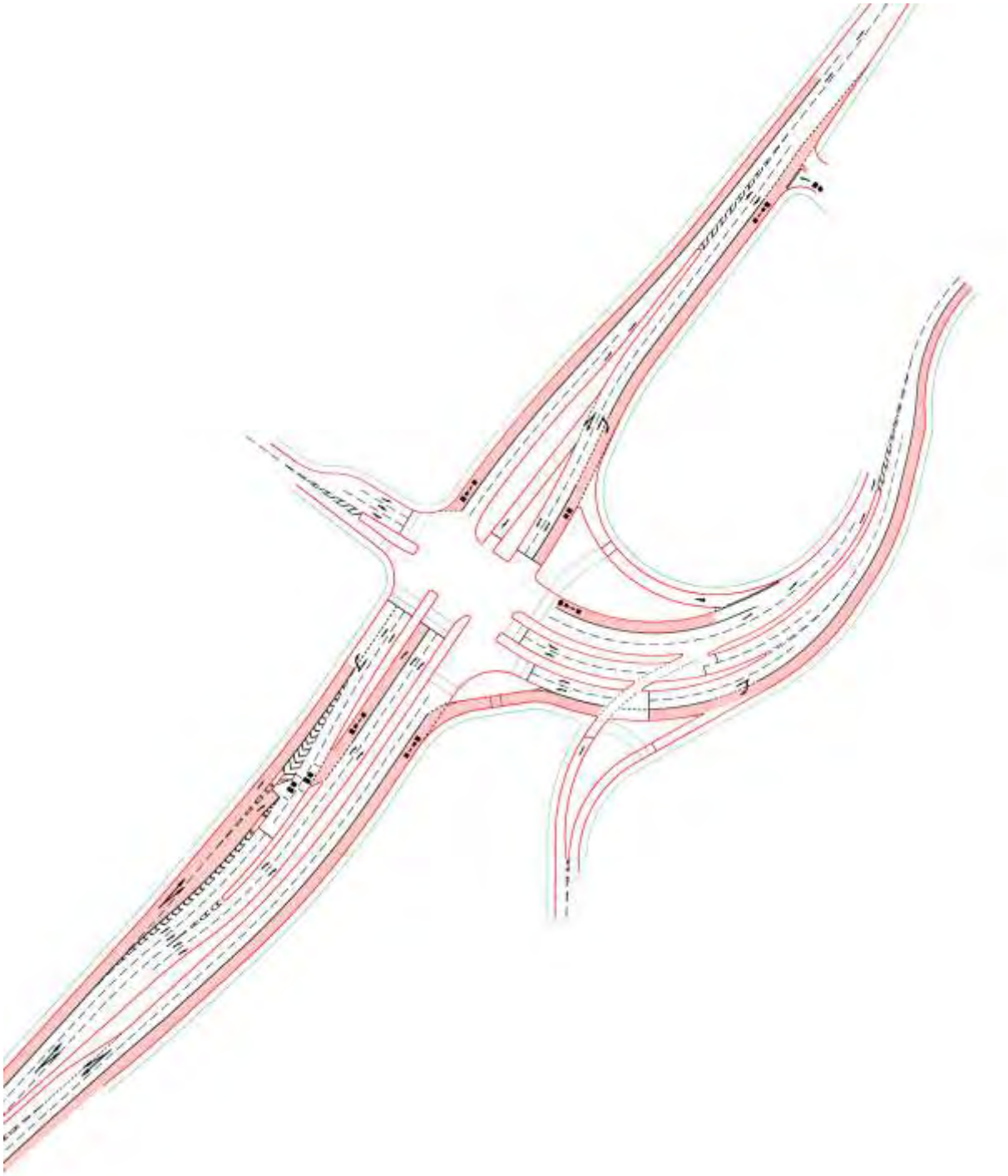
APPENDIX C

Scheme layout plans for options taken forward

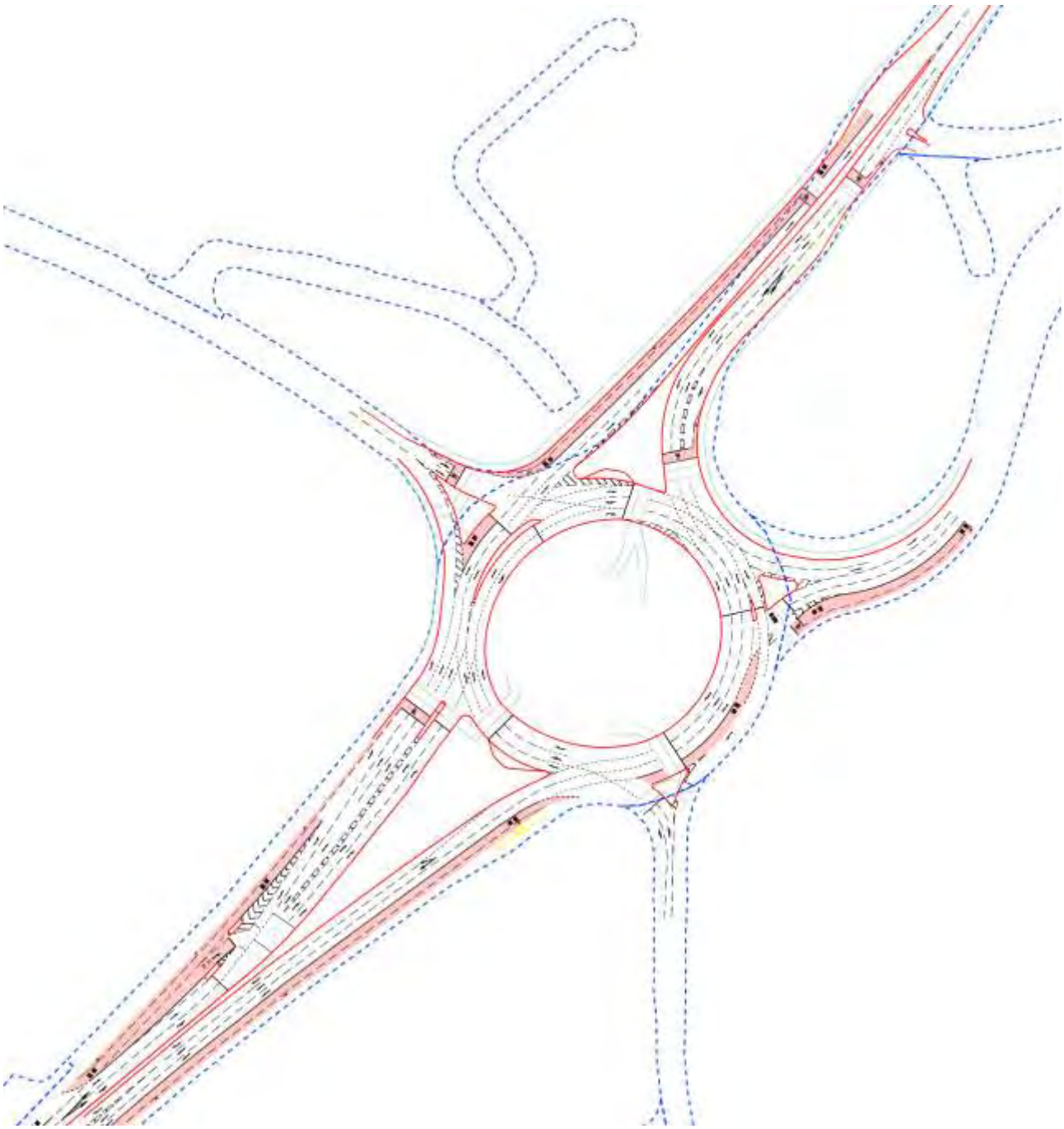
WPR Option H: Upgraded signalised junction.



Derriford Option A v2: Signalised Junction with access between Derriford Road and Brest Road.



Derriford Option C v2: Upgraded roundabout.



Derriford Option D: 2 Lane Flyover.