

WHITE MARE POOL JUNCTION STUDY



A194/A184 WHITE MARE POOL – EMERGING PRESSURES

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EXECUTIVE SUMMARY

The South Tyneside Infrastructure impact study, undertaken by SYSTRA on behalf of National Highways in 2019, tested the impact of South Tyneside's Local Plan (2019 draft allocations) on the Strategic Road Network [SRN]. The study identified schemes to mitigate the impact of the plan in 2023 and 2028. However, 2033 scenarios included significant delay on the SRN and local roads, illustrating a severe impact. The main delays originated at the A185/Priory Road (Jarrow) junction, and the A194/A184 White Mare Pool.

A potential scheme was found for Jarrow area in a further study undertaken by SYSTRA on behalf of National Highways: "A19/A185 Jarrow Junction Study". The current study aimed to identify a scheme which addresses the future congestion issues at White Mare Pool.

National Highways' Aimsun Next model was used to test the impacts of the 2019 draft Local Plan allocations on the strategic road network in South Tyneside. Future traffic flows for 2033 were forecast and a number of schemes were tested at White Mare Pool area. The majority of the schemes and combination of schemes were discarded because they did not operate effectively.

A194/A184 Half throughabout (Option 9) shows significant improvements in the operation of the White Mare Pool junction. The results show that the network will be operating within capacity when the full Local Plan traffic is included for 2033, based on the 2019 draft allocations.

An additional test has also been undertaken of the release of 1000 to 1500 houses at the Land south of Fellgate on top of the 2019 draft allocations. This set of traffic flows was tested with the Option 9 half throughabout at White Mare Pool, and an enlarged signalised roundabout layout at the A194 Leam Lane/Mill Lane roundabout to provide access to the Land south of Fellgate site. The outputs show that there is little impact along the A194, although there is a small increase in delay at the A19 northbound merge at Jarrow.

Additionally, a stress test was undertaken to identify the consider the extra trips that can be accommodated on the SRN in the White Mare Pool area for new development before any scheme is delivered. The outputs present safety concern on the A184 east and A184 south when 100 additional trips per hour are included.

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1. INTRODUCTION

1.1 Background

- 1.1.1 The South Tyneside Infrastructure Study, undertaken by SYSTRA on behalf of National Highways in 2019, tested the impact of South Tyneside’s 2019 draft Local Plan on the Strategic Road Network [SRN].
- 1.1.2 The study identified schemes to mitigate the impact of the 2019 draft Local Plan in 2023 and 2028. However, the results for 2033 presented significant delays at the A19/A185/Priory Road (Jarrow) junction, and the A194/A184 White Mare Pool. Therefore, as part of a later study named A19/A185 Jarrow Junction Study, potential schemes at Jarrow were developed, concluding that solutions were available to address these delays.
- 1.1.3 The A194/A184 White Mare Pool – Emerging Pressures study aims to identify solutions to existing and future congestion at White Mare Pool junction. The first phase of work (Task B) was completed in June 2021. This task identified that a potential Land south of Fellgate site can accommodate between 1000 and 1500 houses before the impact on the SRN becomes unacceptable. Detailed information is included in the “Large Greenbelt Release - Aimsun testing” document issued on 15/07/2021.
- 1.1.4 The purpose of this current study is to identify a scheme which addresses the future congestion issues at White Mare Pool. While the project was in progress, an extra task was added to confirm that, as well as growth associated with the 2019 draft Local Plan allocations, the new scheme can also accommodate any impacts on the on the SRN associated with the Land south of Fellgate site. This tasks was intended to support the inclusion of the Land south of Fellgate site in the 2021/22 allocations.
- 1.1.5 Additionally, a stress test is undertaken to consider the quantum of new development trips that can be accommodated on the SRN in the White Mare Pool area before the junction is upgraded.
- 1.1.6 This study used the South Tyneside Infrastructure Study model and includes one of the proposed schemes at Jarrow tested in the A19/A185 Jarrow Junction Study. This model is referred to as STsHy18 and its development is set out in the Reference Case Technical Note issued on 01/10/2021.

1.2 Model area

- 1.2.1 The study area covers from north of the Tyne Tunnel to south of the Downhill Lane junction along the A19, and south of the Follingsby junction along the A194. It also includes the Arches (A185 and Newcastle Road) and the A184 from east of Testos to west of White Mare Pool. The model area is shown on Figure 1.1 below.

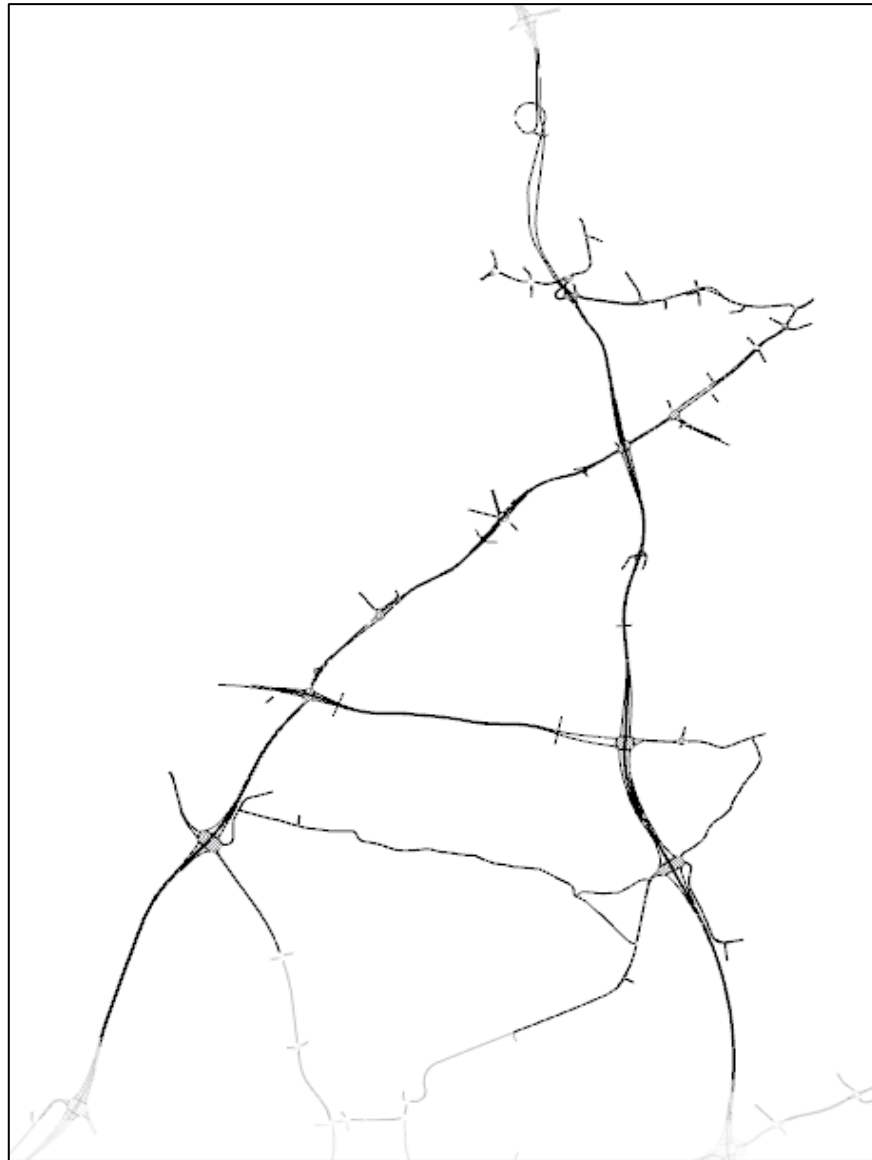
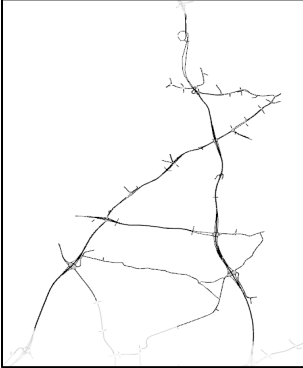


Figure 1.1 South Tyneside Infrastructure Study model network.

1.3 Model summary

- 1.3.1 STsHy18 was developed using the Aimsun Next software package, version 8.3.1. The model was built as a hybrid subnetwork of the Tyne and Wear A19 model built in 2018. Most of the model is at mesoscopic level, with a microscopic area at Jarrow and White Mare Pool/ Mill Lane.
- 1.3.2 Key details of the model are set out in Table 1.1 below.

Table 1.1 Model summary table.

ELEMENT	SPECIFICATION
Model time periods	Average weekday AM (06:00-10:00) Average weekday PM (15:00-19:00)
Warm up / cool down	Warm up 30 minutes AM, 30 minutes PM 30 minutes cooldown
Simulation area	
Public transport	Bus services and stops from base model
Assignment	Dynamic User Equilibrium [DUE] Max iterations 100 – converged
Model calibration	None undertaken within this project
Model validation	None undertaken within this project
Software version	Aimsun 8.3.1
Model level	Hybrid (meso/micro) (Micro at White Mare Pool and Mill Lane Roundabout)
Model name & parent	South Tyneside subnetwork (STsHy18) Parents A19 Tyne & Wear model/2019 South Tyneside Infrastructure Study
Future year demand	Base demand / 2019 draft Local Plan Allocations / Land south of Fellgate 1500 houses

2. MODELLING METHODOLOGY

2.1 Testing scenarios

- 2.1.1 A number of scenarios have been tested as part of this study, to eliminate schemes and combinations of schemes which did not operate effectively. These included the original north-south throughabout design which was shown in the A194(M)/A184 White Mare Pool – Emerging Pressures Evidence Base report, produced for National Highways and dated 31st March 2021.
- 2.1.2 Results are provided only for scenarios which operate satisfactorily. The reported model scenarios are as follows:

Task A

Task A was project inception and is not documented in this report

Task B

Task B comprised initial testing of the potential Large Greenbelt Release at Land South of Fellgate and was documented in the “Large Greenbelt Release - Aimsun testing” document issued on 15th July 2021

Task C

- 2033 Do Minimum with 2019 draft Local Plan demand;
- 2033 Do Something Option 0 (East & South arm widening at White Mare Pool) with 2019 draft Local Plan demand;
- 2033 Do Something Option 6 (Spiral marked circulatory carriageway) with 2019 draft Local Plan demand; and
- 2033 Do Something Option 9 (A194/A184 Half throughabout) with 2019 draft Local Plan demand.

Further infrastructure options were also tested as part of Task C but are not reported since they did not operate satisfactorily.

Task D

Task D was adjustments to scheme designs, and is documented in section 2.2 Infrastructure schemes.

Task E

- 2021 Do Minimum with Amazon committed and indicative development trips at White Mare Pool existing layout.

Extra task

- 2033 Do Something Option 9 & Mill Lane roundabout (2019 draft Local Plan demand and Land south of Fellgate).

This task followed on from Task C, to check whether the scheme identified for White Mare Pool would continue to operate effectively if development at Land South of Fellgate comes forward. Task B had identified that 1000-1500 homes could be delivered at this site (compared to an initial proposal of 3000 homes), dependent on the level of provision by sustainable modes and consequent mode share by car. This

test therefore included 50% of the initial “worst case” traffic demand – this could represent 1500 homes with strong provision for sustainable modes and a low car mode share, or 1000 homes with a higher car mode share.

- 2.1.3 Only limited results are presented for Option 6, since the delays in this scenario were similar to the existing layout. Option 9 has significantly less delay and full results are provided here.
- 2.1.4 2033 has been adopted for testing the full 2019 draft Local Plan allocations which was established through the 2019 study. Results for the interim years of 2023 and 2028 are presented in the “South Tyneside Infrastructure Study Report” undertaken by SYSTRA on behalf of National Highways in 2019 . Results are not presented for the interim years in this report, since the traffic flows are unchanged. It is unlikely that any major schemes in congested areas such as Jarrow and White Mare Pool could be identified, designed, funded and delivered before 2028, so additional tests were not considered necessary.

2.2 Infrastructure schemes

- 2.2.1 A number of schemes have been included to test the scenarios above. A summary table of schemes by scenario is included at the end of this section.
- 2.2.2 Several schemes have been already included in previous studies which formed part of the 2019 draft Local Plan testing, see below:
 - Free flow toll payment at the Tyne Tunnel northbound;
 - Tyne Tunnel (Epinay loop) ramp metering;
 - A19 northbound lane gain from Lindisfarne;
 - Testos / Downhill Lane;
 - North arm widening at White Mare Pool;
 - East arm widening at White Mare Pool;
 - South arm widening at White Mare Pool;
 - Jarrow and Port of Tyne Dualling; and
 - Mill Lane signalisation.
- 2.2.3 The first five of these are either already complete, or under construction as of December 2021. The Jarrow junction upgrade scheme is not committed since no funding has been identified, however it has been included to ensure that traffic is not held up at Jarrow, changing network operation and flow patterns at White Mare Pool.

Additionally, three more infrastructure scheme options have been tested in STsHy18:

1. Option 6 – Spiral marked circulatory carriageway

- 2.2.4 A spiral marked roundabout at White Mare Pool was included as one of the Do Something scenarios. The scheme is shown in Figure 2.1 below.

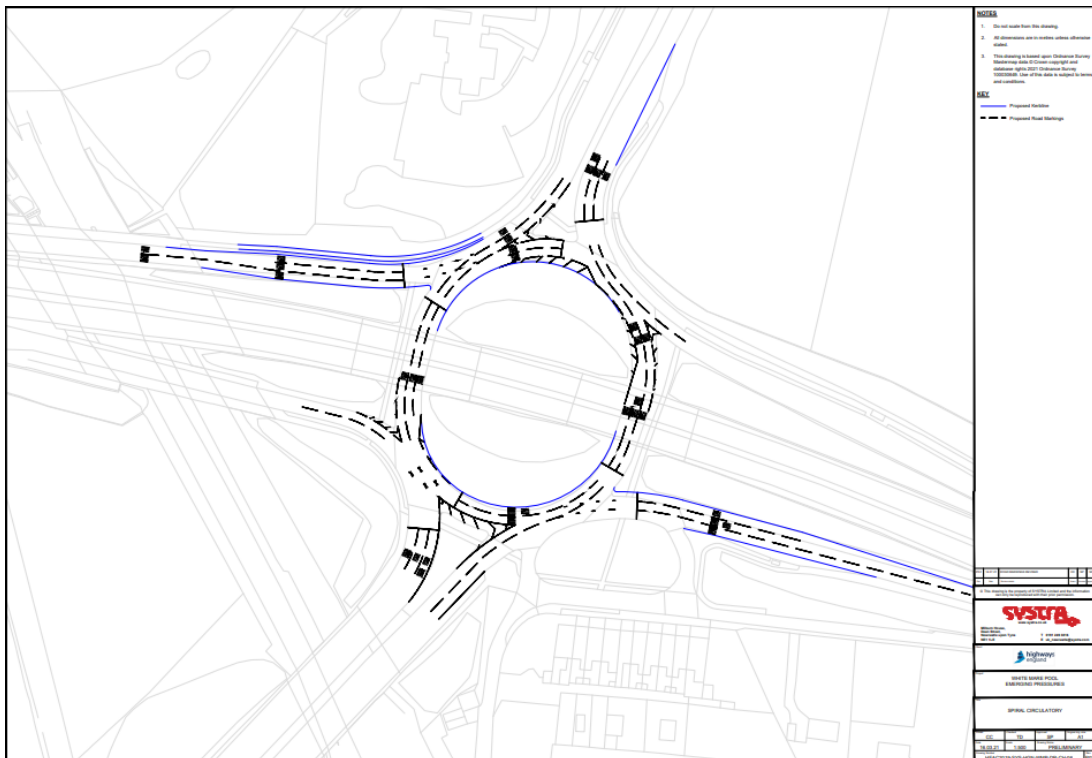


Figure 2.1 Spiral marked circulatory carriageway at White Mare Pool.

2. Option 9 - A194/A184 half throughabout

- 2.2.5 The previous Emerging Pressures study identified two throughabout options at White Mare Pool. The first provided through movements from north to south and south to north. This has been tested in the Aimsun model, and does not operate effectively.
- 2.2.6 The second option provided through movements for both right turns, as shown in Figure 2.2 below. Further assessment of the forecast traffic flows at the junction demonstrated that the south to east right turn does not require a dedicated through movement, and would not result in enough benefit to counterbalance the additional conflict created by the through movement at the northeast corner of the junction. A modified “half throughabout” (excluding the south to east route as identified by the red cross on Figure 2.2) was therefore tested as one of the Do Something scenarios.

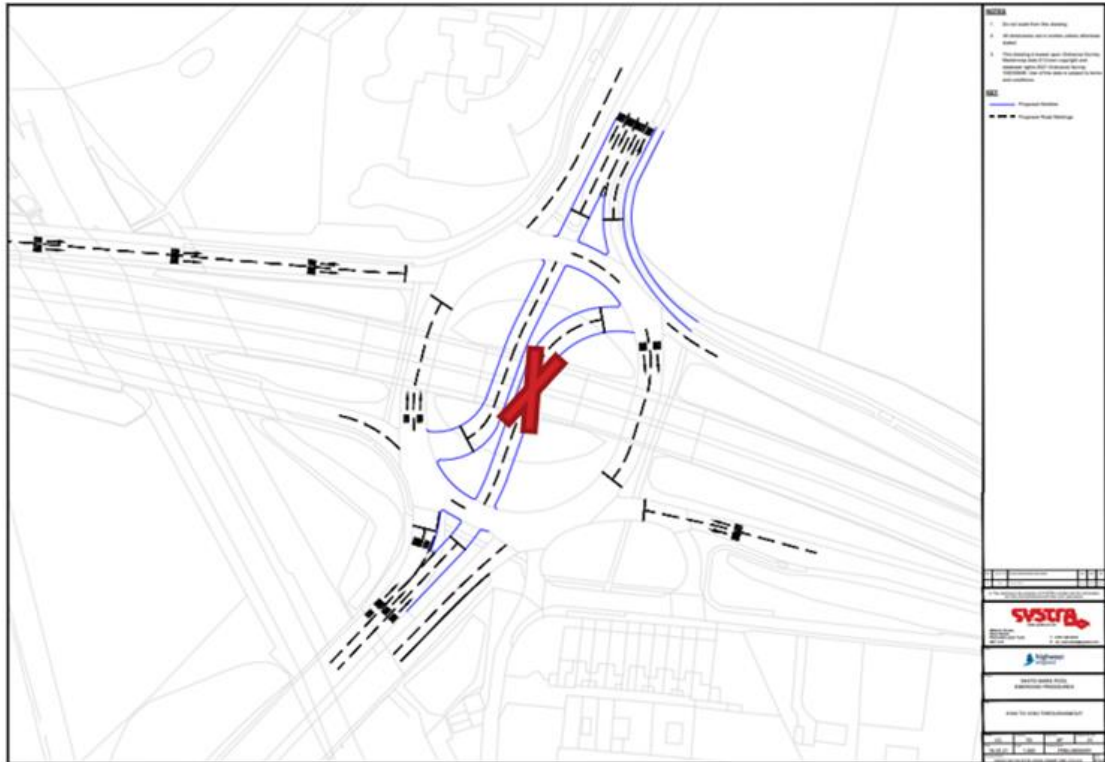


Figure 2.2 A194/A184 Half throughabout at White Mare Pool.

3. Mill Lane roundabout

2.2.7 A design for a three lane wide signalised roundabout at the A194 / Mill Lane junction with two new accesses to the Land south of Fellgate site scheme was provided by iTransport on 22nd September 2021. This scheme was included in the final Do Something scenario. The scheme is shown in Figure 2.3 below.

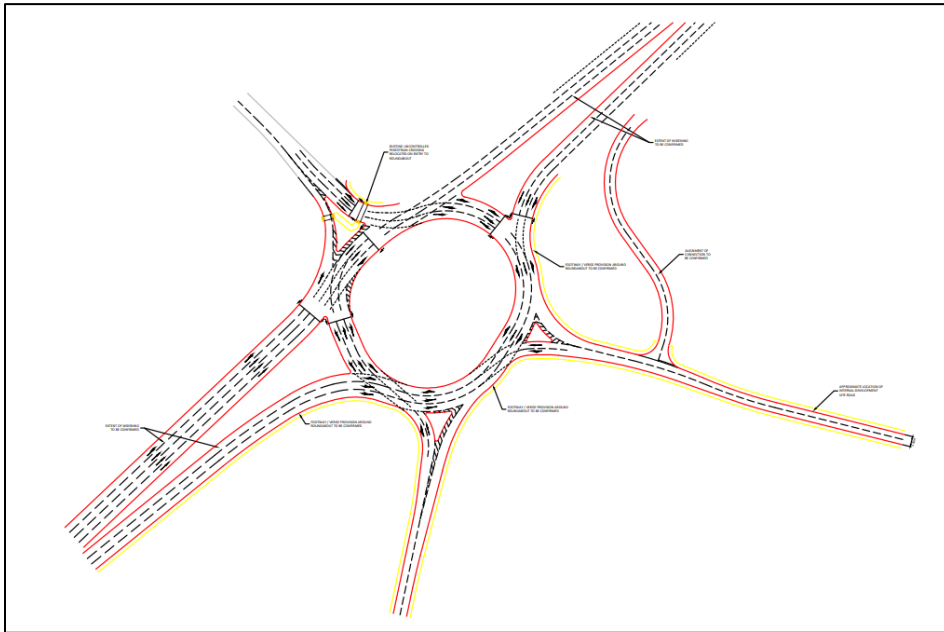


Figure 2.3 Three lane and signalised roundabout at Mill Lane.

2.2.8 The following Table 2.1 summarises the schemes used for each scenario.

Table 2.1 Infrastructure schemes.

SCENARIO ID	TASK C	TASK C	TASK C	TASK C	TASK C	TASK E	EXTRA TASK
Schemes	2018 reference	2033 Do minimum	2033 Do Something Option 0	2033 Do Something Option 6	2033 do something option 9	2021 do minimum	2033 Do Something Option 9 (Fellgate)
Lindisfarne lane gain							
Testos / Downhill Lane							
Tyne Tunnel free flow tolls							
Tyne Tunnel ramp metering							
Jarrow & Port of Tyne dualling							
North arm widening at WMP							
Mill Lane signalisation							
East arm widening at WMP							
South arm widening at WMP							
Spiral marked circulatory							
A194-A184 half throughabout							
Mill Lane enlarged Roundabout							

2.3 Future demand

2033 Local Plan demand

- 2.3.1 The future Local Plan traffic demand was calculated for the 2019 South Tyneside Infrastructure Study as described in previous reporting. The demand includes full Local Plan traffic, based on the 2019 allocations, and was applied for all 2033 scenarios, both Do Minimum and Do Something.
- 2.3.2 The modelled time periods are:
- Morning period: 06:00 to 10:00; and
 - Evening period: 15:00 to 19:00.

Land south of Fellgate development demand

- 2.3.3 For the Land south of Fellgate site, development traffic was ascertained from the South Tyneside Greenbelt Release – Sustainable Access Review dated 16th July 2021, produced by SYSTRA on behalf of South Tyneside Council. This allowed for the development of a separate matrix to be built manually.
- 2.3.4 The development matrix was built as follows:
1. Trip generation was taken from previous reports as described above.
 2. Trip distribution for the development was obtained from National Highways' GraHAM tool.
 3. Four access points to the modelled network were used (two new accesses at the new A194 Leam Lane / Mill Lane roundabout, the left in / left out junction of Durham Drive with the A194 Leam Lane, and Abingdon Way via Hedworth Lane).
 4. Where necessary trips were distributed to the wider modelled area proportionally as for the 2033 Local Plan demand.
 5. This provided traffic flows for the peak hours only (08:00-09:00 and 17:00-18:00). Shoulder peak hours were calculated by applying factors obtained from adjacent ATC counters. This was checked against TRICS residential profiles and was similar, but included factors for 06:00-07:00 which were not available from TRICS.
- 2.3.5 The previous Task B model test included the full development content of the Land south of Fellgate, with a mode share identified as typical for this area: this was considered to be 3000 houses, with a car driver mode share of 61%.
- 2.3.6 This test resulted in significant delays on the Strategic Road Network [SRN] and suggested that the full build out with typical mode share would unacceptable to National Highways.
- 2.3.7 This demand was included in scenario 2033 X9. For the scenario reported here, 50% of the Land south of Fellgate demand was used. This could represent 1500 houses with the “typical” mode share, or a higher number of dwellings but a lower proportion of car trips.

Total demand

- 2.3.8 A summary of the total traffic demands is provided in Table 2.2 below.

Table 2.2 Matrix totals (vehicles)

SCENARIOS	MORNING PERIOD (06:00-10:00)	EVENING PERIOD (15:00-19:00)
2018 Reference	70,447	78,035
2033 Do Minimum	79,510	87,820
2033 Do Something	79,510	87,820
Fellgate at 50%	1,628	2,570

3. OUTPUTS – WHITE MARE POOL SCHEME TESTING

- 3.1.1 As discussed earlier, various iterations of schemes at White Mare Pool have been tested, most notably committed widening on the south and east arms (Option 0), the spiral marked roundabout (Option 6), the straight north-south throughabout and the half throughabout (Option 9). Option 6 and Option 9 were the most promising schemes, therefore those have been reported.
- 3.1.2 No results are presented for the throughabout since the model did not converge so no valid results were available. Option 6 is sufficient to accommodate the 2019 draft Local Plan allocations but is close to capacity by the end of the plan. Visual results are presented for Option 0 (widening on east and south arms at White Mare Pool) and Option 6 as well as Option 9. Option 9 provides additional capacity and for clarity numerical results are presented only for Option 9.
- 3.1.3 The model was set up to 100 iterations and 0.05% Rgap with Dynamic User Equilibrium approach and all the scenarios converged. Results from each scenario have been compiled from the model and presented here. Results collected include:
 - Overall network performance statistics;
 - Journey time; and
 - Queue length – visual results.

3.2 Overall network performance statistics

- 3.2.1 This section gives information on the overall operation of each of the scenarios. To measure the performance of the scenarios the following key performance indicators (KPIs) were assessed in this study:
 - Average speed;
 - Average journey time;
 - Average delay time; and
 - Throughput.
- 3.2.2 Table 3.1 and Table 3.2 below shows the KPIs for all scenarios.

Table 3.1 Overall network performance statistics, morning period

SCENARIO	Average Speed (kph)	Average Travel Time (mm:ss)	Average Delay Time (mm:ss)	Throughput (vehicles)
2018 Reference	52	06:38	00:32	70327
2033 Do Minimum	53	05:54	00:26	79672
2033 Do Something	54	05:40	00:24	79622

Table 3.2 Overall network performance statistics, evening period

SCENARIO	Average Speed (kph)	Average Travel Time (mm:ss)	Average Delay Time (mm:ss)	Throughput (vehicles)
2018 Reference	53	05:36	00:23	77941
2033 Do Minimum	51	06:07	00:30	88710
2033 Do Something	52	05:49	00:28	88752

3.2.3 There are some discrepancies between the demand and throughput; in particular for all 2033 scenarios the throughput is slightly higher than the total demand from Table 2.2 above. This is due to two factors. Firstly, the output (throughput) is collected for the modelled period, with each vehicle counted as it completes its trip – so some of the demand from the warmup period will be included in the throughput, although it is not included in the matrix total. Also, the model runs with an element of random variability called “exponential release”. This means that for instance if the demand is 3600 vehicles per hour, the vehicles will not be released in exactly one second intervals. This variability can mean that the actual number of vehicles release in the modelled period may vary slightly.

3.2.4 The 2033 Do Minimum for the purpose of this study includes a significant scheme at Jarrow. This is enough to accommodate demands in the morning period with no increase in delay from the 2018 base. In the evening the overall network delays are increased in the Do Minimum, with average speed across the network dropping from 54km/h in the base to 51km/h in the 2033 Do Minimum. The White Mare Pool scheme in 2033 Option 9 brings the average speed back up to 52 km/h with average journey times similar to the base (5 minutes and 49 seconds, compared to 5 minutes and 36 seconds).

3.2.5 The traffic passing through the model in 2033 is around 14% higher than in the 2018 base.

3.3 Journey times

3.3.1 This section provides a summary of the journey times along the key A19, A194 and A184 routes for the 2018 Reference, 2033 Do Minimum and 2033 Do Something Option 9 scenarios in both morning and evening periods. The journey times routes are:

- The A19, measured between the A19 mainline north of Jarrow and A19 mainline south of Downhill Lane;
- The A194, measured between John Reid Road and the A194(M) mainline south of Follingsby; and
- The A184, measured between Testos and the A184 mainline west of White Mare Pool.

3.3.2 The journey times and how they change through the peak periods can be seen in Figure 3.1 to Figure 3.6 below.

A19 Journey times

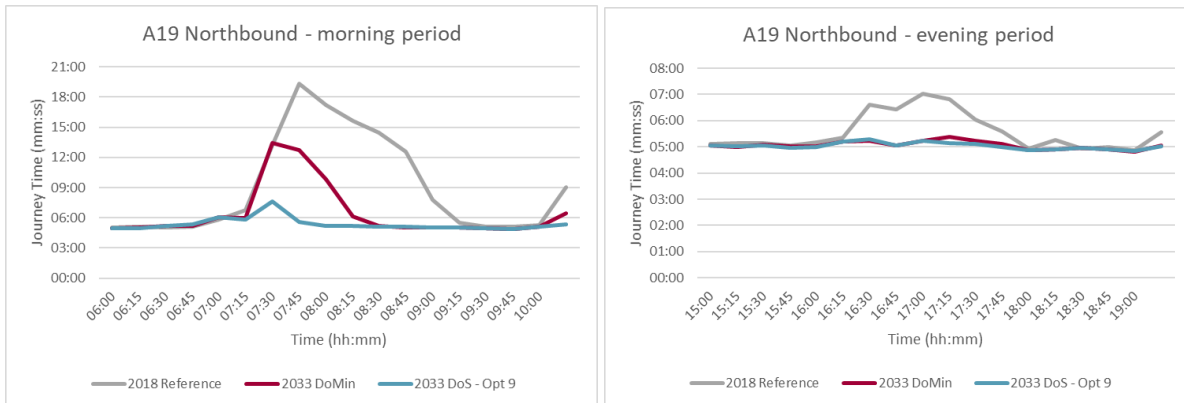


Figure 3.1 A19 northbound journey times

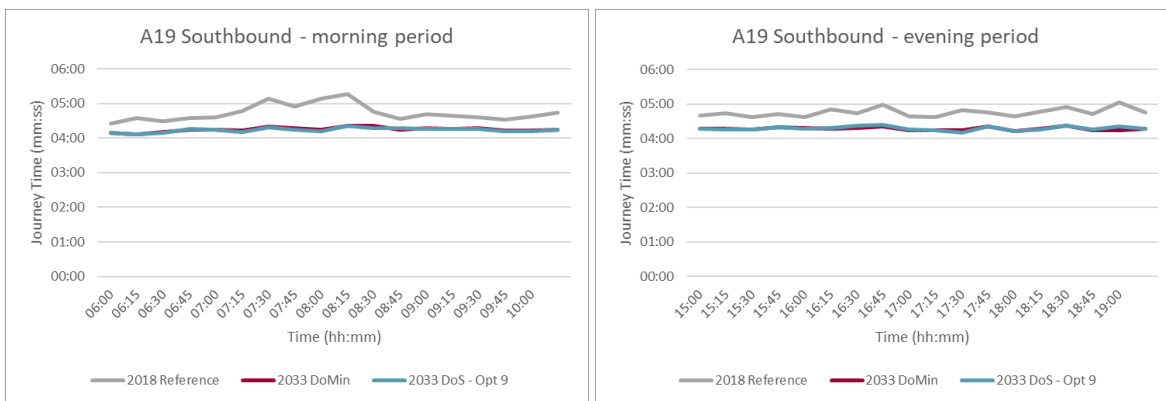


Figure 3.2 A19 southbound journey times

- 3.3.3 In the 2018 base there are delays on the A19 northbound, primarily due to delays at Lindisfarne and Jarrow. In the 2033 Do Minimum the lane gain is included, and the indicative scheme at Jarrow junction. These eliminate delays in the evening peak, and significantly reduce the delays in the morning peak. Some delay remains, primarily due to weaving between Lindisfarne and Jarrow. When the White Mare Pool scheme is included, vehicles are able to choose the best routes, reducing weaving. This reduces the delays further in the morning period.
- 3.3.4 A19 southbound journey times drop in all 2033 scenarios due to implementation of the grade separation scheme at Testos.

A194 Journey times

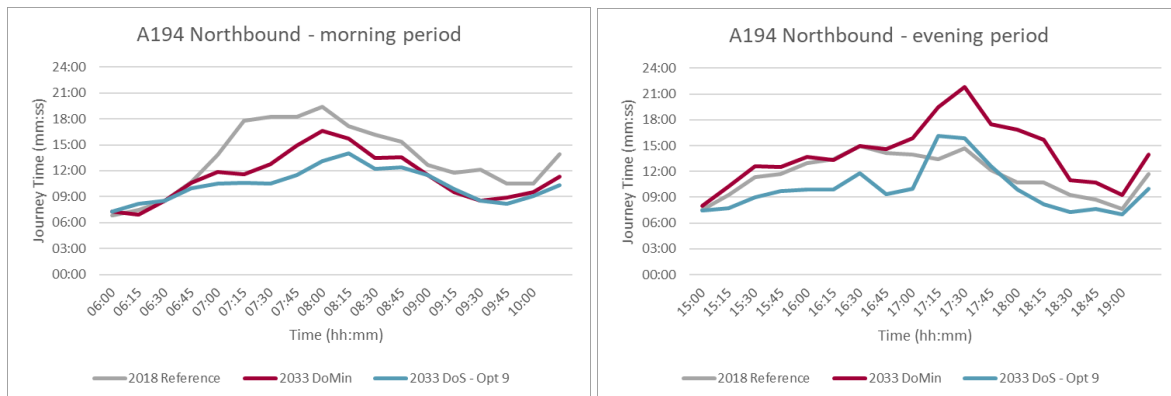


Figure 3.3 A194 northbound journey times

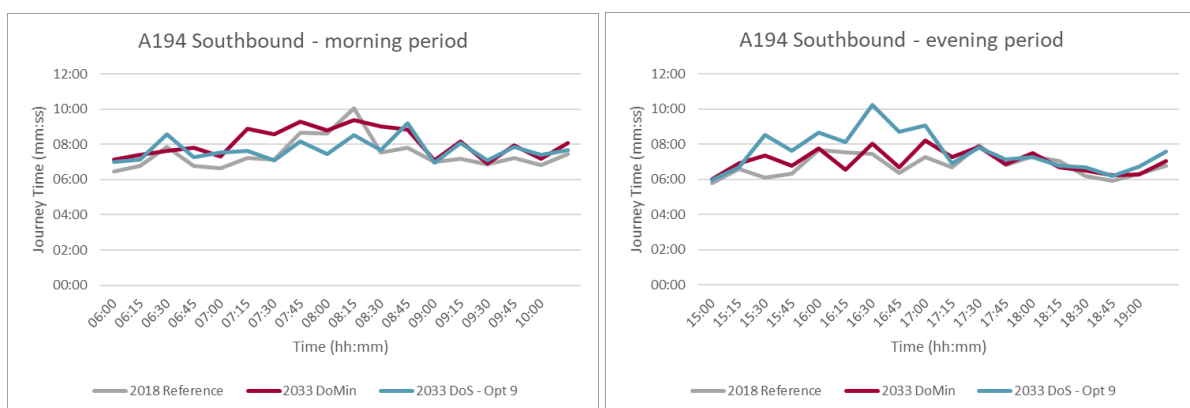


Figure 3.4 A194 southbound journey times

- 3.3.5 In the morning period the A194 experiences northbound delays at both White Mare Pool and Lindisfarne. Lindisfarne delays are reduced by the lane gain in the 2033 Do Minimum, and White Mare Pool delays are reduced by the Option 9 throughout scheme in the 2033 Do Something.
- 3.3.6 In the evening period existing delays on the A194 northbound worsen in the 2033 Do Minimum, but journey times in the 2033 Do Something are faster than the base for most of the peak period, due to the scheme at White Mare Pool. The improvement is partially counter-balanced by a slight increase in southbound journey time.

A184 Journey times

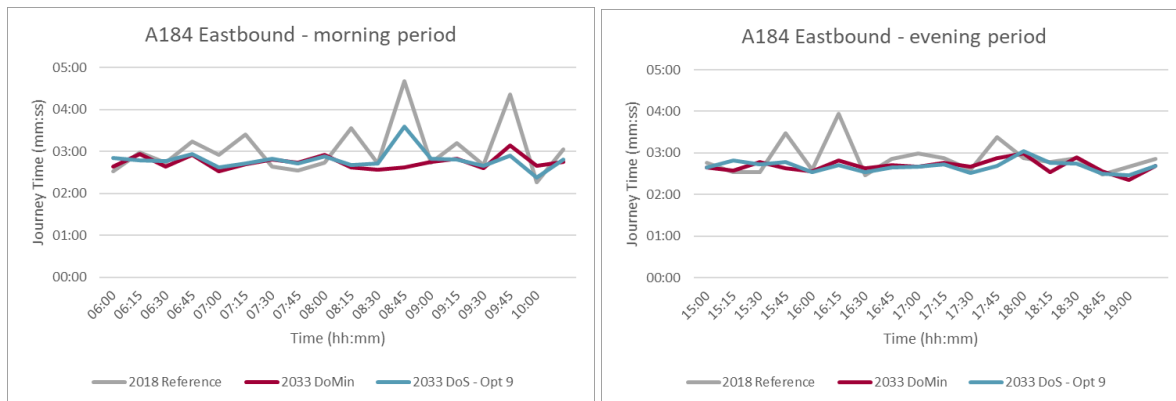


Figure 3.5 A184 eastbound journey times

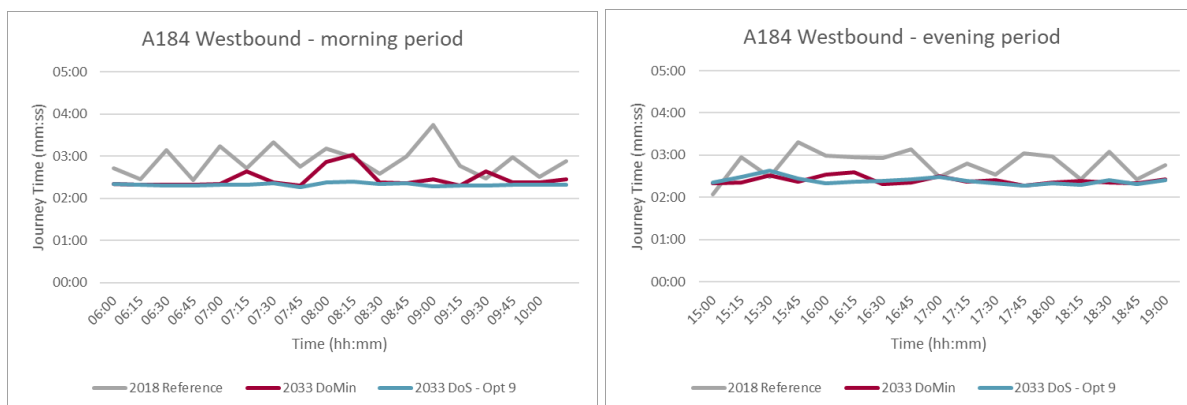


Figure 3.6 A184 westbound journey times

3.3.7 Journey times on the A184 in both directions are improved in 2033, primarily due to the scheme which has now been implemented at Testos. Some improvement is also seen at White Mare Pool with rebalancing of signal timings.

3.3.8 Overall, the 2033 Do Something Option 9 journey times are lower than 2018 reference and 2033 Do Minimum along the A19, A194 and A184.

3.4 Queue length - visual results

3.4.1 Screenshot results showing operation of the network are shown below. Each modelled road link is colour coded according to the delay ratio, with the actual travel time on that section divided by the free flow travel time to provide a measure of delay. Green shows free flowing traffic with very limited delays, and increasing levels of delay through yellow, orange and red to black showing the worst delays.

3.4.2 It should be noted that the delay ratio will always show some delays at junctions where vehicles give way or are controlled by traffic lights.

3.4.3 The legend is shown in Figure 3.7 below.

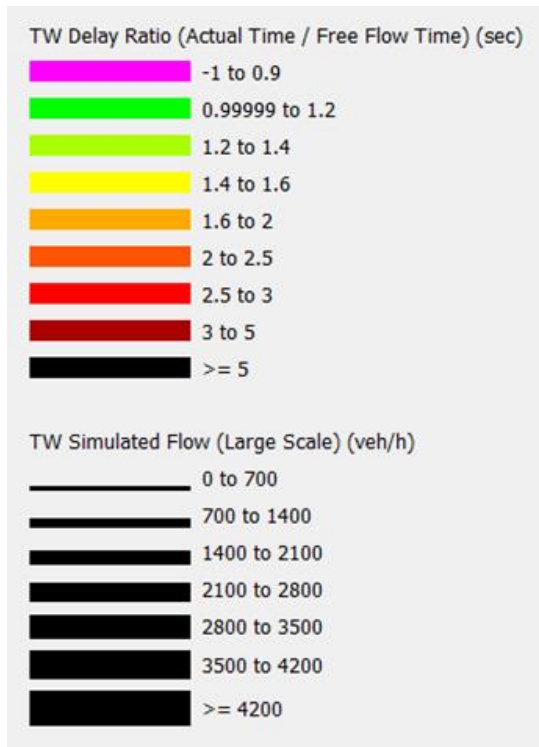


Figure 3.7 Simulated delay ratio with flow width legend.

3.4.4 The outputs are presented for both morning and evening peaks in the following scenarios:

- 2033 Do Minimum;
- 2033 Do Something – Option 0 (east and south arm widening at White Mare Pool);
- 2033 Do Something – Option 6 (spiral marked roundabout at White Mare Pool); and
- 2033 Do Something – Option 9 (half throughabout at White Mare Pool).

3.4.5 Figure 3.8 to Figure 3.15 show the worst 15min time period within the relevant scenario.

07:45:00

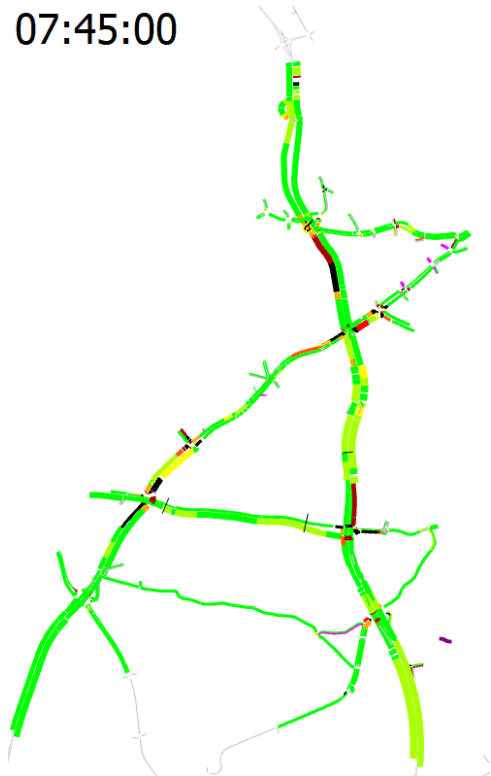


Figure 3.8 2033 Do Minimum, morning peak (07:45)

18:00:00



Figure 3.9 2033 Do Minimum, evening peak (18:00)

07:45:00



Figure 3.10 2033 Do Something Opt 0, morning peak (07:45)

18:00:00



Figure 3.11 2033 Do Something Opt 0, evening peak (18:00)

07:45:00

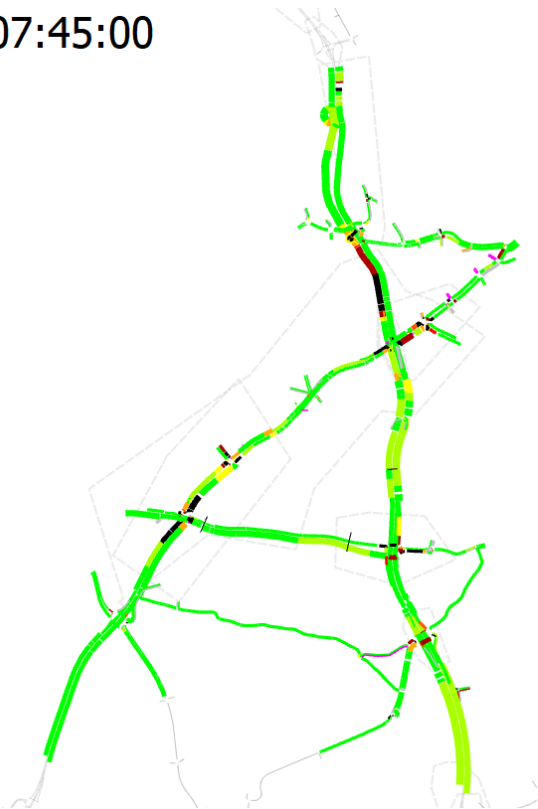


Figure 3.12 2033 Do Something Opt 6, morning peak (07:45)

18:00:00

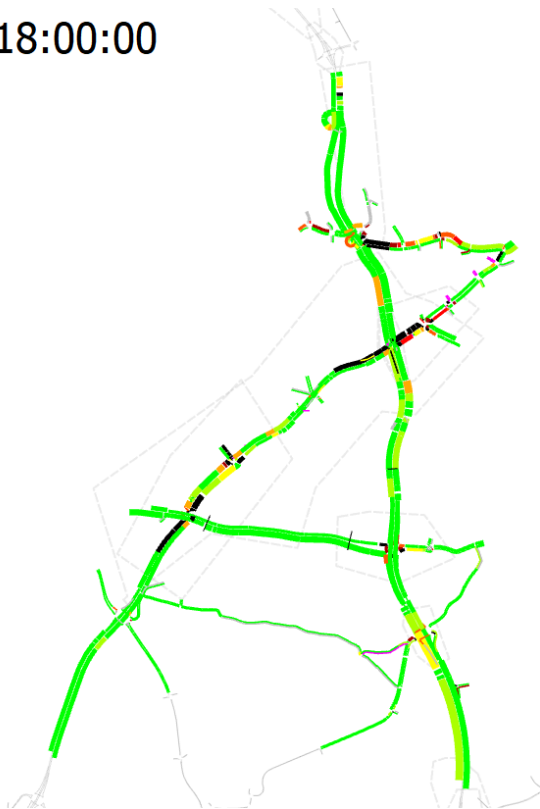


Figure 3.13 2033 Do Something Opt 6, evening peak (18:00)

07:45:00



Figure 3.14 2033 Do Something Opt 9, morning peak (07:45)

18:00:00



Figure 3.15 2033 Do Something Opt 9, evening peak (18:00)

- 3.4.6 The A194/A184 half throughabout (Option 9) scheme presents congestion improvements along the A194 at White Mare Pool for both morning and evening periods.
- 3.4.7 The visual outputs also present other schemes tested, however no significant improvements are observed at White Mare Pool.

4. LAND SOUTH OF FELLGATE SENSITIVITY TEST - OUTPUTS

4.1.1 The previous chapter demonstrates that the Option 9 half throughabout provides additional capacity at White Mare Pool and is expected to provide benefits beyond the end of the Plan period, based on 2019 draft Local Plan allocations.

4.1.2 Since the 2019 draft Local Plan allocations were published, a proposal has come forward for a large greenbelt release at Land south of Fellgate. Further model tests have been undertaken to identify whether the scheme at White Mare Pool continues to provide benefits when Land south of Fellgate is included. As set out in previous reports, the maximum number of dwellings acceptable to National Highways is 1000 with the existing 61% car driver mode share, or up to 1500 if enough sustainable measures are included to bring down the car driver mode share to 41%. These trips have been tested on top of the demand projected in 2033 inclusive of the 2019 draft Local Plan allocations, and with Option 9 included.

4.1.3 The additional 2033 Option 9 scenario was set up to 100 iterations and 0.05% Rgap with Dynamic User Equilibrium approach and it was converged. Results have been compiled from the model and presented here. As for the previous section, results collected include:

- Overall network performance statistics;
- Journey time; and
- Queue length – visual results.

4.2 Overall network performance statistics

4.2.1 This section gives information on the detailed operation of each of the scenarios. To measure the performance of the scenarios the following key performance indicators (KPIs) were assessed in this study.

- Average speed;
- Average journey time;
- Average delay time; and
- Throughput.

4.2.2 The Table 4.1 and Table 4.2 below shows the KPIs for all scenarios.

Table 4.1 Overall network performance statistics, morning period

SCENARIO	Average Speed (kph)	Average Travel Time (mm:ss)	Average Delay Time (mm:ss)	Throughput (vehicles)
2033 Do Minimum	53	05:54	00:26	79672
2033 Do Something	54	05:40	00:24	79622
2033 Do Something (Fellgate)	54	05:41	00:24	80485

Table 4.2 Overall network performance statistics, evening period

SCENARIO	Average Speed (kph)	Average Travel Time (mm:ss)	Average Delay Time (mm:ss)	Throughput (vehicles)
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2033 Do Minimum	51	06:07	00:30	88710
2033 Do Something	52	05:49	00:28	88752
2033 Do Something (Fellgate)	52	05:50	00:28	90352

4.2.3 The network statistics demonstrate that at the network level, the Land South of Fellgate site (with 1000-1500 homes) has no impact on operation.

4.3 Journey time

4.3.1 This section provides a summary of the journey times along the A19, A194 and A184 for the, 2033 Do Minimum, 2033 Do Something and 2033 Do Something (including Land south of Fellgate) scenarios in both morning and evening periods, see Figure 4.1 to Figure 4.6 below.

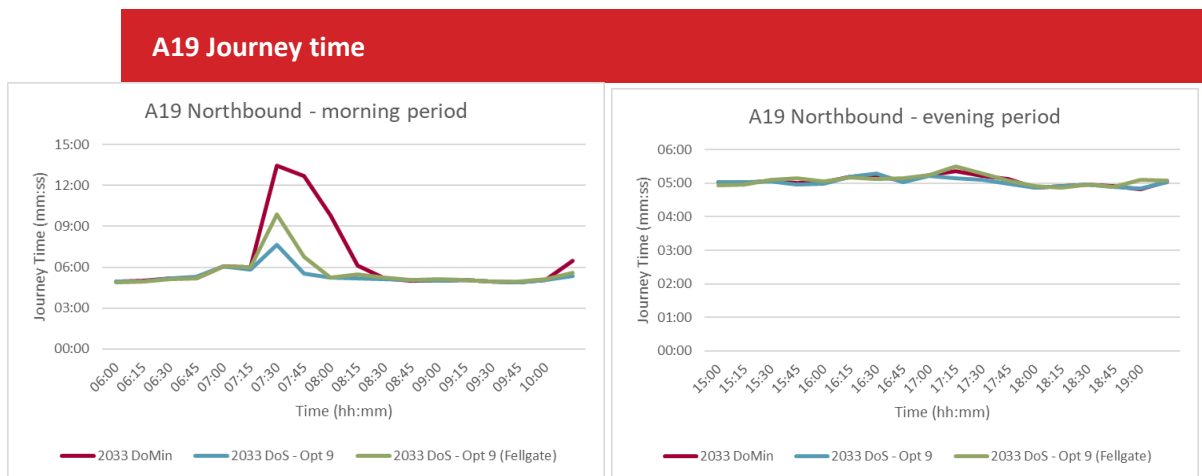


Figure 4.1 A19 northbound journey times

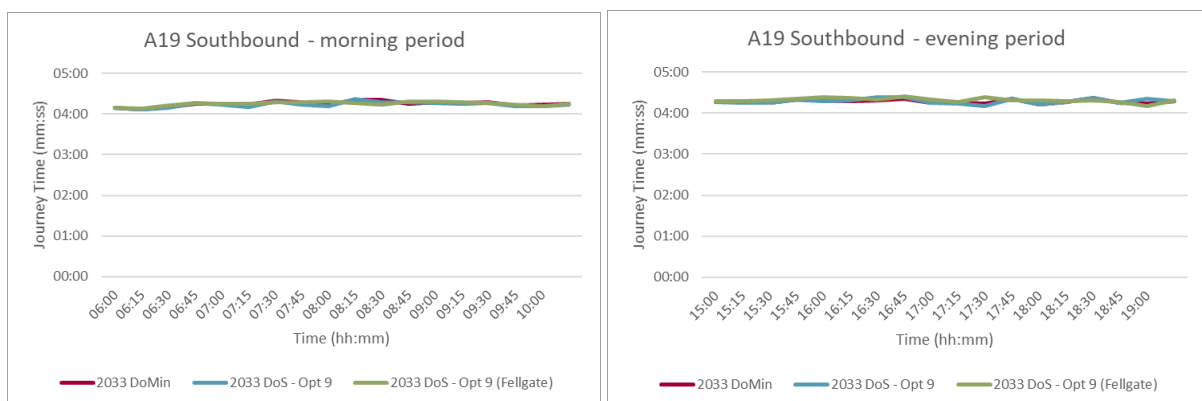


Figure 4.2 A19 southbound journey times

4.3.2 As in chapter 3, there are delays on the A19 northbound in the 2033 Do Minimum due to weaving between Lindisfarne and Jarrow. These delays are reduced by the White Mare Pool scheme due to more efficient routing. There is a small increase in delay when the Land south of Fellgate traffic is included, due to the general increase in traffic. Other directions and periods are unaffected.

A194 Journey time

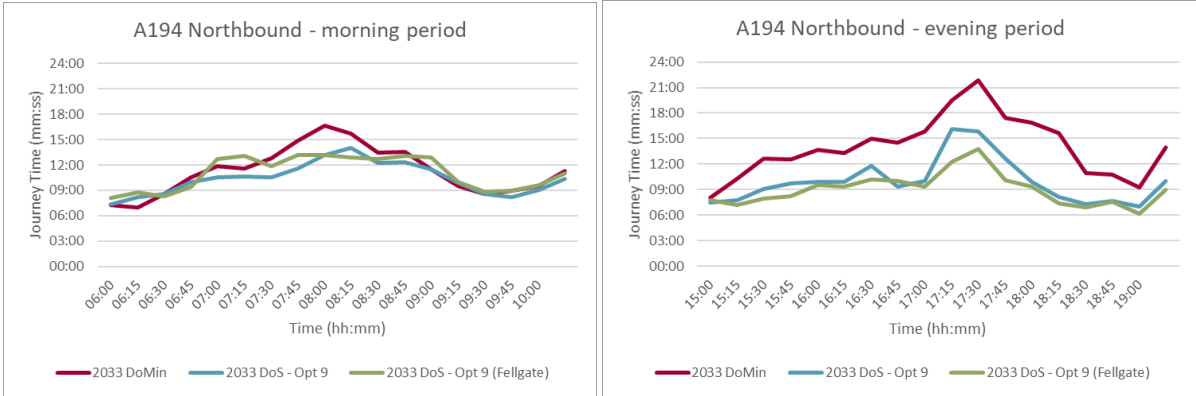


Figure 4.3 A194 northbound journey times

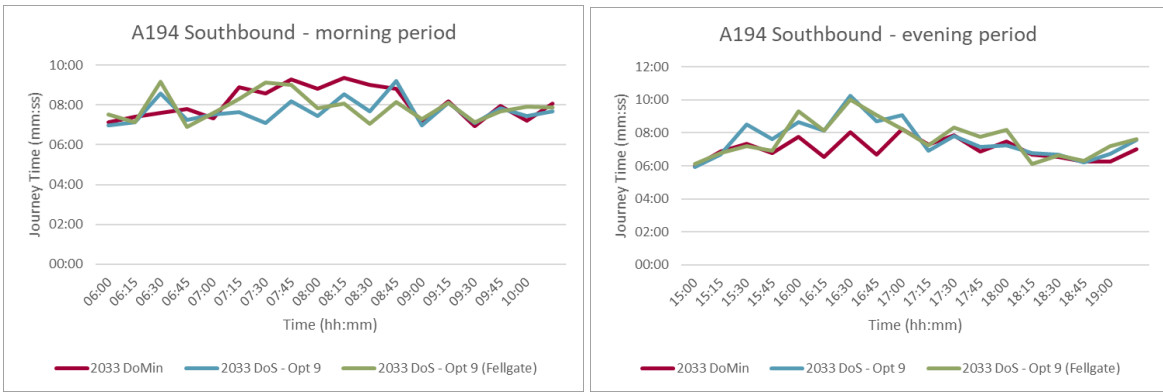


Figure 4.4 A194 southbound journey times

4.3.3 A194 journey times are largely unaffected by the Land south of Fellgate traffic, except for a small increase in southbound journey time in the morning period.

A184 Journey time

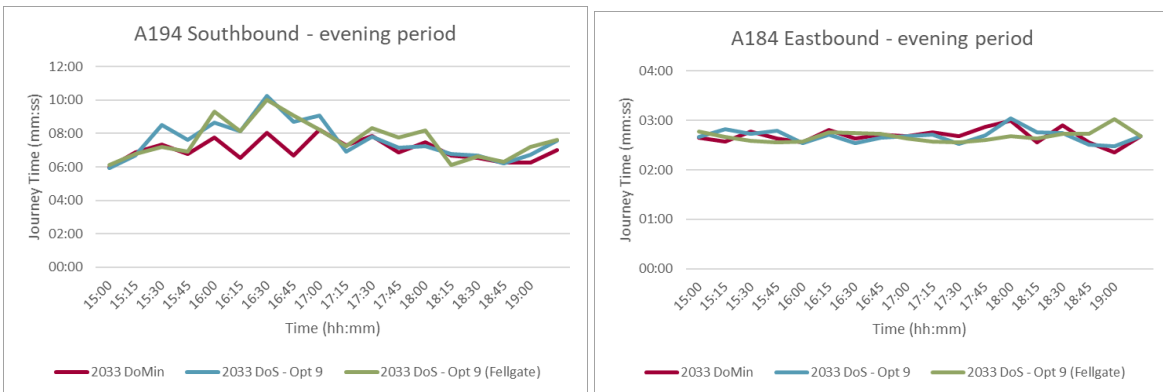


Figure 4.5 A184 eastbound journey times

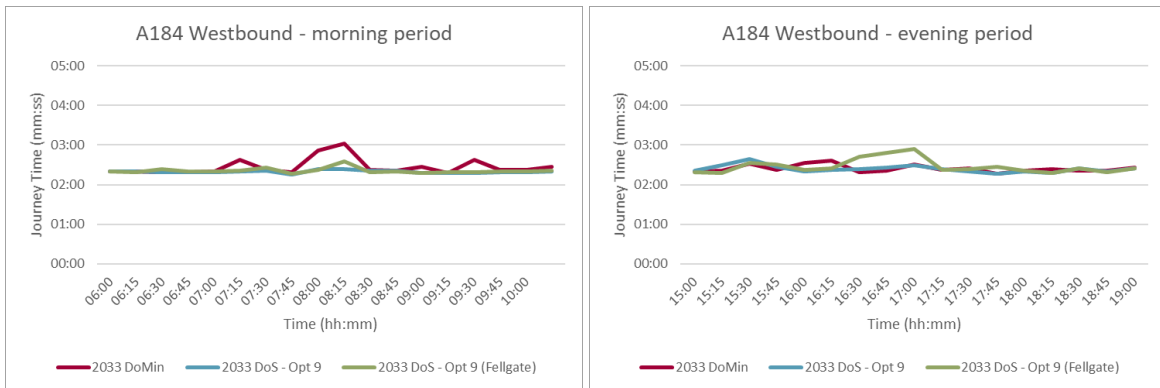


Figure 4.6 A184 westbound journey times

- 4.3.4 A184 journey times are largely unaffected by the Land south of Fellgate traffic.
- 4.3.5 Overall, the 2033 Do Something Option 9 with Land south of Fellgate does not present a significant increase in journey times along the A19, A194 and A184 compared to the 2033 Do Something Option 9 without Fellgate scenario. The small increase in A19 northbound journey time in the morning period is caused by traffic rerouting to find the quickest route, but the journey time remains well below the 2033 Do Minimum.

4.4 Queue length - visual results

- 4.4.1 Screenshot results showing operation of the network are shown below. Each modelled road link is colour coded according to the delay ratio, with the actual travel time on that section divided by the free flow travel time to provide a measure of delay. Green shows free flowing traffic with very limited delays, and increasing levels of delay through yellow, orange and red to black showing the worst delays.
- 4.4.2 It should be noted that the delay ratio will always show some delays at junctions where vehicles give way or are controlled by traffic lights.
- 4.4.3 The legend is shown in Figure 3.7 above.
- 4.4.4 Figure 4.7 and Figure 4.8 show the worst 15min time period within the 2033 Do Something Option 9 with Fellgate scenario.

07:45:00



18:00:00



Figure 4.7 2033 Do Something Opt 9 (Fellgate included), morning peak (07:45)

Figure 4.8 2033 Do Something Opt 9 (Fellgate included), evening peak (18:00)

4.4.5 The figures show that the A194/A184 half throughout (Option 9) still works successfully when including the Land south of Fellgate site demand for 1000 to 1500 homes.

5. WHITE MARE POOL – EXISTING CAPACITY TESTING

- 5.1.1 The existing layout at White Mare Pool is already congested, and a number of planning applications have been received which will add further traffic to the junction. Although many of the applications only add a small number of trips, there are concerns about the cumulative impact at this critical location.
- 5.1.2 Tests have been undertaken to identify when the impact of traffic increases at White Mare Pool becomes unacceptable. For the purpose of this task, it is assumed that an unacceptable impact would be either:
- the queue on one of the A184 approaches extending beyond the end of the slip road (leading to safety concerns as a slow-moving queue extends onto a free flowing mainline)
 - or
 - the queue on the A194(M) south arm extending back to interact with the Follingsby Lane merge (again leading to safety concerns).
- 5.1.3 SYSTRA tested the junction with an additional 100 trips per hour (25 per arm) including the north arm widening at White Mare Pool which is currently being built.
- 5.1.4 The Figure 5.1 and Figure 5.2 show the delay ratio, with the actual travel time on that section divided by the free flow travel time to provide a measure of delay for the worst 15min time period. The legend for these outputs is shown in Figure 3.7 above.

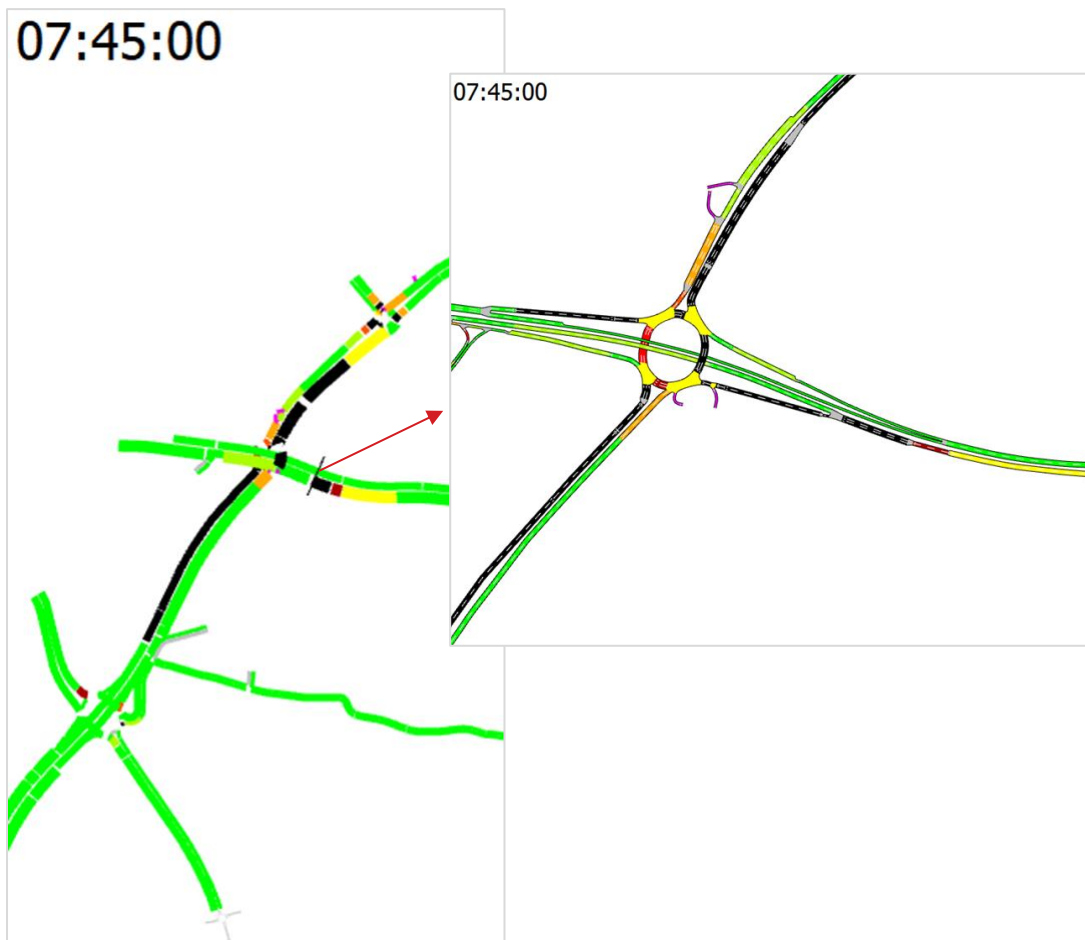


Figure 5.1 2021 Do Minimum, 100 vehicles extra, morning peak (07:45)

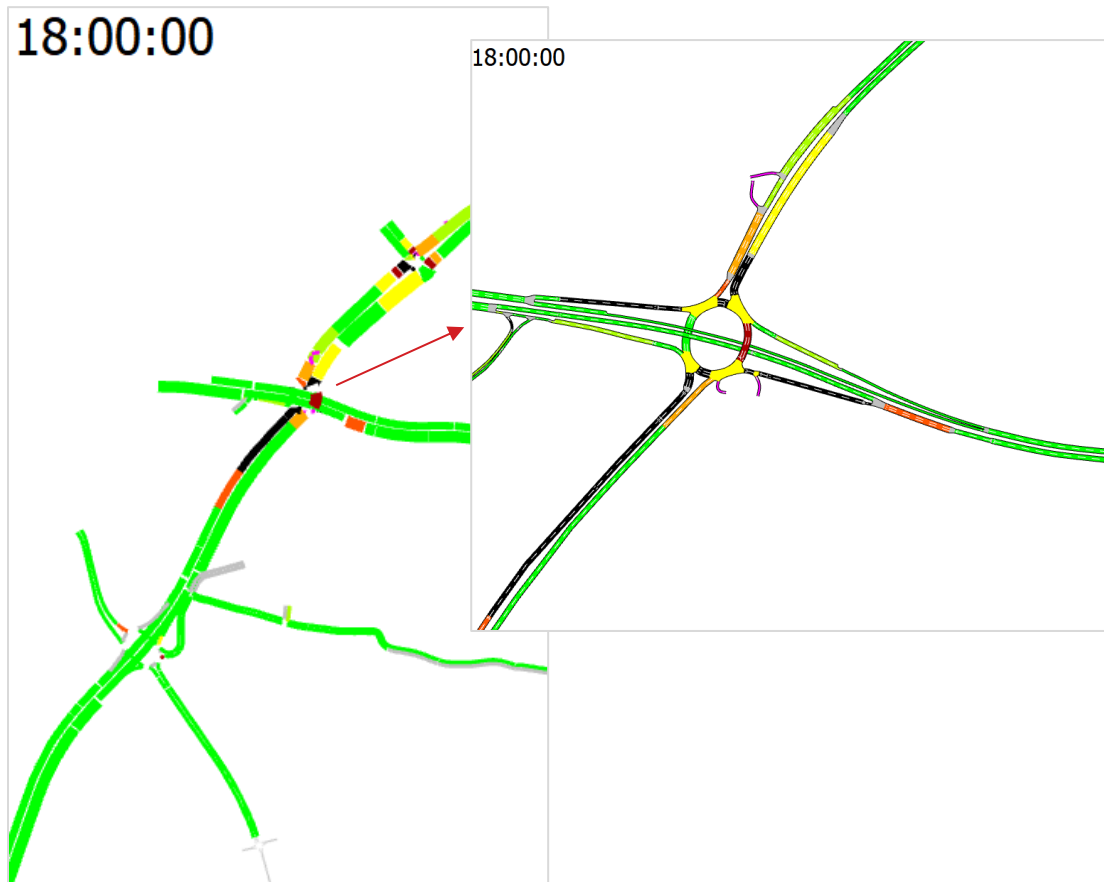


Figure 5.2 2021 Do Minimum, 100 vehicles extra, evening peak (18:00)

- 5.1.5 While the north widening arm scheme is expected to reduce queuing, the junction remains congested. The results show that when including 100 trips per hour (25 per arm) the queues on the A184 east and A194(M) south extend to points which are considered a safety concern.

6. SUMMARY

- 6.1.1 Potential infrastructure schemes at White Mare Pool have been tested for whether they could accommodate the impacts of the South Tyneside 2019 draft Local Plan (2019 allocations) up to 2033.
- 6.1.2 The most promising option is the A194/A184 half throughabout, which provides an additional route through the roundabout for traffic from A194 north to A184 west. This scheme (Option 9) shows significant improvements in the operation of the White Mare Pool junction, as well as positive impacts beyond White Mare Pool.
- 6.1.3 The release of 1000 to 1500 houses from the Land of south Fellgate scenario has been tested, combined with the Option 9 half throughabout, and an enlarged signalised roundabout layout at the A194 Leam Lane / Mill Lane roundabout. On most routes the additional traffic has little impact, although there is a small increase in delay at the A19 northbound merge at Jarrow before the Tyne Tunnel and its layout constraints.
- 6.1.4 Finally, a stress test (Task E) is undertaken to consider the quantum of new development trips that can be accommodated on the SRN in the White Mare Pool area before the junction is upgraded. This concludes that 100 additional trips per hour caused queues on the A194 south and A184 east which are considered a safety concern.

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