

Greater Nottingham Councils

Greater Nottingham Strategic Plan

Strategic Transport Assessment

Reference: GNSP Mitigation Report

V5 | 03 July 2025

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1. Introduction

Authorities in the Greater Nottingham area (Broxtowe, Gedling, Nottingham City and Rushcliffe together with Derbyshire and Nottinghamshire County Councils) have been preparing a review of the Greater Nottingham Aligned Core Strategies – to be called the Greater Nottingham Strategic Plan (GNSP) – for implementation across the plan period up to 2041. Whilst Gedling withdrew from this process early in 2025 to prepare a separate local plan for Gedling Borough, this will continue to align with the strategic elements of the GNSP. The mitigation strategy reflects the level of growth in Gedling as proposed through the Publication Draft Greater Nottingham Strategic Plan (2024) and further modelling will be required to support the emerging local plan. As such this document refers to the GNSP throughout and the GNSP boundary shown in the report includes Gedling, who were involved in the development of this transport strategy.

The authorities have developed a preferred strategy in terms of accommodating housing and employment growth. The purpose of this study is to assess the strategic transport impacts of the GNSP using the current version of the East Midlands Gateway Model (EMGM) to demonstrate that the development proposals are feasible in strategic transport terms and to determine what strategic mitigation is required to acceptably accommodate the Plan proposals. This document should be read in conjunction with the Greater Nottingham Strategic Plan: Strategic Transport Assessment report prepared by Systra which further details the modelling which has been undertaken to support this study. A copy of the report is contained in Appendix A.

This document has been prepared to set out the proposed transport mitigation strategy to support the delivery of growth identified in the GNSP to 2041. The mitigation measures have been iteratively developed in consultation with the commissioning authorities of Broxtowe, Gedling, Nottingham City and Rushcliffe together with Derbyshire and Nottinghamshire County Councils and with input from East Midlands Development Corporation (EMDC).

The mitigation strategy has been developed with reference to a GNSP scenario test within the EMGM which includes development growth

associated with 38,838 homes, an additional 268,821m² of use class E (formerly B1) office, 567,290m² of B2 general industrial, 221,234m² of B8 storage and distribution and 49,761m² of retail space compared to the Reference Case scenario.

Much of this development is already committed or consented with associated transport mitigation and / or contributions agreed, as set out in Appendix B. Seven sites are under construction or have planning consent and can proceed to delivery without further assessment of their transport impacts. A further site has a Local Development Order (LDO) which includes provisions for S106 such that developer contributions outside those reasonably allowed for by the LDO are unlikely. Additionally, two development sites in the city have viability challenges and require a Homes England subsidy to deliver which may constrain contributions from these sites. Consequently, much of the development proposed in the GNSP could be delivered without any additional transport mitigation or opportunity to negotiate contributions.

The transport strategy accompanying the Plan has been developed without an agreed regional transport strategy to integrate with as the Nottingham and Nottinghamshire Local Transport Plans (LTP) are out of date and the emerging LTP being developed by EMCCA has not yet been published. Therefore, this transport strategy has been developed to:

- Respond to the transport challenges forecast by the GNSP scenario test model outputs.
- Reflect the transport interventions which are already proposed and planned for the Greater Nottingham area over the Plan period.
- Align with critical success factors which have been defined for this commission which reflect the wider policy objectives of the Plan.
- Provide a plausible set of transport interventions that are proportionate to the scale of investment and growth planned in Greater Nottingham.
- Recognise the types of schemes which are directly deliverable by the GNSP growth sites and other strategically important major infrastructure which is required to address existing challenges in the city region.

- Enable development to come forward in a sustainable way in line with the soundness test defined by the National Planning Policy Framework.

An iterative approach has been undertaken to the modelling to ensure that the strategy addresses the transport impacts associated with the proposed housing and employment allocations. However, the future levels of congestion forecast on the network in the reference case scenario, without GNSP growth, should not be underestimated. There is a clear need for coordinated strategic investment on focussed parts of the highway network to unlock the growth potential of the Greater Nottingham area. Without such intervention, even small levels of development growth exponentially worsen the operation of the network. Hence, the strategy has had to assume that some level of strategic capacity intervention will be delivered to enable the transport modelling to provide meaningful outputs.

The transport strategy presented in this report is shown to mitigate 37% of morning peak hour congestion and 54% of evening peak hour congestion associated with the GNSP. This is considered to be a positive outcome given the levels of background traffic demand. Whilst the strategy sets out a package of transport schemes to support the GNSP, other interventions could plausibly deliver comparable outcomes. As such, it is recommended that regular monitoring of site delivery and traffic / travel outcomes is undertaken to enable the transport package to be managed and delivered in a proactive way in support of the vision-led approach advocated by the NPPF (2024).

2. Key Challenges

The transport impacts associated with the GNSP scenario are set out in Chapter 6 of the Greater Nottingham Strategic Plan Transport Assessment Report v2.2 dated 19/02/2025. The headline challenges identified from the model outputs can be summarised as follows:

- There are widespread impacts across the network caused by background traffic growth associated with increases in car ownership and increased trip making by car as well as the aggregate of development growth.
- Problem locations are not necessarily local to development sites. The principal issues are on strategic routes where traffic accumulates.
- At junctions operating at or close to capacity, junction operation can be significantly worsened by a relatively small increase in trips. Consequently, a large number of junctions are impacted by even a small increase in trips associated with the GNSP growth proposals.
- Significant impacts are forecast on the strategic road network (SRN) which would be expensive and challenging to address. Such interventions cannot be delivered by developer contributions alone and will require third party coordination, funding and delivery.
- Significant impacts are forecast within the city centre. These could be addressed collaboratively between the authorities using a blend of ‘carrot and stick’ approaches.
- The highway mitigation strategy needs to focus on good quality modal alternatives and intelligent traffic management rather than junction capacity interventions which could be filled with induced demand. Albeit some targeted capacity upgrades will be needed.
- Addressing problems will involve reducing car use for existing trips as well as new trips. It cannot be assumed that new developments will generate no new car trips.

2.1 Strategic Challenges

The GNSP scenario results in a significant increase in vehicle trips when compared to the Reference Case. An additional 60,351 person trips are made in the morning peak and an additional 57,200 person trips are made in the evening peak between the Reference Case and GNSP scenario.

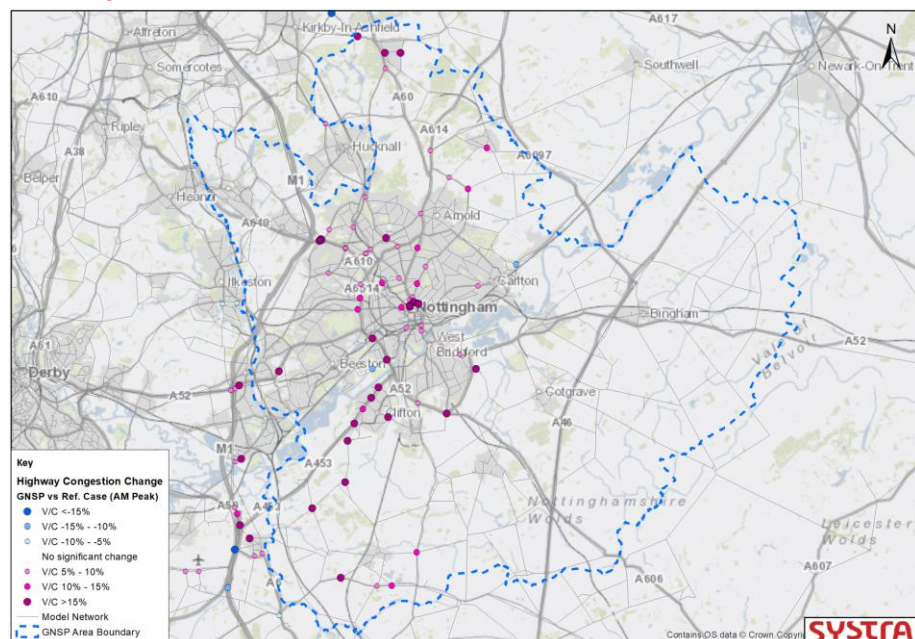
More than 122,000 PCU (Passenger Car Unit) kms are added in the morning peak and more than 116,000 PCU kms are added in the evening peak. The 6% increase in distance travelled exponentially impacts on congestion and queuing which increases by 96% in the morning peak and 59% in the evening peak. (*Ref. Table 14 and Table 15 of the Greater Nottingham Strategic Plan Transport Assessment Report v2.2*)

The distribution outputs (*Ref. Figures 10 and 11 of the Greater Nottingham Strategic Plan Transport Assessment Report v2.2*) show trips are reasonably dispersed from the source of new development but are drawn towards key routes and the SRN which accommodates a sizeable increase in demand. The aggregate of development growth causes widespread impacts across the network including locations which are not local to development sites.

Junction congestion is defined by the ratio of volume/capacity (V/C) which indicates the amount of demand relative to the available capacity on junction approaches. Plots have been prepared to show the difference between the GNSP scenario and Reference Case at junctions which are forecast to operate with a V/C ratio of at least 100% in either or both scenarios. A V/C of $\geq 100\%$ indicates that a junction is operating above its theoretical maximum capacity, with substantial congestion, queuing and delays.

The V/C plots for the morning and evening peak hours are shown in Figure 2-1 and Figure 2-2 respectively.

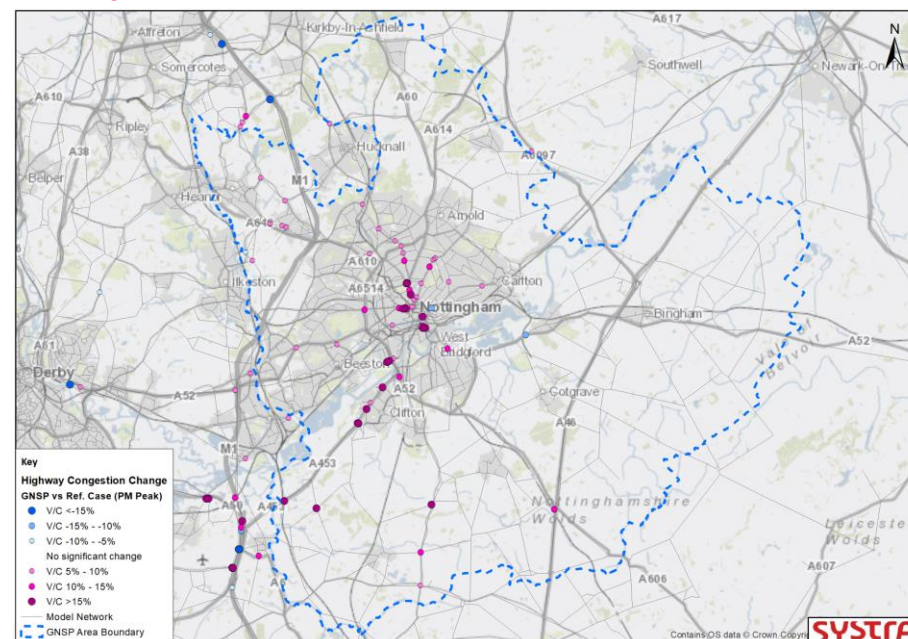
Figure 2-1 Change in AM Peak Volume / Capacity (V/C) at junctions with a V/C of 100% or greater in the Reference Case, GNSP scenario or both scenarios



The plots also show a concentration of impacted junctions within the city centre of Nottingham, within the ring road, and a sequence of impacted junctions along the A453 in the morning and evening peak hours. Addressing capacity at these junctions in isolation would not resolve these issues and would likely move the congestion along the link which evidences the need for a corridor or network level intelligent traffic management solution in this location.

At junctions operating at or close to capacity, junction operation can be significantly worsened by a relatively small increase in trips. Consequently, a large number of junctions are impacted by the growth proposals including significant impacts which are forecast on the SRN which would be expensive and challenging to address.

Figure 2-2 Change in PM Peak Volume / Capacity (V/C) at junctions with a V/C of 100% or greater in the Reference Case, GNSP scenario or both scenarios



The highway mitigation strategy therefore needs to focus on good quality modal alternatives and intelligent traffic management in preference to junction capacity interventions. This approach has been undertaken on the basis that a broader set of measures that achieve modal shift would be more effective than individual junction capacity improvements which could be filled with induced demand and would be unjustified contrary to the soundness test set out in NPPF which considers plans to be ‘sound’ if they are:

- a) **Positively prepared** – providing a strategy which, as a minimum, seeks to meet the area’s objectively assessed needs; and is informed by agreements with other authorities, so that unmet need from neighbouring areas is accommodated where it is practical to do so and is consistent with achieving sustainable development;
- b) **Justified** – an appropriate strategy, taking into account the reasonable alternatives, and based on proportionate evidence;

- c) **Effective** – deliverable over the plan period, and based on effective joint working on cross-boundary strategic matters that have been dealt with rather than deferred, as evidenced by the statement of common ground; and
- d) **Consistent with national policy** – enabling the delivery of sustainable development in accordance with the policies in this Framework and other statements of national planning policy, where relevant.

3. Mitigation Methodology

3.1 Introduction

This chapter outlines the methodology for developing the transport mitigation measures for the GNSP. This methodology integrates several key components to ensure a comprehensive and effective approach to addressing transport challenges.

- Key principles have been defined to acknowledge the inevitability of increased trip-making due to growth and the need for strategic infrastructure investments to unlock growth. By defining these principles, the mitigation strategy aims to support sustainable development and accommodate growth in a proportionate manner.
- The critical success factors (CSFs) are the benchmarks which have been used to evaluate and prioritise mitigation measures. These factors ensure that the proposed interventions align with the commissioning authorities' policies.
- The transport intervention context provides the background for the proposed measures, drawing from existing plans and policies. This context ensures that the mitigation measures are grounded in current and planned transport initiatives, facilitating their seamless integration and implementation.
- Central to the methodology is the Avoid/Shift/Manage & Mitigate framework. This structured approach prioritises reducing the need to travel, promoting sustainable transport modes, and implementing targeted highway investments only when necessary.

Together, these components form a cohesive and robust mitigation strategy methodology, ensuring that the transport challenges identified in the GNSP are addressed effectively and sustainably.

3.2 Key Principles

To effectively address the challenges associated with growth and ensure the mitigation strategy is sustainable, practical and plausible, three key principles have been established.

Key Principle 1: Growth cannot be delivered without increased trip making.

There are three possible scenarios to consider:

- **No growth:** This scenario is not plausible as it would be contrary to mandatory housing targets and contradict NPPF (2024) which promotes the preparation of a plan-led vision for each area.
- **Growth which is dependent on strategic infrastructure investment:** This scenario is also not feasible because the necessary infrastructure cannot be solely developer funded. Growth would likely be tied to planning conditions constraining delivery in advance of a scheme being implemented thereby equating to a no / low growth scenario.
- **Proportionate infrastructure to enable growth:** The most plausible scenario, which involves implementing proportionate infrastructure improvements to enable growth to come forward. This approach will inevitably result in increased congestion, but it is the most practical way to support development delivery. By accepting that some level of congestion is unavoidable, the principle focuses on making targeted improvements that can accommodate growth in a manageable way. This approach has been adopted in the development of this strategy.

Key Principle 2: The tipping point for congestion to result in significant and widespread behaviour change has not yet been met.

A review of WebTRIS data indicates that current congestion levels on strategic routes around Nottingham have not yet returned to pre-Covid levels. This suggests that driver tolerance for congestion is higher than the current levels being experienced. Hence, the propensity to re-mode journeys to avoid highway congestion is not as high as it may be in future.

The WebTRIS data also suggests that the peak hours of highway operation are short and sharp. Hence, there is potential for trips to be retimed to avoid peak hours (or peaks within the peak hour); although this behaviour change is not yet evident.

Additionally, there is potential for greater modal shift to active and public transport modes, but the modelling suggests that supply-focused interventions alone are insufficient to maximise this potential.

Key Principle 3: A more focused review of the relationship between growth sites and strategic infrastructure is required in certain locations.

Wider strategic infrastructure interventions are required to enable growth in the city region to come forward. These schemes are essential to ensure that development is not refused or constrained on highway grounds. However, these schemes would require viability assessments, detailed design, business cases to demonstrate value for money, and investment from Central Government, and therefore, the GNSP cannot be entirely dependent on them.

3.3 Critical Success Factors

Critical success factors (CSFs) have been defined to ensure the mitigation strategy aligns with emerging GNSP policies as set out in Table 1. This will ensure proposals not only perform well in transport terms but also deliver the right outcomes for the people and places within the Plan.

Table 1: Alignment of CSFs with GNSP Policy

Critical success factors	Alignment with GNSP Policy
1. Limit congestion and improve journey time reliability for road-based modes.	Policy 4: Employment Policy 5: Nottingham City Policy 6: Role of Town and Local Centres Policy 15: Transport Infrastructure Priorities
2. Encourage active and low carbon modes (public transport, walking and cycling).	Policy 1: Climate Change Policy 3: Housing Policy 10: Design

Critical success factors	Alignment with GNSP Policy
	Policy 15: Transport Infrastructure Priorities Policy 14: Managing Travel Demand Policy 12: Local Services and Healthy Lifestyles Policy 18: Blue-Green Infrastructure (BGI) Strategy
3. Minimise the impact of infrastructure on the built and natural environment, and limit carbon emissions.	Policy 1: Climate Change Policy 10: Design Policy 17: Biodiversity Policy 18: BGI Strategy
4. Provide the connectivity needed to drive economic growth.	Policy 4: Employment Policy 5: Nottingham City Policy 6: Role of Town Centres Policy 14: Managing Travel Demand
5. Make use of existing and committed infrastructure to reduce the need to travel.	Policy 6: Role of Town and Local Centres Policy 11: Local Services and Healthy Lifestyles Policy 14: Managing Travel Demand Policy 18: BGI Strategy

3.4 Transport Intervention Context

To determine the starting point for the development of mitigation measures, a review was undertaken of relevant plans and policies which propose transport interventions including:

- Bus Service Improvement Plan (BSIP) for the Greater Nottingham (Robin Hood) Area (June 2024);

- Nottingham City Council Cycling and Walking Infrastructure Plan (LCWIP): Delivery Programme;
- Nottinghamshire County Council Cycling and Walking Infrastructure Plan (LCWIP): Delivery Programme;
- Nottinghamshire Local Transport Plan (LTP, 2011-2026);
- Nottingham Local Transport Plan (LTP, 2011-2026); and
- A list of routes and schemes which are at varying stages of development ranging from safeguarding to feasibility assessment.

It is noted that the East Midlands Combined County Authority (EMCCA) have recently begun to operate some of the transport functions of the City and County Councils and that EMCCA are currently in the process of preparing an LTP which will replace the out-of-date Nottingham and Nottinghamshire LTPs.

3.4.1 Bus

The BSIP proposes several interventions including traffic light priority, new bus lanes, a review of on-street parking, camera enforcement, review of loading restrictions, new yellow box junctions and improvements to passenger waiting facilities.

Interventions are proposed along the following Core Arterial corridors to address wider network congestion issues:

- A60 – Nottingham Railway Station to Central Avenue, West Bridgford;
- A609 – Ilkeston Road to Wollaton Road;
- Edwards Lane and Hucknall Road;
- A611 – Moorbridge; and
- Operator Pinchpoint Package.

The package of measures to be delivered through the BSIP programme and Transforming Cities Programme will deliver journey time savings and reliability benefits. In parallel, Greater Nottingham's bus operators will maintain investment in low emission buses, meet accessibility requirements, provide contactless payment and integrated ticketing, and audio-visual passenger information.

3.4.2 Safeguarded routes

Figure 3-1 shows routes which have been safeguarded for future rail or highway interventions or schemes which are currently under development. These include:

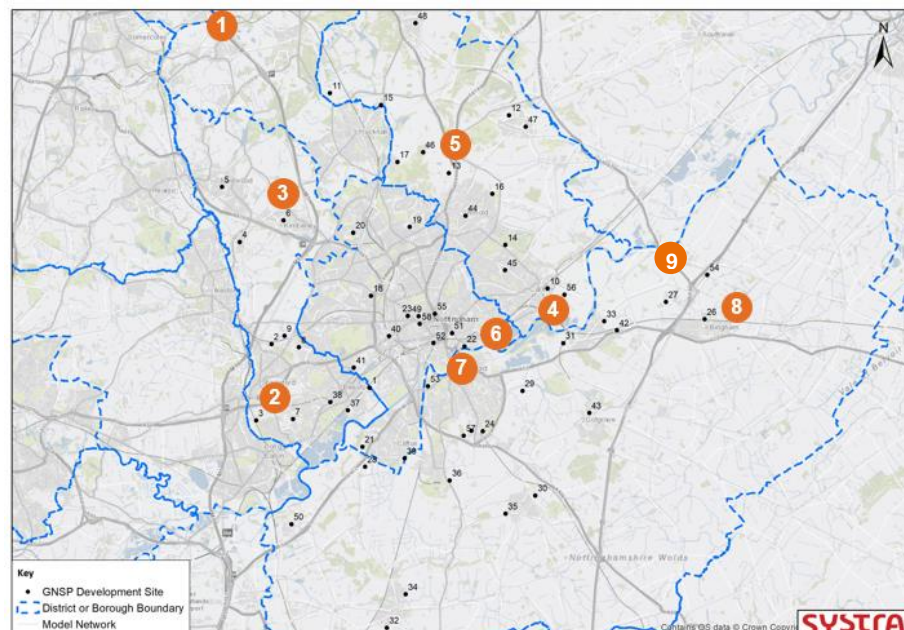
1. Maid Marian Line Reopening to passenger services (referenced in Network North with feasibility stage led by Ashfield District Council in partnership with Nottinghamshire County Council).
2. Toton Access Road (feasibility stage led by Nottinghamshire County Council as identified in LTP3).
3. B600 / B609 Junction Signalisation in Watnall (to be delivered during LTP3).
4. Netherfield to Grantham Rail Route (safeguarded in Nottinghamshire LTP3).
5. A60 Leppol to Sherwood Express Busway and Park & Ride (approved in March 2020, awaiting further feasibility work).
6. A612 Daleside Road / Colwick Loop Road (safeguarded in Nottinghamshire LTP3 for public transport priority).
7. A6011 Radcliffe Road to A6520 Trent Bridge Bus Priority (safeguarded for construction during LTP3).
8. Bingham Park and Ride (rail) (safeguarded in Nottinghamshire LTP3).
9. A6097 Kirk Hill Junction Improvement Scheme, East Bridgford (safeguarded for construction during LTP3).

In addition, the principle of future extensions to the Nottingham tram to serve Gedling and beyond Clifton South was highlighted in the previous

Government's Network North proposals. A feasibility study into potential new routes including to Gedling, to Gamston, beyond Clifton, to Toton and beyond Hucknall is to be commissioned by EMCCA and will further explore the options and opportunities.

Reference has been made to these proposals and where relevant they have been included within this mitigation strategy.

Figure 3-1 Safeguarded routes



3.4.3 Active travel

Within Nottingham city centre and on orbital and radial routes approaching the city centre, there is a comprehensive network of active travel route proposals and priorities set out in the Nottingham City Council Cycling and Walking Infrastructure Plan: Delivery Programme as shown in Figure 3-2. The routes shown in orange have already received investment from the Cycle City and Transforming Cities Fund (TCF) and funding has also been secured for the routes shown in blue. Those shown in green are investment priorities

and include several corridors which are impacted by the proposed GNSP sites.

The Nottinghamshire County Council Cycling and Walking Infrastructure Plan: Delivery Programme sets out long term aspirations for a comprehensive network of routes outside of the city core, also shown in Figure 3-2. Routes shown in green have secured funding whilst those shown in yellow, red and brown are short-, medium- and long-term priorities up to 2026, 2031 and 2036 respectively. The routes in blue are prioritised for consideration beyond 2036 which coincides with the final years of the Plan period.

It should be acknowledged that the Nottinghamshire LCWIP is aspirational, and the vast majority of corridors have had minimal design work undertaken to date. Hence, whilst some off-road routes may be deliverable through road space reallocation, others may require significant land take to be deliverable.

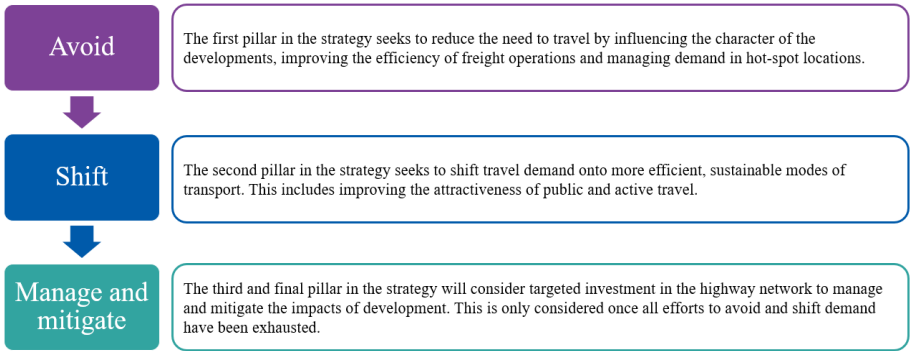
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3.5 Evaluation framework

The objective of the mitigation strategy is to enable development to be delivered sustainably to maximise the growth potential of the Plan area. The strategy has therefore been developed with reference to the modal hierarchy with a view to reducing the need to travel prior to developing transport solutions to accommodate travel demand.

Where transport solutions are required, the strategy has focussed on measures which facilitate a high walking, cycling, micromobility and public transport mode share with car focussed highway capacity interventions only proposed in locations where modal alternatives are either not viable or unable to accommodate the levels of modal shift away from the private car which are required.

The components of the strategy can be defined by the following three pillars:



A long list of policy packages has been defined to align with these pillars. These are summarised in Table 2.

Table 2: Packages per Pillar

Avoid	Shift	Manage & Mitigate
A1. Compact and connected neighbourhoods	S1. Promote active travel and micro-mobility for short to medium distance journeys	M1. Targeted highways investment
A2. Parking policy		M2. Network information
A3. City centre parking interventions	S2. Promote bus and tram as the mode of choice for medium length journeys	M3. Intelligent traffic management
A4. Demand management		M4. Traffic loops and road space reallocation
A5. Freight consolidation and last mile solutions	S3. Introduce new public transport routes and connections	M5. Link roads
A6. Promotion of work from home and local co-working spaces	S4. Improved rail connectivity	
	S5. Park & Ride sites	

A description of each policy intervention, possible locations where it could be applied, the scale of impact each policy has the potential to deliver, and mechanisms for implementation are set out in more detail below. The potential scale of impact has been determined using professional knowledge and benchmarking evidence for interventions of a similar scale in comparable locations. Some interventions have been represented in the EMGM by reducing the forecast trip demands originating from development sites whilst the public transport and highway interventions have been tested within the model.

3.5.1 Avoid

The first pillar in the strategy seeks to reduce the need to travel by influencing the character of developments, improving the efficiency of freight operations and managing demand at hot-spot locations. The policy interventions associated with the avoid pillar are set out in Tables 3 to 8.

These measures are intended to build upon the coordinated behaviour change programme currently operated in Greater Nottingham which requires developers to prepare travel plans to establish positive travel behaviours upon first occupation. Although it is not possible to explicitly model many of these measures in the EMGM, they do provide options for the future to further mitigate the impact should that be required.

Table 3: Avoid Policy A1: Compact Neighbourhoods

Avoid Policy A1	Compact and connected neighbourhoods
Description	Create compact neighbourhoods which require that everyday services and facilities are accessible from new developments on foot, by bicycle, micromobility modes and public transport. This should be complemented by attractive, safe, walkable environments in which people of all ages can connect to the destinations and the services they need. Large new developments, such as urban extensions, should be designed from the outset with these principles in mind.
Where this could be applied?	- Developments within 800m walking distance of an existing town, district or local centre; and - Developments with >1,000 new dwellings which could support their own local centre.
Potential scale of impact?	High: Benchmarking suggests a 30% walking mode share.
How could this be implemented?	- Local plan policies requiring a mix of uses in major developments. - The determination of planning applications. - SPDs and approved Masterplans.
Inclusion in EMGM	The EMGM's trip rates in the with mitigation scenario have been reduced for commuting and leisure/retail purposes to reflect the provision of new compact and connected neighbourhoods in the GNSP area. Percentage shift based on benchmarking / professional judgement.

Table 4: Avoid Policy A2: Parking Policy

Avoid Policy A2	Parking policy
Description	Maximum car parking standards which promote low / no car usage in well-connected urban centres supported by car clubs and car sharing spaces. There are a range of parking requirements across the Plan area that are relevant to different types of development.
Where this could be applied?	- City centre developments; and - Urban fringe developments within 500-800m walking distance of an existing town, district or local centre with access to high frequency public transport.
Potential scale of impact?	High: Benchmarking suggests a 10% reduction in urban car mode share and a 5% reduction in rural car mode share.
How could this be implemented?	Maximum car parking standards implemented through the Local Plan and Parking SPDs (if adopted by the Local Planning Authority).
Inclusion in EMGM	This intervention has not been explicitly represented within the EMGM.

Table 5: Avoid Policy A3: City Centre Parking

Avoid Policy A3	City centre parking interventions
Description	Consolidation of car parking offer, long / short stay provision and charging mechanisms.
Where this could be applied?	City centre developments.
Potential scale of impact?	High: Benchmarking suggests a 10% reduction in urban car mode share. 5% reduction in rural car mode share.
How could this be implemented?	- Local Plan Car Parking Policy. - Operational Car Parking policy and pricing mechanisms
Inclusion in EMGM	This intervention has not been explicitly represented within the EMGM.

Table 6: Avoid Policy A4: Demand Management

Avoid Policy A4	Demand management
Description	Manage demand in key areas through review of the workplace parking levy or other payment mechanisms.
Where this could be applied?	- At a strategic level across the city region; and, - Targeted in the city centre.
Potential scale of impact?	High: Benchmarking suggests a 6%-18% reduction in car trips.
How could this be implemented?	Transport Planning Policies. If introduced, it would require a decision by EMCCA.
Inclusion in EMGM	This intervention has not been explicitly represented within the EMGM.

Table 7: Avoid Policy A5: Freight Consolidation

Avoid Policy A5	Freight consolidation centres and last mile solutions
Description	Reduce the number of freight trips made by consolidating deliveries at strategic locations on the outside of cities.
Where this could be applied?	- Locations with high clusters of logistics activity; and, - Adjacent to dense urban areas.
Potential scale of impact?	Low: Benchmarking suggests a 0-1% reduction in road freight. This intervention has not been explicitly represented within the EMGM.
How could this be implemented?	Collaboration with freight and logistics sector and stakeholders including National Highways and EMCCA.
Inclusion in EMGM	This intervention has not been explicitly represented within the EMGM.

Table 8: Avoid Policy A6: Home / Co-Working

Avoid Policy A6	Promotion of work from home and local co-working spaces
Description	Enabling people to work from home or providing places for people to work remotely in their local community thus reducing the need to travel to the city centre.
Where this could be applied?	- Working from home to be facilitated at all residential developments through the provision of high-speed internet connectivity. - Co-working spaces encouraged at locations with 1,000 units or more.
Potential scale of impact?	Low: Benchmarking suggests a 3% reduction in car trips.
How could this be implemented?	- Planning policy. - In collaboration with private sector operators.
Inclusion in EMGM	This intervention has been represented by the compact and connected neighbourhoods' policy intervention A1.

3.5.2 Shift

The second pillar of the strategy seeks to shift demand onto more efficient, sustainable modes of transport by improving the opportunities and attractiveness of these modes. These measures complement existing requirements for developers to implement promotional travel card initiatives with the goal of influencing modal shift. Additional policy interventions associated with the shift pillar are set out in Tables 9 to 13.

The EMGM results of the ‘with GNSP sites’ scenario model run were interrogated to understand where there is additional stress on the network as a result of the GNSP sites as well as to determine the characteristics of trips that are contributing to this stress. The model was inspected based on Select Link Analysis information which allows the user to pick a link on the network and determine where people are travelling from (origin) and to (destination) when using that link. Volume (or percentage) of traffic using links across the network for a set distance range was also inspected including:

- 0-8km, on the basis that active travel (walking and cycling) is an acceptable modal option for journeys up to 5km and 8km respectively.
- 5-20km, on the basis that local public transport including bus, rail and tram could be used for intermediate trip lengths up to 20km.

This analysis enabled a more focussed approach to mitigation development by targeting locations with a higher number of short and intermediate distance journeys which could reasonably be moved onto alternative modes.

It should be noted that whilst such public transport improvements are supported by the commissioning authorities in principle, any decisions as to their implementation will be dependent upon the feasibility of any such measures, their wider network implications, sustainability, commercial viability and receiving the necessary approvals. Historically rural bus services have struggled to maintain patronage levels which ensure ongoing commercial viability. As the commissioning authorities are not able to subsidise services to keep them operational, care has been taken to ensure that the levels of modal shift forecast by the EMGM are proportionate and realistic.

Table 9: Shift Policy S1: Active Travel and Micro-Mobility

Shift Policy S1	Promote active travel and micro-mobility for short to medium distance journeys
Description	Provide improvements to walking and cycling routes and options to encourage healthy and active lifestyles and reduce short car journeys. This includes influencing masterplans and design codes to ensure they shape design in a manner that promotes active travel.
Where this could be applied?	All locations across the plan area.
Potential scale of impact?	Low: Benchmarking suggests a 20% walking mode share for short journeys of 0-5km.
How could this be implemented?	• The Local Plan and the determination of planning applications. • SPDs, approved Masterplans and Design Codes. • Local Cycling and Walking Infrastructure Plans
Inclusion in EMGM	The walking component of this intervention has been represented by the compact and connected neighbourhoods’ policy intervention A1. The cycling component has been tested in the EMGM by reducing demand originating from sites as follows: • A cycle mode share of 10% has been applied for all trips in line with Nottinghamshire’s Cycling Strategy Delivery Plan. • A 15% cycle mode share has been applied for short journeys (those up to 8 kilometres or 5 miles) with an origin or destination within 1km of a proposed new cycle corridor. This assumption has been reflected in the modelling by shifting appropriate short distance trips from highway to active travel modes in the vicinity of the cycle corridors. Percentage shift based on benchmarking / professional judgement.

Table 10: Shift Policy S2: Public Transport Mode Choice

Shift Policy S2	Promote bus and tram as the mode of choice for medium length journeys
Description	Increase the attractiveness of bus and tram through improvements to frequency, journey times, multi-operator ticketing and reliability.
Where this could be applied?	All developments, with enhanced provision at those developments of greater than 1,000 dwellings.
Potential scale of impact?	Medium: Benchmarking suggests 3% reduction in car trips.
How could this be implemented?	- Section 106 Agreements - Determination of planning applications - Bus Service Improvement Plans
Inclusion in EMGM	Public transport connectivity enhancements including route extensions / diversions and increased service frequencies have been represented in the EMGM and the model has determined the resultant mode share on affected routes.

Table 11: Shift Policy S3: Public Transport Connectivity

Shift Policy S3	Introduce new public transport routes and connections
Description	New strategic routes and connections, for example new bus priority routes or NET extensions.
Where this could be applied?	Developments of greater than 1,000 dwellings.
Potential scale of impact?	High: Benchmarking suggests 5% reduction in car trips.
How could this be implemented?	- Section 106 Agreements / Community Infrastructure Levy (CIL) - Transport Planning Policies - Bus Service Improvement Plans
Inclusion in EMGM	Public transport connectivity enhancements including route extensions / diversions and increased service frequencies have been represented in the EMGM and the model has determined the resultant mode share on affected routes.

Table 12: Shift Policy S4: Rail Connectivity

Shift Policy S4	Improved rail connectivity
Description	Unlock capacity on the rail network with better connections to stations, new stations and increased service frequencies where possible. Existing national rail stations should also be upgraded and better integrated with local public transport and active travel routes.
Where this could be applied?	New stations close to high trip generators, such as at the Jubilee Campus. Upgraded local stations and creation of transport interchanges could include Netherfield, Carlton and Attenborough.
Potential scale of impact?	High: Benchmarking suggests a 5% reduction in car trips but only in the locations in which they are targeted.
How could this be implemented?	- Section 106 Agreements / Community Infrastructure Levy (CIL) - Transport Planning Policies
Inclusion in EMGM	Public transport connectivity enhancements comprising capacity and service improvements have been represented in the EMGM and the model has determined the resultant mode share on affected routes. Better interchanges have not been modelled.

Table 13: Shift Policy S5: Park & Ride

Shift Policy S5	Park and Ride sites
Description	New Park and Ride to access to high quality bus, NET and national rail stations.
Where this could be applied?	High-capacity public transport interchanges on the suburban fringe with good highway accessibility.
Potential scale of impact?	High: Benchmarking suggests 5% reduction in car trips at problem locations on the highway network only.
How could this be implemented?	- Section 106 Agreements / Community Infrastructure Levy (CIL) - Transport Planning Policies
Inclusion in EMGM	New Park and Ride locations have been represented in the EMGM and the model has determined the resultant mode share on affected routes.

3.5.3 Manage and Mitigate

The third and final pillar in the strategy considers targeted highways investment to manage and mitigate the impact of development. This will only be considered once all efforts to avoid and shift demand have been exhausted. The policy interventions associated with the manage and mitigate pillar are set out in Tables 14 to 18.

Table 14: Manage Policy M1: Highway Investment

Manage and Mitigate Policy M1	Targeted highways investment
Description	Targeted highways mitigation to provide additional capacity and improve traffic flow.
Where this could be applied?	Where it is not possible to avoid or shift demand to completely resolve the transport capacity issues identified.
Potential scale of impact?	High – at target locations. However, the benefit may be short lived due to induced highway demand and may reduce benefits of sustainable travel behaviour measures.
How could this be implemented?	- Targeted investment in problem locations where other modal interventions cannot deliver sufficient modal shift. - CIL / Infrastructure Levy / S106.
Inclusion in EMGM	Localised improvements to highway links and junctions have been represented in the EMGM. A representative scheme has been included at M1 J24. The model has determined the resultant mode share and route choice.

Table 15: Manage Policy M2: Network Information

Manage and Mitigate Policy M2	Network information
Description	Integrated traveller information to influence decision making before and during a journey.
Where this could be applied?	On strategic and key route networks and at key decision making locations. Information could be provided through social media and smart phone apps.
Potential scale of impact?	Low.
How could this be implemented?	- Transport Planning Policies - Collaboration with National Highways
Inclusion in EMGM	This intervention has not been explicitly represented within the EMGM.

Table 16: Manage Policy M3: Traffic Management

Manage and Mitigate Policy M3	Intelligent traffic management
Description	Variable speed signs / ramp metering to manage traffic flows plus measures to prevent rat-running.
Where this could be applied?	On strategic and key route networks or in poor air quality locations.
Potential scale of impact?	Low.
How could this be implemented?	- Transport Planning Policies - Collaboration with National Highways
Inclusion in EMGM	This intervention has not been explicitly represented within the EMGM.

Table 17: Manage Policy M4: Road Space Reallocation

Manage and Mitigate Policy M4	Traffic loops and road space reallocation
Description	Discourage through traffic in the city centre by restricting route choice and introducing traffic loops so traffic arrives and departs via the same route. These would maintain access whilst preventing rat-running through the city centre. This measure would enable road space to be reallocated for public transport and cycle priority.
Where this could be applied?	City centre locations.
Potential scale of impact?	Low: Benchmarking suggests a 10% reduction in city centre car trips however demand may be displaced elsewhere, such as the ring road.
How could this be implemented?	Local highway design.
Inclusion in EMGM	This intervention has not been explicitly represented within the EMGM.

Table 18: Manage Policy M5: Link Roads

Manage and Mitigate Policy M5	Link roads
Description	New roads to service growth areas.
Where this could be applied?	Locations which are not currently connected to the highway. Such interventions would only be to enable proposed growth and in situations where the growth could not occur without the intervention.
Potential scale of impact?	Specific location(s) to be determined by model.
How could this be implemented?	Capital investment.
Inclusion in EMGM	Toton Link Road has been represented in the EMGM.

The proposed interventions have been cross referenced against the critical success factors to show their level of contribution to the policy objectives of the Plan. This is shown in Table 19. This demonstrates that a multi-modal strategy is required to achieve success and that an over emphasis on one particular pillar could undermine the ability of the strategy to achieve all of its overarching objectives.

Table 19: Contribution of Policy Interventions to CSFs

	Critical Success Factors				
	1. Limit congestion and improve journey time reliability for road-based modes.	2. Encourage active and low carbon modes (public transport, walking and cycling).	3. Minimise the impact of infrastructure on the built and natural environment; and limit carbon emissions.	4. Provide the connectivity needed to drive economic growth.	5. Make use of existing and committed infrastructure to reduce the need to travel.
AVOID					
A1 Compact and connected neighbourhoods					
A2 Parking policy					
A3 City centre parking interventions					
A4 Demand management					
A5 Freight consolidation and last mile solutions					
A6 Promotion of work from home and local co-working spaces					
SHIFT					
S1 Promote active travel and micro-mobility for short to medium distance journeys					
S2 Promote bus and tram as the mode of choice for medium length journeys					
S3 Introduce new public transport routes and connections					
S4 Improved rail connectivity					
S5 Park & Ride sites					
MANAGE & MITIGATE					
M1 Targeted highways investment					
M2 Network information					
M3 Intelligent traffic management					
M4 Traffic loops and road space reallocation					
M5 Link Roads					

3.6 Mitigation Scheme Categories

Based on the key principles outlined in section 3.2, the schemes have been attributed to two distinct categories:

- Schemes which are deliverable by the GNSP, either by the developer or through contributions; and
- Schemes which are beneficial to the GNSP and the wider area but will require delivery and investment by third parties.

By categorising the mitigation schemes in this way, the strategy ensures that both immediate and long term transport challenges are recognised and addressed as described in more detail in the following sections.

3.6.1 Schemes deliverable by the GNSP or other existing programmes

These schemes are directly attributable to development sites and are proportionate in terms of scale of investment. They are considered deliverable within the scope of the GNSP by developers, third parties or a combination of both depending on the scale of intervention and the particular circumstances of the development scheme. Funding will also need to be secured from EMCCA to enable transport measures to come forward to support growth. These measures include:

- **Policy Interventions:** Measures such as the application of walkable neighbourhoods' principles to ensure that developments are designed and delivered in a way which encourages active travel and reduces the need for car trip making. These interventions are embedded within the design of new development sites and are implemented through local plan policies and planning application requirements.
- **Walking and Cycling Infrastructure:** Development of new walking and cycling routes to promote active travel. This includes the creation of compact and connected neighbourhoods, new cycle corridors, and active travel connections that integrate with existing and proposed routes. These measures will benefit existing users as well as new trips generated by the GNSP sites.
- **Bus Service Improvements:** Enhancements to bus services, including increased frequencies, route extensions and diversions to improve

accessibility to new development locations. Bus priority measures such as bus lanes, bus gates, and prioritised signalling are also included in some locations to improve the reliability and speed of bus services.

3.6.2 Schemes which are beneficial to the GNSP and the wider area

These schemes address recognised strategic pinch points on the network, unlock growth across the wider area, and require significant investment beyond that which can be supported by the GNSP alone. They are plausible but require additional study work and scheme development and will be dependent upon third party funding and delivery. These include:

- **NET Extensions:** Extensions or new stops on the Nottingham Express Transit (NET) network to improve connectivity and support the wider growth agenda.
- **Heavy Rail Schemes:** Improvements to the rail network which aim to enhance rail connectivity and support regional growth.
- **Highway Schemes on the Strategic or Main Road Network:** Targeted highway investments, including new link roads and Park and Ride sites, to address congestion and improve traffic flows on key routes.

4. Mitigation measures

In line with the overall approach set out in Chapter 3, the following mitigation measures have been developed. For each measure, the modelling approach and forecast scale of impact have been set out. The proposed measures are shown spatially in Figure 4-1.

4.1 Deliverable by the GNSP

Schemes included in this section are directly attributable to development sites and are proportionate in terms of scale of investment. They are considered to be deliverable by developers, third parties or a combination of both within the scope of the GNSP or other existing programmes. Albeit several sites have already secured planning permission so there is no further opportunity to secure S106 contributions. Funding will also need to be secured from EMCCA to support growth.

4.1.1 Walking and cycling measures

The strategy assumes implementation of the various LCWIP proposals listed in the Delivery Programmes. In addition to the proposals within the LCWIP, the following active travel measures are recommended to form part of the GNSP Mitigation Strategy.

The EMGM is not able to assess the impact of active travel solutions. As such these interventions have been indicatively represented in the model by assuming a reduction in origin trip generation demand at relevant locations to reflect the potential levels of modal shift that can be achieved.

4.1.1.1 Compact and Connected Neighbourhoods

Developments located within 800m walking distance of an existing town, district or local centre or which are proposed to deliver more than 1,000 dwellings and will therefore be capable of supporting everyday services and facilities will be expected to embed connected neighbourhood principles.

Sites which are designed to incorporate attractive, safe and walkable routes which connect residents to the destinations and services they need have the potential to achieve a 30% walking mode share shift for retail and leisure trips and to reduce commuter trips at mixed use sites by 10% to reflect local employment prospects.

4.1.1.2 Active travel connections

All the sites should be encouraged to be connected with high quality walking and cycling routes ensuring integration with the wider strategic active travel network. It has been estimated that an active mode share of up to 10% could be achieved by connecting sites into these routes.

4.1.1.3 South-West Orbital cycling corridor

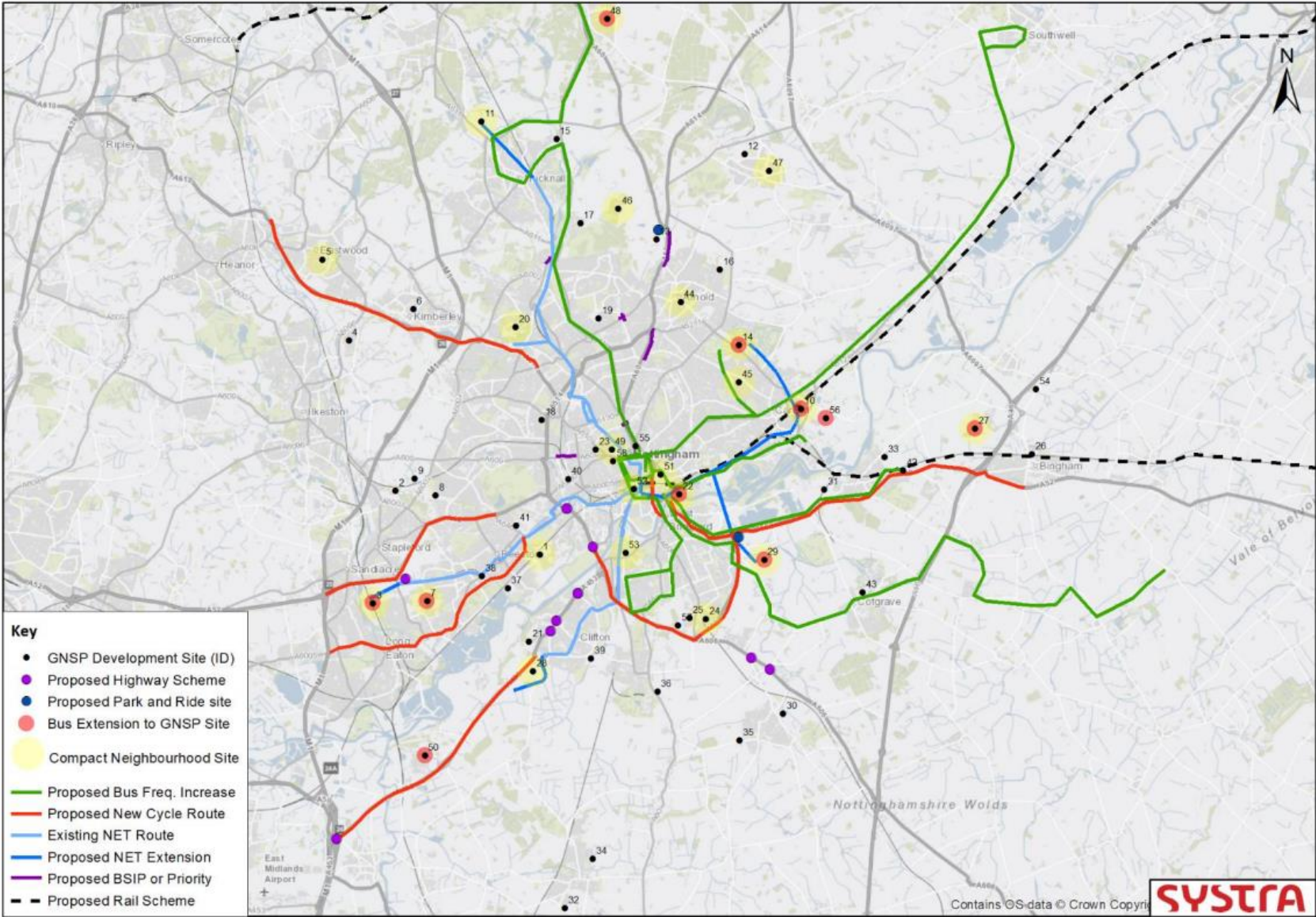
A new cycle route connecting Wilford and West Bridgford with the Queens Medical Centre, Wollaton Park, University Park and the Jubilee Campus via Clifton Boulevard. A new shared pedestrian / cycle plaza could be delivered to connect these destinations. This will encourage modal shift for orbital journeys and link into existing strategic cycling routes.

It has been estimated that this could achieve a 15% active mode share (shifted from car) for short journeys (up to 8km) with an origin / destination within 1km of the new cycle corridor section (defined as sections which have not already secured funding through the Nottingham and Nottinghamshire LCWIPs). This is a conservative estimate with some longer trips also expected to shift to cycling.

4.1.1.4 East-West cycle corridor

A new route adjacent to the A52 running between the M1 in the west and Bingham in the east via the city centre. This will provide an attractive alternative for local journeys along the highly congested A52 corridor. It has been estimated that this could achieve a 15% active mode share (shifted from car) for journeys up to 8km with an origin / destination within 1km of the cycle corridor.

Figure 4-1 Mitigation Strategy



The GNSP Development Sites which each Site ID refers to are detailed in Table 10 of the Greater Nottingham Strategic Plan: Strategic Transport Assessment report prepared by Systra in Appendix A. The Proposed BSIP or Priority schemes are set out section 3.4.1.

4.1.1.5 A6005 Cycle Superhighway

A new cycle superhighway is proposed, running along the A6005 between Beeston and Long Eaton, with an approximate length of 2.5km. The cycle route will provide an attractive alternative for local journeys along congested corridors and will encourage modal shift for orbital journeys. It has been estimated that this route could achieve a 15% cycle mode share for journeys up to 8 kilometres with an origin or destination within 1km of the cycle corridor.

4.1.1.6 Walking and cycling measures around Cinderhill

Implementation of various improvements to encourage walking and cycling in Cinderhill including:

- Improved wayfinding (signage and road markings) via Japonica Drive / Neston Drive to connect Cinder Hill Road with existing cycle routes alongside River Leen, leading to Bulwell.
- Provision of off-road cycle lanes along Broxtowe Lane and Bell's Lane (1.5km total length).
- Creation of improved pedestrian / cycle crossing points at key junctions and at locations along Nuthall Road to suit desire lines.

4.1.1.7 London Road Public Realm Improvements

Implementation of various potential improvements to London Road including:

- Pedestrian crossing upgrade at London Road / Cattle Market Road junction enabling onward connection to Meadows Way.
- Potential rationalisation of the crossing points at London Road / Queens Road junction to reduce the complexity of crossings.
- Footway widening along the western side of London Road achieved through the removal of hatched central areas of London Road and widening into the grass verge areas between Queens Road / Truman's Road, along an approximately length of 550m.

4.1.1.8 Micro-mobility trials

There is potential to expand existing shared micromobility schemes to the whole of the Greater Nottingham area including large development locations such as Ratcliffe-on-Soar Power Station where on-site shared bike or electric scooter services could be introduced. This would encourage car-free travel within developments and encourage people to not use private vehicles when accessing NET and rail stations.

It has been estimated that this could achieve a 5% cycle/micro-mobility mode share from urban development sites. Shared bike and electric scooter services cannot be explicitly represented in the model so the micro-mobility trials at large developments have been accounted for through the compact and connected neighbourhoods' assumptions set out above.

4.1.1.9 'Wheel and ride' facilities

To encourage greater utilisation of public transport and reduce short car journeys to stations, 'wheel and ride' facilities could be installed at trial locations. These would be locations with enhanced cycle storage, cycle hire schemes and micro mobility such as e-scooters.

Candidate locations are shown in Table 20. It is acknowledged that in some locations there is limited space within the street environment. Hence, further work would need to be undertaken to ensure that there is sufficient space in the local vicinity to deliver this provision. It has been estimated that this could achieve up to a 10% reduction in car use for journeys within 0-5km of these wheel and ride locations.

Table 20: Proposed 'wheel and ride' locations

Candidate locations on the NET network include:	Candidate locations on the national rail network include:
Clifton Centre	Netherfield
Wilford Lane	Beeston
Beeston Centre	Attenborough
Bramcote Lane	Ilkeston
Highbury Vale	Bulwell
Moor Bridge	Hucknall
	Carlton

4.1.2 Public transport (bus, tram and national rail) measures

Building on the existing schemes and priorities set out within the BSIP and safeguarded public transport routes in the city region, the following section sets out the public transport mitigation measures.

The EMGM has been used to assess the mode shift potential of these interventions based on relative costs for public transport and highway. The model simulates how people switch between different modes and routes based on the travel options available and how easy, fast and expensive each option is. The model does this iteratively until it finds a balance where no-one can improve their travel by changing mode or route.

4.1.2.1 Increased bus service frequencies

Bus frequencies on routes close to GNSP developments could be increased to make buses a more attractive mode. The routes shown in Table 21 are those directly impacted by GNSP developments and are therefore candidates for frequency enhancements.

It is estimated that an increase in frequency to four buses per hour would represent a turn-up-and-go level of service and could increase the bus mode share by between 5-10% for journeys on routes along these bus corridors.

Table 21: Proposed enhanced services

Bus number / name	Operator	Current frequency (buses per hour)	Target frequency (buses per hour)
Rushcliffe Villager	Trent Barton	1	4 <i>It should be noted that specific improvements will be the subject of commercial feasibility and viability discussions as</i>
27 – Nottingham-Carlton	Trent Barton	1*	
26 – Nottingham-Southwell	Nottingham City Transport	2	
141 – Nottingham-Sutton in Ashfield	Stagecoach	1	

Bus number / name	Operator	Current frequency (buses per hour)	Target frequency (buses per hour)
33 – Nottingham-Cropwell Bishop-Radcliffe/Sutton	NottsBus	<1	<i>sites are brought forward.</i>
9 – Nottingham-Bunny-Loughborough	KinchBus	2	
45 – Nottingham-Victoria Park	Nottingham City Transport	2	

*The Reference Case model already assumes four buses per hour on this route.

4.1.2.2 Bus extensions and diversions

It may also be necessary to extend or divert bus services in specific locations to increase access to new development locations. The nature of these improvements would need to be discussed and agreed with operators and the local highway authority at subsequent planning stages; however, areas which would potentially benefit from extended or diverted routes include:

- East of Gamston
- Gedling Colliery;
- Ravenshead;
- Waterside;
- RAF Newton Site;
- Teal Close (Victoria Retail Park);
- Toton development site;
- Chetwynd Barracks, including bus priority;
- Ratcliffe on Soar Power Station shuttle bus to transport people within the site and to connect them off-site to East Midlands Parkway and the Clifton tram Park and Ride.

These locations have been identified due to being either prioritised by local stakeholders or by being of a sufficient size (600 dwellings or greater), though some locations such as Gedling Colliery and Ravenshead may require additional development growth to come forward to be viable. As many of these locations are at the fringes of the urban area where car ownership and usage is likely to be higher, the potential for mode shift is small. It is estimated that no more than two buses per hour would be supported by any new service, at least initially. As such, a small mode share increase of up to 2% has been assumed for journeys on the route of the corridor.

4.1.2.3 *New limited stop bus service*

A limited stop bus service is proposed to operate along the A6514 / A52 corridors to serve Gamston Park & Ride and Radcliffe-on-Trent possibly extending to Saxondale at the intersection with the A46. This route would be limited stop to offer competitive journey times to the private car and would benefit traffic arriving from the east of Nottingham. A limited stop service coupled with a Park & Ride facility has the potential to catch traffic on its journey into Nottingham thereby reducing the levels of vehicular traffic crossing Trent Bridge to enter the city.

4.2 **Beneficial to the GNSP**

Schemes included in this section address recognised pinch points on the network, unlock growth across the wider area, and require significant investment beyond what can be supported by the GNSP alone. They are plausible but require additional study work, scheme development and are reliant on third party funding and delivery.

4.2.1 **Public transport (bus, tram and national rail) measures**

Building on the existing schemes and priorities set out within the BSIP and safeguarded public transport routes in the city region, the following section sets out the public transport mitigation measures beneficial to the GNSP.

The EMGM has been used to assess the mode shift potential of these interventions based on relative costs for public transport and highway. As noted previously, the model does this iteratively based on the modes and routes available and how easy, fast and expensive each option is.

4.2.1.1 *Nottingham Express Transit (NET) Extensions and improvements*

Extensions or new stops on the NET network are proposed in the following locations:

- Extension from current terminus at Toton Lane to the site of the proposed Toton development.
- Extension north of Hucknall to serve developments to the north.
- An eastern extension from the city centre to Gedling, with a spur line leading south to Gamston.
- Extension from Clifton through South Clifton Sustainable Urban Extension (SUE) (also known as Fairham Pastures); and
- A new NET Station at Broadmarsh.

It must be acknowledged that whilst these extensions and improvements are supported in principle, any decisions as to their implementation will be dependent upon further development work, commercial viability and receiving the necessary funding and approvals which will take time to deliver. Responsibility for development of these extensions will pass to EMCCA who will be commissioning a feasibility study into potential new routes to further explore options and opportunities. This list may therefore be subject to review.

The additional tram connectivity could lead to a significant improvement in mode share. Data on the evidence of tram improvements is limited so a conservative estimate of 10-20% mode share increase for journeys along the tram corridors has been applied. However, the mode shift potential may be greater than this based on performance evaluation data following the opening of NET Phase 2, which indicated that 32-35% of passengers using the network extensions had previously used their car or now use tram park and ride.

4.2.1.2 *Park and Ride sites*

The following locations have been identified as potential Park and Ride locations for either national rail, local buses, or NET services. These sites are

designed to relieve congestion on the major arterial routes by capturing car trips on their way into the city.

- East of West Bridgford (Gamston) or alternatively at Bingham, for national rail services and local buses.
- Leapool, west of the A60 for buses on the A60.

A new service is also proposed to connect the Boots site to existing P&R at either Clifton or East Midlands Parkway. Existing facilities may potentially require expansion if demand is shown to exceed supply. These schemes are likely to have a low impact across the Greater Nottingham area, however, they may help to reduce peak time congestion at hot spot locations and on arterial routes into the city centre. This could be beneficial to journeys originating from the GNSP sites which have no alternative option other than to travel by car.

4.2.1.3 *Improvement to access to national rail*

The ability of this Plan to implement large scale changes to the rail network in the city region is limited. However, the following measures are proposed to increase access to the rail network and to offer new journey opportunities.

- Creation of better transport interchanges at existing stations with improvements to active travel routes, bus interchange and parking facilities (including wheel and ride). Priority locations for these interventions include Netherfield, Beeston, Attenborough, Ilkeston, Bulwell, Hucknall and Carlton. This has been reflected in the model by ensuring the stations are well connected to nearby bus stops.
- Ashfield District Council and partners including Nottinghamshire County Council are currently investigating the feasibility of upgrading the Maid Marian Line to facilitate passenger services. This could provide an alternative public transport route between Toton and Ashfield, avoiding

the M1. The scheme was also referenced in the Department for Transport's published Integrated Rail Plan for the North and Midlands (18 November 2021) and the Network North policy paper (4 October 2023). Two new rail routes operating hourly have been reflected in the model. The first line runs between Mansfield and Leicester, with the second running between Mansfield and Derby.

- Extension of the Robin Hood Line from Shirebrook to Ollerton, with intermediate stations at Warsop and Edwinstowe.
- 50% line speed improvements on the Castle Line to Newark from 50mph to 75mph, as referenced in the Midlands Connect 'Tourism on Track' study (October 2024)¹.
- One additional peak hour service on the Poacher Line between Nottingham and Grantham in each direction.

4.2.2 *Highways measures*

The following highways schemes are also proposed in order to meet the demand arising from the GNSP development growth. These locations have been identified due to experiencing the greatest increases in traffic demand at junctions which are already at or close to capacity and in some cases, such as the A453, due to traffic displacement onto less suitable parallel routes.

- Toton Link Road to provide access to the Toton development;
- A453 corridor through Clifton;
- Strategic scale improvements to M1 Junction 24 / 24a;
- Localised improvements on the A52 corridor south of West Bridgford;

¹ Tourism on Track: Nottingham to Lincoln, Unlocking Economic Growth through the Visitor Economy, Midlands Connect, October 2024. Available at: <https://www.midlandsconnect.uk/media/0r0hoxri/d1e8ac0bafc3fed3f005ea5d9a40180927b77f0d6d9394e50fe765c03c12.pdf>

- Junction improvements on the A606 corridor; and
- New Park & Ride sites.

The following paragraphs give additional high-level detail on the potential improvement measures which could be provided at the junctions / locations listed above. Whilst locations requiring significant intervention have been identified from the strategic model, it must be acknowledged that other local pinch points are also likely to require specific mitigation through capacity improvements.

4.2.2.1 *Toton Link Road*

The proposed Toton link road is a scheme which provides access to an area of residential development to the south-east of Bardills roundabout along the A52. The proposed design of the link road joins the A52 approximately 450m to the east of Bardills via a signalised junction and is a two-lane single carriageway which continues south across the NET route and connects to Stapleford Lane. The alignment of the link road is designed to provide access to a proposed development site, whilst also enabling access to the future redevelopment of the Chetwynd Barracks site and reducing pressure on Bardills roundabout itself by removing a proportion of through traffic.

The proposed design of the link road enables the provision of public transport infrastructure, including bus priority or other sustainable modes. The scheme has been represented in the model as one bus lane in each direction for diverted buses, routing them away from the existing A52 roundabout, where reasonable. Initial scoping meetings to discuss the scheme have been held with National Highways and the final designs are still to be agreed.

4.2.2.2 *A453 Corridor (Clifton)*

The strategic modelling exercise has highlighted that the A453 corridor throughout Clifton is currently subject to delays at peak periods, with increased congestion expected as a result of ongoing development and background traffic growth. Minor improvements are proposed at two junctions in this area which are conditioned to the consented South Clifton SUE development, however these are limited to relatively localised

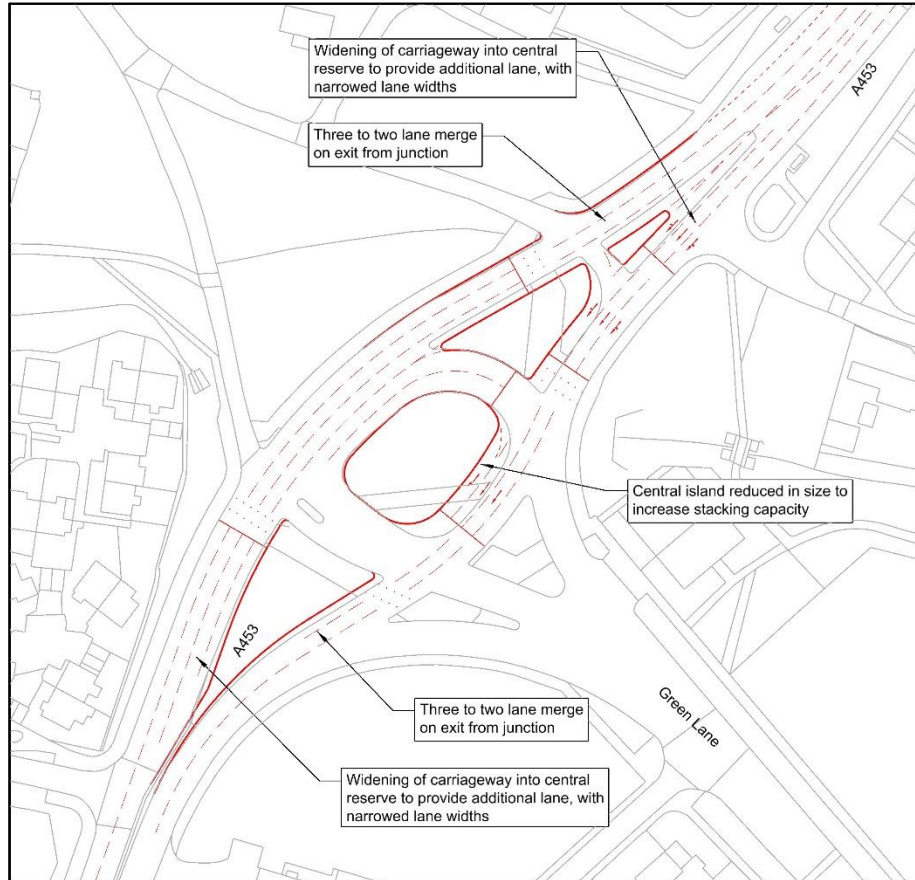
carriageway widening in the vicinity of the junctions, and as such are not expected to deliver significant capacity benefits.

Whilst additional minor improvements at individual junctions can be provided (including localised widening to junction entries or short lengths of bus priority lane), there are land constraints along the corridor which have been exacerbated by the recent works to create a dual carriageway. Consequently, larger-scale improvements will be difficult to accommodate without affecting land outside of the existing highway boundary (third-party land). A blend of improved public transport and the removal of general traffic capacity from the existing carriageway to accommodate public transport focused improvements such as continuous bus lanes or bus priority measures at junctions is required to manage congestion along this corridor.

Potential improvements to junctions along the corridor include:

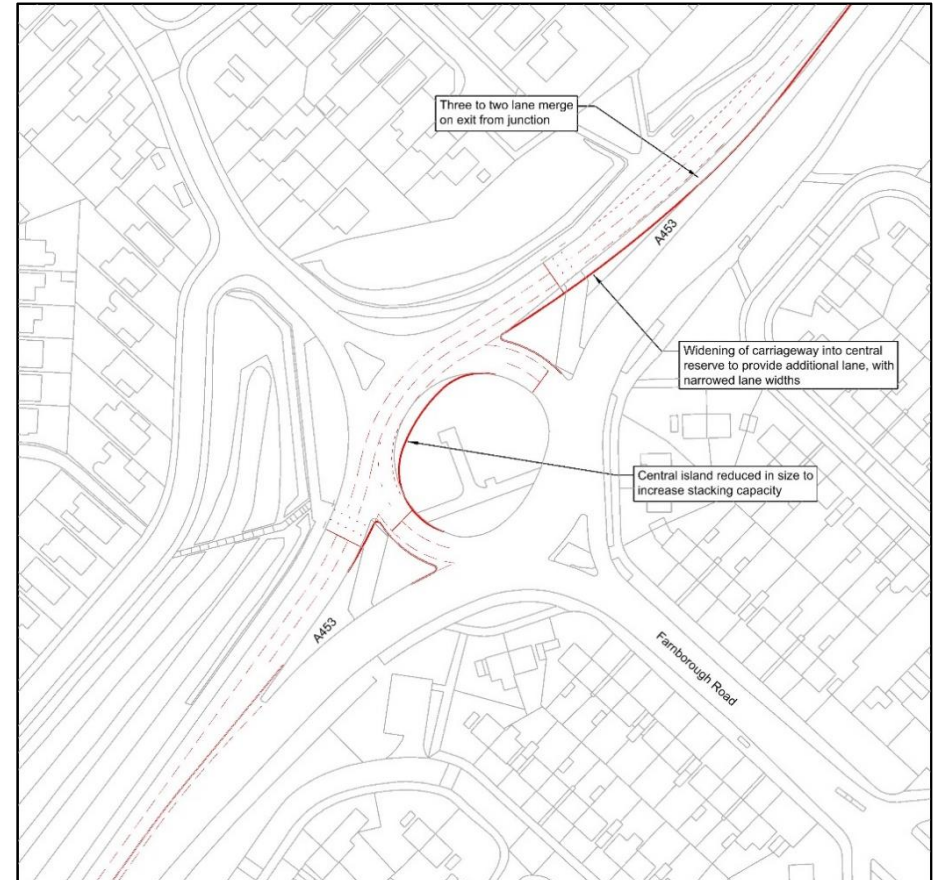
- Widening to the north-eastbound and south-westbound A453 approaches to Crusader roundabout to provide a third entry lane on both arms (as per the Clifton South SUE scheme). It would not be possible to provide significant further improvements to this junction within the highway boundary, over and above what is proposed as part of the Clifton South SUE scheme.
- Realignment of both A453 approaches to the A453 / Green Lane junction, to provide three through-lanes in both directions (albeit recognising that the lengths of three to two-lane merges would be substandard, if working within the existing highway boundary). See Figure 4-2 for details.
- Widening and realignment of the north-eastbound A453 approach to Farnborough Road roundabout, to provide an additional through lane. Similar widening on the south-westbound approach to the roundabout would not be possible without removing the existing bus lane which passes through the junction. This could potentially have a detrimental effect on bus provision unless the capacity improvements provided a significant benefit to general traffic. See Figure 4-3 for details.

Figure 4-2 A453 / Green Lane Potential Mitigation



Within the Clifton area, the traffic issues experienced along the A453 are principally due to the volumes of two-way through traffic, as opposed to traffic turning to and from the side roads. As such, whilst the above mitigation measures may provide a degree of capacity improvement, additional through-lanes are generally required at all major junctions in order to provide a meaningful improvement to capacity throughout the corridor.

Figure 4-3 A453 / Farnborough Road Potential Mitigation



The capacity limitations throughout the A453 corridor in Clifton are exacerbated by highway boundary restrictions to further improvements to the Crusader roundabout. Any potential benefit gained by mitigating the Green Lane and Farnborough Road junctions would potentially be offset by the delays which would remain at Crusader roundabout. These capacity constraints could, however, be used as incentives to encourage increased uptake of public transport along the A453 corridor, particularly for local residents travelling to and from Nottingham city centre.

4.2.2.3 M1 Junction 24 / 24a

M1 Junction 24/ 24a is a severely congested section of the strategic highway network, which has been subject to numerous improvements over recent years, including reconfiguration of the A50 connection at J24a. There are a number of key and conflicting traffic flows which pass through J24, with the existing bridge deck widths representing a constraint to further mitigation. As such, whilst additional improvements to capacity can be provided through localised widening and realignment of arms on the approaches to the junction(s), it is recognised by stakeholders that larger-scale mitigation measures are required to increase capacity and better manage delay. These could include the removal or separation of specific movements from J24, for example by providing a direct connection between the A50 and A453, bypassing J24 in its entirety.

For the purpose of this strategy, widening of the J24 bridge decks has been assessed within the EMGM to represent the provision of additional circulatory lanes. This has been modelled to include one additional circulatory lane with signal timings optimised to reflect traffic demand.

It is acknowledged that a larger-scale solution will be necessary to enable development anticipated in the next five-to-ten-year period to come forward. This is consistent with the findings of the Ratcliffe-on-Soar Local Development Order (LDO) condition, where Condition 6 stipulates that:

- The total quantum of development must not exceed thresholds equivalent to a defined number of trips, until modelling was undertaken to assess the impact on M1 J24; and
- It has been agreed in writing by Rushcliffe Borough Council in consultation with the relevant highway authorities that development traffic above any of the thresholds would not result in an unacceptable safety impact and that the residual cumulative impact on the operation of the highway would not be severe; or
- That highway mitigation schemes are prepared and submitted to the Rushcliffe Borough Council for approval in writing in consultation with the relevant highway authorities and thereafter either the mitigation is implemented in accordance with the agreed schemes, or an agreement is in place for the delivery of the agreed schemes.

Clearly, this suggests that growth in this area is reliant upon an acceptable mitigation solution being identified and delivered. This would likely comprise a package of measures which includes, but is not limited to, highway mitigation or the delivery of additional highway capacity.

4.2.2.4 A52 Corridor (south of West Bridgford)

The A52 to the south of West Bridgford is a dual carriageway that links the city centre with areas to the south and provides an onward link to the A46 in the east. Many of the junctions along this route are congested at peak periods, although major improvement schemes are planned at the A52 / A606 Melton Road (Wheatcroft roundabout) junction and A60 / A52 Nottingham Knight roundabout and are reflected in the Reference Case modelling with construction due to commence in 2026.

Opportunities for improvement are limited at junctions closer to the city centre, due to the grade-separated nature of many of the existing junction designs, and the proximity of third-party land boundaries. Potential localised improvements could include:

- Widening of the A52 off-slips at the A52 Clifton Boulevard / Queens Drive junction, to provide additional capacity and / or bus priority lanes. An additional lane has been included in the model for the off-slips at this junction.
- Signalisation of the A52 Clifton Boulevard / Abbey Street roundabout, to help provide bus priority on key approaches. This signalisation is included in the modelling and optimised in accordance with traffic demand.

A606 Corridor Improvements

Junction modelling undertaken in support of the A52 junctions' scheme has shown the need for improvements to the A606 corridor. Three improvement schemes on the A606 corridor are proposed at the junctions with Old Melton Road, Main Road and Cotgrave Road. These schemes have been included within the mitigation proposals based upon layout plans provided by NCC.

4.2.2.5 *Park & Ride Sites*

Two potential new P&R sites have been identified and are referenced in previous sections of this report, namely:

- East of West Bridgford (Gamston) or alternatively at Bingham, for national rail services and local buses.
- Leapool (to be served by buses only) on the A60.

A site to the west of the A60 has been identified for Leapool Park and Ride and is referenced in the Part 2 Local Plan. The proposed site north of Nottingham on the route to / from Mansfield would be accessed from the A60, near to the roundabout junction with A614 Ollerton Road. As such there are options to incorporate a dedicated P&R site access directly from the roundabout to the proposed site to the west of the A60.

The potential P&R site at Gamston, to the east of West Bridgford, is located adjacent to the intersection of the A52 and Radcliffe Road, with the existing three-arm roundabout potentially enabling the provision of a fourth arm to service the P&R site. An alternative site to the east of Nottingham at Bingham would provide improved connectivity to the existing Bingham rail station but may prove difficult to accommodate given that access to the station is restricted to the south by the built-up area of Bingham, suggesting that vehicular connections between the A52 and a P&R site would require vehicles to travel through the town centre.

It is envisaged that any Park and Ride provisions could be supported by complementary Park and Cycle and Park and Share provisions where relevant.

5. Modelling Results

The EMGM has been used to test the mitigation strategy detailed in Chapter 4. The results of the model scenario with GNSP developments and mitigation have been compared to the scenario with the GNSP developments only to identify the impacts of the mitigation schemes on addressing the highway impacts of the development sites.

5.1 Network Statistics

Network statistics provide a way of gauging the overall impact of the modelled mitigation measures in the study area. Percentage changes indicate how far the mitigation proposals have taken network performance back to the situation in the Reference Case, before any GNSP growth is added. These have been calculated by comparing the change between the Reference Case and GNSP with mitigation scenario to the change between the Reference Case and the GNSP without mitigation.

Network statistics are reported in Table 22 for the morning peak and

Table 23 for the evening peak. In both peaks, the mitigation measures have had a positive impact improving conditions across all metrics relative to the GNSP development scenario. Congestion impacts are predicted to be 37% and 54% mitigated in the morning and evening peaks, respectively.

Table 22: Network Statistics – AM Peak

Indicator	Reference Case	Strategic Plan	With Mitigation	Percentage Mitigated
Overcapacity Queues (PCU hrs) (Congestion)	1,938	4,184	3,354	37%
Total Travel Time (PCU hrs)	49,272	57,192	53,862	42%
Total Travel Distance (PCU kms)	1,974,417	2,115,079	2,071,765	31%
Average Speed (km/hr)	40	37	39	49%

Table 23: Network Statistics – PM Peak

Indicator	Reference Case	Strategic Plan	With Mitigation	Percentage Mitigated
Overcapacity Queues (PCU hrs) (Congestion)	2,608	4,655	3,541	54%
Total Travel Time (PCU hrs)	50,217	57,716	54,283	46%
Total Travel Distance (PCU kms)	1,979,641	2,110,407	2,071,198	30%
Average Speed (km/hr)	39	37	38	57%

It would be challenging to achieve higher levels of impact mitigation than these due to the strategic nature of this assessment. The remaining increases in congestion are spread over a significantly large area and comprise of congestion increases along strategic corridors as traffic from individual development sites accumulates on primary routes.

5.2 Trips and Mode Share

In summary, 9,062 fewer person trips are made in the morning peak and 8,599 fewer person trips are made in the evening peak with the mitigation measures included. This is the result of increased accessibility to local facilities through the inclusion of retail, employment and leisure facilities within the larger development sites and improved access to these facilities already available within the city centre.

The majority of this reduction is seen in Nottingham city centre, where the mitigation measures to reduce the need for people to travel outside of the city, which when combined with a decrease in the proportion of highway mode share, has resulted in less congestion in Nottingham city centre and across the GNSP area as a whole.

There is also evidence that the mitigation strategy delivers a positive impact in terms of drawing vehicular traffic back onto strategic corridors which are designed to accommodate this demand and reduce rat-running through lower order routes which can be detrimental to local communities. In particular, the modelled capacity upgrade at M1 J24 makes the A453 corridor more

attractive and draws back traffic from parallel local routes to the south of the A453 as well as rebalancing demand between the A52 and A453 corridors for journeys from the M1 into Nottingham city.

Across all the GNSP sites, on average there has been a 6% decrease in the proportion of trips made by highway modes, a 2% increase in public transport trips and a 4% increase in trips made by active modes (walking and cycling). This combined with lower volumes of trip making as a result of connected and sustainable development has resulted in fewer highway trips and reduced highway congestion.

5.3 Patronage

The following subsections provide the patronage forecasts from the EMGM associated with each of the public transport schemes included within the mitigation strategy. The analysis of the patronage outputs provides differing results in the context of patronage volumes and catchment of demand generated by the GNSP sites.

The outputs highlight the effectiveness of various public transport schemes in attracting passengers and reducing highway congestion. However, some schemes do not generate patronage levels proportionate to the investment required by those schemes raising risks associated with long-term financial viability of these schemes.

Several schemes attract a significant volume of trips directly from the GNSP sites, providing benefits directly attributable to these sites. In other cases, the patronage levels driven by the GNSP sites are relatively low, predominantly attracting other trips resulting in freeing up capacity on the highway network that can contribute to accommodating the highway demand associated with the GNSP sites.

5.3.1 NET Extensions

The total patronage for each NET extension forecast by the EMGM is shown in Table 24. The extensions at Gedling and Gamston indicate high levels of peak hour patronage, with 20-30% of this demand originating from GNSP sites. The extensions to Clifton and Hucknall have reasonable volumes of passengers associated with the GNSP sites which demonstrates that they directly benefit the GNSP.

Table 24: NET Extensions Patronage

Proposed Extension	AM Peak Trips	Inter Peak Trips	PM Peak Trips	GNSP Site Proportion (%)
NET Extension to Gedling	1,403	733	1,361	19-20
NET Extension to Clifton	490	167	448	86-89
NET Extension to Gamston	2,066	1,083	2,101	28-31
NET Extension north of Hucknall	290	122	206	57-75
NET to Site of Potential Toton Rail Station (station not modelled)	124	58	110	3-5

The total number of boarders and alighters at the proposed new NET stop at Broadmarsh is shown in Table 25. The proposals which include a new pedestrian link from the NET stop to the bus station and development site are forecast to attract 1,176 alighters in the morning peak hour and 1,652 boardings in the evening peak hour.

Table 25: Broadmarsh NET Stop Patronage

	AM Peak	Inter Peak	PM Peak
Boarding	334	493	1,652
Alighting	1,176	457	500

5.3.2 Bus Frequency Improvements

Table 26 shows the forecast change in patronage on the bus services which are proposed to benefit from frequency enhancements or extensions to serve development sites. The results vary by peak, with Route 141 being moderately used in the morning and evening peaks, as well as Route 33 and 26 in the evening peak. In all peaks, the A52 Express bus competes with the NET extension to Gamston and proposed NET P&R on the A52 which limits its potential usage. The negative values in the patronage volumes are related to reduced trip making in the scenario with mitigation compared to that without mitigation, as summarised in Chapter 3.

Table 26: Bus Frequency Improvements Patronage (With Mitigation vs Strategic Plan Scenario)

Scheme	AM Peak Trips	Inter Peak Trips	PM Peak Trips	GNSP Site Proportion (%)
Rushcliffe Villager (Newton – Bingham)	34	18	92	0 Peak 100 Inter Peak
Route 9 (Compton Acres & Wilford Hill to City)	116	45	91	0 Peak 0 Inter Peak
Route 26 (Southwell to Nottingham)	-50	-5	249	0 Peak 0 Inter Peak
Route 33 (Nottingham - Cropwell Bishop - Radcliffe / Sutton)	74	31	286	18-34 Peak 100 Inter Peak
Route 50 (Victoria Retail Park to City)	-143	-62	77	0-17 Peak 0 Inter Peak
Route 141 (Nottingham - Sutton in Ashfield)	176	85	390	11-29 Peak 61 Inter Peak
A52 Express Bus (proposed) (Saxondale to City)	56	19	41	0 Peak 0 Inter Peak

5.3.3 Rail Schemes

Maid Marian Line services are forecast to generate reasonable levels of patronage, but with a low proportion of those journeys originating from GNSP sites. The other national rail schemes with enhanced services are forecast to result in minimal patronage change as shown in Table 27. The negative values in the patronage volumes are related to reduced trip making in the scenario with mitigation compared to that without mitigation, as summarised in Chapter 3.

Table 27: Rail Schemes Patronage (With Mitigation vs Strategic Plan Scenario)

Scheme	AM Peak Trips	Inter Peak Trips	PM Peak Trips	GNSP Site Proportion (%)
Maid Marian Line (Mansfield <> Derby) (proposed)	218	155	177	2-3
Maid Marian Line (Mansfield <> Leicester) (proposed)	350	160	457	13-18
Castle Line to/from Newark	-152	-75	-120	100*
Poacher Line to Grantham	137	73	110	141-167

**New patronage generated by GNSP sites but reduction in other passengers as a consequence of reduced trip making in the with mitigation scenario.*

5.3.4 Park and Ride

Table 28 shows that the proposed NET P&R on the A52 at Gamston is well used, both with passengers associated with GNSP sites, other development locations and background travel demand.

The A60 Leapool P&R is also used, but the model does not show it being used by GNSP site passengers who make use of other bus services which are able to benefit from proposed bus priority measures into the city associated with the A60 Leapool scheme. However, there is potential that this facility could be attractive to development at Ravenshead.

The results are presented for the morning peak only on the basis that the morning peak patronage is representative of the volume of passengers who return to the P&R sites later in the day.

Table 28: Park and Ride Schemes Patronage

Scheme	Passengers	GNSP Site Proportion (%)
A52 Gamston P&R (NET)	772	19
A60 Leapool P&R (Bus)	124	0

6. Cost Estimate

High level cost estimates have been prepared for each of the physical infrastructure interventions which form part of the identified mitigation strategy. Reference has been made to costed schemes, where available, and in all other cases, costs have been estimated based upon:

- Benchmarking of interventions of a comparable type, scale and location;
- Department for Transport (DfT) guidance on typical costs and cost per mile; and / or
- Professional judgement drawing on experience and comparable studies undertaken.

Each cost estimate is based upon a low to high range. In some cases, this range reflects the level of intervention, for example, whether a bus lane is delivered through road space reallocation or widening of the carriageway. In other cases, the range reflects variations in the cost of equivalent schemes. The assumptions made have been document within this chapter.

No cost estimates have been prepared for policy-based interventions, as it has been assumed that these will be embedded within the design of new development sites and will therefore be delivered and funded by the developer.

6.1 Deliverable by the GNSP

6.1.1 Walking and Cycling Measures

6.1.1.1 Compact and Connected Neighbourhoods

This is a policy-based mitigation which we have assumed will be embedded within the design of new sites and will therefore be delivered by third parties.

6.1.1.2 South-West Orbital Cycling Corridor

This has been estimated to have a cost range from £1.1M to £3.4M per kilometre. The length of the scheme is approximately 12.5 km, giving a total cost range from £13.8M to £42.5M. This has been benchmarked against other schemes and DfT documents “Typical Costs of Cycling Interventions” (2017), and “Summary and Synthesis of Evidence: Cycle City Ambition Programme 2013-2018” (2019), with costs uplifted to 2023. The cost range reflects that a cycle route along the A52 would require retaining structures and additional interventions to bypass existing highway links which are unsuitable for cycle crossing movements.

6.1.1.3 East-West Cycle Corridor

This has been estimated to have a cost range from £1.1M to £3.4M per kilometre. The length of the scheme is approximately 9 km, giving a total cost range from £9.9M to £30.6M. This has been benchmarked against other schemes and DfT documents “Typical Costs of Cycling Interventions” (2017), and “Summary and Synthesis of Evidence: Cycle City Ambition Programme 2013-2018” (2019), with costs uplifted to 2023. The cost range reflects that retaining and / or bridging structures will be required to widen the A52 corridor.

6.1.1.4 A6005 Cycle Superhighway

This has been estimated to have a cost range from £1.1M to £3.4M per kilometre. The length of the scheme is approximately 2.5 km, giving a total cost range from £2.8M to £8.5M. This has been benchmarked against other schemes and DfT documents “Typical Costs of Cycling Interventions” (2017), and “Summary and Synthesis of Evidence: Cycle City Ambition Programme 2013-2018” (2019), with costs uplifted to 2023.

The wide cost range reflects that footway widening into verge areas will be required along a large proportion of the proposed route, together with the potential for localised carriageway realignment to provide a consistent route width but also recognises the potential limitations in the scale of the proposals due to 3rd party land constraints.

6.1.1.5 *Active Travel Connections*

This is a policy-based mitigation which we have assumed will be embedded within the design of new sites and will therefore be delivered by third parties.

6.1.1.6 *Nottinghamshire LCWIP*

This is a policy-based mitigation which is being delivered by Nottingham City and Nottinghamshire County Councils.

6.1.1.7 *Cinderhill Walking and Cycling*

This has been estimated to have a cost range from £450k to £1M per kilometre in addition to improved wayfinding from £250k to £500k and improved crossing facilities from £50k to £100k per crossing. The length of the scheme is approximately 1.5 km, with up to six potential locations for improved crossings. Therefore, the total cost is range is £1.2M to £2.1M. This has been benchmarked against other schemes and the DfT document “Typical Costs of Cycling Interventions” (2017) with costs uplifted to 2023.

The cost range assumes that cycle routes can be accommodated without affecting third-party land (where off-road provision is required) or without significantly affecting highway capacity (where on-road provision is appropriate).

6.1.1.8 *London Road Public Realm Improvements*

This has been estimated to have a cost range from £450k to £1M per junction in addition to footway widening from £750k to £1.2M. The scheme includes two junctions, giving a junction cost range from £900k to £2.0M, plus approx. 1km of potential footway improvement, giving a cost range of £750k to £1.2M. Therefore, the total cost is range is £1.7M to £3.2M.

The cost range reflects that potential amendments to the junctions are anticipated to be relatively minor in scale, including:

- London Road / Cattle Market Road signals could be adapted to incorporate pedestrian crossing stage(s) without a significant detriment to highway capacity.
- Queens Road junction could be simplified to improve crossing facilities without a significant detriment to highway capacity.

The estimates also assume that footway widening can be accommodated along certain sections of London Road through removal of central hatched areas of carriageway and / or widening into western verge area.

6.1.1.9 *Micro-mobility trials*

This has been estimated to have a cost range from £50k to £100k, with costs highly dependent on factors such as the scale of operation and the number of units.

6.1.1.10 *‘Wheel and ride’ facilities*

This has been estimated to have a cost range from £50k to £100k, with provision assumed to include an enclosed, lockable shelter which has capacity for approximately 100 bicycles per shelter. The higher cost estimate assumes local reconfiguration of public realm to create dedicated accesses to the cycle facilities at stations and stops. Twelve possible locations have been identified for wheel and ride facilities which gives a total cost range of £600k to £1.2M.

6.1.2 *Public Transport Measures*

6.1.2.1 *Increased bus service frequencies*

This has been estimated to have a cost range from £180k to £420k per vehicle, in addition to operating and fixed costs from £800k to £1.5M per annum. Based on service frequencies increasing on seven routes, this gives a total cost range from £1.3M to £2.9M plus annual operating costs. This has been determined from Arup and DfT benchmarking.

High operating and fixed costs assume one new single deck vehicle is required to cover service extensions; lower costs apply if the operator is able to source a vehicle from its existing fleet. Vehicle costs vary based on fuel type.

6.1.2.2 *Bus extensions and diversions*

This has been estimated to have a cost range from £180k to £420k per vehicle, in addition to operating and fixed costs from £800k to £1.5M per annum. Based on nine extended routes, this gives a total cost range from

£1.6M to £3.8M plus annual operating costs. This has been determined from Arup and DfT benchmarking.

High operating and fixed costs assume one new single deck vehicle is required to cover service extensions; lower costs apply if the operator is able to source a vehicle from its existing fleet. Vehicle costs vary based on fuel type.

6.1.2.3 New limited stop bus service

This has been estimated to have a cost range from £180k to £420k per vehicle, in addition to operating and fixed costs from £800k to £1.5M per annum. Based on four new buses operating the route, this gives a total cost range from £0.7M to £1.7M plus annual operating costs. This has been determined from Arup and DfT benchmarking.

High operating and fixed costs assume one new single deck vehicle is required to cover service extensions; lower costs apply if the operator is able to source a vehicle from its existing fleet. Vehicle costs vary based on fuel type.

6.1.3 Cost of GNSP Schemes

The package of mitigation which would need to be delivered to support the GNSP has a total cumulative cost range of £34.4 to £97.8M.

6.2 Beneficial to the GNSP

6.2.1 Public transport (bus, tram and national rail) measures

6.2.1.1 Nottingham Express Transit (NET) extensions and improvements

The costs for these mitigation measures have been benchmarked against existing tram systems; where the costs were £75M per km in Birmingham, £71M per km in Edinburgh, £28M per km in Nottingham for phase 1 and £36M per km for phase 2.

An eastern extension towards Gedling

This has been estimated to have a cost range from £400M to £650M. The route length is approximately 11.5 km, with the alignment assumed to run east on Meadows Way (Nottingham Station) via Cattle Market Road, Meadow Lane and A612 Daleside Road, before using the alignment of the disused railway line via Gedling to a new terminus at Woodthorpe (Gedling Rd / Arno Vale Rd). The adopted Gedling Local Plan protects the route as far as Lambley Lane recreation ground.

Spur to Gamston (from Gedling extension)

This has been estimated to have a cost range from £150M to £250M. The route length is approximately 2.5 – 3.0km, with the alignment assumed to head south from the A612 via Racecourse Road and crosses the River Trent via a new bridge structure, leading to the proposed Gamston P&R site adjacent to the A52.

Extension to South Clifton SUE

This has been estimated to have a cost range from £55M to £65M. The route length is approximately 1.5km and extends south-west from the current terminus at Clifton South P&R site to reach the south-western extent of the South Clifton SUE.

Extension to north of Hucknall

This has been estimated to have a cost range from £75M to £150M. A route is safeguarded as part of the planning permission for the Top Wighay Farm site, which would be an on-road route through this development. Alternatively, the Ashfield Local Plan safeguards the railway line for the extension to run north of the existing NET station towards Wighay Road. .

Broadmarsh NET station

This has been estimated to have a cost range from £6M to £10M. The cost estimate assumes Broadmarsh NET station will be provided with a direct pedestrian link to the bus station and the adjacent Broadmarsh development site.

Extension to site of potential Toton Railway Station

This has been estimated to have a cost range from £40M to £55M. The route length is approximately 1.1km from Toton Lane P&R NET station to the potential site of Toton Railway Station and development site, with the alignment assumed to project west along its current alignment, crossing the B6003 Toton Lane and running parallel to the A52 before curving south to align with the location of the proposed station.

6.2.1.2 Park and Ride sites

Costs for P&R sites have been benchmarked against the Stratford-upon-Avon P&R site, which has 750 spaces, an area of 26,000 m², approximately 35 m² per space including passenger waiting facilities and sustainable drainage between rows of cars. Costs include an allowance for car park surfacing, kerbs, passenger facilities and landscaping / drainage.

East of West Bridgford (Gamston) accessed from the A52 / Radcliffe Road three arm roundabout

This has been estimated to have a cost range from £5.5M to £8.5M. Costs for this site have been based on provision for a 1,000 space P&R site of approximately 35,000 m². An allowance has been made for junction amendments to create new site access.

Leapool, west of the A60, near to the roundabout junction with A614 Ollerton Road

This has been estimated to have a cost of approximately £10M, including a passenger waiting facility and an allowance for a new access off the existing Leapool roundabout, as per Nottinghamshire County Council analysis (2021).

6.2.1.3 Improvements to access to national rail

Better transport interchanges at existing stations including active travel routes, bus interchange and parking facilities (including wheel and ride) at Attenborough, Netherfield and Carlton

Improved interchange facilities have been estimated to have a cost range from £250k to £750k per location, based on professional judgement and benchmarking against junction improvement schemes / cost plans. Three

locations have been identified which gives a total cost range from £750k to £2.3M.

Estimated costs recognise the constrained nature of the sites stated, with limited opportunity for off carriageway improvement to bus facilities due to 3rd party land ownership, allowing for upgraded bus stops, cycle parking facilities and localised road reconfiguration.

Upgrade of the Maid Marian Line to facilitate passenger services

This has been estimated to have a cost range from £12M to £19M – an estimate taken from ‘Maid Marian Rail Extension Economic Impact Analysis’, Ashfield District Council and Mansfield District Council (Feb 2020) and Ashfield District Council Strategic Outline Business Case (2021).

Extension of the Robin Hood Line to Ollerton

This has been estimated to have a cost range from £40M to £45M, as per Nottinghamshire County Council analysis (2022).

Line speed improvements on the Castle Line to Newark

This has been estimated to have a cost of around £18M, as costed by Midlands Connect in their business case (2023).

Additional services provision on the Poacher Line to Grantham

This has been estimated to have a cost range from £500k to £1M, based on professional judgement assuming operating expenses (OpEx) only.

6.2.2 Highways Measures

6.2.2.1 Toton Link Road

This has been estimated to have a cost of approximately £40M, as per the Balfour Beatty costed scheme (2022).

6.2.2.2 A453 Corridor (Clifton)

This has been estimated to have a cost per junction from £900k to £1.8M for junction reconfiguration, and a cost per junction from £125k to £200k for Selective Vehicle Detection (SVD). This gives a total cost range of £3.1M to

£6.0M across the three junctions. This has been derived from professional judgement and benchmarking against junction improvement schemes / cost plans.

Costs assume that reconfiguration of the highway would remain within 75 m distance of respective junctions in both directions along the A453, with widening limited to areas of land within the highway boundary.

6.2.2.3 M1 Junction 24 / 24a

The above scheme has been reflected in the modelling to represent additional capacity, on the assumption that a scheme will be delivered in this location. Further work is required to develop a solution and therefore a cost estimate has not been provided.

6.2.2.4 A52 Corridor (South of West Bridgford)

Widening of the A52 off-slips at the A52 Clifton Boulevard / Queens Drive junction, to provide additional capacity and / or bus priority lanes

This has been estimated to have a cost range from £500k to £1.5M, based on professional judgement and benchmarking against junction improvement schemes / cost plans. Variations in cost are dependent on the scale of off-slip road widening and retaining structure necessary, and the impact on existing culverts.

Signalisation of the A52 Clifton Boulevard / Abbey Street roundabout, to help provide bus priority on key approaches

This has been estimated to have a cost range from £350k to £750k, based on professional judgement and benchmarking against junction improvement schemes / cost plans. Variations in cost are dependent on the requirement for realignment of the circulatory carriageway and the need for a signals maintenance bay.

6.2.2.5 A606 Corridor Improvements

The total cost of the junction improvement schemes at Tollerton Lane / Main Road and Cotgrave Road / Old Melton Road are estimated to range from £10M to £15M, based on information received from NCC. It is understood

that these costs will be updated / checked by NCC once access is provided to EMCCA development funds.

6.2.3 Cost of Strategic Schemes which would benefit the GNSP

The package of strategic mitigation measures which would benefit the GNSP has a total cumulative cost range of £0.98BN to £1.6BN.

7. Conclusions

7.1 Overview

This document has been prepared to set out the proposed transport mitigation strategy to support the delivery of growth identified in the GNSP to be delivered over the 15-year period to 2041. Much of this development is already committed or consented with associated transport mitigation and / or contributions agreed, and there is no agreed regional transport strategy to integrate as the emerging EMCCA LTP has not yet been published. The mitigation strategy has therefore been developed with reference to scenario testing undertaken within the EMGM and has been developed to:

- Respond to the transport challenges forecast by the GNSP scenario test model outputs.
- Reflect the transport interventions which are already proposed and planned for the Greater Nottingham area over the Plan period.
- Align with critical success factors which have been defined for this commission which reflect the wider policy objectives of the Plan.
- Provide a plausible set of transport interventions that are proportionate to the scale of investment and growth planned in Greater Nottingham.
- Recognise the types of schemes which are directly deliverable by the GNSP growth sites and other strategically important major infrastructure which is required to address existing challenges in the city region.
- Enable development to come forward in a sustainable way in line with the soundness test defined by the National Planning Policy Framework.

7.2 Outcomes

The objective of the mitigation strategy is to enable development to be delivered sustainably to maximise the growth potential of the Plan area. The

strategy has therefore been developed with reference to the modal hierarchy with a view to reducing the need to travel prior to developing transport solutions to accommodate travel demand. Where transport solutions are required, the strategy has focussed on measures which facilitate a high walking, cycling and public transport mode share with focussed highway capacity interventions only proposed in locations where modal alternatives are either not viable or unable to accommodate the levels of modal shift away from the private car which are required. The strategy has therefore been developed around the three pillars of the evaluation framework:

Avoid: reducing the need to travel.

The concept of compact and connected neighbourhoods can transform urban living by reducing the need for trip making. This shift is crucial for sustainable growth, as it helps manage congestion and improve overall traffic flow.

The model forecasts that 9,062 fewer person trips are made in the morning peak, and 8,599 fewer person trips are made in the evening peak with the 'avoid' mitigation measures included. The majority of this reduction is seen in Nottingham city centre, where the mitigation measures reduce the need for people to travel outside of the city. When combined with a decrease in the proportion of highway mode share, this has resulted in less congestion in Nottingham city centre and across the GNSP area as a whole.

Shift: moving travel demand onto more efficient, sustainable modes.

The walking, cycling, micromobility and public transport schemes are forecast to encourage behaviour change and deliver modal shift away from the private car. This shows positive impacts on highway operation, demonstrating that strategic planning can enhance urban mobility and deliver modal shift.

Of the proposed NET extensions, Gedling, and Gamston are forecast to have high levels of patronage with 20-30% of this demand originating from GNSP sites. Extensions to Clifton and Hucknall are forecast to attract reasonable levels of passengers from GNSP sites whilst also accommodating modal shift in background trip making. The new stop at Broadmarsh is also expected to attract a high volume of morning peak hour alighters and evening peak hour boarders. The proposed bus services with frequency enhancements or

extensions result in distinctly varying levels of patronage by peak, with Route 141 being moderately used in the morning and evening peaks, as well as Route 33 and 26 in the evening peak.

The proposed NET P&R on the A52 at Gamston is well used, both with passengers associated with GNSP and non-GNSP sites. The A60 Leapool P&R is also used, but not by GNSP site passengers who make use of other bus services.

The proposed Maid Marian Line services are forecast to generate reasonable levels of patronage, but with a low proportion of those deriving from GNSP sites. The two other assessed national rail schemes with enhanced services are forecast to result in minimal patronage change.

The results summarised above reflect the EMGM's capability to represent propensity to mode shift and respond to changes in travel costs between competing modes. Given the strategic scale of the model, it is important to acknowledge that the model is not capable of representing all of the measures that could be put in place and the modelled mode shift potential of the proposed mitigation strategy is likely to be at the lower end of the scale of change which may be achieved. Other measures, such as (but not limited to) development design codes, wayfinding and travel plan initiatives which cannot be represented in the model may have an additional positive impact in reducing the vehicle trip making potential of the GNSP sites. There is also the potential for societal behavioural change to play a role.

Manage and Mitigate: targeted investment in the highway network only once all efforts to avoid and shift demand have been exhausted.

It is unrealistic to expect a complete resolution of all traffic issues associated with increased background traffic growth and the GNSP development sites. However, the current mitigation strategy delivers a noticeable positive change – ensuring the right people are using the right routes, thereby reducing rat running and encouraging the use of strategic corridors for car-based travel. As new developments come online, additional local schemes may further support this Plan, contributing to a more efficient and sustainable urban environment.

The mitigation measures have had a positive impact improving conditions across all metrics relative to the GNSP scenario. Congestion impacts are predicted to be 37% and 54% mitigated in the morning and evening peaks, respectively.

A.1 Greater Nottingham Strategic Plan: Strategic Transport Assessment report prepared by Systra

GREATER NOTTINGHAM STRATEGIC PLAN

STRATEGIC TRANSPORT ASSESSMENT



SYSTRA

GREATER NOTTINGHAM STRATEGIC PLAN

STRATEGIC TRANSPORT ASSESSMENT

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1. STRATEGIC TRANSPORT ASSESSMENT

1.1 Introduction

- 1.1.1 Four authorities in the Greater Nottingham area (Broxtowe, Gedling, Nottingham City and Rushcliffe), together with Derbyshire and Nottinghamshire County Councils, are in the process of preparing a review of the Greater Nottingham Aligned Core Strategy (to be called the Greater Nottingham Strategic Plan or GNSP) for implementation across the Plan period to 2041. The Authorities have developed a preferred strategy in terms of accommodating housing and employment growth within the GNSP area, as shown in Figure 1. Note that Gedling Borough Council decided to withdraw from the GNSP in March 2025. However this report and the transport modelling behind it include Gedling sites and schemes. References to the GNSP in this report include Gedling Borough.
- 1.1.2 The purpose of this commission is to undertake an assessment of the strategic transport impacts of the GNSP to provide an indication of whether the development proposals are feasible in strategic transport terms and, if so, what strategic mitigation is required to accommodate the Plan proposals.
- 1.1.3 In summary this report details:
- The land use and infrastructure requirements of the 2041 Reference Case model required to assess the strategic transport impacts of the GNSP using the East Midlands Gateway Model (EMGM);
 - The modelling outputs and analysis of the Reference Case;
 - The modelling outputs and analysis of the Strategic Plan scenario, and
 - The modelling outputs and analysis of the Strategic Plan scenario inclusive of a package of mitigation measures.

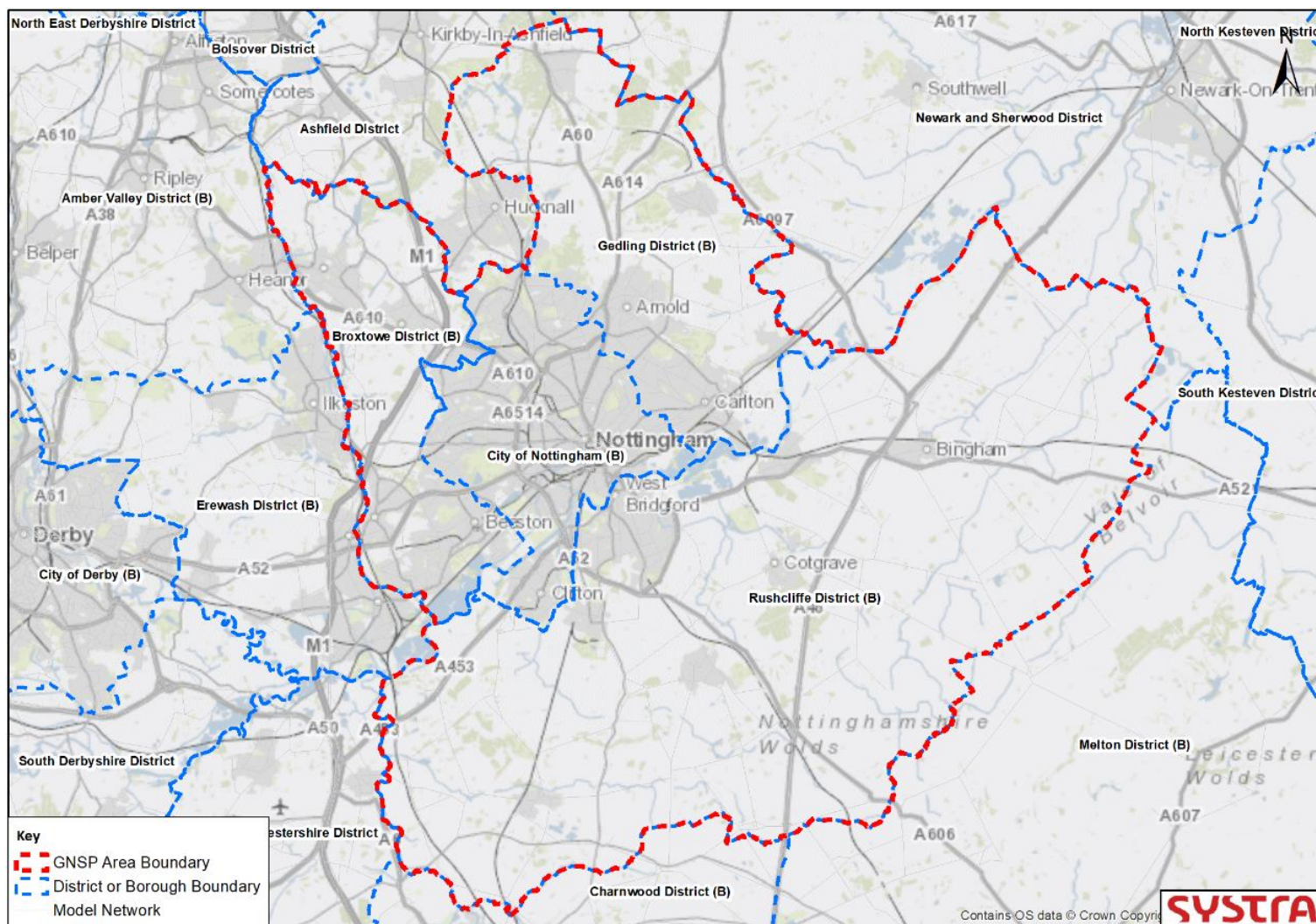


Figure 1. Greater Nottingham Strategic Plan Area

2. THE EAST MIDLANDS GATEWAY MODEL

2.1 EMGM Overview

- 2.1.1 The EMGM has been developed as a multimodal transport model built following guidance in the Department for Transport's (DfT) Transport Analysis Guidance (TAG). The EMGM is fully simulated in an area covering Nottinghamshire, Derbyshire and North Leicestershire, as shown in Figure 2. Also shown is the GNSP area in yellow.
- 2.1.2 The EMGM was recalibrated and validated in line with the DfT's TAG. To ensure that the EMGM is fit for purpose for the present assessment, a review of the model was undertaken in and around the GNSP area. It was found that the EMGM achieves good levels of calibration and validation and is therefore fit for purpose.
- 2.1.3 An overview of the structure of the EMGM is shown in Figure 3. In summary, the modelling suite is comprised of the following elements:
- SATURN Highway Model;
 - CUBE Voyager Public Transport Model;
 - Cube Variable Demand Model including destination, mode choice, trip frequency and time of day responses;
 - Park and Ride model; and
 - TRICS based Trip End Model.

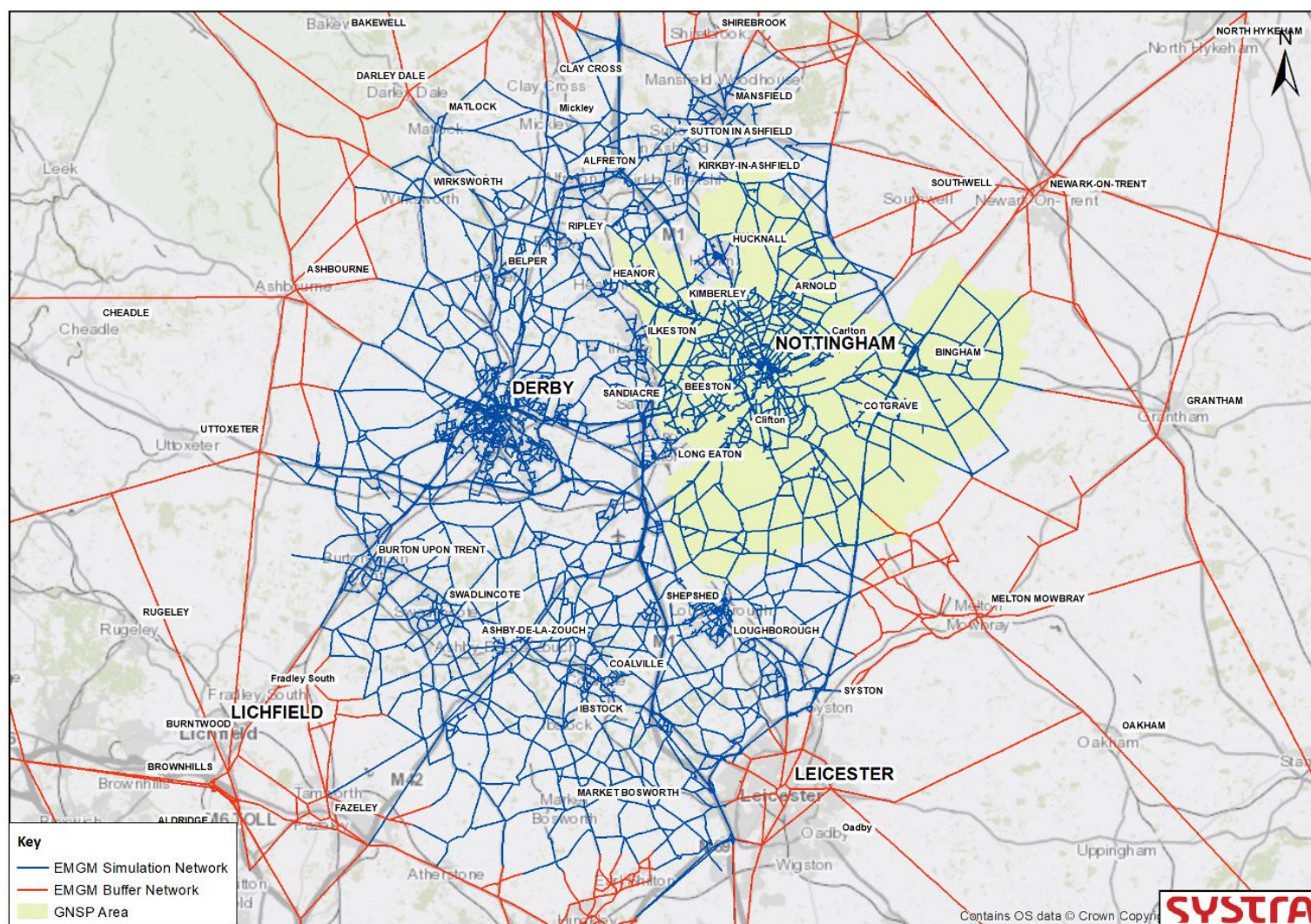


Figure 2. EMGM Model Extent and GNSP Area

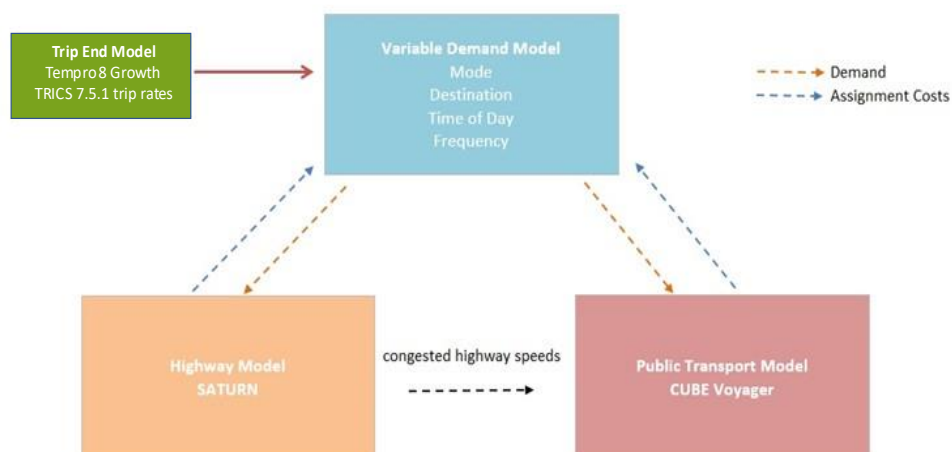


Figure 3. EMGM Technical Structure

2.1.4 Forecast demand is calculated in the Trip End Model, as in Figure 4.

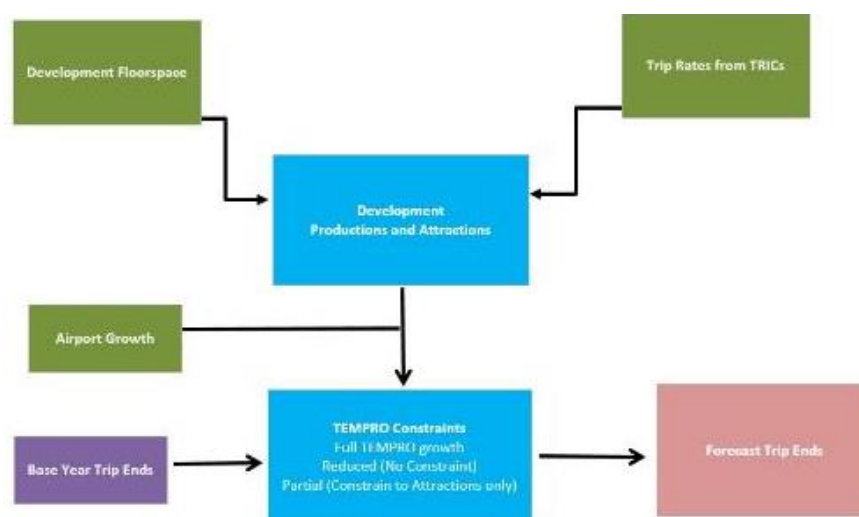


Figure 4. Trip End Model Structure

- 2.1.5 The number of development trips is calculated from trip rates contained within TRICS and are applied to floorspace, or the number of dwellings, proposed at each development. The development trips are added to the base matrices and then background growth is applied to the matrix in a way that ensures that the outturn growth matches Trip End Model Presentation Program (TEMPro 8) growth forecasts i.e. the EMGM is constrained to TEMPro growth.
- 2.1.6 Outturn generations for developments which have been entered specifically, closely align with the expected level of generations. Residual TEMPro growth is applied to surrounding wards within each MSOA and constrained at a district level.
- 2.1.7 Trip rates have been extracted from TRICS 7.5.1 for different types of land-use and segmented by mode and time period. The final person trip rates applied in the trip end model are shown in Table 1. These have been previously agreed with the Local Authorities and National Highways for the development of previous EMGM Reference Cases.

Table 1. EMGM Person Trips Rates

	AM PEAK (08:00 – 09:00)			PM PEAK (17:00 – 18:00)		
	ARRIVAL	DEPARTURE	TOTAL	ARRIVAL	DEPARTURE	TOTAL
Residential houses (per dwelling)	0.183	0.729	0.912	0.570	0.257	0.827
Residential flat (per flat)	0.074	0.295	0.369	0.231	0.104	0.335
B1 Employment (per 100sqm)	1.631	0.115	1.746	0.102	1.479	1.581
B2 Employment (per 100sqm)	0.388	0.145	0.533	0.081	0.375	0.456
B8 Employment (per 100sqm)	0.087	0.023	0.110	0.011	0.042	0.090
Primary Education (per 100sqm)	7.193	1.613	8.806	0.311	0.658	0.969
Secondary Education (per 100sqm)	2.341	0.256	2.597	0.066	0.634	0.700
College (Nottingham Skills Hub, per pupil)	0.359	0.017	0.376	0.031	0.069	0.100
Food Retail (per 100sqm)	3.518	2.624	6.142	6.558	6.887	13.445
Non-Food Retail (per 100sqm)	0.287	0.069	0.356	0.253	0.206	0.459
Café/Restaurant/Bar (per 100sqm)	0.000	0.000	0.000	6.256	2.874	9.130
Health Centre (Clinic) (per 100sqm)	1.952	0.355	2.307	0.124	0.805	0.929

3. REFERENCE CASE INPUTS

3.1 Introduction

- 3.1.1 This chapter details the developments and infrastructure schemes that have been included in the 2041 Reference Case. Opening years and build out rates are based upon best available knowledge, as provided by each Planning Authority.

3.2 Infrastructure Schemes

Committed Infrastructure Schemes

- 3.2.1 Table 2 to Table 5 detail the committed infrastructure schemes that have been included in the Reference Case, that are either already constructed or committed, with a year of opening in or before 2041, presented by Authority.

Table 2. National Highways Committed Infrastructure Schemes

NATIONAL HIGHWAYS SCHEME
A52 Nottingham junction improvements at the following junctions: Bingham Road, Stragglethorpe Road, Silverdale roundabout and Gamston roundabout
Grade Separation of A38 junctions with A61, A52 and A5111
EM SRFI mitigation at M1 J24/24a
A52 Nottingham Junctions Improvement Scheme (Nottingham Knight and Wheatcroft)
Improvements to M1 J22 (associated with Bardon Grange development)
A453 Mill Hill roundabout and Crusader roundabout improvement schemes as conditioned to the consented Clifton South SUE development (planning reference 14/01417/OUT)
Smart Motorways schemes implemented along M1 J23a to J25
M1 J20 signalisation to support the Lutterworth East development
A46/A6 junction improvements to support North Birstall development
M1 J26/A610 slip road improvements

Table 3. Nottingham City and Nottinghamshire Committed Infrastructure Schemes

NOTTINGHAM CITY AND NOTTINGHAMSHIRE SCHEME
Turning Point South
Gedling Access Road
Boots Link Road

NOTTINGHAM CITY AND NOTTINGHAMSHIRE SCHEME

A614 / A6097 MRN junction scheme package (6 junctions)

A60 Larch Farm crossroads improvement, Ravenshead

A612 Colwick Loop Road bus priority linked to southern growth corridor

Northern, Southern, Central and Western bus priority growth corridors as part of Transforming Cities Fund

Table 4. Derby City and Derbyshire Committed Infrastructure Schemes

DERBY CITY OR DERBYSHIRE SCHEME

Highway Proposals associated with the East Midlands Gateway development adjacent to M1 J24

Stenson Road/A5111 associated with Stenson Fields development

Radbourne Lane development mitigation

Schemes associated with South Derbyshire Core Strategy (south of A50)

A52 Wyvern Transport Improvement Scheme

NO2 Scheme

Rolls Royce Victory Road Realignment

New A50 junction and associated South Derby Growth Zone link road

Pentagon Island bus priority

Junction Improvements at Blue Peter Roundabout and London Road

Junction Improvements associated with Boulton Moor development

Transforming Cities Fund schemes

Table 5. Leicestershire Committed Infrastructure Schemes

LEICESTERSHIRE SCHEME

Bardon vehicular link and improvements to A42 junction 13 (associated with Bardon Grange)

Link Road between A512 and A6 north and improvements to M1 J23 (associated with Garendon)

Castle Donnington Western Relief Road linking Back Lane with Hill Top

Signalisation of the A50/A46 roundabout (associated with Ashton Green and Glenfield Park)

Signalisation of the A46/Ansty Lane roundabout (associated with Ashton Green)

LEICESTERSHIRE SCHEME

Kegworth Bypass

Infrastructure Schemes Without Funding Commitment

- 3.2.2 Table 6 to Table 8 detail all proposed infrastructure schemes that have been included in the Reference Case that are associated with Local Plans within the wider modelled area.

Table 6. Nottinghamshire Proposed Infrastructure Schemes

NOTTINGHAMSHIRE SCHEMES

Ashfield transport enhancements associated with Local Plan

Table 7. Derbyshire Proposed Infrastructure Schemes

DERBYSHIRE SCHEMES

Kirk Hallam Relief Road

Amber Valley transport enhancements associated with Local Plan

Erewash transport enhancements associated with Local Plan

Table 8. Leicestershire Proposed Infrastructure Schemes

LEICESTERSHIRE SCHEMES

Main road via East Thurmaston from Barkby Thorpe Lane to King Street and Hamilton Lane

Link to Sandhills Avenue

Link road from North East Leicester SUE

Capacity enhancements at A607 Barkby Thorpe Lane and Troon way / Barkby Road roundabouts

3.3 Committed and Proposed Developments

Developments Located Outside of the Greater Nottingham Strategic Plan Area

- 3.3.1 Appendix A details the committed and proposed housing and employment developments, presented by Authority, that are located outside of the GNSP area and are therefore included in the Reference Case to represent their level of build out in 2041.
- 3.3.2 To be explicitly included in the Reference Case, only developments of at least approximately 180 dwellings (or those that are of an equivalent size in terms of trip generation for non-residential developments (e.g. B1-13,000 sqm, B2-42,000 sqm and B8-200,000 sqm)) are

explicitly modelled, due to the EMGM being strategic. Smaller developments are included through the application of TEMPro 8 growth assumptions.

Developments Located Within the Greater Nottingham Strategic Plan Area

- 3.3.3 Within the GNSP area, only developments, or parts of developments, that have been constructed between 2016 and 2023, or those do not form part of the proposed GNSP, are included in the Reference Case. Growth in the GNSP area is constrained to represent the completed development and infrastructure in 2023. This is so as to be able to assess the full impact of the Strategic Plan.
- 3.3.4 Appendix B details the committed and proposed housing, employment and educational developments that are located within the GNSP area and are therefore included in the Reference Case to represent their level of build out in 2023.
- 3.3.5 Non-allocated housing in Gedling, specifically within Arnold, Bestwood, Calverton, Carlton and Ravenshead, has been included in the Reference Case by spreading the defined housing quantum in Appendix B across the respective settlement zones proportionately. Similarly, Nottingham City Centre flat/apartment development windfall has been accounted for in the Reference Case by spreading the defined quantum in Appendix B across Nottingham City Centre zones.

3.4 East Midlands Freeport Sites

- 3.4.1 The East Midlands Freeport proposals include three schemes, as follows.

East Midlands Intermodal Park (Freeport) – Excluded

- 3.4.2 Although outside of the GNSP area, the East Midlands Intermodal Park (EMIP) does not currently have firm committed status and sufficient planning detail to include in the EMGM. Therefore, EMIP has been excluded from the Reference Case.

East Midlands Airport Area (Freeport) – Included

- 3.4.1 As it is outside of the GNSP area, the East Midlands Airport Area Freeport has been included in the Reference Case.

Ratcliffe-on-Soar Power Station (Freeport) – Excluded

- 3.4.2 The proposed development floorspace for the Ratcliffe-on-Soar Power Station Freeport is currently c.810,000 sqm and comprises battery storage, hydrogen, advanced manufacturing, a gigafactory, logistics, a data centre, research and development, offices, a training facility, hotel and ancillary facilities.

- 3.4.3 As the Ratcliffe-on-Soar Power Station Freeport is located within the GNSP area, with none of the development likely to be built out by the commencement of the new Strategic Plan, the Ratcliffe-on-Soar Power Station Freeport has been excluded from the Reference Case.

4. REFERENCE CASE ANALYSIS

4.1 Introduction

- 4.1.1 A 2041 Reference Case model has been developed for this assessment. The Reference Case represents information about the ‘most likely’ future year scenario taking into account planning permissions and allocations to date, but excluding the developments associated with the GNSP, as detailed in Chapter 3.

4.2 Highway Trip Growth

- 4.2.1 Table 9 outlines the growth in highway trips between the 2016 Base and the 2041 Reference Case. There is expected to be 19% growth in highway trips between 2016 and 2041 in the AM peak and 18% growth in the PM peak. Note, within the GNSP area, only developments/part of developments that have been constructed between 2016 and 2023, or those do not form part of the proposed Greater Nottingham Aligned Strategic Plan, are included in the Reference Case.

Table 9. Growth in Highway Trips 2016 to 2041

PEAK	2016 BASE	2041 REFERENCE CASE	GROWTH
AM	321,220	383,838	19%
PM	323,893	381,699	18%

4.3 Traffic Flow Change

- 4.3.1 Figure 5 shows AM peak traffic flow change for the 2041 Reference Case compared to the 2016 Base model. Figure 6 shows the same for the PM peak. Red represents links which experience an increase in traffic, whilst green represents links which see a reduction.
- 4.3.2 Traffic growth between 2016 and 2041, as well as various infrastructure schemes, impact on traffic flows on the local and Strategic Road Network (SRN). In the GNSP area, on the SRN, the M1, A46, A52 and A453 in particular are forecast to experience increases in traffic. This is the result of a combination of the following:
- Development growth using these corridors;
 - Mitigation of Erewash and Ashfield Local Plan development impacts and schemes;
 - Strategic schemes on the A52 at Nottingham Knight and Wheatcroft;
 - Improvements to M1 J26 and J27 which releases additional capacity;
 - Improvements to M1 J24a/J24, built as part of the East Midlands Gateway Rail Freight Interchange and the Kegworth Bypass, which releases capacity at M1 J24a/J24 and improves connections between the A42, A50, A453 and the M1.
- 4.3.3 On the local highway network, a number of routes are also forecast to experience increases in traffic flow. Much of the flow change in the GNSP area is a result general traffic growth but also can be attributed to local schemes such as the Boots Link Road, the Turning Point South scheme and new development accesses, e.g. Gedling, which redistribute traffic and release highway capacity.

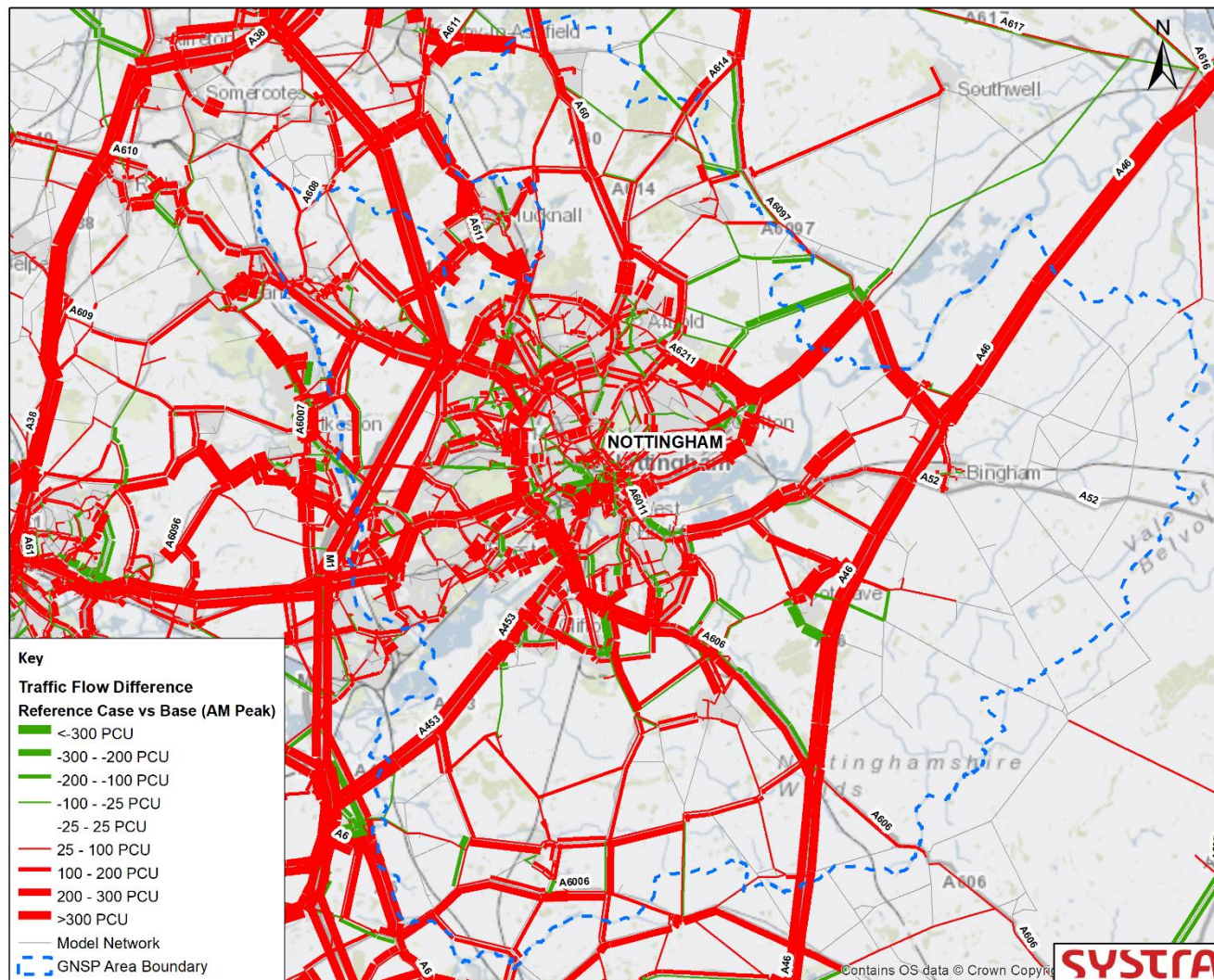


Figure 5. Flow Difference – AM Peak

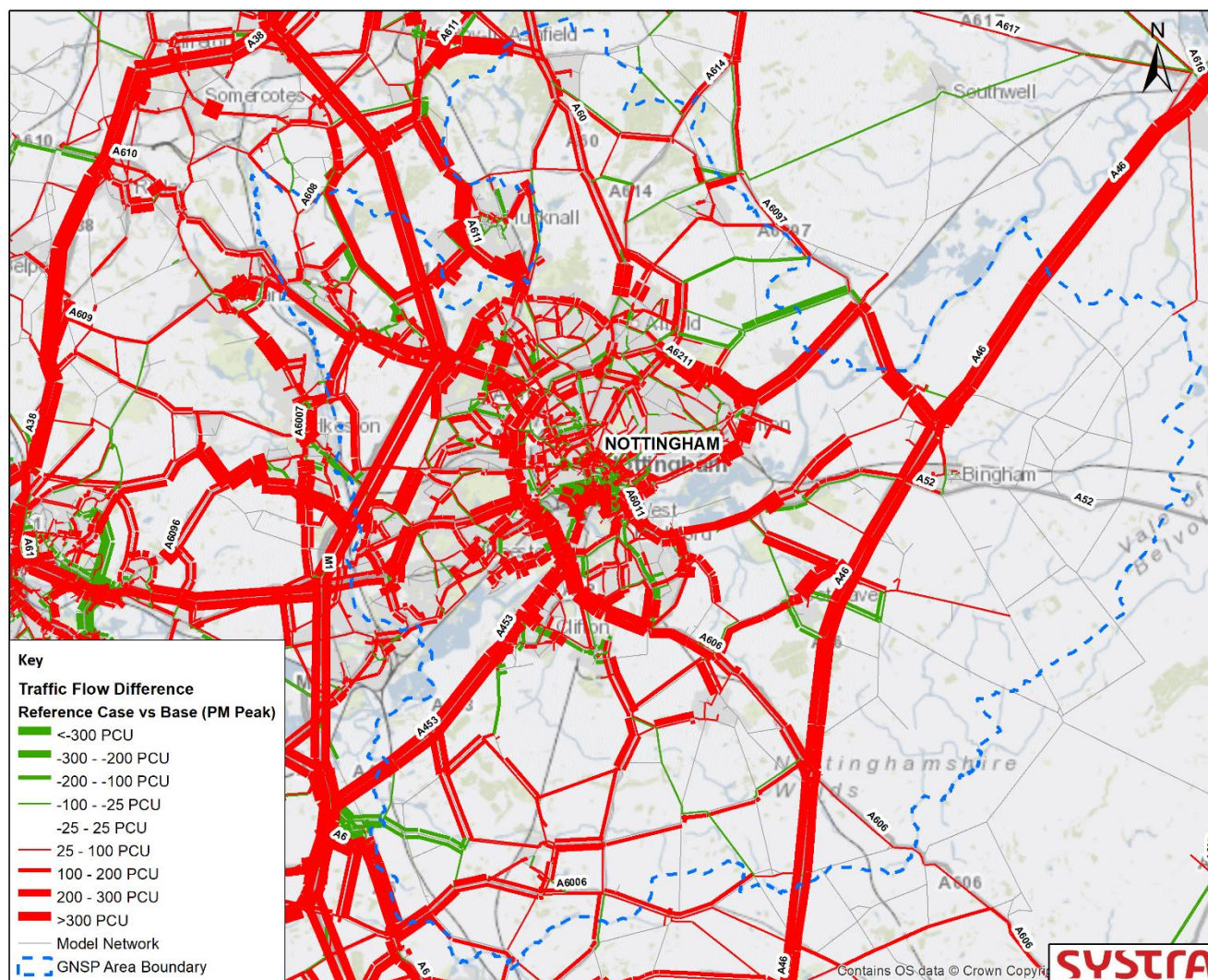


Figure 6. Flow Difference – PM Peak

4.4 Junction Congestion

- 4.4.1 Junction congestion is measured by determining the ratio of the volume of traffic to the capacity that can be accommodated by a junction. A Volume to Capacity (V/C) of 85% is considered to be the threshold at which a junction is approaching its operational capacity, therefore increasing the likelihood of operational problems, including congestion, with associated delays and queues. A V/C of $\geq 100\%$ indicates that a junction is operating above its theoretical maximum capacity, with substantial congestion, queuing and delays.
- 4.4.2 Figure 7 and Figure 8 show the junctions which are forecast to have a V/C of 85% or higher in the Reference Case. Orange represents junctions with a V/C over 85% but under 100%. Red marks junctions severely congested with a V/C of 100% or more.
- 4.4.3 In 2041, the Reference Case shows severe congestion, particularly within and around Nottingham City, but also across the GNSP area, in particular around Broxtowe given the District's proximity to the M1.
- 4.4.4 The M1 and A52 include several junctions with a V/C $\geq 100\%$ in the 2041 Reference Case. For example M1 J24/J24a, J25 and J26, as well as the A52 towards Derby and through Nottingham City, are significantly congested in both peaks, with V/C of $\geq 100\%$ at multiple points along these strategic routes.
- 4.4.5 On the local network, there is significant congestion within wider Nottingham and the City itself generally, particularly on strategic roads such as the A60, A610 and A6514.

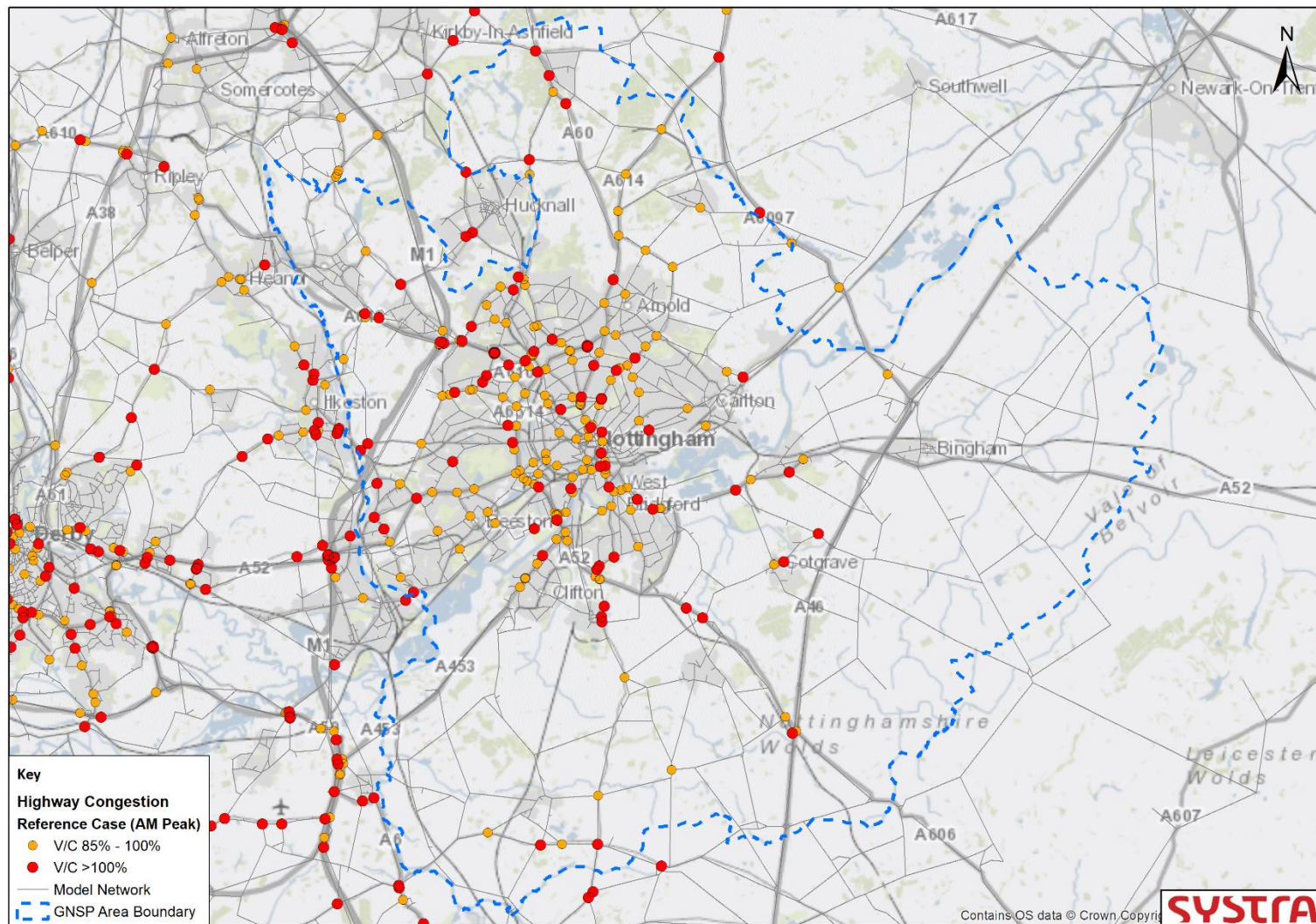


Figure 7. Reference Case Congestion – AM Peak

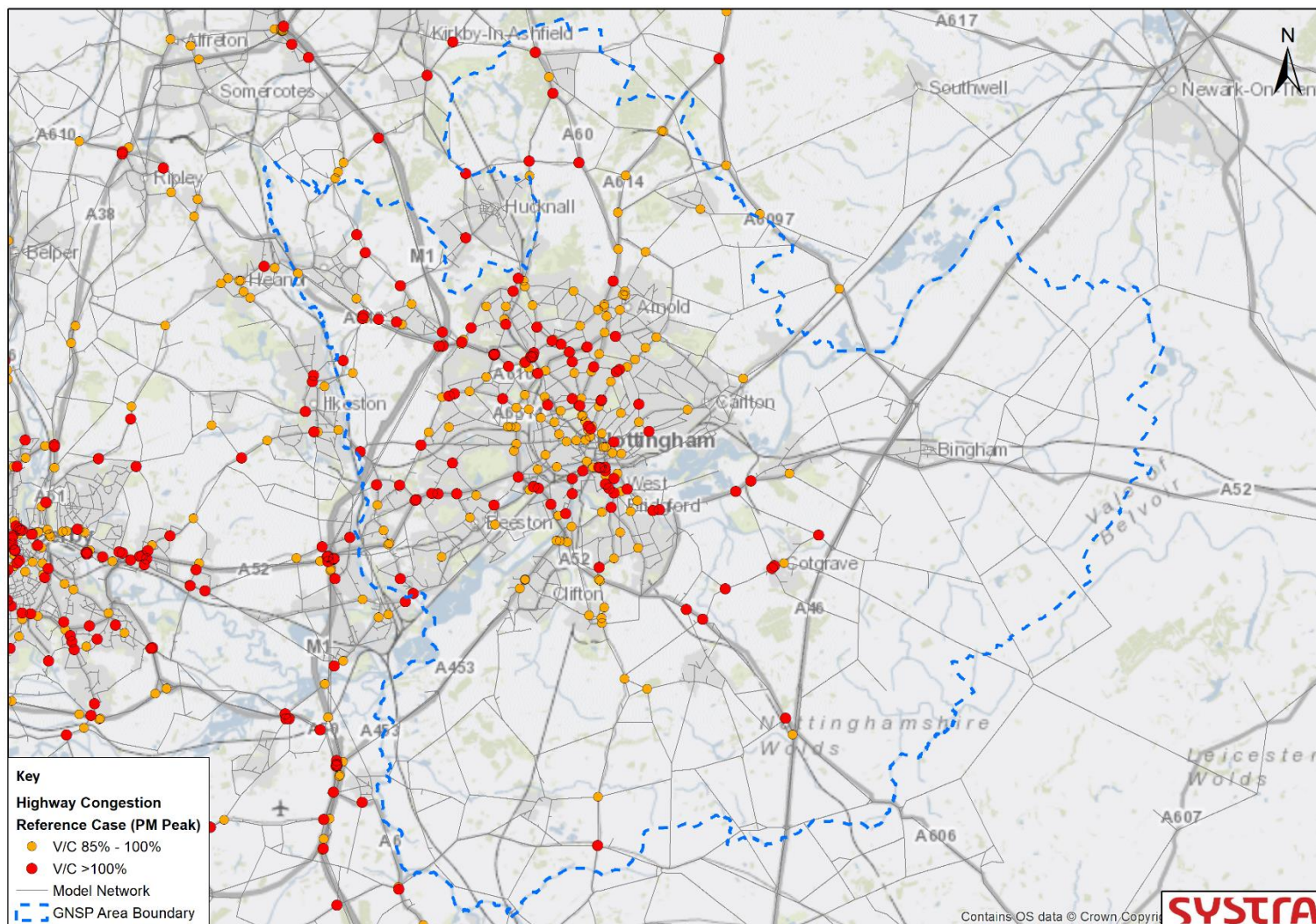


Figure 8. Reference Case Congestion – PM Peak

5. GREATER NOTTINGHAM STRATEGIC PLAN SCENARIO

5.1 Additional Development

- 5.1.1 Figure 9 shows the approximate locations of the GNSP development sites and includes both the developments that are already committed but will incur further development between 2023 and 2041 and new site allocations in the GNSP area.
- 5.1.2 Table 10 details the quantum of housing development that has been included in the Reference Case, within the Strategic Plan scenario and the difference between the two, presented by Authority. The ID numbers of each development are with reference to Figure 9.
- 5.1.3 In total, an additional **38,838 homes** are explicitly modelled in the Strategic Plan scenario compared to the Reference Case in the GNSP area, distributed by Local Authority as follows:
- 5,201 homes in Broxtowe;
 - 6,747 homes in Gedling;
 - 17,584 homes in Nottingham City; and
 - 9,306 homes in Rushcliffe.

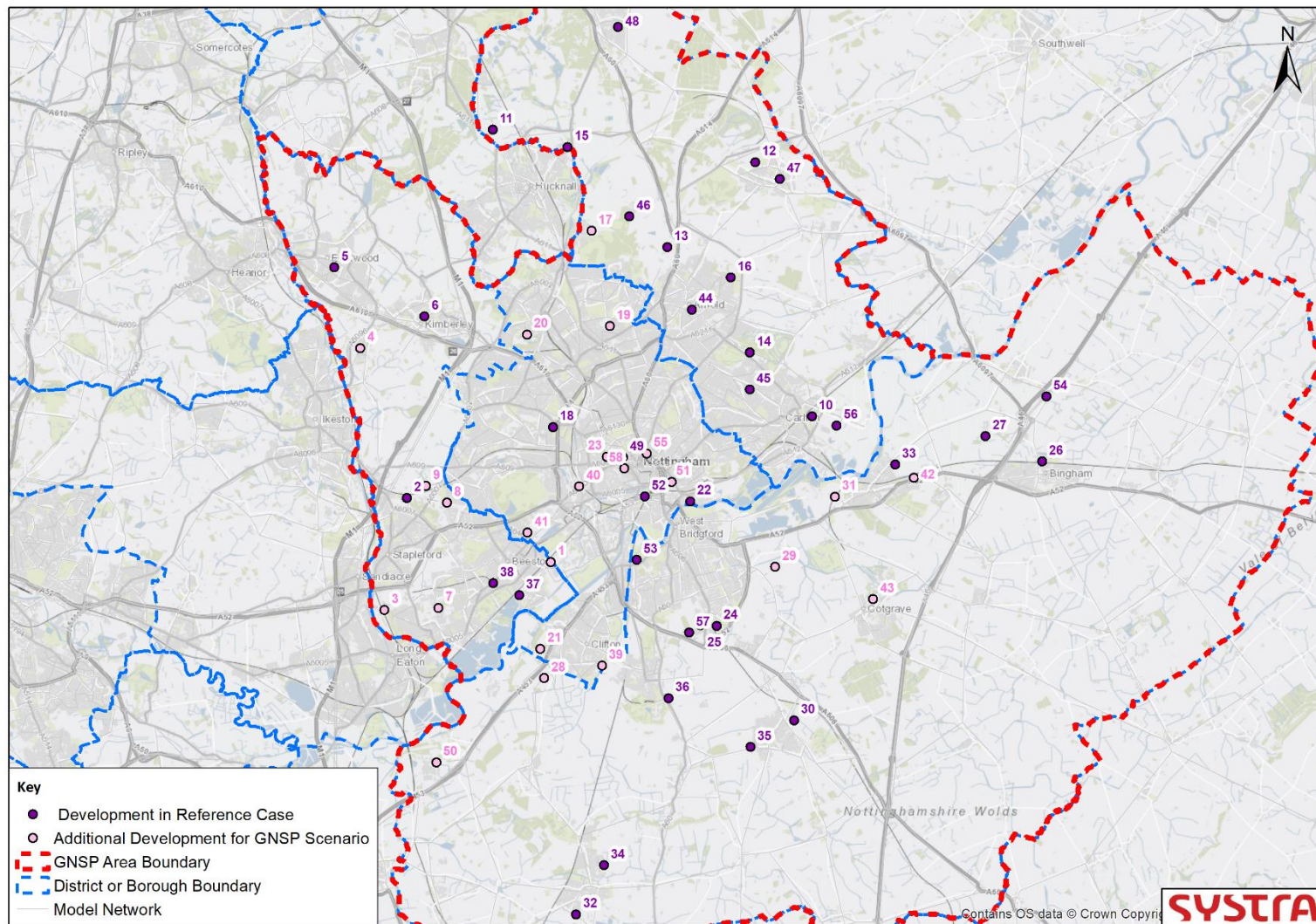


Figure 9. Sites with Additional Development 2023-2041

Table 10. GNSP Area Housing Developments with Additional Development

ID	DEVELOPMENT	AUTHORITY	HOMES IN REFERENCE CASE	HOMES IN GNSP SCENARIO	DIFFERENCE IN HOMES
1	Boots Site	Broxtowe / City	-	627	627
2	Field Farm	Broxtowe	129	450	321
3	Toton Strategic Location for Growth	Broxtowe	-	1,200	1,200
4	Land west of Awsworth	Broxtowe	-	250	250
5	Eastwood	Broxtowe	581	960	379
6	Kimberley	Broxtowe	149	363	214
7	Chetwynd Barracks	Broxtowe	-	1,500	1,500
8	Land Adjacent and north west of Bramcote Crematorium	Broxtowe	-	190	190
9	East of Coventry Lane, Bramcote	Broxtowe	-	470	470
37	Beeston Business Park, Technology Drive, Beeston	Broxtowe	221	310	89
38	Bartons land between High Road & Queens Road West, Chilwell	Broxtowe	30	221	191
10	Teal Close	Gedling	331	807	476
11	Top Wighay Farm	Gedling	38	1,900	1,862
12	H16 Park Road, Calverton	Gedling	101	363	262
13	Land West of A60 Redhill (X2 and X3)	Gedling	70	220	150
14	Gedling Colliery	Gedling	465	941	476
15	North of Papplewick Lane	Gedling	225	255	30
16	Mapperley Plains and Killisick Lane	Gedling	89	435	346

ID	DEVELOPMENT	AUTHORITY	HOMES IN REFERENCE CASE	HOMES IN GNSP SCENARIO	DIFFERENCE IN HOMES
17	Bestwood Business Park	Gedling	-	220	220
44	Arnold (non-allocated sites)	Gedling	204	864	660
45	Carlton (non-allocated sites)	Gedling	507	1,221	714
46	Bestwood (non-allocated sites)	Gedling	35	541	506
47	Calverton (non-allocated sites)	Gedling	61	586	525
48	Ravenshead (non-allocated sites)	Gedling	66	586	520
18	Chalfont Drive	Nottingham City	345	475	130
19	Former Padstow School Site Gainsford Crescent	Nottingham City	-	291	291
20	Stanton Tip	Nottingham City	-	500	500
21	Clifton West	Nottingham City	-	285	285
22	Waterside	Nottingham City	204	1,289	1,085
23	Alfreton Road - Forest Mill	Nottingham City	-	484	484
39	Farnborough Road - Former Fairham Comprehensive	Nottingham City	-	196	196
40	406/408 Derby Road and Northern Dairies LTD	Nottingham City	-	306	306
41	Western Village, University of Nottingham Campus	Nottingham City	-	200	200
49	City Centre flats	Nottingham City	4,973	18,850	13,877
24	East and West of Melton Road, Edwalton	Rushcliffe	1,277	1,844	567

ID	DEVELOPMENT	AUTHORITY	HOMES IN REFERENCE CASE	HOMES IN GNSP SCENARIO	DIFFERENCE IN HOMES
26	East and West of Chapel Lane, Bingham	Rushcliffe	408	1,022	614
27	RAF Newton	Rushcliffe	115	528	413
28	Clifton South	Rushcliffe	-	3,000	3,000
29	East of Gamston North of Tollerton	Rushcliffe	-	3,000	3,000
30	Between Platt Lane and Station Road, Keyworth	Rushcliffe	128	187	59
31	Land North of Nottingham Road/The Paddocks	Rushcliffe	-	175	175
32	Land at Rempstone Road (north)	Rushcliffe	100	282	182
33	Shelford Road/Grooms Cottage	Rushcliffe	216	455	239
34	Lantern Lane, E. Leake	Rushcliffe	231	365	134
35	North of Bunny Lane	Rushcliffe	114	221	107
36	East of L'borough Rd/Meadowcroft	Rushcliffe	109	231	122
42	North of Grantham Road	Rushcliffe	-	280	280
43	Land R/O Mill Lane/the Old Park/South of Hollygate Lane	Rushcliffe	-	414	414

5.1.4 Table 11 details the quantum of commercial development that has been included in the Strategic Plan scenario and the difference between this scenario and the Reference Case.

Table 11. GNSP Area Commercial Developments with Additional Development

ID	DEVELOPMENT	AUTHORITY	COMMERICAL DEV. (SQM) IN REFERENCE CASE	COMMERICAL DEV. (SQM) IN GNSP SCENARIO	DIFFERENCE BETWEEN SCENARIOS (SQM)
3	Toton Strategic Location for Growth	Broxtowe	-	B1 – 10,000 B2 – 4,000 B8 – 4,000	B1 – 10,000 B2 – 4,000 B8 – 4,000
11	Top Wighay Farm	Gedling	-	B1 – 8,000 B2 – 41,500	B1 – 8,000 B2 – 41,500
56	Teal Close, ALDI and Local Centre	Gedling	Retail – 1,818	Retail – 3,447	Retail – 1,629
1	Boots Site	Nottingham City	-	B1 – 4,500 B2 – 30,000 B8 – 10,000	B1 – 4,500 B2 – 30,000 B8 – 10,000
22	Waterside	Nottingham City	-	B1 – 21,000	B1 – 21,000
51	Canal Quarter - Island Site	Nottingham City	-	Retail – 3,750	Retail – 3,750
52	Phase 1 Unity Square, Sheriffs Way	Nottingham City	B1 – 36,519	B1 – 58,360	B1 – 21,841
55	Victoria Centre Huntingdon Street	Nottingham City	-	Retail – 37,000	Retail – 37,000
58	Nottingham City Centre offices	Nottingham City	-	B1 – 115,741	B1 – 115,741
28	Clifton South	Rushcliffe	-	B1 – 20,000 B2 – 40,000 B8 – 40,000 Retail – 2,500	B1 – 20,000 B2 – 40,000 B8 – 40,000 Retail – 2,500
29	East of Gamston North of Tollerton	Rushcliffe	-	Retail – 2,500	Retail – 2,500
50	Ratcliffe on Soar Power Station	Rushcliffe	-	B1 – 96,739 B2 – 493,290 B8 – 167,234	B1 – 96,739 B2 – 493,290 B8 – 167,234
53	Land on Wilford Lane West Bridgford	Rushcliffe	Retail – 2,783	Retail – 4,098	Retail – 1,315
54	East Bridgford Garden Centre	Rushcliffe	Retail – 12,469	Retail – 13,136	Retail – 667

ID	DEVELOPMENT	AUTHORITY	COMMERICAL DEV. (SQM) IN REFERENCE CASE	COMMERICAL DEV. (SQM) IN GNSP SCENARIO	DIFFERENCE BETWEEN SCENARIOS (SQM)
57	Landmere Lane Edwalton	Rushcliffe	Retail – 3,370	Retail – 3,770	Retail – 400

5.1.5 In total, an additional 297,821m² of B1, 608,790m² of B2, 221,234m² of B8 and 49,761m² of retail space is explicitly modelled in the Strategic Plan scenario compared to the Reference Case in the GNSP area, distributed by Local Authority as follows:

- 10,000m² B1, 4,000m² B2 and 4,000m² B8 in Broxtowe;
- 8,000m² B1, 41,500m² B2 and 1,629m² retail in Gedling;
- 163,082m² B1, 30,000m² B2, 10,000m² B8 and 40,750m² retail in the City; and
- 116,739m² B1, 533,290m² B2, 207,234m² B8 and 7,382m² retail in Rushcliffe.

5.1.6 Smaller proposed sites with less than 180 dwellings (or equivalent generations for non-residential uses) that are not detailed in Table 10 or Table 11 but are part of the GNSP cannot be specifically modelled in the EMGM due to the model's strategic nature. Such developments have been included indirectly through the application of TEMPro growth constraint within the GNSP area.

5.2 Development Person Trips

5.2.1 Table 12 details the number of person trips travelling to and from each development in the Strategic Plan scenario, the number of additional trips relative to the Reference Case and the modelled mode share between highway (HW), public transport (PT) and active modes.

Table 12. Development Trips (People)

ID	DEVELOPMENT	AUTHORITY	STRATEGIC PLAN SCENARIO TRIPS		ADDITIONAL TRIPS		MODE SHARE		
			AM	PM	AM	PM	HW	PT	ACTIVE
1	Boots Site	Broxtowe	380	364	380	364	80%	10%	10%
2	Field Farm	Broxtowe	435	411	309	292	86%	4%	10%
3	Toton Strategic Location for Growth	Broxtowe	1,390	1,296	1,390	1,296	74%	15%	11%
4	Land west of Awsorth	Broxtowe	246	228	246	228	85%	4%	11%
5	Eastwood	Broxtowe	947	873	369	341	80%	10%	10%
6	Kimberley	Broxtowe	357	330	209	194	85%	4%	11%
7	Chetwynd Barracks	Broxtowe	1,450	1,369	1,450	1,369	74%	16%	10%
8	Land Adjacent to Bramcote Crematorium	Broxtowe	185	173	185	173	85%	4%	11%

ID	DEVELOPMENT	AUTHORITY	STRATEGIC PLAN SCENARIO TRIPS		ADDITIONAL TRIPS		MODE SHARE		
			AM	PM	AM	PM	HW	PT	ACTIVE
9	East of Coventry Lane	Broxtowe	456	429	456	429	85%	4%	11%
37	Beeston Business Park, Technology Drive, Beeston	Broxtowe	297	284	82	79	80%	10%	10%
38	Bartons land between High Road & Queens Road West	Broxtowe	212	203	183	175	73%	16%	11%
10	Teal Close	Gedling	772	742	449	436	82%	7%	11%
11	Top Wighay Farm	Gedling	2,260	2,121	2,222	2,087	80%	8%	11%
12	H16 Park Road, Calverton	Gedling	360	333	259	240	84%	5%	11%
13	Land West of A60 Redhill	Gedling	217	201	148	137	84%	5%	11%
14	Gedling Colliery	Gedling	920	862	459	433	82%	7%	11%
15	North of Papplewick Lane	Gedling	252	232	28	26	82%	7%	11%
16	Mapperley Plains and Killisick Lane	Gedling	428	398	339	316	82%	7%	11%
17	Bestwood Business Park	Gedling	217	199	217	199	85%	4%	11%
44	Arnold (non-allocated)	Gedling	848	749	648	603	83%	9%	8%
45	Carlton (non-allocated)	Gedling	1,189	1,053	695	653	86%	7%	6%
46	Bestwood (non-allocated)	Gedling	533	463	498	459	88%	5%	7%
47	Calverton (non-allocated)	Gedling	580	506	520	480	85%	7%	8%
48	Ravenshead (non-allocated)	Gedling	583	505	517	476	86%	6%	8%
56	Teal Close, ALDI & Local Centre	Gedling	208	522	93	245	78%	2%	20%
1	Boots Site	Nottingham	479	474	479	474	67%	21%	12%
18	Chalfont Drive	Nottingham	460	433	121	115	78%	12%	10%
19	Former Padstow School Site Gainsford Crescent	Nottingham	287	264	287	264	75%	14%	11%
20	Stanton Tip	Nottingham	490	453	490	453	65%	24%	11%
21	Clifton West	Nottingham	265	257	265	257	79%	11%	10%
22	Waterside	Nottingham	1,699	1,569	1,495	1,382	67%	20%	12%

ID	DEVELOPMENT	AUTHORITY	STRATEGIC PLAN SCENARIO TRIPS		ADDITIONAL TRIPS		MODE SHARE		
			AM	PM	AM	PM	HW	PT	ACTIVE
23	Alfreton Road - Forest Mill	Nottingham	474	437	474	437	71%	19%	10%
39	Farnborough Road - Former Fairham Comprehensive	Nottingham	183	178	183	178	74%	15%	11%
40	406/408 Derby Road and Northern Dairies LTD	Nottingham	298	277	298	277	66%	23%	11%
41	Western Village, University of Nottingham Campus	Nottingham	195	181	195	181	67%	22%	11%
49	Nottingham City Centre flats	Nottingham	35,262	32,059	25,960	23,602	25%	15%	60%
51	Canal Quarter - Island Site	Nottingham	201	619	201	619	58%	23%	19%
52	Phase 1 Unity Square	Nottingham	1,232	1,128	460	418	53%	28%	19%
55	Victoria Centre Huntingdon St	Nottingham	425	195	425	195	13%	25%	62%
58	Nottingham City Centre offices	Nottingham	2,444	2,237	2,444	2,237	44%	37%	19%
24	East and West of Melton Road, Edwalton	Rushcliffe	1,762	1,683	577	569	84%	5%	10%
26	E. & W. Chapel Lane, Bingham	Rushcliffe	1,007	933	602	558	84%	5%	11%
27	RAF Newton	Rushcliffe	520	483	406	377	86%	4%	10%
28	Clifton South	Rushcliffe	3,399	3,363	3,399	3,363	74%	15%	11%
29	E. of Gamston N. of Tollerton	Rushcliffe	2,913	2,756	2,913	2,756	83%	6%	10%
30	Between Platt Lane and Station Road, Keyworth	Rushcliffe	180	170	54	53	82%	8%	10%
31	Land North of Nottingham Road/The Paddocks	Rushcliffe	170	160	170	160	82%	8%	10%
32	Land at Rempstone Road N.	Rushcliffe	269	252	170	161	85%	4%	11%
33	Shelford Rd/Grooms Cottage	Rushcliffe	446	415	231	217	86%	4%	10%
34	Lantern Lane, E. Leake	Rushcliffe	347	327	120	116	83%	6%	11%
35	North of Bunny Lane	Rushcliffe	212	200	101	96	77%	13%	10%
36	East of L'borough Rd	Rushcliffe	220	210	113	110	85%	4%	11%
42	North of Grantham Road	Rushcliffe	275	255	275	255	81%	9%	10%

ID	DEVELOPMENT	AUTHORITY	STRATEGIC PLAN SCENARIO TRIPS		ADDITIONAL TRIPS		MODE SHARE		
			AM	PM	AM	PM	HW	PT	ACTIVE
43	Land R/O Mill Lane/the Old Park/S. of Hollygate Lane	Rushcliffe	405	376	405	376	83%	6%	11%
50	Ratcliffe on Soar Power Sta.	Rushcliffe	4,616	4,909	4,616	4,909	76%	8%	16%
53	Wilford Lane West Bridgford	Rushcliffe	227	678	62	231	72%	9%	19%
54	E. Bridgford Garden Centre	Rushcliffe	47	115	2	8	79%	2%	19%
57	Landmere Lane, Edwalton	Rushcliffe	214	625	7	66	77%	3%	20%
Total			77,345	73,517	60,351	57,200	55%	12%	33%

5.2.2 In summary, an additional **60,352** person trips are made in the AM peak and an additional **57,200** person trips are made in the PM peak between the Reference Case and with Strategic Plan scenario, split 55% on highway modes, 12% on public transport modes and 33% on active modes overall, which can be summarised by Local Authority as shown in Table 13.

Table 13. Summary of Development Trips (People) by Local Authority

AUTHORITY	STRATEGIC PLAN SCENARIO TRIPS		ADDITIONAL TRIPS		MODE SHARE (STRATEGIC PLAN SCENARIO)		
	AM	PM	AM	PM	HW	PT	ACTIVE
Broxtowe	6,354	5,961	5,259	4,941	79%	11%	10%
Gedling	9,367	8,886	7,093	6,789	82%	8%	10%
Nottingham City	44,394	40,763	33,777	31,090	34%	16%	50%
Rushcliffe	17,229	17,910	14,223	14,380	83%	5%	12%
Total	77,344	73,520	60,352	57,200	55%	12%	33%

5.2.3 Considering highway and public transport modes, which are modes explicitly modelled by the EMGM, the number of total person trips in the EMGM increases by 6% between the Reference Case and the Strategic Plan scenario, which is made up predominantly of additional GNSP development trips (circa. 90% of growth) but also from an increase in background traffic (circa. 10% of growth) between 2023-2041 between the Reference Case and the Strategic Plan scenario in the GNSP area.

5.2.4 Accounting for vehicle occupancy and mode share, there are an additional **16,113** vehicle trips modelled in the AM peak and an additional **15,434** vehicle trips modelled in the PM peak overall.

6. STRATEGIC PLAN TRANSPORT IMPACTS

6.1 Development Trip Distribution

- 6.1.1 Figure 10 and Figure 11 show the distribution of GNSP development traffic across the network in the AM and PM peaks, respectively.
- 6.1.2 In the AM and PM peak, significant levels of development trips utilise the SRN, especially the A46, A52, A453 and M1 on routes to and from the GNSP area. M1 Junctions 24 through to 27 are used by development traffic depending upon where in the GNSP area the trip originates or is destined. On the local road network, many development trips utilise the A52 and A6514 to travel around Nottingham in both peaks, having headed in/out of Nottingham City on a variety of radial routes, including but not limited to in the AM peak the A606, A60, A612, A6005, A6200, A609, A610 and A6130. Nearby to the A453, development trips route via local roads in and around Gotham in order to access the A453 at junctions less congested than those within Clifton and around the Clifton South (Fairham Pastures) development.

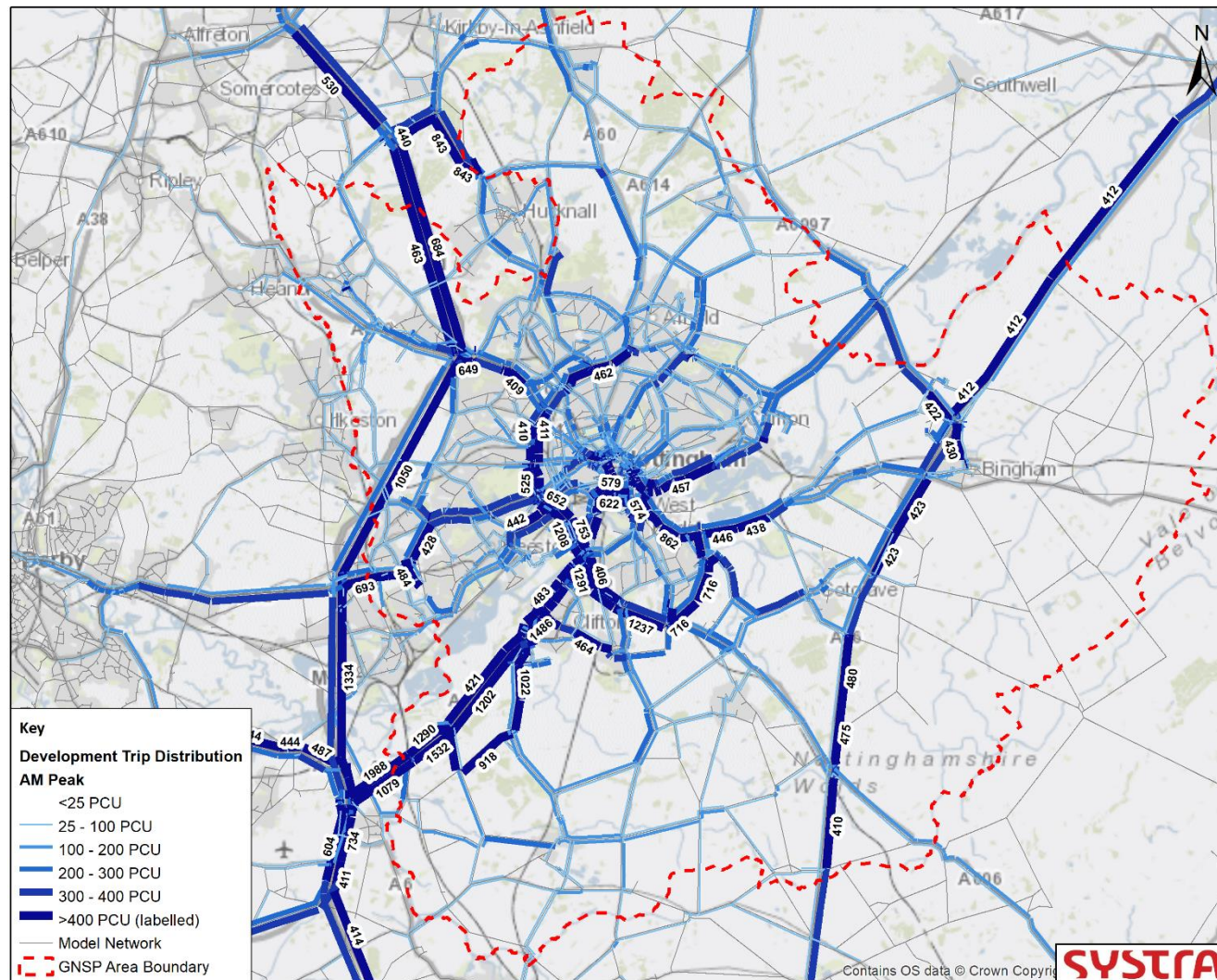


Figure 10. Development Trip Distribution – AM Peak

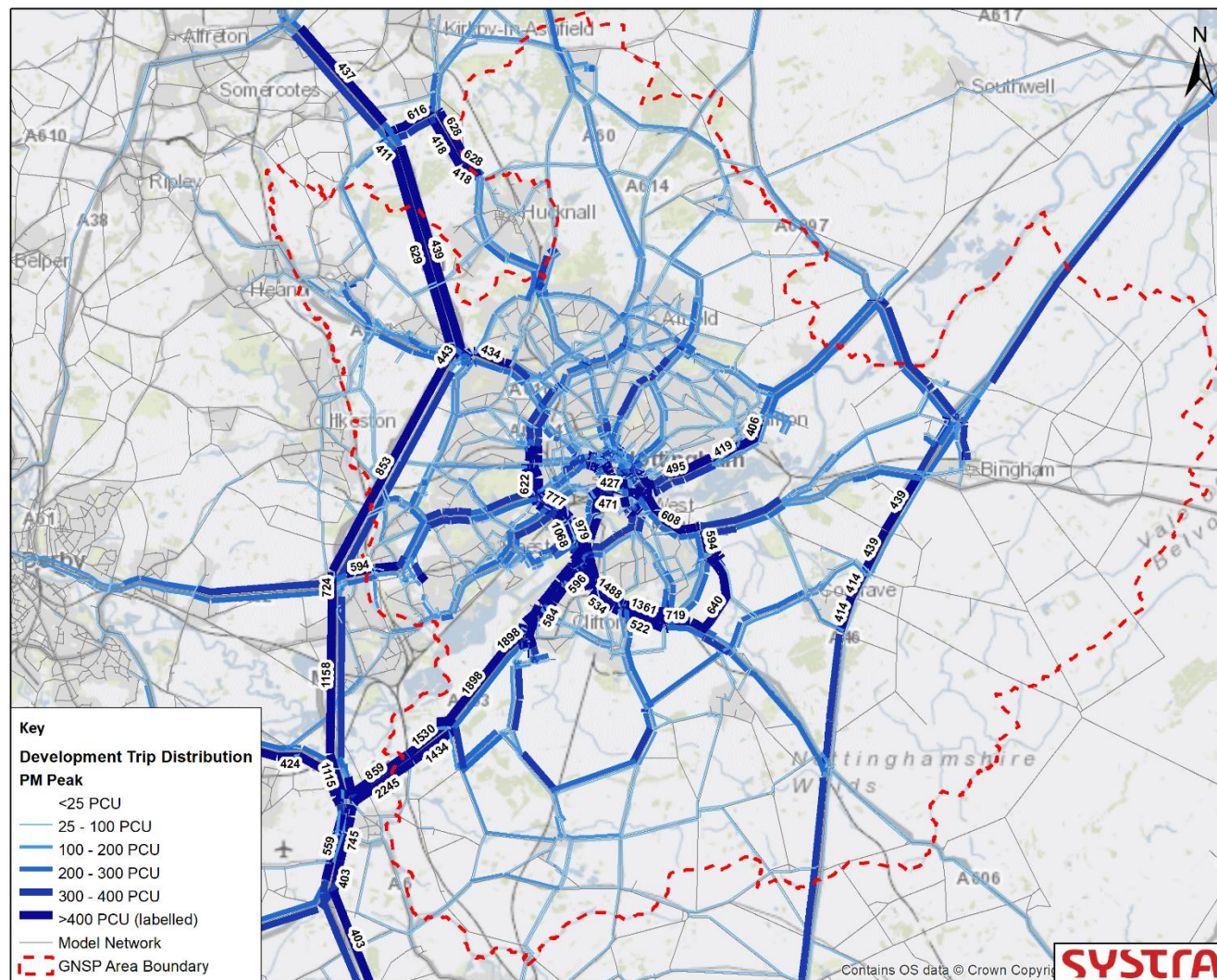


Figure 11. Development Trip Distribution – PM Peak

6.2 Highway Flow Change

- 6.2.1 Highway flow change on the network is a function of traffic directly generated by the GNSP developments and traffic which is reassigned as a consequence of the additional development traffic being present in the network in the Strategic Plan scenario.
- 6.2.2 Figure 12 and Figure 13 show highway flow change compared to the Reference Case. Red links represent roads which experience a net increase in traffic, whilst green links represent roads which experience a reduction in traffic.
- 6.2.3 Highway flow change is broadly similar in both peaks, with there being increases in highway flows as a result of the additional GNSP development. There is some reassignment of existing traffic, particularly in the west of Nottingham around Toton due to the addition of the development traffic in this area. There is also localised reassignment in Rushcliffe on the A453, partly as a result of an increase in congestion and highway flow at A453 junctions near the Clifton South and Ratcliffe on Soar Power Station sites which causes a flow decrease on the A453 due to reassignment from congestion (in the PM peak predominately).
- 6.2.4 There are decreases in highway flow on the M1 around Junction 24 in the AM peak. This is due to increased volumes of traffic in the Strategic Plan scenario utilising the M1 to access the A453 at Junction 24, which increases congestion and the volume of queued flow in the model on the M1 around Junction 24. This reduces the volume of traffic that is able to pass freely along the M1 south of Junction 24, since queued flow and congestion increases, whilst demand flow does not change.

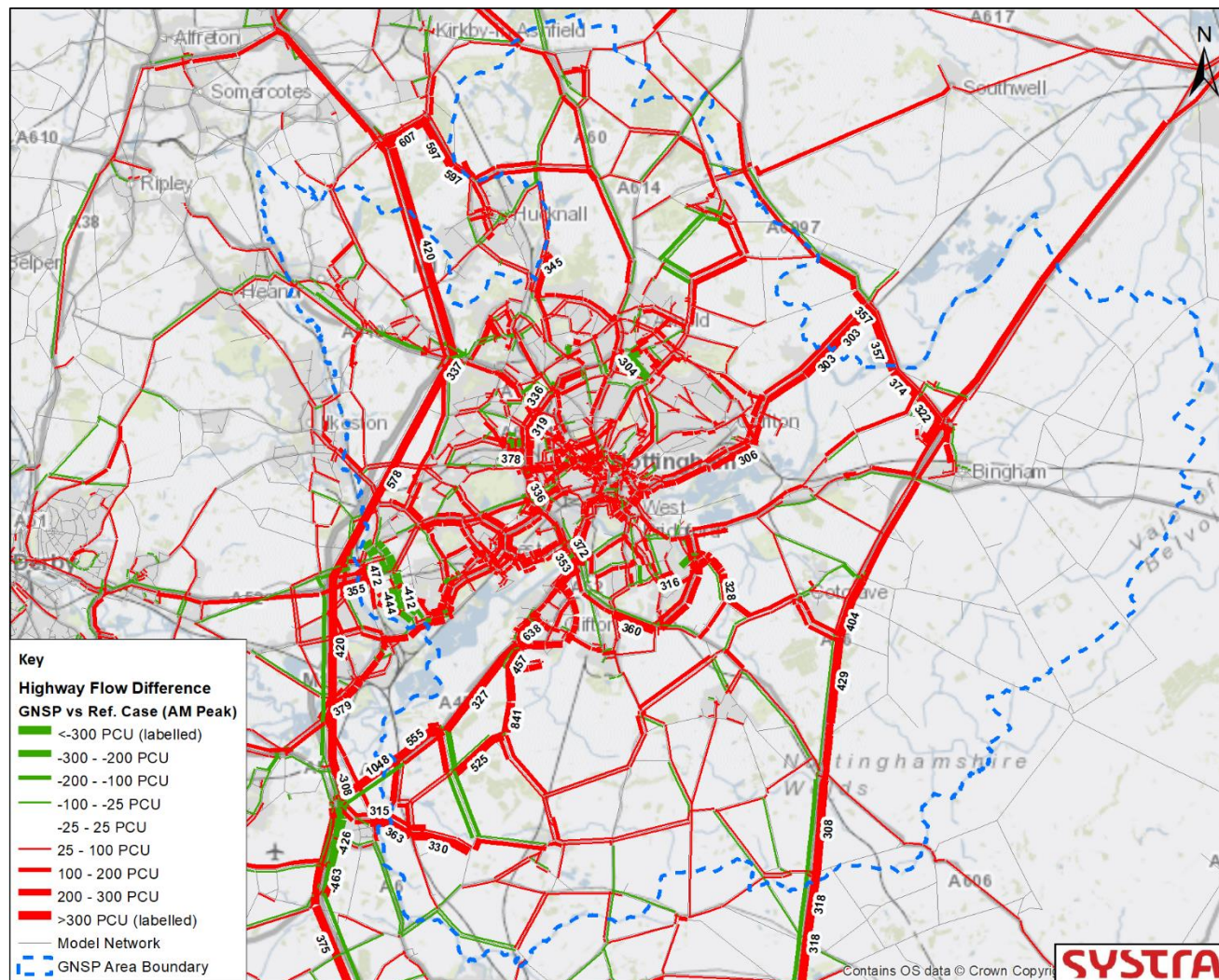


Figure 12. Highway Flow Difference – AM Peak

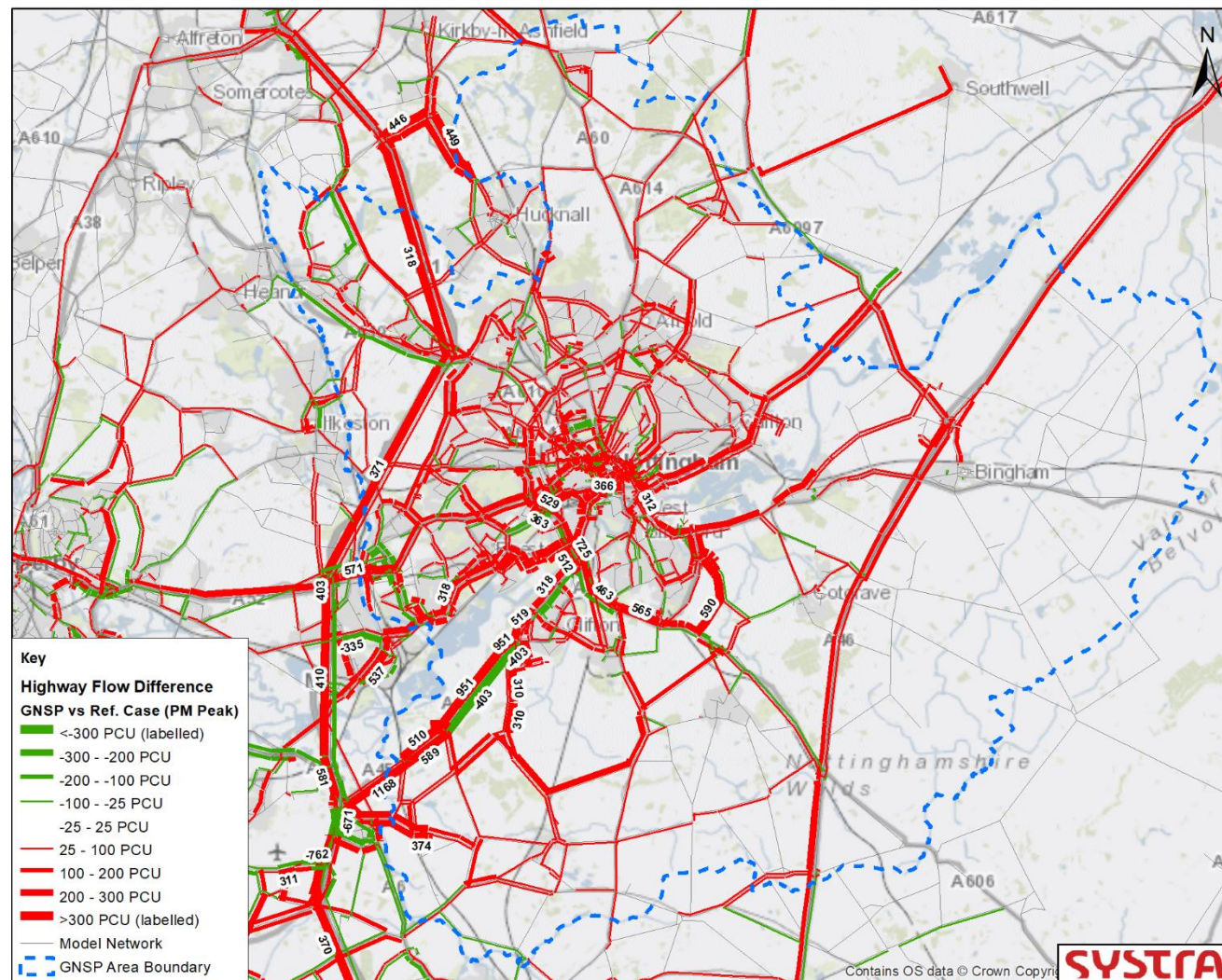


Figure 13. Highway Flow Difference – PM Peak

6.3 Junction Congestion

- 6.3.1 Junction congestion is measured by determining the ratio of the volume (V) of traffic to the capacity (C) that can be accommodated by a junction. A Volume to Capacity (V/C) of 85% is considered to be the threshold at which a junction is approaching its operational capacity, therefore increasing the likelihood of operational problems, including congestion, with associated delays and queues. A V/C of $\geq 100\%$ indicates that a junction is operating above its theoretical maximum capacity, with substantial congestion, queuing and delays.
- 6.3.2 Figure 14 and Figure 15 show the change in congestion as a result of additional development traffic at junctions which are forecast to have a V/C ratio of $>85\%$ in either the Reference Case or the Strategic Plan scenario. The change in congestion is shown relative to congestion in the Reference Case.
- 6.3.3 Junction congestion in the Strategic Plan scenario is shown in Figure 16 and Figure 17.
- 6.3.4 Appendix C details the change in congestion at each junction, where between the Reference Case and the Strategic Plan scenario the V/C increases by $\geq 10\%$ at congested junctions.
- 6.3.5 On much of the SRN, there is generally an increase in junction congestion. There is however some reduction in V/C at A52 Bardhills Roundabout due to the additional capacity provided by the Toton Link Road infrastructure. The A453 also shows an increase in congestion of $>10\%$ at M1 J24 and junctions through Clifton. Further north on the M1, V/C decreases by $>15\%$ at J26 in the AM peak, whereas in the PM peak V/C increases by $>15\%$ as a result. However, in both peaks, the J26 remains congested in the Strategic Plan scenario.
- 6.3.6 Within Nottingham there are a significant number of junctions that exhibit an increase in congestion. In most cases however, this congestion increase is focussed on strategic corridors such as the A52, A60, A610, A612, A6008 and A6011 where most of additional development traffic routes, as well as in the City Centre itself, where many junctions were already congested in the Reference Case before any additional development is added.

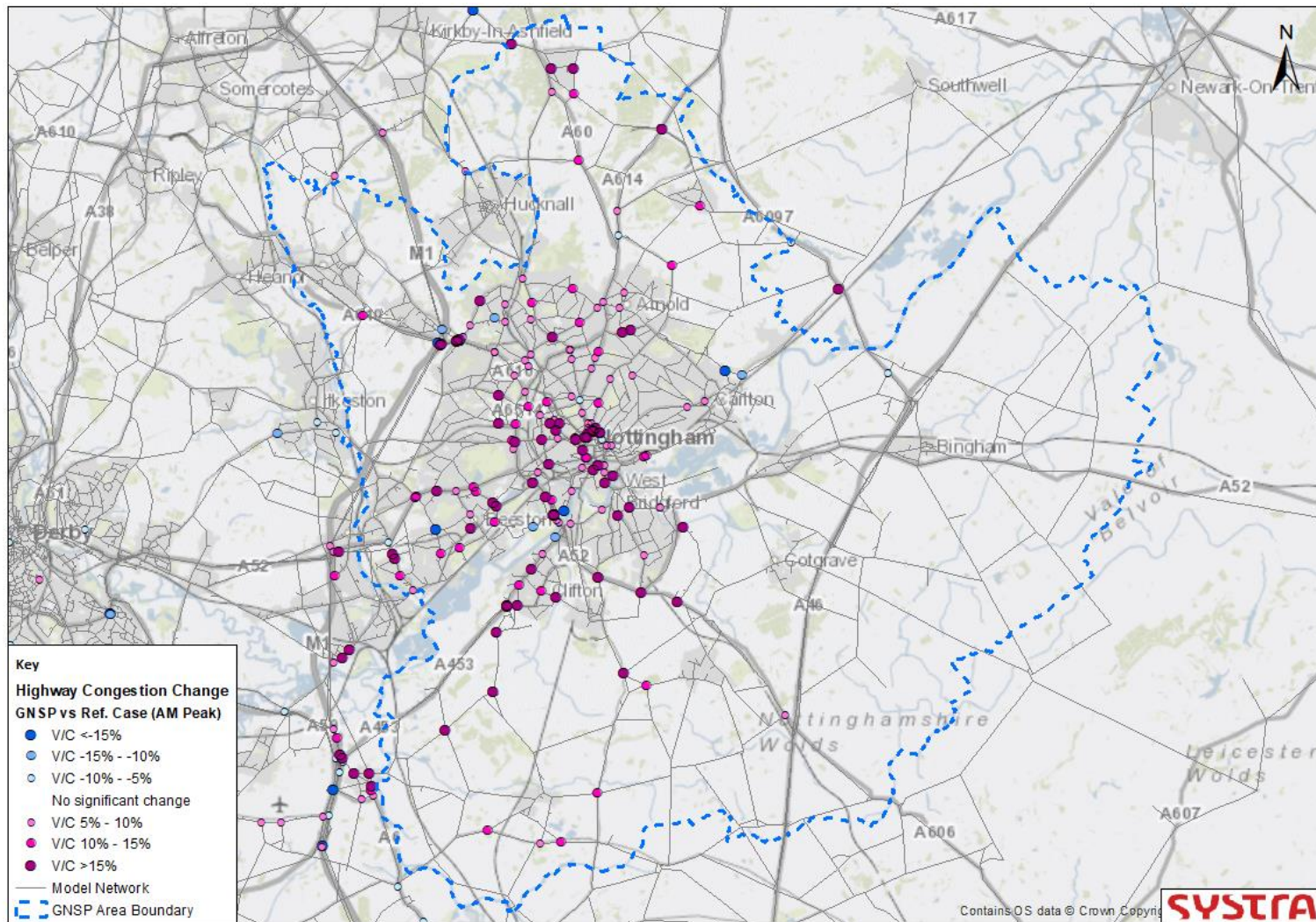


Figure 14. Junction Congestion Difference – AM Peak

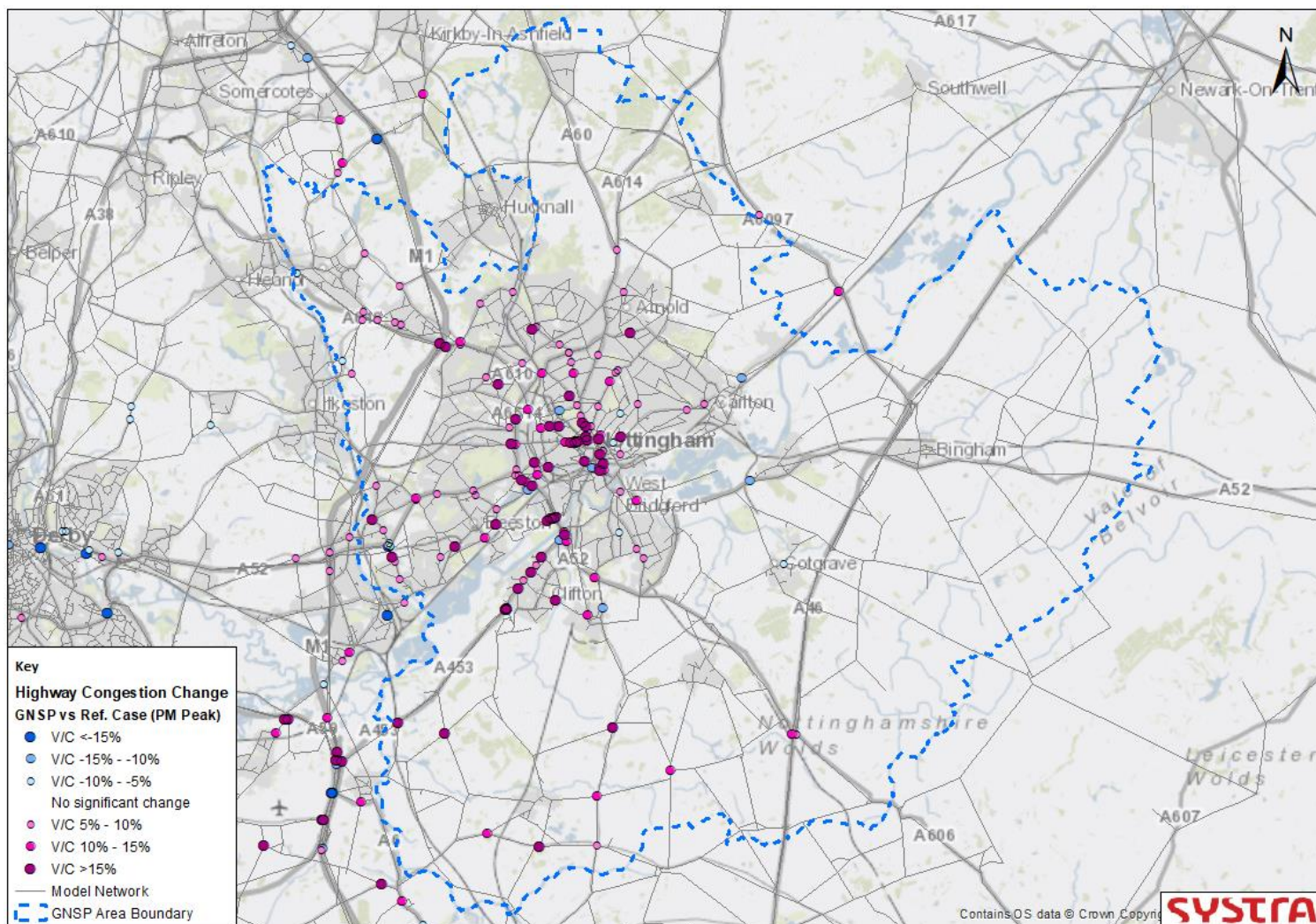


Figure 15. Junction Congestion Difference – PM Peak

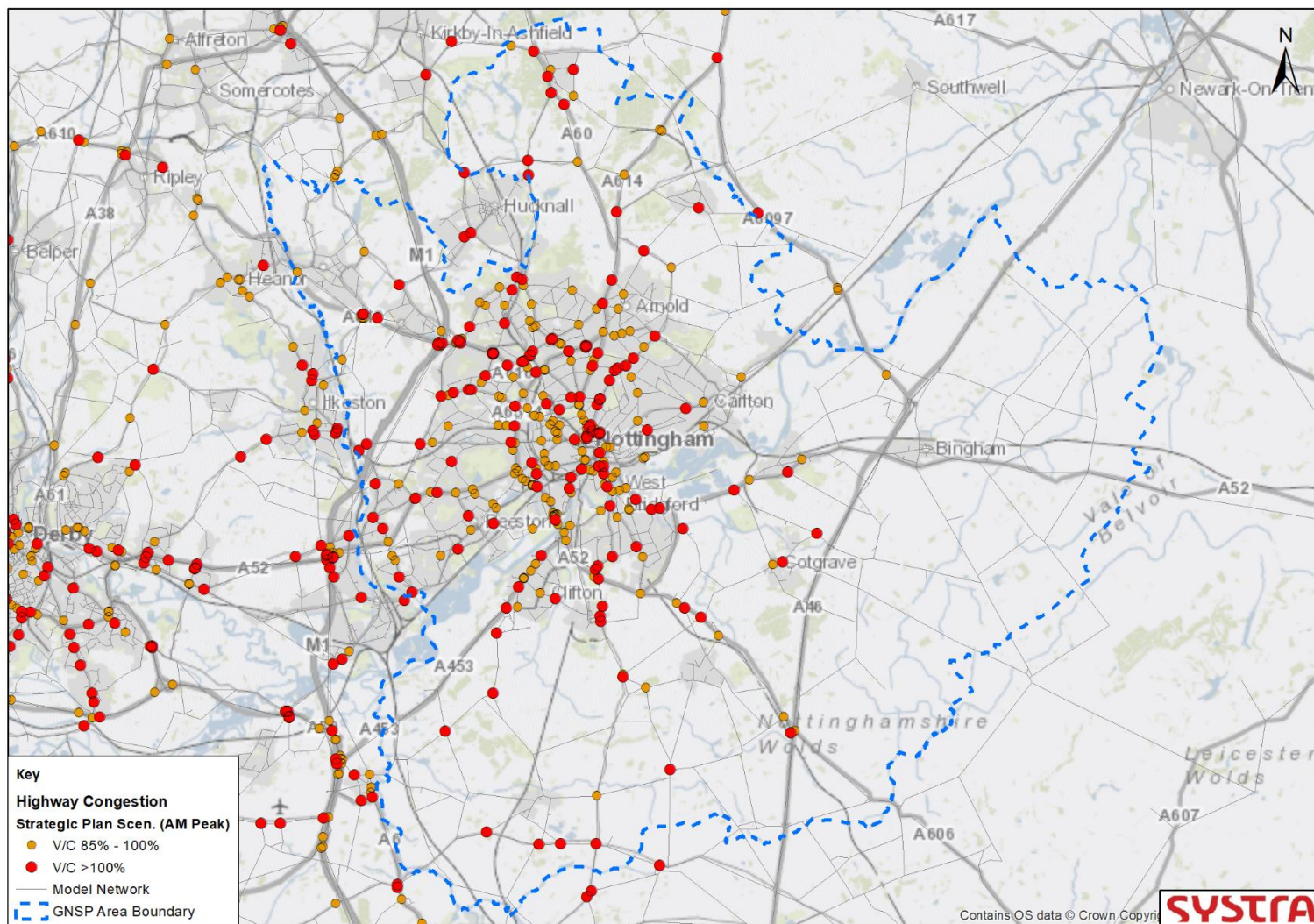


Figure 16. Strategic Plan Scenario Congestion – AM Peak

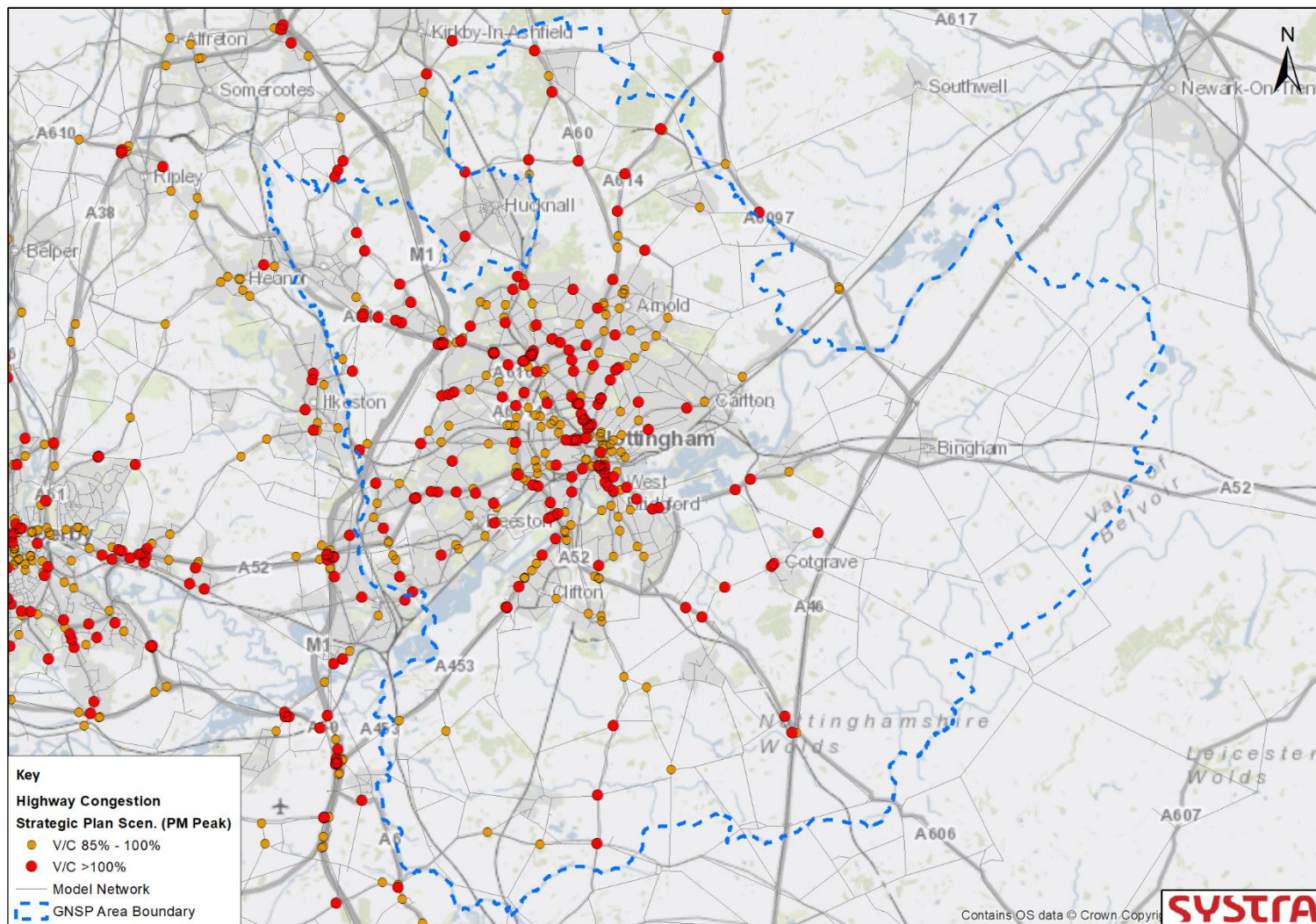


Figure 17. Strategic Plan Scenario Congestion – PM Peak

6.4 Network Statistics

- 6.4.1 Network statistics provide a way of gauging the overall impact from the addition of trips associated with the development sites. An explanation of the key indicators is as follows:
- **Congestion / Over Capacity Queues** – reflect the change in overall congestion and is the time spent queuing at junctions that are over capacity. As traffic levels increase, a growing number of junctions reach capacity and the time spent queuing at junctions can increase;
 - **Total Travel Time** – across the highway network in PCU hours;
 - **Total Travel Distance** – across the highway network in PCU kilometres; and
 - **Average Speed** – expressed as kilometres per hour, averaged for all traffic. Increased traffic levels lead to greater delays, potentially resulting in a lower average travel speed.
- 6.4.2 To focus network statistical analysis, an Area of Interest (AOI) has been defined by comparing the Reference Case against the Strategic Plan scenario to ascertain the area where the impacts of the additional development are most pronounced. The extent of the AOI is shown in Figure 18. The AOI incorporates all of the junctions identified as exhibiting a change in V/C of >10% and extends therefore slightly beyond the GNSP area boundary.

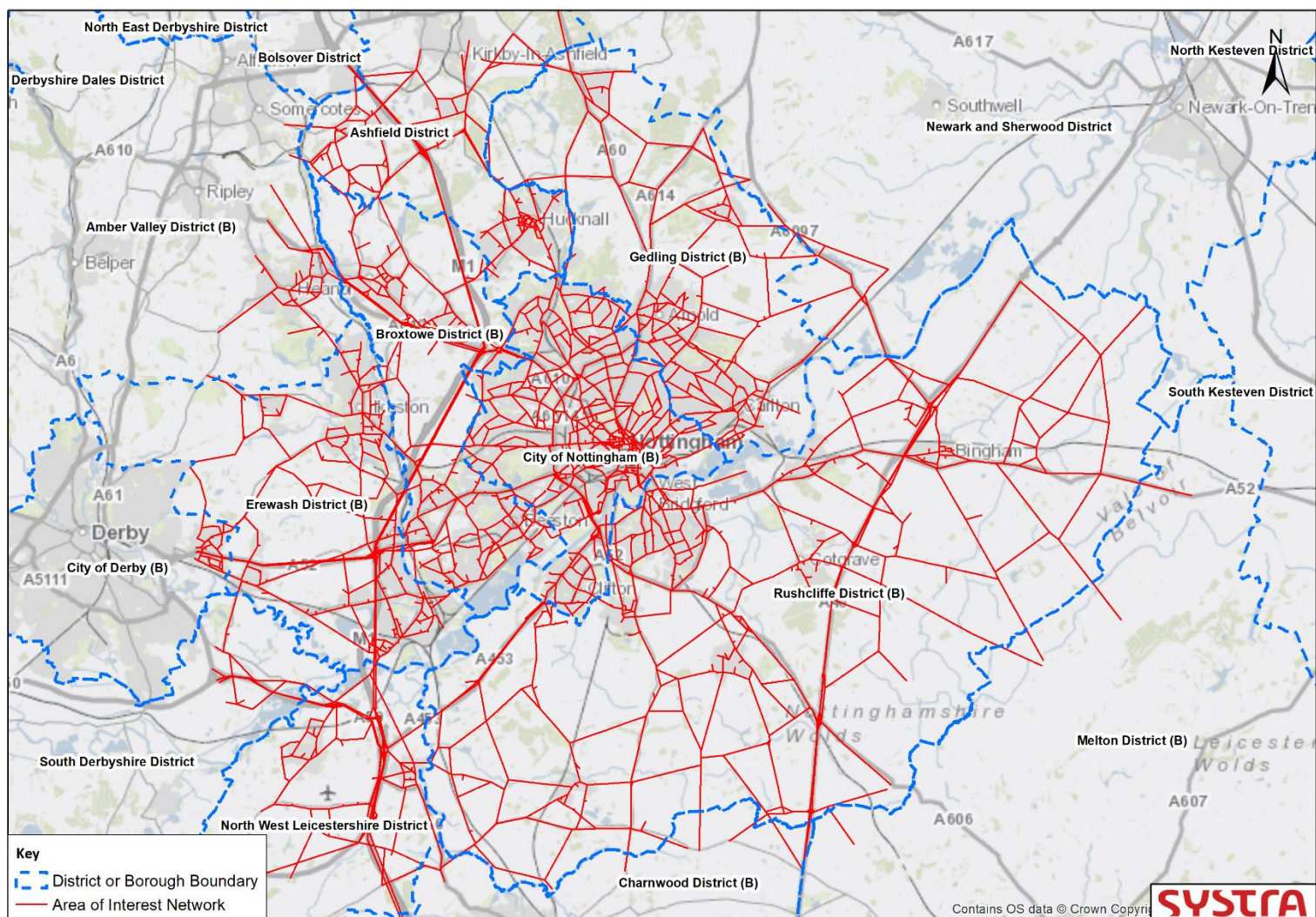


Figure 18. Area of Interest

6.4.3 Network statistics for the AOI are provided in Table 14 and Table 15.

Table 14. Network Statistics – AM Peak

INDICATOR	REFERENCE CASE	STRATEGIC PLAN	CHANGE (%)
Overcapacity Queues (PCU hrs) / Congestion	2,132	4,170	96%
Total Travel Time (PCU hrs)	49,886	57,172	15%
Total Travel Distance (PCU kms)	1,991,599	2,113,981	6%
Average Speed km/hr	40	37	-7%

Table 15. Network Statistics – PM Peak

INDICATOR	REFERENCE CASE	STRATEGIC PLAN	CHANGE (%)
Overcapacity Queues (PCU hrs) / Congestion	2,801	4,464	59%
Total Travel Time (PCU hrs)	50,793	57,422	13%
Total Travel Distance (PCU kms)	1,995,519	2,112,284	6%
Average Speed km/hr	39	37	-6%

6.4.4 In both peaks, there is a significant increase in congestion in the AOI (denoted by the overcapacity queues statistic) between the two scenarios, which accompany increases in total travel time and total travel distance. Congestion almost doubles in the AM peak and by 59% in the PM peak. The resultant effect is average speeds reduce due to increased congestion.

7. STRATEGIC PLAN MITIGATION PROPOSALS

7.1 Introduction

- 7.1.1 This chapter sets out the modelling results of the proposed transport mitigation strategy to support the delivery of growth identified in the Greater Nottingham Strategic Plan to 2041. The mitigation measures were developed by Arup in consultation with the commissioning authorities of Broxtowe, Gedling, Nottingham City and Rushcliffe, together with Derbyshire and Nottinghamshire County Councils and with input from East Midlands Development Corporation (EMDC).

7.2 Proposed Walking and Cycling Measures

Compact and Connected Neighbourhoods

- 7.2.1 Developments located within 500-800m walking distance of an existing district centre, or those proposed to deliver more than 1,000 dwellings and will therefore be capable of supporting everyday services and facilities, will be expected to embed connected neighbourhood principles. Sites designed to incorporate attractive, safe and walkable routes which connect residents to the destinations and services they need, have the potential to achieve a walking mode share of up to 30%. The EMGM's trip rates in the with mitigation scenario have been reduced for commuting and leisure/retail purposes to reflect the provision of new compact and connected neighbourhoods in the GNSP area.

Orbital Cycling Corridors and Active Travel Connections

- 7.2.2 A new cycle superhighway along the A6005 between Beeston and Long Eaton, a new South-West cycle route connecting Wilford and West Bridgford with the Queens Medical Centre, Wollaton Park, University Park and the Jubilee Campus via Clifton Boulevard and a new East-West route adjacent to the A52 running between the M1 in the west and Bingham in the east via the city centre are proposed. All three new cycle routes will provide attractive alternatives for local journeys along congested corridors and will encourage modal shift for orbital journeys. It has been estimated that they could achieve a 15% cycle mode share for short journeys (those up to 8 kilometres or 5 miles) with an origin or destination within 1km of the cycle corridors. This assumption has been reflected in the modelling by shifting appropriate short distance trips from highway to active travel modes in the vicinity of the cycle corridors.
- 7.2.3 All the proposed GNSP sites will be encouraged to be connected to existing and proposed walking and cycling routes, ensuring integration with wider strategic active travel routes. To support this ambition, new walking and cycling measures are proposed, for example, around Cinderhill and via improved public realm on London Road. The ambition is to achieve a cycle mode share of 10% for all trips in line with Nottinghamshire's Cycling Strategy Delivery Plan.

Micro-mobility Trials

- 7.2.4 Although it is not possible to reflect this in the model, at large development locations such as Ratcliffe-on-Soar Power Station, on-site shared bike or electric scooter services could be introduced. This would encourage car-free travel within developments and encourage people to not use private vehicles when accessing NET and rail stations. It has been estimated that this could achieve a 5% cycle/micro-mobility mode share from urban development sites.

‘Wheel and Ride’ Facilities

- 7.2.5 Although it is not possible to reflect this in the model, to encourage greater utilisation of public transport and reduce short car journeys to stations, ‘wheel and ride’ facilities could be installed at trial locations, for example, Clifton Centre, Wilford Lane, Beeston Centre, Bramcote Lane, Highbury Vale or Moor Bridge. These would be locations with enhanced cycle storage, cycle hire schemes and micro mobility such as e-scooters. It has been estimated that this could achieve a 3% reduction in car use for journeys within 0-5km of such locations.

7.3 Proposed Public Transport (Bus, Tram and Rail) Measures

- 7.3.1 Building on the existing schemes and priorities set out within the Bus Service Improvement Plan (BSIP) and safeguarded public transport routes in the city region, the following section sets out the public transport mitigation measures. The EMGM has assessed the potential passenger uptake of these interventions, as reported later.

Increased Bus Service Frequencies

- 7.3.2 Bus frequencies on routes close to GNSP developments are to be increased to make bus a more attractive mode. Four buses per hour on the following routes: Rushcliffe Villager and bus service numbers 9, 26, 33, 50, 141, which are all routes close to GNSP developments have received these frequency enhancements.

7.3.3 Bus Extensions and Diversions

- 7.3.4 To serve the development sites, a number of services have been extended or diverted in specific locations. The nature of these improvements would need to be discussed and agreed with operators and the local highway authority at subsequent planning stages. Areas where potential extended or diverted routes have been included in this assessment include:

- East of Gamston
- Gedling Colliery;
- Ravenshead;
- Waterside;
- RAF Newton Site;
- Teal Close (Victoria Retail Park);
- Toton, aligning with the Toton strategic development site;
- Chetwynd Barracks and
- Ratcliffe on Soar Power Station.

- 7.3.5 In addition, a new limited stop bus service to serve the A52, Gamston Park & Ride, and Radcliffe-on-Trent and Saxondale has been included.

- 7.3.6 Those proposed have been identified due to being either prioritised by local stakeholders or by serving development of a sufficient size (600 dwellings or greater).

Bus Service Improvement Plan (BSIP) Proposals

- 7.3.7 The infrastructure associated with the latest Bus Service Improvement Plan (BSIP) for Nottingham has been reflected in the with mitigation modelling, including bus priority associated with Leapool Park and Ride, specifically new bus lanes on the A60 from the Leapool petrol filling station to Arch Hill, from Appledorne Way to Cross Street and an inbound bus lane on Oxclose Lane.

Nottingham Express Transit (NET) Extensions and Improvements

- 7.3.8 Extensions or new stops on the NET network are also proposed in the following locations:
- Northern extension north of Hucknall to the Top of Wighay Farm development;
 - Eastern extension towards Gedling with a spur off to the proposed Gamston P&R and Gamston development site;
 - Southern extension from Clifton to the Fairham Pastures development;
 - Western extension from the current terminus at Toton Lane to the site of the proposed Toton rail station (rail station not modelled) and the proposed Toton development site;
 - New NET station at Broadmarsh in the City Centre, with a direct pedestrian link to the bus station and the Broadmarsh development site.

Park and Ride Sites

- 7.3.9 The following two locations have been identified as potential for Park and Ride (P&R) locations for either bus or NET services. These sites are designed to relieve congestion on the major arterial routes into the city.
- A new NET P&R near Gamston, accessed from the A52 / Radcliffe Road three arm roundabout;
 - A new bus P&R at Leapool west of A60, at the roundabout with A614 Ollerton Road.

Improvement to National Rail Services and Access

- 7.3.10 The ability of this Plan to implement large scale changes to the rail network in the region is limited. However, the following measures are suggested to increase speed and access to the rail network and to offer new journey opportunities:
- Creation of better transport interchanges at existing stations with improvements to active travel routes, bus interchange and parking facilities (including wheel and ride). Priority locations for these interventions include Attenborough, Netherfield and Carlton (not modelled);
 - Upgrade of the Maid Marian Line to facilitate passenger services between Mansfield and Derby/Leicester;
 - Extension of the Robin Hood Line to Ollerton;
 - Line speed improvements on the Castle Line to Newark;
 - Additional services provision on the Poacher Line to Grantham.

7.4 Proposed Highway Measures

- 7.4.1 The following highways schemes are proposed in order to meet the demand arising from the GNSP development growth. These locations have been identified due to experiencing the greatest increases in traffic demand at junctions which are already at or close to capacity and in some cases, such as the A453, due to traffic displacement onto less suitable alternative routes.

Toton Link Road (with a link to the Chetwynd Development)

- 7.4.2 The Toton Link Road is a proposed scheme which provides access to an area of residential development to the south-east of Bardills roundabout along the A52. The high level design of the link road joins the A52 approximately 450m to the east of Bardills via a signalised junction and is a single carriageway which continues south across the NET alignment and connects to Stapleford Lane and the Chetwynd development site. The alignment of the link road is designed to provide access to a proposed development site, whilst also enabling access to the future redevelopment of the Chetwynd Barracks site and reducing pressure on Bardills roundabout itself by removing a proportion of through traffic. The proposed design of the link road enables the provision of public transport infrastructure, including bus priority or other sustainable modes.

A453 Corridor (Clifton)

- 7.4.3 The EMGM has highlighted that, without mitigation, the A453 corridor throughout Clifton is currently subject to delays at peak periods, with increased congestion expected as a result of ongoing development and background traffic growth. Improvements are proposed to two junctions in this area which are conditioned to the consented Clifton South Sustainable Urban Extension (SUE) development. These improvements are limited to relatively localised carriageway widening in the vicinity of the junctions.
- 7.4.4 Modelled improvements to the various junctions in the with mitigation scenario along the corridor are:
- Widening to the north-eastbound and south-westbound A453 approaches to Crusader roundabout to provide a third entry lane on both arms (as per the Clifton South SUE scheme). It would not be possible to provide significant further improvements to this junction within the highway boundary, over and above what is proposed as part of the Clifton South SUE scheme;
 - Realignment of both A453 approaches to the A453 / Green Lane junction, to provide a three through-lanes in both directions (albeit recognising that the lengths of three to two-lane merges would be substandard, if working within the existing highway boundary);
 - Widening and realignment of the north-eastbound A453 approach to Farnborough Road roundabout to provide an additional through lane. Similar widening on the south-westbound approach to the roundabout would not be possible without removing the existing bus lane which passes through the junction. This would potentially have a detrimental effect on bus provision unless the capacity improvements provided a significant benefit to general traffic.

M1 Junction 24

- 7.4.5 M1 Junction 24 is a severely congested junction of the strategic highway network, which has been subject to numerous improvements over recent years, including reconfiguration of the A50 connection at the nearby Junction 24a. There are a number of key and conflicting traffic flows which pass through J24, with the existing bridge deck widths representing a constraint to further mitigation. Whilst additional minor improvements to capacity could be provided through localised widening and realignment of arms on the approaches to the junction, a larger-scale mitigation measures is required to deliver significant benefits to capacity and delay.
- 7.4.6 It has been agreed with National Highways to model an indicative capacity enhancement at this location to represent an upgrade in the capacity at the junction, without specifying a likely scheme. The modelled scheme with enhanced capacity includes:
- Widening of both M1 overbridges to five lanes;
 - A453 southern access widened to four lanes;
 - A direct link between M1 northbound off-slip and A50;
 - M1 southbound off-slip widened to five lanes (three left turn to A453 and two lanes onto the circulatory carriageway), and
 - Widening of the M1 northbound off-slip to five lanes.

A52 Corridor (north of West Bridgford)

- 7.4.7 The A52 to the north of West Bridgford is a dual-carriageway that links with the city centre and provides an onward link to the A46 in the east. Many of the junctions along this route are congested at peak periods, although it is understood that an improvement scheme is proposed at the A52 / A606 Melton Road junction.
- 7.4.8 Opportunities for improvement are limited at junctions closer to the city centre, due to the grade-separated nature of many of the existing junction designs, and the proximity of third-party land boundaries. Modelled localised improvements are:
- Widening of the A52 off-slips at the A52 Clifton Boulevard / Queens Drive junction, to provide additional capacity, and
 - Signalisation of the A52 Clifton Boulevard / Abbey Street roundabout, to help provide bus priority on key approaches.

A606 Corridor Improvements

- 7.4.9 On the back of junction modelling undertaken for the A606 corridor as part of the A52 Larger Junctions scheme an intervention along the A606 corridor has been identified. Three improvement schemes on the A606 corridor have been modelled in the with mitigation scenario using plans provided by NCC, specifically at the junctions of the A606 with:
- Tollerton Lane
 - Main Road
 - Cotgrave Road

7.5 Summary of Mitigation Measures

- 7.5.1 Where transport solutions are required, the strategy has focussed on measures which facilitate a high walking, cycling and public transport mode share with car focussed highway

capacity interventions only proposed in locations where modal alternatives are either not viable or unable to accommodate the levels of modal shift away from the private car which are required.

7.5.2 Figure 19 is a schematic summary of the modelled mitigation schemes.

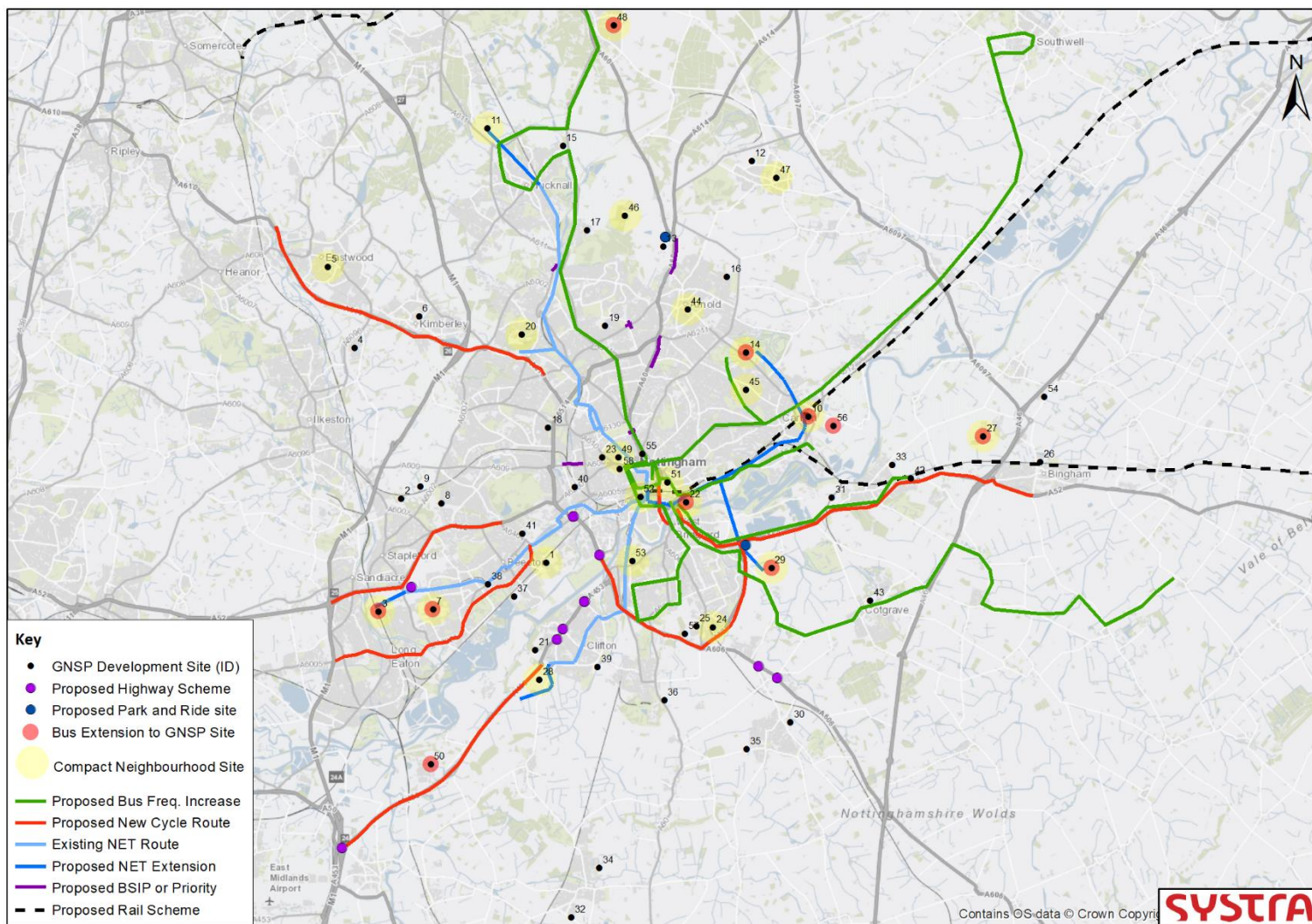


Figure 19. Schematic Summary of Modelled Mitigation Schemes

8. STRATEGIC PLAN MITIGATION ANALYSIS

8.1 Introduction

8.1.1 The proposed public transport and active mode mitigation schemes detailed in the previous chapter have been modelled along with the GNSP developments. The results of the with mitigation scenario have been compared to the scenario with the GNSP developments only to identify the impacts of the mitigation schemes on addressing the highway impacts of the development sites.

8.1.2 Analysis has been undertaken of the following impacts:

- Mode share and change in number of trips;
- Highway flow change;
- Junction congestion change (expressed as change in Volume/Capacity ratio);
- Network statistics (key performance indicators), and
- Public transport patronage change (usage of new public transport services).

8.2 Change in Trips and Mode Share

8.2.1 Table 16 shows the change in the number of person trips made to and from each development site and the change in mode share in the Strategic Plan scenario with the mitigation measures included compared to the Strategic Plan scenario without the mitigation measures.

Table 16. Change in Trips (People) and Mode Share

ID	DEVELOPMENT	AUTHORITY	CHANGE IN TRIPS		CHANGE IN MODE SHARE		
			AM	PM	HW	PT	ACTIVE
1	Boots Site	Broxtowe	-49	-47	-12%	1%	11%
2	Field Farm	Broxtowe	0	0	-8%	0%	8%
3	Toton Strategic Location for Growth	Broxtowe	-252	-228	-11%	4%	7%
4	Land west of Awsworth	Broxtowe	0	0	-7%	0%	7%
5	Eastwood	Broxtowe	-126	-110	-4%	0%	4%
6	Kimberley	Broxtowe	0	0	-6%	0%	6%
7	Chetwynd Barracks	Broxtowe	-188	-177	-5%	0%	5%
8	Land Adjacent to Bramcote Crematorium	Broxtowe	0	0	-11%	0%	11%
9	East of Coventry Lane	Broxtowe	0	0	-7%	0%	7%
37	Beeston Business Park, Technology Drive, Beeston	Broxtowe	0	0	-11%	0%	11%

ID	DEVELOPMENT	AUTHORITY	CHANGE IN TRIPS		CHANGE IN MODE SHARE		
			AM	PM	HW	PT	ACTIVE
38	Bartons land between High Road & Queens Road West	Broxtowe	0	0	-12%	0%	12%
10	Teal Close	Gedling	-97	-96	-2%	2%	0%
11	Top Wighay Farm	Gedling	-366	-327	-5%	4%	0%
12	H16 Park Road, Calverton	Gedling	0	0	0%	0%	0%
13	Land West of A60 Redhill	Gedling	0	0	0%	0%	0%
14	Gedling Colliery	Gedling	-118	-110	-2%	2%	0%
15	North of Papplewick Lane	Gedling	0	0	-1%	1%	0%
16	Mapperley Plains and Killisick Lane	Gedling	0	0	0%	0%	0%
17	Bestwood Business Park	Gedling	0	0	-1%	1%	0%
44	Arnold (non-allocated)	Gedling	-110	-101	0%	0%	0%
45	Carlton (non-allocated)	Gedling	-152	-144	1%	0%	-1%
46	Bestwood (non-allocated)	Gedling	-70	-62	-3%	1%	2%
47	Calverton (non-allocated)	Gedling	-76	-67	-2%	0%	2%
48	Ravenshead (non-allocated)	Gedling	-77	-67	-2%	1%	2%
56	Teal Close, ALDI & Local Centre	Gedling	0	35	-8%	8%	0%
1	Boots Site	Nottingham	-60	-54	-11%	1%	10%
18	Chalfont Drive	Nottingham	0	0	0%	0%	0%
19	Former Padstow School Site Gainsford Crescent	Nottingham	0	0	0%	0%	0%
20	Stanton Tip	Nottingham	-65	-58	-9%	2%	7%
21	Clifton West	Nottingham	2	1	-10%	1%	9%
22	Waterside	Nottingham	-311	-284	-11%	4%	8%
23	Alfreton Road - Forest Mill	Nottingham	0	0	0%	0%	0%
39	Farnborough Road - Former Fairham Comprehensive	Nottingham	1	0	-11%	0%	11%

ID	DEVELOPMENT	AUTHORITY	CHANGE IN TRIPS		CHANGE IN MODE SHARE		
			AM	PM	HW	PT	ACTIVE
40	406/408 Derby Road and Northern Dairies LTD	Nottingham	0	0	0%	0%	0%
41	Western Village, University of Nottingham Campus	Nottingham	0	0	-14%	0%	14%
49	Nottingham City Centre flats	Nottingham	-5,443	-4,862	-9%	-1%	10%
51	Canal Quarter - Island Site	Nottingham	-162	-498	0%	0%	0%
52	Phase 1 Unity Square	Nottingham	0	1	-9%	3%	7%
55	Victoria Centre Huntingdon St	Nottingham	0	0	-25%	10%	15%
58	Nottingham City Centre offices	Nottingham	-1	-1	-7%	0%	7%
24	East and West of Melton Road, Edwalton	Rushcliffe	-225	-217	-6%	1%	5%
26	E. & W. Chapel Lane, Bingham	Rushcliffe	-130	-118	-5%	1%	4%
27	RAF Newton	Rushcliffe	-67	-61	-6%	0%	5%
28	Clifton South	Rushcliffe	-563	-570	-11%	5%	6%
29	E. of Gamston N. of Tollerton	Rushcliffe	-372	-362	-11%	8%	3%
30	Between Platt Lane and Station Road, Keyworth	Rushcliffe	0	0	0%	0%	0%
31	Land North of Nottingham Road/The Paddocks	Rushcliffe	0	0	-10%	1%	9%
32	Land at Rempstone Road N.	Rushcliffe	1	1	0%	0%	0%
33	Shelford Rd/Grooms Cottage	Rushcliffe	1	0	-5%	0%	4%
34	Lantern Lane, E. Leake	Rushcliffe	1	1	0%	0%	0%
35	North of Bunny Lane	Rushcliffe	0	0	0%	0%	0%
36	East of L'borough Rd	Rushcliffe	0	0	0%	0%	0%
42	North of Grantham Road	Rushcliffe	0	0	-7%	1%	6%
43	Land R/O Mill Lane/the Old Park/S. of Hollygate Lane	Rushcliffe	0	0	-8%	8%	0%
50	Ratcliffe on Soar Power Sta.	Rushcliffe	4	-13	-5%	1%	4%

ID	DEVELOPMENT	AUTHORITY	CHANGE IN TRIPS		CHANGE IN MODE SHARE		
			AM	PM	HW	PT	ACTIVE
53	Wilford Lane West Bridgford	Rushcliffe	0	-16	-8%	1%	6%
54	E. Bridgford Garden Centre	Rushcliffe	0	0	0%	0%	0%
57	Landmere Lane, Edwalton	Rushcliffe	1	12	-8%	2%	5%
Total Change in Trips for GNSP Sites (People)			-9,062	-8,599			

8.2.2 In summary, **9,062** fewer person trips are made in the AM peak and **8,599** fewer person trips are made in the PM peak in the Strategic Plan scenario with the mitigation measures included. This is the result of increased accessibility to local facilities through the inclusion of retail, employment and leisure facilities within the larger development sites and improved access to these facilities already available within the city centre.

8.2.3 The majority of this reduction is seen in Nottingham City Centre, specifically at the flats (ID 49), where the mitigation measures are modelled to reduce the need for people to travel outside of the city, which when combined with a decrease in the proportion of highway mode share, has resulted in less congestion in Nottingham City Centre and across the GNSP area as a whole.

8.2.4 Across all the GNSP sites, on average there has been a **6% decrease** in the proportion of trips made by highway modes, a **2% increase** in public transport trips and a **4% increase** in trips made by active modes (walking and cycling). This combined with lower volumes of trip making as a result of connected and sustainable development has resulted in fewer highway trips and reduced highway congestion.

8.3 Highway Flow Change

8.3.1 Highway flow change on the network is a function of traffic directly generated by the GNSP developments and traffic which is reassigned as a consequence of the additional development traffic being present in the network in the Strategic Plan scenario.

8.3.2 Figure 20 and Figure 21 show highway flow change compared to the Strategic Plan scenario. Red links represent roads which experience a net increase in traffic, whilst green links represent roads which experience a reduction in traffic as a result of the mitigation measures being introduced.

8.3.3 Highway flow change is similar in both peaks, with there being a general decrease in highway flow across the GNSP area as a result of the mitigation measures.

8.3.4 In both peaks, there is a noticeable increase in traffic flow on the A453 corridor between M1 Junction 24 and Nottingham due to the capacity increase provided by the highway scheme at M1 Junction 24 and the highway schemes along the A453 corridor around Clifton which provide additional capacity along the corridor which attracts trips from less effective alternative routes due to the reductions in congestion along this corridor.

- 8.3.5 There is an increase in traffic flow on the A606 corridor in both peaks which is due to additional highway capacity provided by the mitigation schemes in the Tollerton and Gamston areas. This also includes public transport schemes such as the proposed NET Park and Ride site at Gamston, releasing highway capacity across the network.
- 8.3.6 On the M1, in both peaks, north of Junction 24, traffic flow reductions are predicted to occur because of less highway trip making in general on the local network associated with developing connected neighbourhoods which reduce the need for people to travel and consequently on the SRN and the relocation of traffic to the A453 from alternative routes into the city (e.g. the A52). South of M1 Junction 24, an increase in highway flow is modelled in the AM peak because of reduced congestion at M1 J24 which makes the corridor as a whole more attractive to longer distant movements.

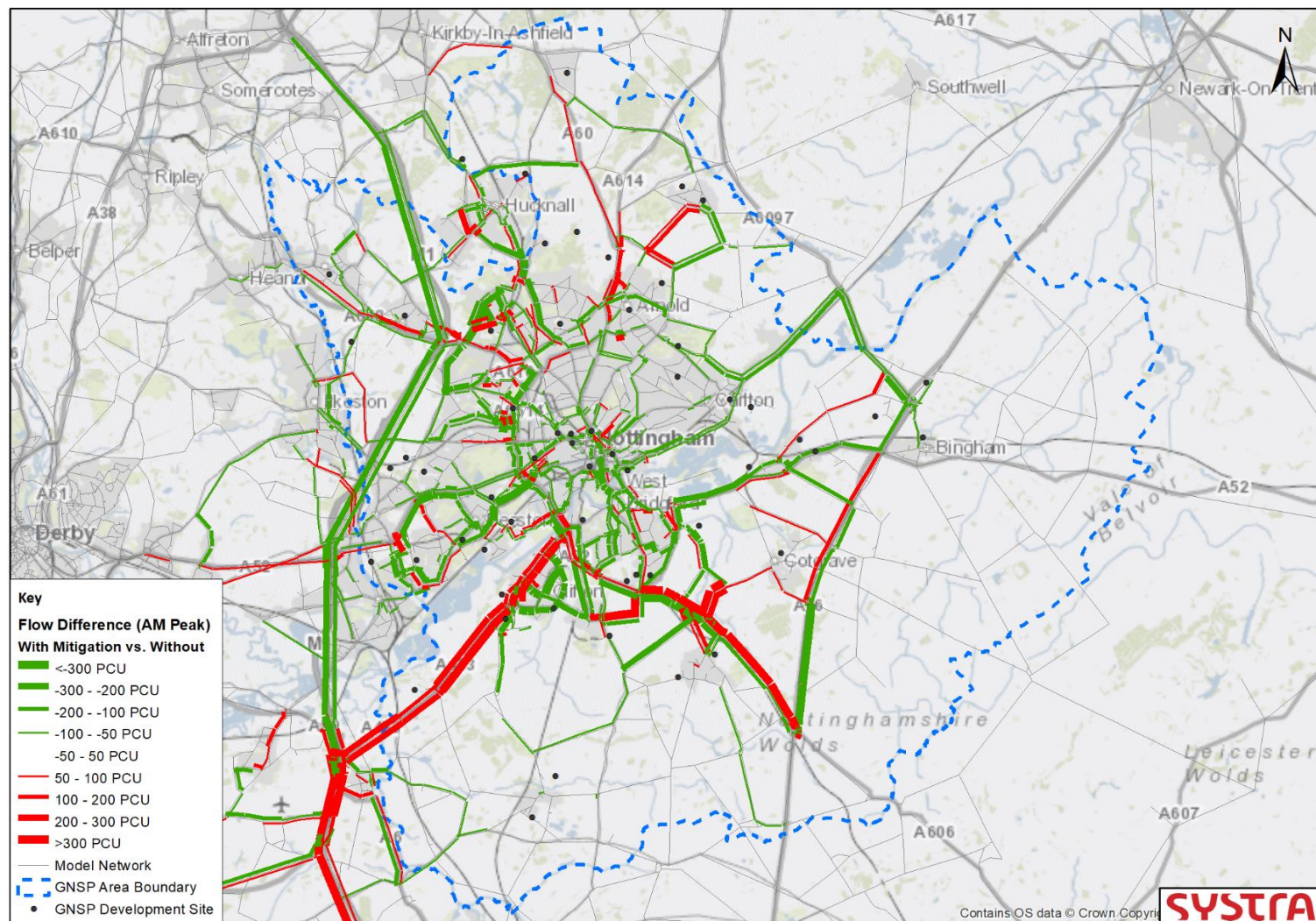


Figure 20. Highway Flow Difference – AM Peak

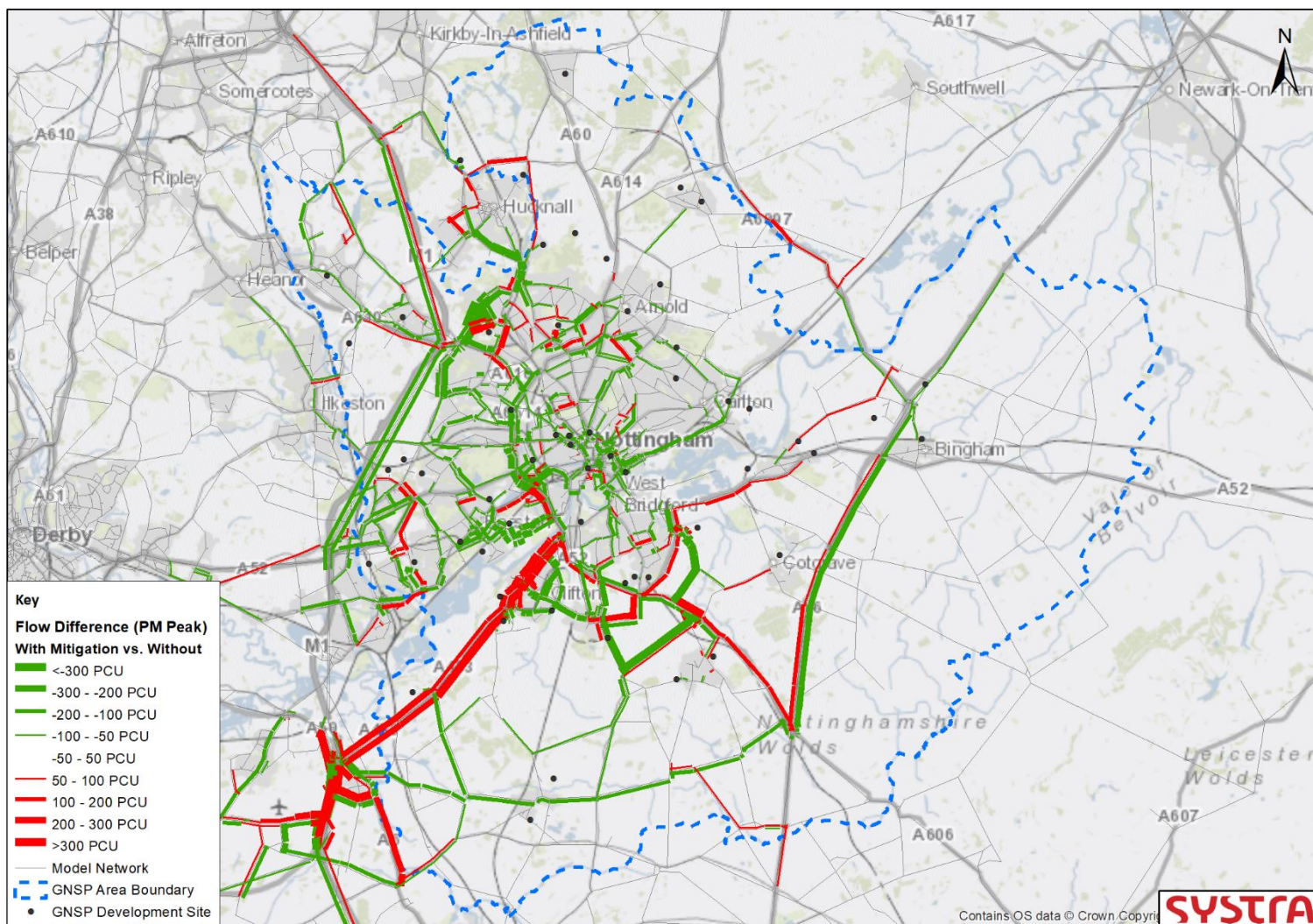


Figure 21. Highway Flow Difference – PM Peak

8.4 Junction Congestion Change

- 8.4.1 Junction congestion is measured by determining the ratio of the volume (V) of traffic to the capacity (C) that can be accommodated by a junction. A Volume to Capacity (V/C) of 85% is considered to be the threshold at which a junction is approaching its operational capacity, therefore increasing the likelihood of operational problems, including congestion, with associated delays and queues. A V/C of $\geq 100\%$ indicates that a junction is operating above its theoretical maximum capacity, with substantial congestion, queuing and delays.
- 8.4.2 Figure 22 and Figure 23 show the change in congestion as a result of the mitigation measures at junctions which are forecast to be approaching or in excess of their operational capacity (i.e. have a V/C ratio of $>85\%$) in either the Strategic Plan only or With Mitigation scenarios. The change in congestion is shown relative to congestion in the Strategic Plan only scenario.
- 8.4.3 In general, in both peaks, the majority of the junctions which are congested as a result of the GNSP are predicted to have a reduction in congestion as a result of the mitigation proposals resulting in an overall positive impact on congestion across the highway network.
- 8.4.4 Specifically, congestion decreases are predicted at M1 Junction 24 general, where the mitigation scheme provides additional highway capacity. Within Nottingham City Centre and along key corridors into the city congestion decreases are predicted to occur for example along the A453, A52 and A60 corridors on the SRN. In some cases, isolated pockets of congestion increase are predicted, for example along the A453 corridor in the PM peak which is a result of higher flows along this route due to the increased capacity which results in some non-improved junctions becoming the constraint on the corridor resulting in higher levels of congestion at these locations.

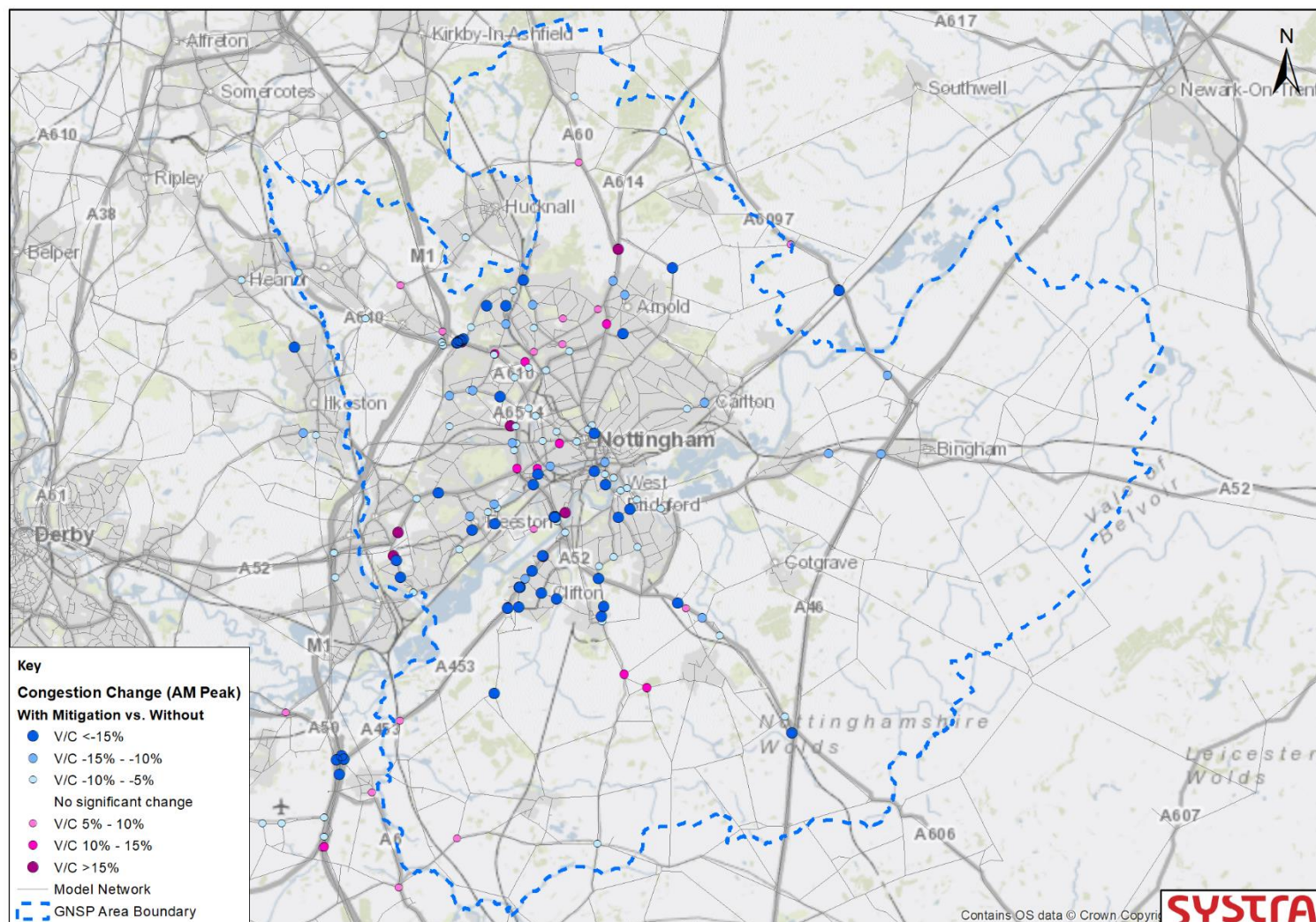


Figure 22. Junction Congestion Difference – AM Peak

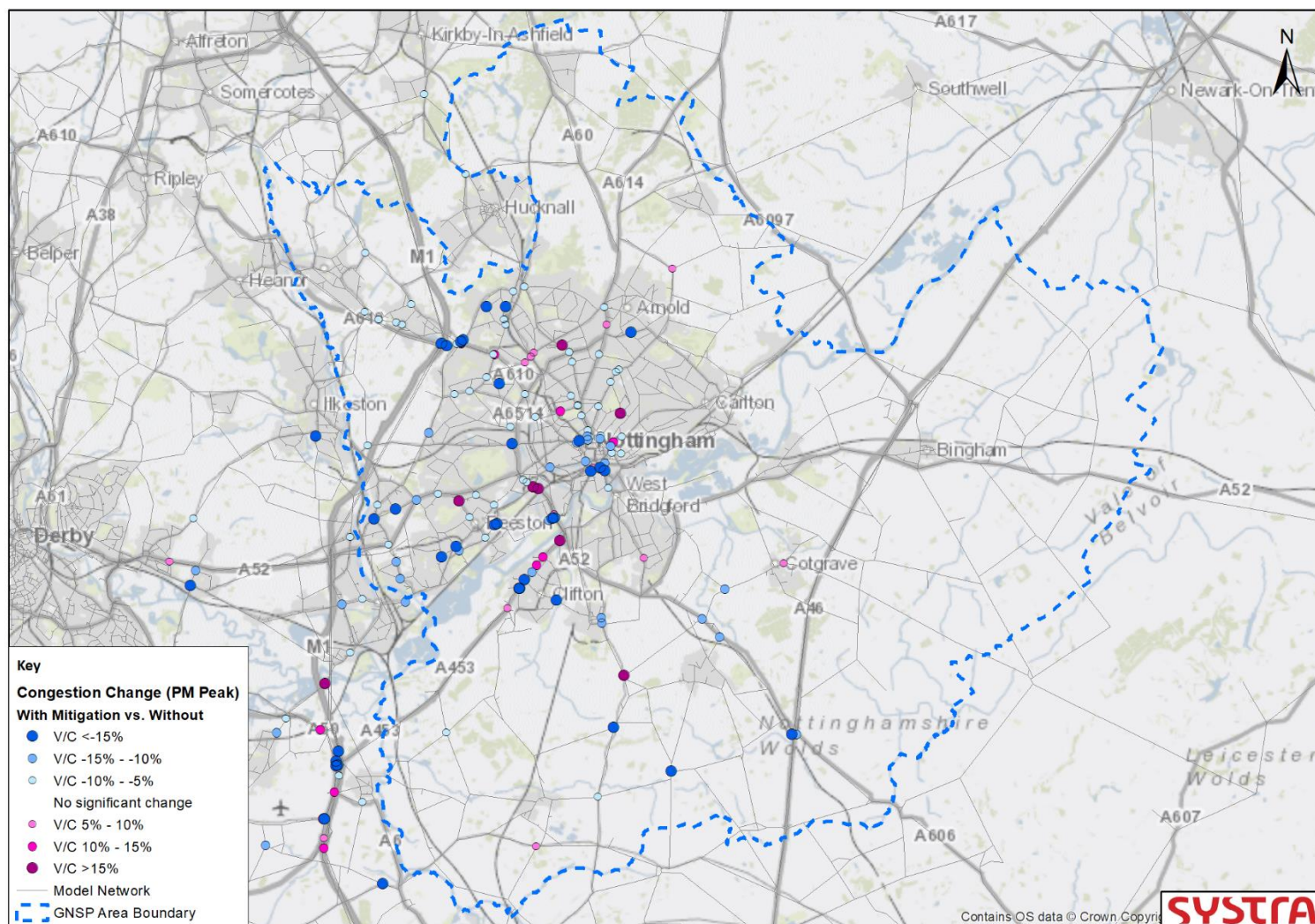


Figure 23. Junction Congestion Difference – PM Peak

8.5 Public Transport Patronage

- 8.5.1 To provide an indication of patronage on each of the public transport schemes, passenger numbers have been extracted. The analysis provides total passengers, number deriving from GNSP sites and the number from non-GNSP sites. Where a scheme does not exist in the scenario without mitigation, total patronage is presented, but where the scheme extends or enhances an existing route, the change in patronage between the two scenarios is given.
- 8.5.2 Table 17 through to Table 19 show that of the proposed NET extensions, two (Gedling and Gamston) are modelled to have moderate patronage. They also have reasonable volumes of passengers associated with the GNSP sites.

Table 17. AM Peak Patronage Data – NET Schemes

PROPOSED EXTENSION	PASSENGERS	GNSP SITE PASSENGERS	OTHER PASSENGERS	GNSP SITE PROPORTION
NET to Gedling	1,403	266	1,137	19%
NET Extension to Clifton	490	436	54	89%
NET to Gamston	2,066	644	1,422	31%
NET Extension north of Hucknall	290	166	124	57%
NET Extension to Potential Toton Rail Station (<i>not modelled</i>)	124	6	118	5%

Table 18. Inter Peak Patronage Data – NET Schemes

PROPOSED EXTENSION	PASSENGERS	GNSP SITE PASSENGERS	OTHER PASSENGERS	GNSP SITE PROPORTION
NET to Gedling	733	142	591	19%
NET Extension to Clifton	167	146	21	87%
NET to Gamston	1,083	321	762	30%
NET Extension north of Hucknall	122	81	41	66%
NET Extension to Potential Toton Rail Station (<i>not modelled</i>)	58	2	56	3%

Table 19. PM Peak Patronage Data – NET Schemes

PROPOSED EXTENSION	PASSENGERS	GNSP SITE PASSENGERS	OTHER PASSENGERS	GNSP SITE PROPORTION
NET to Gedling	1,361	269	1,092	20%
NET Extension to Clifton	448	385	63	86%
NET to Gamston	2,101	590	1,511	28%
NET Extension north of Hucknall	206	155	51	75%
NET Extension to Potential Toton Rail Station (<i>not modelled</i>)	110	3	107	3%

8.5.3 Associated with the NET, Table 20 shows the number of boardings and alightings at the proposed new NET station at Broadmarsh, in the City Centre, that includes a pedestrian link from the stop to the bus station and the Broadmarsh development site.

Table 20. Broadmarsh NET Stop Boardings and Alightings by Peak Hour

PEAK HOUR	BOARDINGS	ALIGHTINGS
AM Peak	334	1,176
Inter Peak	493	457
PM Peak	1,652	500

8.5.4 For bus routes, Table 21 through to Table 23 show the proposed bus services with frequency enhancements or extensions. The results vary by peak, with Route 141 being moderately used in the AM and PM peaks, as well as Route 33 and 26 in the PM peak. In all peaks, the A52 Express bus competes with the NET extension to Gamston and proposed NET P&R on the A52 which limits its potential usage.

8.5.5 Note that where there are negatives in the patronage volumes, this is due to being less trip making in the scenario with mitigation versus without mitigation, as shown in Table 16.

Table 21. AM Peak Patronage Data – Bus Schemes

SCHEME	PASSENGERS / CHANGE	GNSP SITE PASSENGERS	OTHER PASSENGERS	GNSP SITE PROPORTION
Rushcliffe Villager (Newton – Bingham)	34	0	34	0%
Route 9 (Compton Acres & Wilford Hill to City)	116	0	116	0%
Route 26 (Southwell to Nottingham)	-50	0	-50	0%
Route 33 (Nottingham - Cropwell Bishop - Radcliffe / Sutton)	74	25	49	34%
Route 50 (Victoria Retail Park to City)	-143	20	-163	n/a
Route 141 (Nottingham - Sutton in Ashfield)	176	51	125	29%
A52 Express Bus (<i>proposed</i>) (Saxondale to City)	56	0	56	0%

Table 22. Inter Peak Patronage Data – Bus Schemes

SCHEME	PASSENGERS / CHANGE	GNSP SITE PASSENGERS	OTHER PASSENGERS	GNSP SITE PROPORTION
Rushcliffe Villager (Newton – Bingham)	18	21	-3	117%
Route 9 (Compton Acres & Wilford Hill to City)	45	-2	47	n/a
Route 26 (Southwell to Nottingham)	-5	-22	17	n/a
Route 33 (Nottingham - Cropwell Bishop - Radcliffe / Sutton)	31	143	-112	461%
Route 50 (Victoria Retail Park to City)	-62	42	-104	n/a
Route 141 (Nottingham - Sutton in Ashfield)	85	52	33	61%
A52 Express Bus (<i>proposed</i>) (Saxondale to City)	19	0	19	0%

Table 23. PM Peak Patronage Data – Bus Schemes

SCHEME	PASSENGERS / CHANGE	GNSP SITE PASSENGERS	OTHER PASSENGERS	GNSP SITE PROPORTION
Rushcliffe Villager (Newton – Bingham)	92	-2	94	n/a
Route 9 (Compton Acres & Wilford Hill to City)	91	-3	94	n/a
Route 26 (Southwell to Nottingham)	249	-2	251	n/a
Route 33 (Nottingham - Cropwell Bishop - Radcliffe / Sutton)	286	52	234	18%
Route 50 (Victoria Retail Park to City)	77	13	64	17%
Route 141 (Nottingham - Sutton in Ashfield)	390	43	347	11%
A52 Express Bus (<i>proposed</i>) (Saxondale to City)	41	0	41	0%

8.5.6 Given that the AM peak is representative of the volume of passengers who return later in the day to the two assessed Park and Ride sites, Table 24 shows that the proposed NET P&R on the A52 at Gamston is well used, both with passengers associated with GNSP and non-GNSP sites. The A60 Leppool P&R is also utilised, but not by GNSP site passengers who make use of other bus services which are still able to benefit from proposed bus priority measures into the city associated with the A60 Leppool scheme.

Table 24. AM Peak Patronage Data – Park and Ride Schemes

SCHEME	PASSENGERS	GNSP SITE PASSENGERS	OTHER PASSENGERS	GNSP SITE PROPORTION
A52 Gamston P&R (NET) <i>(proposed)</i>	772	146	626	19%
A60 Leapool P&R (Bus) <i>(proposed)</i>	124	0	124	0%

8.5.7 For rail, Table 25 through to 0 show that proposed Maid Marian Line services are forecast generate reasonable patronage, but with a low proportion of those deriving from GNSP sites. The other national rail schemes with enhanced services are forecast to result in minimal patronage change.

8.5.8 Note that where there are negatives, this is due to being less trip making in the scenario with mitigation versus without mitigation, as shown in Table 16.

Table 25. AM Peak Patronage Data – Rail Schemes

SCHEME	PASSENGERS / CHANGE	GNSP SITE PASSENGERS	OTHER PASSENGERS	GNSP SITE PROPORTION
Maid Marian Line (Mansfield <> Derby) <i>(proposed)</i>	218	4	214	2%
Maid Marian Line (Mansfield <> Leicester) <i>(proposed)</i>	350	64	286	18%
Castle Line to/from Newark	-152	116	-268	n/a
Poacher Line to Grantham	137	195	-58	144%

Table 26. Inter Peak Patronage Data – Rail Schemes

SCHEME	PASSENGERS / CHANGE	GNSP SITE PASSENGERS	OTHER PASSENGERS	GNSP SITE PROPORTION
Maid Marian Line (Mansfield <> Derby) <i>(proposed)</i>	155	4	151	3%
Maid Marian Line (Mansfield <> Leicester) <i>(proposed)</i>	160	25	135	16%
Castle Line to/from Newark	-75	149	-224	n/a
Poacher Line to Grantham	73	122	-49	167%

Table 27. PM Peak Patronage Data – Rail Schemes

SCHEME	PASSENGERS / CHANGE	GNSP SITE PASSENGERS	OTHER PASSENGERS	GNSP SITE PROPORTION
Maid Marian Line (Mansfield <> Derby) <i>(proposed)</i>	177	5	172	3%
Maid Marian Line (Mansfield <> Leicester) <i>(proposed)</i>	457	58	399	13%
Castle Line to/from Newark	-120	103	-223	n/a
Poacher Line to Grantham	110	155	-45	141%

8.6 Network Statistics

8.6.1 Network statistics provide a way of gauging the overall impact of including the mitigation measures in the AOI (see Figure 18), as shown in Table 28 and Table 29. Percentage changes indicate how far the mitigation proposals have taken network performance back to the situation in the Reference Case, before any GNSP development.

Table 28. Network Statistics – AM Peak

INDICATOR	REFERENCE CASE	STRATEGIC PLAN	WITH MITIGATION	PERCENTAGE MITIGATED
Overcapacity Queues (PCU hrs) (Congestion)	1,938	4,184	3,354	37%
Total Travel Time (PCU hrs)	49,272	57,192	53,862	42%
Total Travel Distance (PCU kms)	1,974,417	2,115,079	2,071,765	31%
Average Speed km/hr	40	37	39	49%

Table 29. Network Statistics – PM Peak

INDICATOR	REFERENCE CASE	STRATEGIC PLAN	WITH MITIGATION	PERCENTAGE MITIGATED
Overcapacity Queues (PCU hrs) (Congestion)	2,608	4,655	3,541	54%
Total Travel Time (PCU hrs)	50,217	57,716	54,283	46%
Total Travel Distance (PCU kms)	1,979,641	2,110,407	2,071,198	30%
Average Speed km/hr	39	37	38	57%

8.6.2 In both peaks, the mitigation measures have had a positive impact improving conditions across all metrics relative to the Strategic Plan scenario. Congestion impacts are predicted to be 37% and 54% mitigated in the AM and PM peaks, respectively.

- 8.6.3 It would be challenging to achieve higher levels of impact mitigation than these due to the strategic nature of this assessment and the fact that the remaining increases in congestion are spread over a significantly large area and comprise of congestion increases at junctions in the immediate vicinity of the individual development sites. Furthermore, localised mitigation could be modelled at the detailed application stage for individual sites on a case-by-case basis.

9. STUDY CONCLUSIONS

9.1 Introduction

- 9.1.1 Transport modelling to support the transport assessment of the GNSP has provided an assessment of the strategic transport impacts associated with planned GNSP development through to 2041. This report has analysed a number of scenarios and mitigation measures to determine the viability and necessary interventions required to support the proposed growth.

9.2 GNSP No Mitigation - Key Findings

- 9.2.1 The assessment has identified that growth in housing and employment, and hence trip making in the GNSP area, will likely have associated transport impacts that will require mitigation. Key findings include:

Increase in Trips and Traffic:

- 9.2.2 Without mitigation, an increase in trip making will take place, with an additional 60,000 person trips in the AM peak and 57,000 person trips in the PM peak. This growth will lead to increased congestion, particularly along key strategic routes such as the A52, A453 and M1.

Network Performance and Challenges:

- 9.2.3 Without intervention, congestion levels are expected to rise during the peak periods, resulting in reduced average speeds and increased travel times. Junctions, including M1 J24, the A453 corridor and key junctions within Nottingham, were identified as congestion areas requiring potential mitigation.

Mode Share and Active Transport:

- 9.2.4 With most trips being made in private vehicles, the scenario without mitigation highlighted the potential to significantly increase active and public transport mode shares through targeted interventions across the GNSP area.

9.3 GNSP With Mitigation - Key Findings

- 9.3.1 To address the identified transport challenges and support sustainable growth, a range of mitigation measures were proposed and modelled. These include:

Active Travel Enhancements:

- Creation of compact, connected neighbourhoods with pedestrian and cycling prioritised.
- Development of cycling superhighways and enhanced walking routes to promote non-motorised transport modes and healthy lifestyles.

Public Transport Enhancements:

- Extensions to the Nottingham Express Transit network, along with improved bus service provision through frequency enhancements and route diversions.

- New park-and-ride facilities and rail service improvements, including the opening of the Maid Marian Line and Robin Hood Line proposals.

Highway Infrastructure Improvements:

- Targeted junction upgrades (e.g., M1 J24 enhancements, A453 and A52 corridor schemes) to address congestion.
- Development of future highway schemes to support growth, such as the Toton Link Road and the A606 corridor, to improve connectivity and capacity around the area of new strategic development.

9.4 Conclusion

- 9.4.1 This assessment has provided a foundation for informed decision-making and lays the groundwork for developing sustainable transport schemes in the GNSP area to 2041.
- 9.4.2 In summary, 9,062 fewer person trips are made in the AM peak and 8,599 fewer person trips are made in the PM peak in the Strategic Plan scenario with the mitigation measures included. The majority of this reduction is seen in Nottingham City Centre, specifically at the flats (ID 49), where the mitigation measures are modelled to reduce the need for people to travel outside of the city (due to this being envisaged to be developed as a compact and connected neighbourhood), which when combined with a decrease in the proportion of highway mode share, has resulted in less congestion in Nottingham City Centre and across the GNSP area as a whole. It follows that there has been shown to be a general decrease in highway flow across the GNSP area as a result of the mitigation measures.
- 9.4.3 Of the proposed NET extensions, two (Gedling and Gamston) are modelled to have particularly moderate patronage. They also have reasonable volumes of passengers associated with the GNSP sites. The proposed bus services with frequency enhancements or extensions result in distinctly varying levels of patronage by peak, with Route 141 being moderately used in the AM and PM peaks, as well as Route 33 and 26 in the PM peak. The proposed NET P&R on the A52 at Gamston is well used, both with passengers associated with GNSP and non-GNSP sites. The A60 Leapool P&R is also utilised, but not by GNSP site passengers who make use of other bus services. The proposed Maid Marian Line services are forecast generate reasonable patronage, but with a low proportion of those deriving from GNSP sites. The two other assessed national rail schemes with enhanced services are forecast to result in minimal patronage change.
- 9.4.4 The mitigation measures have had a positive impact improving conditions across all metrics relative to the Strategic Plan scenario. Congestion impacts are predicted to be 37% and 54% mitigated in the AM and PM peaks, respectively.

Appendix A – Developments Located Outside the GNSP Area

Nottinghamshire Housing Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041
N1	Rolls Royce	Ashfield	902
N35	Clipstone Road East	Mansfield	511
N36	Pleasley Hill Farm (formerly Penniment Farm)	Mansfield	850
N68	Land North of A611/South of Broomhill Farm/Land at Broomhill Farm, Hucknall	Ashfield	850
N69	Rolls Royce/Hucknall Town FC	Ashfield	727
N70	Land adj. Stubbing Wood Farm, Watnall Rd	Ashfield	198
N71	Walesby Drive/A611 off Diamond Avenue, Derby Road/Land off Diamond Avenue/Warwick Close/Annesley Miners Welfare Institute	Ashfield	359
N74	Cauldwell Village	Ashfield	315
N75	Adj. Oakham Business Park, Sutton-in-Ashfield	Ashfield	225
N76	Rear Kingsmill Hospital, Sutton-in-Ashfield	Ashfield	264
N77	Sunnyside Farm, Blackwell Road, Huthwaite	Ashfield	283
N78	Land to the East of A6075, Beck Lane, Skegby	Ashfield	212
N79	Land at Beck Lane, Skegby	Ashfield	422
N80	Alfreton Road	Ashfield	223
N81	Bull and Butcher and land off Park Lane	Ashfield	318
N97	Jubilee Way East, Mansfield SUE 2	Mansfield	850
N98	Lindhurst, SUE 3	Mansfield	1,800

Derbyshire Housing Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041
D17	Wragley Way (SDDC)	SDDC	1,950
D19	Boulton Moor Phase 1	SDDC	905
D20	Boulton Moor Phase 2	SDDC	550

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041
D21	Boulton Moor Phase 3	SDDC	190
D22	Land at Hackwood Farm	SDDC	290
D24	Primula Way	SDDC	500
D25	Chellaston Fields	SDDC	500
D26	Land West of Mickleover Phase 1 (Newhouse Farm)	SDDC	300
D27	Land West of Mickleover Phase 2	SDDC	252
D28	Land West of Mickleover Phase 3	SDDC	1,100
D29	Broomy Farm	SDDC	600
D30	Land NE of Hatton	SDDC	400
D31	North of William Nadin Way	SDDC	600
D32	Church Street, Church Gresley	SDDC	350
D33	Land off the Mease, Hilton	SDDC	485
D34	Woodville Regeneration Area	SDDC	300
D37	Highland Farm	SDDC	1,056
D38	Drakelow Power Station	SDDC	2,239
D41	Phase 1 Radbourne Lane, Mackworth	Amber Valley	510
D42	Phase 2 Radbourne Lane, Mackworth	Amber Valley	600
D43	Land S of Mansfield Road/N of A38, Alferton	Amber Valley	323
D44	Coppice Farm, Peasehill Road, Ripley	Amber Valley	400
D45	Lily Street Farm, Derby Road, Swanwick	Amber Valley	600
D46	Kedleston Road, Quarndon	Amber Valley	400
D47	Shipley Lakeside, Shipley	Amber Valley	307
D49b	South Stanton	Erewash	1,000
D50	West of Quarry Hill Road	Erewash	350
D53	Nether Farm, Birchwood Lane, Somercotes	Amber Valley	200

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041
D54	Land off Somercotes Hill, Somercotes	Amber Valley	180
D56	Newlands/Loscoe Fields	Amber Valley	500
D57	Acorn Way	Erewash	600
D58	Spondon	Erewash	200
D59	Kirk Hallam	Erewash	1,300
D60	Cotmanhay	Erewash	250
D64	Nottingham Road	Amber Valley	181
D65	Land off Brun Lane, Mackworth	Amber Valley	2,000
D66	Land off Aldreds Lane, Heanor	Amber Valley	250

Derby City Housing Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041
D1	Rykneld Road (Heatherton Extn)	DCC	900
D3	Derby Royal Infirmary	DCC	920
D6	Manor/Kingsway Hospitals	DCC	837
D9	Brook Farm Chaddesden	DCC	230
D10	Hackwood Farm	DCC	410
D11	Nightingale Works	DCC	400
D13	Various City Centre	DCC	750
D14	Castleward	DCC	840
D15	Friar Gate Goods Yard	DCC	400
D16	Wragley Way (DCC)	DCC	180
D18	Boulton Moor/Snelsmoor Grange	DCC	800
D55	Onslow Road	DCC	203

Leicestershire Housing Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041
L1	Bardon Grange, Coalville	NW Leicestershire	800
L3	South East Coalville	NW Leicestershire	2,700
L4	Standard Hill Coalville	NW Leicestershire	400
L5	Money Hill (phase 1) Ashby	NW Leicestershire	605
L6	Money Hill (phase 2) Ashby	NW Leicestershire	1,252
L8	Holywell Spring Farm Ashby	NW Leicestershire	400
L9	Burton Road/Moira Road Ashby	NW Leicestershire	800
L10	Castle Donington	NW Leicestershire	895
L11	Bosworth Road, Measham	NW Leicestershire	300
L15	Garendon Park, Loughborough	NW Leicestershire	3,200
L16	North East of Leicester	NW Leicestershire	4,500
L17	North of Birstall (Broadnook)	NW Leicestershire	1,650
L19	West Shepshed (various applications)	NW Leicestershire	892
L21	Land at Gynsill Lane & Anstey Lane, Glenfield	Charnwood	260
L23	Laburnum Way, Loughborough	Charnwood	422
L24	Land South of Loughborough	Charnwood	723
L25	Land off Tickow Lane (north), Shepshed	Charnwood	394
L26	Land N of Hallamford Rd and W of Shepshed	Charnwood	250
L27	Land off Tickow Lane (south)	Charnwood	300
L28	Land West of Anstey	Charnwood	600
L29	Land South East of Syston	Charnwood	960
L30	Barkby Road, Syston	Charnwood	270

Nottinghamshire Employment Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041 (SQM)
N1	Rolls Royce	Ashfield	B1 – 47,000 B2 – 35,250 B8 – 35,250
N36	Pleasley Hill Farm (formerly Penniment Farm)	Ashfield	B1 – 3,300 B2 – 90,000
N82	Land to the North East of Junction 27, M1	Ashfield	B8 – 184,200
N83	Land to the South East of Junction 27, M1	Ashfield	B8 – 225,000

Derbyshire Employment Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041 (SQM)
D23	Land South of Sinfin Moor/Infinity Park	SDDC	B1 – 3,000 B2 – 3,000 B8 – 24,000
D33	Land off The Mease, Hilton	SDDC	B1 – 7,000 B2 – 14,000 B8 – 14,000
D34	Woodville Regeneration Area	SDDC	B1 – 12,000 B2 – 24,000 B8 – 24,000
D35	Land North of Dove Valley Business Park	SDDC	B1 – 28,300 B2 – 56,600 B8 – 56,600
D38	Drakelow Power Station	SDDC	B1 – 12,000 B2 – 24,000 B8 – 24,000
D45	Lily Street Farm, Derby Road, Swanwick	Amber Valley	B1 – 6,500 B2 – 7,500 B8 – 10,000
D49a	North Stanton	Erewash	B2 – 200,000 B8 – 200,000

Derby City Employment Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041 (SQM)
D1	Ryknel Road (Heatherton Extn)	DCC	B1 – 7,000
D2	Chaddesden Sidings (South)	DCC	B2 – 22,875 B8 – 132,075
D4	Chaddesden Sidings (West)	DCC	B2 – 13,000 B8 – 13,000
D5	Raynesway/Derby Commercial Park	DCC	B8 – 181,000
D6	Manor/Kingsway Hospitals	DCC	B1 – 20,000
D8	Chellaston Business Park/Infinity Park	DCC	B1 – 2,500 B2 – 42,013 B8 – 92,160
D12	Infinity Park Extension	DCC	B1 – 5,000 B2 – 45,000
D39a	SmartParc (old Celanese Site)	Derby City	B2 – 60,000
D39b	SmartParc (old Celanese Site)	Derby City	B2 – 149,000

Leicestershire Employment Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041 (SQM)
L7	Land at Money Hill Ashby	NW Leicestershire	B1 – 16,000 B2 – 32,000 B8 – 32,000
L12S	East Midlands Gateway	NW Leicestershire	6 million sq. foot
L13	East Midlands Airport (Pegasus) Extension	NW Leicestershire	B1 – 54,400 B8 – 36,000
L14	Loughborough, Science Park	Charnwood	B1 – 250,000
L15	Garendon Park, Loughborough	Charnwood	B1 – 15,000 B2 – 30,000 B8 – 30,000
L16	North East of Leicester	Charnwood	B1 – 13,000 B2 – 26,000 B8 – 26,000
L17	North of Birstall (Broadnook)	Charnwood	B1 – 15,000 B2 – 30,000 B8 – 30,000

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2041 (SQM)
L18	Watermead	Charnwood	B1 – 12,500 B2 – 23,750 B8 – 23,750

Appendix B – Developments Located Within the GNSP Area

Housing Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2023	% OF 2041 BUILD OUT	BUILD OUT 2041
N12	Field Farm	Broxtowe	129	29%	450
N17	Eastwood	Broxtowe	581	61%	960
N18	Kimberley	Broxtowe	149	41%	363
N23	Teal Close	Gedling	331	41%	807
N24	Top Wighay Farm	Gedling	38	2%	1,900
N25	H16 Park Road, Calverton	Gedling	101	28%	363
N27	Land West of A60 Redhill (X2 and X3)	Gedling	70	32%	220
N28	Gedling Colliery	Gedling	465	49%	941
N29	North of Papplewick Lane	Gedling	225	88%	255
N31	Mapperley Plains and Killisick Lane	Gedling	89	20%	435
N38	Chalfont Drive	Nottingham City	345	73%	475
N45	Waterside	Nottingham City	204	16%	1,289
N51-52	East and West of Melton Road, Edwalton	Rushcliffe	1,277	69%	1,844
N54	East and West of Chapel Lane, Bingham	Rushcliffe	408	40%	1,022
N55	RAF Newton	Rushcliffe	115	22%	528
N62	Kirk Ley, East Leake	Rushcliffe	287	100%	287
N63	Between Platt Lane and Station Road, Keyworth	Rushcliffe	128	68%	187
N96	Land at Former Cotgrave Colliery	Rushcliffe	372	100%	372
N99	Land at Rempstone Road (north)	Rushcliffe	100	35%	282

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2023	% OF 2041 BUILD OUT	BUILD OUT 2041
N100	Shelford Road/Grooms Cottage	Rushcliffe	216	47%	455
N104	Lantern Lane, E. Leake	Rushcliffe	231	63%	365
N105	North of Bunny Lane	Rushcliffe	114	52%	221
N106	East of L'borough Rd/Meadowcroft	Rushcliffe	109	47%	231
N107	Ilkeston Road - Radford Mill	Nottingham City	339	100%	339
N108	Woodhouse Way - Woodhouse Park	Nottingham City	214	100%	214
N109	11 and Workshop Deakin Place	Nottingham City	328	100%	328
N115	Beeston Business Park, Technology Drive, Beeston	Broxtowe	221	71%	310
N116	Bartons land between High Road & Queens Road West, Chilwell	Broxtowe	30	14%	221
N137	Arnold (non-allocated)	Gedling	204	24%	864
N157	Bestwood (non-allocated)	Gedling	35	6%	541
N147	Calverton (non-allocated)	Gedling	61	10%	586
N158	Carlton (non-allocated)	Gedling	507	42%	1,221
N159	Ravenshead (non-allocated)	Gedling	66	11%	586
N160	City Centre flats (windfall)	Nottingham City	4,973	28%	18,850

Employment Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2023 (SQM)	% OF 2041 BUILD OUT	BUILD OUT 2041 (SQM)
N42	Phase 1 Unity Square, Sheriffs Way	Nottingham City	B1 – 36,519	63%	B1 – 58,360
N101	Sainsbury land south of Colwick Loop Road	Gedling	Retail – 11,781	100%	Retail – 11,781

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2023 (SQM)	% OF 2041 BUILD OUT	BUILD OUT 2041 (SQM)
N102	Land on Wilford Lane West Bridgford	Rushcliffe	Retail – 2,783	68%	Retail – 4,098
N103	East Bridgford Garden Centre	Rushcliffe	Retail – 12,469	95%	Retail – 13,136
N110	Lidl, Bulwell	Nottingham City	Retail – 1,927	100%	Retail – 1,927
N111	Woodhouse Park	Nottingham City	Retail – 1,743	100%	Retail – 1,743
N112	The Triangle, Clifton	Nottingham City	Retail – 5,749	100%	Retail – 5,749
N113	Beechdale Baths	Nottingham City	Retail – 3,065	100%	Retail – 3,065
N114	Former NCV Garage Hucknall Road	Nottingham City	Retail – 1,600	100%	Retail – 1,600
N117	The Square, Beeston	Broxtowe	Retail – 8,290	100%	Retail – 8,290
N122	NG2 West	Nottingham City	B1 – 14,000	100%	B1 – 14,000
N123	Royal Quarter - Burton Street, Guildhall, Police and Fire Station	Nottingham City	B1 – 15,000	100%	B1 – 15,000
N135	Teal Close, ALDI and Local Centre	Gedling	Retail – 1,818	53%	Retail – 3,447
N136	Landmere Lane Edwalton	Rushcliffe	Retail – 3,370	89%	Retail – 3,770

Educational Development

REF.	DEVELOPMENT	AUTHORITY	BUILD OUT 2023	% OF 2041 BUILD OUT	BUILD OUT 2041
N50S	Nottingham College	Nottingham City	4,000 pupils	100%	4,000 pupils

Appendix C – Junction Congestion Data and Location Plots

Junction Congestion Change of $\geq 10\%$, where V/C ratio is $\geq 85\%$ in either the Reference Case or Strategic Plan Scenario

ID	LOCATION	REF. CASE AM	GNSP SCEN. AM	REF. CASE PM	GNSP SCEN. PM	DIFF. AM	DIFF. PM
1	Nottingham	69	89	64	76	20	n/a
2	Nottingham	94	105	87	101	11	14
3	Nottingham	13	36	45	92	n/a	47
4	Nottingham	71	95	57	101	24	44
5	Nottingham	30	47	96	109	n/a	13
6	Nottingham	57	89	98	105	32	7
7	Nottingham	79	93	60	94	14	33
8	Nottingham	97	113	34	39	15	n/a
9	Nottingham	54	126	55	94	73	39
10	Nottingham	69	101	50	54	32	n/a
11	Nottingham	61	95	47	52	34	n/a
12	Nottingham	57	71	78	95	n/a	17
13	Nottingham	69	103	83	95	34	13
14	Nottingham	1	162	2	9	161	n/a
15	Nottingham	39	93	71	73	54	n/a
16	Nottingham	48	46	41	91	n/a	50
17	Nottingham	51	52	44	101	n/a	57
18	Nottingham	101	101	81	101	n/a	20
19	Nottingham	78	88	66	75	10	n/a
20	Nottingham	86	91	80	98	5	18
21	Nottingham	87	91	118	131	4	13
22	Nottingham	70	96	114	117	25	3

ID	LOCATION	REF. CASE AM	GNSP SCEN. AM	REF. CASE PM	GNSP SCEN. PM	DIFF. AM	DIFF. PM
23	Nottingham	81	93	74	90	13	16
24	Nottingham	86	98	95	94	12	-1
25	Nottingham	37	97	109	103	60	-6
26	Nottingham	62	90	76	71	28	n/a
27	Nottingham	107	109	121	132	3	12
28	Nottingham	74	93	70	82	19	n/a
29	Nottingham	81	91	75	75	10	n/a
30	Nottingham	62	92	91	102	29	11
31	Nottingham	102	114	84	100	11	16
32	Nottingham	90	101	85	88	11	2
33	Nottingham	45	88	40	41	43	n/a
34	Nottingham	69	78	73	86	n/a	13
35	Nottingham	69	91	78	84	22	n/a
36	Nottingham	74	97	68	86	24	18
37	Nottingham	97	108	107	105	11	-2
38	Nottingham	80	94	85	98	14	12
39	Nottingham	46	54	57	88	n/a	31
40	Nottingham	59	48	72	88	n/a	16
41	Nottingham	70	89	72	74	19	n/a
42	Broxtowe	78	100	81	85	22	n/a
43	Broxtowe	89	105	64	70	16	n/a
44	Broxtowe	97	100	85	96	3	11
45	Broxtowe	50	99	100	100	49	n/a
46	Broxtowe	100	100	62	99	n/a	37

ID	LOCATION	REF. CASE AM	GNSP SCEN. AM	REF. CASE PM	GNSP SCEN. PM	DIFF. AM	DIFF. PM
47	Nottingham	55	88	72	99	33	27
48	Nottingham	58	58	63	88	n/a	25
49	Nottingham	73	83	74	87	n/a	13
50	Nottingham	59	85	80	87	26	7
51	Nottingham	67	79	96	110	n/a	14
52	Nottingham	95	95	54	86	n/a	32
53	Nottingham	83	105	97	99	22	1
54	Nottingham	81	96	99	104	15	5
55	Nottingham	76	90	90	92	14	2
56	Nottingham	77	89	99	100	12	1
57	Nottingham	91	104	99	106	13	8
58	Nottingham	84	94	89	90	10	1
59	Nottingham	81	91	82	79	10	n/a
60	Nottingham	90	103	89	97	13	8
61	Nottingham	96	102	91	106	7	15
62	Gedling	89	100	80	83	11	n/a
63	Gedling	69	96	67	93	27	25
64	Gedling	86	96	96	98	10	2
65	Nottingham	65	68	82	100	n/a	18
66	Nottingham	74	88	54	61	14	n/a
67	Nottingham	85	96	47	53	12	n/a
68	Rushcliffe	101	103	93	106	2	13
69	Nottingham	71	93	80	83	22	n/a
70	Rushcliffe	79	100	55	61	21	n/a

ID	LOCATION	REF. CASE AM	GNSP SCEN. AM	REF. CASE PM	GNSP SCEN. PM	DIFF. AM	DIFF. PM
71	Rushcliffe	72	90	58	55	18	n/a
72	Rushcliffe	74	93	83	85	19	n/a
73	Nottingham	76	87	31	30	11	n/a
74	Nottingham	87	97	101	101	10	1
75	Nottingham	61	70	68	101	n/a	33
76	Nottingham	96	100	88	100	3	12
77	Nottingham	57	55	76	97	n/a	21
78	Nottingham	58	58	75	87	n/a	12
79	Nottingham	68	100	64	92	32	28
80	Nottingham	75	88	50	70	13	n/a
81	Nottingham	77	105	72	90	27	19
82	Nottingham	59	98	35	40	39	n/a
83	Rushcliffe	38	67	37	106	n/a	69
84	Nottingham	94	101	73	86	7	13
85	Nottingham	78	96	68	89	18	21
86	Nottingham	91	93	76	89	2	14
87	Nottingham	72	100	86	92	28	6
88	Nottingham	84	100	107	110	16	3
89	Broxtowe	95	105	92	95	10	3
90	Broxtowe	64	71	79	91	n/a	12
91	Broxtowe	58	75	57	93	n/a	36
92	Broxtowe	89	101	92	101	12	9
93	Broxtowe	91	103	84	88	12	4
94	Broxtowe	78	80	72	97	n/a	25

ID	LOCATION	REF. CASE AM	GNSP SCEN. AM	REF. CASE PM	GNSP SCEN. PM	DIFF. AM	DIFF. PM
95	Broxtowe	76	100	71	81	24	n/a
96	Broxtowe	79	92	94	102	13	8
97	Broxtowe	98	114	110	116	15	6
98	Nottingham	49	69	65	87	n/a	23
99	Nottingham	95	99	74	93	3	19
100	Nottingham	82	93	95	102	11	7
101	Broxtowe	101	101	75	96	n/a	21
102	Nottingham	88	100	81	89	12	8
103	Nottingham	58	95	47	87	37	40
104	Nottingham	45	100	30	47	55	n/a
105	Nottingham	67	74	64	99	n/a	35
106	Nottingham	7	6	101	120	n/a	20
107	Rushcliffe	49	219	52	119	171	67
108	Rushcliffe	69	93	51	71	24	n/a
109	Rushcliffe	66	66	85	97	n/a	12
110	Nottingham	48	70	52	102	n/a	49
111	Nottingham	67	91	28	55	25	n/a
112	Broxtowe	60	89	106	109	28	2
113	Nottingham	23	31	56	106	n/a	50
114	Nottingham	100	98	35	96	-2	61
115	Nottingham	82	100	92	90	18	-2
116	Gedling	54	93	49	66	39	n/a
117	Rushcliffe	10	104	4	30	94	n/a
118	Broxtowe	66	94	81	89	28	8

ID	LOCATION	REF. CASE AM	GNSP SCEN. AM	REF. CASE PM	GNSP SCEN. PM	DIFF. AM	DIFF. PM
119	Broxtowe	81	89	86	98	8	12
120	Broxtowe	106	119	116	124	13	8
121	Broxtowe	79	90	101	101	11	n/a
122	Gedling	81	94	102	104	13	2
123	Gedling	81	94	32	43	14	n/a
124	Rushcliffe	90	105	35	34	15	n/a
125	NW Leicestershire	54	54	67	99	n/a	31
126	Rushcliffe	87	100	94	105	13	11
127	Rushcliffe	36	45	43	103	n/a	60
128	NW Leicestershire	82	95	53	61	13	n/a
129	NW Leicestershire	62	95	42	29	33	n/a
130	NW Leicestershire	74	102	61	80	27	n/a
131	Erewash	106	108	106	116	2	10
132	Ashfield	73	56	72	85	n/a	13
133	Gedling	57	100	70	84	43	n/a
134	Gedling	82	100	55	61	19	n/a
135	Gedling	84	101	28	36	17	n/a
136	Gedling	88	102	96	100	14	5
137	Rushcliffe	98	103	77	90	5	14
138	Rushcliffe	64	109	69	100	45	31
139	Rushcliffe	103	110	66	91	7	25
140	Rushcliffe	86	101	81	93	15	12
141	NW Leicestershire	41	85	14	20	44	n/a
142	Rushcliffe	56	52	60	100	n/a	40

ID	LOCATION	REF. CASE AM	GNSP SCEN. AM	REF. CASE PM	GNSP SCEN. PM	DIFF. AM	DIFF. PM
143	Erewash	58	103	98	104	45	6
144	Erewash	66	91	75	88	25	13
145	Erewash	88	101	110	111	13	2
146	Broxtowe	104	108	82	94	3	11
147	Broxtowe	74	86	105	105	12	1
148	Broxtowe	61	100	57	60	39	n/a
149	Erewash	77	100	78	79	23	n/a
150	Rushcliffe	103	101	87	102	-2	15
151	Rushcliffe	82	95	89	94	13	4
152	Rushcliffe	43	148	40	63	105	n/a
153	Rushcliffe	59	91	55	78	31	n/a
154	Charnwood	46	45	58	96	n/a	38
155	Gedling	76	95	96	100	20	5
156	NW Leicestershire	54	50	101	120	n/a	18
157	NW Leicestershire	73	64	110	127	n/a	17
158	NW Leicestershire	77	76	90	103	n/a	12
159	NW Leicestershire	73	73	79	104	n/a	25
160	NW Leicestershire	103	102	106	120	-1	15
161	NW Leicestershire	40	44	43	97	n/a	55
162	NW Leicestershire	61	87	70	99	25	29
163	NW Leicestershire	52	58	85	134	n/a	50
164	NW Leicestershire	114	115	68	101	1	33
165	Broxtowe	74	109	106	113	35	7
166	Newark	57	97	82	96	39	13

ID	LOCATION	REF. CASE AM	GNSP SCEN. AM	REF. CASE PM	GNSP SCEN. PM	DIFF. AM	DIFF. PM
167	Nottingham	84	84	84	107	n/a	23
168	Nottingham	90	104	99	97	14	-2
169	Nottingham	135	142	80	132	8	52
170	Rushcliffe	74	94	93	97	20	5
171	Rushcliffe	91	94	84	95	3	11
172	Rushcliffe	39	98	42	92	59	50
173	Derby	98	97	84	94	-1	10
174	Ashfield	33	35	90	104	n/a	13
175	Ashfield	85	85	79	91	n/a	12
176	NW Leicestershire	77	79	80	94	n/a	14
177	NW Leicestershire	72	87	59	59	15	n/a
178	Charnwood	94	92	74	89	-1	15
179	NW Leicestershire	131	138	105	117	7	12
180	NW Leicestershire	88	100	75	70	12	n/a
181	NW Leicestershire	65	100	55	59	35	n/a
182	NW Leicestershire	57	86	61	93	29	33
183	Nottingham	58	93	55	62	35	n/a
184	Derby	14	105	17	54	92	n/a
185	Rushcliffe	52	58	63	95	n/a	32

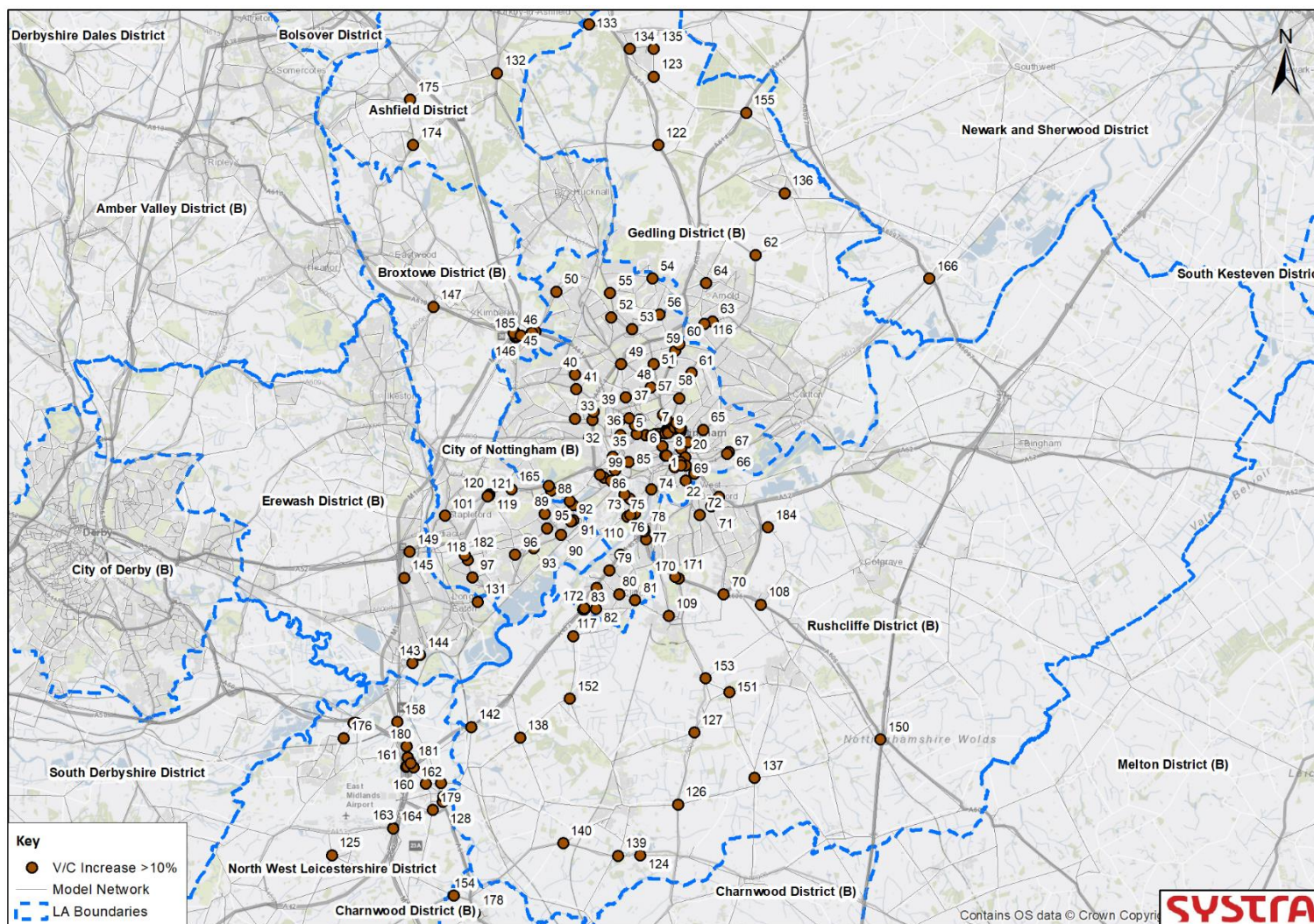


Figure 24. Overall GNPS Area Junction Locations

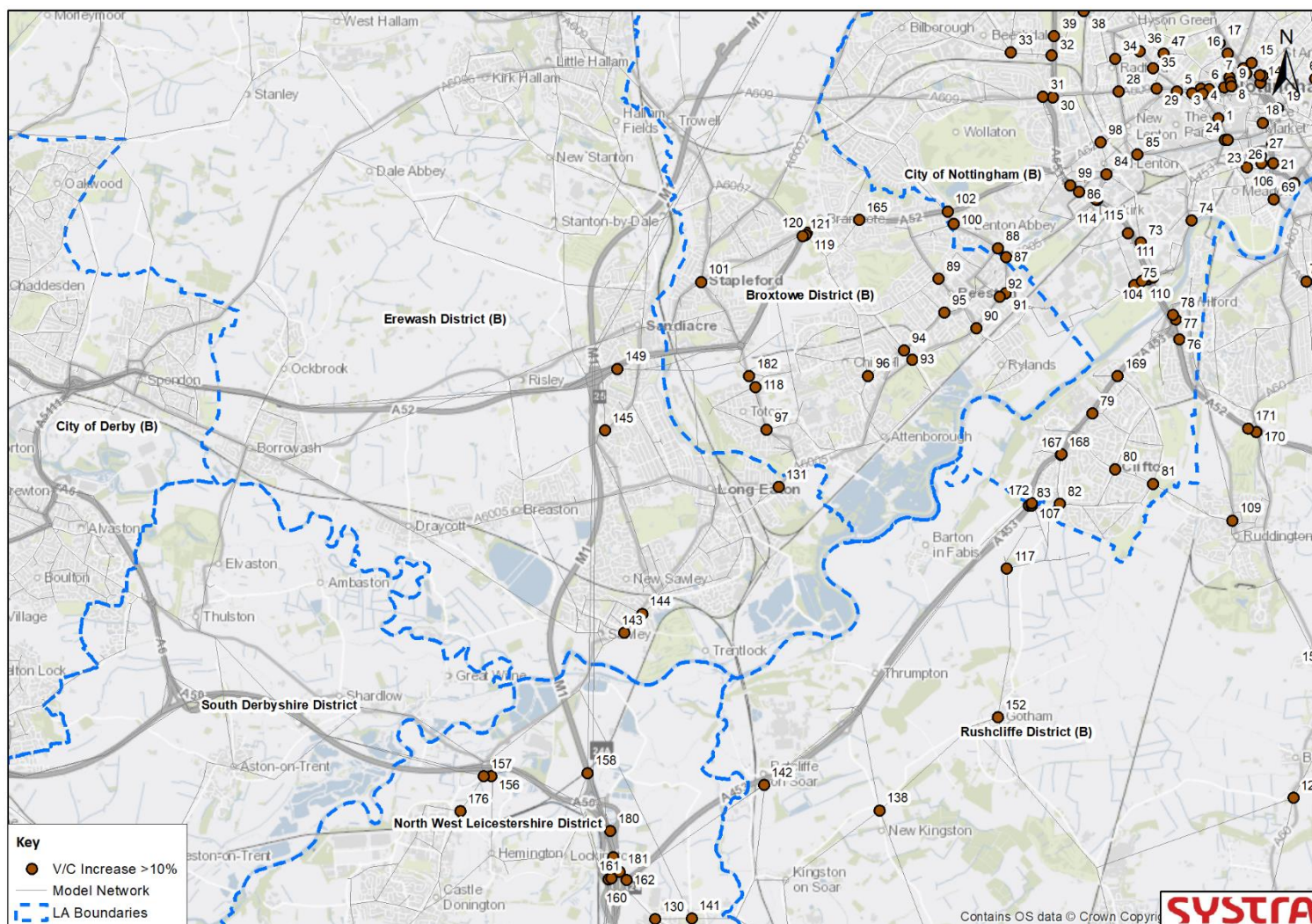


Figure 25. West GNSP Area Junction Locations

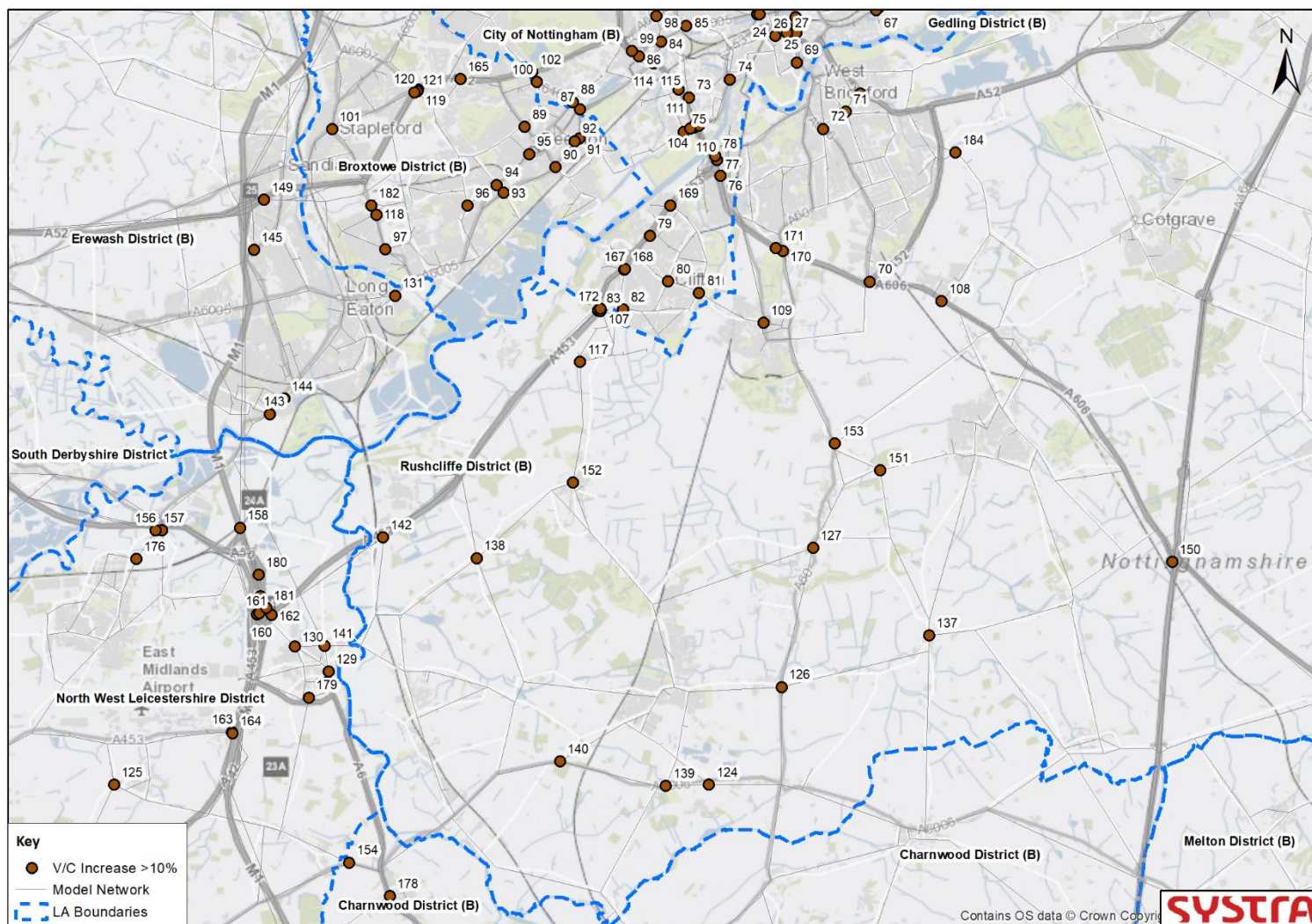


Figure 26. South GNSP Area Junction Locations

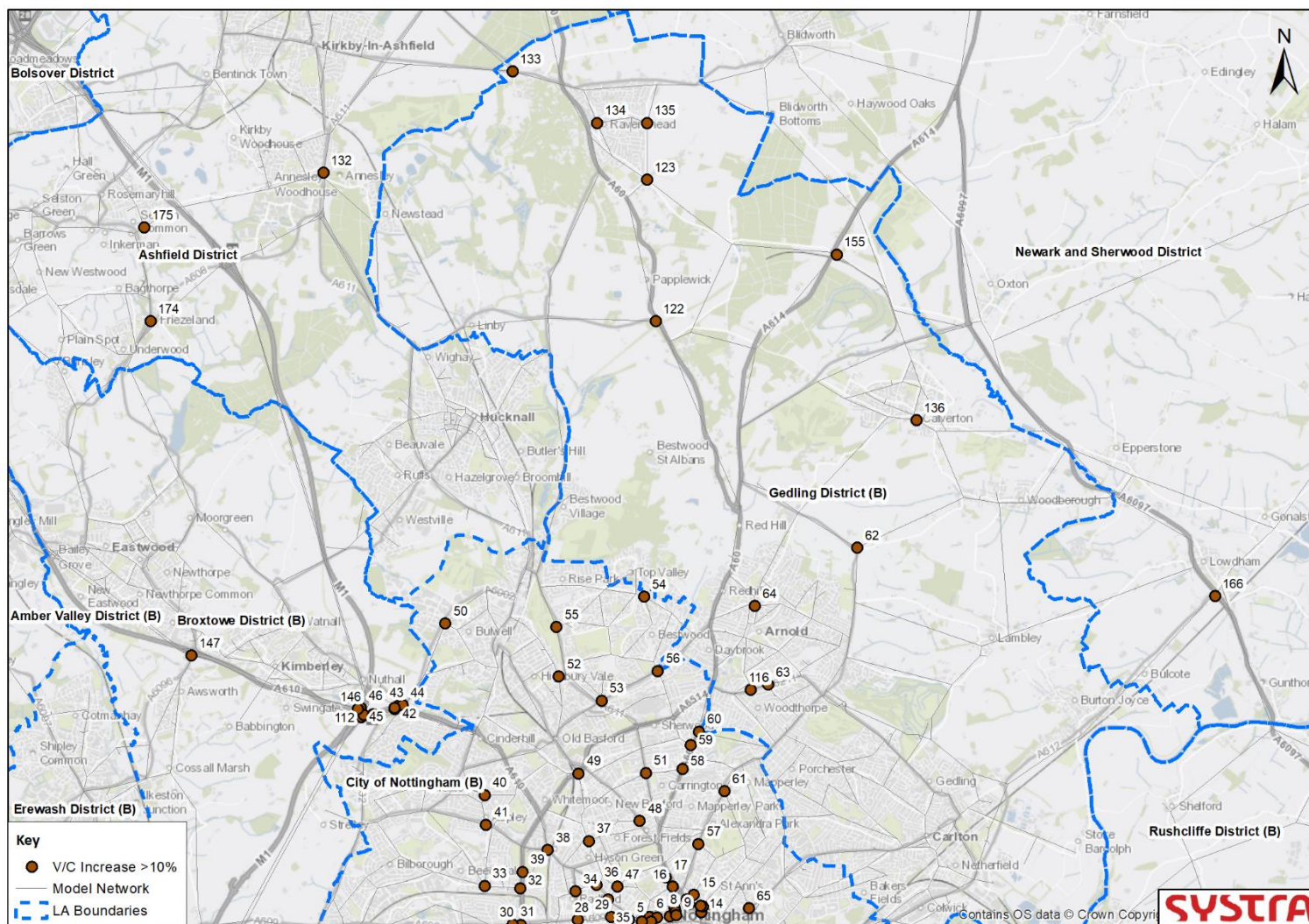


Figure 27. North GNSP Area Junction Locations

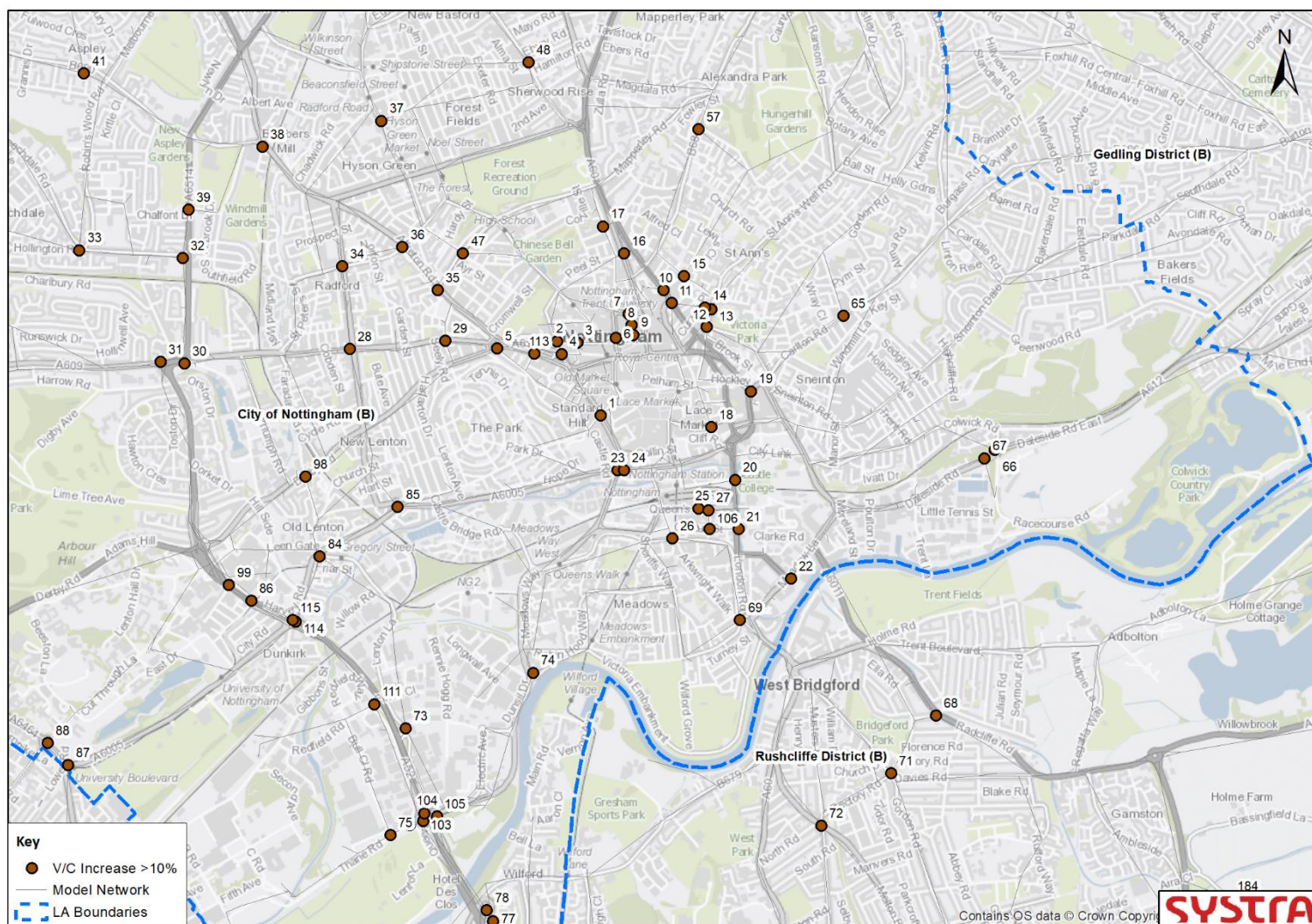


Figure 28. Nottingham City Centre Junction Locations

SYSTRA provides advice on transport, to central, regional and local government, agencies, developers, operators and financiers.

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Madrid, Rabat, Rome, Sofia, Tunis

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Seoul, Shanghai, Singapore, Shenzhen, Taipei

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Latin America:

Lima, Mexico, Rio de Janeiro, Santiago, São Paulo

North America:

Little Falls, Los Angeles, Montreal, New-York, Philadelphia,
Washington

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A.2 Planning status of sites allocated in the Greater Nottingham Strategic Plan

GNSP Site	Planning Status	Notes
Field Farm 450 homes	Full planning permission.	Under construction. Further developer contributions unlikely.
Toton and Chetwynd Barracks 2,700 homes in the plan period	Extant planning permission for 282 dwellings (17/00499/REM) on part of land to west of Toton/ Stapleford Lane. Three pending planning applications for a total of 1455 homes (see notes). Existing allocations in Part 2 Local Plan for 500-800 homes at Toton and 500 homes at Chetwynd Barracks.	Permission for 282 dwellings has been implemented (through ground works) but no indication if/ when development would be built out in accordance with this permission. Three planning applications currently pending consideration on other parts of the site: 25/00371/OUT: Land West Of Stapleford Lane Stapleford Nottinghamshire. Outline Planning Application for the construction of a residential development of up to 420 residential dwellings 25/00255/FUL: Land East Of Stapleford Lane Toton Nottinghamshire. Construct 155 dwellings and associated open space and infrastructure. 25/00306/OUT: Land Between A52 Stapleford And Chilwell Lane Bramcote Nottinghamshire. Outline planning application for a residential development of up to 880 homes (with some matters reserved) link road (means of access only), local centre, country park, education provision (forest school) and associated infrastructure. Planning application at Chetwynd Barracks expected early 2026.
Former Bennerley Coal Disposal 61ha of logistics	No planning permission	Planning application expected September 2025.
Boots 613 homes	Full planning permission.	Further developer contributions unlikely.

GNSP Site	Planning Status	Notes
Former Stanton Tip 500 homes	No planning permission	Will require subsidy from HE to deliver. (Note site unlikely to deliver the full quantum of development in the GNSP due to site abnormalities – 100 to 150 homes anticipated)
Broad Marsh 1,000 homes	No planning permission except for Diagnostic Centre on part of site.	Separate viability assessment identifies £6 million shortfall. Subsidy from HE required, HE actively engaged in delivery process.
South of Clifton 3000 homes	Full Planning Permission (under construction)	Further developer contributions unlikely.
Melton Road, Edwalton	Full Planning Permission (under construction)	Further developer contributions unlikely.
Land North of Bingham 1050 homes (of which 460 remain to be built)	Full Planning Permission (under construction)	Further developer contributions unlikely.
Former RAF Newton 470 homes (all built)	Full Planning Permission (under construction)	Further developer contributions unlikely.
Former Cotgrave Colliery	Full Planning Permission (under construction). Only a small are of employment land remains undeveloped	Further developer contributions unlikely.
East of Gamston / North of Tollerton 4,000 homes	No planning permission (two applications submitted – 1. for 2,250 homes and 2. for 1,600 homes)	
Former Ratcliffe on Soar Power Station	Planning permission for Energy from Waste facility, Local Development Order for whole site	Includes up to 36.4 of logistics. Developer contributions outside those reasonably allowed for by the LDO are unlikely, however a trigger clause limits development until capacity improvements to J24 are implemented.