Plymouth and South West Devon Joint Local Plan – 2034 Forecast SATURN model results summary – January 2018

Executive Summary

A traffic modelling exercise has been undertaken by WSP on behalf of Plymouth City Council (PCC) and the Transport Strategy Working Group (TSWG) to assess the future performance of the Plymouth Policy Area (PPA) highway network. The work was undertaken in support of the Plymouth and South West Devon Joint Local Plan (JLP) which will see additional homes built and jobs created.

An existing strategic model of the Plymouth road network has been used to assess the impact of traffic growth across the PPA for the year 2034 (the end year of the JLP). An average of 14,000 additional vehicle trips are forecast to be made in each peak traffic period by 2034 and the model has been used to inform an assessment of the network's performance at the end of the Plan period.

Seven versions of the 2034 traffic model were created to test the impact of an increased number of vehicle journeys, as shown in Table i below.

Table i - 2034 traffic model versions

Model Version	Description
1	2034 traffic growth with committed physical transport interventions only;
2	Model version 1 **plus** sustainable transport measures;
3	Model version 2 **plus** non-committed 'pipeline' transport interventions;
3a	As per Model version 3, with revisions to the JLP spatial strategy (in terms of distribution and scale), as set out in the pre-submission JLP;
4L	As per Model version 3a, with additional physical transport measures identified by the TSWG: The additional interventions are considered deliverable in the short to medium term and at a lower cost than those included in B4H;
4LT	As per Model version 4L, with further refinement to 4L proposed interventions;
4H	As per Model version 3a, with additional physical transport measures identified by the TSWG. The interventions are considered deliverable in the medium to long term and are higher cost than those included in the B4L scenario

Node capacity results were output from the models for analysis and the number of congested nodes was used to compare the operation of each network. Model version 1 showed the highest number of congested nodes, with the number reducing in subsequent model versions.

The seven versions of the model were compared against a 'core' 2034 scenario, which did not include vehicle trips forecast to be generated from JLP allocations. The aim of the exercise was twofold:

(i) to return the performance of the highway network to, or as close as possible to, the 'core' scenario; and

(ii) to verify that the 'direction of travel', in policy and infrastructure intervention terms, was indeed heading in the right direction (see Table ii below):

Table ii - Number of congested nodes by time period

	Number of congested nodes[1]							
Period	**Core**	**1**	**2**	**3**	**3a**	**4L**	**4LT**	**4H**
AM (08:00-09:00)	184	222	206	205	180	176	172	173
PM (17:00-18:00)	195	242	227	221	203	195	193	183

As can be seen in Table ii, the number of congested nodes reduces in each iteration of the model. The most recent model iteration, version B4H sees 11 fewer congested nodes in the AM peak and 12 fewer congested nodes in the PM peak in comparison to the 'core scenario.' This indicates that the proposed physical network interventions tested within the B4H scenario have a positive impact on the operation of the future road network.

[1] Junctions/Nodes which will operate with an RFC of 75% or above are considered to be congested

Introduction

Background

WSP has been working on behalf of Plymouth City Council (PCC) and the Transport Strategy Working Group (TSWG) to produce future year traffic forecast modelling in support of the Plymouth and South West Devon Joint Local Plan (JLP).

The JLP is a blueprint for growth across Plymouth and the surrounding towns and villages, with the plan being jointly developed by PCC, South Hams District Council and West Devon Borough Council (SHWDC) in consultation with a wide range of stakeholders. The plan outlines future housing and employment developments, with an objectively assessed need (OAN) of 26,700 dwellings identified within the Plymouth Housing Market Area (excluding Dartmoor).

An average of 14,000 additional vehicle trips per model period are forecast to be generated from the proposed additional dwellings and employment opportunities within the Plymouth Policy Area (PPA) over the plan period. The impact of these was tested using an existing SATURN Highway Assignment Model (HAM). The existing Plymouth HAM 2 is based on 2009 highway operation, but was updated to include housing and employment growth which occurred between 2009 and April 2016[2]. This was then used as the starting point to represent the likely operation of the highway network in 2034, producing future year modelled networks for assessment.

AM and PM weekday peak period models were produced to reflect the busiest times in terms of traffic volumes for a typical weekday. The AM peak covers the hour between 08:00 – 09:00, while the PM peak covers the hour between 17:00 – 18:00.

Objective

The purpose of the modelling exercise is to identify nodes on the network which are forecast to see an increase in congestion by 2034 as a result of traffic growth arising from the proposed development allocations in the JLP. By highlighting nodes forecast to exceed their vehicle capacity in the future then proportionate and appropriate mitigation options can then be identified for these locations. The overall objective of the exercise is to minimise potential traffic impact on the Plymouth highway network.

Modelling Methodology

An origin / destination matrix was produced for each development scenario to calculate 2034 traffic volumes. These were then assigned through the future year Plymouth HAM. The results from each scenario were analysed to assess firstly the implications of traffic growth and secondly the road network's ability to accommodate the predicted number of vehicle trips, in comparison with a 'core' scenario (representing the 2034 Plymouth road network, with committed physical transport interventions and committed developments but not the additional growth associated with the JLP).

Seven rounds of modelling using the Plymouth HAM have taken place to date. These iterations are summarised in Table 1.

[2] A description of the model and the updates is included in the Plymouth and South West Devon Joint Local Plan Strategic Modelling Methodology Note (February 2017) - https://www.plymouth.gov.uk/sites/default/files/PlymouthSouthWestDevonJLPStrategicModellingMethodologyNote.pdf

Table 1 - Future model iterations

Model Version	Description
1	2034 traffic growth with committed physical transport interventions only;
2	Model version 1 **plus** sustainable transport measures;
3	Model version 2 **plus** non-committed 'pipeline' transport interventions;
3a	As per Model version 3, with revisions to the JLP spatial strategy (in terms of distribution and scale), as set out in the pre-submission JLP
4L	As per Model version 3a, with additional physical transport measures identified by the TSWG: The additional interventions are considered deliverable in the short to medium term and at a lower cost than those included in B4H,
4LT	As per Model version 4L, with further refinement to 4L proposed interventions
4H	As per Model version 3a, with additional physical transport measures identified by the TSWG. The interventions are considered deliverable in the medium to long term and are higher cost than those included in the B4L scenario

This report specifically focuses upon the results from the following modelled scenarios:

- **A1** – 'Core' scenario, representing the 2034 Plymouth road network with committed developments only and committed physical transport interventions;

- **B1** – JLP scenario, representing the 2034 Plymouth road network with committed & JLP development allocations and committed physical transport interventions;
- **B2** – As B1 plus sustainable transport measures;
- **B3** – As B2 plus non-committed 'pipeline' interventions;[3]
- **B3a** – As B3 with revisions to JLP development allocations (in terms of locations and numbers) as per the pre-submission JLP;
- **B4L** –As B3a additional interventions considered deliverable in the short to medium term and at a lower cost than those included in B4H;
- **B4LT** – As B4L with further refinement to the B4L proposed interventions;
- **B4H** - As B3a with additional interventions considered deliverable in the medium to long term and at a higher cost than those included in the B4L scenario.

Physical transport interventions and sustainable transport measures were tested in the model with the objective of returning the network performance of the Scenario B highway network to that, or as close as possible to that, seen in the 'core' A1 scenario.

The B1 scenario displays the highest number of congested nodes with this figure reduced in the B2 and B3 scenarios, once sustainable transport measures and additional physical transport interventions were applied to the network respectively. Further reductions in the number of congested nodes are seen in the B3a scenario.

[3] 'Pipeline' schemes are targeted transport infrastructure interventions likely to come forward during the life of the JLP.

The B3a scenario has been used as a basis for the B4 iterations of the strategic modelling encompassing the B4L, B4LT and B4H scenarios. The objective of the B4 exercise was to improve the operation of nodes on and located close to the A38 through 'low' and 'high' cost options and to reduce the likelihood of queuing back onto the mainline.

B4H is the latest iteration of the modelling testing higher cost options to nodes on and nearby to the A38. Taking AM and PM congested node numbers into consideration the B4H scenario shows the highest overall level of improvement in network operation.

This report provides a summary of results for each time period, along with the numbers of congested nodes in each modelled scenario, providing an indication of the overall forecast network performance.

Results

Upon completion of the modelling, results were extracted from each scenario to assess their individual operation. Primarily, node capacity results were analysed with the number of nodes considered to be congested used as the indicator of the overall operation of the network, i.e. the fewer congested nodes the better the network is deemed to operate.

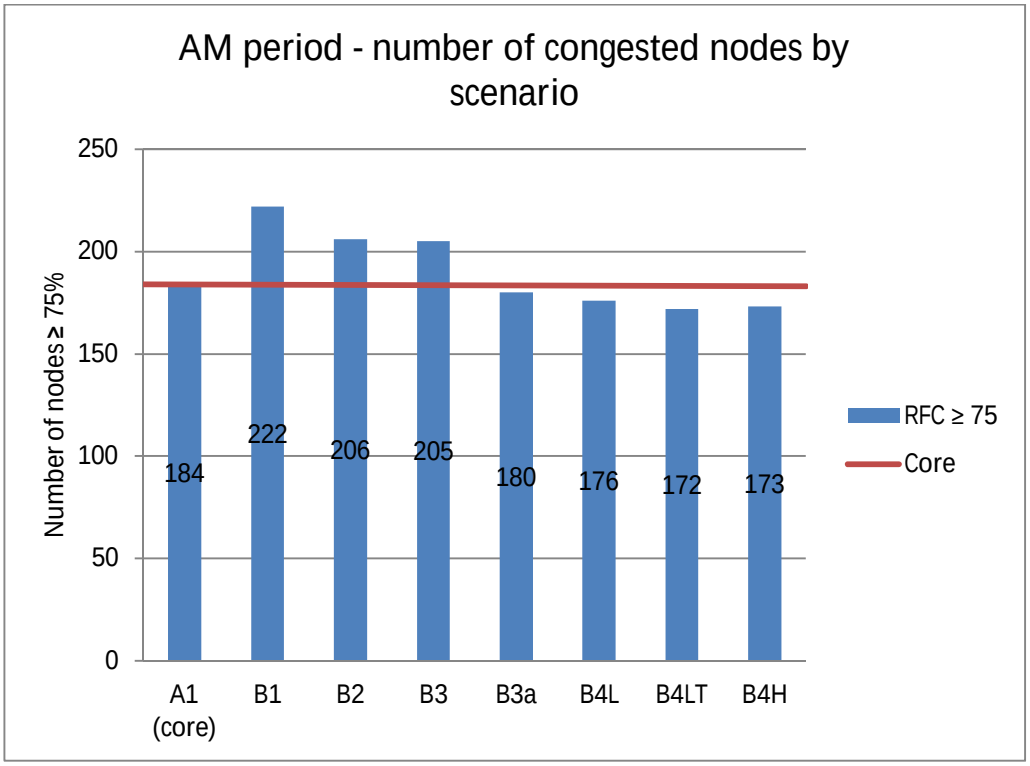
Congested nodes were defined as locations on the network with a Ratio of (traffic) Flow to Capacity (RFC) of 75% or above. RFC is a measure of junction/node saturation and indicates how much traffic is passing through the junction/node in relation to its overall capacity. Should the volume of traffic approach the maximum level of available throughput, then a junction/node will become congested and delay to vehicle journeys will begin to occur.

AM Peak Period

Figures 1 and 2 display the node RFC results output from the AM modelled scenarios. The results are used to (a) analyse the overall network operation and (b) to assess the effectiveness of proposed interventions in reducing the overall number of nodes which appear as congested in the model.

Figure 1 displays the number of nodes which are deemed as congested for each scenario in the AM peak period. The red threshold line indicates the number of congested nodes in the 'core' scenario and hence the target value to achieve in the B development scenarios.

Figure 1 - Number of congested nodes per scenario (AM Peak Period)



As can be seen in Figure 1 the number of congested nodes increases between the 'core' scenario (A1) and the JLP development scenario (B1). This is the result of an increase in traffic flow once the JLP development allocations are factored into the 2034 traffic forecast.

The number of congested nodes decreases by 16 in the AM following the application of sustainable transport measures in the B2 model (B2-B1). An assumption of a 5-10% reduction in vehicle demand has been applied to the B2 scenario to reflect likely modal shift away from journeys by private vehicles due to the implementation of sustainable transport measures and policies outlined in the JLP.

The decrease in the number of congested nodes between the B1 and B2 modelled scenarios indicates that proposed sustainable measures will have a positive impact on the operation of the future Plymouth road network. An additional node is removed from the overall number of congested nodes in the AM once physical 'pipeline' transport interventions are also applied to the network in the B3 scenario.

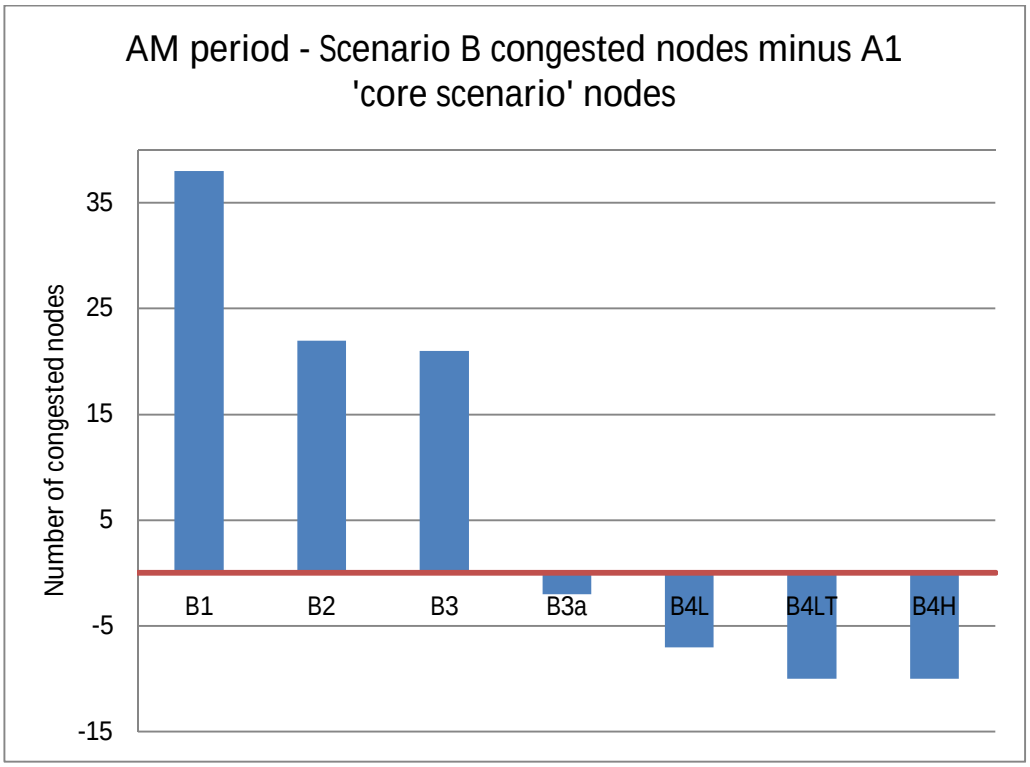
The B3 scenario was used as a basis to test the impact of the revised JLP development allocations as per the pre-submission JLP. The B3a scenario was created for this purpose and is forecast to result in 25 fewer congested nodes in the AM in comparison to the previous B3 iteration.

Further reductions in the number of congested nodes are seen once the B4 physical transport interventions are applied. There are 4 fewer nodes in the AM deemed as congested in the B4L scenario in comparison to the B3a scenario with a further 4 nodes removed once B4LT refinements are applied.

Between scenarios B4LT and B4H the number of congested nodes increases by 1. This suggests that the AM may have peaked in terms of potential improvement with differences in the number of congested nodes caused by fluctuations in how traffic is assigning across each modelled network.

Figure 2 represents the number of nodes which are forecast to be over-capacity in the AM period as a result of the JLP growth, i.e. nodes which are not congested in the AM 'core' scenario but become so once JLP traffic flows are assigned to the network. Removing those nodes which are congested in the 'core' scenario allows us to pinpoint those areas in the network which become congested as a direct result of JLP development allocations.

Figure 2 - AM congested nodes once 'core' scenario congested nodes are removed



The graph in Figure 2 shows that there are 38 additional congested nodes in the B1 scenario in the AM period over and above the 184 which appear as congested in the 'core' scenario (indicated by the red threshold line). Compared with the A1 scenario results, 22 additional nodes are congested in the B2 AM scenario and 21 in the B3 AM scenario.

From B3a onwards the number of congested nodes is below that seen in the A1 'core scenario'. This is a key indicator as the objective of the exercise was to return the network performance of the Scenario B highway network to that, or as close as possible to that, seen in the 'core' A1 scenario.

The B3a AM scenario displays 4 fewer congested nodes in comparison to the 'core scenario' with B4H, the latest modelled scenario displaying 11 fewer congested nodes in the AM.

Appendix A lists those nodes in the B3a model scenario AM peak period which are either:

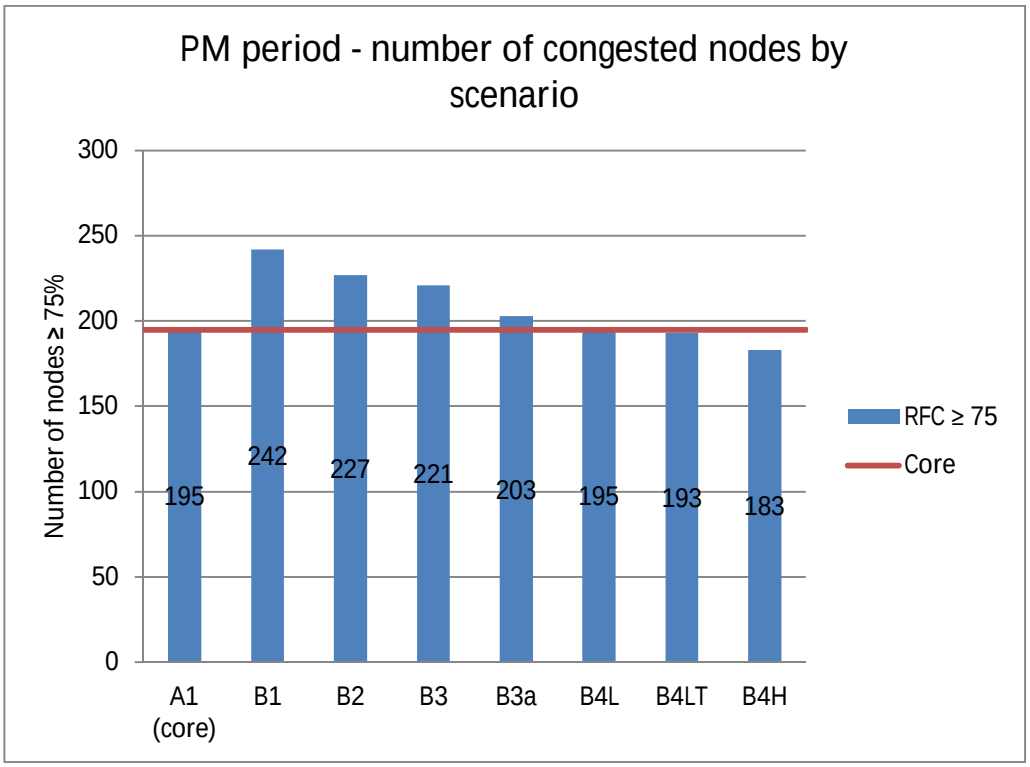
(i) Below 75% RFC in the A1 model but pass the ≥ 75% RFC threshold in the B3a model; or
(ii) ≥ 75% RFC in the A1 model and have a larger RFC in the B3a model.

PM Peak Period

Node capacity results were extracted from the model for analysis and comparison for the PM peak period in the same way as for the AM peak period. The number of nodes which are forecast to have an RFC of 75% or above in the PM peak period, and are therefore considered as congested, can be

seen on Figure 3. The red threshold line indicates the number of congested nodes in the 'core' scenario and hence the target value to achieve in the B development scenarios.

Figure 3 - Number of congested nodes per scenario (PM Peak Period)



The graph in Figure 3 shows that in the PM peak period there are forecast to be 47 additional congested nodes in the B1 scenario as a result of increased traffic flow generated by the JLP development allocations.

Between the B1 and B2 scenarios the number of congested nodes reduces by 15, signifying that decreased traffic volumes resulting from sustainable transport measures are forecast to have a positive impact on the road network.

A further 6 nodes are removed from the overall number of congested nodes in the PM B3 scenario, once physical 'pipeline' transport interventions are also introduced to the highway network. This indicates that the pipeline physical transport interventions are anticipated to ease the level of congestion experienced across the PPA.

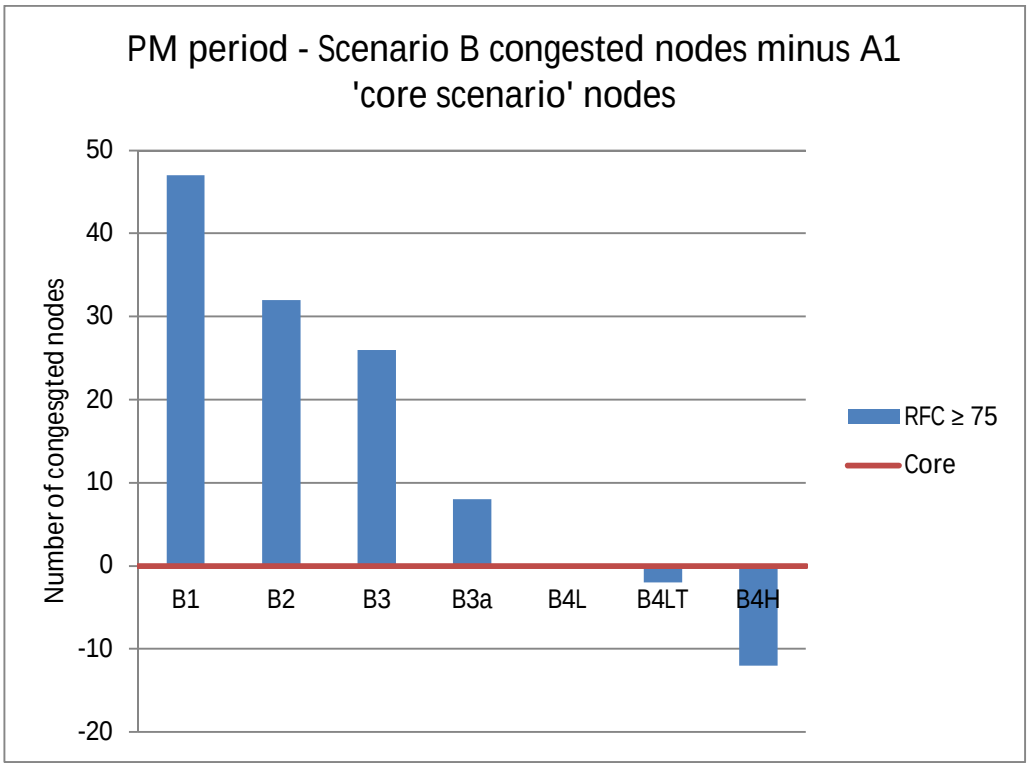
The B3a scenario is predicted to result in 18 fewer congested nodes in comparison to the previous B3 iteration. This indicates that the revised distribution and scale of JLP development allocations will have a positive effect on the forecast performance of the Plymouth road network.

Finally, the B4 scenarios, with additional physical transport interventions applied to improve performance around the A38, display a further reduction in number of congested nodes. In comparison to the previous B3a iteration the B4L and B4LT scenarios display 8 and 10 fewer congested nodes in the PM respectively.

The B4H scenario displays the greatest improvement in terms of network operation with 10 fewer congested nodes than the previous B4LT scenario. This indicates that the proposed B4H physical transport interventions will result in an improved performance of the Plymouth highway network.

Figure 4 illustrates the number of congested nodes in each development scenario in the PM peak period, once those nodes which are congested in the 'core' scenario are removed.

Figure 4 - PM Peak Period congested nodes once 'core' scenario congested nodes are removed



The graph in Figure 4 highlights an encouraging downward trend in the number of congested nodes seen within each scenario, once proposed sustainable transport measures, 'pipeline' interventions and the revised JLP development allocations are taken into account. The B3a scenario is forecast to have 8 more nodes defined as congested in the PM peak period, than in the core scenario.

As previously the core scenario is indicated by a red threshold line. All B4 scenarios in the PM period reduce consecutively and below that seen in the core scenario. B4H is showing the greatest overall improvement in the PM with 12 fewer nodes appearing as congested in comparison to the core scenario.

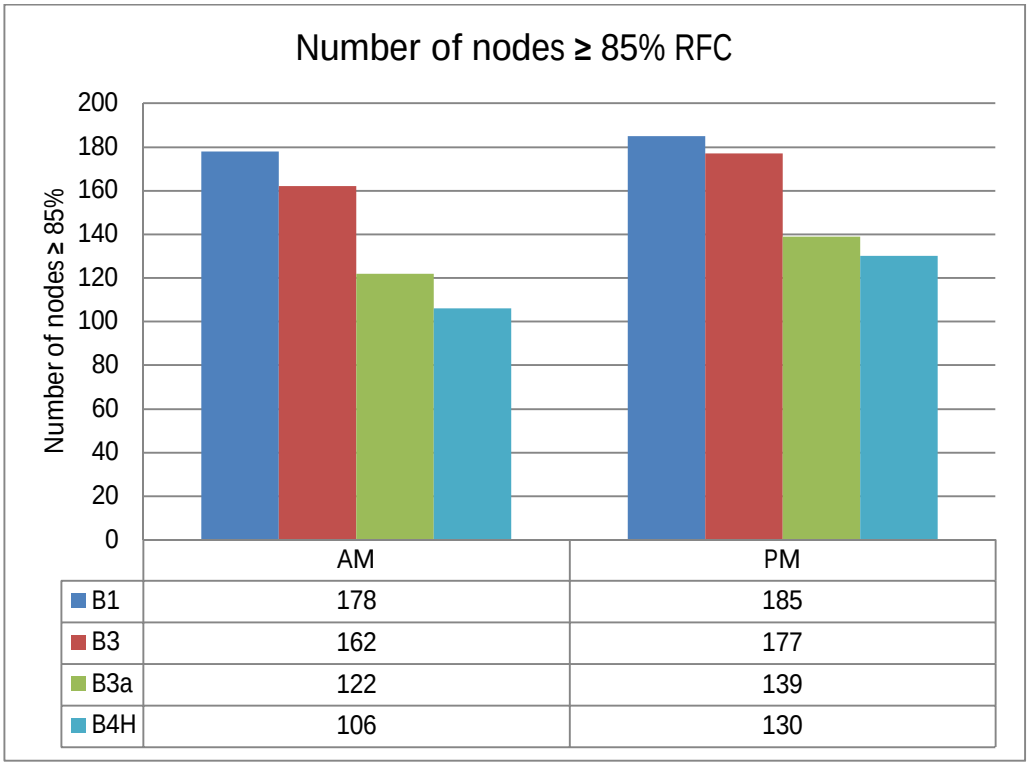
Appendix A lists those nodes in the B3a model scenario PM peak period which are either:

(i) Below 75% RFC in the A1 model but which pass the ≥ 75% RFC threshold in the B3a model; or
(ii) ≥ 75% RFC in the A1 model and have a larger RFC in the B3a model.

Assessing the benefits derived from the pipeline transport interventions

To further analyse the benefits of introducing the proposed 'pipeline' interventions, the number of nodes which are operating at or above 85% RFC in the AM and PM peak periods has also been reviewed. The results are shown in Figure 5.

Figure 5 - Number of nodes at or above 85% RFC



	AM	PM
B1	178	185
B3	162	177
B3a	122	139
B4H	106	130

The graph indicates that, once 'pipeline' interventions are included (in the B3 scenario), the overall number of nodes operating at or above 85% RFC reduces. 16 fewer nodes are operating at or above 85% in the AM peak period B3 scenario with 8 less in the PM peak period in comparison to the respective B1 scenarios. This shows that the 'pipeline' transport interventions have a positive impact on the network.

The combination of the 'pipeline' interventions and revised scale and distribution of JLP development allocations in the B3a scenario is forecast to give further improvement to the operation of the highway network. Vehicle distribution is likely to change as a result of the B3a scenario, with fewer vehicle trips within the city centre area in comparison to the previous model iterations. This is forecast to result in 40 and 38 fewer nodes operating at or above 85% RFC in the AM and PM peak periods respectively in comparison to the B3 scenario.

The latest round of modelling, B4H, shows a further reduction in the number of nodes operating with an RFC at or above 85%. This indicates that the additional physical transport interventions applied to the network leads to an improved performance of the highway network.

Conclusion

The modelling exercise undertaken in support of the JLP has achieved the objective of identifying those locations on the network which are forecast to become congested in 2034, as a result of traffic generated by development allocations proposed in the JLP. The results indicate that, when account is taken of traffic growth associated with the JLP, the number of nodes which will operate with an RFC of 75% or above is forecast to increase in both peak periods (and in so doing, are considered to become congested).

It is apparent that as a result of the scale of growth, which adds circa 14,000 additional vehicle trips per peak period, the PPA road network will experience additional congestion. The application of sustainable transport measures and additional physical transport interventions (the 'pipeline' schemes), is forecast to reduce the number of congested nodes, as are the revisions made to the scale and distribution of JLP development allocations (as per the pre-submission JLP).

Overall the B4H scenario performs best, with the number of congested nodes less than in the core scenario in both the AM and PM peak thus achieving the objective of returning the performance of the highway network to, or as close as possible to, the 'core' scenario and verifying that the 'direction of travel', in policy and infrastructure intervention terms, is heading in the right direction.

APPENDIX A – Location of congested nodes (Scenario B4H)

Appendix A - Location of congested nodes (Scenario B3a – B4H)

Address	Node in model	Nodes in the B3a model scenario which are either > or = to 75% RFC, or more than as reported in scenario A1 if the node was already greater than 75% in A1[4]		Nodes in the B4H model scenario which are either > or = to 75% RFC, or more than as reported in scenario A1 if the node was already greater than 75% in A1[5]	
		AM Peak	PM Peak	AM Peak	PM Peak
Brest Road / William Prance Road	24				✓
Brest Road / Morlaix Drive	27			✓	
William Prance Road / Forder Valley Link Road	33		✓		✓
William Prance Road (East)	38	✓	✓		✓
William Prance Road (South)	46			✓	
Union Street / Martin Street	161	✓	✓	✓	✓
Ferry Road / Torpoint Ferry	170		✓		✓
Molesworth Road / Milehouse Road	194	✓			
Devonport Road / Albert Road	195		✓		✓
Albert Road / Park Road	197				
A3064 Wolseley Rd / Henderson Pl	204		✓		✓
Wolseley Road / Royal Navy Avenue	207	✓		✓	
Wolseley Road / Victoria Road	212			✓	
Saltash Road / Wolseley Road	213			✓	
Weston Mill Drive / Ferndale Road	214			✓	✓
Saltash Road / North Road West	239			✓	
Outland Road / Seagrave Road	252	✓	✓	✓	✓
Outland Road / Peverell Park Road	253		✓		✓
Seagrave Road / North Prospect Road	258		✓		
Hyde Park Road / Weston Park Road	286		✓		✓
Weston Park Road / Burleigh Park Road	287				✓
Outland Road / Weston Park Road	290	✓	✓		
Ham Drive / Pennycross Park Road	293	✓	✓	✓	
Crownhill Road / St Peters Road	318	✓			
Budshead Way / Budshead Road	321		✓		✓
Budshead Road / Tamerton Foilot Road	322				
Budshead Road / Milford Lane	325	✓	✓	✓	✓
Tamerton Foliot Road / Southway Drive	337	✓			
North Road East / Houndiscombe Road	350	✓		✓	
Mannamead Road / Seymour Road	362	✓	✓	✓	
Mannamead Road / Eggbuckland Road	363	✓		✓	
Mannamead Road / Thornhill Road	366	✓		✓	
Mannamead Road / Torr Lane	367	✓		✓	
A386 Tavistock Rd north of Manadon Roundabout	372	✓	✓		

[4] Note that by this definition, if a node is above 75% in both scenarios but the RFC decreases from Core to B3a, it is not included in this table.

[5] Note that by this definition, if a node is above 75% in both scenarios but the RFC decreases from Core to B4H, it is not included in this table.

Tavistock Road / Meavy Way	373	✓	✓		
Tavistock Road / Plumer Road	376	✓	✓	✓	✓
Tavistock Road / Charlton Road (S/B)	377	✓	✓	✓	✓
Tavistock Road / Sendall's Way	378	✓			
Derriford Roundabout / Tavistock Road (North)	379	✓			
Tavistock Road / Powisland Drive	380		✓		✓
Derriford Road / Plymbridge Lane	381		✓		
Mannamead Road / Compton Park Road	382		✓	✓	✓
Tavistock Road / Morgan Road	385	✓		✓	
Mannamead Road / Hartley Road	388	✓		✓	✓
Derriford Roundabout / Brest Road	390	✓	✓	✓	✓
Derriford Rounabout / Tavistock Road (South)	391	✓	✓		
Derriford Roundabout / Looseleigh Lane	392		✓		
Derriford Road / Hospital Exit	398	✓	✓		✓
Morlaix Drive / Hospital through road	401			✓	
Lipson Road / Mount Gould Road	408		✓		✓
Lipson Road / Mostyn Road	414		✓		✓
Old Laira Road / Efford Lane	417	✓	✓	✓	✓
Fort Austin Road / Widey Lane	430		✓		
Fort Austin Road / Church Hill	431		✓		✓
Barnstaple Close / Longbridge Road	437	✓		✓	
Forder Valley Road / Novorossisk Road	439	✓	✓		
Novorossisk Road / Miller Way	440		✓		
Novorossiysk Road / Bampton Road	441	✓			
Novorossiysk Road / Plymbridge Road	442	✓			
Glen Road / Hillcrest Drive	460	✓	✓	✓	✓
Deep Lane E/B off-slip / Deep Lane	462			✓	
Deep Lane / W/B on-slip	467	✓			
Sherford Road / Plympton Hill	469			✓	
Notte Street / Princess Street Ope	484	✓		✓	
Exeter Street / Bretonside	489		✓		✓
Plymouth Rd / Coypool Rd	504		✓		✓
Dark Street Lane / Mudge Way	514			✓	
Ridgeway / Moorland Road	515	✓		✓	
Ridgeway / George Lane	516			✓	
Underwoor Rd / Market Rd	521	✓	✓		
Merafield Road / Ridge Road	528				
Stamps Hill / Deep Lane	533		✓		✓
Laira Bridge Road / Hele's Terrace	552		✓		✓
Laira Bridge Road / Finnigan Road	553		✓		✓
Billacombe Road / Pomphlett Road	554	✓		✓	
Colesdown Hill / Billacombe Road	555	✓		✓	
Stanborough Road / Haye Road	559				
Stanborough Road / Reservoir Road	562			✓	
Plymstock Road / Randwick Park Road	570	✓		✓	✓
Pomphlett Road / Pomplett Roundabout (south)	574	✓		✓	✓
Pomphlett Road / Horn Cross Road	576	✓			
Outland Road / St Erth Road	581	✓		✓	

Clovelly Rd / Macadam Rd	588		✓		✓
Novorossisk Road / Dover Road	611		✓		✓
Deep Lane / Ridgeway	614	✓	✓	✓	✓
Gdynia Way / Cattewater Road	618		✓	✓	✓
Embankment Road / Embankment Lane	621	✓	✓	✓	✓
Gydnia Way / Laira Bridge Road	622	✓	✓	✓	✓
A38 E/B off-slip / Crownhill Road	625	✓			
St Budeaux E/B on-slip / A38 E/B	626			✓	✓
Victoria Way / Roman Road (Crownhill Rounabout South)	628		✓		
Ernsettle Lane / Crownhill Road	632	✓	✓		
Crownhill Roundabout (North) / Crownhill Road	633		✓		✓
A38 W/B off-slip / Roman Way	634	✓			
St Budeaux southern roundabout / Victoria Road	635			✓	✓
A38 E/B off-slip / Weston Mill	637	✓			✓
A38 E/B on-slip / Weston Mill	638		✓		
A38 W/B off-slip / Weston Mill	639	✓			
The Parkway / Weston Mill Drive (South)	640		✓	✓	✓
Tavistock Road (S/B) / Manadon Roundabout	642	✓		✓	✓
A38 E/B on-slip / A3 E/B	643			✓	
Manadon Roundabout / Mannamead Road	645		✓	✓	✓
Manadon Roundabout / A38 E/B off-slip	647	✓			
Manadon Roundabout / A38 E/B on-slip	648	✓			
A38 W/B off-slip / Marsh Mills Roundabout	652	✓			
A38 W/B on-slip / Marsh Mills Roundabout	653	✓		✓	✓
A38 W/B off-slip / Manadon Roundabout	655	✓			
A38 E/B off-slip / Forder Valley Interchange	656	✓			
Forder Valley Interchange (north) / Forder Valley Road	657	✓	✓	✓	✓
A38 W/B off-slip / Forder Valley Interchange	659		✓	✓	✓
Delamere Road / Forder Valley Interchange	663				✓
A38 E/B on-slip / Forder Valley Road S/B	664		✓		
A38 W/B on-slip / Forder Valley Interchange	665		✓		✓
A38 E/B slip toward Marsh Mills Roundabout	666				✓
Forder Valley interchange A38 W/B on-slip / A38 W/B	700		✓	✓	✓
A38 / A38 W/B off-slip toward Forder Valley interchange	701	✓		✓	
A38 / A38 W/B off-slip toward Manadon Roundabout	702		✓		
Manadon Roundabout / Outland Road (N/B)	703	✓	✓	✓	✓
Manadon Roundabout A38 W/B on-slip / A38 W/B	704		✓	✓	✓
Manadon Roundabout / Manadon Hill (N/B)	705	✓	✓		
A38 W/B on-slip / B3413	709		✓		✓
Manadon Hill / Great Berry Road	712	✓	✓		✓
Tavistock Road / Budshead Way	718	✓		✓	✓
Tavistock Road / Charlton Road (N/B)	720	✓			
Shapters Rd	741	✓			
Union Street / Derrys Cross	770		✓		✓
Royal Parade / Derry's Cross	772				
Charles Cross Roundabout / Charles Street (S/B)	791	✓		✓	
Charles Cross Roundabout / Hampton St	792		✓		✓
Charles Cross Rounabout / Exeter Street (W/B)	793	✓	✓	✓	✓

Charles Street / Drake Circus Car Park exit	800	✓		✓	
A386 Tavistock Road (north of Robourgh)	817		✓		✓
Tavistock Road / William Prance Road	821	✓	✓	✓	✓
Tavistock Road / McDonalds Entrance	823	✓		✓	
Wolseley Road (S/B) / Wolseley Roundabout	860		✓		✓
Seagrave Road / Wolseley Roundabout	861		✓		✓
Wrigleys Roundabout / Novorossisk Road	891			✓	
Tamar Bridge W/B / North Road	899	✓	✓	✓	✓
North Road East / North Cross Roundabout	903	✓			
A38 W/B / A38 W/B off-slip toward Marsh Mills	950	✓	✓	✓	
Notte Street / Athenaeum Street	961				
Tamar Bridge / W/B exit	973	✓		✓	
Tavistock Road (N/B) / Woolwell Road	975	✓	✓		
A38 W/B on-slip / Smithaleigh	1004	✓	✓	✓	✓
A38 E/B off-slip / Lee Mill	1006	✓	✓	✓	✓
A38 W/B off-slip / Lee Mill	1007	✓	✓	✓	✓
A38 W/B off-slip / Forder Valley Interchange	1106		✓	✓	✓
Plymouth Road E/B / Great Woodford Drive	1201	✓	✓		✓
Plymouth Road / Cot Hill	1202		✓		✓
Plymouth Road W/B / Larkham Lane	1204		✓		✓
Plymouth Road / Great Woodford Drive	1205		✓		
Plymouth Road / Glen Road	1209	✓		✓	
Plymouth Road / Ridgeway	1210		✓		
Gydnia Way (N/B) / Barbican Approach (E/B)	1221	✓	✓	✓	✓
Gdynia Way / Barbican Approach	1222	✓		✓	
Finnigan Road / Faraday Road	1226		✓		✓
Embankment Road / A379 / A374	1228		✓		
Tavistock Road / Bladder Lane	1235	✓	✓	✓	✓
Manamead Road / Compton Avenue	1247	✓		✓	
Pemros Road (N/B) / Tamar Bridge	1260		✓		✓
A38 W/B / Tamar Bridge	1261		✓		✓
Tamar Bridge E/B / A38 E/B	1262	✓	✓	✓	✓
Tamar Bridge E/B / Pemros Road Roundabout	1265	✓		✓	
A38 W/B / Pemros Road Roundabout	1266		✓		✓
Plymouth Road (E/B) Coypool Road	1294	✓	✓	✓	✓
A386 Tavistock Road / New Road	1299	✓	✓	✓	✓
Holland Road / Ledgate Lane	1304		✓		✓
Langage Lane / Ridgeway	1305			✓	
Unnamed Rd off the A38 near Smithaleigh	1306	✓	✓		✓
A38 E/B on-slip / Ridgway	1307	✓	✓	✓	✓
B3416 Deep Lane	1331		✓	✓	✓
Lee Mill W/B on-slip / A38 W/B	1350	✓	✓		✓
Milehouse Park & Ride / Life Centre exit	1376				
Park Avenue / Granby Way	1395		✓		✓
Mannamead Road mid link	1550			✓	
Old Laira Road / Bramley Road	1627	✓		✓	
Old Laira Road / Wycliffe Road	1628	✓		✓	
Shapters Rd / Cattedown Rd	1630		✓		✓

Glen Road / Eagle Road	1653	✓		✓	
Tamerton Road / Belliver Way	1664		✓		✓
Forder Valley Road / Novorossisk Road	1675	✓	✓	✓	✓
Forder Valley Road north of Forder Valley Interchange	1676	✓	✓	✓	✓
Derrys Cross / Royal Parade	1679				
Royal Parade / Armada Way (Crossing)	1680		✓		✓
Royal Parade / St. Andrews Cross	1681		✓		
Union Street west of Derry's Cross	1682		✓		✓
Forder Valley Road	1685	✓		✓	
Embankment Road / Embankment Lane	1695			✓	
A38 W/B toward Tamar Bridge	1700		✓		✓
A38 E/B toward Weston Mill	1701	✓			
A38 E/B toward Manadon Roundabout	1703			✓	
A38 W/B towrd Weston Mill	1704		✓	✓	✓
A38 W/B toward Manadon Roundabout	1706		✓		
Derriford Roundabout / Tavistock Road	1732		✓	✓	✓
Outland Road / Park and Ride	3005				
Laira Bridge Road / Embankment Lane	3007	✓		✓	
A38 W/B / Marsh Mills W/B on-slip	4001	✓			
Sherford High Street / Plympton Hill	4002			✓	✓
Haye Road / Sherford Main Street	4003	✓		✓	✓
Tavistock Road north of William Prance Road	4076		✓		✓
Tavistock Road	4078			✓	✓
Billacombe Road / Broxton Drive	4101		✓		✓
Billacombe Road / Pomphlett Road	4104	✓			
Exeter Street east of Charles Cross Roundabout	4108		✓		✓