Tonbridge and Malling Local Plan Junction Modelling Report

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1. Introduction

In response to recent revisions to the National Planning Policy Framework (NPPF), Tonbridge and Malling Borough Council (TMBC) commissioned Jacobs to undertake an update of the Tonbridge and Malling Local Transport Model. The objective of this update was to reflect changes in site allocations within the emerging Local Plan and to assess the potential impacts of proposed developments on the performance of the local transport network.

Three development scenarios, Low, Medium, and High, were modelled using the strategic transport model. Table 1-1 summarises the scale of development assessed under each Local Plan scenario. While the spatial distribution of sites remains broadly consistent, the variation in residential and employment growth directly influences traffic demand and junction performance across the borough.

It should be noted that the Local Plan test used in this assessment was based on the high growth scenario, representing a robust and conservative approach to future demand forecasting. The outcomes of this analysis will help provide an early indication of junction capacity to help inform Tonbridge and Malling Borough Council's (TMBC) emerging spatial strategy. Further, testing will be required to reflect evolving policy priorities and community feedback and to test the preferred option at the Regulation 19 Local Plan stage.

Table 1-1: Low, Medium & High Scenarios

Scenarios	Total Residential Estimates (dwelling units)	Employment Estimate (sqm)
Local Plan (LP) Low	9,338	425,174
Local Plan (LP) Medium	12,179	464,334
Local Plan (LP) High	19,069	485,734

Figure 1-1 illustrates the geographical distribution of the proposed Local Plan development sites across the borough.

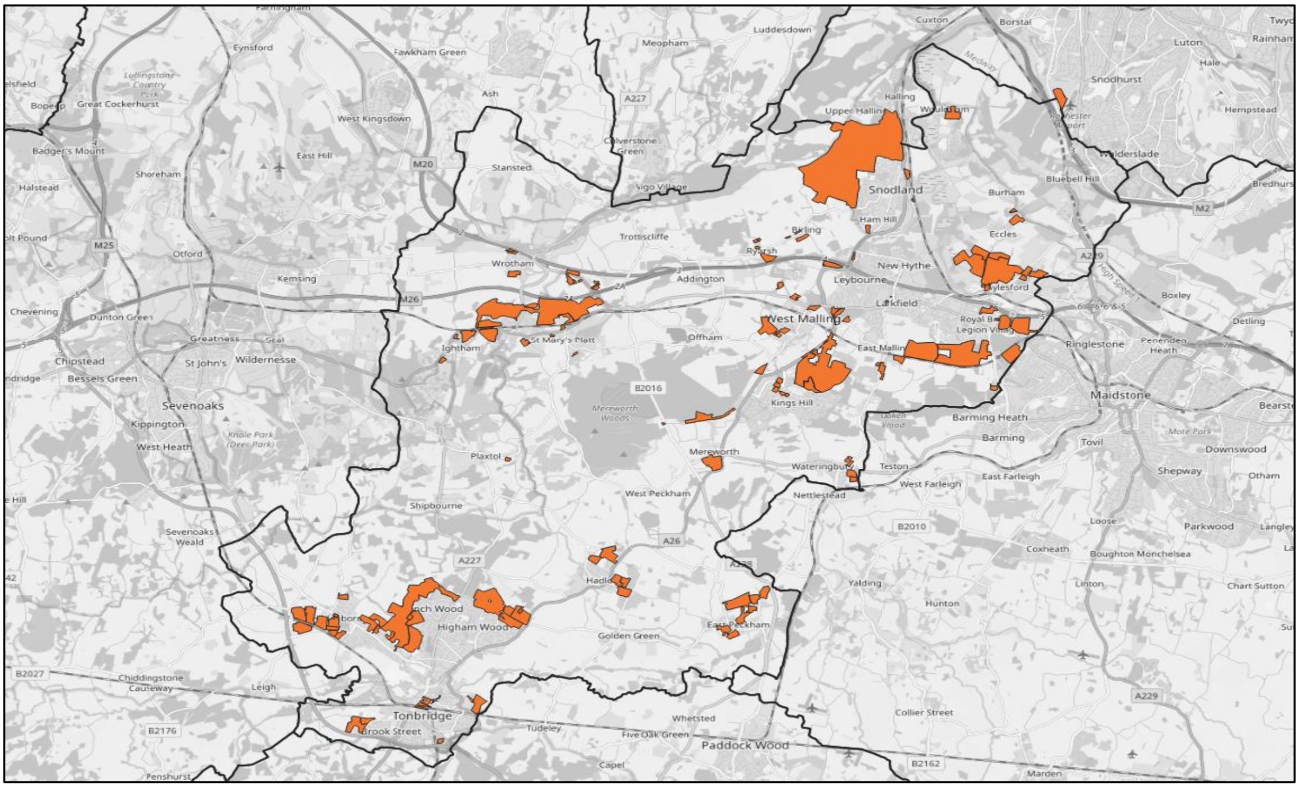

Figure -1-1: Location of areas for development within the Local Plan

As discussed in the *Tonbridge and Malling Local Plan Test Draft Report*, the following junctions and corridors were identified as 'hot-spots'. The majority of these already exist in the 2042 Forecast Baseline; however, those highlighted in **bold** are additional ones specified in the Local Plan High scenario..

Northeast

- A20 (extended between Old Coach Road and A25 Nepicar Lane)
- Seven Mile Lane / Comp Lane Junction (from LOS E to F)
- A25 / Quarry Hill Road / High Street (from LOS E to F)
- A20 / Church Road / Trottiscliffe Road
- A25 / A20
- **A227 (Wrotham)**

Northwest

- A228 / Bull Road Roundabout
- M20 J5
- M20 J6 (from LOS E to F)
- A20 / Beatrix Way

- Forstal Road / Rochester Road / High Street
- **A228 Rochester Road, Sundridge Hill (VC Ratio >100%)**

East

- Tonbridge Road / Bow Road / Red Hill (from LOS E to F)
- Seven Mile Lane
- **A26 Tonbridge Road / Bow Road / Red Hill (from LOS E to F)**

South

- Vauxhall Roundabout (Pembury Road Arm)
- Vale Road / Sovereign Way (from LOS E to F)
- B2260 Railway Approach
- B2260 High Street (VC ratio > 100%)
- **A21 Morley's Roundabout (B245 Arm)**
- **B245 Tonbridge Road**
- **A227 Tonbridge Road / Hildenborough Road / Back Lane**

In comparison to the Low and Medium scenarios, the Local Plan High Scenario significantly affected journey times on several routes due to the substantial increase in development quantum in specific areas. The following routes show travel time increases of more than 10%. Routes highlighted in **bold** are those additionally included in the list for the Local Plan High Scenario.

- Route 1 – M20
- Route 2 – A20 London Road
- Route 5 – A26 Hadlow Road and Woodgate Way
- **Route 8 – B245**
- **Route 10 – A25 Borough Green Road / A20 London Road**
- Route 13 – Pilgrims Way and Rochester Road
- Route 16 – M20 and A229 Blue Bell Hill

Considering the additional flows, junction level of service, link volume-to-capacity ratio, and journey time comparison, the corridors above have been analysed, and a list of junctions has been identified for further detailed investigation.

Local junction modelling was undertaken using turning movement data from the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan High scenario.

This report presents the methodology, assumptions, and results of the local junction modelling exercise. It evaluates junction performance under future demand conditions and identifies locations where mitigation measures may be required to ensure operational efficiency and safety.

Figure 1-2 & Figure 1-3 identifies the locations of the junctions included in the local modelling assessment.

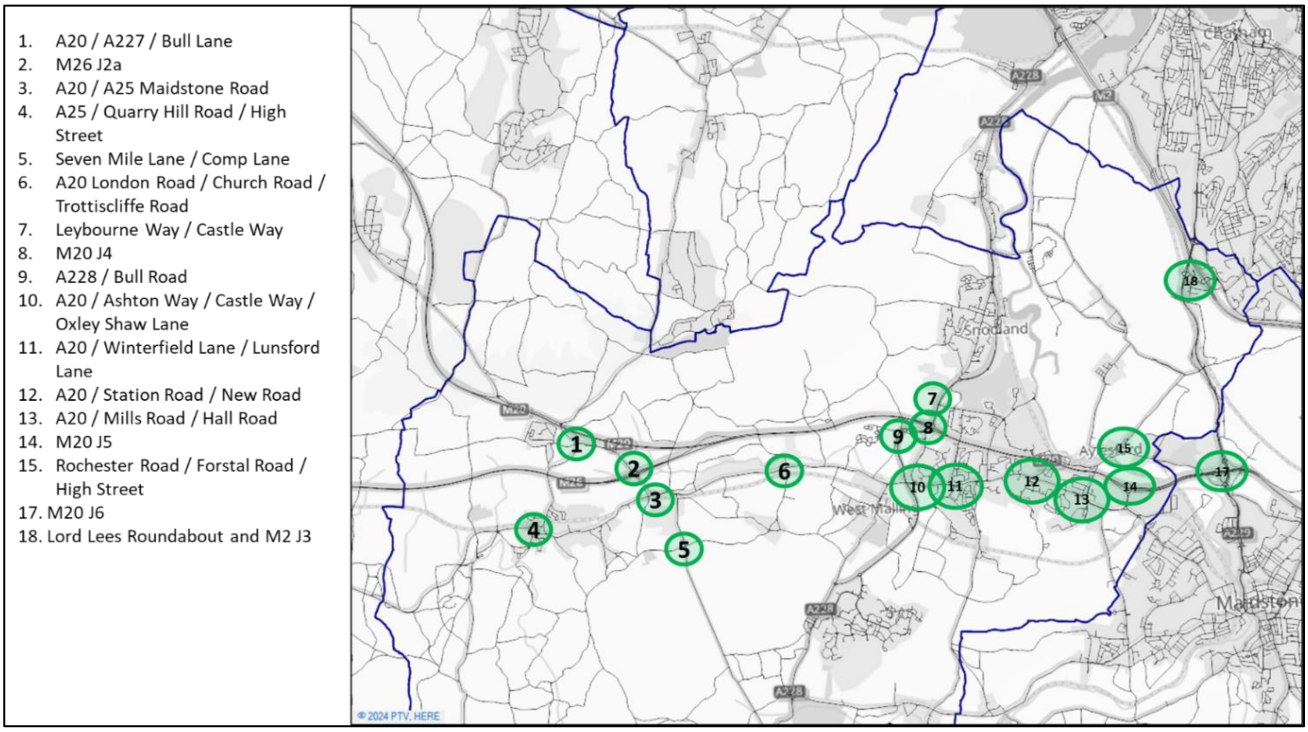

Figure 1-2: Location of the Junctions – Northern Part of the Borough

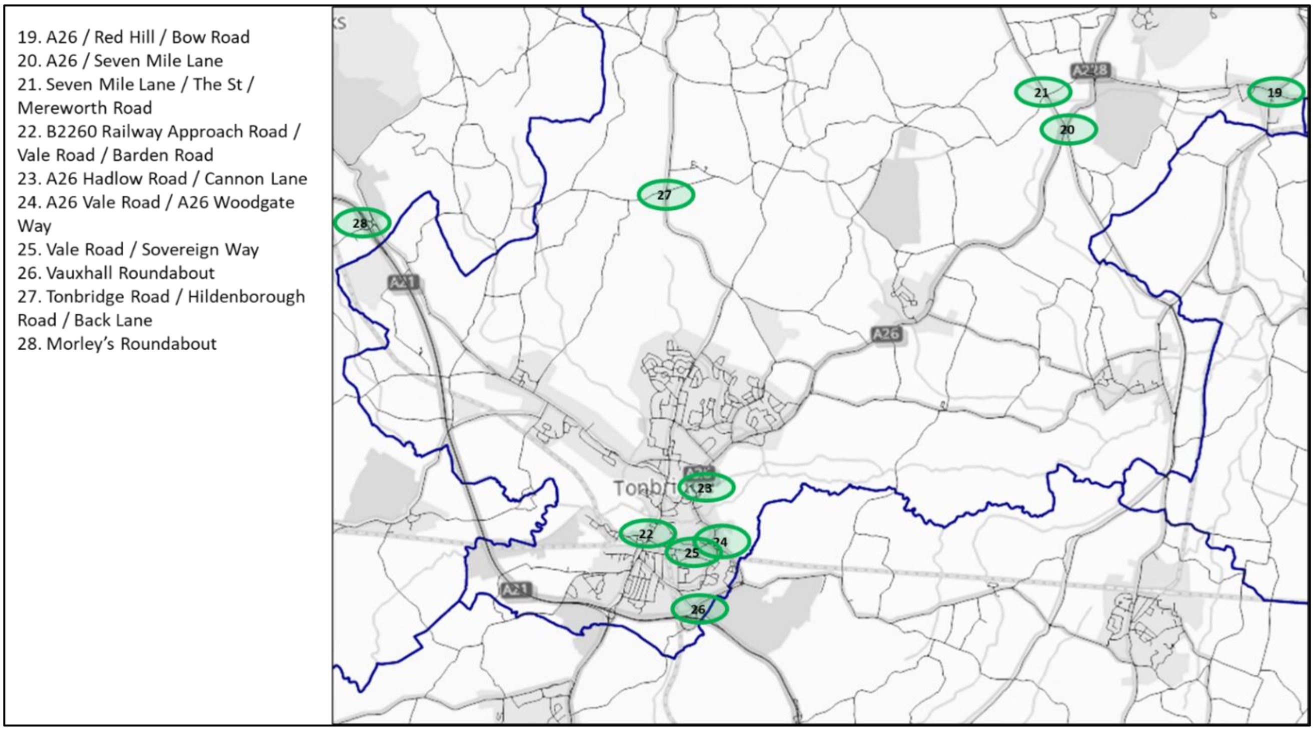

Figure 1-3: Location of the Junctions – Southern Part of the Borough

1.1 Structure of This Report.

This report presents the technical modelling details and operational performance assessments of the junctions illustrated in Figure 1-2 and Figure 1-3. The purpose is to document the modelling approach, summarise the performance of each junction under existing conditions, and identify where mitigation measures may be required.

The report is structured as follows:

- **Section 1: Introduction**
  Outlines the objectives, scope, and context of the modelling exercise.
- **Section 2: Modelling Methodology**
  Describes the tools, data sources, and assumptions used in developing the traffic models.
- **Section 3: Glossary of Terms and Definitions**
  Provides definitions for technical terminology and acronyms used throughout the report.
- **Sections 4 to 32: Junction Operational Performance – Existing Layouts**
  Each section presents the performance analysis of a specific junction, including metrics such as queue lengths, delays, and capacity utilisation:
  - Junction 1: A20 / A227 / Bull Lane
  - Junction 2: M26 J2a
  - Junction 3: A20 / A25 Maidstone Road
  - Junction 4: A25 / Quarry Hill Road / High Street
  - Junction 5: Seven Mile Lane / Comp Lane
  - Junction 6: A20 London Road / Church Road / Trottiscliffe Road
  - Junction 7: Leybourne Way / Castle Way
  - Junction 8: M20 J4
  - Junction 9: A228 / Bull Road
  - Junction 10: A20 / Ashton Way / Castle Way / Oxley Shaw Lane
  - Junction 11: A20 / Winterfield Lane / Lunsford Lane
  - Junction 12: A20 / New Road / Station Road
  - Junction 13: A20 / Mills Road / Hall Road
  - Junction 14: M20 J5
  - Junction 15: Rochester Road / Forstal Road / High Street
  - Junction 16: High Street / Bull Lane / Aylesford Priory Lane
  - Junction 17: M20 J6
  - Junction 18a: M2 J3

    - Junction 18b: Lord Lees Roundabout
    - Junction 19: A26 / Red Hill / Bow Road
    - Junction 20: A26 / Seven Mile Lane
    - Junction 21: Seven Mile Lane / The Street / Mereworth Road
    - Junction 22: B2260 Railway Approach Road / Vale Road / Barden Road
    - Junction 23: A227 A26 Hadlow Road / Cannon Lane
    - Junction 24: A26 Vale Road / A26 Woodgate Way
    - Junction 25: Vale Road / Sovereign Way
    - Junction 26: Vauxhall Roundabout
    - Junction 27: Tonbridge Road / Hildenborough Road / Back Lane
    - Junction 28: Morley's Roundabout
- **Section 33: Summary and Recommendations**
  Summarises key findings, highlights any operational concerns, and outlines recommendations for future consideration.

2. Modelling Methodology

2.1 Base Modelling

Initial assessments were undertaken to identify existing operational issues at each junction using traffic flow data from the 2019 base year. This step established a benchmark for evaluating current junction performance, including capacity utilisation, delay patterns, and queue formation.

By analysing baseline conditions, it identifies junctions that already experience congestion or operational inefficiencies, which informed the prioritisation of locations for further assessment under future development scenarios. This baseline also provided a reference point against which future traffic growth and the impact of proposed Local Plan developments could be measured.

Where available, junction turning movement data was also incorporated into the base model to enhance its accuracy and reliability. This data provided a more detailed representation of traffic behaviour at individual junctions, allowing for improved calibration of flow patterns, better estimation of approach-specific demand, and more precise modelling of capacity and delay characteristic.

2.2 Flow Development

Forecast traffic flows were developed using the strategic Tonbridge and Malling Local Transport Model (T&MLTM), which incorporates land use, trip generation, and network assignment components. These flows formed the basis for assessing future junction performance under two distinct development scenarios:

- **2042 Forecast Baseline**: Represents future traffic conditions assuming committed developments, highway schemes and background growth, but without the additional Local Plan allocations.
- **2042 Local Plan High**: Includes the full extent of proposed residential and employment growth under the Local Plan high development scenario, reflecting the maximum land use assumptions.

The strategic model outputs were used to extract turning movement flows for each junction, which were then input into local junction models. This approach ensures consistency between strategic and local modelling and enables a detailed understanding of how future demand affects junction capacity and operation.

2.3 Modelling Programmes

2.3.1 JUNCTIONS (Roundabouts & Priority T-Junctions)

To assess the operational feasibility and performance of the proposed non-signalised roundabouts and priority junctions, a model was developed using the Junctions 11 software suite. The primary objective of this programme was to evaluate how effectively the design accommodates traffic demand and maintains flow under varying conditions.

The simulation model was constructed using geometric and operational data derived from the CAD layout of the proposed roundabout. Key input parameters, such as lane configurations, entry widths, flare lengths, and turning proportions, were coded into the Junctions 11 to replicate real world conditions as accurately as possible.

Once the model was configured, it was used to simulate traffic movement through the junction during peak periods. The software generated performance metrics including queue lengths, delays, and capacity utilisation, which were then analysed to determine the effectiveness of the design.

2.3.2 LinSig (Signalised junction Roundabouts & T-Junctions)

To evaluate the operational feasibility and performance of the proposed signalised junction design, a model was developed using the LinSig software suite. The primary objective of this modelling exercise was to assess how effectively the proposed signal control strategy accommodates traffic demand and maintains flow under peak conditions.

The LinSig model was constructed using geometric and operational data derived from the CAD layout of the junction. Key input parameters, including lane configurations, approach widths, signal staging, intergreens timings, and turning movements, were coded into the model to replicate real world conditions as accurately as possible.

Once configured, the model was used to simulate traffic movement through the junction during the AM and PM peak periods. LinSig generated a range of performance metrics, including degree of saturation, queue lengths, cycle times, and delay per vehicle, which were analysed to determine the effectiveness of the proposed signal timings and overall junction layout.

2.4 Model Validation

Due to constraints in time and data availability, full validation of the local junction models was not undertaken. Exceptions to this include M20 Junction 4 and Leybourne Way Junction, where sufficient traffic survey data enabled validation against observed conditions.

This approach aligns with standard practice in strategic transport modelling, particularly for rural and semi-urban junctions where:

- The risk of blocking back is minimal.
- The effort and cost of collecting detailed on-site data for each junction is disproportionate to the level of risk or impact.
- The primary objective is to assess future capacity performance under significant growth scenarios, rather than to replicate existing conditions with high precision.

Although formal validation was not completed for most junctions, the models were developed with careful consideration of existing operational characteristics. This includes:

- Manual optimisation of signal timings to reflect observed phasing and intergreens periods.
- Representation of unequal lane usage at priority roundabouts and other junctions where lane behaviour affects capacity.

These enhancements improve the realism of the models and support robust comparative assessments between baseline and future scenarios.

2.5 Assessment Criteria

Mitigation measures are not considered necessary if either of the following conditions is satisfied:

- The junction operates within practical capacity, defined as:
    - I. Signalised junctions: Degree of Saturation (DoS) is less than 90%.
    - II. Unsignalised junctions: Ratio of Flow to Capacity (RFC) is less than 0.85.

- The increase in demand between the Forecast Reference Case Scenario is not significant, specifically:
    I. For signalised junctions: DoS increase is less than +2.5%.
    II. For unsignalised junctions: RFC increase is less than +0.025.

Mitigation measures are triggered under the following circumstances:

- The junction transitions from operating below practical capacity to exceeding it, meaning:
    I. DoS increases from below 90% to above 90% for signalised junctions.
    II. RFC increases from below 0.85 to above 0.85 for unsignalised junctions.
- The junction exceeds theoretical capacity, defined as:
    I. DoS exceeds 100% for signalised junctions.
    II. RFC exceeds 1.00 for unsignalised junctions.

3. Glossary of Terms and Definitions

A summary of key terms and definitions has been provided to support the interpretation of modelling outputs presented throughout this report. This glossary is intended to assist readers, particularly those less familiar with transport modelling terminology, by offering clear explanations of the technical language and performance indicators used in the analysis. It serves as a reference point to ensure consistency and clarity in the understanding of results and recommendations.

- **Intergreens Periods**: This refers to the time interval between the end of one traffic signal phase and the commencement of the next. It is a critical safety mechanism designed to prevent vehicle conflicts by ensuring that all movements have cleared the junction before a new movement is permitted.
- **RFC / DoS (Ratio of Flow to Capacity / Degree of Saturation)**: These metrics quantify the extent to which a junction or link is operating relative to its theoretical capacity. Expressed either as a percentage or a decimal, they provide a direct indication of congestion levels and are fundamental to capacity assessments.
- **Level of Service (LOS)**: A qualitative measure used to describe operational conditions within a traffic stream. LOS is typically based on factors such as delay, queue length, and user perception, and is used to categorise the performance of a junction or link from free flowing (LOS A) to highly congested (LOS F).
- **Practical Capacity**: This is the threshold at which a junction or link begins to experience significant increases in delay and queuing. For modelling purposes, practical capacity is assumed to be 85% of theoretical capacity for roundabouts and 90% for signal-controlled junctions.
- **Practical Reserve Capacity (PRC)**: PRC represents the percentage increase in traffic demand that a junction can accommodate before reaching its practical capacity. It is a useful indicator of the resilience of a junction to future growth or fluctuations in demand.
- **Network Reserve Capacity (NRC)**: Similar in concept to PRC, NRC applies specifically to unsignalised junctions. It reflects the additional traffic volume that can be absorbed by the network before performance deteriorates beyond acceptable levels.

Table 3-1 provides a concise visual summary of junction performance, offering a quick reference for interpreting operational conditions. It categorises each junction based on its level of congestion and capacity utilisation, using a colour-coded system to indicate whether the junction is operating within, approaching, or exceeding its practical or absolute capacity. This table is intended to support rapid assessment and comparison across multiple junctions within the study are.

Table 3-1: Junction Performance Assessment Key

XX	(green)
XX	(yellow)
XX	(red)

- **Green Box**: Indicates that the junction is operating within practical capacity. Under these conditions, traffic flows are smooth, with minimal to moderate delays and queuing. The junction is performing satisfactorily.
- **Yellow Box**: Denotes that the junction is operating above practical capacity but below absolute capacity. This suggests that while the junction is still functioning, it is experiencing moderate to prominent levels of delay and queuing and may require monitoring or mitigation in the near term.

- **Red Box**: Signifies that the demand exceeds the absolute capacity of the junction. In such cases, significant congestion is likely, and without mitigation, the performance of the surrounding network may also be adversely affected. This typically triggers the need for capacity enhancements or demand management strategies.

4. Junction 1: A20 / A227 / Bull Lane – Existing Layout

4.1 Existing Layout

Figure 4-1 presents the current layout of the roundabout, which comprises a five-arm priority-controlled junction. Each approach operates under give-way conditions, with no signal control in place. The configuration facilitates movements between the A20, A227, Bull Lane, and minor arms, accommodating a mix of local and through traffic.

The geometry and lane arrangements of the existing roundabout form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under existing and forecast traffic conditions.

Figure 4-1: A20 / A227 / Bull Lane Junction

4.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 4-1: (NRC) Results - Existing Layout

Scenario	NRC Results	
	AM	PM
2019 Base	-24%	-19%
2042 Forecast Baseline	-21%	-21%
2042 Local Plan Test High	-32%	-26%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In all three scenarios, the NRC values are negative, which signifies that the junction is already operating beyond its practical capacity. Specifically, in the 2019 Base scenario, the NRC is -24% in the AM peak and -19% in the PM peak, confirming that the junction is under significant operational stress even under existing traffic conditions.

The 2042 Forecast Baseline scenario shows a marginal improvement in the AM peak (NRC of -21%) but a worsening in the PM peak (also -21%), suggesting that background growth alone will continue to place pressure on the junction without any development related traffic.

Under the 2042 Local Plan Test, High Growth scenario, the NRC values deteriorate further to -32% in the AM peak and -26% in the PM peak. These results highlight the compounded impact of Local Plan development traffic, which would exceed the junction's practical capacity if no mitigation measures were implemented.

Overall, the results demonstrate that the existing roundabout layout is not capable of accommodating current or future traffic demand without mitigation. These findings support the need for junction improvements or alternative mitigation strategies to ensure acceptable operational performance in the future.

4.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the roundabout's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 4-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
A20 (north)	1.11	1.20	1.11	1.20
A20 (east)	1.08	1.00	1.08	0.98
A227	0.74	0.87	1.50	1.32
Bull Lane	0.51	0.85	0.00	0.70

The results highlight significant disparities in performance between the different arms of the roundabout:

- A20 (North) consistently exhibits the highest RFC values, reaching 1.11 in the AM and 1.20 in the PM across both scenarios. These values indicate that this approach is operating well beyond its theoretical capacity, with severe queuing and delays expected.
- A20 (East) also shows signs of overcapacity, with RFCs of 1.08 (AM) and 1.00 (PM) under the Forecast Baseline, and similar values under the Local Plan scenario. This suggests persistent congestion, particularly during the morning peak.
- A227 performs moderately under the Forecast Baseline scenario (0.74 AM, 0.87 PM), but deteriorates under the Local Plan Test, with RFCs rising to 1.50 (AM) and 1.32 (PM). This indicates an increase in demand pressure due to development traffic.
- Bull Lane remains within capacity under both scenarios, with RFCs ranging from 0.00 to 0.85, suggesting minimal operational issues on this arm. The zero RFC in the AM peak under the Local Plan scenario may reflect low or no demand during that period.

The analysis confirms that the A20 (North) and A227 approaches are the most critically affected under future traffic conditions, particularly in the Local Plan scenario. These findings reinforce the need for targeted mitigation measures focused on these approaches to improve overall junction performance and accommodate future growth.

4.4 Junction Summary

The modelling assessment has identified a requirement for mitigation measures to address the forecast impacts. However, an initial review of the available land within the highway boundary, alongside the scale of mitigation needed, has highlighted challenges in delivering a feasible mitigation scheme.

The extent of the improvements required suggests that a significantly larger junction footprint may be necessary, which would involve land acquisition beyond the existing highway boundary. Alternatively, an offline solution, such as the provision of a new link road in Borough Green, may need to be considered to accommodate future demand effectively. Given the amount of growth proposed in the area, if a link road is deemed necessary, it will likely need to be delivered during the early stages of development. This is subject to further model testing.

5. Junction 2: M26 J2a – Existing Layout

5.1 Existing Layout

Figure 4-1 illustrates the existing layout of the roundabout, which forms a key junction between the A20 and the M26 motorway. The roundabout is constructed as a grade separated roundabout, passing over the M26, with entry and exit slip roads providing full connectivity between the two routes. The A20 approaches the roundabout from both the north and south, while the M26 runs east, west beneath the structure.

The roundabout operates as a priority-controlled junction, with all approaches governed by give way conditions and no signalisation in place. The configuration facilitates a mix of local and strategic traffic movements, serving both through traffic on the A20 and access to the M26 via grade-separated ramps.

The geometry and lane arrangements of the existing roundabout form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under existing and forecast traffic conditions.

Figure 5-1: M26 J2a Junction

5.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 5-1: (NRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	22%	52%
2042 Forecast Baseline	18%	15%
2042 Local Plan Test High	9%	-1%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In the 2019 Base scenario, the roundabout demonstrates a moderate level of resilience, with available reserve capacity of 22% in the AM peak and 52% in the PM peak. This suggests that, under existing conditions, the junction is operating within acceptable limits and can accommodate some additional traffic growth.

Under the 2042 Forecast Baseline scenario, reserve capacity declines to 18% in the AM peak and 15% in the PM peak. While still within capacity, these values indicate a reduction in operational flexibility and growing pressure on the junction due to background traffic growth.

In the 2042 Local Plan Test, High Growth scenario, the NRC values fall to 9% in the AM peak and -1% in the PM peak. The negative value in the PM peak indicates that the junction would exceed its practical capacity under this scenario, which has triggered a more detailed look into junction performance below.

5.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the roundabout's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 5-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
A20 (N)	0.44	0.66	0.44	0.78
M26 Off-Slip (E)	0.64	0.49	0.61	0.68
A20 (S)	0.64	0.59	0.73	0.70
M26 Off-Slip (w)	0.33	0.46	0.39	0.86

Table 5-2 presents the Ratio of Flow to Capacity (RFC) values for each approach arm of the roundabout under the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios. These values provide insight into how individual arms are expected to perform under future traffic conditions.

- A20 (North) remains well within capacity across both scenarios in the AM peak, with an RFC of 0.44. However, in the PM peak, the RFC increases from 0.66 under the Forecast Baseline to 0.78 under the Local Plan scenario. While still below the critical threshold of 0.85, this increase indicates growing pressure on this approach during evening peak periods.

- M26 Off-Slip (East) performs well in both scenarios. In the AM peak, the RFC slightly decreases from 0.64 (Forecast Baseline) to 0.61 (Local Plan), suggesting stable conditions. However, in the PM peak, the RFC increases from 0.49 to 0.68, indicating a noticeable rise in demand, though still within acceptable operational limits.

- A20 (South) shows a clear increase in demand under the Local Plan scenario. The RFC rises from 0.64 to 0.73 in the AM peak and from 0.59 to 0.70 in the PM peak. These values remain within capacity but suggest that this approach will experience more consistent queuing and delay as traffic volumes grow.

- M26 Off-Slip (West) is the most affected approach under the Local Plan scenario. While the RFC remains low in the AM peak (rising from 0.33 to 0.39), the PM peak RFC increases sharply from 0.46 to 0.86. This exceeds the practical capacity threshold, indicating delays and queues on this arm will start to increase at a higher rate. As this is just over the practical capacity threshold, it is unlikely to significantly impact the wider network.

Overall, the roundabout continues to operate within capacity under the 2042 Forecast Baseline scenario. However, the 2042 Local Plan Test, High Growth scenario introduces notable pressure particularly on the M26 Off-Slip (West) approaches.

5.4 Queue Lengths

To provide greater confidence in the assessment of the Local Plan's impact on the Strategic Road Network (SRN) at this junction, a detailed comparison was undertaken between the projected queue lengths on the off-slip roads and the physical storage capacity available.

This analysis helps to determine whether the junction can accommodate the expected traffic volumes without causing blocking back onto the main carriageway or adjacent network. The results of this comparison are summarised in Table 5-3.

Table 5-3: (Queue) Results in metres - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High		Available Storage
	AM	PM	AM	PM	
M26 Off-Slip (E)	16m	4m	14m	5m	500m
M26 Off-Slip (w)	4m	4m	4m	9m	530m

As demonstrated by the junction modelling results, the predicted queue lengths on the off slips are shorter than the available storage capacity. This indicates that the junction is unlikely to experience significant queuing issues, thereby suggesting a minimal impact on the Strategic Road Network (SRN) under the Local Plan scenario.

5.5 Junction Summary

Although the Ratio of Flow to Capacity (RFC) value on the M26 eastbound off-slip slightly exceeds the practical capacity threshold, the exceedance is marginal and is not expected to result in significant operational issues or wider network impacts. This conclusion is supported by the queue length assessment, which indicates that queues remain within the available storage and do not extend onto the Strategic Road Network (SRN). Given this, mitigation measures are not recommended at this junction.

6. Junction 3: A20 / A25 Maidstone Road – Existing Layout

6.1 Existing Layout

Figure 4-1 illustrates the current layout of the A20 / A25 Maidstone Road roundabout, which functions as a signal-controlled junction. The junction facilitates movements between the A20 (north and east), A227, Bull Lane, and a minor arm, serving both local and strategic traffic flows.

The existing geometry and lane arrangements form the baseline for all capacity assessments and future design considerations. This layout is used as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 6-1: A20 / A25 Maidstone Road Junction

6.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 6-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	-1%	8%
2042 Forecast Baseline	4%	-13%
2042 Local Plan Test High	-4%	-34%

Table 6-1 presents the Practical Reserve Capacity (PRC) results for the existing junction layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The PRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In the 2019 Base scenario, the junction is operating close to its practical capacity in the AM peak, with an PRC of -1%, and shows some available reserve in the PM peak at 8%. This suggests that while the junction is under pressure during the morning peak, it performs more comfortably in the evening.

Under the 2042 Forecast Baseline scenario, the AM peak improves slightly to 4%, indicating a small amount of reserve capacity. However, the PM peak deteriorates to -13%, suggesting that background traffic growth alone will push the junction beyond its practical capacity during the evening peak period.

The 2042 Local Plan Test, High Growth scenario shows a further decline in performance, with the AM peak NRC falling to -4% and the PM peak dropping to -34%. These results highlight the cumulative impact of Local Plan development traffic, which would result in the junction operating well beyond its practical capacity, particularly in the PM peak.

Overall, the results indicate that while the junction may continue to function under current conditions, it will not be able to accommodate future traffic demand, especially during the evening peak, without mitigation. These findings support the need for targeted mitigation measures to maintain acceptable operational performance under forecast growth scenarios.

6.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junctions' operational performance by reporting the Degree of Saturation (DOS) for each individual approach arm, rather than assessing the junction. The DoS values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods as well as the 2019 Base scenario.

Table 6-2: (DOS) Results - Existing Layout

Approach / Scenario	2019 Base		2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM	AM	PM
A20 (West)	90%	83%	84%	98%	93%	117%
A20 (East)	90%	82%	86%	101%	91%	119%
Maidstone Road	88%	82%	84%	99%	93%	120%
Cycle Time	120 sec's	120 sec's	120 ses's	120 ses's	120 ses's	120 ses's

The results highlight significant disparities in performance between the different arms of the junction:

- A20 (West) operates near capacity in the 2042 Forecast Baseline scenario, with DOS of 84% (AM) and 98% (PM). Under the 2042 Local Plan High scenario, performance worsens to 93% (AM) and 117% (PM), indicating significant overcapacity in the evening peak.
- A20 (East) exceeds capacity in the PM peak under both scenarios. DOS increase from 86% (AM) and 101% (PM) in the Forecast Baseline to 91% (AM) and 119% (PM) in the Local Plan scenario, suggesting worsening congestion and queuing.
- Maidstone Road also shows a similar trend, with RFCs of 84% (AM) and 99% (PM) under the Forecast Baseline, rising to 93% (AM) and 120% (PM) under the Local Plan scenario. These values confirm that this approach would be over capacity in the future.
- Cycle time remains fixed at 120 seconds across all scenarios and time periods, indicating that signal timings are not currently adjusted to respond to increased demand.

Under the 2019 Base scenario, all approaches operate below or at 90% Degree of Saturation (DoS), indicating acceptable performance.All three arms are forecast to operate at or above capacity in the PM peak under the Local Plan scenario. The A20 (East), A20 (West), and Maidstone Road approaches are all expected to experience severe congestion, reinforcing the need for mitigation to maintain acceptable operational performance.

6.4 Junction Summary

The modelling assessment has identified a clear requirement for mitigation measures at this junction under the 2042 Local Plan scenario. However, an initial review of the available land within the existing highway boundary, combined with the scale of intervention required, suggests that delivering a feasible mitigation layout may be challenging. The magnitude of the improvements needed to address the forecast demand is likely to exceed the spatial constraints of the current highway footprint.

As a result, more substantial mitigation, such as land acquisition to accommodate a significantly enlarged junction layout, or the development of an offline solution like a new link road in Borough Green, may be necessary. These options would require further investigation, including engineering feasibility, environmental impact, and cost-benefit analysis, to determine the most appropriate course of action.

7. Junction 4: A25 / Quarry Hill Road / High Street – Existing Layout

7.1 Existing Layout

Figure 4-1 illustrates the existing layout of the A25 / Quarry Hill Road / High Street junction, which is configured as a staggered crossroad. The junction facilitates movements between the A20 (north and south) and the M25 (east and west), serving as a key connection point between local and strategic routes.

Each approach operates under priority-controlled conditions, with vehicles entering the junction required to give way on Quarry Hill Road and High Street. There is no signal control in place. The junction accommodates a mix of local, regional, and motorway-bound traffic, with entry and exit points providing full access to both directions of the A20 and M25.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

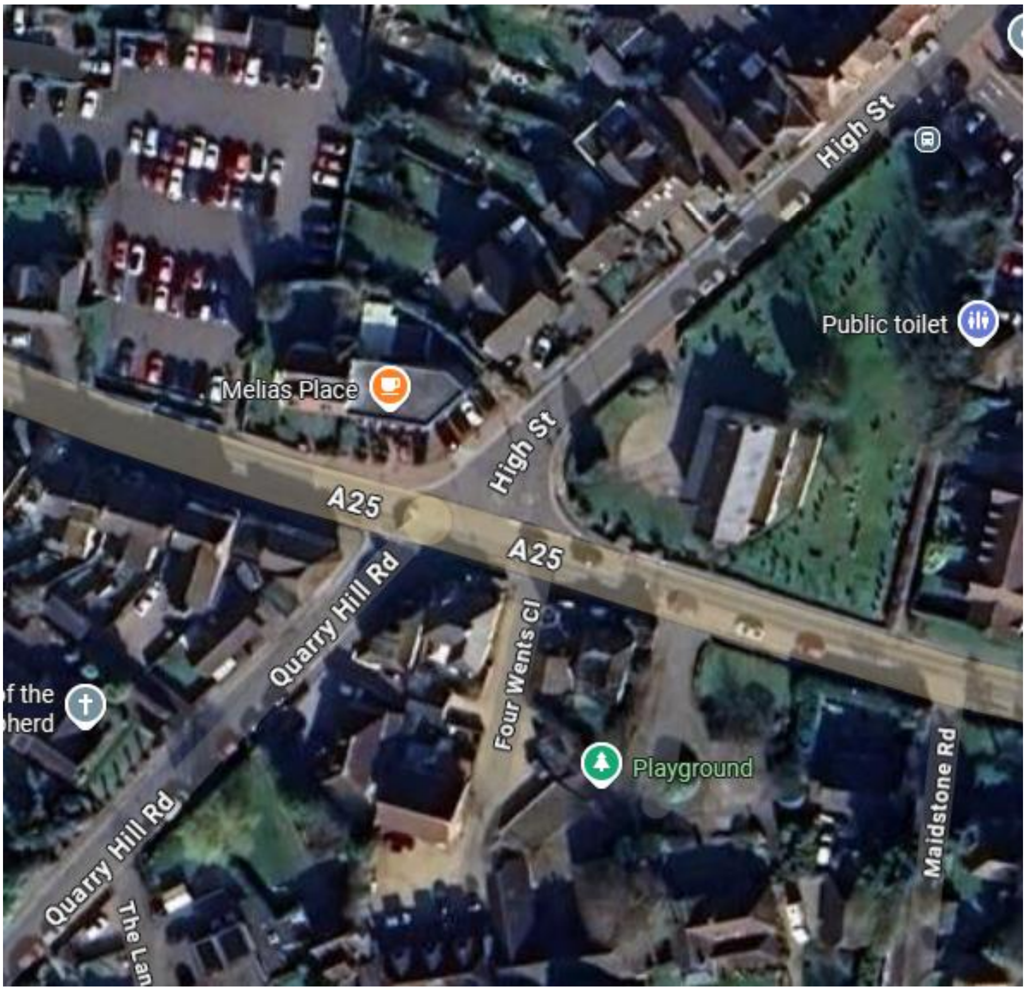

Figure 7-1: A25 / Quarry Hill Road / High Street Junction

7.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 7-1: (NRC) Results - Existing Layout

Scenario	NRC Results	
	AM	PM
2019 Base	26%	31%
2042 Forecast Baseline	13%	12%
2042 Local Plan Test High	-6%	-34%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing junction's layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction had a reasonable level of spare capacity, with NRC values of 26% in the AM peak and 31% in the PM peak, suggesting it could accommodate additional traffic without exceeding its practical limits.

However, by 2042, under the Forecast Baseline scenario, which assumes background traffic growth without any additional development, the available capacity is reduced. The NRC drops to 13% in the AM and 12% in the PM, indicating that the junction is approaching its operational limits even without Local Plan related traffic.

The situation becomes critical under the 2042 Local Plan Test High scenario, where the NRC values fall into negative, -6% in the AM and -34% in the PM. This means the junction would be operating well beyond its practical capacity, particularly during the evening peak, if the planned development proceeds without mitigation. These results highlight the need for mitigation, such as junction improvements or alternative traffic management strategies, to support future growth and maintain acceptable levels of service.

Overall, the analysis clearly demonstrates that the existing layout is not sustainable under current or future traffic conditions. Without mitigation, operational performance will continue to deteriorate, reinforcing the need for junction improvements or alternative mitigation strategies to support planned growth and maintain acceptable traffic conditions.

7.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 7-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
A25 (East)	0.68	0.62	0.84	1.30
Quarry Hill Road	0.36	0.42	0.51	0.52
A25 (West)	0.00	0.00	0.00	0.00
High Street	0.22	0.22	0.55	0.65

The results highlight significant disparities in performance between the different arms of the junction:

- The A25 (East) approach shows the most significant capacity issues, with RFC values increasing from 0.68 (AM) and 0.62 (PM) under the Forecast Baseline to 0.84 (AM) and a critical 1.30 (PM) under the Local Plan scenario. This indicates that the arm is expected to operate well beyond its theoretical capacity in the evening peak, leading to severe queuing and delays.
- Quarry Hill Road remains within operational limits in both scenarios, with RFCs rising from 0.36 to 0.42 under the Forecast Baseline to 0.51 to 0.52 under the Local Plan scenario. These values suggest manageable traffic conditions with only minor increases in demand.
- The A25 (West) arm consistently records an RFC of 0.00 across all time periods and scenarios, indicating either negligible traffic demand or that this arm is not actively used in the modelled network.
- High Street shows a more noticeable increase in RFC values, rising from 0.22 (AM and PM) under the Forecast Baseline to 0.55 (AM) and 0.65 (PM) under the Local Plan scenario. While still within capacity, this growth reflects a clear increase in traffic pressure, particularly in the PM peak.

Overall, the analysis confirms that the A25 (East) approach is the most critically affected under future traffic conditions, especially in the PM peak of the Local Plan scenario. These findings support the need for targeted mitigation measures focused on this arm to maintain acceptable junction performance and accommodate future development-related growth.

7.4 Junction Summary

To address the increasing traffic pressure on the A25 (East) arm of the junction, particularly under the 2042 Local Plan High Growth scenario, it is recommended that the feasibility of implementing a dedicated right-turn pocket for vehicles turning into High Street be investigated. This mitigation would help separate right turning traffic from the main circulating flow, reducing the likelihood of queuing and delays that could otherwise block or slow down through movements at the junction.

By providing a dedicated space for right turning vehicles to wait, the overall efficiency and safety of the junction could be improved, especially during peak periods when turning movements are more frequent. The design and implementation of this measure would need to consider available carriageway width, visibility, pedestrian impacts, and potential land constraints.

Given the physical and operational constraints at the junction, if the proposed mitigation measures cannot be delivered within the existing highway boundary, an alternative offline solution, such as a bypass or link road in

Borough Green, may need to be considered. This would provide additional network capacity and help divert traffic away from the constrained junction, thereby addressing the forecast demand more effectively.

8. Junction 5: Seven Mile Lane / Comp Lane – Existing Layout

8.1 Existing Layout

Figure 4-1 illustrates the existing layout of the Seven Mile Lane and Comp Lane junction, which is configured as a standard four-way crossroads. Seven Mile Lane runs in a north-south direction, crossed by Comp Lane running east-west.

Each approach operates under priority-controlled conditions, with vehicles entering the junction required to give way on Comp Lane. There is no signal control in place. The junction accommodates a mix of local, regional traffic.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 8-1: Seven Mile Lane / Comp Lane Junction

8.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 8-1: (NRC) Results - Existing Layout

Scenario	NRC Results	
	AM	PM
2019 Base	44%	13%
2042 Forecast Baseline	34%	6%
2042 Local Plan Test High	4%	2%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing junction's layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with a satisfactory level of spare capacity, showing NRC values of 44% in the AM peak and 13% in the PM peak. These figures suggest that the junction could manage additional traffic without exceeding its operational limits during the morning peak.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without additional development, the available capacity is notably reduced. NRC values fall to 34% in the AM and just 6% in the PM, indicating that the junction is well below its operational threshold, particularly during the evening peak.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance improves. NRC values drop to just 4% in the AM and 2% in the PM, suggesting that the junction would be operating well within its practical capacity if planned development proceeds.

These results clearly demonstrate that the existing layout is sustainable under future traffic conditions.

8.3 Junction Summary

Although Comp Lane (West) remains within theoretical capacity under the 2042 Local Plan High scenario, the model indicates vehicle delays exceeding one minute during peak periods. These delays, while not breaching capacity thresholds, suggest operational inefficiencies that could impact driver experience and junction performance. While there is an increase of delay here, the overall number of vehicles experiencing the delay remain low. Therefore, it is not considered necessary to implement mitigation measures at this stage of the assessment.

9. Junction 6: A20 London Road / Church Road / Trottiscliffe Road – Existing Layout

9.1 Existing Layout

Figure 4-1 illustrates the existing layout of the A20 London Road / Church Road / Trottiscliffe Road junction, which is configured as a standard four-way crossroads. A20 London Road runs in an east to west direction, crossed by Church Road and Trottiscliffe Road running south to north.

Each approach operates under priority-controlled conditions, with vehicles entering the junction required to give way on Church Road and Trottiscliffe Road. There is no signal control in place. The junction accommodates a mix of local and regional traffic.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 9-1: A20 London Road / Church Road / Trottiscliffe Road Junction

9.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 9-1: (NRC) Results - Existing Layout

Scenario	NRC Results	
	AM	PM
2019 Base	41%	27%
2042 Forecast Baseline	39%	26%
2042 Local Plan Test High	33%	18%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing junction's layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with a satisfactory level of spare capacity, showing NRC values of 41% in the AM peak and 27% in the PM peak. These figures suggest that the junction could manage additional traffic without exceeding its operational limits during peak periods.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without additional development, the available capacity is slightly reduced, with NRC values of 39% in the AM and 26% in the PM, indicating a decline in performance.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance is more constrained, with NRC values dropping to 33% in the AM and 18% in the PM, suggesting that while the junction remains operational, its spare capacity is reduced under higher growth assumptions.

These results highlight the importance of considering future traffic growth in junction design and planning, while also demonstrating that the existing layout retains a reasonable level of resilience under forecast conditions.

9.3 Junction Summary

Based on the operational performance results presented in this report, and in alignment with the assessment criteria outlined in Section 2, it is concluded that mitigation measures are not required for the existing junction layout under the assessed scenarios.

10. Junction 7: Leybourne Way / Castle Way – Existing Layout

10.1 Existing Layout Performance

Figure 4-1 illustrates the existing layout of the Castle Way / Leybourne Way junction, which is configured as a standard four-way crossroads. Castle Way runs in a north to south direction and Leybourne Way an east to west direction. Each approach operates under signalised controlled. The junction accommodates a mix of local and regional traffic.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 10-1: Leybourne Way / Castle Way Junction

10.2 Model Validation

In response to concerns that queuing at this junction could affect traffic conditions upstream at M20 Junction 4, a validation exercise was conducted. This involved comparing observed queue lengths, recorded through an additional queue length survey, with the available storage space between the two junctions. The survey, which covered the period from 07:00 to 19:00, identified a maximum queue length of 310 metres across all five-minute intervals. This is comfortably within the 400 metres of available storage, indicating that, under current conditions, the junction does not pose a risk of queuing spillback or disruption to the wider Strategic Road Network.

10.3 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 10-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	-6%	-1%
2042 Forecast Baseline	-9%	-10%
2042 Local Plan Test High	-12%	-16%

Table 4-1 presents the Practical Reserve Capacity (PRC) results for the existing junction's layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test – High Growth. The PRC values indicate the percentage increase in traffic demand that the junction could accommodate before reaching its practical operating limits.

In 2019, the junction operated close to capacity, with PRC values of -6% in the AM peak and -1% in the PM peak. These negative values suggest that the junction was already experiencing demand levels slightly above its practical capacity during peak periods.

By 2042, under the Forecast Baseline scenario (assuming background traffic growth without additional development), the situation worsens slightly, with PRC values of -9% in the AM and -10% in the PM, indicating increased pressure on the junction and reduced operational performance.

Under the 2042 Local Plan Test, High Growth scenario, the junction's performance is further constrained, with PRC values dropping to -12% in the AM and -16% in the PM. These figures highlight a significant shortfall in capacity under higher growth assumptions, suggesting that the junction would struggle to accommodate future traffic demand without mitigation.

These results underscore the need for strategic planning and potential junction improvements to address future capacity challenges and maintain acceptable operational performance.

10.4 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Degree of Saturation (DOS) for each individual approach arm, rather than assessing the junction. The DOS values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 10-2: (DOS) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
Castle Way (North)	98%	99%	101%	99%
Leybourne Way	97%	95%	100%	95%
Castle Way (South)	98%	98%	100%	98%
Cycle Time	120 secs	120 secs	120 secs	120 secs

The results show consistently high saturation levels across all arms of the junction:

- Castle Way (North) reaches 98% (AM) and 99% (PM) under the Forecast Baseline, increasing to 101% (AM) and 99% (PM) under the Local Plan High scenario, indicating that this arm is likely to experience congestion during peak periods.
- Leybourne Way operates at 97% (AM) and 95% (PM) under the Forecast Baseline, rising to 100% (AM) and 95% (PM) under the High Growth scenario, suggesting marginal capacity exceedance in the morning peak.
- Castle Way (South) shows similar trends, with 98% (AM and PM) under the Forecast Baseline and 100% (AM) and 98% (PM) under the High Growth scenario.
- The cycle time remains constant at 120 seconds across all scenarios and time periods, indicating no change in signal timing assumptions.

These results highlight that the junction is operating at or near capacity under both future scenarios, with some arms exceeding practical limits during peak periods. While the layout remains functional, the high saturation levels suggest limited resilience to further growth or unexpected traffic fluctuations.

10.5 Junction Summary

Although the junction is shown to operate at or slightly above theoretical capacity under the Local Plan scenario, the actual increase in Degree of Saturation (DoS) is less than 5%. Furthermore, no significant impacts have been observed on the surrounding network. This suggests that the operational risk associated with not implementing mitigation at this location is minimal. As such, mitigation is not recommended for this junction at this stage.

11. Junction 8: M20 J4 – Existing Layout

11.1 Existing Layout

Figure 4-1 illustrates the existing layout of the M20 Junction 4 roundabout which features a large roundabout connecting the M20 motorway with Castle Way and the A228. The roundabout serves as the central node of the junction, facilitating movements between the motorway and surrounding local roads.

Castle Way approaches the roundabout from both the north and the A228 from the south, while slip roads provide access to and from the M20 in both eastbound and westbound directions. The junction is surrounded by landmarks, including Leybourne Lake to the east, ETMS Highways depot to the north, and Premier Inn Maidstone (West Malling) to the southwest.

Traffic movements at the junction are managed through signalled controls. The roundabout accommodates a mix of strategic and local traffic, serving both long-distance motorway users and regional trips.

The existing geometry, including the roundabout configuration and lane arrangements, forms the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

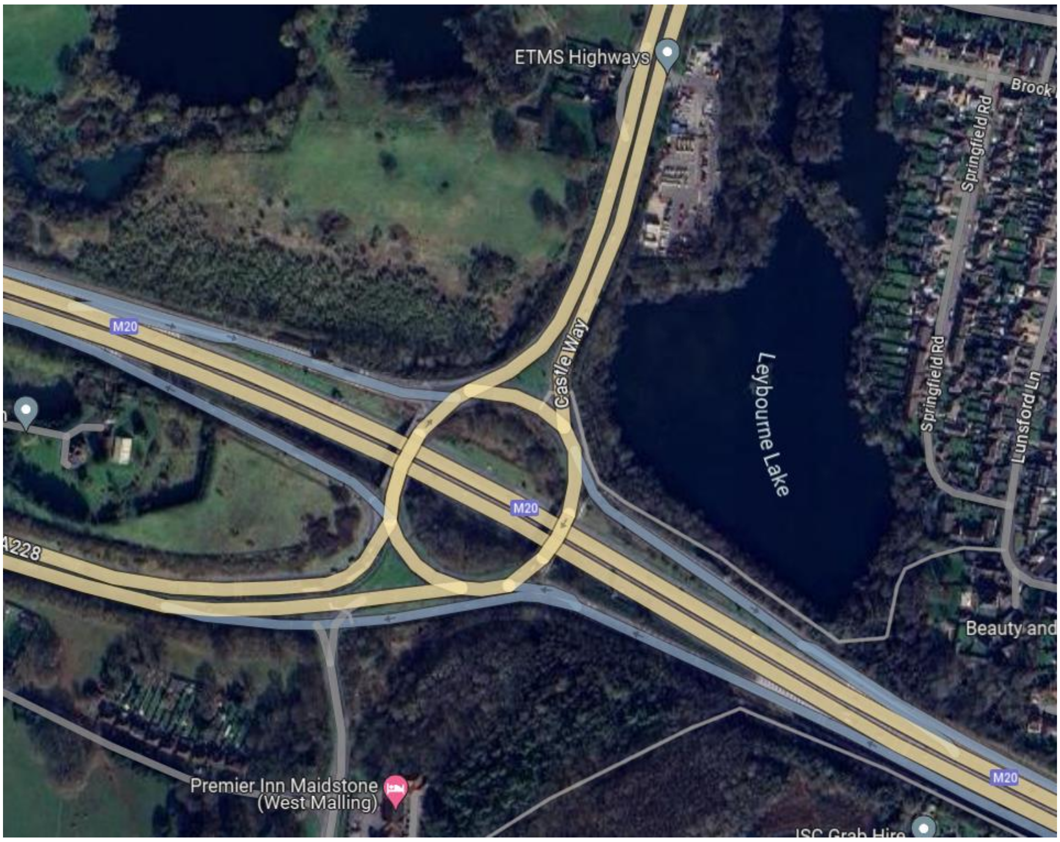

Figure 11-1: M20 J4 Junction

11.2 Model Validation

To provide some additional assurance around the underlying conditions at the junctions, a validation exercise was undertaken for the M20 off-slips. This was done using Degree of Saturation measurements taken on site, compared to modelled DoS values. This is summarised in Table 11-1.

Table 11-1: M20 J4 Validation

Arm	Observed DoS	Modelled DoS
M20 EB* - AM	30%	50%
M20 EB* - PM	62%	61%
M20 WB - AM	56%	56%
M20 WB – PM	64%	66%

This shows a satisfactory level of validation between observed data and the model. This alongside queue lengths collected indicate no current issues affecting the SRN at this junction.

11.3 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 11-2: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	32%	33%
2042 Forecast Baseline	13%	35%
2042 Local Plan Test High	10%	10%

Table 4-1 presents the Practical Reserve Capacity (PRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The PRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with a healthy level of spare capacity, showing PRC values of 32% in the AM peak and 33% in the PM peak. These figures indicate that the junction was capable of handling additional traffic volumes without exceeding operational limits during peak periods.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without additional development, the available capacity is notably reduced. PRC values fall to 13% in the AM and 35% in the PM, suggesting that while the junction remains functional, its resilience during the morning peak is diminished.

Under the 2042 Local Plan Test, High Growth scenario, which incorporates projected development related traffic increases, the junction's performance becomes more constrained. PRC values drop to 10% in both the AM and PM peaks, indicating that the junction is nearing its practical capacity.

11.4 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Degree of Saturation (DOS) for each individual approach arm, rather than assessing the junction. The DOS values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 11-3: (DoS) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
M20 (West) Offslip	38%	62%	40%	73%
A228 Castle Way (North)	75%	66%	64%	56%
M20 (East) Offslip	79%	67%	82%	82%
A228 Bypass (South)	48%	51%	52%	51%
Cycle Time	60 secs	60 secs	60 secs	60 secs

The results highlight notable differences in performance across the various arms of the junction:

- M20 (West) Offslip shows increasing saturation, rising from 38% (AM) and 62% (PM) under the Forecast Baseline to 40% (AM) and 73% (PM) under the High Growth scenario. This suggests growing pressure during the evening peak.
- A228 Castle Way (North) operates at 75% (AM) and 66% (PM) under the Forecast Baseline but sees a reduction to 64% (AM) and 56% (PM) under the High Growth scenario, indicating a redistribution of traffic demand.
- M20 (East) Offslip is the most saturated arm, increasing from 79% (AM) and 67% (PM) to 82% (AM and PM) under the High Growth scenario. These figures suggest this approach is nearing its practical capacity and may require future mitigation.
- A228 Bypass (South) remains stable, with DoS values of 48% (AM) and 51% (PM) under the Forecast Baseline, and 52% (AM) and 51% (PM) under the High Growth scenario, indicating continued efficient operation.
- Cycle time remains unchanged at 60 seconds across all scenarios and time periods, reflecting consistent signal timing assumptions.

Overall, the findings suggest that while most arms of the junction continue to operate within acceptable limits, the M20 off slips, particularly the eastbound approach, are approaching saturation under forecast growth. A queue length analysis on the off slips also indicated no concerns with queues exceeding the available storage.

11.5 Junction Summary

Based on the operational performance results presented in this report, and in alignment with the assessment criteria outlined in Section 2, it is concluded that mitigation measures are not required for the existing roundabout layout under the assessed scenarios.

12. Junction 9: A228 / Bull Road – Existing Layout

12.1 Existing Layout

Figure 4-1 illustrates the existing layout of the A228 / Bull Road / Birling Road / Park Road junction, which is configured as a multi-arm roundabout. The A228 runs in a north-south direction, crossed by Bull Road from the northwest, Birling Road from the west, and Park Road from the southeast.

Much of the junction operates under signal-controlled conditions, with traffic signals present on the approach to manage vehicle movements and improve safety. These signals regulate entry into the roundabout, coordinating flow and reducing conflict between turning movements.

In addition to signal control, give way markings are present at Bull Road, reinforcing the requirement for vehicles to yield to circulating traffic when signals are not active or during transitional phases. This combination of signalisation and priority control ensures orderly movement and supports both local and strategic traffic.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 12-1: A228 / Bull Road Junction

12.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 12-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	51%	35%
2042 Forecast Baseline	28%	13%
2042 Local Plan Test High	25%	13%

Table 4-1 presents the Practical Reserve Capacity (PRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test – High Growth. The PRC values indicate the percentage increase in traffic demand that the junction could accommodate before reaching its practical operating limits.

In the 2019 Base Year, the junction operated with a healthy level of reserve capacity, showing PRC values of 51% in the AM peak and 35% in the PM peak. These figures suggest that the junction was well within its operating limits and capable of accommodating a substantial increase in traffic demand during both peak periods.

By 2042, under the Forecast Baseline scenario, the available reserve capacity is notably reduced, with PRC values falling to 28% in the AM peak and 13% in the PM peak. This indicates that while the junction can still accommodate some additional traffic, its capacity is more constrained, particularly during the evening peak.

Under the 2042 Local Plan Test, High Growth scenario, the junction’s performance is slightly more limited, with PRC values of 25% in the AM and 13% in the PM. These results suggest that the junction is approaching its practical capacity, especially during the PM peak.

12.3 Junction Summary

Based on the operational performance results presented in this report, and in alignment with the assessment criteria outlined in Section 2, it is concluded that mitigation measures are not required for the existing roundabout layout under the assessed scenarios.

13. Junction10: A20 / Ashton Way / Castle Way / Oxley Shaw Lane – Existing Layout

13.1 Existing Layout

Figure 4-1 illustrates the existing layout of the A20 / Castle Way / Oxley Shaw Lane / Ashton Way junction, which is configured as a complex multi-arm signal-controlled junction. The A20 runs in an east-west direction, crossed by Castle Way from the north, Oxley Shaw Lane from the northeast, and Ashton Way from the south.

Unlike a standard priority-controlled crossroads, this junction is equipped with traffic signals that regulate vehicle movements across all approaches. These signals are designed to manage traffic flow efficiently and reduce conflict between turning and through movements.

The surrounding roads, including Millbrook, Pump Court, and Old Orchard Lane, connect nearby but do not directly feed into the main signalised junction. The overall configuration supports a mix of local and strategic traffic, with the A20 serving as a key corridor.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 13-1: A20 / Ashton Way / Castle Way / Oxley Shaw Lane Junction

13.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 13-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	56%	34%
2042 Forecast Baseline	24%	11%
2042 Local Plan Test High	18%	2%

Table 4-1 resents the Practical Reserve Capacity (PRC) results for the existing layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The PRC values represent the percentage increase in traffic demand that the junction could accommodate before reaching its practical operating limits.

In 2019, the junction operated with a strong level of spare capacity, showing PRC values of 56% in the AM peak and 34% in the PM peak. These figures indicate that the junction was well within its operational limits and capable of accommodating additional traffic during peak periods.

By 2042, under the Forecast Baseline scenario, the available capacity is reduced, with PRC values falling to 24% in the AM and 11% in the PM. This reflects a notable decline in performance, particularly during the evening peak.

Under the 2042 Local Plan Test, High Growth scenario, the junction’s performance becomes increasingly constrained, with PRC values dropping further to 18% in the AM and just 2% in the PM. These results suggest that the junction is nearing its practical capacity and may struggle to accommodate future growth without mitigation.

13.3 Junction Summary

Based on the operational performance results presented in this report, and in alignment with the assessment criteria outlined in Section 2, it is concluded that mitigation measures are not required for the existing junction layout under the assessed scenarios.

14. Junction11: A20 / Winterfield Lane / Lunsford Lane – Existing Layout

14.1 Existing Layout

Figure 4-1 illustrates the existing layout of the A20 / Lunsford Lane / Winterfield Lane junction, which is configured as a staggered four-way priority junction. The A20 runs in an east west direction, crossed by Lunsford Lane from the north and Winterfield Lane from the south. Each approach operates under signalled controlled.

The junction accommodates a mix of local and through traffic, with the A20 serving as a key corridor for regional movement.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 14-1: A20 / Winterfield Lane / Lunsford Lane Junction

14.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 14-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	-19%	-22%
2042 Forecast Baseline	-19%	-22%
2042 Local Plan Test High	-28%	-33%

Table 4-1 presents the Practical Reserve Capacity (PRC) results for the existing layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The PRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical operating limits.

In both the 2019 Base Year and the 2042 Forecast Baseline scenarios, the junction operates over capacity, with PRC values of -19% in the AM peak and -22% in the PM peak. These negative values indicate that the junction is already experiencing demand levels beyond its practical capacity, resulting in operational stress during peak periods.

Under the 2042 Local Plan Test, High Growth scenario, the situation worsens, with PRC values dropping further to -28% in the AM and -33% in the PM. This suggests that the junction will face significant congestion and delays without mitigation, particularly during the evening peak.

These results highlight the need for mitigation measures and infrastructure improvements to address existing and future capacity shortfalls. The current layout is not resilient to forecast growth and will require strategic planning to restore acceptable levels of service and ensure long term operational viability.

14.3 Detailed Arm Level Operational Assessment

Table 4-2 provides a detailed view of the junction's operational performance by reporting the Degree of Saturation (DoS) for each individual approach under the 2042 Forecast Baseline and 2042 Local Plan High Growth scenarios during both AM and PM peak periods.

Table 14-2: (DOS) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
Lunsford Lane	107%	109%	114%	121%
London Road (East)	102%	106%	115%	118%
Winterfield Lane	74%	81%	78%	86%
London Road (West)	95%	106%	99%	116%
Cycle Time	90 secs	90 secs	90 secs	100 secs

The results highlight notable differences in performance across the various arms of the junction:

- Lunsford Lane shows the highest saturation levels, increasing from 107% (AM) and 109% (PM) under the Forecast Baseline to 114% (AM) and 121% (PM) under the High Growth scenario, indicating severe overcapacity and congestion.
- London Road (East) also operates above capacity, rising from 102% (AM) and 106% (PM) to 115% (AM) and 118% (PM), suggesting sustained pressure and limited operational flexibility.
- Winterfield Lane remains below critical thresholds but shows increasing demand, with DoS values rising from 74% (AM) and 81% (PM) to 78% (AM) and 86% (PM), indicating growing pressure during peak periods.
- London Road (West) is nearing capacity, with saturation increasing from 95% (AM) and 106% (PM) to 99% (AM) and 116% (PM), particularly constrained in the evening peak.
- Cycle time is maintained at 90 seconds in the AM and PM peaks under the Forecast Baseline but increases to 100 **seconds** in the PM peak under the High Growth scenario, reflecting adjustments to accommodate higher demand.

Overall, the results indicate that the junction is operating over capacity on several arms, particularly Lunsford Lane and London Road (East), under both baseline and high growth conditions. These findings highlight the need for mitigation measures to address congestion and maintain acceptable levels of service.

14.4 Junction Summary

The model assessment indicates that mitigation would be required to reduce the impact of the local plan. Due to the physical limitations around the junction in terms of space as well as the capacity issues at the junction, it is unlikely an easy fix could be found here. Any mitigation here would be in the form of turn bans, potentially making one or two of the junctions left-in left out or just banning the right turns into the junction. This would have wider impacts on the network with traffic rerouting as a result.

15. Junction12: A20 / New Road / Station Road – Existing Layout

15.1 Existing Layout

Figure 4-1 illustrates the existing layout of the A20 / Station Road / New Road junction, which is configured as a staggered T-junction rather than a standard four-way crossroads. The A20 runs in an east west direction along the southern edge of the junction, while Station Road crosses it from the north and continues diagonally across the image. New Road connects from the southwest and meets Station Road before linking to the A20. The junction operates under signalled controlled conditions.

This layout accommodates a mix of local and regional traffic, with the A20 serving as a key strategic route and Station Road and New Road providing access to nearby residential and commercial areas.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 15-1: A20 / New Road / Station Road Junction

15.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 15-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	-13%	-13%
2042 Forecast Baseline	-6%	-8%
2042 Local Plan Test High	-18%	-13%

Table 4-1 presents the Practical Reserve Capacity (PRC) results for the existing junction layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test – High Growth. The PRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical operating limits.

In the 2019 Base Year, the junction was already operating over capacity, with PRC values of -13% in both the AM and PM peak periods. This suggests that demand exceeded the junction's practical capacity even under baseline conditions.

By 2042, under the Forecast Baseline scenario, the situation improves slightly, with PRC values rising to -6% in the AM and -8% in the PM, indicating a reduction in pressure but still reflecting an over capacity condition.

Under the 2042 Local Plan Test – High Growth scenario, the junction's performance deteriorates further, with PRC values dropping to -18% in the AM and -13% in the PM, highlighting the impact of increased development related traffic.

These results demonstrate that the junction is consistently operating beyond its practical limits across all scenarios and time periods. This underscores the need for targeted mitigation measures to improve capacity and ensure the junction can accommodate future traffic growth effectively.

15.3 Detailed Arm Level Operational Assessment

Table 4-2 provides a detailed view of the junction's operational performance by reporting the Degree of Saturation (DoS) for each individual approach under the 2042 Forecast Baseline and 2042 Local Plan High Growth scenarios during both AM and PM peak periods.

Table 15-2: (DOS) Results - Existing Layout

Approach / Scenario	2019 Base		2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM	AM	PM
Station Road	100%	100%	95%	96%	105%	101%
A20 London Road (East)	72%	79%	67%	85%	84%	101%
New Road	99%	98%	95%	95%	104%	101%
A20 London Road (West)	101%	100%	96%	97%	107%	99%
Cycle Time	120 secs	120 secs	110 secs	110 secs	120 secs	120 secs

The results highlight notable differences in performance across the various arms of the junction:

- Station Road operates near capacity under the Forecast Baseline with 95% (AM) and 96% (PM), increasing to 105% (AM) and 101% (PM) under the High Growth scenario, indicating oversaturation and potential delays.
- A20 London Road (East) shows rising demand, with DoS values increasing from 67% (AM) and 85% (PM) to 84% (AM) and 101% (PM), suggesting congestion during the evening peak under high growth.
- New Road is similarly constrained, with saturation levels of 95% (AM and PM) under the Forecast Baseline, rising to 104% (AM) and 101% (PM) under the High Growth scenario, indicating that this arm will experience queuing and delay.
- A20 London Road (West) also approaches and exceeds capacity, with DoS values of 96% (AM) and 97% (PM) under the Forecast Baseline, increasing to 107% (AM) and 99% (PM) under the High Growth scenario.
- Cycle time increases from 110 seconds under the Forecast Baseline to 120 seconds under the High Growth scenario, reflecting adjustments to signal timings to manage higher traffic volumes.

Overall, the results indicate that all arms of the junction are operating at or above practical capacity under future growth conditions, particularly during peak periods. These findings highlight the need for targeted mitigation measures to improve junction performance and accommodate forecast traffic demand.

15.4 Proposed Layout Test

Kent County Council (KCC) has submitted a developer led proposal featuring an alternative layout for this junction. The design incorporates two ahead lanes in each direction along the A20, aiming to improve capacity and traffic flow. The proposed layout is illustrated in Figure 15-2, with the corresponding modelling results presented in Table 15-3.

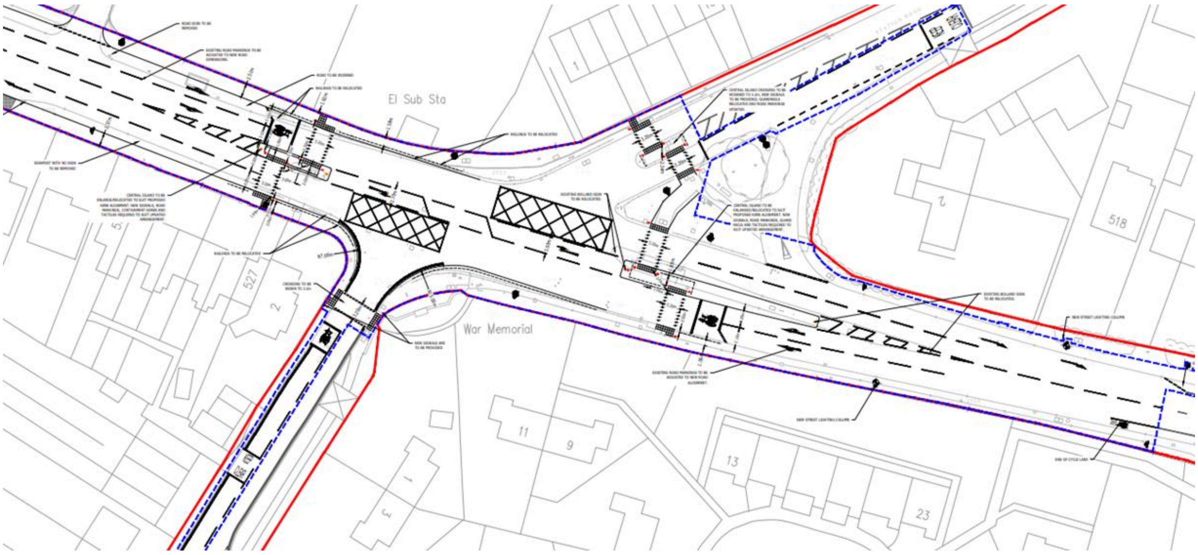

Figure 15-2: A20/Station Road Developer Proposed Layout

Table 15-3: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	-13%	-13%
2042 Forecast Baseline	23%	11%
2042 Local Plan Test High	5%	-4%

The modelling results demonstrate that the proposed layout would deliver a substantial increase in junction capacity. Although the PM peak scenario under the Local Plan still exceeds practical capacity thresholds, the performance is notably improved compared to the baseline, indicating that the design offers meaningful operational benefits.

15.5 Junction Summary

While the existing junction layout has been shown to perform poorly under Local Plan traffic scenarios, modelling of the alternative design proposed by KCC indicates that it would effectively mitigate these impacts. The results suggest that the revised layout would sufficiently address the identified capacity issues. However, as this design has not yet been implemented, its benefits remain theoretical at this stage. If delivered, no further mitigation measures are expected to be necessary at this location.

16. Junction13: A20 / Mills Road / Hall Road – Existing Layout

16.1 Existing Layout

Figure 4-1 illustrates the existing layout of the A20 / Mills Road / Hall Road junction, which is configured as a signalised crossroads junction. The A20 runs diagonally from the bottom right to the top left, crossed by Mills Road from the south and Hall Road from the north. The junction accommodates a mix of local and through traffic, with the A20 serving as a key strategic route and the side roads providing access to adjacent residential and commercial areas.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 16-1: A20 / Mills Road / Hall Road Junction

16.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 16-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	20%	3%
2042 Forecast Baseline	2%	8%
2042 Local Plan Test High	-4%	-3%

Table 4-1 presents the Practical Reserve Capacity (PRC) results for the existing junction layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test High Growth. PRC values represent the percentage change in traffic demand that the junction can accommodate before reaching its practical capacity.

In 2019, the junction operated with a reasonable level of spare capacity, with PRC values of 20% in the AM peak and 3% in the PM peak. These figures indicate that the junction could manage some increase in traffic demand, particularly in the morning period, without exceeding its operational limits.

By 2042, under the Forecast Baseline scenario, which reflects background traffic growth without additional development, the available capacity is notably reduced. PRC values fall to 2% in the AM and 8% in the PM, suggesting that the junction is approaching its operational limits, especially during the morning peak.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance becomes constrained, with PRC values turning negative: -4% in the AM and -3% in the PM. These results imply that the junction would be over capacity under higher growth assumptions, leading to potential congestion and delays.

16.3 Detailed Arm Level Operational Assessment

Table 4-2 presents the Degree of Saturation (DoS) results for the existing junction layout, showing the operational performance of each individual approach arm during the AM and PM peak periods under both the 2042 Forecast Baseline and the 2042 Local Plan High Growth scenarios.

Table 16-2: (DOS) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
Hall Road	88%	79%	93%	90%
A20 London Road (East)	45%	70%	64%	88%
Mills Road	78%	75%	89%	89%
A20 London Road (West)	87%	83%	93%	93%

The results highlight notable differences in performance across the various arms of the junction:

- Hall Road shows increasing saturation, with DoS values rising from 88% (AM) and 79% (PM) under the 2042 Forecast Baseline to 93% (AM) and 90% (PM) under the 2042 Local Plan High scenario. This indicates that the arm is approaching its operational capacity, particularly during the morning peak.
- A20 London Road (East) experiences a significant increase in DoS, especially in the PM peak, where values rise from 70% to 88%. The AM peak also increases from 45% to 64%, suggesting growing pressure and potential congestion risks under higher growth.
- Mills Road sees a consistent rise in saturation, with DoS values increasing from 78% (AM) and 75% (PM) to 89% in both peaks. This reflects sustained demand and nearing capacity limits.
- A20 London Road (West) records the highest saturation levels across all arms, increasing from 87% (AM) and 83% (PM) to 93% in both peaks under the Local Plan High scenario. This suggests that this approach is likely to experience congestion without mitigation.

16.4 Junction Summary

Based on the operational performance results presented in this report, and in alignment with the assessment criteria outlined in Section 2, it is concluded that mitigation measures are not required for the existing junction layout under the assessed scenarios.

However, due to ongoing local concerns regarding the baseline conditions at the junction, it is recommended that a validated traffic model be developed to evaluate a potential worst-case scenario. A validated model, calibrated against observed traffic data, would provide a more robust and reliable representation of current network conditions.

This would allow for a more accurate assessment of junction performance under stress conditions, helping to identify any latent issues that may not be captured in the current modelling. This approach would strengthen the evidence base, support stakeholder confidence, and ensure that any necessary mitigation is identified and justified.

17. Junction14: M20 J5 – Existing Layout

17.1 Existing Layout

Figure 4-1 illustrates the existing layout of the Aylesford Interchange, where the A20 London Road intersects with Coldharbour Lane and other connecting roads via a grade separated roundabout configuration.

The M20 motorway runs east-west beneath the roundabout, with slip roads providing access to and from the motorway in both directions. The roundabout itself serves as the central hub, linking the A20 London Road, Coldharbour Lane, and other local roads. All approaches operate under priority-controlled conditions, with vehicles entering the roundabout required to give way. There is no signal control in place.

This junction accommodates a mix of local and strategic traffic, serving both regional connectivity and access to nearby facilities, including the Highways England Coldharbour Depot and the Physiotherapy Department in Kent.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

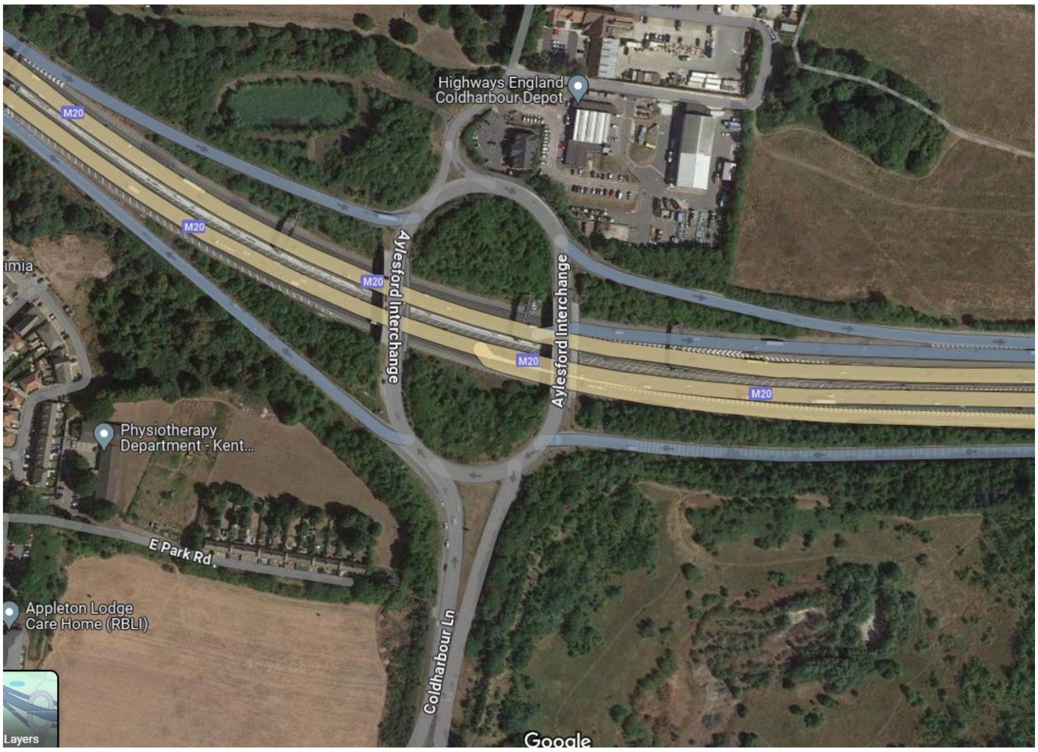

Figure 17-1: M20 J5 Junction

17.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 17-1: (NRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	15%	41%
2042 Forecast Baseline	2%	17%
2042 Local Plan Test High	-6%	9%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with a strong level of spare capacity, with NRC values of 15% in the AM peak and 41% in the PM peak, indicating that the junction could comfortably manage additional traffic during peak periods.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without further development, the available capacity is reduced, with NRC values falling to 2% in the AM and 17% in the PM. This suggests a notable decline in operational resilience, particularly in the morning peak.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance becomes more constrained, with NRC values dropping to -6% in the AM and 9% in the PM. These figures indicate that the junction would exceed its practical capacity during the morning peak and operate with limited spare capacity in the evening peak under higher growth assumptions.

The results demonstrate that while the junction remains functional under forecast conditions, its ability to accommodate future traffic demand is diminished, particularly under high growth scenarios.

17.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 17-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
Coldharbour Lane	0.00	0.00	0.00	0.00
M20 (East)	0.83	0.65	0.90	0.77
A20	0.64	0.65	0.69	0.68
M20 (West)	0.37	0.51	0.39	0.54

The results highlight notable differences in performance across the various arms of the junction:

- Coldharbour Lane consistently records an RFC of 0.00 across all scenarios and peak periods, indicating negligible traffic flow and no operational pressure on this arm.
- The M20 (East) approach shows the highest RFC values among all arms, increasing from 0.83 (AM) and 0.65 (PM) under the 2042 Forecast Baseline to 0.90 (AM) and 0.77 (PM) under the 2042 Local Plan High scenario. These figures suggest that this arm is approaching its practical capacity, particularly during the morning peak.
- The A20 approach experiences a moderate increase in RFC, rising from 0.64 (AM) and 0.65 (PM) to 0.69 (AM) and 0.68 (PM). While still within acceptable limits, this growth reflects a steady rise in demand across both peak periods.
- The M20 (West) arm shows a slight increase in RFC values, from 0.37 (AM) and 0.51 (PM) to 0.39 (AM) and 0.54 (PM), indicating low to moderate saturation levels with no immediate capacity concerns.

Overall, the results highlight varying levels of demand across the junction's approach arms. While most arms remain within operational thresholds, the M20 (East) approach may require closer monitoring or future mitigation to maintain junction performance under high growth conditions.

17.4 Junction Summary

Based on the operational performance results presented in this report, and in alignment with the assessment criteria outlined in Section 2, it is concluded that mitigation measures are not required for the existing roundabout layout under the assessed scenarios.

18. Junction15: Rochester Road / Forstal Road / High Street – Existing Layout

18.1 Existing Layout

Figure 4-1 illustrates the junction involving High Street, Rochester Road, Forstal Road, which converge at a small central roundabout. High Street enters from the west and continues southeast as Forstal Road, forming a continuous route through the junction. Rochester Road approaches from the north. Bush Row joins Rochester Road just before the roundabout and runs parallel to Forstal Road on its northern side.

The roundabout serves as the focal point for traffic movements between these roads, operating under priority-controlled conditions without signalisation. The layout supports local traffic circulation within an urban setting. The surrounding area includes some dense development, with a mix of residential and commercial buildings, including consented growth at Eccles and the Forstal Road industrial area.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 18-1: Rochester Road / Forstal Road / High Street Junction

18.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 18-1: (NRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	10%	35%
2042 Forecast Baseline	-7%	20%
2042 Local Plan Test High	-21%	-5%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with a reasonable level of spare capacity, with NRC values of 10% in the AM peak and 35% in the PM peak, indicating that the junction could accommodate additional traffic, particularly in the evening period.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without further development, the junction's performance declines, with NRC values falling to -7% in the AM and 20% in the PM. This suggests that the junction would exceed its practical capacity during the morning peak and operate with reduced resilience in the evening.

Under the 2042 Local Plan Test High Growth scenario, the junction becomes more constrained, with NRC values dropping further to -21% in the AM and -5% in the PM, indicating that the junction would be over capacity during both peak periods under higher growth assumptions.

These results highlight the impact of future traffic growth on junction performance and suggest that without mitigation, the existing layout may not be sufficient to accommodate projected demand, particularly under high growth conditions.

18.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 18-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline	2042 Local Plan High

	AM	PM	AM	PM
Rochester Rd	0.93	0.63	0.78	0.63
Forstal Rd	0.47	0.70	0.63	0.89
High St	0.65	0.39	1.15	0.73

The results highlight notable differences in performance across the various arms of the junction:

- Rochester Road shows high RFC values under the 2042 Forecast Baseline scenario, with 0.93 in the AM peak and 0.63 in the PM. Under the 2042 Local Plan High scenario, the AM peak value decreases to 0.78, while the PM remains unchanged at 0.63, indicating a slight improvement in morning performance but continued pressure during both peaks.
- Forstal Road experiences a noticeable increase in RFC values, rising from 0.47 (AM) and 0.70 (PM) under the Forecast Baseline to 0.63 (AM) and 0.89 (PM) under the Local Plan High scenario. These figures suggest growing demand, particularly in the evening peak, where the arm approaches its practical capacity.
- High Street shows the most notable change, with RFC values increasing from 0.65 (AM) and 0.39 (PM) under the Forecast Baseline to 1.15 (AM) and 0.73 (PM) under the Local Plan High scenario. The AM peak value exceeds 1.0, indicating that this arm would operate over capacity and experience congestion without mitigation.

Overall, the results highlight varying levels of saturation across the junction's approach arms. While Rochester Road and Forstal Road remain within operational limits, High Street is projected to exceed capacity during the morning peak under high growth conditions. These findings suggest that targeted improvements may be necessary to maintain junction performance and prevent future congestion.

18.4 Junction Summary

Considering the projected capacity constraints identified under the 2042 Local Plan High Growth scenario, mitigation measures should be considered to maintain acceptable junction performance. One potential option is the conversion of the existing roundabout layout to a signalised junction. Signal control could offer more structured traffic management and potentially improve flow during peak periods by allocating green time based on demand.

However, the feasibility of this approach is limited by the high volume of right turning movements from Forstal Road to Rochester Road. This movement is particularly challenging to accommodate within a signalised layout, as it would require either a dedicated signal phase or complex staging to avoid conflict with opposing flows. Such arrangements could lead to increased delay for other arms of the junction and reduce overall efficiency.

Additionally, the physical constraints of the site and surrounding built environment do limit opportunities for geometric improvements or the introduction of additional lanes to support signalisation. Therefore, while signal control may offer some benefits, it is unlikely to fully resolve the operational issues without further supporting measures.

Alternative mitigation strategies may need to be explored, such as junction reconfiguration, demand management, or targeted capacity enhancements on specific arms. A detailed junction modelling exercise would be required to assess the operational impacts of different options and identify the most effective solution.

19. Junction17: M20 J6 – Existing Layout

19.1 Existing Layout Performance

Figure 4-1 illustrates the existing layout of the Running Horse (south) roundabout, it redesigned as a turbo-roundabout in 2024, which has strict lane markings to force vehicles into the correct lane for exiting the roundabout. These are still rare in the UK and as such, there is limited guidance on how to model them using local modelling as such, the quality and accuracy of local junction modelling for these novel junction layouts is therefore not sufficient.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

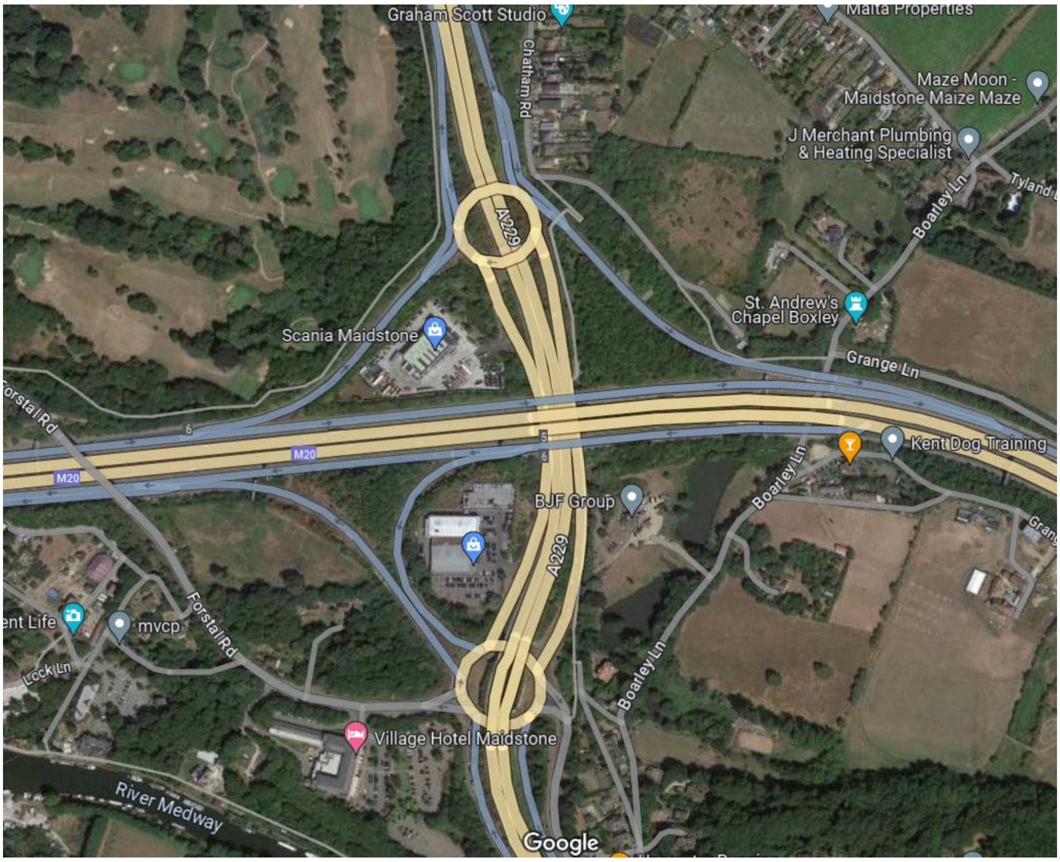

Figure 19-1: M20 J6 Junction

19.2 Operational Assessment

The Running Horse (south) roundabout was redesigned as a turbo-roundabout in 2024, which has strict lane markings to force vehicles into the correct lane for exiting the roundabout. These are still rare in the UK and as such, there is limited guidance on how to model them using local modelling as such, the quality and accuracy of local junction modelling for these novel junction layouts is therefore not sufficient. Instead, a microsimulation VISSIM model has been developed by AECOM, which is more able to accurately model the more complex interactions. This model has been reviewed by Jacobs and can be provided separately. The model shows a reasonable level of operation in the reference case.

As the increases between the reference case and Local Plan scenarios is not significant, given the operation of the VISSIM model in the reference case scenario it is not anticipated that any further mitigation would be required at this stage. However, if more assurance is required, it is recommended the VISSIM model is re-run with Local Plan flows.

20. Junction18a: M2 J3 – Existing Layout

20.1 Existing Layout

Figure 4-1 illustrates a complex junction layout involving the A229, A2045, and M2 roads. The M2 motorway runs north-east to south-west underneath the Taddington Roundabout, with multiple slip lanes in each direction and local road connections. The A229 crosses over the M2 via bridges, forming a grade-separated junction.

The slip roads connect the M2 and A229, facilitating smooth transitions between these major routes. To the west of the Taddington Roundabout (M2 Jn3), the A229 links with Maidstone Road, Blue Bell Hill and an accesses serving the Hospital Lane Dental and Implant Referral Clinic. The surrounding area features dense woodland with residential communities at Blue Bell Hill and Walderslade. The junction layout is designed to accommodate both strategic and local traffic movements, with priority given to through traffic on the major roads.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

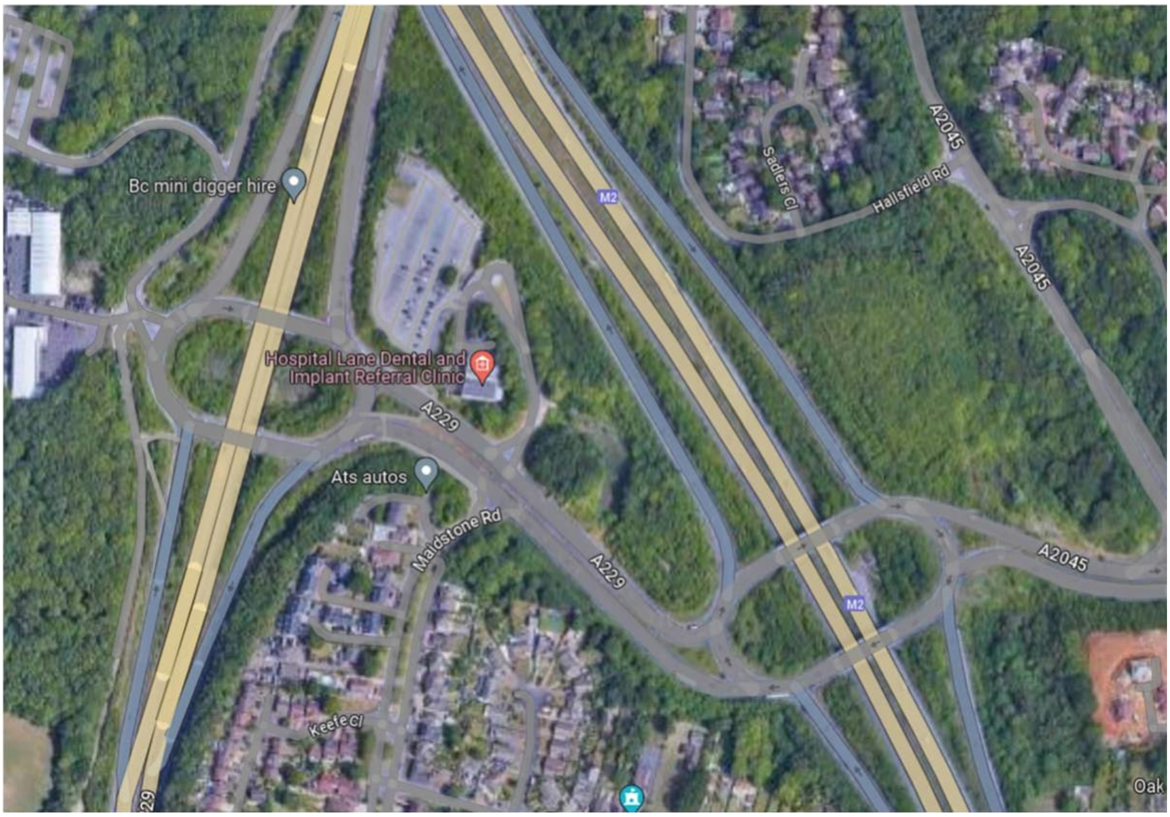

Figure 20-1: Lord Lees Roundabout and M2 J3 Junction

20.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results

provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 20-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	-71%	-32%
2042 Forecast Baseline	-139%	-141%
2042 Local Plan Test High	-159%	-149%

Table 4-1 presents the Practical Reserve Capacity (PRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test High Growth. PRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction was already operating over capacity, with PRC values of -71% in the AM peak and -32% in the PM peak. These negative values suggest that the junction was unable to accommodate existing demand without experiencing operational stress, particularly during the morning peak.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without additional development, the situation worsens, with PRC values dropping to -139% in the AM and -141% in the PM. This indicates severe overcapacity and performance degradation.

Under the 2042 Local Plan Test High Growth scenario, the junction becomes even more constrained, with PRC values falling further to -159% in the AM and -149% in the PM, reflecting critical levels of congestion and a need for major mitigation.

These results highlight that the existing layout is not capable of supporting current or future traffic demand and that significant upgrades or redesigns will be required to restore operational viability and accommodate projected growth.

20.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a detailed assessment of the junction's operational performance by reporting the Degree of Saturation (DoS) for each individual approach arm at M2 Junction 3. The results are shown for both the 2042 Forecast Baseline and the 2042 Local Plan High Growth scenarios during the AM and PM peak periods.

Table 20-2: (DoS) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
M2 J3: M2 (North)	166%	115%	157%	115%
M2 J3: A2045	215%	165%	233%	224%
M2 J3: M2 (South)	129%	217%	141%	203%
A229	73%	67%	80%	65%
Cycle Time	60s secs	60s secs	60s secs	60s secs

The results highlight notable differences in performance across the various arms of the junction:

- A2045 shows the highest saturation levels across all arms, increasing from 215% (AM) and 165% (PM) under the 2042 Forecast Baseline to 233% (AM) and 224% (PM) under the 2042 Local Plan High scenario. These values indicate severe overcapacity and significant congestion risk.
- M2 (South) also experiences high saturation, with DoS values rising from 129% (AM) and 217% (PM) to 141% (AM) and 203% (PM), suggesting persistent congestion, particularly during the evening peak.
- M2 (North) shows slightly improved performance in the AM peak under the Local Plan scenario, decreasing from 166% to 157%, while the PM peak remains unchanged at 115%, indicating continued pressure.
- A229 operates within acceptable limits, with DoS values ranging from 73% to 80% in the AM and 65% to 67% in the PM across both scenarios, suggesting manageable demand levels.
- Cycle time remains consistent at 60 seconds across all scenarios and peak periods, indicating no change in signal timing despite increasing saturation.

Overall, the results highlight critical performance issues at M2 Junction 3, particularly on the A2045 and M2 approaches, which exceed practical capacity under both forecast scenarios. Significant mitigation measures will be required to address congestion and maintain junction functionality.

20.4 Junction Summary

Given the high Degree of Saturation (DoS) values observed across several arms of M2 Junction 3, particularly on the A2045 and M2 approaches, substantial physical mitigation may be required to restore acceptable operational performance and accommodate projected traffic growth.

Kent County Council (KCC) has shared a preliminary mitigation scheme, which primarily involves modifications to the slip roads to reduce traffic pressure at the junction. To assess the effectiveness of this proposal, it is recommended that the mitigation be evaluated using updated traffic data within the local modelling framework.

This will require the collection of additional survey data, including turning movement counts, queue length observations, and signal timing information, to ensure the model reflects current conditions accurately. Incorporating this data into a validated model will allow for a more robust evaluation of the proposed mitigation and help determine whether it sufficiently addresses the capacity constraints identified in the assessment.

21. Junction18b: Lord Lees Roundabout – Existing Layout

21.1 Existing Layout

Figure 21-1 the existing layout of the A229, A2045, and M2 junction. The A229 runs vertically through the centre of the image, crossing with the M2. The junction is grade-separated, featuring a series of overpasses, underpasses, and slip roads that facilitate smooth transitions between the major routes. These slip roads form loops and ramps that allow vehicles to merge and diverge efficiently without interrupting the main traffic flow.

Maidstone Road connects to the junction, as well as accesses to local businesses including Big Motoring World and Buckmore Park. The layout is designed to manage high volumes of traffic while maintaining separation between fast-moving highway traffic and slower local movements. The junction operates as a majority, signal control, with priority on one arm.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

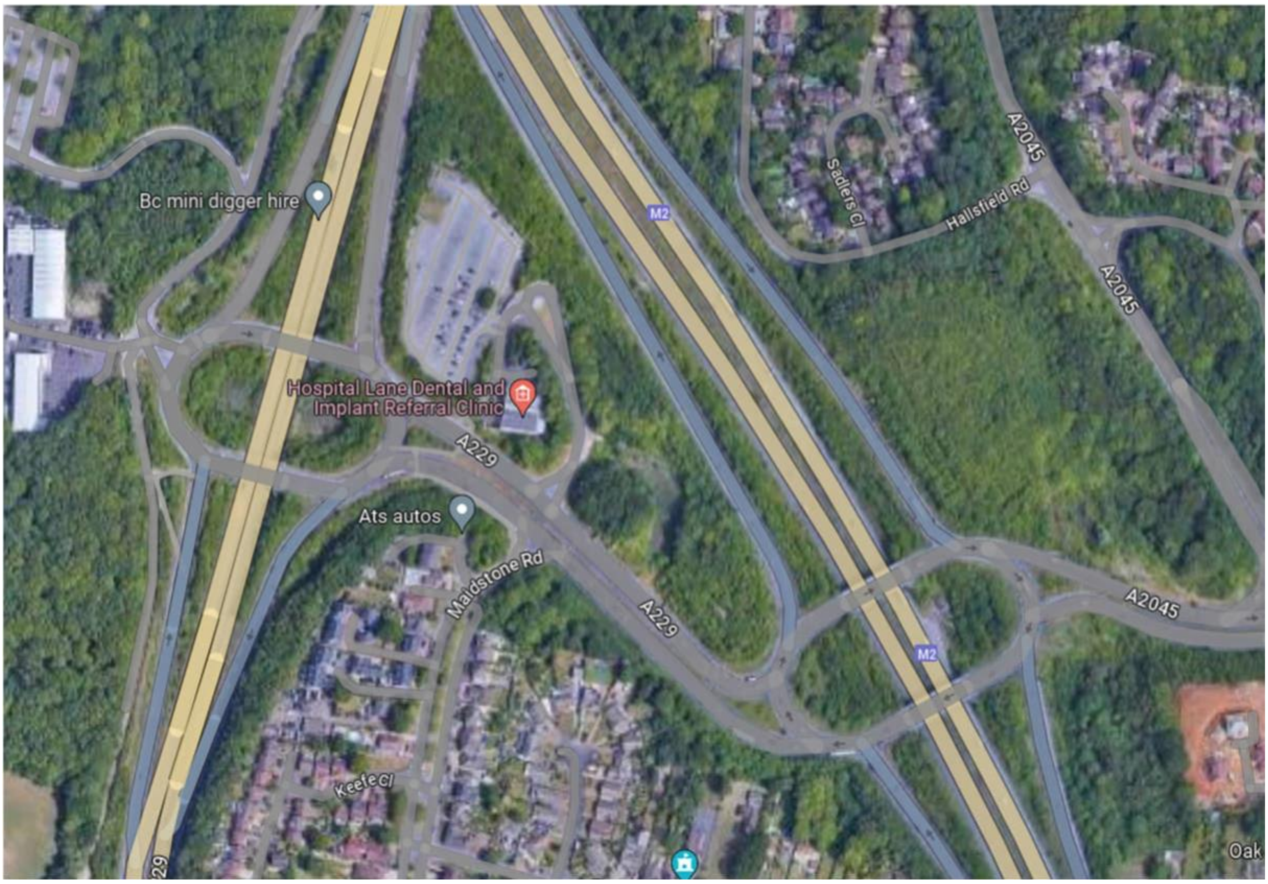

Figure 21-1: Lord Lees Roundabout and M2 J3 Junction

21.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results

provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 21-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	0%	-4.5%
2042 Forecast Baseline	-32%	-30%
2042 Local Plan Test High	-53%	-17%

Table 21-1 presents the Practical Reserve Capacity (PRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test High Growth. PRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction was already operating at or slightly over capacity, with PRC values of 0% in the AM peak and -4.5% in the PM peak. These figures suggest that the junction had no spare capacity in the morning and was marginally over capacity in the evening.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without additional development, the situation deteriorates, with PRC values falling to -32% in the AM and -30% in the PM. This indicates that the junction would be over capacity during both peak periods.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance worsens further, with PRC values dropping to -53% in the AM and -17% in the PM, reflecting congestion and a clear need for mitigation.

These results demonstrate that the existing layout is not capable of accommodating current or future traffic demand, particularly under high growth conditions. Strategic upgrades or redesigns will be essential to restore operational efficiency and support long term development.

21.3 Detailed Arm Level Operational Assessment

Table 4-2 provides a detailed view of the junction's operational performance by reporting the Degree of Saturation (DoS) for each individual approach under the 2042 Forecast Baseline and 2042 Local Plan High Growth scenarios during both AM and PM peak periods.

Table 21-2: (DoS) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
Lord Lees: A229 (North)	118%	117%	138%	100%
Lord Lees: A229 (East)	99%	80%	98%	83%
Lord Lees: A229 (South)	99%	112%	101%	105%
Cycle time	60s secs	60s secs	60s secs	60s secs

The results highlight notable differences in performance across the various arms of the junction:

- A229 (North) shows high saturation levels, increasing from 118% (AM) and 117% (PM) under the 2042 Forecast Baseline to 138% (AM) and 100% (PM) under the 2042 Local Plan High scenario. These values indicate that this arm is operating over capacity, particularly during the morning peak.
- A229 (East) remains close to capacity across both scenarios, with DoS values of 99% (AM) and 80% (PM) under the Forecast Baseline, and 98% (AM) and 83% (PM) under the Local Plan High scenario. These figures suggest consistent pressure, especially in the morning.
- A229 (South) also operates near or above capacity, with DoS values of 99% (AM) and 112% (PM) under the Forecast Baseline, increasing slightly to 101% (AM) and 105% (PM) under the Local Plan High scenario. This indicates sustained congestion during both peak periods.
- Cycle time remains unchanged at 60 seconds across all scenarios and time periods, suggesting that signal timings have not been adjusted to respond to increasing demand.

Overall, the results show that all arms of the Lord Lees junction are operating at or above practical capacity, with worsening conditions under the high growth scenario. These findings highlight the need for significant mitigation measures to address congestion and maintain junction performance.

21.4 Junction Summary

Due to the high Degree of Saturation (DoS) values observed across multiple arms of the junction, particularly on key approaches, substantial physical mitigation may be required to restore operational efficiency and support future traffic growth.

Kent County Council (KCC) has shared a preliminary mitigation scheme that primarily involves modifications to the slip roads, aimed at reducing traffic volumes at the junction and improving flow. To assess the effectiveness of this proposal, it is recommended that the mitigation be evaluated through the local modelling framework using updated junction counts and traffic data.

This will require the collection of additional survey information, including turning movement counts, queue length observations, and signal timing data. Incorporating this into a validated model will ensure that the junction's current performance is accurately represented and allow for a more robust evaluation of the proposed mitigation under future demand scenarios.

22. Junction19: A26 / Red Hill / Bow Road – Existing Layout

22.1 Existing Layout

Figure 4-1 show the junction located in Wateringbury, Kent, and comprises a multi-arm junction linking the A26, Red Hill, Bow Road, and Boorman's Mews. The A26 serves as the primary route running east to west through the junction, crossed by Red Hill from the north and Bow Road from the south.

This junction operates under signal-controlled conditions. The surrounding area includes a mix of residential and commercial properties, with several businesses and community facilities located near the junction, including Wateringbury Village Hall and a JET petrol station.

The junction accommodates both local and through traffic. Its configuration suggests potential for congestion during peak periods, particularly were turning movements conflict. Any future modelling or mitigation would need to account for the complexity of movements and the proximity of pedestrian activity and local access points.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 22-1: A26 / Red Hill / Bow Road Junction

22.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 22-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	-22%	2%
2042 Forecast Baseline	-27%	-8%
2042 Local Plan Test High	-35%	-22%

Table 4-1 presents the Practical Reserve Capacity (PRC) results for the existing junction layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test High Growth. PRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction was operating close to its limit, with a PRC of -22% in the AM peak and a marginal surplus of 2% in the PM peak. This suggests that the junction was already over capacity in the morning and only slightly under capacity in the evening.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without additional development, the situation deteriorates further, with PRC values falling to -27% in the AM and -8% in the PM, indicating that the junction would be over capacity during both peak periods.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance declines more, with PRC values dropping to -35% in the AM and -22% in the PM, reflecting congestion and a clear need for mitigation.

These results demonstrate that the existing layout is not sufficient to accommodate current or future traffic demand, particularly under high growth conditions. Strategic upgrades or redesigns will be necessary to restore operational efficiency and support long term development.

22.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Degree of Saturation (DoS) for each individual approach arm, rather than assessing the junction. DoS values are provided for both the 2042 Forecast Baseline and 2042 Local Plan High Growth scenarios during the AM and PM peak periods.

Table 22-2: (DoS) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
Red Hill	113%	96%	119%	85%
A26 (East)	114%	97%	120%	110%
Bow Road	115%	97%	121%	110%
A26 (West)	52%	87%	61%	109%
Cycle Time	120 secs	120 secs	120 secs	120 secs

The results highlight notable differences in performance across the various arms of the junction:

- Bow Road consistently shows the highest DoS values, increasing from 115% (AM) and 97% (PM) under the Forecast Baseline to 121% (AM) and 110% (PM) under the Local Plan High scenario. These figures indicate that this arm is operating well above its theoretical capacity, with significant potential for queuing and delay.

- A26 (East) also experiences high saturation levels, rising from 114% (AM) and 97% (PM) to 120% (AM) and 110% (PM). This suggests sustained pressure across both peak periods, particularly under future growth conditions.

- Red Hill shows elevated DoS values in the AM peak, increasing from 113% to 119%, but a notable reduction in the PM peak from 96% to 85% under the Local Plan scenario, indicating some relief in evening traffic conditions.

- A26 (West) remains well below capacity in the AM peak, with DoS values of 52% and 61% respectively, but shows a sharp increase in the PM peak, rising from 87% to 109%. This points to emerging congestion issues during evening periods that may require attention.

- Cycle time remains unchanged at 120 seconds across all scenarios and time periods, suggesting that signal timings have not been adjusted to accommodate increased demand.

Overall, the findings indicate that while the junction continues to function, several approach arms, particularly Bow Road and A26 (East), are already operating over capacity and are likely to experience worsening conditions under future growth. Targeted mitigation measures, such as signal optimisation or capacity enhancements, have been considered previously with no solution carried forward. Continued monitoring and periodic reassessment will be essential to ensure the junction remains resilient to future development pressures and traffic demand.

22.4 Junction Summary

Mitigation at this junction is particularly challenging due to the constrained nature of the surrounding area. One potential option could involve the construction of a bypass linking Tonbridge Road to Maidstone Road, southeast of Wateringbury. While this could help divert through traffic away from the junction and relieve pressure on its approach arms, it would be a costly and complex undertaking. The scheme would require bridging both the River Medway and the Medway Valley railway line, presenting significant engineering and environmental constraints.

Another measure involves converting the two existing signalised pedestrian crossings to staggered crossings. This change could improve traffic flow by reducing the impact of pedestrian phases on vehicle movements.

However, implementing this solution would require the removal of the pocket parks located on both sides of Bow Road, which may raise concerns regarding the loss of public amenity and local character.

Given the scale and implications of these options, further feasibility work and consultation with stakeholders would be essential before any mitigation strategy is progressed.

23. 20: A26 / Seven Mile Lane – Existing Layout

23.1 Existing Layout

Figure 4-1 illustrates a roundabout junction connecting multiple approach roads, notably the A26 and Seven Mile Lane. The roundabout serves as a key junction within a semi-rural setting, surrounded by woodland and agricultural land.

The roundabout operates as a priority-controlled junction and is not signalised. Each approach arm features flare lanes, which provide additional capacity for turning movements and help manage vehicle queuing at the entry points.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 23-1: A26 / Seven Mile Lane Junction

23.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 23-1: (NRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	3%	7%
2042 Forecast Baseline	-12%	-4%
2042 Local Plan Test High	-13%	-10%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with a small but positive reserve capacity, with NRC values of 3% in the AM peak and 7% in the PM peak. These figures suggest that while the junction was close to its operational limits, it could still accommodate an increase in traffic demand without exceeding capacity.

By 2042, under the Forecast Baseline scenario, which reflects background traffic growth without additional development, the junction's performance declines, with NRC values falling to -12% in the AM peak and -4% in the PM peak. These negative values indicate that the junction would be operating over capacity, with demand exceeding what the layout can efficiently accommodate.

Under the 2042 Local Plan Test High Growth scenario, the situation worsens further, with NRC values dropping to -13% in the AM peak and -10% in the PM peak. This reflects the impact of planned development and increased traffic volumes, suggesting that the junction would be over capacity during peak periods.

These results highlight the limited resilience of the existing layout under future growth conditions and underscore the need for mitigation measures or junction improvements to maintain acceptable operational performance.

23.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 23-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
A26 Tonbridge Road (North)	0.99	0.71	1.00	0.80
Access Road	0.00	0.00	0.00	0.00
A228 Seven Mile Lane (North)	0.97	0.89	1.03	0.97

A26 Tonbridge Road (South)	0.73	0.91	0.84	0.93
B2016 Seven Mile Lane (South)	0.81	0.71	0.84	0.73

The results highlight notable differences in performance across the various arms of the junction:

- A26 Tonbridge Road (North) operates at or above capacity, with RFC values increasing from 0.99 (AM) and 0.71 (PM) under the Forecast Baseline to 1.00 (AM) and 0.80 (PM) under the Local Plan High scenario. This indicates congestion, particularly in the morning peak.
- A228 Seven Mile Lane (North) shows worsening conditions, rising from 0.97 (AM) and 0.89 (PM) to 1.03 (AM) and 0.97 (PM), suggesting that this arm will exceed capacity during the AM peak and operate close to capacity in the PM.
- Access Road maintains an RFC of 0.00 across all scenarios and time periods, indicating negligible traffic flow and no operational concerns.
- A26 Tonbridge Road (South) experiences moderate increases in RFC, rising from 0.73 (AM) and 0.91 (PM) to 0.84 (AM) and 0.93 (PM), suggesting growing pressure, especially in the PM peak.
- B2016 Seven Mile Lane (South) remains within acceptable limits, with RFC values increasing slightly from 0.81 (AM) and 0.71 (PM) to 0.84 (AM) and 0.73 (PM), indicating manageable demand.

Overall, the results show that key arms of the junction, particularly A26 Tonbridge Road (North) and A228 Seven Mile Lane (North), are expected to operate at or above capacity under future growth scenarios. This highlights the need for targeted mitigation to maintain junction performance and reduce peak period congestion.

23.4 Junction Summary

While the RFC values on some arms exceed the practical capacity limit, this is only just over the limit and is unlikely to cause wider network concerns. While mitigation could be considered, the lower increases to flow and the reduced risk of a knock-on impact to other junctions, it is not recommended at this stage.

24. Junction 21: Seven Mile Lane / The St / Mereworth Road – Existing Layout

24.1 Existing Layout

Figure 4-1 illustrates a four-arm priority-controlled junction located in a semi-rural setting. It connects B2016, Mereworth Road, The Street, and Seven Mile Lane, forming a crossroad layout. The surrounding area consists of open land to the south, woodland to the northwest, and Mereworth School and private properties to the northeast, which may limit opportunities for physical expansion.

The junction is unsignalised, with vehicles on minor roads giving way to those on the major routes. Its configuration suggests moderate traffic flow, but capacity and safety could be affected during peak periods depending on visibility, turning movements, and approach geometry.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 24-1: Seven Mile Lane / The St / Mereworth Road Junction

24.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the

2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 24-1: (NRC) Results - Existing Layout

Scenario	NRC Results	
	AM	PM
2019 Base	-11%	10%
2042 Forecast Baseline	-11%	12%
2042 Local Plan Test High	-4%	-4%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing junction layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with mixed performance, showing an NRC of -11% in the AM peak and 10% in the PM peak. This indicates that the junction was already over capacity in the morning, but retained some spare capacity in the evening, allowing for modest increases in traffic demand during the PM peak.

By 2042, under the Forecast Baseline scenario (reflecting background traffic growth without additional development), the AM peak NRC remains at -11%, while the PM peak improves slightly to 12%, suggesting a marginal increase in evening resilience but continued morning congestion.

Under the 2042 Local Plan Test, High Growth scenario, the junction's performance becomes more constrained, with NRC values of -4% in both the AM and PM peaks. This reflects the impact of planned development and increased traffic volumes, indicating that the junction would be operating over capacity during both peak periods.

These results highlight the limited resilience of the existing layout, particularly in the AM peak, and underscore the need for targeted mitigation measures or junction improvements to ensure acceptable operational performance under future growth conditions.

24.3 Detailed Arm Level Operational Assessment

Table 24-1 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 24-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
The Street	0.88	0.55	0.78	0.75
Seven Mile Lane (North)	0	0.00	0.00	0.00
Mereworth Road	0.03	0.06	0.06	0.07
Seven Mile Lane (South)	0.29	0.27	0.29	0.27

The results highlight notable differences in performance across the various arms of the junction:

- The Street shows the highest RFC values, with a slight reduction in the AM peak from 0.88 under the Forecast Baseline to 0.78 under the Local Plan High scenario, but an increase in the PM peak from 0.55 to 0.75. These figures suggest that while the arm remains within capacity, pressure increases notably in the evening peak under the growth scenario.
- Seven Mile Lane (North) maintains consistently low RFC values of 0.00 across all scenarios and time periods, indicating minimal traffic flow and no operational concerns.
- Mereworth Road experiences a modest increase in RFC values, rising from 0.03 (AM) and 0.06 (PM) under the Forecast Baseline to 0.06 (AM) and 0.07 (PM) under the Local Plan High scenario. These values remain well below capacity thresholds.
- Seven Mile Lane (South) shows stable RFC values of 0.29 (AM) and 0.27 (PM) across both scenarios, indicating consistent performance and no significant change in demand.

Overall, the findings suggest that the junction is resilient to forecast growth, with most arms operating well within capacity. However, the increase in RFC on The Street, particularly during the PM peak, highlights the importance of ongoing monitoring and potential future mitigation to ensure continued operational efficiency.

24.4 Junction Summary

Based on the operational performance results presented in this report, and in alignment with the assessment criteria outlined in Section 2, it is concluded that mitigation measures are not required for the existing junction layout under the assessed scenarios.

25. Junction 22: B2260 Railway Approach Road / Vale Road / Barden Road – Existing Layout

25.1 Existing Layout

Figure 4-1 illustrates an urban roundabout located in Tonbridge, where Barden Road (B2260), Vale Road, and Avebury Avenue converge. It serves as a key local connector within a built-up area, surrounded by commercial and community facilities including restaurants, shops, and Tonbridge Library. The roundabout facilitates traffic movement between these roads and is unsignalised, relying on standard roundabout priority rules.

The layout is typical of small urban roundabouts, designed to manage moderate traffic volumes while maintaining accessibility for pedestrians and nearby businesses. Vehicles are visible both circulating within the roundabout and parked in adjacent areas, indicating active use and local demand. The surrounding land use and proximity to amenities suggest that pedestrian activity may be high, which could influence junction performance and safety considerations.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 25-1: B2260 Railway Approach Road / Vale Road / Barden Road Junction

25.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results

provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 25-1: (NRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	15%	22%
2042 Forecast Baseline	12%	21%
2042 Local Plan Test High	9%	11%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with a reasonable level of spare capacity, with NRC values of 15% in the AM peak and 22% in the PM peak. These figures indicate that the junction could accommodate an increase in traffic without exceeding its operational limits during peak periods.

By 2042, under the Forecast Baseline scenario, which reflects background traffic growth without additional development, the available capacity is slightly reduced. NRC values fall to 12% in the AM peak and 21% in the PM peak, suggesting a minor decline in performance but continued operational viability.

Under the 2042 Local Plan Test High Growth scenario, the junction's reserve capacity is further constrained, with values dropping to 9% in the AM peak and 11% in the PM peak. This reflects the impact of planned development and increased traffic volumes, indicating that while the junction remains functional, its ability to absorb additional demand is reduced.

25.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 25-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
B2260 North	0.37	0.36	0.43	0.40
Vale Road	0.30	0.36	0.32	0.32
B2260 South	0.54	0.54	0.56	0.65

Barden Road	0.56	0.43	0.59	0.50

The results highlight notable differences in performance across the various arms of the junction:

- B2260 North shows an increase in RFC values, rising from 0.37 (AM) and 0.36 (PM) under the Forecast Baseline to 0.43 (AM) and 0.40 (PM) under the Local Plan High scenario. These figures suggest that this arm remains well within its practical capacity.

- Vale Road maintains low RFC values across both scenarios, with a slight increase in the AM peak from 0.30 to 0.32, and a small decrease in the PM peak from 0.36 to 0.32. This indicates stable performance and no immediate capacity concerns.

- B2260 South experiences a gradual rise in RFC values, increasing from 0.54 (AM and PM) to 0.56 (AM) and 0.65 (PM). The PM peak value suggests growing pressure, though still within acceptable limits.

- Barden Road shows a similar trend, with RFC values increasing from 0.56 (AM) and 0.43 (PM) to 0.59 (AM) and 0.50 (PM), indicating a slight increase in demand but continued operational viability.

Overall, the results suggest that the junction is performing well under both forecast scenarios, with all approach arms operating below capacity. While some increases in RFC are observed, particularly during the PM peak, the junction remains resilient and capable of accommodating future growth without requiring immediate upgrades.

25.4 Junction Summary

Based on the operational performance results presented in this report, and in alignment with the assessment criteria outlined in Section 2, it is concluded that mitigation measures are not required for the existing roundabout layout under the assessed scenarios.

26. Junction 23: A227 A26 Hadlow Road / Cannon Lane – Existing Layout

26.1 Existing Layout

Figure 4-1 illustrates a signalised T-junction where Hadlow Road, Cannon Lane, and the A26 converge. It is situated within a predominantly residential area that includes some green spaces adjacent to the highway on Cannon Lane. The wider built environment extends into the Tonbridge retail park and industrial areas to the south, and Tonbridge town centre to the west, the junction serves both local and through traffic.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 26-1: A227 A26 Hadlow Road / Cannon Lane Junction

26.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix B for reference.

Table 26-1: (PRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	13%	-2%
2042 Forecast Baseline	4%	1%
2042 Local Plan Test High	0%	-16%

Table 4-1 presents the Practical Reserve Capacity (PRC) results for the existing junction layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test High Growth. PRC values indicate the percentage increase in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with limited spare capacity, showing a PRC of 13% in the AM peak, but already slightly over capacity in the PM peak with a value of -2%. This suggests that while morning conditions were manageable, evening traffic was already placing strain on the junction.

By 2042, under the Forecast Baseline scenario, the available capacity is further reduced. PRC values fall to 4% in the AM peak and 1% in the PM peak, indicating that the junction is nearing its operational limits throughout the day, even without additional development.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance becomes constrained. The PRC drops to 0% in the AM peak and -16% in the PM peak, showing that the junction would be operating at or beyond capacity, particularly during the evening peak, under higher growth assumptions.

These results highlight the junction's limited resilience to future traffic growth. While it remains marginally functional in the short term, its ability to accommodate further increases in demand is compromised, and mitigation measures will be necessary to maintain acceptable performance.

26.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Degree of Saturation (DoS) for each individual approach arm, rather than assessing the junction. The DoS values are shown for both the 2042 Forecast Baseline and 2042 Local Plan High Growth scenarios during the AM and PM peak periods.

Table 26-2: (DoS) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
Hadlow Road (North)	86%	89%	90%	86%
Cannon Lane	86%	88%	90%	104%
Hadlow Road (South)	50%	85%	89%	102%
Cycle Time	105 secs	105 secs	105 secs	105 secs

The results highlight notable differences in performance across the various arms of the junction:

- Hadlow Road (North) operates close to capacity across both scenarios, with DoS values increasing slightly from 86% (AM) and 89% (PM) under the Forecast Baseline to 90% (AM) and 86% (PM) under the Local Plan High scenario. These figures suggest consistent demand with manageable performance.
- Cannon Lane shows a more notable increase in saturation, rising from 86% (AM) and 88% (PM) to 90% (AM) and 104% (PM). The PM peak value exceeds practical capacity, indicating potential queuing and delay under high growth conditions.
- Hadlow Road (South) experiences the most notable change, with DoS values increasing from 50% (AM) and 85% (PM) to 89% (AM) and 102% (PM). The PM peak value suggests that this arm will operate over capacity, resulting in congestion.
- Cycle time remains constant at 105 seconds across all scenarios and time periods, indicating that no signal timing adjustments have been made to accommodate increased demand.

These results highlight growing pressure on the junction, particularly during the PM peak under the Local Plan High scenario. While the layout remains functional in the short term, the saturation levels suggest that mitigation measures may be required to maintain acceptable performance and prevent operational issues as traffic demand increases.

26.4 Junction Summary

While the current junction layout remains operational in the short term, the elevated Degree of Saturation (DoS) levels observed across multiple arms suggest that mitigation measures may be necessary to maintain acceptable performance and avoid future operational issues as traffic demand increases.

However, the limited physical space available and the already optimised signal staging present significant challenges in identifying feasible on-site mitigation options. As a result, broader strategic measures may need to be considered.

27. Junction 24: A26 Vale Road / A26 Woodgate Way – Existing Layout

27.1 Existing Layout

Figure 4-1 illustrates a roundabout junction of the A26 and Vale Road, known as the Vale Road Roundabout. It features flared approaches, which are widened sections at the entry points designed to accommodate additional queuing space and improve vehicle throughput. These flares help separate turning movements and reduce entry delays, particularly during peak traffic periods.

The roundabout is situated in a busy part of the Tonbridge industrial area, surrounded by commercial buildings, occupied by prominent businesses including Mercedes Benz. A tributary of the River Medway is present to the northwest, adding a further geographical constraint that may influence future junction modifications.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 27-1: A26 Vale Road / A26 Woodgate Way Junction

27.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results

provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 27-1: (NRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	-17%	-8%
2042 Forecast Baseline	-24%	-13%
2042 Local Plan Test High	-26%	-19%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction was already operating over capacity, with NRC values of -17% in the AM peak and -8% in the PM peak. These figures suggest that even in the base year, the junction was unable to accommodate additional traffic without experiencing operational issues.

By 2042, under the Forecast Baseline scenario, which reflects background traffic growth without additional development, the situation worsens. NRC values fall to -24% in the AM peak and -13% in the PM peak, indicating that the junction would be over capacity throughout the day.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance becomes even more constrained, with NRC values dropping to -26% in the AM peak and -19% in the PM peak. These results reflect the impact of planned development and increased traffic volumes, confirming that the junction would be operating well beyond its practical limits.

Overall, the findings highlight a critical lack of resilience in the existing layout. The junction is already under strain and will face increasing pressure under future growth scenarios. Mitigation measures will be required to restore operational performance and prevent severe congestion.

27.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 27-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
A26 Vale Road E	0.88	0.86	1.05	0.86
A26 Woodgate Way	1.15	1.00	1.17	1.00

Vale Road (S)	0.46	0.56	0.49	0.56

The results highlight notable differences in performance across the various arms of the junction:

- A26 Vale Road East operates near capacity in the Forecast Baseline scenario, with RFC values of 0.88 (AM) and 0.86 (PM). Under the Local Plan High scenario, the AM peak increases to 1.05, indicating that this arm would exceed capacity and experience queuing and delay, while the PM peak remains stable at 0.86.
- A26 Woodgate Way shows the highest RFC values across both scenarios, reaching 1.15 (AM) and 1.00 (PM) under the Forecast Baseline, and increasing slightly to 1.17 (AM) and remaining at 1.00 (PM) under the Local Plan High scenario. These figures confirm that this arm is operating over capacity and would be subject to congestion during peak periods.
- Vale Road (South) maintains low RFC values, increasing slightly from 0.46 (AM) and 0.56 (PM) under the Forecast Baseline to 0.49 (AM) and 0.56 (PM) under the Local Plan High scenario. This suggests that this arm continues to operate well within its practical capacity.

Overall, the results indicate that the junction is under considerable pressure, particularly on the A26 approaches. The RFC values show that both A26 Vale Road East and A26 Woodgate Way are expected to operate at or above capacity, especially during the AM peak. This highlights the need for targeted mitigation measures to manage congestion and maintain acceptable junction performance under future growth conditions.

27.4 Junction Summary

Although the current junction layout remains operational in the short term, the elevated Degree of Saturation (DoS) values across multiple arms suggest that mitigation measures may be necessary to maintain acceptable performance and avoid future operational issues as traffic demand increases.

It is understood that an active travel scheme is being proposed at this location, which could help reduce vehicular demand by encouraging a shift to more sustainable modes of transport. While this presents an opportunity to diversify mode share and potentially alleviate pressure on the junction, it also introduces additional design constraints. These constraints may limit the scope for physical mitigation, making it more challenging to identify a feasible solution that balances both traffic capacity and active travel priorities. Any mitigation proposals would need to consider the active travel scheme.

28. Junction 25: Vale Road / Sovereign Way – Existing Layout

28.1 Existing Layout

Figure 4-1 illustrates a priority T-junction where Sovereign Way intersects Vale Road. Vale Road is the minor arm of the junction and must yield to traffic on Sovereign Way, which functions as the major route. This arrangement is typical of priority junctions, where vehicles on the minor road are required to give way to those on the major road, often indicated by road markings such as give-way lines and signage.

The surrounding built environment is a mix of residential and commercial at this location, with some natural features. Parked vehicles can be seen on Vale Road in street bays, these are assumed to be related to the adjacent dwellings, elsewhere there are on-street restrictions.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 28-1: Vale Road / Sovereign Way Junction

28.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 28-1: (NRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	10%	11%
2042 Forecast Baseline	13%	7%
2042 Local Plan Test High	13%	0%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing junction layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with limited spare capacity, showing NRC values of 10% in the AM peak and 11% in the PM peak. These figures suggest that while the junction was functioning within its limits, it had minimal tolerance for additional traffic during peak periods.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without additional development, the AM peak NRC increases slightly to 13%, while the PM peak drops to 7%. This indicates a marginal improvement in morning performance but a slight decline in evening resilience.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance becomes more constrained. The AM peak NRC remains at 13%, but the PM peak falls to 0%, suggesting that the junction would be operating at full capacity during the evening peak, with no room for additional traffic growth.

These results highlight the junction's vulnerability to future traffic increases, particularly in the PM peak, and reinforce the need for targeted mitigations or redesign to ensure continued operational efficiency under higher growth conditions.

28.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 28-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
Vale Road West	0.62	0.69	0.62	0.78

Sovereign Way North	0.00	0.00	0.00	0.00

The results highlight notable differences in performance across the various arms of the junction:

- Vale Road West shows the highest RFC values, increasing from 0.62 (AM) and 0.69 (PM) under the Forecast Baseline to 0.62 (AM) and 0.78 (PM) under the Local Plan High scenario. These figures suggest that this arm is approaching its practical capacity during the PM peak.
- Sovereign Way North maintains consistently low RFC values of 0.00 across all scenarios and time periods, indicating minimal traffic flow and no operational issues.

Overall, the findings support the conclusion that the junction is resilient to forecast growth and can continue to function effectively without major upgrades.

28.4 Junction Summary

Based on the operational performance results presented in this report, and in alignment with the assessment criteria outlined in Section 2, it is concluded that mitigation measures are not required for the existing junction layout under the assessed scenarios.

29. Junction 26: Vauxhall Roundabout – Existing Layout

29.1 Existing Layout

Figure 4-1 illustrates Vauxhall Roundabout, a multi-arm roundabout that connects several key local roads including the A2014 Pembury Road, A26, as well as slips associated with the A21 which is a strategic road. Each of these roads feeds into/off the roundabout, facilitating traffic movement in multiple directions. The layout is of a standard roundabout, with central island circulation and entry/exit points clearly marked.

Two of the approaches, A26 and A2014, feature flared entries. These flares are widened sections of the carriageway near the roundabout entry points, designed to accommodate additional lanes or provide space for vehicles to queue and merge more effectively.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 29-1: Vauxhall Roundabout Junction

29.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 29-1: (NRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	13%	31%
2042 Forecast Baseline	4%	17%
2042 Local Plan Test High	-1%	10%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the roundabout operated with a reasonable level of spare capacity, showing NRC values of 13% in the AM peak and 31% in the PM peak. These figures suggest that the junction could accommodate some additional traffic, particularly in the evening peak, without exceeding its operational limits.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without additional development, the available capacity is notably reduced. NRC values fall to 4% in the AM peak and 17% in the PM peak, indicating a decline in performance and reduced tolerance for further traffic increases.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance becomes more constrained. The AM peak NRC drops to -1%, suggesting the junction would be operating over capacity during the morning peak, while the PM peak NRC falls to 10%, indicating limited spare capacity in the evening.

These results highlight the junction's vulnerability to future traffic growth, particularly in the AM peak, and emphasise the need for mitigation measures or junction improvements to maintain operational efficiency under higher growth conditions.

29.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 29-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
A26 North	0.71	0.58	0.81	0.59
Pembury Road (East)	0.00	0.00	0.00	0.00
Slip off A21 WB	0.71	0.53	0.71	0.60
Slip Off A21 EB	0.55	0.39	0.54	0.46
Pembury Road (West)	0.84	0.70	0.92	0.77

The results highlight notable differences in performance across the various arms of the junction:

- A26 North shows moderate RFC values, increasing from 0.71 (AM) and 0.58 (PM) under the Forecast Baseline to 0.81 (AM) and 0.59 (PM) under the Local Plan High scenario. These figures suggest that this arm remains within capacity, though pressure increases notably in the morning peak.
- Pembury Road (East) maintains consistently low RFC values of 0.00 across all scenarios and time periods, indicating negligible traffic flow and no operational concerns.
- Slip Road from A21 Westbound records RFC values of 0.71 (AM) and 0.53 (PM) under the Forecast Baseline, rising slightly to 0.71 (AM) and 0.60 (PM) under the Local Plan High scenario. These results suggest stable performance with minor increases in PM peak demand.
- Slip Road from A21 Eastbound shows RFC values of 0.55 (AM) and 0.39 (PM) under the Forecast Baseline, with marginal changes to 0.54 (AM) and 0.46 (PM) under the Local Plan High scenario, indicating continued operation well within capacity.
- Pembury Road (West) experiences the highest RFC values, increasing from 0.84 (AM) and 0.70 (PM) under the Forecast Baseline to 0.92 (AM) and 0.77 (PM) under the Local Plan High scenario. These figures suggest that this arm is approaching capacity, particularly during the morning peak, and may require monitoring or mitigation.

These results highlight the varying performance across the roundabout's arms, with most approaches operating within acceptable limits. However, increasing pressure on Pembury Road (West) and A26 North under future growth scenarios suggests the need for ongoing monitoring and potential mitigation to maintain junction efficiency.

29.4 Junction Summary

Although the Ratio of Flow to Capacity (RFC) values on certain arms of the junction exceed the practical capacity threshold, these exceedances are marginal and are not expected to result in significant operational issues or wider network impacts.

While mitigation could be considered, the modest increases in traffic flow and the negligible risk of knock-on effects on adjacent junctions suggest that intervention is not warranted at this stage. Continued monitoring and further assessment may be appropriate if future growth or network changes alter current condition.

30. Junction 27: Tonbridge Road / Hildenborough Road / Back Lane – Existing Layout

30.1 Existing Layout

Figure 4-1 illustrates the existing layout of the A227 Tonbridge Road / Hildenborough Road / Back Lane junction, which is configured as a four-way crossroads. A227 Tonbridge Road runs in a north to south direction, crossed by Hildenborough Road to the west and Back Lane to the east.

Each approach operates under priority-controlled conditions, with vehicles entering the junction required to give way on Hildenborough Road and Back Lane, there is no signal control in place. The junction serves a mix of local and through traffic, and is surrounded by green fields, with some low-density residential development adjacent to the northeast.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 30-1: Tonbridge Road / Hildenborough Road / Back Lane Junction

30.2 Overall Junction Performance

The operational performance results for the junction under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 30-1: (NRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	75%	54%
2042 Forecast Baseline	56%	40%
2042 Local Plan Test High	20%	15%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing junction layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with a prominent level of spare capacity, showing NRC values of 75% in the AM peak and 54% in the PM peak. These figures indicate that the junction was well within its operational limits and capable of accommodating additional traffic.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without additional development, the available capacity is reduced, with NRC values falling to 56% in the AM and 40% in the PM. This represents a noticeable decline in performance, though the junction remains comfortably within capacity.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance is more constrained, with NRC values dropping to 20% in the AM and 15% in the PM. These results suggest that while the junction continues to operate within its limits, its resilience is diminished under higher growth assumptions.

The findings highlight the importance of considering future traffic growth in junction design and planning, and while the existing layout currently performs well.

30.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 30-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
Back Lane	0.17	0.02	0.05	0.04
Stumble Hill	0.30	0.12	0.54	0.12
Hildenborough Road	0.30	0.47	0.39	0.60

Tonbridge Road	0.00	0.00	0.00	0.00

The results highlight notable differences in performance across the various arms of the junction:

- Back Lane shows low RFC values, decreasing from 0.17 (AM) and 0.02 (PM) under the Forecast Baseline to 0.05 (AM) and 0.04 (PM) under the Local Plan High scenario. These figures suggest that this arm is well within its practical capacity.
- Stumble Hill experiences a noticeable increase in RFC values under the Local Plan scenario, rising from 0.30 (AM) and 0.12 (PM) to 0.54 (AM) and 0.12 (PM). While still within acceptable limits, this growth indicates mounting pressure during the morning peak.
- Hildenborough Road also sees a rise in RFC values, from 0.30 (AM) and 0.47 (PM) under the Forecast Baseline to 0.39 (AM) and 0.60 (PM) under the Local Plan High scenario, suggesting a gradual increase in demand and reduced spare capacity, particularly in the PM peak.
- Tonbridge Road maintains consistently low RFC values of 0.00 across all scenarios and time periods, indicating minimal traffic flow and no operational issues.

Overall, the findings support the conclusion that the junction is resilient to forecast growth and can continue to function effectively without major upgrades.

30.4 Junction Summary

Based on the operational performance results presented in this report, and in alignment with the assessment criteria outlined in Section 2, it is concluded that mitigation measures are not required for the existing junction layout under the assessed scenarios.

31. Junction 28: Morley's Roundabout – Existing Layout

31.1 Existing Layout

Figure 4-1 illustrates the existing layout of Morley's Roundabout, which serves as the junction between the A21 Sevenoaks Bypass, B245, A225 and Morleys Road. The A21 runs in a north to south direction through the roundabout, connecting with the B245 and A225 to the northeast and Morleys Road to the southwest.

The roundabout is configured with a central island surrounded by greenery, and each approach operates under priority-controlled conditions, with vehicles entering the roundabout required to give way. There are no signal controls in place. The junction accommodates a mix of local and through traffic and is surrounded by open green fields, with some built-up areas visible nearby, indicating a semi-rural setting.

The existing geometry and lane arrangements form the baseline for capacity assessments and future design considerations. This layout serves as the reference point for evaluating operational performance under both existing and forecast traffic conditions.

Figure 31-1: Morley's Roundabout Junction

31.2 Overall Junction Performance

The operational performance results for the roundabout under different traffic scenarios are summarised in Table 4-1. This table presents the key outputs from the modelling assessment, covering the 2019 Base Year, the 2042 Forecast Baseline scenario, and the 2042 Local Plan Test, High Growth scenario. These results provide an overview of how the junction is expected to perform in terms of capacity utilisation, queuing, and delay under both current and future traffic conditions.

The summary is intended to support a comparative evaluation of junction performance across the assessed scenarios and to identify where operational issues may arise as traffic demand increases. Full detailed modelling outputs, including turning movement data, queue lengths, and capacity calculations, are provided in Appendix A for reference.

Table 31-1: (NRC) Results - Existing Layout

Scenario	PRC Results	
	AM	PM
2019 Base	19%	59%
2042 Forecast Baseline	7%	28%
2042 Local Plan Test High	-2%	11%

Table 4-1 presents the Network Reserve Capacity (NRC) results for the existing roundabout layout under three modelled scenarios: the 2019 Base Year, the 2042 Forecast Baseline, and the 2042 Local Plan Test, High Growth. The NRC values indicate the percentage change in traffic demand that the junction could accommodate before reaching its practical capacity.

In 2019, the junction operated with a moderate level of spare capacity, showing NRC values of 19% in the AM peak and 59% in the PM peak. These figures suggest that while the junction was more constrained during the morning period, it could still accommodate additional traffic, particularly in the evening peak.

By 2042, under the Forecast Baseline scenario, which assumes background traffic growth without additional development, the available capacity is further reduced, with NRC values of 7% in the AM and 28% in the PM. This indicates a noticeable decline in performance, especially during the morning peak, where the junction approaches its operational limits.

Under the 2042 Local Plan Test High Growth scenario, the junction's performance becomes more constrained, with NRC values falling to -2% in the AM and 11% in the PM. These results suggest that the junction would exceed its practical capacity during the morning peak under high growth conditions, while still retaining limited spare capacity in the evening.

These results highlight the need to consider future traffic growth in junction design and planning, and demonstrate that while the existing layout remains functional, its resilience is reduced under forecast and high growth scenarios.

31.3 Detailed Arm Level Operational Assessment

Table 4-2 presents a more detailed view of the junction's operational performance by reporting the Ratio of Flow to Capacity (RFC) for each individual approach arm, rather than assessing the junction. The RFC values are shown for both the 2042 Forecast Baseline and 2042 Local Plan Test, High Growth scenarios, during the AM and PM peak periods.

Table 31-2: (RFC) Results - Existing Layout

Approach / Scenario	2042 Forecast Baseline		2042 Local Plan High	
	AM	PM	AM	PM
A21 North	0.53	0.50	0.56	0.62
River Hill	0.40	0.45	0.41	0.50
B245	0.41	0.27	0.53	0.31
A21 South	0.75	0.46	0.87	0.55

Morleys Road	0.36	0.18	0.42	0.25

The results highlight notable differences in performance across the various arms of the junction:

- A21 South shows the highest RFC values, increasing from 0.75 (AM) and 0.46 (PM) under the Forecast Baseline to 0.87 (AM) and 0.55 (PM) under the Local Plan High scenario. These figures suggest that this arm is approaching its practical capacity, particularly during the morning peak.
- A21 North experiences a slight increase in RFC values under the Local Plan scenario, rising from 0.53 (AM) and 0.50 (PM) to 0.56 (AM) and 0.62 (PM). While still within acceptable limits, this growth indicates mounting pressure during peak periods.
- B245 sees a more noticeable rise in RFC values, from 0.41 (AM) and 0.27 (PM) to 0.53 (AM) and 0.31 (PM), suggesting a gradual increase in demand that may warrant future monitoring.
- River Hill records increase, with RFC values moving from 0.40 (AM) and 0.45 (PM) to 0.41 (AM) and 0.50 (PM), indicating stable performance with slight growth.
- Morleys Road maintains low RFC values across both scenarios, increasing from 0.36 (AM) and 0.18 (PM) to 0.42 (AM) and 0.25 (PM), suggesting minimal congestion and no immediate operational concerns.

Overall, the findings support the conclusion that the junction is resilient to forecast growth and can continue to function effectively without major upgrades. However, ongoing monitoring and periodic reassessment are recommended to ensure that any future changes in traffic patterns or development pressures are appropriately managed.

31.4 Junction Summary

During the assessment of junction performance, a potential mitigation was identified: reducing the A21 southbound approach to a wider single lane. This adjustment appears to resolve the operational issue observed in the traffic model, particularly in terms of improving flow and reducing delay at the roundabout.

However, it is important to emphasise that this solution is a modelling issue rather than a practical engineering mitigation. In the context of strategic transport modelling, lane configurations are often simplified or abstracted to reflect capacity assumptions rather than precise geometric layouts. The effectiveness of this mitigation in the model may therefore stem from coding logic rather than a feasible design change.

From a real-world perspective, the A21 southbound approach already functions effectively as a two-lane entry, and reducing it to a single lane, albeit wider, would not typically be considered a viable or beneficial mitigation. Such a change could potentially reduce capacity and increase congestion, contrary to the modelled outcome.

As such, while the mitigation resolves the issue within the modelling framework, it should be treated as a coding workaround rather than a recommendation for physical implementation. It is included here for completeness and transparency, but no further action is proposed unless future design work or modelling suggests a need to revisit lane configurations in more detail.

32. Summary & Conclusions

A total of 27 junctions were assessed using projected strategic modelling flows to evaluate their potential impact on traffic conditions. The purpose of this assessment was to understand how each junction might influence overall traffic patterns and congestion within the study area.

A summary of the outcomes at each junction has been shown in Table 32-1.

Table 32-1: Junction Modelling Summary

Scenario	AM			PM			Mitigation Needed
	2019 Base	2042 Baseline	2040 LP High	2019 Base	2042 Baseline	2040 LP High	
J1: A20 / A227 / Bull Lane							✓
J2: M26 J2a							✗
J3: A20 / A25 Maidstone Road							✓
J4: A25 / Quarry Hill Road / High Street							✓
J5: Seven Mile Lane / Comp Lane							✗
J6: A20 London Road / Church Road / Trottisliffe Road							✗
J7: Leybourne Way / Castle Way							✗
J8: M20 J4							✗
J9: A228 / Bull Road							✗
J10:A20 / Ashton Way / Castle Way / Oxley Shaw Lane							✗
J11: A20 / Winterfield Lane / Lunsford Lane							✓
J12: A20 / Station Road / New Road							✓
J13: A20 / Mills Road / Hall Road							✗
J14: M20 J5							✗
J15: Rochester Road / Forstal Road / High Street							✓
J17: M20 J6							✗
J18: Lord Lees Roundabout and M2 J3							✓
J19: A26 / Red Hill / Bow Road							✓
J20:A26 / Seven Mile Lane							✗
J21: Seven Mile Lane / The Street / Mereworth Road							✗
J22: B2260 Railway Approach Road / Vale Road / Barden Road							✗
J23: A26 Hadlow Road / Cannon Lane							✓
J24: A26 Vale Road / A26 Woodgate Way							✓
J25: Vale Road / Sovereign Way							✗
J26: Vauxhall Roundabout							✗
J27: Tonbridge Road / Hildenborough Road / Back Lane							✗
J28: Morley's Roundabout							✗

Out of the 27 junctions assessed through the modelling process, ten have been identified as requiring mitigation to accommodate the forecast traffic demand. Mitigation proposals have already been developed for three of these locations: the A20/Station Road/New Road junction, M2 Junction 3, and Lord Lees Roundabout. These proposals will be subject to more detailed testing and refinement at the next stage of the assessment.

For the remaining six junctions, mitigation strategies have not yet been developed and will need to be formulated as part of the next phase of work. These locations will require further analysis to identify appropriate mitigations that address the specific operational challenges identified in the modelling.

- A20 / A227 / Bull Lane
- A20 / A25 Maidstone Road
- A25 / Quarry Hill Road / High Street
- A20 / Winterfield Lane / Lunsford Lane
- Rochester Road / Forstal Road / High Street
- A26 / Red Hill / Bow Road
- A26 Hadlow Road / Cannon Lane
- A26 Vale Road / A26 Woodgate Way

In addition to progressing mitigation proposals at the identified junctions, it is recommended that a validated traffic model be developed for the A20 / Mills Road / Hall Road junction to provide additional assurance regarding the robustness of the modelling outcomes.

A validated model, calibrated using up-to-date traffic surveys and observed flow, speed, and queue data, would enable a more accurate representation of existing conditions and improve confidence in future scenario testing.

This process would help to identify any discrepancies between modelled and real-world performance, particularly under peak demand conditions, and ensure that any mitigation proposals are appropriately targeted. Key data requirements for validation would include turning movement counts, queue length observations, signal timing data, and journey time surveys. The validated model would serve as a reliable tool for stress testing the junction under worst-case scenarios and informing any necessary design refinements."

It should be noted that the Local Plan test used in this assessment was based on the high growth scenario, representing a robust and conservative approach to future demand forecasting. The outcomes of this analysis will help provide an early indication of junction capacity issues to inform Tonbridge and Malling Borough Council's (TMBC) emerging spatial strategy, although further scenario testing will be required to reflect evolving policy priorities and community feedback.

To support this, the following tasks have been identified as key next steps:

- Update the Local Plan test to incorporate any changes arising from the Regulation 18 consultation, including potential opportunities for modal shift, trip internalisation, and revised land use allocations.
- Refresh traffic flow inputs and rerun the local junction models to reflect updated assumptions and network conditions.
- Undertake junction modelling with mitigation to assess the effectiveness of proposed interventions at identified locations.

- Conduct a Local Plan test with mitigation to evaluate the cumulative impact of all proposed measures across the network.

In addition, it is recommended that a validated traffic model be developed for the A20 / Mills Road / Hall Road junction. This would involve collecting new survey data, including turning movement counts, queue lengths, journey times, and signal timings, to calibrate the model against observed conditions. A validated model will enhance the reliability of the assessment by ensuring that the base conditions are accurately represented, allowing for more robust testing of future scenarios and mitigation options. This will also help address local concerns about existing performance and provide a stronger evidence base for decision making.

Appendix A. Modelling Outputs – Junctions 11

Appendix B. Modelling Outputs – LinSig v3