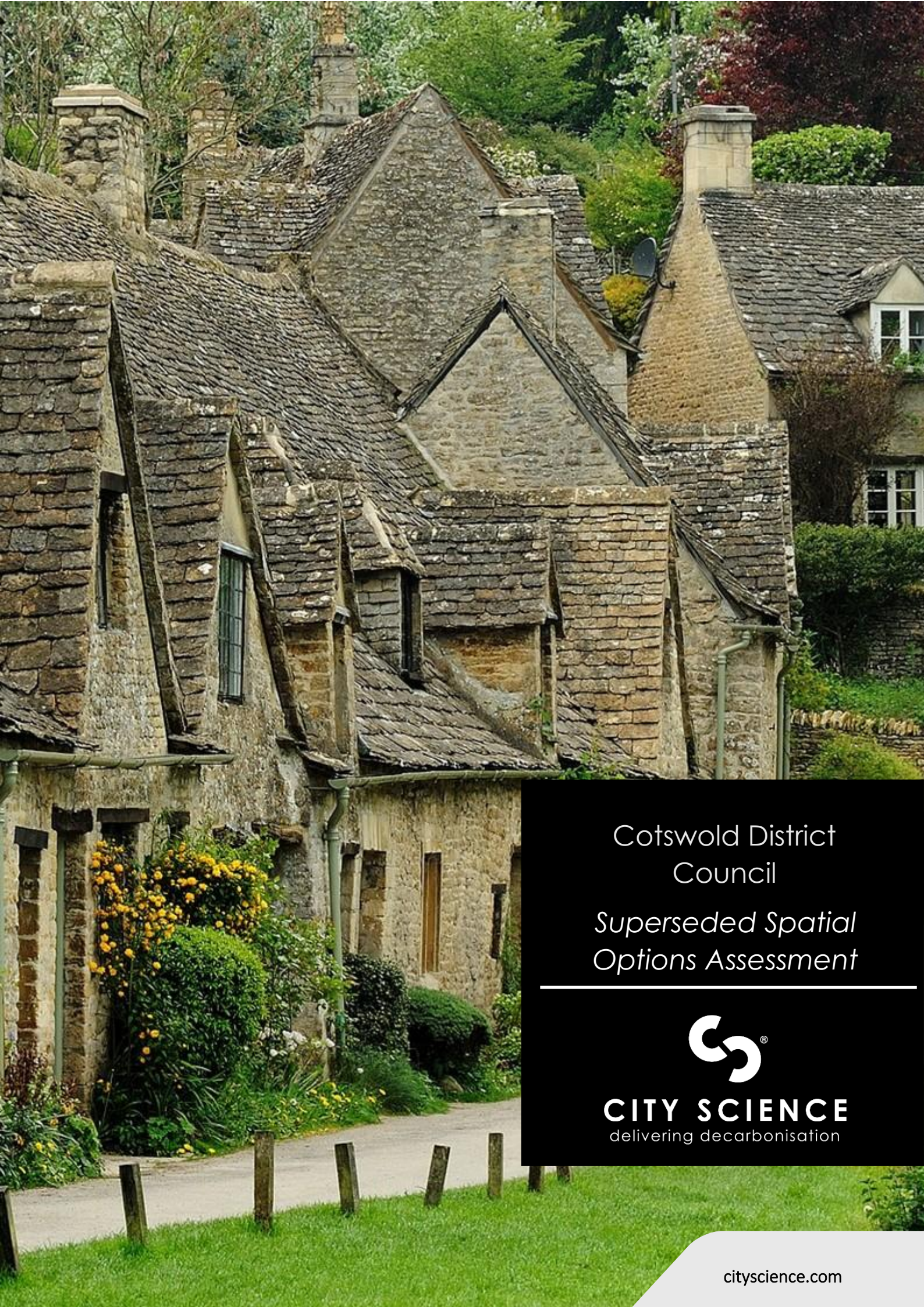




Cotswold District  
Council

*Superseded Spatial  
Options Assessment*

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# 1 Introduction

## 1.1 Overview

City Science has been commissioned by Cotswold District Council (CDC) to support the development of the Regulation 19 transport evidence base for the Cotswold Local Plan. The Gloucestershire Countywide Multi-Modal Model (GC3M) will support the identification of the preferred spatial option, assess the impacts of Local Plan land use on the transport network, and test potential transport interventions to inform the strategic transport assessment. Figure 1-1 illustrates the geographical extent of the GC3M and highlights the Cotswold District area.

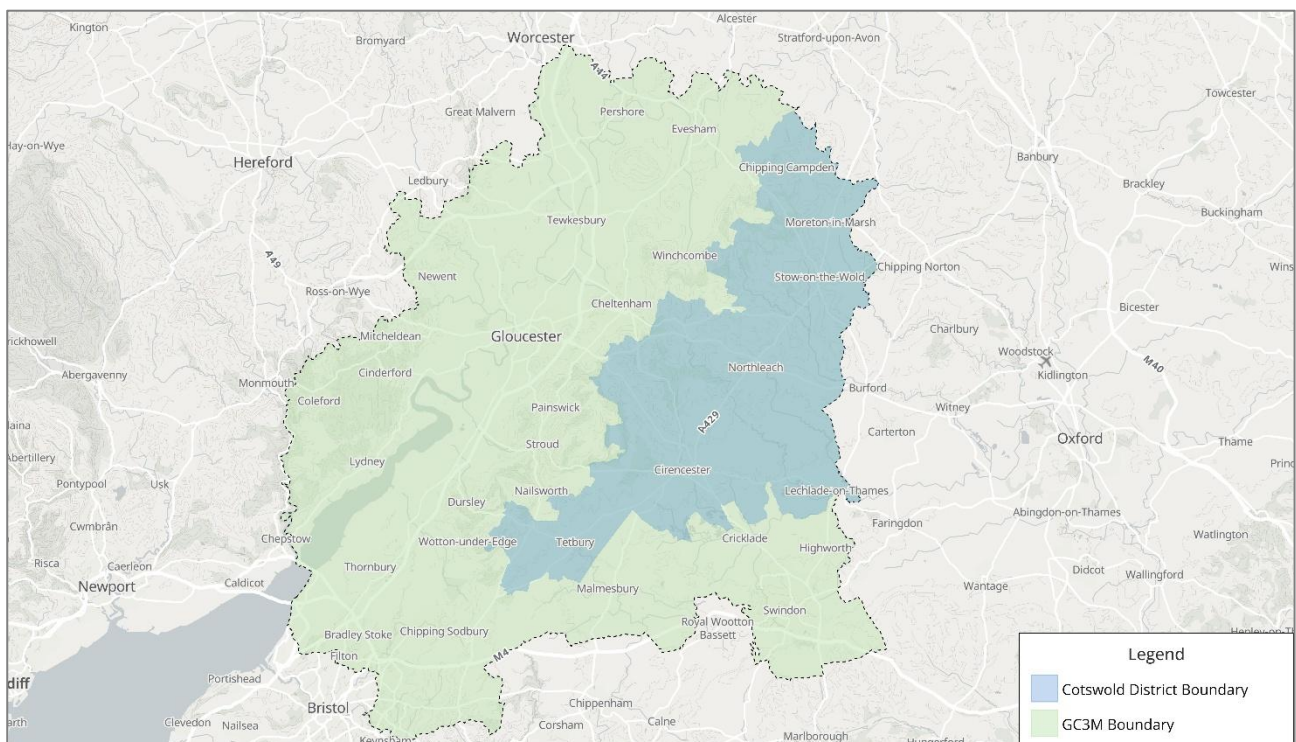


Figure 1-1: Extent of the GC3M and Cotswold District Boundary

## 1.2 Purpose of this Technical Note

The purpose of this Technical Note (see **Error! Reference source not found.** below) is to describe the approach to the assessment of the Spatial Options. This includes:

- An overview of the development of the Spatial Options.
- Derivation of trip rates from the TRICS database accompanied with a benchmarking assessment. This includes details of the mode share information for the Spatial Option developments.
- Representation of the Spatial Options within the Gloucestershire Countywide Multi-Modal Model (GC3M).
- Local area review of the 2024 Base Year GC3M in the vicinity of the potential strategic spatial option development sites
- The performance indicators and assessment framework to be used to compare the Spatial Options and the impacts of interventions.
- Lastly the conclusion, Section 5.2, provides initial information on the assessment approach of the Preferred Spatial Option (PSO). This includes details on the application of the VDM to assess modal shift, from car to active travel modes, derived from sustainable development interventions.

A separate appendix is provided along with this technical note and includes detailed information on the trip rates and trip-end forecasts of the spatial options.

This technical note outlines the approach to spatial option testing and how it fits within the overall proposed schedule of GC3M.

### 1.3 Proposed model runs

To identify the PSO and evaluate relative impacts and test interventions, the proposed model run schedule comprises 15 core model runs (Figure 1-2). These runs test different combinations of development scenarios, trip rate assumptions with a focus on vision and validate, and transport network interventions. The process is iterative, with four decision points built in to review results and guide the setup of subsequent runs. This approach ensures the modelling remains responsive to emerging insights and supports robust, evidence-based decision making. Each run is structured to address specific questions such as:

- The impacts of different development scenarios, including Business as Usual (BAU), three Spatial Options, and the PSO, on future travel demand.
- The effects of alternative trip rate assumptions, including standard trip rates and Vision & Validate (V&V).
- The implications of different background growth scenarios, including BAU growth, behaviour change scenarios (e.g. Behaviour Change Common Analytical Scenario (BCCAS)), and adjustments for more sustainable travel futures.
- The performance of different transport network assumptions, ranging from existing committed infrastructure to targeted interventions needed to achieve the transport vision.

Figure 1-3 provides a high-level overview of the modelling process, showing the purpose of each scenario, the sequence of model runs, and the key decision points. Further details on the model runs are provided in Table 1-1, which outlines the categorisations used to define the runs, and Table 1-2, which describes the proposed model runs in more detail.

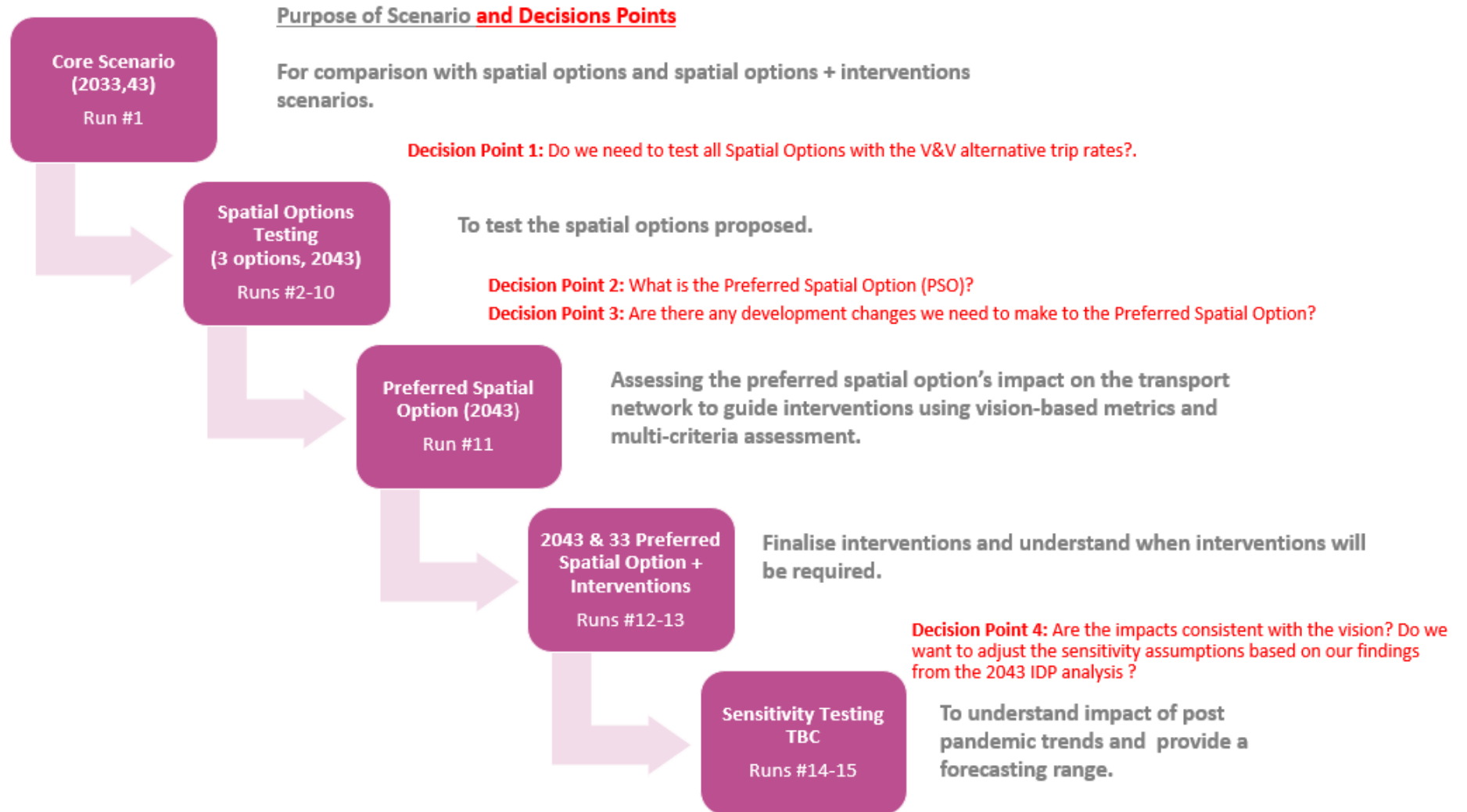


Figure 1-2: Overview of Each Stage in the Modelling Proce

| Category                                  | Acronym                                                 | Detail                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Trip Rates                                | STR                                                     | Standard trip rates applied to the Cotswold developments. Assumed to be a 'worst case' scenario in terms of number of car trips.                                                                                                                                                                       |
|                                           | V&V                                                     | Reflecting a 'Vision & Validate' approach, lower car trip rates and higher non-car trip rates applied to the Cotswold developments.<br>Mode share determined on a zone-by-zone basis by the demand model (e.g. higher public transport share for developments closer to the public transport network). |
|                                           | Refined Vision & Validate Trip Rate (V&V-R)             | Trip rates agreed for 'Vision & Validate' approach following testing of the four Spatial Options.<br>Mode share determined on a zone-by-zone basis by demand model (e.g. higher public transport share for developments closer to the public transport network).                                       |
| Development Scenarios                     | BAU                                                     | Committed, near certain and more than likely developments only.                                                                                                                                                                                                                                        |
|                                           | SO's                                                    | Cotswold Spatial Options.                                                                                                                                                                                                                                                                              |
|                                           | PSO                                                     | Cotswold Preferred Spatial Option.                                                                                                                                                                                                                                                                     |
|                                           | Refined Spatial Preferred Option (PSO-R)                | Cotswold Preferred Spatial Option refined during iterative testing.                                                                                                                                                                                                                                    |
| Background Demand Scenarios               | Core                                                    | Represents the 'BAU' background growth scenario to compare other scenarios to.                                                                                                                                                                                                                         |
|                                           | BCCAS                                                   | Behaviour Change Common Analytical Scenario (reflects variation in travel behaviour post pandemic, to be applied to the GCC area).                                                                                                                                                                     |
|                                           | Core Scenario plus lower car trip rates (referred GCC+) | Core plus lower trip rates and/or car mode share in Gloucestershire, to reflect GCC sustainable transport policies anticipated impacts (for example the local transport plan).                                                                                                                         |
| Forecast Years                            | 2033                                                    | Partial build-out. Interim year to examine the effects of the phasing of development.                                                                                                                                                                                                                  |
|                                           | 2043                                                    | Full Cotswold development demand and associated networks.                                                                                                                                                                                                                                              |
| Transport Network Scenarios (Supply Side) | Do-Minimum (Do Min)                                     | Existing, committed, near certain and more than likely transport investment only.                                                                                                                                                                                                                      |
|                                           | Site Access                                             | As above plus infrastructure necessary to access development sites.                                                                                                                                                                                                                                    |
|                                           | With Interventions (WI)                                 | As above plus transport interventions identified as necessary to achieve transport vision.                                                                                                                                                                                                             |

Table 1-1: Categorisation Used to Define Model Runs

| Run                                                                                                                                                                                                                                                    | Trip Rate | Dev Scenario                   | Year                           | Background   | Network (Supply) | Compare to Run # | Purpose                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------|--------------------------------|--------------|------------------|------------------|-------------------------------------------------------------------------------------------------------------------|
| #1                                                                                                                                                                                                                                                     | STR       | BAU                            | 2043, 2033                     | Core         | Do min           | n/a              | 'Business as usual' scenario to compare other scenarios to.                                                       |
| #2                                                                                                                                                                                                                                                     | STR       | SO #4                          | 2043                           | Core         | Access           | #1               | Assess the impacts of SO #4 without intervention compared to 'Business as usual'.                                 |
| #3                                                                                                                                                                                                                                                     | STR       | SO #5                          | 2043                           | Core         | Access           | #1               | Assess the impacts of SO #5 without intervention compared to 'Business as usual'.                                 |
| #4                                                                                                                                                                                                                                                     | STR       | SO #6                          | 2043                           | Core         | Access           | #1               | Assess the impacts of SO #6 without intervention compared to 'Business as usual'.                                 |
| #5                                                                                                                                                                                                                                                     | STR       | SO #4 scaled up to match SO #6 | 2043                           | Core         | Access           | #1               | To address variations in housing numbers across the spatial options and support a fair, like-for-like comparison. |
| #6                                                                                                                                                                                                                                                     | STR       | SO #5 scaled up to match SO #6 | 2043                           | Core         | Access           | #1               | To address variations in housing numbers across the spatial options and support a fair, like-for-like comparison. |
| <b>Decision Point 1:</b> Do we need to test all SOs with the V&V alternative trip rates?                                                                                                                                                               |           |                                |                                |              |                  |                  |                                                                                                                   |
| #7                                                                                                                                                                                                                                                     | V&V       | SO #4                          | 2043                           | Core         | Access           | #1 #2            | Assess the impacts of a V&V approach to SO #4 compared to a traditional approach and BAU.                         |
| #8                                                                                                                                                                                                                                                     | V&V       | SO #5                          | 2043                           | Core         | Access           | #1 #3            | Assess the impacts of a V&V approach to SO #5 compared to a traditional approach and BAU.                         |
| #9                                                                                                                                                                                                                                                     | V&V       | SO #6                          | 2043                           | Core         | Access           | #1 #4            | Assess the impacts of a V&V approach to SO #6 compared to a traditional approach and BAU.                         |
| #10                                                                                                                                                                                                                                                    | V&V       | SO #4-6                        | 2043                           | CDC+         | Access           | #1 #7 - #9       | Assess the effect of the LP assuming a more sustainable future.                                                   |
| <b>Decision Point 2:</b> What are the key issues to consider? What is the PSO? Which background scenario is brought forward (Core or CDC+?)                                                                                                            |           |                                |                                |              |                  |                  |                                                                                                                   |
| #11                                                                                                                                                                                                                                                    | V&V-R     | PSO                            | Full Buildout to 2043 & beyond | CDC+ or Core | Access           | #1 #10 or #7 -#9 | Assess the impacts of the PSO assuming minimal transport investment. Trip rates to be confirmed.                  |
| <b>Decision Point 3:</b> Informed by the ongoing assessment of the model runs, are there any development changes or adjustments we need to make to the PSO?                                                                                            |           |                                |                                |              |                  |                  |                                                                                                                   |
| #12                                                                                                                                                                                                                                                    | V&V-R     | PSO-R?                         | 2043                           | CDC+ or Core | WI               | #1 #11           | Iterate to identify preferred transport measures required to achieve vision. Possible revised PSO.                |
| <b>Decision Point 4:</b> Are the impacts consistent with the vision? Are measures deliverable? If not, what further measures need to be considered? Do we want to adjust the sensitivity assumptions based on our findings from the 2043 IDP analysis? |           |                                |                                |              |                  |                  |                                                                                                                   |
| #13                                                                                                                                                                                                                                                    | V&V-R     | PSO-R?                         | 2033                           | CDC+ or Core | WI               | #1 #12           | Understand the interim position in 2033 assuming a PSO(-R) and the Cotswold interventions.                        |
| #14                                                                                                                                                                                                                                                    | V&V-R     | BAU                            | 2043                           | BCCAS        | Do Min           | #1               | 'Behaviour change' Common Analytical Framework (CAF).                                                             |



| Run | Trip Rate | Dev Scenario | Year | Background | Network (Supply) | Compare to Run # | Purpose                                                                      |
|-----|-----------|--------------|------|------------|------------------|------------------|------------------------------------------------------------------------------|
| #15 | V&V-R     | PSO-R?       | 2043 | BCCAS      | WI               | #12 #14          | Understand the sensitivity of the PSO impacts to national post-COVID trends. |

*Table 1-2: Proposed Model Runs*

## 2 The Spatial Options

### 2.1 Development of the Spatial Options

Seven spatial options have been identified by CDC to explore different ways of delivering the total proposed housing growth over the local plan period. Of these, Spatial Options 4, 5, and 6 will be explicitly modelled as per CDC's request. This will be compared against the core minus scenario, see section 3.1 for more details. The three spatial options are subject to an on-going Regulation 18 Consultation, and final call for sites, but are the best available position to produce proportionate evidence within the time constraints of the transitional plan-making system.

| Spatial Options  | Description                                                                                                                                                                                                                                                                                      |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Spatial Option 1 | Allocates sites in Principal Settlements, Non-Principal Settlements and Village Clusters and support Rural Exception Sites in Rural Settlements                                                                                                                                                  |
| Spatial Option 2 | Allocates sites in Principal Settlements, Non-Principal Settlements, Village Clusters and Rural Settlements                                                                                                                                                                                      |
| Spatial Option 3 | Main Service Centre focus                                                                                                                                                                                                                                                                        |
| Spatial Option 4 | Focuses growth around transport nodes                                                                                                                                                                                                                                                            |
| Spatial Option 5 | Allocates sites in Principal Settlements, Non-Principal Settlements and Village Clusters. Support Rural Exception Sites in Rural Settlements. Create new settlement(s) and/or strategic extensions to existing settlement(s)                                                                     |
| Spatial Option 6 | Allocates sites in Principal Settlements, Non-Principal Settlements and Village Clusters. Support Rural Exception Sites in Rural Settlements. Create new settlement(s) and/or strategic extensions to existing settlement(s). Supports major development within the Cotswolds National Landscape |
| Spatial Option 7 | Maximises growth across the district (for example, via additional new settlement(s) / strategic extensions)                                                                                                                                                                                      |

Table 2-1. Summary of spatial options

## 2.2 Additional Spatial Options (SO4+ & SO5+)

At present, the level and distribution of additional local plan housing across each spatial option vary due to a significant gap between the supply of suitable sites and the Government's housing requirement figure. Ideally, the assessment should compare spatial options that deliver the same overall level of housing growth to ensure a fair and robust appraisal of reasonable alternatives (i.e. a "like-for-like" comparison). To address the variation in housing numbers across the spatial options, two additional model runs will be undertaken during the Spatial Options Testing Stage. These are referred to as sensitivity tests and will involve increasing the housing numbers in Spatial Options 4 and 5 so that all scenarios deliver the same total level of housing as Spatial Option 6. Testing the performance of each spatial strategy under maximum development pressure makes differences between spatial options, and their associated transport impacts, more evident and easier to distinguish. A review of the impact of the scaling shows that the median density of sites without any additional scaling (SO4, SO5, SO6) is around 15 dwellings per hectares - the median for Output Areas within Gloucestershire. For the scaled sensitivity tests median densities are 40 dwelling per hectare and 30 dwellings per hectare for SO4+ and SO5+ respectively. All spatial options, with the exception of SO4+, have maximum site densities below the maximum density of Output Areas within Gloucestershire., it is worth noting that this approach may require unrealistic assumptions about the capacity of Spatial Options 4 and 5 to accommodate additional growth.

## 2.3 Residential Developments

### 2.3.1 Spatial Option 4

Spatial Option 4 represents a public transport-focused growth scenario that concentrates future development along key public transport corridors and around existing and potential transport hubs. The option seeks to locate growth in areas with good current access to public transport, or where there is realistic potential for service enhancement, thereby encouraging travel by sustainable modes. Bus service provision varies across the district, with some areas benefiting from relatively good levels of service, while others experience limited coverage, particularly during off-peak periods. Rail provision is focused on the district's two stations at Kemble and Moreton-in-Marsh, which represent important strategic transport nodes. By directing development towards these locations, Spatial Option 4 aims to reduce reliance on the private car, helping to alleviate congestion and reduce transport-related emissions. The scenario includes several strategic urban extensions at key transport nodes where opportunities for sustainable travel exist. The principal strategic allocations under this option are: Cirencester (2,458 dwellings) and Kemble (593 dwellings) in the south and Moreton-in-Marsh (1,779 dwellings) in the northeast. Overall, Spatial Option 4 is estimated to deliver approximately 9,897 dwellings over the Local Plan period, equating to around 53% of the identified housing requirement.



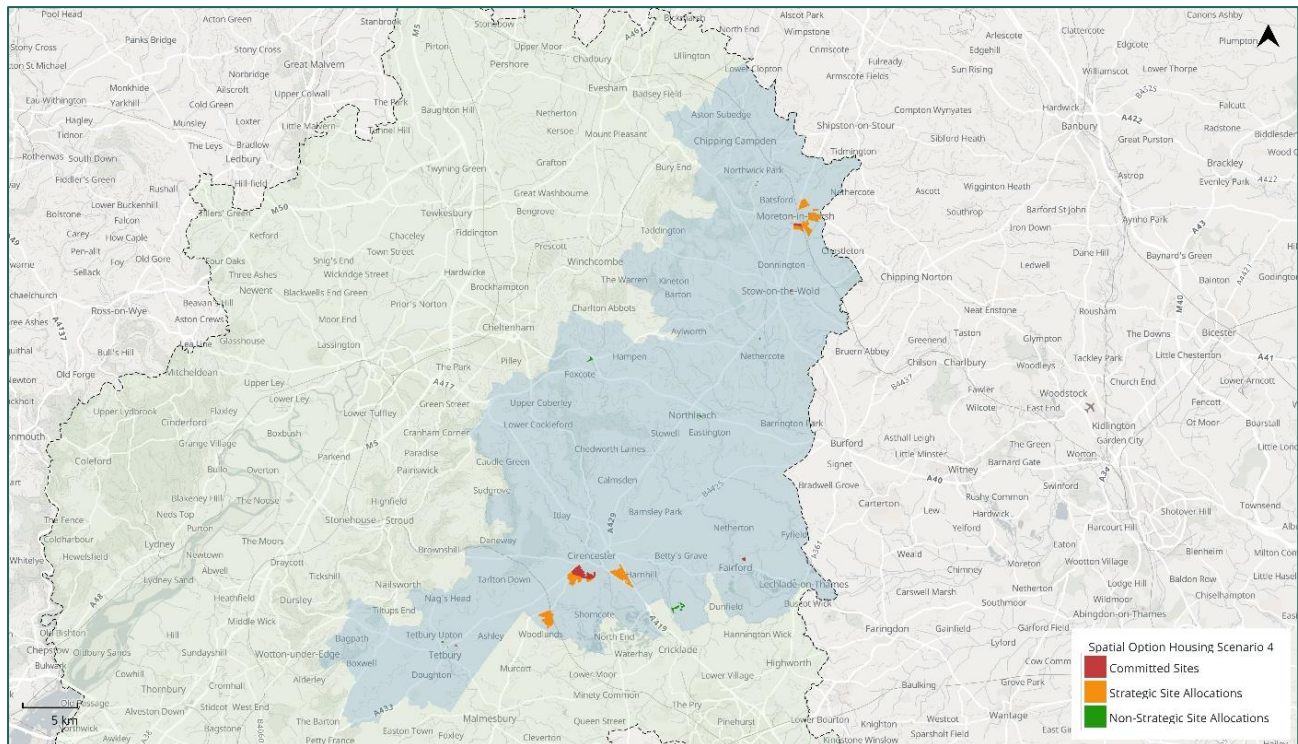


Figure 2-1 Spatial Option 4 Sites

### 2.3.2 Spatial Option 5

Spatial Option 5 allocates development within Principal Settlements, while also identifying Non-Principal Settlements and Village Clusters that have developable land suitable for growth. In addition, the option introduces the potential for new settlements or strategic extensions to existing towns or villages within the district, collectively referred to as strategic sites. These strategic sites would be planned to achieve, as a minimum, a level of services, facilities, and employment provision comparable to that of a Non-Principal Settlement, thereby supporting more sustainable patterns of development. Currently, eight locations across the district have been identified as having potential for strategic-scale growth. The principal strategic allocations under this option are: Cirencester (3,052 dwellings), Moreton-in-Marsh (1,776 dwellings), and Kemble (587 dwellings). Overall, Spatial Option 5 is estimated to deliver approximately 14,604 dwellings over the Local Plan period, equating to around 78% of the identified housing requirement.

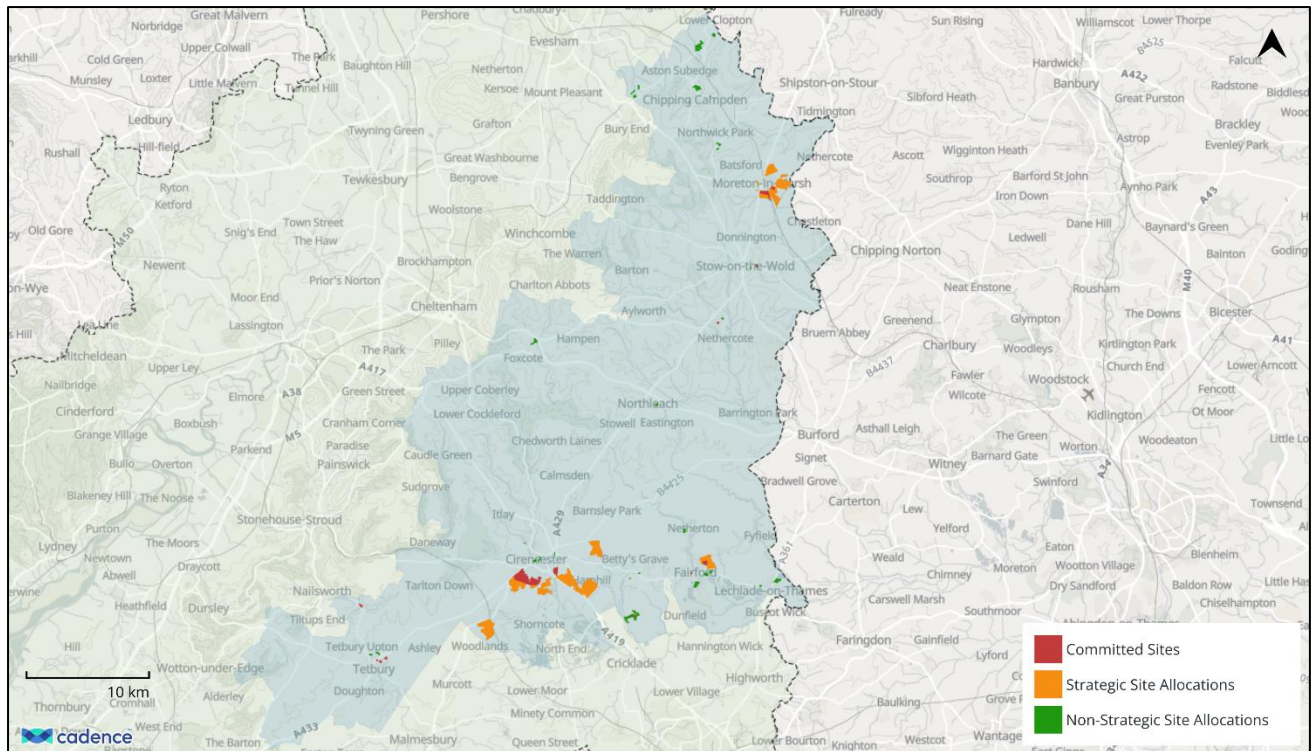


Figure 2-2. Spatial Option 5 Sites

### 2.3.3 Spatial Option 6

Spatial Option 6 builds upon Spatial Option 5 by testing the theoretical maximum capacity for housing and associated development across the district, including locations within the Cotswolds National Landscape. The purpose of this option is to explore the upper limits of potential growth by considering development in areas that are subject to higher levels of planning constraint due to their landscape designation. Spatial Option 6 retains all strategic sites and settlement growth identified under Spatial Option 5, while additionally allowing for further development within the Cotswolds National Landscape. This includes the potential for new settlements or strategic extensions to existing settlements located within the National Landscape, as well as increased levels of growth in Principal, Non-Principal, and Rural Settlements within these areas. The principal strategic allocations under this option are: Cirencester (4,012 dwellings), Moreton-in-Marsh (2,111 dwellings), and Kemble (587 dwellings). Overall, Spatial Option 6 is estimated to deliver approximately 23,502 dwellings over the Local Plan period, which is higher than the identified housing requirement.



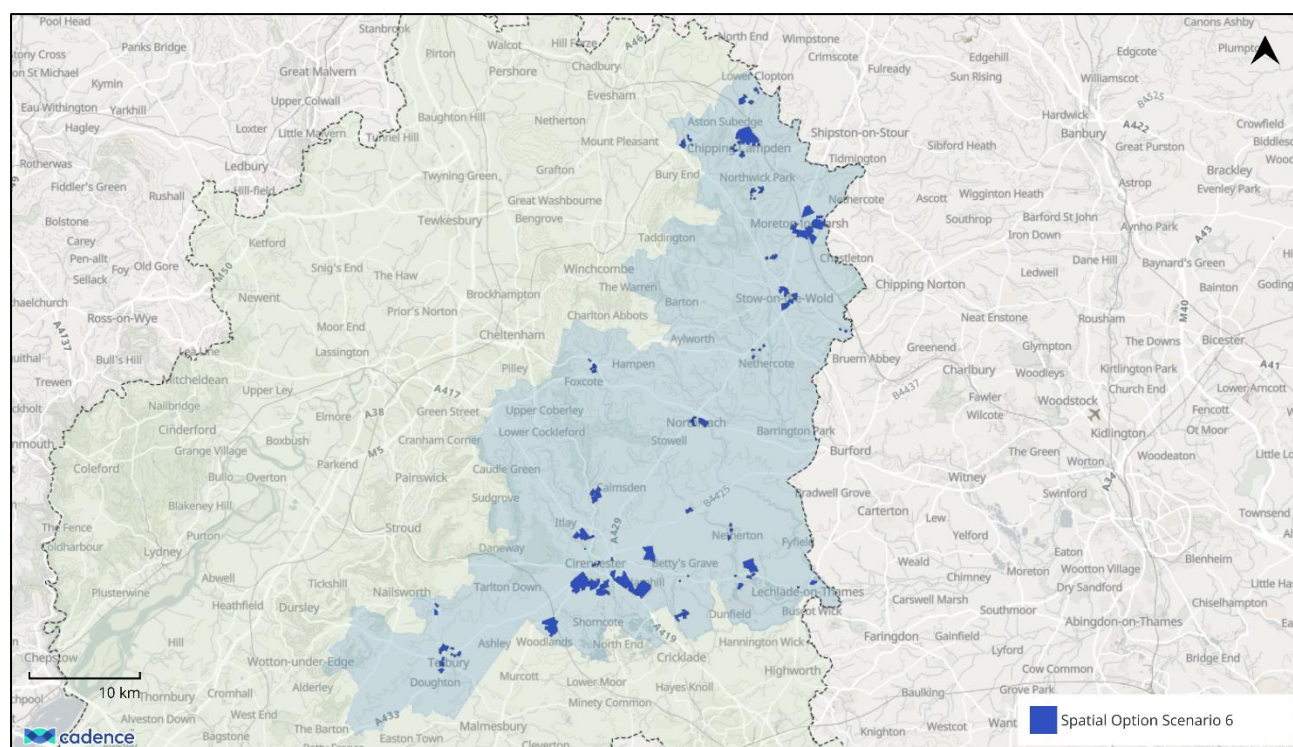


Figure 2-3. Spatial Option 6 Sites

### 2.3.4 Spatial Option Categories

Table 2-2 presents the assumed level of development by category for each Spatial Option, while Figure 2-4 illustrates the same information as a percentage for easy comparison across the options.

|                                                                                          | SO4         | SO5          | SO6          | SO4+         | SO5+         |
|------------------------------------------------------------------------------------------|-------------|--------------|--------------|--------------|--------------|
| <b>Committed Dwellings</b>                                                               | 2912        | 2859         | 2859         | 2859         | 2859         |
| <b>Potential Non-Strategic Site allocations in Principal Settlements</b>                 | 148         | 1586         | 1586         | 422          | 2755         |
| <b>Potential Non-Strategic Site allocations in Non-Principal Settlements</b>             | 359         | 556          | 556          | 1023         | 966          |
| <b>Potential Strategic Sites / New Settlements</b>                                       | 3655        | 6816         | 6816         | 15847        | 13950        |
| <b>Remaining Non-Strategic Allocations from current plan without planning permission</b> | 286         | 250          | 250          | 815          | 434          |
| <b>Windfalls</b>                                                                         | 2537        | 2537         | 2537         | 2537         | 2537         |
| <b>National Landscape Allocations</b>                                                    | -           | -            | 8898         | -            | -            |
| <b>Total</b>                                                                             | <b>9897</b> | <b>14604</b> | <b>23502</b> | <b>23502</b> | <b>23502</b> |

Table 2-2: Level of Development for each Spatial Option by Category

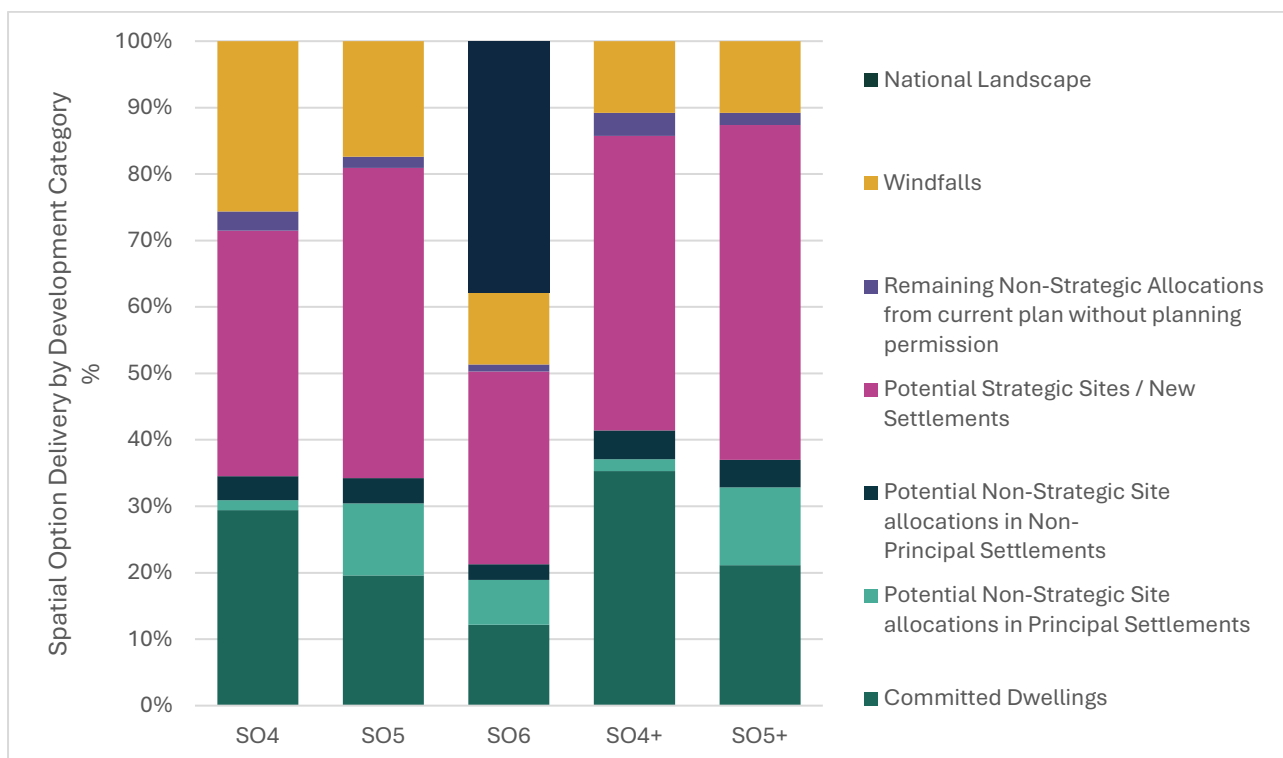


Figure 2-4 Spatial Option Delivery by Development Category

## 2.4 Employment Developments

Table 2-3 and Figure 2-5 identify the two employment sites that are common across all spatial options, displaying their land in hectares and the assumed distribution of employment land by use class (B2 Industrial and B8 Warehousing). These sites represent the only employment site allocations included consistently across the spatial options.



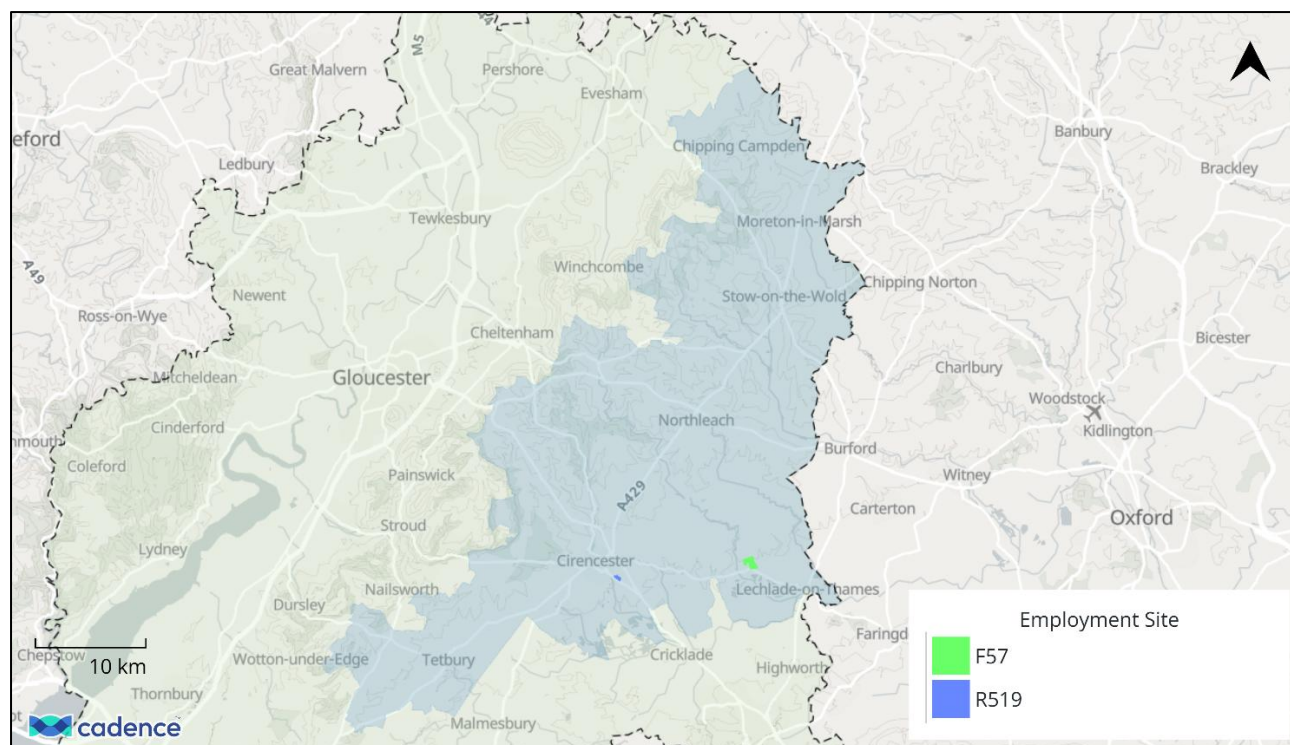


Figure 2-5: Employment Sites

| Parish   | Site Ref | Site Name                   | Non-Res Development     |
|----------|----------|-----------------------------|-------------------------|
| Preston  | R519     | Land South of Preston       | 6ha B uses (open B2/B8) |
| Fairford | F57      | Land north-east of Fairford | 2ha B uses (open B2/B8) |

Table 2-3: Employment Sites

## 3 Spatial Option Forecasting Approach

### 3.1 Overview

The GC3M is a strategic multi-modal model developed by AtkinsRéalis for Gloucestershire County Council. It is focused on the six Local Authority areas in the county (Cheltenham, Gloucester, Stroud, Cotswolds, Tewkesbury and the Forest of Dean). The GC3M includes a highway assignment in Saturn, and public transport model and Variable Demand Model (VDM) in Visum.

The 'Forecasting Approach Technical Note' (November 2025) explains how the Without Local Plan (Core) Scenario was developed. In summary, this scenario sets out the central assumptions for future travel demand and will be built to provide a consistent baseline to derive all background growth, modal shares and trip distributions for the Spatial Options. To ensure it is reliable, the scenario is based on published plans reflecting 'firm and funded' government policies, uses central projections for key demand drivers, and is designed to be unbiased, coherent, realistic, and plausible.

As discussed in Section 4.2 of the 'Present Year Validation Technical Note' (January 2026), an updated 2024 GC3M provides the baseline for assessing the forecast year Cotswold development scenarios. As such the 2024 demand matrix alterations and supply side updates will be incorporated into the forecast year models, based on an interpolation approach, which are developed from a 2019 GC3M VDM. Figure 3-1 below provides an overview of the application of the GC3M VDM within the Core Scenario runs.

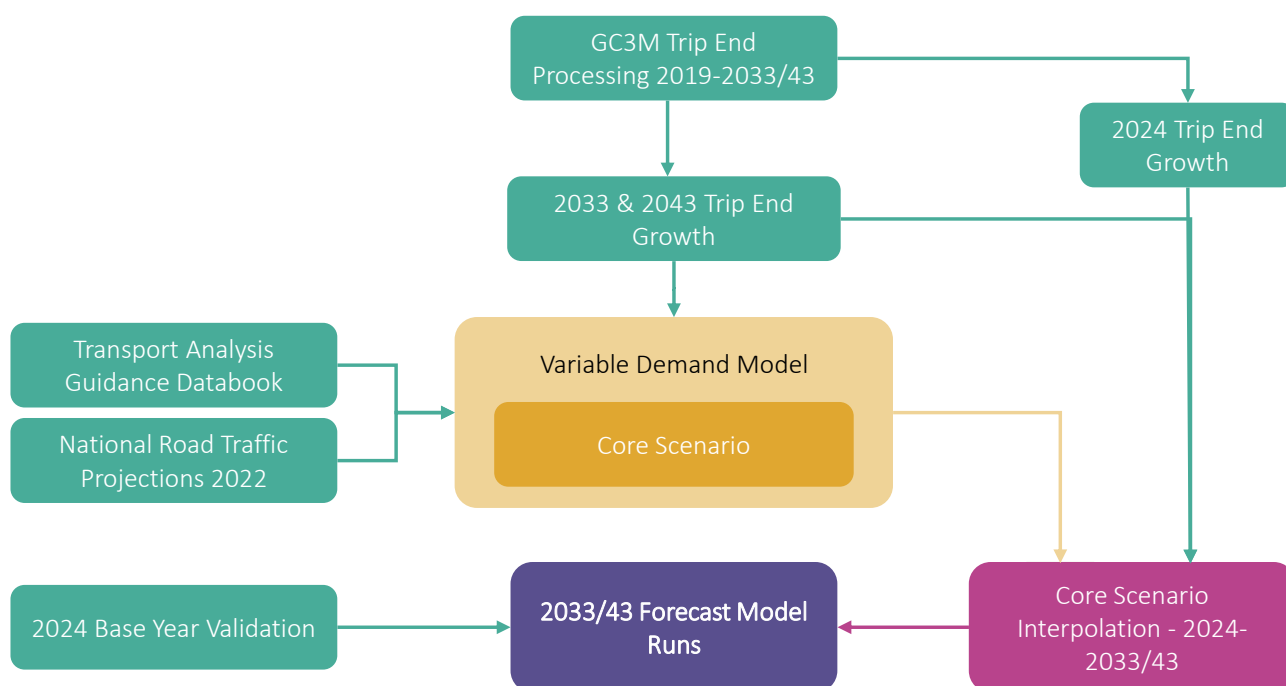


Figure 3-1: GC3M VDM Forecasting Methodology Overview

The Without Local Plan (or 'Core Scenario') model run outputs will then feed into the Spatial Option testing, as shown in Figure 3-2. The Spatial Options show illustrative patterns of growth that differ from the development assumed in the Core Scenario. As each Spatial Option includes different amounts of committed development, they need a consistent basis for comparison. For this reason, the Spatial Options are assessed separately rather than added directly to the Core Scenario, allowing us to understand the impacts of different levels and distributions of growth across the Cotswold area.

To achieve this, the proposed Spatial Option allocations are added to a 2043 Core Minus demand matrix. This 2043 Core Minus Scenario captures all forecasted growth between 2024 and 2043 except development within the study area. It includes:

- **Background Growth:** Across the external area and the wider Gloucestershire area will be derived from the 2043 Core scenario model
- **Cotswold Development Growth:** Will be set back to 2024 base year demand levels.

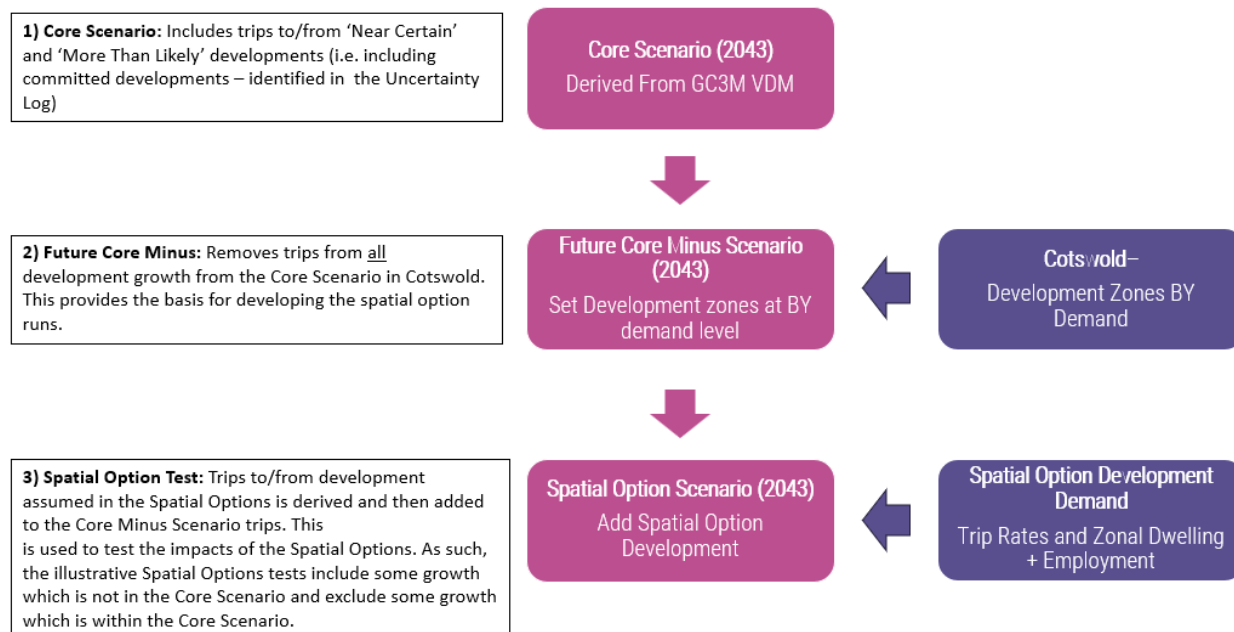


Figure 3-2: GC3M Spatial Option Forecasting Methodology Overview

Spatial Option developments will then be forecasted using site-specific trip rates to produce a Local Plan development matrix. The demand distributions for these sites will be taken from existing zones and adjacent zones from the Core Scenario model. This approach allows each Spatial Option to be modelled consistently, using two sets of forecasted trip rates – standard and V&V. Sections 3.2 and 0 describe how these trip rates are derived, benchmarked and applied within the GC3M, including how the resulting demand matrices and necessary network coding are derived. Table 3-1 provides a summary of the Core Scenario, Future Core Minus and Spatial Option forecast model specifications.

| Scenario                  | Background Growth | Cotswold COMMITTED development Growth | Local Plan Sites  |
|---------------------------|-------------------|---------------------------------------|-------------------|
| Core (without local plan) | Yes               | Yes, derived from GC3M UL             | No                |
| Future Core Minus         | Yes               | No                                    | No                |
| Spatial options           | Yes               | Yes                                   | Yes, illustrative |

Table 3-1: Future year growth specifications - Core Scenario, Future Core Minus and Spatial Option

This approach provides a clear basis for testing the Spatial Options with both sets of forecasted trip rates, enabling comparison with the Core Minus Scenario and supporting a robust framework to assess their incremental impacts.

It should be noted that, as part of a vision-led approach, a wider variety of scenarios are required to be tested within the evidence base “taking into account all reasonable future scenarios”. Therefore, as discussed in Section 1.3, the assessment of the Spatial Options represents one set of the proposed GC3M runs, within the overall assessment. Following the assessment of the outputs of the spatial

options and the identification of the PSO, further iteration and refinement of the PSO will be undertaken as the assessment develops.

## 3.2 Trip Rates - Residential

### 3.2.1 Overview

Table 3-2 below summarises the trip rate categories used within the TRICS8 database. The selected sites were chosen based on the following:

- **Compatibility with Spatial Option Sites:** The 'Mixed Private and Non-Private Housing' category was used to match potential development site types.
- **Multi-modal Surveys:** Only sites with surveys covering all transport modes, private vehicles, public transport, and active travel, were included.
- **Weekday Surveys:** Data from Monday to Friday was used (a small number of Friday records (2) were utilised to increase the sample size).
- **Recent Data:** Surveys conducted from 1 January 2016 onwards were included, excluding 2020 and 2021 due to pandemic-related travel impacts.
- **Geographic Coverage:** Around 50 sites across the Southwest, Southeast, Midlands, Wales, and East Anglia were considered. Sites in Greater London and major Northern cities were excluded. Data was further filtered based on availability and selection criteria.

After applying these criteria, 32 sites with between approximately 15 and 400 units each were analysed. These sites were divided into the subcategories shown in Table 3-2.

| Location                  | Type     | Assumptions                                                                                                                                                 |
|---------------------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Residential Zone          | Standard | Based on 19 surveys defined as "Residential Zone" located primarily at the Edge of Town (15 Edge of Town, 3 suburban Area, 1 Neighbourhood Centre).         |
|                           | V&V      | Based on an example site with calculation assumptions applied as defined below (approx. 400 dwellings out of Edge of Town site).                            |
| Residential Zone Isolated | Standard | Based on a subset of five surveys from the Residential Zone location dataset, all specified as less than 5,000 population within one mile (5 Edge of Town). |
|                           | V&V      | Based on the calculation assumptions defined below.                                                                                                         |
| Village                   | Standard | Based on 13 surveys defined as "Village" all located in Neighbourhood Centres.                                                                              |
|                           | V&V      | Based on an example site with calculation assumptions applied as defined below (approx. 200 dwellings Neighbourhood Centre site).                           |

Table 3-2: Trip Rate Location Definitions

In summary, trip rates for the Spatial Option developments are categorised into three location classes, each with two types of trip rate (see Table 3-3). These trip rates are used to forecast travel demand and assess the likely transport impacts of new development.

| Trip Rate Type | Description                                                                                                                                                                |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard       | Applied to all developments. Represents a 'worst case' scenario in terms of car trips. These rates are derived from the overall average rates from each location category. |



|                |                                                                                                                                                                                                                                                                       |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>V&amp;V</b> | Applied in line with the vision-led approach, with lower car trip rates and higher non-car trip rates. These are calculated based on selected examples of well-located developments with good access to public transport and active travel options as outlined below. |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Table 3-3: Trip Rate Descriptions

Initially, example V&V trip rates were selected from the overall dataset for developments that were of a suitable size and type, and which had good access to the public transport network. These examples were used to understand the potential difference between the standard trip rates and a vision-led approach encouraging sustainable travel. The key findings from these examples are summarised in Table 3-4 below.

|                                | Residential Zone V&V                                                                                                                         | Village V&V                                                                                                                      |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Size &amp; Location</b>     | ~400 dwellings at the edge of Stratford-upon-Avon.                                                                                           | ~550 dwellings in Wolvercote, around 9 miles from Oxford city centre.                                                            |
| <b>Public Transport Access</b> | 36 bus services within 400m and 68 train services within 1km (weekday 07:00-19:00).                                                          | 118 bus services within 400m (weekday 07:00-19:00).                                                                              |
| <b>Car Trips</b>               | Approximately 50% reduction in the AM peak and 20% reduction in the Inter-Peak (IP) and PM peak periods.                                     | Approximately 30% reduction in the AM peak, 30% reduction in the IP, and 60% reduction in the PM peak.                           |
| <b>Public Transport Trips</b>  | Small increases in trips, approximately 0.01 trips/hour in the AM peak, 0.02 trips/hour in the PM peak, and 0.3 trips/hour in the IP period. | Increases of approximately 0.03 trips/hour in the AM peak, 0.05 trips/hour in the PM peak, and 0.16 trips/hour in the IP period. |

Table 3-4: Examples Used to Demonstrate Difference in Standard and V&amp;V Trip Rates

Using individual sites from TRICs in isolation could be unrepresentative and introduce limitations into the analysis. To address this, the adjustments were generalised using a set of defined rules to ensure the V&V trip rates are robust and consistent. The exemplar trip rates were therefore used as an initial guide to inform the development of the V&V trip rate adjustments. From this assessment, the following assumptions were applied:

- V&V car and LGV trips were limited to a maximum reduction of 20%, which corresponds to the lower end of the reductions observed in the example sites.
- The reduction in car trips was reallocated to public transport, walking, and cycling, while ensuring that the change in modal share did not exceed 10% for any mode.

The calculation process assumptions for deriving the V&V trip rates was as follows:

- **Step 1 - Extract Initial Example:** An initial V&V trip rate was selected from the overall dataset as a reference point. It was based on a search of the selected TRICS dataset based upon the analysis of the criteria specified in Table 3-4.
- **Step 2 - Address Limitations of Single-Site Data:** Using a single site in isolation is not feasible, particularly for lower-volume modes, due to natural variations in observed data. To overcome this, a series of rules were applied to generalise the adjustments at the modal level.
- **Step 3 – Apply Rules by Mode:**

- **Car Driver & LGV:** V&V trip rates were limited to a maximum reduction decrease of 20%. This was based on the analysis of the TRICS data and what is feasible for a global parameter.
- **Rail & OGV:** A minimum trip rate of 0.001 was applied to both Standard and V&V categories. This is to avoid a zero trip rate.
- **Walk & Cycle:** Calculated by reallocating remaining reductions in car trips, after accounting for potential shifts to public transport. Maximum modal share increase is capped at 10%. This aligns with applying a 20% reduction in car trips, given the balance across modal shares.
- **Car Passengers:** Derived using standard vehicle occupancy factors from the DfT's NTEM for Gloucestershire (e.g 1.45 in the morning and evening peaks, 1.51 in the inter-peak). This was applied consistently to both Standard and V&V rates.
- **General:** The increase in Walk and Cycle modal share was controlled to a maximum of 10%, and similarly, the decrease in Car (driver and passenger) modal share was also limited to 10%.

Table 3-5 to Table 3-7 summarises the trip rates by mode as well as the mode share for each of the location category, residential, isolated residential, and village respectively, and by trip rate type for the AM and PM peak hours. Figure 3-3 to Figure 3-5 visually show the change in mode share between the Standard and V&V trip rates. **Appendix A** (see attached) provides the TRICS output reports. Table 3-8 presents a comparison between the TRICS-derived Standard trip rates and a range of trip rates broadly in line with existing local planning applications within the GCC area. The figures differ slightly from those in Tables 3-5 to 3-7 because the modelling trip rates are subsequently adjusted using TEMPRO data for car passenger observations and exclude certain modes.

| Mode          | Residential Trip Rate |              |              |              | Mode Share  |             |             |             |           |           |
|---------------|-----------------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-----------|-----------|
|               | Standard              |              | Vision       |              | Standard    |             | Vision      |             | Diff      |           |
|               | AM                    | PM           | AM           | PM           | AM          | PM          | AM          | PM          | AM        | PM        |
| Rail          | 0.008                 | 0.011        | 0.010        | 0.021        | 1%          | 1%          | 1%          | 3%          | 0%        | 1%        |
| Bus           | 0.032                 | 0.031        | 0.040        | 0.058        | 4%          | 4%          | 6%          | 8%          | 1%        | 4%        |
| Car passenger | 0.158                 | 0.174        | 0.127        | 0.151        | 21%         | 23%         | 18%         | 20%         | -3%       | -2%       |
| Car Driver    | 0.353                 | 0.390        | 0.282        | 0.339        | 46%         | 52%         | 40%         | 46%         | -6%       | -6%       |
| LGV           | 0.035                 | 0.040        | 0.028        | 0.032        | 5%          | 5%          | 4%          | 4%          | -1%       | -1%       |
| OGV           | 0.002                 | 0.002        | 0.002        | 0.002        | 0%          | 0%          | 0%          | 0%          | 0%        | 0%        |
| Cycle         | 0.015                 | 0.017        | 0.018        | 0.021        | 2%          | 2%          | 3%          | 3%          | 1%        | 1%        |
| Walk          | 0.165                 | 0.092        | 0.208        | 0.113        | 21%         | 12%         | 29%         | 15%         | 8%        | 3%        |
| <b>Total</b>  | <b>0.768</b>          | <b>0.757</b> | <b>0.714</b> | <b>0.737</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>0%</b> | <b>0%</b> |

Table 3-5: Trip Rates (per dwelling per peak hour) and Implied Mode Share – Residential Zone

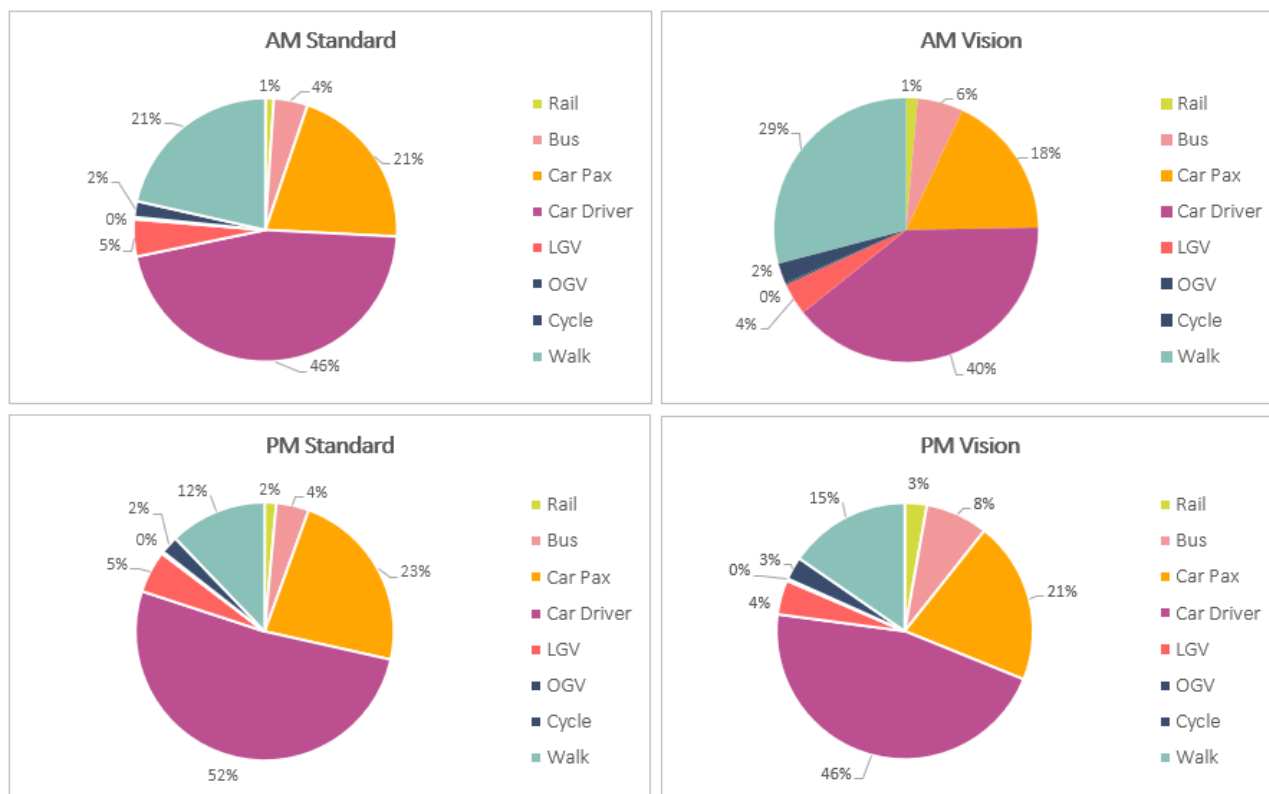


Figure 3-3: Mode Share – Residential Zone

| Mode          | Residential Isolated Trip Rate |              |              |              | Mode Share  |             |             |             |           |           |
|---------------|--------------------------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-----------|-----------|
|               | Standard                       |              | Vision       |              | Standard    |             | Vision      |             | Diff      |           |
|               | AM                             | PM           | AM           | PM           | AM          | PM          | AM          | PM          | AM        | PM        |
| Rail          | 0.008                          | 0.011        | 0.010        | 0.021        | 1%          | 1%          | 1%          | 3%          | 0%        | 1%        |
| Bus           | 0.039                          | 0.029        | 0.043        | 0.045        | 5%          | 4%          | 5%          | 6%          | 1%        | 2%        |
| Car passenger | 0.200                          | 0.184        | 0.160        | 0.160        | 23%         | 23%         | 20%         | 21%         | -3%       | -2%       |
| Car Driver    | 0.446                          | 0.413        | 0.357        | 0.359        | 52%         | 53%         | 45%         | 48%         | -7%       | -5%       |
| LGV           | 0.035                          | 0.067        | 0.028        | 0.054        | 4%          | 9%          | 4%          | 7%          | -1%       | -1%       |
| OGV           | 0.002                          | 0.002        | 0.002        | 0.002        | 0%          | 0%          | 0%          | 0%          | 0%        | 0%        |
| Cycle         | 0.019                          | 0.020        | 0.025        | 0.030        | 2%          | 3%          | 3%          | 4%          | 1%        | 1%        |
| Walk          | 0.107                          | 0.057        | 0.164        | 0.075        | 13%         | 7%          | 21%         | 10%         | 8%        | 3%        |
| <b>Total</b>  | <b>0.856</b>                   | <b>0.783</b> | <b>0.788</b> | <b>0.745</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>0%</b> | <b>0%</b> |

Table 3-6: Trip Rates (per dwelling per peak hour) and Implied Mode Share - Isolated

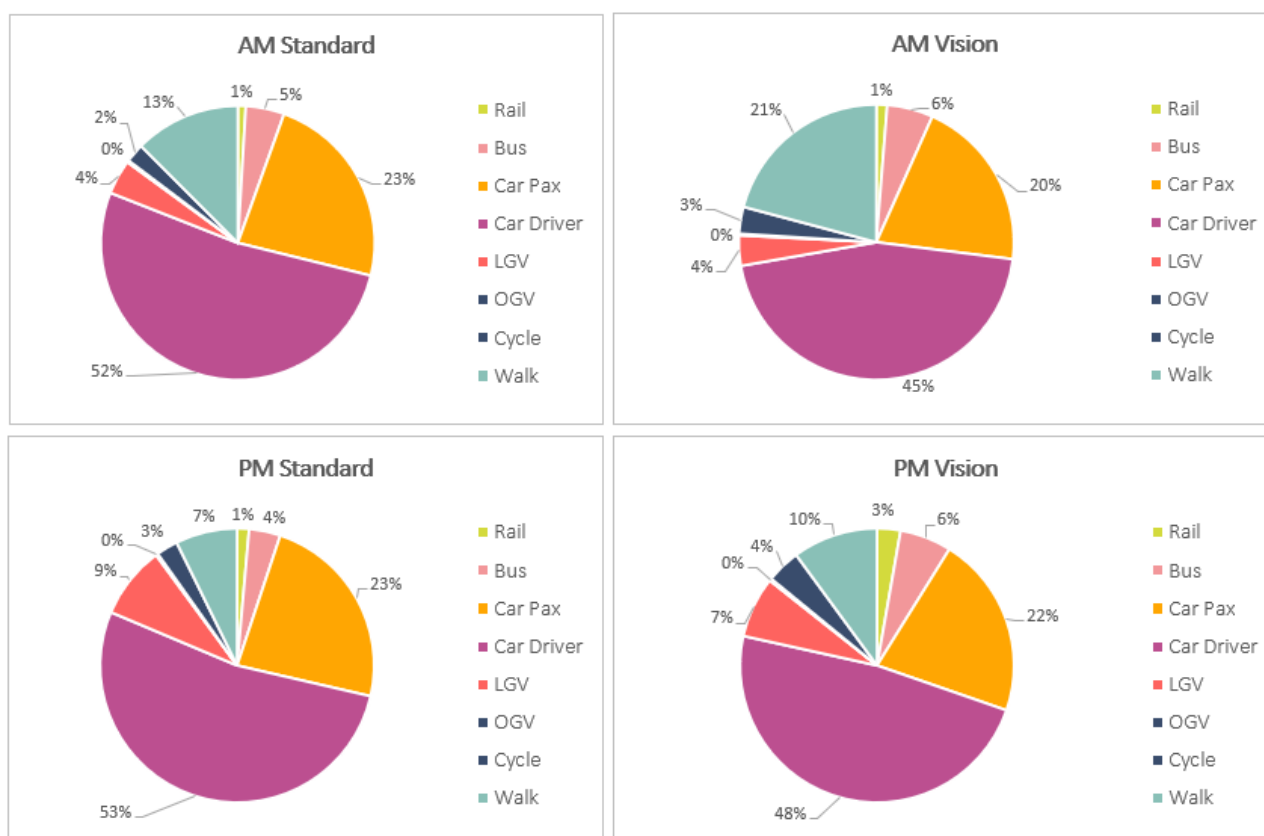


Figure 3-4: Mode Share – Residential Zone Isolated



| Mode          | Village Trip Rate |       |        |       | Mode Share |      |        |      |      |     |
|---------------|-------------------|-------|--------|-------|------------|------|--------|------|------|-----|
|               | Standard          |       | Vision |       | Standard   |      | Vision |      | Diff |     |
|               | AM                | PM    | AM     | PM    | AM         | PM   | AM     | PM   | AM   | PM  |
| Rail          | 0.005             | 0.004 | 0.007  | 0.007 | 1%         | 0%   | 1%     | 1%   | 0%   | 0%  |
| Bus           | 0.041             | 0.039 | 0.061  | 0.068 | 4%         | 5%   | 7%     | 9%   | 2%   | 4%  |
| Car passenger | 0.220             | 0.194 | 0.189  | 0.167 | 22%        | 24%  | 21%    | 21%  | -2%  | -3% |
| Car Driver    | 0.492             | 0.436 | 0.423  | 0.375 | 50%        | 54%  | 46%    | 48%  | -4%  | -6% |
| LGV           | 0.044             | 0.033 | 0.035  | 0.031 | 4%         | 4%   | 4%     | 4%   | -1%  | 0%  |
| OGV           | 0.006             | 0.002 | 0.002  | 0.002 | 1%         | 0%   | 0%     | 0%   | 0%   | 0%  |
| Cycle         | 0.024             | 0.013 | 0.027  | 0.017 | 2%         | 2%   | 3%     | 2%   | 1%   | 1%  |
| Walk          | 0.150             | 0.093 | 0.171  | 0.116 | 15%        | 11%  | 19%    | 15%  | 3%   | 3%  |
| Total         | 0.982             | 0.814 | 0.915  | 0.784 | 100%       | 100% | 100%   | 100% | 0%   | 0%  |

Table 3-7: Trip Rates (per dwelling per peak hour) and Implied Mode Share – Village

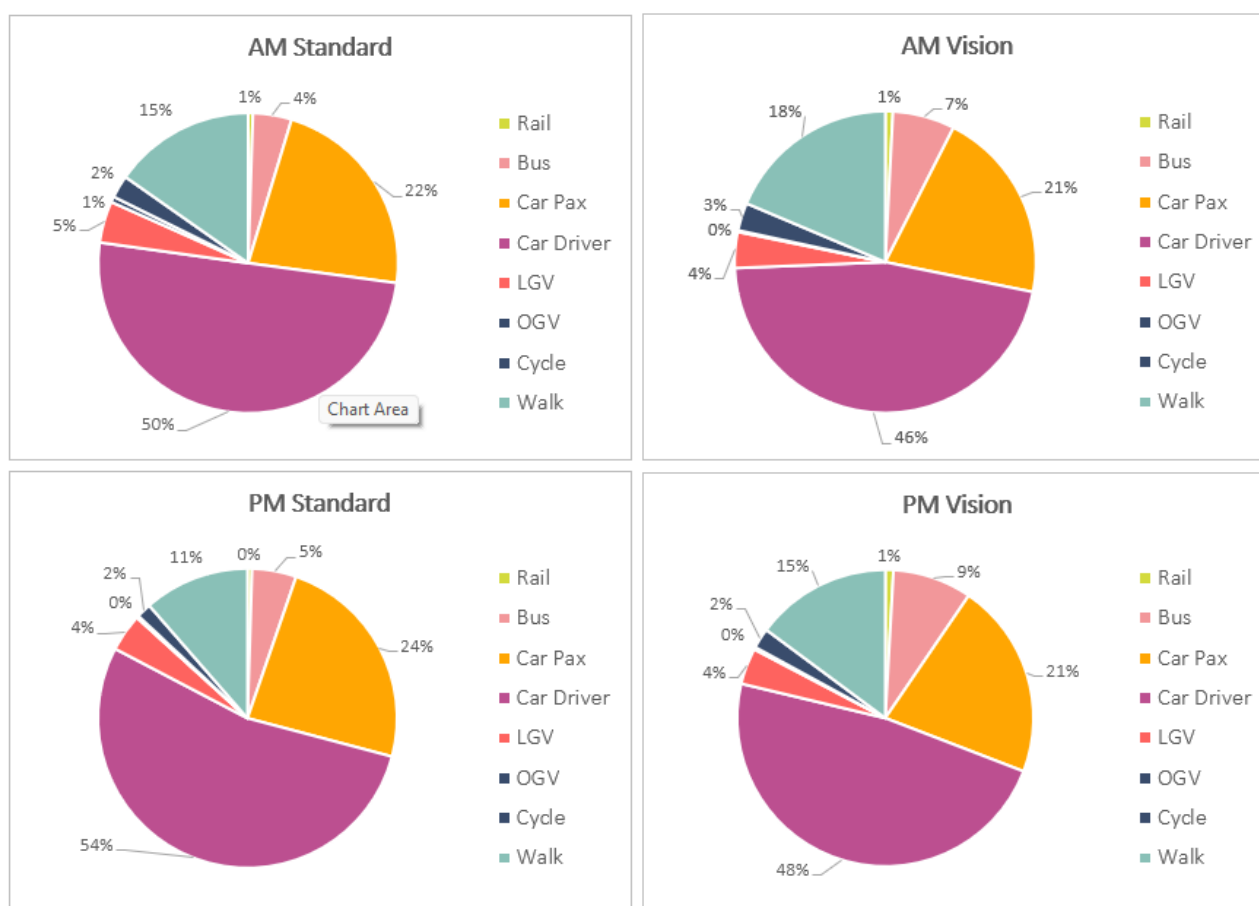


Figure 3-5: Mode Share – Village

### 3.2.2 Benchmarking

Table 3-8 below shows the comparison of the TRICS derived Standard trip rates, broken down by location and a raw average, against a comparative range of trip rates which is broadly in line with existing local planning applications within the GCC area. To enable a consistent assessment, the total vehicles and people metrics account for all observed movements within TRICS (e.g. some modes such as motorcycle, taxi and PSV trip rates are not included separately in the modelling assessment). The purpose of the table below is to provide a comparative assessment between the TRICS analysis undertaken for existing planning applications within the study area and the TRICS derived standard trip rates. Note, for the purpose of modelling these standard trip rates are then adjusted using TEMPRO data for car passenger observations and some modes are excluded. This means the trip rates in Table 3-8 are slightly different to the trip rates shown in Table 3-5 to Table 3-7.

| Location                  | Total Vehicle |      | Cyclist |      | Walk |      | PT   |      | Total People |      |
|---------------------------|---------------|------|---------|------|------|------|------|------|--------------|------|
|                           | AM            | PM   | AM      | PM   | AM   | PM   | AM   | PM   | AM           | PM   |
| Residential Zone          | 0.40          | 0.44 | 0.02    | 0.02 | 0.17 | 0.09 | 0.04 | 0.04 | 0.85         | 0.84 |
| Residential Zone Isolated | 0.50          | 0.51 | 0.02    | 0.02 | 0.11 | 0.06 | 0.05 | 0.04 | 0.96         | 0.98 |
| Village                   | 0.57          | 0.48 | 0.02    | 0.01 | 0.11 | 0.09 | 0.05 | 0.04 | 1.11         | 0.85 |
| Average                   | 0.49          | 0.48 | 0.02    | 0.02 | 0.13 | 0.08 | 0.04 | 0.04 | 0.97         | 0.89 |
| Estimated Lower Range     | 0.46          | 0.47 | 0.01    | 0.01 | 0.01 | 0.05 | 0.01 | 0.01 | 0.86         | 0.79 |
| Estimated Upper Range     | 0.57          | 0.63 | 0.03    | 0.04 | 0.27 | 0.18 | 0.03 | 0.03 | 1.04         | 0.97 |

Table 3-8: Trip Rate Benchmarking – TRICS (peak hour per dwelling)

On average, trip rates across all modes fall within the estimated comparative ranges. The only minor exception is Public Transport (combined), which deviates slightly by 0.01 trips.

For Total Vehicles, the Residential Zone shows slightly lower trip rates than the estimated range, while the Village and Residential Zone Isolated locations fall within the expected range. In particular, the general Residential Zone, which represents areas with lower car generation, has slightly lower car trip rates than estimated. Overall, both the range of trip rates across location categories and the average total vehicle trip rates are broadly in line with expectations.

For Total People, average trip rates are within the estimated range. A small deviation of 0.01 trips was observed in the Residential Zone during the weekday morning peak (08:00-09:00). In some specific periods, slightly higher trip rates were recorded including:

- **Residential Zone Isolated** (average weekday afternoon peak (17:00-18:00))
- **Village** (average weekday morning peak (08:00-09:00))

These deviations are primarily related to vehicle occupant observations, which are in the majority car passengers. This is not considered significant, as the modelling process utilises TEMPRO data for Car passengers. Overall, the analysis indicates a good level of consistency between estimated ranges and observed values by location category.

Table 3-9 compares the average weekday morning (08:00-09:00) and afternoon (17:00-18:00) car driver trip rates from the TRICS assessment with the equivalent rates derived from TEMPRO v8.0 core scenario for 2024, covering the Cotswolds. As TEMPRO can be used as a trip end constraint for traffic growth in modelling assessment, this comparison allows for an assessment of overall level of growth that is generated from the Standard trip rates used for the 'BAU' assessment. It also provides an additional reference point to consider the analysis of the Standard trip rates against the estimated ranges detailed in Table 3-8

Analysis indicates that, overall, the TRICS trip rates are slightly higher than the TEMPRO rates by approximately 0.09-0.12 trips per dwelling on average. The TRICS values ranging from 0.27 to 0.37 in the average weekday morning peak hour (08:00-09:00) and 0.35 to 0.43 in the average weekday afternoon peak hour (17:00-18:00). In comparison, the TEMPRO trip rates—0.24 in the morning peak and 0.26 in the afternoon peak—fall at the lower end of the TRICS ranges, indicating broadly comparable but slightly more conservative values.

| Data Source | Location                  | AM   | PM   |
|-------------|---------------------------|------|------|
| TRICS       | Residential Zone          | 0.27 | 0.35 |
|             | Residential Zone Isolated | 0.34 | 0.43 |
|             | Village                   | 0.37 | 0.38 |
|             | Average                   | 0.33 | 0.39 |
| Tempro      | Cotswolds                 | 0.24 | 0.26 |

Table 3-9: Trip Rate (average period per dwelling) Benchmarking - TEMPRO

Overall, the TRICS standard trip rates show a good level of consistency when compared with both the estimated planning application ranges and the derived TEMPRO trip rates. Where outliers have been identified from the estimated range typically, they deviate by only approximately around 0.05 trips per hour per dwelling. In addition, the car trip rates are slightly higher than the corresponding TEMPRO values, but this is within an acceptable margin. These results indicate that the Standard trip rates provide a reliable basis for the BAU assessment of the Spatial Options. Furthermore, the V&V trip rates offer a robust means of assessing the impact on the Standard trip rates, reflecting a reduction of approximately 6-10% in total car user modal share. If required, further highway assignment level sensitivity testing can be undertaken, after the selection of the PSO, to assess any deviations in trip rate.

### 3.2.3 Internalisation

For the larger strategic proposed spatial option sites, defined as those with more than 750 dwellings, it is anticipated that a proportion of the generated demand will either be entirely internal to the model zone or associated with linked trips serving mixed land uses. However, as no detailed information is currently available regarding the mixed land use composition within these strategic sites, a 10% reduction in car trip rates is assumed. This reduction is broadly in line with common practice for trip rate calculations for larger development sites. As this represents an additional adjustment beyond the trip rate calculations discussed in Section 3.2.1, specifically for the larger development sites, it is applied equally to both the Standard and V&V trip rates.

### 3.2.4 Area Classifications

The location types identified in the Spatial Options have been assigned to the three categories of locations used in deriving trip rates. Figure 3-6 shows the distribution of development types across the three Spatial Options. In-line with the spatial option categories, shown in Section 2.3, analysis of Figure 3-6 shows that:

- **SO4:** Contains the highest concentration of Residential Zones.
- **SO5:** Total development is similar to SO4, but with an increased proportion of Isolated Residential Zones.
- **SO6:** Residential Zone development is lower with a shift to Villages.

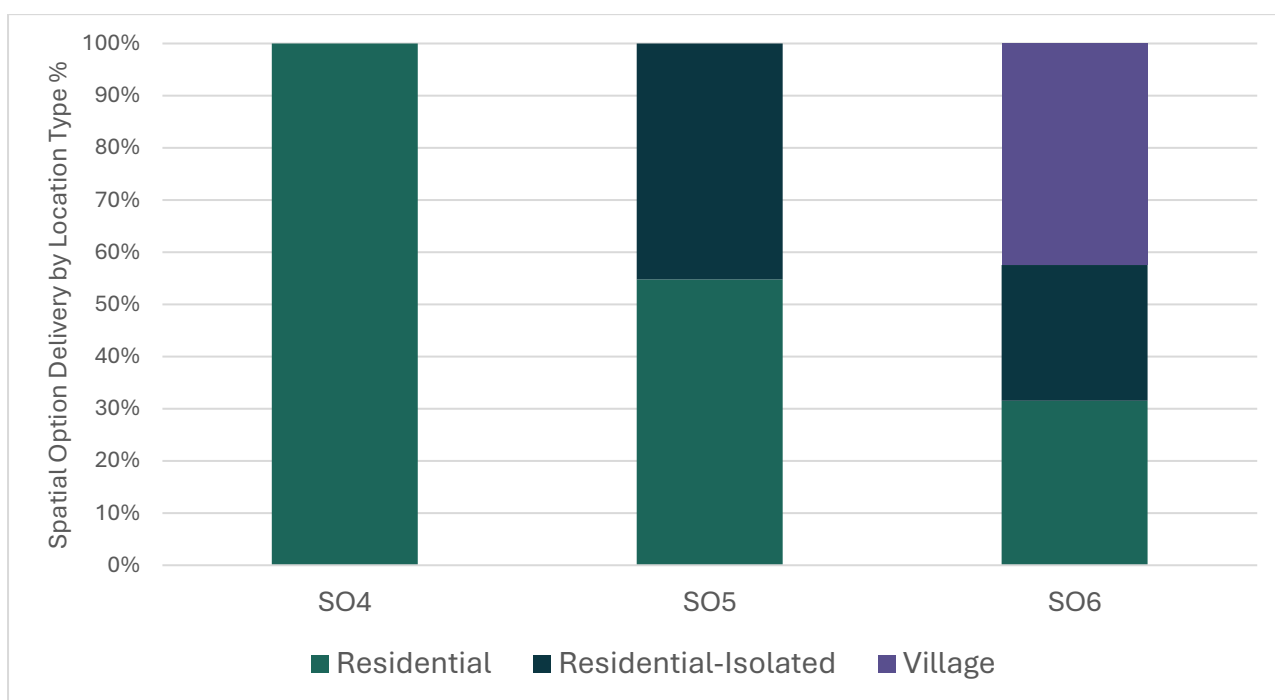


Figure 3-6: Spatial Option Zone Area Classification Definitions

### 3.2.5 Application within the Model

The Spatial Option development sites will be applied in the model as follows:

- **Step 1 - Trip Generation:** Trip generation calculations will be applied to each spatial option zone to derive growth.
- **Step 2 – Development Zone Grouping:** New development zones will be added for developments with greater than 500 dwellings. Smaller development sites (e.g. fewer than 500 dwellings) will be included with the existing GC3M zoning system. This relationship for existing GC3M zone will be defined based on identifying which GC3M zone boundary the development is located within.
- **Step 3 – Network Connections:** As only the spatial boundaries have been identified at this stage and site access arrangements are not yet known, zones will be connected to the model using spider network coding (e.g. zone connectors attached to networks links as opposed to coding individual site access arrangements such as signalised or priority junctions at a node level). This methodology is in line with the current level of detail included in the GC3M's base year network representation and will ensure that all trips can access the network. Where appropriate existing zone connector arrangements, which are primarily coded as spider arrangements, will be used.



- **Step 4 – Trip Distribution:** As discussed in Section 3.1, the Core Scenario model will be used to derive the spatial option development distributions. To implement this methodology, local zones will be identified for each development site greater than 500 dwellings. These zones will be combined to derive an average distribution, which will then be ‘furnished’ with the trip generation totals to calculate traffic growth for each development site greater than 500 dwellings. Similarly, the development sites with less than 500 dwellings are added to the SO option forecasted based on a ‘furness’ procedure utilising the existing GC3M zoning system. This methodology will therefore base the development distribution on the forecast distribution derived from the GC3M core scenario.

In total, approximately 10 zones will be included to represent the larger development sites. Assignment runs will first be undertaken using the highway assignment model, allowing for initial analysis and iteration. Subsequently, public transport assignments will be carried out to inform the Multi-Criteria Assessment Framework (MCAF).

Trip Rates - Employment

### 3.2.6 Overview

Table 3-2 below summarises the trip rate categories used within the TRICS8 database. The selected sites were chosen based on the following:

- **Compatibility with Spatial Option Sites:**
  - The ‘Business Park’ (02/B) category was adopted to represent office land use.
  - The ‘Industrial Estate’ (02/D) category was adopted to represent Industrial land use.
  - The ‘Warehousing (Commercial)’ (02/F) category was adopted to represent office land use
  - Trip rates have been derived based on trips per GFA
- **Multi-modal Surveys:** Only sites with surveys covering all transport modes, private vehicles, public transport, and active travel, were included.
- **Weekday Surveys:** Data from Monday to Friday was used.
- **Recent Data:** Surveys conducted from 1 January 2016 onwards were included, excluding any 2020 and 2021 surveys identified by TRICS as being impacted by the pandemic-.

**Geographic Coverage:** To allow for a suitable sample size for each employment land use, no regional geographical filter has been applied. However, sites located within Town centres have been excluded for compatibility with spatial options.

| Location      | Type     | Assumptions                                                                                                                                                                 |
|---------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Business Park | Standard | Based on 25 surveys defined as " Business Park " located primarily at the Edge of Town (13 Edge of Town, 2 Edge of Town Centre, 9 Suburban Area, 1 Neighbourhood Centre).   |
|               | V&V      | Based on the calculation assumptions defined below.                                                                                                                         |
| Industrial    | Standard | Based on 49 surveys defined as " Industrial Estate " located primarily at the Edge of Town (38 Edge of Town, 1 Edge of Town Centre, 9 Suburban Area, 1 Free Standing).      |
|               | V&V      | Based on the calculation assumptions defined below.                                                                                                                         |
| Warehousing   | Standard | Based on 9 surveys defined as " Warehousing (Commercial)" located primarily at the Edge of Town (5 Edge of Town, 1 Neighbourhood Centre, 2 Suburban Area, 1 Free Standing). |

V&amp;V

Based on the calculation assumptions defined below.

Table 3-10: Trip Rate Location Definitions (Employment)

In summary, trip rates for the Spatial Option developments are categorised into three land use classes, each with two types of trip rate (see Table 3-3). These trip rates are used to forecast travel demand and assess the likely transport impacts of new development.

| Trip Rate Type | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Standard       | Applied to all developments. Represents a 'worst case' scenario in terms of car trips. These rates are derived from the overall average rates from each location category.                                                                                                                                                                                                                                                                                                                                                                                                       |
| V&V            | Applied in line with the vision-led approach for residential developments, with lower car trip rates and higher non-car trip rates. To ensure consistency with residential developments, a 20% reduction in Car driver trips has been applied. These trips are then redistributed to PT and Active Travel modes according to the proportions observed in the Standard trip rates. LGV and OGV trips are held constant between Standard and V&V trip rates. Car passengers are calculated based on factors derived from DfT NTEM for Gloucestershire (AM 1.45, IP 1.51, PM 1.45). |

Table 3-11: Trip Rate Descriptions (Employment)

Table 3-5 to Table 3-7 summarises the trip rates by mode as well as the mode share for each of the location categories and by trip rate type for AM and PM peak hours. Figure 3-3 to Figure 3-5 visually show the change in mode share between the Standard and V&V trip rates. **Appendix A** (see attached) provides the TRICS output reports.

| Mode         | Trip Rate    |              |              |              | Mode Share  |             |             |             |             |             |
|--------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|
|              | Standard     |              | Vision       |              | Standard    |             | Vision      |             | Diff        |             |
|              | AM           | PM           | AM           | PM           | AM          | PM          | AM          | PM          | AM          | PM          |
| Rail         | 0.190        | 0.218        | 0.269        | 0.285        | 0.098       | 0.130       | 0.138       | 0.169       | 0.041       | 0.040       |
| Bus          | 0.154        | 0.156        | 0.218        | 0.204        | 0.079       | 0.093       | 0.112       | 0.121       | 0.033       | 0.028       |
| Car Pax      | 0.400        | 0.313        | 0.320        | 0.250        | 0.206       | 0.186       | 0.165       | 0.149       | -0.041      | -0.037      |
| Car Driver   | 0.892        | 0.703        | 0.714        | 0.562        | 0.459       | 0.418       | 0.367       | 0.334       | -0.092      | -0.084      |
| LGV          | 0.025        | 0.005        | 0.025        | 0.005        | 0.013       | 0.003       | 0.013       | 0.003       | 0.000       | 0.000       |
| OGV          | 0.003        | 0.001        | 0.003        | 0.001        | 0.002       | 0.001       | 0.002       | 0.001       | 0.000       | 0.000       |
| Cycle        | 0.094        | 0.078        | 0.133        | 0.102        | 0.048       | 0.046       | 0.068       | 0.061       | 0.020       | 0.014       |
| Walk         | 0.185        | 0.209        | 0.262        | 0.273        | 0.095       | 0.124       | 0.135       | 0.162       | 0.039       | 0.038       |
| <b>Total</b> | <b>1.943</b> | <b>1.683</b> | <b>1.943</b> | <b>1.683</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> |

Table 3-12: Trip Rates and Mode Share – Business Park (trips per 100sqm GFA per peak hour)

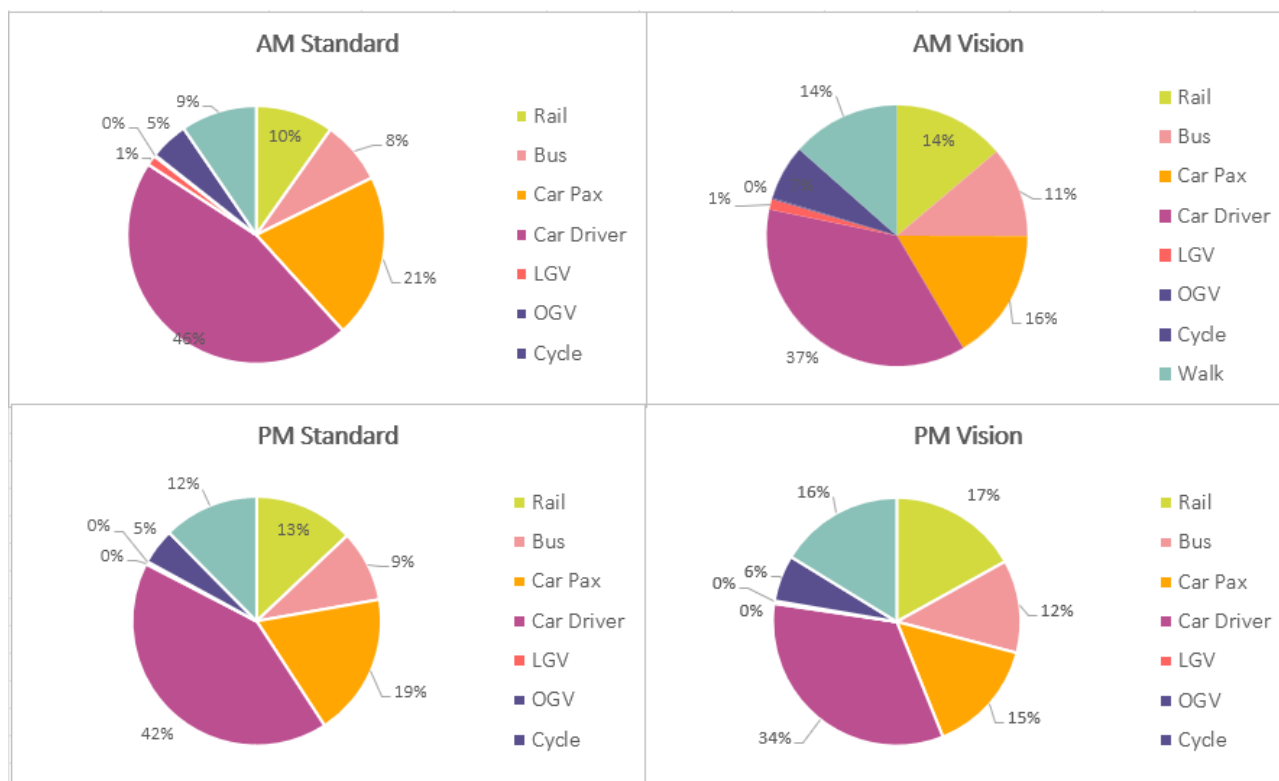


Figure 3-7 - Mode Share – Business Park

| Mode         | Trip Rate    |              |              |              | Mode Share  |             |             |             |             |             |
|--------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|
|              | Standard     |              | Vision       |              | Standard    |             | Vision      |             | Diff        |             |
|              | AM           | PM           | AM           | PM           | AM          | PM          | AM          | PM          | AM          | PM          |
| Rail         | 0.001        | 0.001        | 0.002        | 0.002        | 0.004       | 0.005       | 0.012       | 0.015       | 0.008       | 0.010       |
| Bus          | 0.003        | 0.003        | 0.008        | 0.007        | 0.020       | 0.020       | 0.057       | 0.056       | 0.037       | 0.037       |
| Car Pax      | 0.033        | 0.033        | 0.026        | 0.027        | 0.236       | 0.262       | 0.189       | 0.209       | -0.047      | -0.052      |
| Car Driver   | 0.073        | 0.075        | 0.059        | 0.060        | 0.526       | 0.588       | 0.421       | 0.470       | -0.105      | -0.118      |
| LGV          | 0.017        | 0.005        | 0.017        | 0.005        | 0.122       | 0.043       | 0.122       | 0.043       | 0.000       | 0.000       |
| OGV          | 0.005        | 0.002        | 0.005        | 0.002        | 0.035       | 0.016       | 0.035       | 0.016       | 0.000       | 0.000       |
| Cycle        | 0.002        | 0.002        | 0.004        | 0.006        | 0.011       | 0.017       | 0.032       | 0.047       | 0.021       | 0.031       |
| Walk         | 0.006        | 0.006        | 0.019        | 0.018        | 0.046       | 0.050       | 0.133       | 0.143       | 0.087       | 0.093       |
| <b>Total</b> | <b>0.139</b> | <b>0.127</b> | <b>0.139</b> | <b>0.127</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> |

Table 3-13: Trip Rates and Mode Share – Industrial Estates (trips per 100sqm GFA per peak hour)

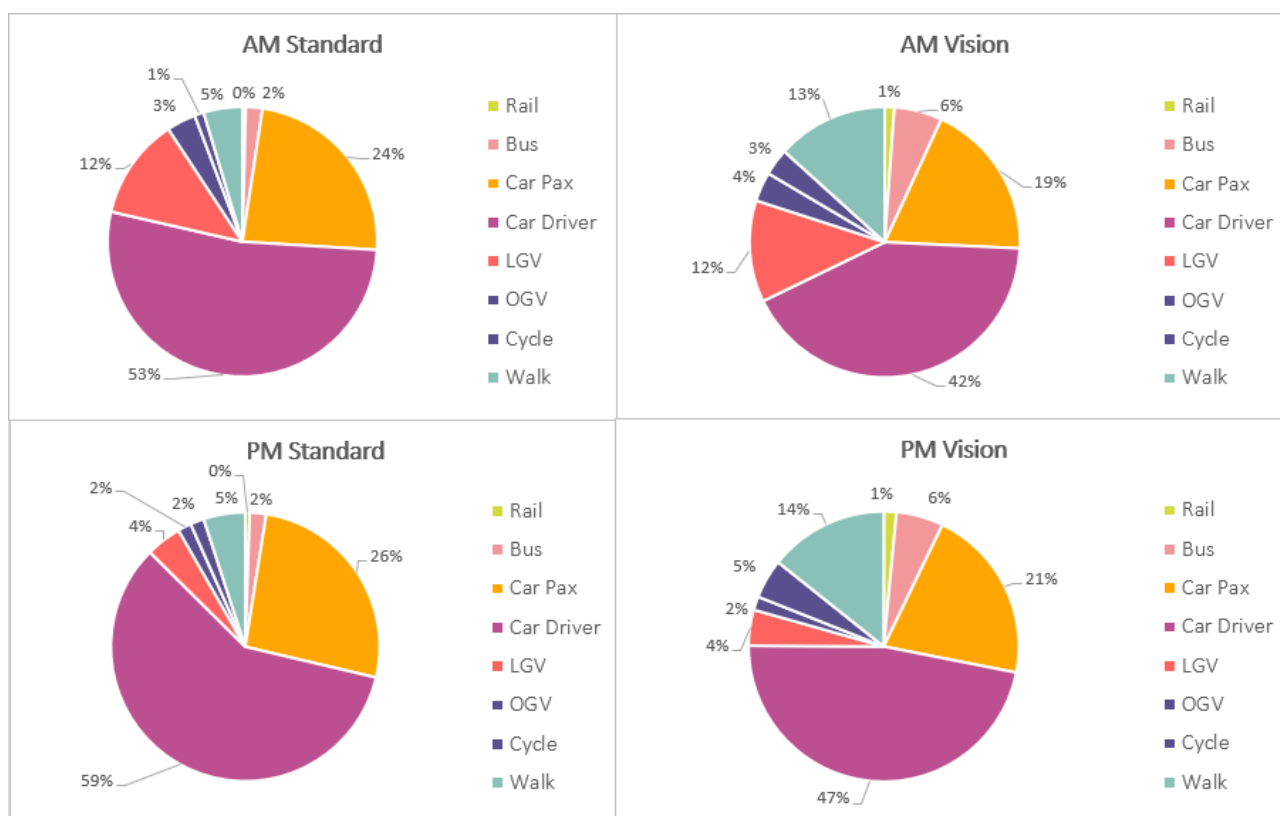


Figure 3-8 Mode Share – Industrial Estate

| Mode         | Trip Rate    |              |              |              | Mode Share  |             |             |             |             |             |
|--------------|--------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|
|              | Standard     |              | Vision       |              | Standard    |             | Vision      |             | Diff        |             |
|              | AM           | PM           | AM           | PM           | AM          | PM          | AM          | PM          | AM          | PM          |
| Rail         | 0.002        | 0.004        | 0.004        | 0.007        | 0.014       | 0.024       | 0.024       | 0.042       | 0.010       | 0.019       |
| Bus          | 0.011        | 0.013        | 0.019        | 0.023        | 0.075       | 0.077       | 0.133       | 0.138       | 0.058       | 0.061       |
| Car Pax      | 0.027        | 0.036        | 0.022        | 0.028        | 0.187       | 0.210       | 0.149       | 0.168       | -0.037      | -0.042      |
| Car Driver   | 0.061        | 0.080        | 0.049        | 0.064        | 0.417       | 0.472       | 0.333       | 0.377       | -0.083      | -0.094      |
| LGV          | 0.012        | 0.005        | 0.012        | 0.005        | 0.082       | 0.029       | 0.082       | 0.029       | 0.000       | 0.000       |
| OGV          | 0.023        | 0.020        | 0.023        | 0.020        | 0.157       | 0.118       | 0.157       | 0.118       | 0.000       | 0.000       |
| Cycle        | 0.002        | 0.002        | 0.004        | 0.004        | 0.014       | 0.012       | 0.024       | 0.021       | 0.010       | 0.009       |
| Walk         | 0.008        | 0.010        | 0.014        | 0.018        | 0.055       | 0.059       | 0.097       | 0.106       | 0.042       | 0.047       |
| <b>Total</b> | <b>0.146</b> | <b>0.170</b> | <b>0.146</b> | <b>0.170</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> | <b>100%</b> |

Table 3-14: Trip Rates and Mode Share – Warehousing (trips per 100sqm GFA per peak hour)

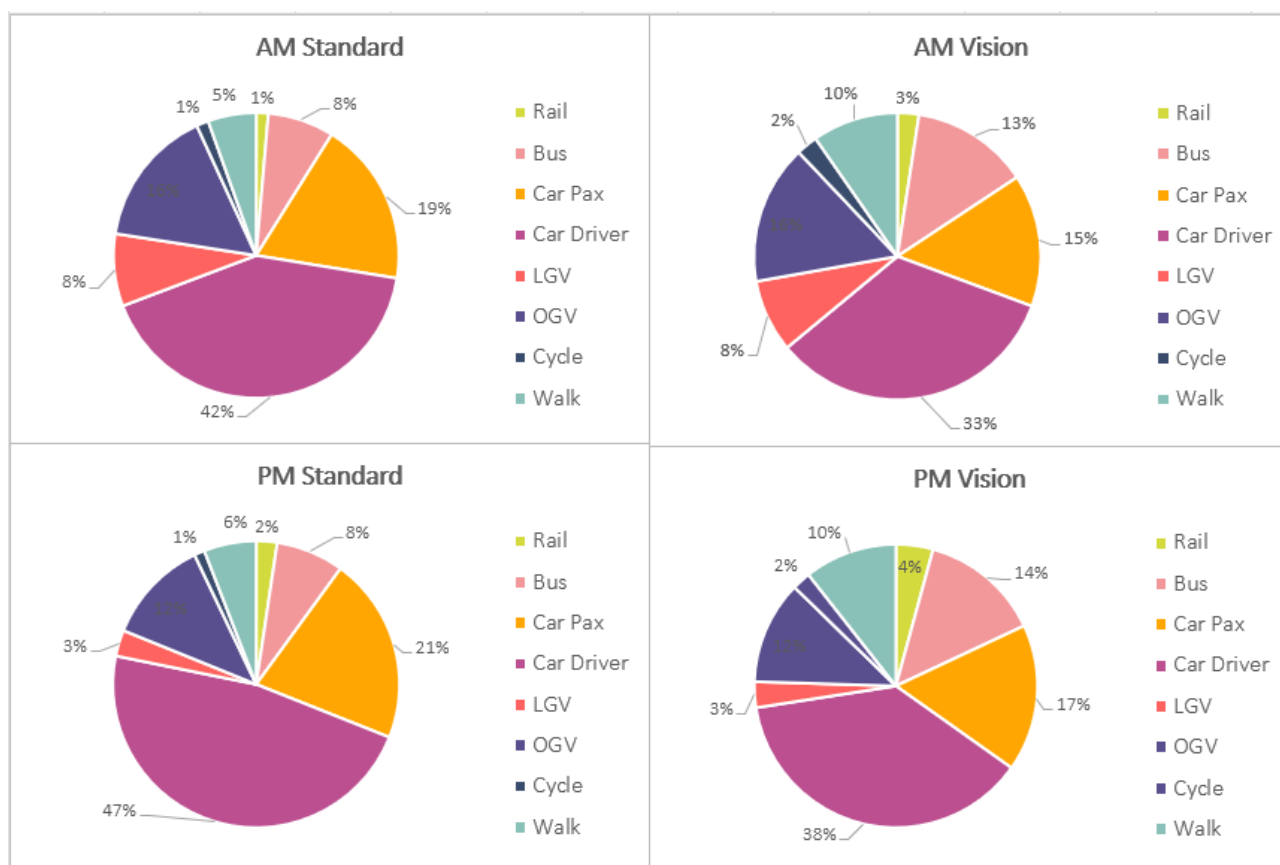


Figure 3-9 - Mode Share – Warehousing

### 3.2.7 Application within the Model

The employment sites will be applied in the model using a similar process described for residential development in **Section 3.2.5**, with the following steps:

- **Step 1 - Trip Generation:** Trip generation calculations will be applied to each spatial option zone to derive growth.
- **Step 2 – Development Zone Grouping:** New development zones will be added for geographical clusters. Smaller development sites (e.g fewer than 0.5 hectares) will be grouped together based on proximity.
- **Step 3 – Network Connections:** As only the spatial boundaries have been identified at this stage and site access arrangements are not yet known, zones will be connected to the model using spider network coding (as described in **Section 3.2.5**).
- **Step 4 – Trip Distribution:** As discussed in Section 3.1, the Core Scenario model will be used to derive the spatial option development distributions. To implement this methodology, local zones will be identified for each development site. These zones will be combined to derive an average distribution, which will then be ‘furnished’ with the trip generation totals to calculate traffic growth for each development site. This methodology will maintain the forecast distribution derived from the GC3M based on zones within the vicinity of the Cotswold development sites.

In total, two zones will be included to represent the employment development sites. These two zones will be split equally between Business Park’ (02/B) category and ‘Industrial Estate’ (02/D) categories. Assignment runs will first be undertaken using the highway assignment model, allowing for initial analysis and iteration. Subsequently, public transport assignments will be carried out to inform the Multi-Criteria Assessment Framework (MCAF).



## 4 Assessment Criteria

### 4.1 Overview

The three Spatial Options and the two supporting sensitivity tests for Spatial Options 4 and 5 will be assessed against the vision and objectives. The analysis is informed by forecasts from the GC3M model, derived from the 2024 base year and documented in the Present Year Validation Technical Note. These forecasts contribute to the wider evidence base underpinning the MCAF, enabling a consistent comparison across the Spatial Options and sensitivity tests.

This section sets out how the resulting metrics will be applied through the MCAF at this stage of the Cotswold Local Plan. During this phase of plan development, the framework will be used to assess and compare the performance of the three Spatial Options and the two sensitivity tests, with outcomes benchmarked against the Core Scenario.

The assessment is framed within a 'Vision & Validate' approach, which prioritises desired policy outcomes over forecasting-led infrastructure provision. Within this approach, the MCAF incorporates a suite of Key Performance Indicators (KPIs) to support comparative evaluation rather than absolute compliance. The KPIs provide a means of understanding how each Spatial Option and sensitivity test performs against transport objectives, helping to shape intervention choices and inform ongoing monitoring. The KPI set may evolve as further modelling and analysis is undertaken.

### 4.2 Key Performance Indicators

#### 4.2.1 Overview of Key Performance Indicators

The Local Plan for Cotswold has been prepared using a 'Vision and Validate' methodology, moving away from conventional 'Predict and Provide' models. This approach is outcomes-focused and rooted in policy objectives, with an emphasis on supporting sustainable travel. Rather than accommodating travel demand based on historic trends, it seeks to test what transport interventions are required to achieve a desired long-term future.

That desired future is described through the overarching vision and objectives of the Local Plan, alongside a dedicated transport vision supported by strategic objectives and sub-objectives. The process used to define and refine these transport ambitions is set out in detail within the Vision & Validate Technical Note. They are outlined in Figure 4-1 and Figure 4-2 respectively.

*"Residents in developments within the Cotswold District will have access to high quality sustainable low-carbon transport with low car dependency. Developments will prioritise active travel and public transport as we transition to net zero carbon."*

*Residents will be well connected to their everyday needs with options that enable low-carbon travel choices for all to reduce emissions, boost*

**The 'what'.**

**A vision of what transport could BE.**

(Refers to transport sub-objectives)

**The 'why'.**

*health and wellbeing, allow supporting local people and the environment to thrive.”*

**A vision of what transport could DO.**

(Refers to overarching transport objectives)

Figure 4-1: Cotswold Local Plan Transport Vision



Figure 4-2: Cotswold Local Plan Overarching Transport Objectives and Sub-Objectives

The Vision & Validate Technical Note also summarises some of the types of policies and measures that could support achievement of each of the objectives. This helps to illustrate the linkages between the desired outcomes and the inputs required to achieve them. These connections form an important part of the ‘audit trail’ used to justify the transport investments necessary to deliver the Local Plan development. Figure 4-3 demonstrates how logic mapping can clarify these linkages, providing an illustrative example. The ‘logic map’ is read from left to right but developed from right to left, consistent with the ‘Vision and Validate’ approach.

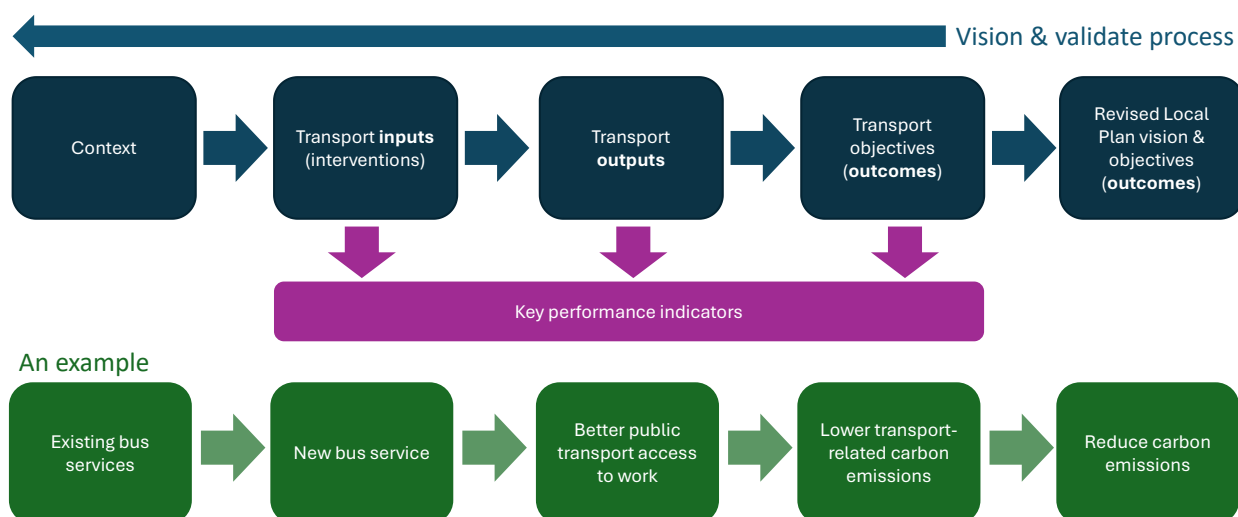


Figure 4-3: Tavistock Institute Approach to Logic Mapping

Figure 4-3 also highlights the role of clearly defined KPIs within the methodology. These indicators help translate transport objectives into practical terms by setting out how inputs, outputs and outcomes can be assessed. At this stage, KPIs are intended to act as monitoring indicators rather than fixed targets, which may be established at a later point if required.

The KPIs will support the Local Plan at multiple stages, from plan preparation through to implementation, by providing a consistent framework for assessing how effectively the vision and objectives of the Local Plan are being delivered.

### 4.3 Purpose of Key Performance Indicators

The KPIs therefore serve the following purposes:

- They help articulate what successful, sustainable development means from a transport standpoint, drawing on established guidance and recognised best practice, including the National Planning Policy Guidance (Ministry of Housing, 2025).
- They reinforce that certain indicators of success relate to the inputs underpinning the “Vision & Validate” methodology and therefore require careful scrutiny. In many cases, these inputs shape the behaviours the strategy seeks to influence, such as assumptions around vehicle trip generation. Exploring alternative input assumptions is a core element of the Vision & Validate process.
- They are the source of the criteria used to compare the potential impacts of the Cotswold Spatial Options, and the effects of any transport interventions proposed (as part of the Multi-Criteria Assessment Framework).
- They identify the transport outputs that the package of Local Plan transport policies, interventions and services could deliver.
- They offer a foundation for monitoring and evaluation of travel behaviour at individual sites, or across groups of developments, supporting validation of whether the transport vision is being realised and helping to identify where additional measures may be required.

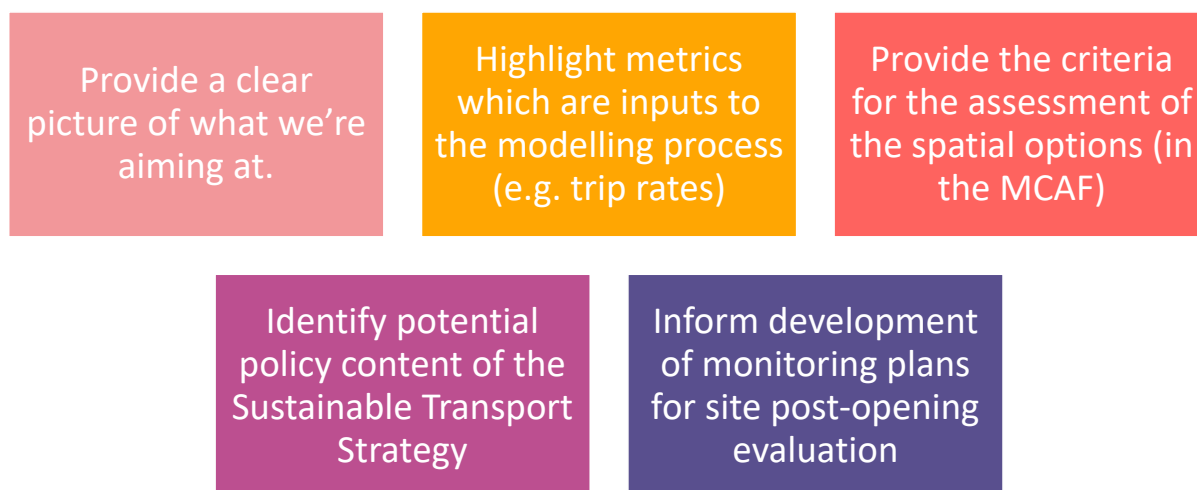


Figure 4-4: Purpose of the KPIs

The following section describes how the transport KPIs were derived for the Cotswold Local Plan.

### 4.3.1 Development Approach

The KPIs were derived using a three-step process.

1. **Step 1- Define What Good Looks like:** Descriptions were prepared of ‘what good would look like’ in practice for each of the transport sub-objectives and, where helpful, the overarching transport objectives. These descriptions were informed by the latest version of NPPF, Active Travel England design resources and best practice from other Local Plans.
2. **Step 2 – Select KPIs:** Potential KPIs were considered for each transport objective. These were selected based on those which most closely aligned with the objectives, and which were more likely to be measurable and/or quantifiable. Note at this stage targets were not identified, simply the measure.
3. **Step 3 – Determine Measurement Approach:** Potential approaches to measuring or forecasting each KPI were considered and a preferred approach selected for each, including identification of the information source(s).

Two KPIs were defined for each transport objective. These were adopted as criteria within the MCAF to compare the Spatial Options (see Section 4.4). Following completion of the evidence review, it may also be appropriate to introduce additional KPIs to assess the extent to which different Spatial Options either exacerbate existing challenges or capitalise on identified opportunities.

## 4.4 Multi-Criteria Assessment Framework

### 4.4.1 Purpose of the Multi-Criteria Assessment Framework

An MCAF provides a consistent way for examining and contrasting different options to support informed decision-making. It considers how each option performs against a set of defined characteristics (criteria) both individually and at a holistic level across several characteristics. Further guidance on multi-criteria decision making is set out in the Green Book supplementary guidance (DESNZ, 2024).

For the Local Plan, the framework will underpin the development of the transport evidence base and be used at different stages in the process. Its application will evolve as the work progress through each stage, as summarised below.

- **Initial Use – Spatial Option Testing (GC3M Runs #2-#10):** In the early stages, the MCAF will be applied to compare the potential relative transport impacts of the three Spatial Options and two sensitivity tests against the Core Scenario. The comparison will use the KPIs set out in Section 4.4.3, which relate directly to the overarching transport objectives. At this stage, as no Local Plan interventions are included in the model tests, the MCAF focuses solely on the strategic case within the standard five-case business case model.
- **Third Round – PSO (Run #11):** In the third round of GC3M modelling, the same MCAF will be used to compare the impacts of the PSO against the three Spatial Options.
- **Fourth Round – PSO & Interventions (Runs #12-13):** During this stage, the MCAF will be used to assess the forecast impacts (benefits) of potential Local Plan transport interventions. The aim will be to identify a preferred package of measures by comparing different combinations of interventions and each package against the Core Scenario. At this point, the MCAF criteria will be expanded beyond the strategic case to reflect the other four dimensions of the business case (e.g. incorporating criteria relating to deliverability, cost, and acceptability).
- **Fifth Round – Sensitivity Testing (Runs #14-15):** In the final stage, the expanded MCAF will be used to explore how sensitive the forecast results are to changes in key input assumptions. This will help validate the robustness of the modelling outputs and strengthen the overall evidence base.

#### 4.4.2 Considerations in Developing the Multi-Criteria Assessment Framework

The following points were taken into consideration when developing the detail of the MCAF and are summarised in Figure 4-5 below:

- Each KPI (assessment criterion) is required to link back to at least one overarching transport objective, ensuring a clear line of evidence between the indicators, the wider vision, and the objectives of the Cotswold Local Plan.
- Where practicable, every transport objective is supported by at least one assessment criterion. In some cases, particularly where objectives or KPIs relate to detailed development form or transport design, this cannot be applied at the current stage of plan-making.
- A bespoke five-point scoring system will be applied to all criteria, ranging from negative or adverse effects (score of 1) to strong positive outcomes (score of 5). This approach enables both comparison between options and identification of instances where materially different impacts are anticipated. To minimise the risk of methodological bias, sensitivity testing will be undertaken using alternative scoring approaches.

Scores across all criteria will not be aggregated into a single overall score for each spatial option. Doing so would require the application of weighting factors to reflect the relative importance of different criteria, which, without robust justification, can disproportionately influence outcomes. In addition, reliance on a single composite score risks over-simplifying decision-making. Instead, a balanced scorecard approach will be used, allowing the relative strengths and weaknesses of each spatial option to be considered across the full set of criteria and informing the selection of preferred elements to be taken forward to the Preferred Spatial Option (PSO).



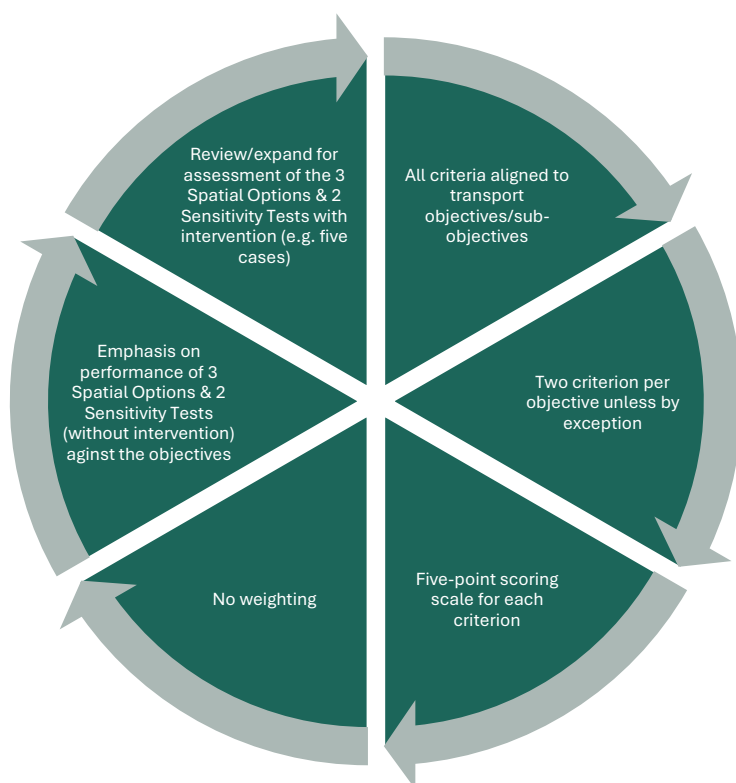


Figure 4-5: Considerations in Developing the MCAF

#### 4.4.3 The Key Performance Indicators used in the Multi-Criteria Assessment Framework

The five tables below summarise the KPIs which will be used in the first stage MCAF assessment (during the second and third rounds of modelling): e.g. prior to expansion of criteria to include deliverability, affordability etc. Each table relates to one of the five overarching transport objectives shown in Figure 4-2. The sources of data are also shown; at this stage most KPIs use data from the GC3M.

| Objective                    | KPI                                                         | Data Sources          |
|------------------------------|-------------------------------------------------------------|-----------------------|
| <b>Meeting needs locally</b> | Accessibility on foot/bicycle to employment, education etc. | DfT Connectivity Tool |

Table 4-1: KPIs for Objective #1 Meeting needs locally

| Objective                             | KPI                                                             | Data Sources          |
|---------------------------------------|-----------------------------------------------------------------|-----------------------|
| <b>Healthier &amp; greener travel</b> | Mode share of journeys to/from developments.                    | GC3M                  |
|                                       | Accessibility by public transport to employment, education etc. | DfT Connectivity Tool |

Table 4-2: KPIs for Objective #2 Healthier & safer travel

| Objective                | KPI                                                           | Data Sources            |
|--------------------------|---------------------------------------------------------------|-------------------------|
| <b>Harmonious places</b> | Household-weighted average of NO2 and PM2.5 at current levels | Defra Modelled Baseline |

Table 4-3: KPIs for Objective #5 Harmonious places

| Objective                  | KPI                                                                                                                                                | Data Sources |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Safer & resilient networks | Ratio of traffic volume to total capacity of highways.                                                                                             | GC3M tests   |
|                            | Operational safety issues at locations where higher traffic volumes could contribute to increased accident risk (e.g. A417/A419 and M5 junctions). | GC3M tests   |

Table 4-4: KPIs for Objective #4 Safer &amp; resilient networks

| Objective                            | KPI                                                                                   | Data Sources |
|--------------------------------------|---------------------------------------------------------------------------------------|--------------|
| Attractive & viable public transport | Public transport mode share of journeys of one to ten miles to/from Local Plan sites. | GC3M tests   |

Table 4-5: KPIs for Objective #5 Attractive &amp; viable public transport choices

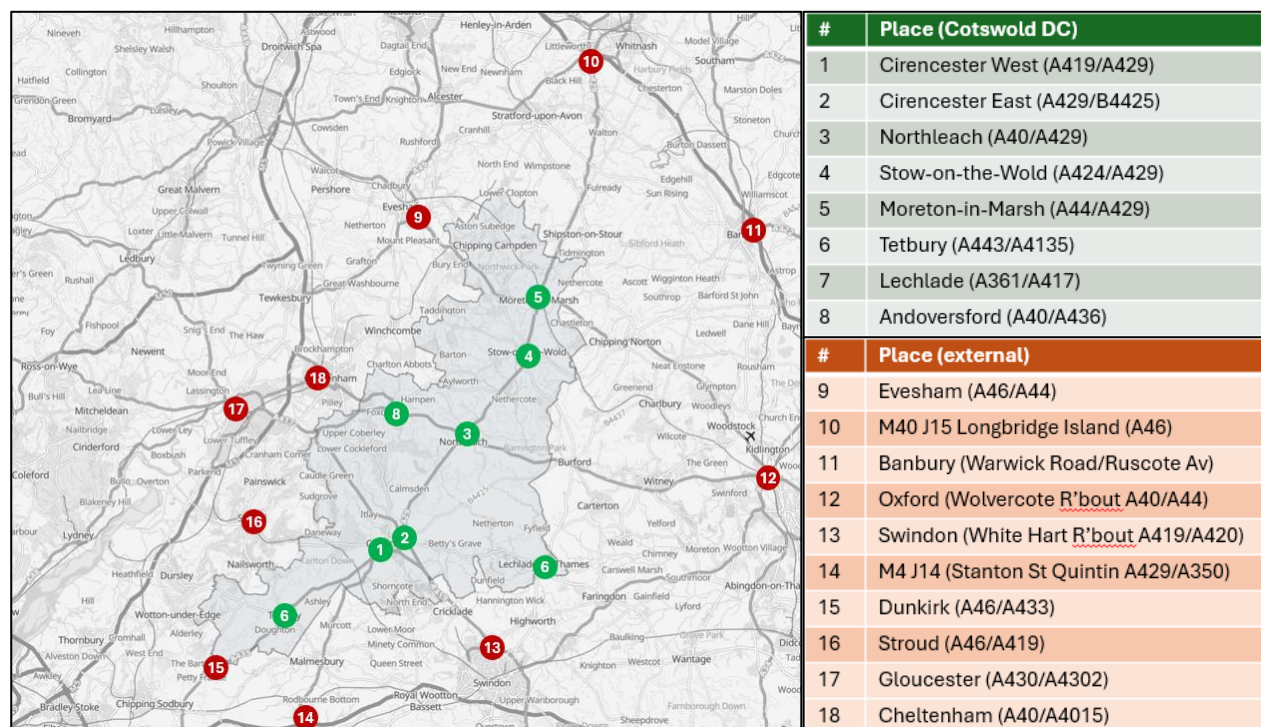


Figure 4-6: Origins/Destinations for Journey Time and Delay Analysis

#### 4.4.4 Scoring Guides

The following tables provide an initial indication of the scoring guides which will be used to determine scores for each spatial option against each criterion. Initial descriptions of the impacts which might constitute a score of 1, 3 or 5 are shown (allowing scores for 2 and 4 to be inferred). When the first GC3M Spatial Option runs have been completed and the results considered, the descriptions may be clarified further, to ensure that there is an appropriate spread of scores for different options in each criterion.

| KPI                                                                                 | Score of 1             | Score of 3                  | Score 5                |
|-------------------------------------------------------------------------------------|------------------------|-----------------------------|------------------------|
| Accessibility on foot to employment, education, healthcare, leisure & community etc | Above district average | Similar to district average | Below district average |

Table 4-6: Scoring guides for KPIs for Objective #1 Meeting need locally

| KPI                                                             | Score of 1             | Score of 3                  | Score 5                |
|-----------------------------------------------------------------|------------------------|-----------------------------|------------------------|
| Mode share of journeys under one mile to/from developments.     | <30% non-car           | 30-50% non-car              | >50% non-car           |
| Accessibility by public transport to employment, education etc. | Below district average | Similar to district average | Above district average |

Table 4-7: Scoring guides for KPIs for Objective #2 Healthier &amp; safer travel

| KPI                                                                                   | Score of 1                           | Score of 3                  | Score 5                              |
|---------------------------------------------------------------------------------------|--------------------------------------|-----------------------------|--------------------------------------|
| Household-weighted average of NO <sub>x</sub> and PM <sub>2.5</sub> at current levels | Substantially above district average | Similar to district average | Substantially below district average |

Table 4-8: Scoring guides for KPIs for Objective #3 Harmonious places

| KPI                                                                                                    | Score of 1                                 | Score of 3                                   | Score 5                                    |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------|----------------------------------------------|--------------------------------------------|
| Ratio of traffic volume to total capacity of highways. <sup>1</sup>                                    | Peak time V/C on main roads typically >90% | Peak time V/C on main roads typically 80-90% | Peak time V/C on main roads typically <80% |
| Average delay between the 21 points shown in Figure 4-6 (forecast vs free-flow time) for car journeys. | As district average                        | Delay is 10-20% of total JT                  | Delay is <10% of total JT                  |

Table 4-9: Scoring guides for KPIs for Objective #4 Safe &amp; resilient networks

| KPI                                                                                   | Score of 1 | Score of 3     | Score 5 |
|---------------------------------------------------------------------------------------|------------|----------------|---------|
| Public transport mode share of journeys of one to ten miles to/from Local Plan sites. | <15%       | 15-20% (<1 ml) | >20%    |

Table 4-10: Scoring guides for KPIs for Objective #5 Attractive &amp; viable public transport choices

## 4.5 Setting Targets

Targets for each KPI will be set later once the impacts of the Spatial Options is better understood. The targets will provide a quantitative description of the vision.

<sup>1</sup> 80-85% is typically the % at which congestion is considered to begin occurring. See

<https://assets.publishing.service.gov.uk/media/5e73a43d86650c2978afa311/road-traffic-forecasts-2018-document.pdf>

## 5 Conclusion & Next Steps

### 5.1 Conclusion

This Technical Note outlines the approach used to assess the Spatial Options, drawing on a range of evidence including transport modelling outputs, local network style analysis, and wider supporting information. Together, these sources provide context on existing conditions and help identify the potential effects associated with the different Spatial Options.

Consistent with a vision-led methodology, the Cotswold Spatial Assessment considers a wide range of future scenarios to ensure that all reasonable possibilities are captured. The evaluation of Spatial Options represents one element of the wider Cotswold local plan assessment, helping to inform decisions about strategic direction and policy alignment.

The note also sets out findings from different evidence streams feed into the MCAF, which provides a structured framework to help compare Spatial Options against strategic objectives. The combination of quantitative analysis and qualitative insight enables a comprehensive and rounded appraisal. This Technical Note forms part of a series of reports supporting the local plan evidence base, alongside the Forecasting Approach Technical Note and the Forecast Modelling Output Technical Note.

The Cotswold assessment is underpinned by the Vision & Validate framework, which shifts away from traditional “Predict and Provide” approaches towards a process guided by desired outcomes and policy priorities. KPIs within the MCAF provide measurable criteria for evaluating Spatial Options, guiding interventions, and supporting ongoing monitoring. These KPIs are not fixed targets but tools to help ensure that decision-making remains flexible and aligned with strategic objectives.

### 5.2 Next Steps

After undertaking the Spatial Option assessment, subsequent model runs will be undertaken to firstly understand the impact of the PSO, once identified, then subsequently determine and evaluate potential transport interventions.

As discussed in Section 3.1, the spatial option assessment will be based on assignments derived from the Core Scenario utilising fixed demand calculated from the site-specific trip rates. These site-specific trip rates consider both BAU and V&V scenarios. The outputs of the spatial option assessment will help inform and identify the Preferred Spatial Option (PSO).

After the PSO has been selected, the assessment will then be taken back into the VDM framework, where investigation will be undertaken on how to achieve the V&V reduction in Car trip making as well as other aspects such as the trip length distances impacted. At this stage, the reduction of the V&V scenario will not be capped to a 20% reduction in car traffic, as discussed in Section 3.2. The V&V trip rates will inform a comparison to analyse against and indeed if a greater reduction in car trips can be achieved this will be monitored and reported on.

## 6 Bibliography

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DfT, 2024b. *TAG Unit M3.1 Highway Assignment Modelling*. [Online] Available at: <https://assets.publishing.service.gov.uk/media/67ed0e54e9c76fa33048c634/tag-m3-1-highway-assignment-modelling.pdf#:~:text=1.1.1%20This%20unit%20provides%20guidance%20on%20developing%2C%20calibrating,conditions%20over%20the%20modelled%20period%2C%20often%2>

Ministry of Housing, C. & L. G., 2025. *National Planning Policy Framework*, s.l.: UK Government.