North Yorkshire County Council

HARROGATE CONGESTION STUDY

Options Assessment Report Addendum

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OCTOBER 2018

North Yorkshire **County Council**

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1 INTRODUCTION

1.1 PURPOSE OF THE REPORT

This report forms an addendum to the Options Assessment Report (OAR), published in November 2017 as part of the Harrogate Congestion Study (HCS). It should be noted that, at that time, the project was titled the 'Harrogate Relief Road Review'; this has been amended to the HCS to reflect the wider remit of the work that has now been undertaken.

This addendum reports on the additional work that has been undertaken to review and further develop each of the proposed interventions, as far as is possible at this early stage of the study. It also discusses the subsequent early appraisal of the previously proposed packages B and E, in order to more effectively establish the potential impact that they could have on both the current and future challenges within the study area.

1.2 BACKGROUND

WSP was commissioned, in March 2017, by North Yorkshire County Council (NYCC) to undertake work associated with identifying and addressing issues of urban congestion in and around the Harrogate and Knaresborough urban area, whilst also looking to improve longer distance strategic east-west connectivity in the region.

The first stage of this work was completed in November 2017, with the submission and subsequent publication of an Options Assessment Report (OAR). This work concluded that Harrogate and Knaresborough's transport issues are complex; congestion and delays are a result not only of trips in and out of the town, but also of internal trips being made within the towns themselves. As such, it is considered unlikely that one intervention could effectively address these issues; therefore a 'package' approach to interventions was adopted and five notional 'Packages of Interventions' were developed, aimed at meeting the agreed objectives of the study.

It should be noted that the content of the packages has the potential to change as the study progresses, as feedback from any future consultation is considered and work undertaken to develop the interventions further. However, for the purposes of this option identification stage of the project, the packages were formed based upon consideration of the complementary nature of the interventions and, together, their potential for addressing the complex issues experienced within the study area.

As part of the OAR work each of the packages was appraised using the Department for Transport's (DfT) Early Assessment and Sifting Tool (EAST); EAST is used as a decision support tool, summarising and presenting evidence on options in a clear and consistent format. It provides relevant, high level information that enables decision makers to form an early view of the relative performance of different options and is suitable for the assessment and comparison of all types of interventions, across all modes, in a consistent format. This is particularly relevant for this study, which considers a wide range of potential interventions

The EAST assessment, of each of the five packages, concluded that two packages (B and E) had the potential to provide the greatest level of benefit for Harrogate, Knaresborough and the wider study area.

Public consultation, on the initial outcomes of the study and subsequent high-level appraisal of packages, was planned to commence at the beginning of 2018. Feedback from this consultation was to be used to revisit the composition of the better performing packages, and to establish prioritisation of the packages ahead of progression to Strategic Outline Business Case (SOBC).

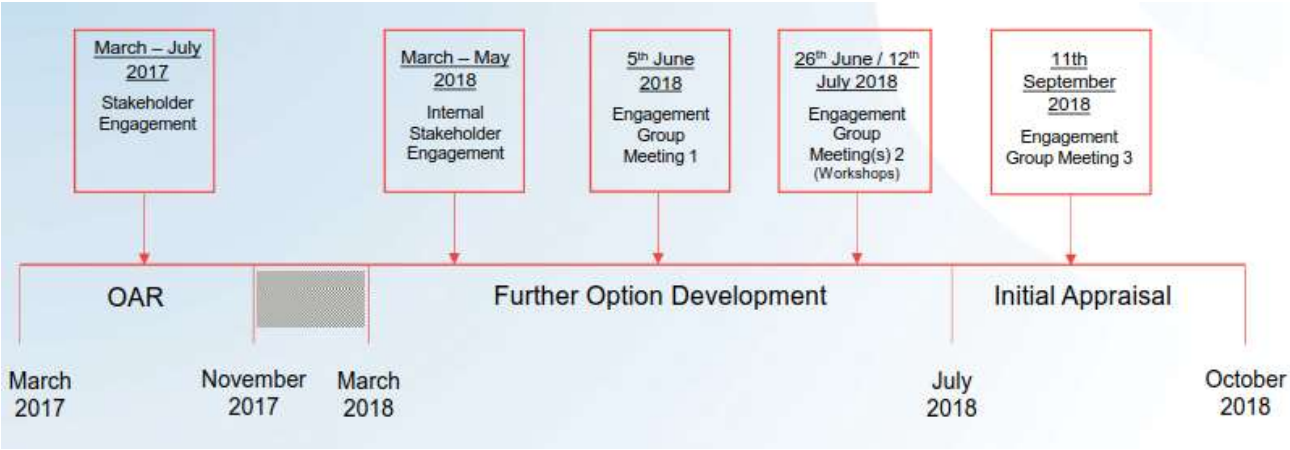
However, in December 2017, and following a recommendation from the Harrogate and Knaresborough Area Committee, NYCC's Business and Environmental Services (BES) Corporate Director and Executive Members took the decision not to go to public consultation on the initial outcomes of the study at this time and to, instead, further develop the interventions within the two packages B and E.

In March 2018, WSP was appointed to undertake this further option development work; this has been informed largely through local knowledge, gathered via engagement with stakeholders - both internal and external – as discussed in the following section.

1.3 STAKEHOLDER ENGAGEMENT

Engagement with stakeholders has been undertaken at key points throughout this study, as part of both the OAR and Further Option Development workstreams; a timeline of this engagement is set out in Figure 1, below.

Figure 1 – Engagement Timeline



Key internal and external stakeholders were consulted as part of the OAR phase of works in 2017; this included face-to-face meetings, telephone calls and postal engagement. As part of this engagement stakeholders inputted in terms of identifying issues within the study area, and providing suggestions as to how these issues could be addressed; the outcomes fed into both the Stage 1 work (identifying the need for intervention) and subsequent option identification.

As part of the Further Option Development there has been ongoing engagement with internal and external stakeholders. As shown in Figure 1, above, internal stakeholders were consulted as part of the long-list review; this review also included consideration of whether any additional interventions had been proposed by external stakeholders since publication of the OAR in late 2017. This is discussed further in Section 2.2.

Over the course of the study a series of meetings have been held with the HCS Engagement Group; the Engagement Group is made up of key external stakeholders, a full list of which is included at Appendix A.

The first HCS Engagement Group meeting was held on 5th June 2018, setting out the scope of work and what stakeholders could expect over the coming months. The second meeting, split into two sessions in late June / early July, was in workshop format with stakeholders invited to comment on the intervention proposals and add value through local knowledge; as a result of these sessions changes were made to a number of the interventions in order to incorporate stakeholder views and knowledge. The final meeting of the Engagement Group was held on 11th September and reported on the approach to appraisal that was underway at that time.

Comments recorded, as part of the HCS Engagement Group meetings, are included at Appendix A.

1.4 STRUCTURE OF THE REPORT

This OAR Addendum builds upon the previous work undertaken, as discussed above; it sets out a summary of the further option development and appraisal of interventions that make up the respective packages B and E.

The remainder of the document is structured as follows:

- **Chapter 2** sets out the process undertaken to further develop each of the interventions considered as part of the packages; this includes detail of the review of the 'long list' and 'short list' of interventions developed as part of the OAR in 2017;
- **Chapter 3** sets out the approach to the appraisal work that has been undertaken which, where possible, includes the potential impact each intervention could be expected to have, based upon the findings of a Comparative Study. The subsequent appraisal that follows comprises of a combination of qualitative assessment, traffic modelling and Active Mode Appraisal, in line with DfT's WebTAG ('Web-based Transport Analysis Guidance').

- **Chapter 4** presents the findings of the appraisal process and the calculation of indicative Benefit Cost Ratios (BCRs) for each of the packages.
- **Chapter 5** summarises the findings of this OAR Addendum, and outlines the recommended next steps for the Harrogate Congestion Study.

2 FURTHER OPTION DEVELOPMENT

2.1 BACKGROUND AND OVERVIEW

The OAR set out detailed analysis of the current and forecasted future conditions in the study area, and the resultant need for intervention; this was informed through a review of existing evidence and stakeholder consultation.

Following identification of the need for intervention, a 'long list' of measures - considered to have the potential to address the issues and constraints identified within the study area - was developed. The interventions included within this long-list were subject to a process of sifting, in order to identify better performing interventions which would allow for them to be collated into wider overarching packages and taken forward for more detailed appraisal as part of any future Strategic Outline Business Case.

A two-stage sifting process was undertaken, as follows:

1. **Initial Sift** – High level qualitative assessment of individual long-list interventions, against agreed Specific Objectives, to produce a subsequent short-list; and
2. **Detailed Sift** – Metric based assessment of the short-list, using DfT's Early Assessment Sifting Tool (EAST). Prior to the EAST assessment the short-listed interventions were, where appropriate, grouped into complementary packages; this is detailed in the OAR.

As discussed above, the sifting process resulted in the initial identification of two packages (B and E) as having the greatest potential to result in benefits, when considered against the EAST metrics (on the assumption that each metric is afforded equal weight).

The findings of the OAR were considered, at a meeting of NYCC's BES Corporate Director and Executive Members, on the 15th December 2017. At this time a decision was taken to delay the planned public consultation until work was undertaken to further develop and appraise the individual elements of these two better performing packages, in order to establish the potential benefits and costs associated with them.

This chapter sets out the work undertaken as part of this further option development.

2.2 BASELINE REVIEW

As part of the further option development, a review of the OAR work was undertaken; to ensure that all potential interventions had been captured as part of the original long-listing, and that the correct interventions were included in the two packages.

The baseline review reconsidered the full long-list of interventions, including those that were shown to offer lesser benefits as part of the OAR appraisal, as well as looking at whether any new interventions had been suggested since development of the original long-list.

As above, the baseline review, undertaken between March and May 2018, consisted of two key tasks undertaken in the following order:

- Review of the original long-list of interventions, developed as part of the OAR work, to ensure that all potential interventions had been captured; and
- Review and challenge of the resulting short-list interventions, and their subsequent inclusion as part of packages B and E.

These tasks were undertaken on the basis of full engagement between WSP and internal stakeholders; the overall process is set out in the following sections.

2.2.1. REVIEW OF LONG-LIST OF INTERVENTIONS

As with the original OAR work, interventions considered as part of the long-list were considered by 'type' under the following categories:

- Information;
- Demand Management;
- Highways;

- Parking;
- Public Transport;
- Cycling; and
- Walking.

Each intervention, included in the original long-list, was discussed in consultation with relevant internal stakeholders (as set out in Section 1.3); a full list of these stakeholders is included at Appendix B. This consultation included discussion of the previous appraisal, undertaken as part of the OAR, consideration of any additional comments (including whether each intervention should remain in the process) and proposals regarding any additional interventions to be considered.

A parallel exercise was undertaken, to identify any suggested interventions that may have been received since the OAR work was finalised at the end of 2017.

Long-list Review Outcome

No additional interventions, over and above those considered as part of the original OAR work, were identified as part of this review; similarly, none of the previously identified interventions were recommended to be discarded from the process as an outcome of the review. As such, all of the interventions, included in the original long-list, were taken forward to the short-list review; a full list of these 38 interventions is included at Appendix C.

2.2.2. REVIEW OF SHORT LIST OF INTERVENTIONS

Following the long-list review a workshop was held, in May 2018, to discuss and seek feedback as to the appropriateness of the inclusion of interventions on the emerging short-list and, ultimately, within packages B and E. This workshop was attended by officers from across the NYCC directorates and representatives from Harrogate Borough Council (HBC) and WSP.

Recommendations, regarding whether each long-list intervention should progress to the short-list, were provided ahead of the 'Shortlisting and Packaging Workshop'. The recommendation was based upon the level of potential benefit an intervention could be expected to bring about, as considered and reported in the OAR, alongside comments received as part of the additional internal stakeholder engagement. The recommendations are set out in a series of summary sheets, included at Appendix D.

In addition to the 23 interventions included as part of the original short-list, a further five interventions - originally not taken forward to Detailed Sift stage (as part of the OAR work) - were recommended for revised consideration as part of the short-list review, these were:

- Reallocation of road space;
- Park and ride;
- Bus priority on key routes;
- Parkway stations; and
- New rail halts.

Detail on the rationale for further consideration of these five interventions is set out below:

Reallocation of road space

'Reallocation of road space' was previously removed from the process, as part of the OAR, on the grounds of deliverability. It was considered that, across Harrogate and Knaresborough, there is a general lack of road space available for reallocation at a sufficient scale to provide a viable intervention; this is an issue further complicated by the designation of The Stray. As such, it is considered that significant land acquisition and potential Compulsory Purchase Orders (CPO) would likely be required in order to provide the additional space. However, it was noted that mode specific reallocation of road space would be considered as part of other interventions, including 'network optimisation' and 'implementation of the Cycling Infrastructure Plan'.

Discussion at the workshop concluded with agreement that the potential locations for, and extent of, road space reallocation remained uncertain; however, it was also considered that it would be a key factor in encouraging use of non-car modes and maximising the level of benefit of certain other interventions, such as

provision of cycle lanes and improvements to public transport. It was therefore decided that the benefits resulting from encouraging behaviour change, e.g. an uplift in travel by active modes with associated health and wellbeing benefits, were worthy of further consideration at this stage of the study; as such, the intervention has been included in the revised short-list and subsequent packaging.

Park and ride

'Park and ride' was originally not taken forward past the OAR Initial Sift due to likely issues of deliverability. For example, in addition to the issues discussed in relation to 'reallocation of road space', it was additionally considered that to create a viable park and ride service it would be necessary to provide significant improvements to bus routes to/from the identified site (i.e. dedicated bus priority), in order to encourage sufficient uptake; it is likely that this would require significant land take along key routes.

As part of the OAR it was considered that a consistent approach to parking across the study area was likely to be the best way in which to capture the appropriateness of a park and ride intervention as part of a wider package; this is due to the fact that the overall success of a park and ride would be intrinsically linked to the supply, demand and charging regimes of parking across the study area.

Previous work, commissioned by NYCC, has suggested that a park and ride for Harrogate would likely be unfeasible in terms of costs; however, feedback from the workshop highlighted that stakeholders believe further consideration of this option, in its own right, is required. It was noted that the provision of a park and ride would likely need to be on the basis of utilising an existing bus service, but that extensive further feasibility work would be necessary in the future if this were to be taken forward to be considered after this initial shortlisting and packaging stage.

Bus priority on key routes

'Bus priority on key routes' was previously shown, as part of the OAR work, to result in a relatively low score against the study objectives. In particular, it was noted that it would likely be difficult to deliver due to a lack of available space to provide adequate bus priority. Discussion with stakeholders concurred that the intervention would be difficult to deliver as there are limited opportunities to provide a coherent package of bus priority measures, given the limitations of available highway space and the constraints of The Stray, and that – if delivered - there would likely be resulting issues of capacity constraints for other vehicles.

It was determined, at the workshop, that any bus priority provision would need to be localised to specific junctions on the network, and that an appropriate balance between provision for buses and general traffic capacity would need to be considered. This intervention could bring benefits as part of a wider package but would require significant feasibility work to determine how it could complement other measures (including the relief road, network optimisation, signals strategy review and park & ride).

Parkway stations

The appraisal process, undertaken as part of the OAR, showed this intervention to score reasonably well against the study objectives, in that it had the potential to encourage use of sustainable modes; however, it was also likely to be subject to very high costs and deliverability issues that would potentially render delivery unfeasible. Additionally, rather than reducing traffic, provision of parkway stations could result in the redistribution of some local traffic, creating congestion in new locations.

Consultation with internal stakeholders, both as part of the long-list review and at the workshop, corroborated the OAR assumption that the cost of implementation was likely to be prohibitive to delivery and that improved service frequencies (outside of the control of the local authority) would be essential for this intervention to be effective. It was therefore agreed that parkway stations would not be progressed to form part of the short-list and that the focus, in relation to rail, should be on better utilising the existing infrastructure.

New rail halts

As with parkway stations, the provision of new rail halts to serve key employment areas, educational facilities and new developments was shown, within the OAR, to score reasonably well against the study objectives in terms of encouraging sustainable mode use. However, this intervention would also have very high costs and deliverability issues associated with it, and would potentially impact current operation and timetabling of existing services.

At the workshop it was agreed that issues, relating to the provision of land and to access, would severely impact deliverability, and that the need for an increase in service frequency would be difficult. As with the

provision of parkway stations it was therefore agreed that a focus on better utilisation of the existing rail infrastructure should be the priority, rather than provision of, new infrastructure.

2.2.3. SHORT LIST REVIEW OUTCOME

The recommendations, set out ahead of the Shortlisting and Packaging Workshop, were largely upheld; each of the 23 interventions that formed part of the original OAR short-list were agreed to still be considered appropriate for inclusion following the review.

Of the additional five interventions, discussed above, three were adopted as part of the revised short-list – these were:

- Reallocation of road space;
- Park and ride; and
- Bus priority on key routes.

The two additional interventions ('parkway stations' and 'new rail halts') were agreed not to be progressed on the basis of cost and deliverability, with agreement that priority should be given to improving existing infrastructure and services as opposed to providing new.

These 26 short-listed interventions were then taken forward for further option development work to be undertaken.

2.2.4. PACKAGING

Packaging of the short-listed interventions was discussed at the May 2018 workshop. As set out earlier in this section, the content of the packages is not set at this time and is subject to change as future work, and consultation on options, is undertaken. For the purposes of this appraisal, stakeholders were asked to consider the packages in their existing form; discussions at the workshop reinforced that the overall composition of the original packages, as set out in the OAR, was still considered to be appropriate at this stage of the study.

No changes to the original packages were proposed, over and above inclusion of the three additional interventions that were reintroduced in the short-list following the review.

It was agreed, at the workshop, that 'reallocation of road space' should be added to both packages B and E, as it was considered to complement the range of interventions contained within each of the packages (albeit potentially in different forms).

Given their linkages, 'park and ride' and 'bus priority on key routes' were agreed for inclusion within package E only; as complementary measures it is considered that they would provide enhanced benefit by being implemented together. These interventions were included in package E only as its focus is on providing sustainable transport options, and subsequent mode shift, through the provision of physical measures; package B includes physical and fiscal measures, to discourage traffic from entering the town centre, and provision of "softer" behaviour change measures for encouraging modal shift. As such, the bus priority and park and ride interventions have a better 'fit' with the rationale, and other interventions, of package E.

As above, the packages, and the selections of interventions within them, are not finalised and are subject to change as part of future stages of work including public consultation; however, for the purposes of this assessment they are to be appraised in their current form (as in the OAR with the addition of the three interventions outlined above).

2.3 FURTHER DEVELOPMENT OF INTERVENTIONS

Following the baseline review, work has been undertaken to further consider and develop the interventions that formed part of the previously identified packages B and E - along with the additional interventions reintroduced as a result of the review. This involves more focussed consideration of how they could potentially be delivered within the study area.

The intervention development work involved collaborative input from WSP specialists, NYCC and other internal stakeholders and external stakeholders (as discussed in Section 1.3).

As a result of the further development of options, it became apparent that some interventions overlapped in terms of the benefits they provided. On this basis, it was appropriate to merge these interventions as follows:

- G1: ‘Area wide public realm strategy’ was considered to be encapsulated within intervention E1: ‘Bus/rail interchange development and public realm improvements’; and
- C3: ‘Network optimisation ‘and C4: ‘Signal strategy review’ were combined as it became clear that the key to delivering network optimisation would most likely be through the implementation of a traffic signals strategy.

The outcome of this work, for each proposed intervention, is presented in an individual ‘Intervention Summary Sheet’; which sets out the following standardised information:

- **Intervention Description;**
- **Potential Location(s**) - if able to identify at this stage;
- **Related Interventions** - to demonstrate where there may be complementary relationships between interventions, potentially resulting in greater combined benefit;
- **Examples of Similar Interventions Elsewhere** - to inform consideration of potential delivery and impact;
- Indicative Cost Estimate - based upon the following ranges:
    - Very Low: <£10k
    - Low: £10k-£100k
    - Medium: £100k-£1m
    - High: £1-5m
    - Very High: >£5m
- **Indicative Delivery Timescale** - based upon the following ranges:
    - Short: <2 years
    - Medium: 2-5 years
    - Long: >5 years

For each intervention it was also identified within which package they are included; B, E or both. Any additional information, including whether the intervention has been reintroduced following the baseline review, was also recorded.

Proposals were taken to the second of the HCS Engagement Group meetings, split over two sessions held in June and July 2018, for input from stakeholders; following the sessions a series of amends were made to the interventions, to reflect the comments made by the group.

The finalised formation of packages B and E is set out in Appendix E while the final set of Intervention Summary Sheets, updated to incorporate comments made by stakeholders, are included at Appendix F.

3 APPRAISAL OF INTERVENTIONS

3.1 OVERVIEW

Following the work undertaken to further develop and localise (where possible) each of the interventions, the finalised short-list - and the respective packages to which they have been allocated - were taken forward for high level appraisal that looked to more specifically identify the potential level of benefit they could bring. Details of the appraisal methodology are discussed in this Chapter.

The respective benefits of each package have been determined through the undertaking of an Active Mode Appraisal (AMA), in line with DfT guidance, and modelling processes, supplemented by qualitative assessment as appropriate. Indicative costs for the delivery of each intervention have also been determined, allowing a Benefit Cost Ratio (BCR) to be calculated for each package. This information will then be used to inform decisions regarding further feasibility work relating to the HCS.

It should be noted that, whilst a BCR provides an indication as to the potential economic benefit of an intervention (or in this case, a package), there are much wider considerations to take account of when building a full business case, should the scheme progress past the optioneering stage.

Figure 2, below, shows the stages associated with the development of a DfT compliant business case. The option identification stage, documented in this report and in the previous OAR, feeds in to the process prior to 'Phase 1'; as such, the level of detail applied to the interventions, and the subsequent approach to appraisal, is appropriate and proportionate to the very early stage of the process.

Figure 2 - Business Case Development Process

3.2 METHODOLOGY

For the purposes of this appraisal, a three-stage approach has been adopted – this is summarised as follows:

- **Step 1**: Appraisal definition.
- **Step 2:** Identification of potential impacts.
- **Step 3:** Initial appraisal of impacts.

3.2.1. STEP 1: APPRAISAL DEFINITION (Identifying the right approach)

An intervention definition and associated timescales have been agreed with NYCC for each intervention, building upon the Intervention Summary Sheets discussed in Section 2.3 above; this has enabled the impacts to be assessed and quantified where possible. It should be noted that the scheme definitions have been assumed as appropriate for this stage of appraisal, to provide an indication of the potential impact; however, significant further work would be required to develop the scope of any intervention if taken forward toward business case development.

Given the range of interventions, and the early stage of appraisal work, it is not possible to quantify the impact of every scheme and it has therefore been agreed, with NYCC, which interventions would be assessed qualitatively and/or quantitatively; where quantitative appraisal was to be undertaken it was agreed whether this would be through an Active Model Appraisal or by using the available VISUM traffic model, or both.

The agreed intervention description, along with associated timescales and appraisal approach, for each intervention, is summarised in the table contained at Appendix G.

As part of this stage of work a number of the interventions were identified where, for the purposes of this appraisal, it was considered advantageous to either combine interventions, split them out into multiple interventions or assess more than one scenario; a summary of these instances is set out below. These assumptions have been made, at this stage, to enable an initial assessment to be undertaken.

- A7: 'Area wide behaviour change' was combined with the following interventions to allow for appraisal of the overarching impact of these complementary 'softer' measures:
    - B4: Area wide travel plans;
    - A4: Publicity campaign
    - A5: Website and app; and
    - A6: Personalised journey planning.
- B1 was split as follows:
    - B1a: Extension of the pedestrian zone; and
    - B1b: Restricted access within the town centre core.
- B8 was split as follows, for the purposes of the traffic modelling appraisal; it was considered in its entirety for the Active Mode Appraisal:
    - B8a: Home Zones; and
    - B8b: 20mph zones.
- C3 was considered for the following scenarios:
    - Network optimisation with relief road; and
    - Network optimisation without relief road.
- E1 was split as follows:
    - E1a: Improved bus / rail interchange (Harrogate); and
    - E1b: Improved bus / rail interchange (Knaresborough).

For the Active Mode Appraisal, a number of interventions, which specifically aim to target improvements for active modes within Harrogate town centre, were considered collectively; these were as follows (further details are provided as part of the Step 2 methodology):

- Package B: A single uplift value applied to account for combined impact on Harrogate town centre: B1a, B1b, B2, C3/4, C5, E1a.
- Package E – A single uplift value applied to account for combined impact on Harrogate town centre: B1a, B1b, C1, C3/4, C5, E1a.

Similarly, in Knaresborough, a single uplift value has been applied to account for combined impact on the centre of the town; this includes interventions E1b and E11.

3.2.2. STEP 2: IDENTIFICATION OF POTENTIAL IMPACTS

In order to begin to determine the level of impact that each intervention could potentially be expected to bring about, a Comparative Study has been undertaken. This is in line with DfT's WebTAG Unit 'The Transport Appraisal Process' (January 2018) and WebTAG Unit A5-1 'Active Mode Appraisal; this considers details of similar schemes implemented elsewhere, along with their reported outcomes where available.

The purpose of the Comparative Study is to provide an indication of the level of impact that each intervention could potentially be expected to have on modal shift in the study area, particularly away from use of the private car linked with an increase in the use of more sustainable modes. The findings of this are then used to inform the various appraisal components, described later in this chapter, to provide an overall indication of the level of economic benefits the packages could provide.

Where possible, the research undertaken has focused on identifying examples of interventions in locations that are broadly comparable with the study area (e.g. towns and urban areas in the UK with a population of less than 100,000). However, due to the availability of information, and of existing similar projects in

comparable areas, this has not always been possible and examples from differing size towns and cities have been included where it is felt that they can still be considered relevant. Where this is the case, figures used have been assessed and adjusted to more accurately reflect the characteristics of the study area.

As part of the Comparative Study in excess of 40 studies and projects were reviewed, a number of which were reviews in themselves and therefore provided information in relation to more than one scheme or project. As well as desk-based research, specialists from across WSP UK provided examples of work they were aware of or had been involved in; this included input from teams including sustainable transport, travel behaviour change, public transport, low emission zones, landscape, urban design, traffic management, parking and ITS.

The findings of the Comparative Study are set out in a series of 'Intervention Impact Summary Sheets', which present the following information for each intervention:

- **Scheme definition** – for the purposes of the impact assessment;
- **Evidence base** – including sources;
- **Impact assessment**:
- **Quantitative** (if applicable);
- **Qualitative** (if applicable);
- **Assumptions**;
- **Caveats**.
- **Indicative cost estimate** –to develop, implement and maintain;
- **Indicative timeframe** - to develop, implement and maintain.

The full set of summary sheets are contained at Appendix H.

It should be noted that, while the Comparative Study approach is in line with DfT appraisal guidance, the information is intended to be high level and indicative given the stage of the study, and that the impacts resulting from delivery of interventions is dependent upon a range of factors - many of which are location specific. On this basis, the results are illustrative rather than definitive.

Where comparable evidence could be identified, a series of proportional changes to modal use has been identified for different users. Where comparable evidence was not available professional judgement has been applied, taking account of the breadth of specialist experience from across WSP; these figures were subject to review and challenge from the NYCC project team, and were updated based upon their local knowledge and experience/data, where available, to arrive at a set of agreed impact figures.

The table at Appendix G summarises the agreed uplifts for active modes (to inform the Active Mode Appraisal, details of which are set out later in this section) alongside changes to demand in the traffic model, and changes to the model network itself (to inform the traffic modelling, discussed later in this section). Model network changes have been determined in such a way that they reflect the potential on-the-ground situation while the proposals in respect of demand changes are largely based upon the findings of the comparative study.

It is considered that the different package elements, if all delivered, could result in a combined impact greater than estimated or, conversely, it may be possible that the impacts are lesser if the same individuals are those being targeted in respect of changing behaviours. For this early stage of appraisal, and to ensure cumulative benefits are recognised and double counting avoided, the following assumptions were made for the purposes of assessment and appraisal:

- All changes in the traffic model were treated separately in appraisal of Package B and Package E;
- Uplifts applied for the Active Mode Appraisal were treated separately, with the exception of the Harrogate Town Centre interventions and Knaresborough Town Centre interventions, as described in Section 3.2.1.

The decision to consider specific interventions together rather than individually, for the purposes of the Active Mode Appraisal, is due to the fact that they are anticipated to have the most significant impact in the concentrated area of the respective town centres. It is considered that assessing the interventions individually would be likely to result in an exaggerated level of benefit, due to potential double counting of benefits as the

interventions are likely to target the same individual users within this area. By cumulatively appraising the interventions that are most likely to result in increased use of active modes within Harrogate town centre, it was considered that a more realistic, aggregate level of benefit for the town centre would be determined.

The appraisal methods are discussed in more detail in the following sections.

3.2.3. STEP 3: INITIAL APPRAISAL OF IMPACTS

As mentioned earlier in this chapter, the appraisal of impact – undertaken at this early stage of the study - has been undertaken using Active Mode Appraisal and modelling processes, supplemented by qualitative assessment as appropriate.

As in Section 3.2.1, due to the early stage of this appraisal work, it is not possible to quantify the impact of each of the interventions. It was therefore agreed, with NYCC, that all of the interventions would be considered qualitatively, on the basis of the impact they could have within the study area, but that only those that could be realistically reflected, in either the traffic model or the Active Mode Appraisal, would be subject to quantitative appraisal. The agreed approach to each intervention is set out in the table at Appendix G.

As a result, there are consequently some interventions which would impact upon the study area but that have not been captured within the economic appraisal (set out in Chapter 4). The qualitative consideration of all interventions is included within the Impact Summary Sheets at Appendix H.

The quantified appraisal is discussed further in the remainder of this section.

ACTIVE MODE APPRAISAL

Appraisal of the potential economic impacts of the interventions in respect of active modes (walking and cycling) has been undertaken in accordance with DfT standard processes, as set out in WebTAG Unit A5.1 'Active Mode Appraisal' (May 2018). As stipulated in the guidance, potential economic benefits have been calculated for the following key categories:

- Physical Activity (Health Benefits);
- Absenteeism (Business Benefits); and
- Journey Quality / Ambience.

In order to apply the relevant 'uplifts' in trips by active modes as a result of the interventions, determined as discussed in the sections above, and to undertake the subsequent appraisal, an estimation of existing demand for active mode travel is required. The methodology below describes how current walking and cycle demand has been estimated.

Active Mode Demand Forecasting

To allow for appraisal of the impact of the interventions on active modes, it is necessary to calculate demand estimates for pedestrians and cyclists for both the baseline "without scheme" (Do Minimum) and future "with scheme" (Do Something) scenarios. Each of the Active Mode Appraisal calculations requires an estimation of the walking and cycling demand, either in terms of the number of people, or the number of trips undertaken for both the "Do Minimum" and "Do Something" scenarios.

Due to a lack of available count data, for both pedestrian and cycle trips in the study area, the base demand has primarily been estimated using Census 2011 'Journey to Work' data - alongside findings from the National Travel Survey – in order to gauge the general propensity to walk or cycle in the areas likely to be impacted by the proposed interventions. The approach to formulating the estimates is set out in the following sub-sections.

Base Demand Estimation

As referred to above, Census 2011 'Journey to Work' data has been used in order to provide an estimate of the number of trips being undertaken by active modes, for a number of the proposed interventions. Differing methodologies have been followed for this estimation, dependent upon the nature of the intervention; for example, some interventions are targeting the entire study area (such as Intervention A7 - Area wide behaviour change package), whereas others are targeting very specific areas (such as B8a Home zones). As such, slightly different approaches have been taken to reduce the risk of double counting trips.

However, due to the fact that 'Journey to Work' data only reports on commuting/business related trips, there is a need to estimate the number of trips for 'other' purposes that are also being undertaken on the study area

network; this has been done using statistics from the National Travel Survey (England, 2016). The National Travel Survey (NTS) is a household survey designed to monitor long-term trends in personal travel; it is the primary source of data on personal travel patterns of residents of England, and collects information on how, why, when and where people travel.

Table NTS0409 'Average number of trips (trip rates) by purpose and main mode per year' has been used to estimate walking and cycling trips made for purposes other than commuting; the information can be used as a proxy to estimate the total number of active mode trips that occur in addition to the commuting trips reported as part of the Census. The data demonstrates that approximately 40% of cycle trips per person are for commuting or business purposes; those for leisure and shopping are proportionally the same at around 40%. As such, it can be assumed that for every cycle commuting/business trip made there would be a corresponding leisure or shopping trip; this 1:1 ratio has then been applied to the number of trips taken from the Journey to Work data. A similar methodology has been used for estimating non-commuter walking demand.

For a number of the interventions Census 'Journey to Work' data was not considered to be adequate to capture the current active mode travel demand and, therefore, alternative approaches for demand estimation have been used. This was the case the following interventions:

- B11: School travel plans - demand has been based on the number of school staff within the study area and mode share for commuters across the study area;
- E4: Sustainable travel provision at new residential developments – demand has been calculated using approved Transport Assessments relating to the individual developments; and
- E11: Access to stations - demand has been based on station survey information and data from the Office for Rail Regulation (ORR), relating to the number of users at the relevant stations.

Converting Trips to Individuals

Whilst estimates of the number of trips in the 'Do Minimum' and 'Do Something' scenarios have been made, a number of the AMA calculations require consideration of the number of individuals, rather than trips.

In line with TAG Unit A5.1, where the number of individual users is unknown, the number of individual users is based upon the assumption that 90% of trips are part of a return journey using the same route, to avoid double counting of the number of individuals affected in the calculation. The formula to calculate the number of individual users is as follows:

$$((No.of\ Trips\ * 90\%)/2) + (No.of\ Trips * 10\%)$$

Where appropriate the reverse of the equation has been used to convert the number of individual users to number of trips.

Without Scheme Demand (Do Minimum Scenario)

As the demand estimates have primarily been based upon data from the 2011 Census data, TEMPro factors have been used to calculate anticipated changes in walking and cycling trips from the 2011 Census year to the future year 'Do Minimum' scenario; TEMPro is the 'Trip End Model Presentation Program', which uses data from the National Trip End Model, and is the industry standard tool for estimating traffic growth.

Similarly, for intervention E11 (Access to stations), the data used for the base calculation was collected in 2017; as such, an appropriate TEMPro factor has been used to adjust this to the relevant future year. The TEMPro factors derived for this calculation are set out in Table 1, below.

Table 1 - Summary of TEMPro Growth Factors

Base Year	Opening Year	Walk			Cycle		
		Origin	Destination	Average	Origin	Destination	Average
2011	2025	0.9367	0.9361	0.9364	0.9574	0.9564	0.9569
2017	2025	0.9834	0.9830	0.9832	0.9845	0.9840	0.9843

Future year 'Do Minimum' values have then been used for calculation of the future year 'Do Something' scenarios, using the agreed uplifts in active mode usage as a result of the interventions, as detailed in the following section.

With Scheme Demand (Do Something Scenario)

The future year 'Do Something' walking and cycling demand has been calculated by applying the uplifts for active mode use, as agreed with NYCC and summarised in Table 2, overleaf; these uplifts are in line with the findings of the Comparative Study, described in Section 3.2.2, with appropriate levels of professional judgement, constructive challenge, local knowledge and experience from projects applied.

DfT WebTAG Unit A5.1 states that, when appraising active mode benefits, analysis can be highly sensitive to forecasts and assumptions, and that sensitivity testing is advised for increased robustness. As such, sensitivity testing of the 'Core' scenario - the scenario based on the core assumptions of the appraisal, and therefore considered to be the most likely expected outcome – has been undertaken as part of the Active Mode Appraisal.

The sensitivity testing carried out applies to the uplift estimates and includes 'Low' and 'High' uplift values, reported alongside the Core scenario results, for each of the applicable interventions; the Low and High scenarios have been derived to reflect a potential range of impact that could realistically be achieved, as well as to account for the differences in conditions that occur across different geographic areas. The Core, Low and High scenarios are set out in Table 2, below.

As previously stated, in Section 3.2.1, those interventions that would be implemented (and/or are considered to have the largest impact) specifically within Harrogate town centre have been considered together, using the agreed overarching uplifts as set out in Table 2, below.

The application of a cumulative uplift for this area is intended to both account for any greater benefit that may be achieved through the implementation of a number of complementary measures in one area, and to avoid issues of double counting and resulting overestimation of benefit as a result of numerous interventions targeting the same individuals. The different uplift proportions (and inclusion of sensitivity tests), outlined in Table 2, were considered to reflect the differing level of impact each intervention could have across the area, whilst considering a cumulative effect of all being implemented together.

Table 2 – Uplifts used for Active Mode Appraisal

Option Ref	Package	Active Mode Appraisal Uplifts
A7: Area wide behaviour change package including: ▪ B4: Area wide travel plans ▪ A4: Publicity campaign ▪ A5: Website & app ▪ A6: Personalised journey planning	B	Uplift applied across active mode users in the built-up area of Harrogate and Knaresborough: ▪ **Walking** – Core 10%, High 15%, Low 5% ▪ **Cycling** – Core 20%, High 30%, Low 10%

Option Ref	Package	Active Mode Appraisal Uplifts
Harrogate Town Centre Improvements including: ▪ B1a: Extend pedestrian zone ▪ B1b: Restricted access within town centre core ▪ B2: Traffic management zone (Package B only) ▪ C1: Relief road (Package E only) ▪ C3/C4: Network optimisation ▪ C5: Reallocate road space ▪ E1a: Public transport hub (Harrogate only)	B & E	Single uplift value to account for combined impact on Harrogate town centre: ▪ **Walking** – Core 30%, High 45%, Low 10% ▪ **Cycling** – Core 15%, High 25%, Low 5%
Knaresborough Town Centre Improvements including: ▪ E1b: Public transport hub (Knaresborough only) ▪ E11: Access to Stations (Knaresborough only)	B & E	Uplifts applied to active mode use based on station surveys and Office for Rail Regulation data on station users, including uplift for interchanging passengers: ▪ **Walking** – Core 30%, High 45%, Low 15% ▪ **Cycling** – Core 30%, High 45%, Low 15%
B8a: Home zones	B & E	Uplift in localised zones where Home Zones may be implemented: ▪ **Walking** – Core 15%, High 25%, Low 5% ▪ **Cycling** – Core 15%, High 25%, Low 5% Uplift would be applied cumulatively with B8b
B8b: 20mph zones	B & E	Uplift applied for local roads across the study area: ▪ **Walking** – Core 15%, High 25%, Low 5% ▪ **Cycling** – Core 15%, High 25%, Low 5% Uplift would be applied cumulatively with B8a
B11: School travel plans	B	Uplift to be applied to estimated change in staff travel across schools within the study area: ▪ **Walking** – Core 10%, High 15%, Low 5% ▪ **Cycling** – Core 20%, High 30%, Low 10%
E4: Sustainable transport at new residential developments	B	Uplifts applied to trip numbers provided in approved Transport Assessments for committed sites: ▪ **Walking** – Core 10%, High 15%, Low 5% ▪ **Cycling** – Core 5%, High 8%, Low 2%

Option Ref	Package	Active Mode Appraisal Uplifts
E11: Access to stations (excluding Harrogate – as covered in Harrogate town centre package and Knaresborough Station – see below)	B & E	Uplifts applied to active mode use based on station surveys and Office for Rail Regulation data on station users: ▪ **Walking** – Core 30%, High 45%, Low 15% ▪ **Cycling** – Core 30%, High 45%, Low 15%
F1: Cycle improvements	B & E	Uplift in localised area where scheme applies (excluding stations in E1): ▪ **Cycling** – Core 20%, High 30%, Low 10%

Active Mode Economic Appraisal Methodology

For the purposes of the Active Mode Appraisal, an opening year of 2025 has been assumed and used for the appraisal of all of the AMA applicable interventions, to ensure that the level of benefit they could potentially achieve is determined on a consistent basis.

The 20-year appraisal period has been chosen as it is suggested, in WebTAG, as an appropriate length of time over which to consider the impact of active mode schemes. The appraisal has been undertaken using the DfT's standard appraisal tool. the 'Active Mode Toolkit', which discounts the benefits using a discount rate of 3.5%, and reports the benefits in present values using DfT's 2010 base year.

The outputs from the AMA, and their application for the Cost Benefit Analysis, are discussed in Chapter 4.

TRAFFIC MODELLING

The existing Harrogate and Knaresborough Strategic Traffic Model (VISUM) has been used to assess the impacts of the interventions, where it was agreed with NYCC that it was appropriate to do so. This is discussed over the course of this section.

Model Overview

The Strategic Traffic Model includes detailed modelling of the main urban areas of Harrogate, Knaresborough and Ripon, and was developed by Jacobs in 2015 to support the development and testing of proposals as part of the HBC Local Plan. The model is a highway-only assignment model constructed in VISUM 14 software; it is a peak hour model of the AM peak (08:00-09:00) and PM peak (16:45-17:45) and the model base year is 2015. Demand within the model was constructed from Roadside Interview (RSI) data, infilled with synthetic trips based upon the identified patterns.

A model summary is provided in Table 3, below.

Table 3 – Model Summary

Characteristic	Model Approach
Software	VISUM 15
Base year	2015
Time periods	AM (08:00-09:00) PM (16:45-17:45)
Vehicle types (pcu factor)	Car (1)

	LGV (1) HGV (2)
User classes	UC1 Commute UC2 Employer's Business UC3 Other UC4 LGV UC5 HGV
Zones	294 zones in model (11 external 283 internal and buffer)
Capacity restraint	Links - Volume delay function (COBA types) on links outside urban areas Junctions – Intersection Capacity Analysis (HCM 2000 for all types except roundabouts which use TRL/Kimber)
Assignment methodology	Assignment with ICA (Subordinate assignment Equilibrium Lohse)

Model Updates

In order to undertake this appraisal, using the existing model, it was necessary undertake a number of minor checks and updates, due primarily to the age of the model and the data which was collected to inform it's build. This included:

- Production of Uncertainty Log and forecast demand matrices;
- Data processing – signal data, traffic counts, moving observer data, roadside interview data;
- Prior matrix construction – merging of observed and synthetic movements;
- Network coding;
- Prior matrix assignment and routing checks;
- Model calibration and validation; and
- Improving calibration and convergence of the AM and PM peak models.

As above, the existing model considers the AM and PM peak periods only; it was decided, by NYCC, not to extend the update work to include the build of a new interpeak model at this time. This decision was on the basis of the model build cost and the fact that the existing model provides a sufficient and proportionate level of testing for the early stage of work.

Should any packages be considered suitable for further development at SOBC stage, the construction of an interpeak model would improve the robustness and reliability of the analysis and it is therefore highly recommended that one is constructed as part of any further work should the study be taken forward to business case preparation.

Forecast Demand

Two forecast years are required to undertake an economic analysis of a project of this scale, using modelling software. Although the package approach means that it is likely that interventions would be delivered to

different timescales, for the purposes of the appraisal it is necessary to have consistent appraisal years; these are taken to be:

- 2025 – possible "Opening" year of interventions; and
- 2040 – Future "Design" year aligned with the Local Plan.

The construction of the demand matrices has been based upon the updated Uncertainty Log for Harrogate Borough Council. The Uncertainty Log is a comprehensive list of all possible developments (residential, employment, highway, education etc) that could occur within the forecast period and the original version was produced by Jacobs as part of the Strategic Model construction.

DfT guidance, set out in WebTAG Unit M4, states that a Core scenario should form the basis of any analysis as it is the best representation for decision making given the evidence at the time. The Core scenario is based upon:

- National Trip End Model (NTEM) growth in demand, at a suitable spatial area;
- Sources of local uncertainty that are more likely to occur than not; and
- Appropriate modelling techniques.

The core scenario includes explicit modelling of developments that are categorised as near certain, and excludes those categorised as hypothetical; the additional developments will come from those categorised as more than likely or reasonably foreseeable.

Forecast trip ends have been calculated for all model zones. Where a zone contains a development site to be modelled the trip ends have been calculated based upon the size and type of that development, usually from the TRICS database; TRICS is the industry standard software for the calculation of trip rates by development type, and is based upon a comprehensive database of traffic counts. Zones which do not contain developments, and existing trips in zones that do, have had their trip ends subjected to background growth, calculated from NTEM after adjusting the planning assumptions to account for the explicitly modelled developments.

The forecast trip ends have then been balanced with respect to existing trip patterns ('furnessed') within VISUM matrix manipulation software to produce the forecast matrices; zone distributions are based upon the base year matrices.

Following guidance in WebTAG Unit M4 Forecasting and Uncertainty (Paragraph 7.4.13) NTEM growth factors for fixed demand models have been adjusted to take account of growth in income and growth in fuel. The combined fuel and income growth factor has been applied only to the car matrices; DfT guidance stipulates that forecast goods vehicle matrices are not subject to this uplift as goods vehicle trips are not determined by the same factors as car trips (e.g. car ownership, fuel costs and income growth).

As stated above, the existing model is highway only; for non-highway elements of the packages, the final forecast demand will be reduced to reflect a modal shift away from private vehicle travel (where possible); this is discussed further below.

Forecast Network

The base network has been shown through the performance of the model to be an accurate representation in terms of routing, journey times and levels of flow. As with the forecast demand matrices, the forecast networks have also been based upon network developments contained within the Uncertainty Log.

In order to assess the packages in isolation, two networks must be constructed and the impacts of each compared in terms of journey time, routing changes and ultimately economic analysis. The two networks are:

- **Do Minimum** – the base network with only core scenario highway schemes modelled. i.e. defined as near certain and more than likely in the Uncertainty Log; and
- **Do Something** – the Do Minimum network as described above with the packages modelled.

Historically, a number of options have been proposed in terms of an alignment for any potential relief road; at this early stage of the process there is no preferred option and, as such, three of these historically proposed corridors have been modelled as part of the Do Something scenario for package E, to determine which has the potential to provide the highest level of benefit as part of the overall package. These are categorised as follows:

- **Package E(i):** Inner South with Bilton Link;
- **Package E(ii):** Inner North; and
- **Package E(iii):** Inner South without Bilton Link.

Each of these potential corridors have been coded into the model along with the accompanying interventions that form part of package E, where applicable. As a result, there will be three outputs for package E, reported as part of the modelling appraisal.

Modelling Appraisal Methodology

The methodology for how the strategic traffic model would be used to test and quantify the impact of the proposed packages, for the purposes of this appraisal, has been discussed and agreed with NYCC.

Inclusion and appraisal within the model was considered to be appropriate where the impact of an intervention could be replicated by changes made to either the model network (e.g. pedestrianisation of specific areas) or to the model matrices (e.g. intervention leading to a specific % reduction in traffic either across the network as a whole or to/from specific destinations).

Changes to the model network were proposed where it was considered that the intervention could realistically be included within the model, to replicate what would be delivered on the ground. When considering changes to the demand matrices the outcomes of the Comparative Study were used, and a level of professional judgement and local knowledge applied to determine what was considered to be a realistic level of change in a Harrogate and Knaresborough context. The proposed changes, to both the model network and the demand matrices have been based upon professional judgement, and were presented to NYCC for discussion and challenge based on their knowledge of the study area; the resultant agreed model changes, for the applicable interventions, are presented within the summary in Table 4.

Table 4 – Network and Demand Matrices Changes for Traffic Modelling Appraisal

Option Ref	Package	Traffic Modelling Appraisal	
		Network Changes	**Demand Changes**
A7: Area wide behaviour change package including: ■ B4: Area wide travel plans ■ A4: Publicity campaign ■ A5: Website & app ■ A6: Personalised journey planning	B	N/A (Model Demand Changes only)	A reduction of 10% applied to all car trips with an origin and destination within Harrogate and Knaresborough urban areas
B1a: Extend pedestrian zone	B & E	Model network changes to consist of closure of links to ban vehicles on James Street and relevant sections of Prospect Place, John Street and Princes Street that connect to Albert Street.	N/A (Model Network changes only)
B1b: Restricted access within town centre core	B & E	Model network changes to consist of link closures: ■ Changes to Parliament Street banning buses from travelling southbound.	Reduced demand in area of restrictions with transfer of trips elsewhere on network. 5% Car reduction in town centre zones

Option Ref	Package	Traffic Modelling Appraisal	
		Network Changes	**Demand Changes**
		▪ Changes to Parliament Street to limit to buses only northbound ▪ Creation of one-way links within the restricted zone to prevent 'rat-running'	
B2: Traffic management zone	B	Model network changes to assign a higher 'cost' to trips crossing a cordon (to include the links set out in the Scheme Definition).	Reallocation of trips from town centre zones to adjacent zones. Nominal toll charge to be included in model to demonstrate change in trip routeing.
B7: HGV restrictions	B & E	Closure of links for HGV use – extents as in B1. Reallocate trips not connected to the network / assume trips retimed to IP.	HGVs banned from links in the area within Montpellier Hill, Crescent Road, A61, Station Parade and Albert Street. Remove HGV trips to town centre zones from model
B8a: Home zones	B & E	Reduced coded speeds for links within the Home Zones (as set out in Scheme Definition) Stopping up of links, as appropriate	25% reduction in traffic flows localised to areas identified for home zones i.e. for trips between modelled zones within the same Home Zone area)
B8b: 20mph zones	B & E	Reduced coded speeds for all non-A/B roads within the study area.	N/A (Model Network changes only)
B9: Car sharing	B	N/A (Model Demand Changes only)	A reduction of 10% applied to all car trips with an origin and destination within Harrogate town centre, Cardale Park, Hornbeam and Hospital
B11: School travel plans	B	N/A (Model Demand Changes only)	3% applied to all car trips with an origin and destination within Harrogate and Knaresborough. AM peak model only
C1: Relief road	E	Three potential new links to be coded in the model: ▪ (i) Inner South with Bilton Link ▪ (ii) Inner North ▪ (iii) Inner South without Bilton Link	N/A (Model Network changes only)

Option Ref	Package	Traffic Modelling Appraisal	
		Network Changes	Demand Changes
C3/C4: Network optimisation with relief road	E	Changes to a small number of key junctions on the existing network to reduce capacity and thus encourage use of the RR	N/A (Model Network changes only)
C3/C4: Network optimisation without relief road	B	Changes to a small number of key junctions, to make minor capacity improvements to represent the potential outcome of optimisation work	N/A (Model Network changes only)
C5: Reallocate road space	B & E	Reduction in road width on Parliament Street and Station Parade.	N/A (Model Network changes only)
D2: Park & Ride	E	N/A (Model Demand Changes only)	Reduce car trip numbers along routes from park and ride sites to town centres by 5% (assuming that these are now being undertaken by PT).
E4: Sustainable transport at new residential developments	B	N/A (Model Demand Changes only)	Forecast models contain committed developments (as of 2015), with trip rates applied based on HBC or relevant TA. Additional car trip reductions to be applied at 18% for committed housing sites at or above 50 dwellings.
E11: Access to stations	B & E	N/A (Model Demand Changes only)	A reduction of 2% applied to all car trips to /from zones containing Pannal, Hornbeam Park, and Starbeck rail stations.
F1: Cycle improvements	B & E	N/A (Model Demand Changes only)	A reduction of 3% applied to all car trips with an origin and destination within Harrogate and Knaresborough

The interventions have been replicated in the model, where applicable, as part of their respective packages (with three options for package E, as discussed above); this allowed for the cumulative impact of the package to be determined on a study area wide basis. The model outputs were then used to undertake the economic appraisal, as discussed in Chapter 4.

Traffic Model Economic Appraisal

For the purpose of quantifying impact, and economic assessment, the Harrogate Strategic Transport Model has been used as this provides a validated base scenario and future year forecast scenarios based on anticipated growth assumptions aligned to National Trip End Model (NTEM) growth targets.

Journey time savings for all vehicles are captured, using the model, by comparing each forecast year with and without the scheme. In line with WebTAG Unit A1.1 (May 2018), the outputs from the traffic model have been

fed into DfT's Transport User Benefit Appraisal (TUBA) software (version 1.9.11) in order to generate a quantified impact resulting from changes to trip, journey time and distance matrices.

Transport Economic Efficiency (TEE) captures the monetised benefits for transport users and private sector providers with WebTAG Unit A1.3 User and Provider Impacts setting out the guidance for deriving TEE. As set out above, for the purposes of this appraisal, TEE has been assessed using the TUBA software programme to quantify impact on the following:

- Consumer – Commuting user benefits;
- Consumer – Other user benefits;
- Business benefits;
- Greenhouse Gases; and
- Wider public finances (indirect taxation).

TUBA carries out an assessment for the opening and design year of the scheme, and forecasts project benefits over a 60-year period from scheme opening year. The inputs to TUBA are from one-hour time period models and, as such, annualisation factors are applied to provide benefits for the whole year. These are:

- AM peak from 0800-0900 to 0700-1000, factored by two;
- PM peak from 1645-1745 to 1600-1900, factored by two.

The AM and PM peaks are factored by two as the relationship between flow and delay is not linear and, as such multiplying by three (or a factor based on proportion of peak hour flow occurring in 0800-0900), could over predict benefits. A final factor of 253 is applied to all matrices to ensure the assessment takes account of the number of working days in a year.

TUBA uses the Present Value of Benefits (PVB) to calculate a Net Present Value (NPV) and a Benefit Cost Ratio (BCR). Economic appraisal of the packages has been completed using a DfT WebTAG compliant Value for Money statement, based upon PVB and PVC to derive a BCR; these are presented and discussed further in Chapter 4.

4 INITIAL ECONOMIC APPRAISAL

This chapter presents the initial economic appraisal that has been undertaken to quantify the possible value for money of packages B and E, as part of the Harrogate Congestion Study. The process has been undertaken in line with current DfT WebTAG guidance, as set out in WebTag Unit A1.1 Cost-Benefit Analysis and WebTAG Unit A5.1 Active Mode Appraisal.

The production of a Benefit Cost Ratio (BCR) for each of the packages is intended to inform decision making on next steps for the HCS, linked to the potential for attracting funding from DfT (and/or other potential sources) in the future.

4.1 COSTS

As set out in Section 2.3, indicative cost ranges were determined for each of the interventions as part of the Further Option Development work; these were recorded and presented as part of the individual Intervention Summary Sheets and subsequently taken to the HCS Steering and Engagement Groups for comment.

These cost ranges have been further developed, to inform the Cost Benefit Analysis (CBA). Costs have been developed, with consideration of the delivery of similar schemes elsewhere and with input from WSP Quantity Surveyors, on an intervention by intervention basis to provide a resulting overall cost per package.

It should be noted that, given the early stage of work, costs have been developed to reflect scheme preparation and construction (development and delivery), and ongoing maintenance and renewal costs have not been considered; this is commensurate with the current stage of the study.

It is important to note that, due to the stage of the study, it has been necessary to make a number of assumptions in deriving cost estimates for each of the interventions; these assumptions have been subsequently agreed with NYCC, and are set out in the table at Appendix I, alongside a breakdown of how the costs have been developed for each intervention. A number of additional general assumptions, across all interventions, have been made in the build-up of these costs, and agreed with NYCC:

- Design costs have been calculated as a percentage of the implementation cost:
    - Infrastructure interventions at 15%;
    - Non-infrastructure interventions at 10%.
- Risk costs have been calculated at 20% of the total design and implementation cost.

The resulting estimated risk-adjusted cost for package preparation and delivery, at 2018 Q1 prices (excluding inflation), for the two package options are set out in Table 5, below; three costs are presented for package E, due to the three potential corridor options for the proposed relief road, as discussed in Section 3.2.3.

Table 5 - Summary of Out-turn Scheme Costs (2018 values)

Package	Out-turn Cost
Package B	£44,574,204
Package E(i)	£111,748,323
Package E(ii)	£143,612,410
Package E(iii)	£108,556,947

The indicative nature of these costs is considered appropriate for this stage of the study; should any future package formation be taken forward, to business case preparation, these costs would be considered and refined at each stage of the process.

Optimism Bias

In line with DfT guidance, set out in WebTAG Unit A1.2, an adjustment for optimism bias has been applied to all costs in this initial economic assessment. The allowance is designed to compensate for the systematic tendency for appraisers to be overly optimistic about key parameters.

The relevant project types identified in guidance are:

- Roads (motorway, trunk roads, local roads, bicycle facilities, pedestrian facilities, park and ride, bus lane schemes, guided buses on wheels).

As a project develops, the cost estimates are refined and, as project-specific risks become better understood, quantified and valued, the factors that contribute to optimism bias are better captured within the risk management process. Therefore, as risk analysis improves, it is expected that the risk-adjusted scheme cost estimate will become more certain, whilst the applicable level of optimism bias will decrease.

At Stage 1 'Programme Entry' the recommended optimism bias uplift for roads is 44%. Whilst a robust approach has been adopted to quantify risk it is considered appropriate to apply optimism bias at this level, to account for the early stage of scheme development.

Present Value of Costs (PVC)

In line with WebTAG guidance the cost estimates have been converted to PVC, using the DfT's base year (2010), to provide the basis of the cost benefit analysis.

Taking into account each of the above elements, the resulting PVCs - for each of the package options - are presented in the tables below.

Table 6 - Present Value of Cost - Package B

Element	Package Delivery Cost
Cost at current prices	£44,574,204
Optimism Bias (44%)	£19,612,650
Total Cost after inflation	£66,214,503
Cost (2010 prices)	£58,143,315
Discounted Value (2010 Prices and Values)	£40,140,047
Present Value of Cost (inc VAT)	£47,766,655

Table 7 - Present Value of Cost - Package E(i)

Element	Package Delivery Cost
Cost at current prices	£111,748,323
Optimism Bias (44%)	£49,169,262
Total Cost after inflation	£165,994,225
Cost (2010 prices)	£145,760,431
Discounted Value (2010 Prices and Values)	£100,652,439
Present Value of Cost (inc VAT)	£119,776,403

Table 8 - Present Value of Cost - Package E(ii)

Element	Package Delivery Cost
Cost at current prices	£143,612,410
Optimism Bias (44%)	£63,189,460
Total Cost after inflation	£213,326,070
Cost (2010 prices)	£187,322,781
Discounted Value (2010 Prices and Values)	£129,352,628
Present Value of Cost (inc VAT)	£153,929,628

Table 9 - Present Value of Cost - Package E(iii)

Element	Package Delivery Cost
Cost at current prices	£108,556,947
Optimism Bias (44%)	£47,765,057
Total Cost after inflation	£161,253,661
Cost (2010 prices)	£141,597,716
Discounted Value (2010 Prices and Values)	£97,777,946
Present Value of Cost (inc VAT)	£116,355,756

4.2 BENEFITS

This section sets out the level of benefit that each package of interventions could be expected to produce[1]. Where this can be monetised, this has been used to calculate the Present Value of Benefits (PVB) and subsequently the package Benefit Cost Ratio (BCR).

The assessment reported here uses the Department for Transport's (DfT) Active Mode Toolkit and Transport Users Benefit Appraisal (TUBA) Version 1.9.11 tools, in line with WebTAG.

4.2.1. Active Mode Appraisal

DfT's 'Active Mode Appraisal Toolkit' (May 2018) has been used for the calculation of active mode benefits for each of the applicable interventions. The Toolkit allows for quantification of benefits in terms of physical activity, absenteeism and journey quality / ambience; this level of appraisal is both appropriate and proportionate for this early stage of the study. Each of these components is discussed in turn below, alongside the results of the appraisal, undertaken over a 20-year period in line with WebTAG.

Physical Activity (Health) Impacts

There is a strong evidence base that supports the impact of physical activity on health; physical inactivity is a primary contributor to a range of chronic diseases including coronary heart disease, diabetes and some cancers. Physical activity can also help to prevent weight gain and obesity, and improve mental health.

[1] All numbers are subject to rounding.

Health benefits have been calculated using DfT's Active Mode Appraisal Toolkit, in accordance with WebTAG Unit A4.1 'Social Impact Appraisal' and Unit A5.1 'Active Mode Appraisal'. The Toolkit calculates the estimated impact on mortality, and quantifies the resulting monetary benefit, taking account of a number of factors including differentiation between age groups and genders.

Default assumptions, as set out within the Active Mode Appraisal Toolkit, have been used for the calculation of health benefits. These include input values such as percentages of return trips, number of days per year the new infrastructure will be used, average Metabolically Equivalent Tasks (MET) for cycling, maximum benefits from walking and cycling, gender and age splits and average life years lost per death. It was considered appropriate to retain the default values, included within the Toolkit, due to the limited availability of specific information at this stage of the study, and the extent of the data collection exercise that would be required to accurately adjust them.

The key specific input required for the Toolkit calculation is the estimated number of new cycling and walking trips per day; the number of new trips that form part of this appraisal have been based upon the agreed uplifts identified as a result of the Comparative Study, and set out in Section 3.2.2 above.

The forecast physical activity (health) impacts in the Core scenario, based upon the results of the appraisal using DfT's Active Mode Toolkit, are set out in Table 10, below.

Table 10 - Summary of Physical Activity (Health) Impacts - Core Scenario (2010 prices)

Package	Total
Package B	£35,350,536
Package E	£20,125,304

Absenteeism (Business) Impacts

Across the UK, around 95% of employee absences are accounted for by short-term sick leave. Research carried out by the World Health Organisation (WHO)2 found that absenteeism from work can be expected to decrease when more people walk or cycle to work. This moderate physical activity is shown to lead to a reduction in the number of sick days taken from work, and therefore results in a benefit to employers; this is in addition to the benefit of better health for the individual (discussed above).

WebTAG Unit A4.1 notes that physical activity of 30 minutes per day is enough to result in a reduction in short-term sick leave; a range of proportional reductions in absenteeism, as a result of this amount of exercise, have been identified across various studies. In line with these findings, a reduction in absenteeism of 25% is recommended, in DfT guidance, for the calculation of benefits associated with this level of increase in activity. As such, for the purposes of this appraisal, this is the percentage figure that has been used in the calculations based upon the number of individuals involved in the increased use of active mode use as set out in the base and future demand forecasts.

The forecast absenteeism impacts in the Core scenario, based upon the results of the appraisal using DfT's Active Mode Toolkit, are set out in Table 11, below.

Table 11 - Summary of Absenteeism Impacts - Core Scenario (2010 prices)

Package	Total
Package B	£8,834,740
Package E	£5,765,562

[2] *World Health Organisation (WHO) (2003) 'Physical Activity Fact Sheet'*

Journey Quality / Ambience Impacts

WebTAG Unit A5.1 recognises 'Journey Quality / Ambience' as an important consideration, in relation to both pedestrians and cycle users, when undertaking scheme appraisal.

Journey quality / ambience, in this instance, primarily refers to the fear of potential accidents and therefore the majority of considerations are related to safety; for example, segregated cycle tracks greatly improve journey quality / ambience when compared to cycling on a road with traffic. It can also be assumed that a lower level of vehicular traffic will create a more pleasant environment for cycle users and pedestrians, resulting in increased demand for trips via these modes. Conversely, poor quality routes may discourage individuals from using active modes resulting in supressed demand.

For the purposes of this appraisal, the calculation of journey quality / ambience benefits follows the guidance set out in WebTAG Unit A5.1 and uses the data contained within the WebTAG Databook in order to quantify the potential impact of each intervention in relation to walking and cycling trips.

The approach to appraisal of journey quality / ambience, as set out in WebTAG, is based upon assigning a 'quality value' to each trip that is made by existing and new users; the number of trips is based upon the base demand estimates and agreed uplifts set out in Table 2. The values within the WebTAG Databook provide an approximate monetary benefit (per minute) related to pedestrian and cycling infrastructure and facility improvements. This monetary value includes all aspects of quality including environmental quality, comfort, convenience and perceived improvements to safety.

It should be noted that journey quality / ambience benefits are subject to the 'rule of half', as stipulated in WebTAG, meaning that current users of a route will experience the full benefit of any improvements while the benefits to new users are halved.

The forecast journey quality / ambience impacts in the Core scenario, based upon the results of the appraisal using DfT's Active Mode Toolkit, are set out in Table 12 below.

Table 12 - Summary of Journey Quality / Ambience Impacts - Core Scenario (2010 prices)

Package	Total
Package B	£27,862,425
Package E	£20,395,540

20-Year Active Mode Appraisal Results – Core Scenario

Table 13, below, summarises the benefits, for each of the active mode impacts, for the Core scenario over the 20-year appraisal period. Appendix J provides a full summary of the discounted benefits.

Table 13 - Summary of Active Mode Impacts over 20 Year Appraisal Period (2010 prices and value)

Benefit Type	Package B	Package E
	Total	Total
Physical Activity (Health)	£35,350,536	£20,125,304
Absenteeism	£8,834,740	£5,765,562
Journey Quality / Ambience	£27,862,425	£20,395,540
Total	**£72,047,701**	**£46,286,406**

The results above demonstrate that, in terms of active mode benefits, package B delivers the highest return of the two packages; this is largely due to the inclusion of the behaviour change intervention (A7) and cycle improvements (F1) that together deliver active mode benefits in the region of £45.5m (more than 60% of the whole package benefits). It should be noted that intervention F1 is also included within package E.

Active Mode Appraisal Sensitivity Testing

As recommended in TAG Unit A5.1, and discussed in Section 3.2.3, the potential differences in uplift for pedestrians and cycle users as a result of the scheme has been considered through appropriate sensitivity testing of Low and High impact scenarios, in addition to the Core scenario discussed above. This has been undertaken for each of the two proposed packages.

Table 14, below, summarise the comparison in benefits between the Low, Core and High scenarios, for each of the packages. The full breakdown of benefits is provided in Appendix J.

Table 14 - Low and High Uplift Sensitivity Test Results

	Package B			Package E		
Benefit Type	**Core**	**Low**	**High**	**Core**	**Low**	**High**
Physical Activity (Health)	£35,350,536	£15,633,375	£54,286,405	£20,125,304	£8,033,877	£31,435,440
Absenteeism	£8,834,740	£3,895,488	£13,513,172	£5,765,562	£2,363,498	£8,906,805
Journey Quality / Ambience	£27,862,425	£26,580,893	£29,077,602	£20,395,540	£19,312,619	£21,412,105
Total Benefits	**£72,047,701**	**£46,109,755**	**£96,877,178**	**£46,286,406**	**£29,709,994**	**£61,754,350**

4.2.2. TRAFFIC MODEL

As discussed in Section 3.2.3, the traffic modelling appraisal has been undertaken using the existing VISUM Harrogate and Knaresborough Strategic Traffic Model (with appropriate updates undertaken); the outputs have then been converted using DfT TUBA software, in order to quantify the potential benefits.

Transport Economic Efficiency

The Transport Economic Efficiency (TEE) benefits are derived from travel time and vehicle operating cost benefits as a result of the interventions, the likely benefits associated with changes in greenhouse gases and indirect taxation have also been calculated.

As previously discussed, the existing traffic model for Harrogate and Knaresborough considers the AM and PM peak periods only; therefore, any benefits (or disbenefits) accrued in the interpeak period are not accounted for in the model, and resulting TUBA, outputs. As such, in order to conservatively represent the impact of the packages across the whole day, the quantified outputs have been adjusted to include an additional 50% of the AM peak benefits, in line with accepted practice; the results are summarised in Table 15, below:

Table 15 - User Benefits

Benefits	**£,000s 2010 prices, discounted to 2010**			
	Package B	**Package E(i)**	**Package E(ii)**	**Package E(iii)**
Consumer – commuting user benefits	-£7,613	£56,957	£40,107	£47,548
Consumer – other user benefits	-£670	£26,539	£15,803	£19,367
Business benefits	-£16,498	£56,153	£39,951	£45,119
Wider public finances (indirect taxation)	-£16,466	-£1,357	£273	-£235
Greenhouse gases	£8,481	£1,037	£23	£339
Total	**-£32,765**	**£139,329**	**£96,156**	**£112,138**

Additional Benefits

At this early stage of economic appraisal, the benefits associated with changes in travel time and vehicle operating cost have been quantified (as described above); however, a number of other additional benefits can be expected, based on DfT guidance and economic appraisals undertaken on similar schemes, these benefits include the following:

- Accident reduction;
- Reliability;
- Maintenance; and
- Wider economic benefits.

Each of these is discussed in turn below, along with the assumptions that have been applied to the TUBA outputs in order to quantify the potential benefits that could be realised as a result of the packages – the resulting figures are then set out in Table 16:

A reduction in the number of accidents and casualties can be expected as a result of the proposed interventions and the benefit has been estimated to be equivalent to 5% of the user, business and active mode benefits.

Journey time reliability is defined as variation in journey times that drivers are unable to predict, and is assessed as part of the DfT's Appraisal Reliability Sub-impact. It is expected that the interventions could help to improve journey time reliability and therefore, based on experience from similar projects the journey time reliability benefits have been estimated at 10% of the overall user, business and active mode benefits.

The packages are also expected to help reduce the current level of maintenance and renewal on the local roads and based on experience from similar projects the maintenance benefits have been estimated at 5% of the user, business and active mode benefits.

One of the key objectives of this study is to support the current and future growth aspirations of Harrogate Borough Council. As such, the wider economic benefits of the packages have been estimated at 10% of the business, health and absenteeism benefits to account for the welfare impact and change in GDP as referenced in WebTag unit A2.1.

Table 16 - Additional Benefits

Benefits	£,000s 2010 prices, discounted to 2010			
	Package B	Package E(i)	Package E(ii)	Package E(iii)
Accident reduction	£2,363	£9,297	£7,107	£7,916
Reliability	£4,727	£18,594	£14,215	£15,832
Maintenance	£2,363	£9,297	£7,107	£7,916
Wider economic benefits	£2,768.78	£8,204.39	£6,584.19	£7,100.99
Total	**£12,222**	**£45,391**	**£35,014**	**£38,765**

Non-monetised Benefits

At this stage of the study the appraisal has focussed on the potential economic benefit and value for money as described above; however, there are a number of other benefits that would need to be considered and appraised should the scheme progress toward Business Case development. This would include wider consideration of the 'Environmental' impacts, including air quality, noise, landscape, historic environment, biodiversity and water environment, and the 'Social' impacts including journey quality, accessibility to services and severance.

Traffic Model Sensitivity Testing

At this stage it has not been necessary to prepare sensitivity tests, in relation to the model testing; however, as discussed earlier in the report, and in line with WebTAG, sensitivity testing has been undertaken as part of the Active Mode appraisal.

In regards the model testing, future appraisal as part of any business case development that may go ahead, would need to consider how sensitive the benefits described are to a range of alternative parameters which could include alternative growth scenarios, or alternative levels of Optimism Bias.

4.3 BENEFIT COST RATIO

The BCR for each package has been calculated by summing all the monetised, discounted benefits to obtain the PVB and dividing them by the PVC; this is shown in Table 17, below, which details the Analysis of Monetised Costs and Benefits (AMCB) and the overall BCR for the packages.

Table 17 - Analysis of Monetised Costs and Benefits

	Package B	Package E(i)	Package E(ii)	Package E(iii)
Consumer – commuting user benefits	-£7,613	£56,957	£40,107	£47,548
Consumer – other user benefits	-£670	£26,539	£15,803	£19,367
Business benefits	-£16,498	£56,153	£39,951	£45,119
Wider public finances (indirect taxation)	-£16,466	-£1,357	£273	-£235
Greenhouse gases	£8,481	£1,037	£23	£339
Total	**-£32,765**	**£139,329**	**£96,156**	**£112,138**
Physical Activity (Health)	£35,351	£20,125	£20,125	£20,125
Absenteeism	£8,835	£5,766	£5,766	£5,766
Journey Quality / Ambience	£27,862	£20,396	£20,396	£20,396
Total	**£72,048**	**£46,286**	**£46,286**	**£46,286**
Accident reduction	£2,363	£9,297	£7,107	£7,916
Reliability	£4,727	£18,594	£14,215	£15,832
Maintenance	£2,363	£9,297	£7,107	£7,916
Wider economic benefits	£2,768.78	£8,204.39	£6,584.19	£7,100.99
Total	**£12,222**	**£45,391**	**£35,014**	**£38,765**
TOTAL PVB	**£51,505**	**£231,007**	**£177,455**	**£197,189**
TOTAL PVC	**£47,767**	**£119,776**	**£153,930**	**£116,356**
NPV	**£3,738**	**£111,230**	**£23,526**	**£80,834**
BCR	**1.1**	**1.9**	**1.2**	**1.7**
VfM	**Low**	**Medium**	**Low**	**Medium**

WebTAG defines the Value for Money (VfM) categories as follows:

- Very Poor: BCR less than or equal to 0
- Poor: BCR between 0 and 1.0

- Low: BCR between 1.0 and 1.5
- Medium: BCR between 1.5 and 2
- High: BCR between 2.0 and 4.0
- Very High: BCR greater than 4.0

Considering the outcome of the appraisal, against these categories, it can be seen that all packages could offer a positive return on investment, with BCR values all equal to or in excess of 1.

In particular, package E(i) (Inner South Relief Road with Bilton Link option) and package E(iii) (Inner South Relief Road without Bilton Link option) offer a good level of return. Although both E(i) and E(iii) are classified as demonstrating 'medium' value for money, it can be seen that E(i) is approaching the 'high' category and would be more appropriately classified as 'medium/high' value for money.

Package B, which does not include for any new highways link, is shown to result in 'low' value for money with the lowest BCR of all the packages tested; this is primarily due to there being no highway benefits as part of this package. The modelling work suggests that, despite the high performance of package B in terms of active mode benefits (significantly outweighing those realised in package E), the modal shift achieved would not be sufficient to offset the impact of the capacity restraints implemented across the rest of the network; this results in disbenefits to remaining vehicle users that do not outweigh the benefits to non-vehicle users.

It should be noted that six of the interventions have not been included within the quantitative impact appraisal at this time, due to the inability to accurately represent either their delivery scope or the likely outcomes; these are:

- A1: Variable Message Signs;
- A2: Real Time Info;
- A3: Signage Strategy;
- B10: Car Clubs;
- D1: Parking Strategy; and
- E2: Bus Priority.

However, only two interventions do not have related costs; these are:

- D1: Parking Strategy; and
- E4: Sustainable Transport at New Residential Developments (as this is assumed to be funded by developers so excluded from costs).

This means that, while the costs of interventions A1, A2, A3, B10 and E2 are included in the economic appraisal, the resulting impact (benefits) are not. The costs of these interventions are not high enough to impact the package BCRs as a result of their inclusion; however, the associated impacts – when they are in a position to be quantified – may result in increased benefits and, subsequently, higher package BCRs.

It should also be noted that, for the purposes of this appraisal, the conservative Active Mode Appraisal 'core' scenario uplifts have been applied; if further work demonstrated it to be more likely that the 'high' scenario uplifts would be achievable then this would increase the benefits and, subsequently, the Benefit Cost Ratio (particularly for package B where the Active Mode benefits were highest).

As a final point to be considered, due to the early stage of the study, wider impacts including those relating to environment or social impacts, are not included within this appraisal; these wider impacts would be considered as part of any future business case development.

5 CONCLUSIONS AND RECOMMENDATIONS

This addendum to the Harrogate Congestion Study Options Assessment Report, published in November 2017, has set out the work undertaken to further develop the interventions, identified as part of the previously proposed packages B and E, and to provide an early indication of the value for money that each package could potentially deliver.

A baseline review of the work carried out as part of the OAR preparation has been undertaken, and the package contents updated in line with the findings. Each intervention has then been considered as to how it could feasibly be delivered in the context of the study area; this included significant engagement with both internal and external stakeholders, as well as input from specialists across WSP UK.

Following the baseline review, and subsequent reformation of the packages, an initial economic appraisal has been undertaken for package B and package E (three options tested to reflect potential relief road alignments); this quantitative appraisal included only the interventions where it was possible to either accurately reflect how the intervention could be delivered on the ground, or to estimate the likely level of demand change as a result of delivery. This quantification of impacts, carried out in line with DfT guidance, was undertaken by Active Mode Appraisal and/or traffic modelling, utilising an updated version of the existing VISUM Harrogate and Knaresborough Strategic Traffic Model.

The results of the quantitative value for money appraisal are as follows:

- **Package B**: BCR of 1.1
- **Package E(i)**: BCR of 1.9
- **Package E(ii):** BCR of 1.2
- **Package E(ii**i): BCR of 1.7

These results demonstrate that each of the packages would deliver some level of return on investment, with Benefit Cost Ratios equal to or in excess of 1. Packages B and E(ii) are shown to result in 'low' value for money, while Packages E(i) and E(iii) demonstrate 'medium' value for money with E(i) approaching 'high'. However, as previously stated, this appraisal considers only factors that would feed into the 'Economic Case', and a BCR is only one element of developing a robust business case. The issue of affordability should also be considered; while Package E(i) may have been shown to deliver the highest value for money, as a result of this appraisal, it also has the potential to cost in excess of £150m to develop and implement, which may limit the ability to secure funding to be able to do so.

Significant further work would be required to fully consider the economic impacts of the proposals, as well as to establish the content of the other four 'cases', as part of any future business case development. This would include, but not be limited to, consideration of Air Quality, Noise and Social and Distributional Impacts and, fundamentally, would consider the potential wider contribution to the study objectives, as defined in the Options Assessment Report.

It should be noted that the appraisal undertaken, and set out in this report, is proportionate to the early stage of the study; given the early stage of scheme development, the subsequent high-level consideration of the costs and benefits, and the fact that the package contents are not fixed and are subject to change, the BCR and VfM ranges would continue to be refined should the project move forward toward business case development. It is also considered that a full interpeak model, and ideally a multi-modal model, would be developed as part of further work which would provide a more accurate representation of the potential impacts of the packages, which could lead to increased levels of benefits.

It is important to note that the results presented in this report are indicative, and should not be taken as final values, but, rather, used for the purpose of establishing an indication of the relative scale of benefits that could be achieved. This information is intended to help inform a decision as to whether to progress the Harrogate Congestion Study further, most likely through public consultation and potentially on to business case development.

While taking the above caveats into account, it is still considered that - at this early stage of the study - these initial findings illustrate that a 'package of measures' approach does have merit, and should be taken forward, ultimately alongside a clear strategy for delivery. Critically, it should be noted that the interventions contained within the two packages, when considered in isolation, have differing levels of impact with some representing

high value for money (particularly the active mode benefits that result from interventions A7 and F1) and others low value for money; however, again, this only considers their economic value at the most basic of levels and does not account for other wider benefits that would be appraised as part of business case development.

It is therefore the recommendation of this report that the packages be taken forward, for further consideration, through appropriate levels of engagement, consultation and technical work. While package B was the lowest scoring, of all the packages tested, it is considered that it is likely to have additional benefits that would not be fully reflected through economic appraisal. However, due to the 'low' value for money classification and relative performance against the other package E options tested, it is recommended that Package Eii (Inner North) should be discounted from the process at this stage.

Appendix A

HCS ENGAGEMENT GROUP MEMBERS AND COMMENTS

HCS ENGAGEMENT GROUP MEMBERS AND COMMENTS RECEIVED

HCS ENGAGEMENT GROUP MEMBERS:

Name	Organisation
Anne Holdsworth	Killinghall Parish Council
Carolyn Frank	Federation of Small Businesses
Craig Temple	Connexions
Chris Kitson	Nidd Gorge Community Action
Cllr Don Mackenzie	NYCC Executive Member
Cllr. Andrew Willoughby	Knaresborough Town Council
Cllr. Phil Ireland	Harrogate Borough Council
Cllr. Michael Harrison	Harrogate Borough Council
Gia Margolis	Harrogate Cycle Forum
Helen Suckling	Visit Harrogate
Ian Williams	York and North Yorkshire Chamber of Commerce
Jemima Parker	Zero Carbon
Keith Roebuck	Transdev Plc
Keith Wilkinson	Bilton Conservation Group
Kevin Jeffery	NYCC Youth Voice Executive
Kevin O' Boyle	Taxi Trade HBC
M Bryom	Road Haulage Association
Malcom Bingham	Freight Transport Association
Martin Weeks	Harrogate Cycle Action
Mike Babbitt	Sustrans
Pete Myres	Northern Rail
Steve Scarre	Harrogate Chamber of Trade

COMMENTS FROM ENGAGEMENT GROUP MEETING 1 (5th June 2018):

Need for Intervention

- Clarity on process was welcomed. In the move towards possible public consultation, there is a need to ensure that the public are provided with clear and readily understood information which is more 'rounded'.
- Please can the information on the NYCC website be updated to be more representative of the current study.
- Felt that there is a blurring of lines between Cllr Mackenzie's views and the official position of NYCC.
- Seen as a 'road v no road' debate with no understanding of the packaging of the options.
- It is important to carry out a scene-setting/information sharing exercise in advance of the public consultation, to ensure that the work being undertaken is understood.
- View that some of the public think that the sustainable measures can only be delivered alongside a relief road, not as part of a no-relief road package. Therefore, a feeling that people are 'over a barrel' and no debate is possible – i.e., if you want money spending on sustainable travel, it has to be alongside investment in a relief road.
- The 'branding' of sustainable travel options is not recognised by the public as package B.
- Has to be recognition by the public that uptake of sustainable travel is to an extent their decision - the council can put everything in place but cannot do it for them. This needs to be better communicated and there needs to be an improved sharing of views.
- Must be better communication of the use of evidence based interventions.
- Use of the correct terminology to ensure a positive impact is critical, for example, the Options Assessment Report talks about HGV bans, which would be viewed very negatively by the haulage industry. But service delivery plans, which would look at improved consolidation and use of efficient and smaller vehicles in town centres, would be viewed more positively. However, must be said that the majority of logistics companies are already consolidating and working as efficiently as they are able to.
- Need to consider the longevity of the project and where we want to be in 2030/2035. Visual materials really help the wider public to grasp this and see what the future might look like and carbon forecasts also help with this.
- Felt that there were mixed messages in terms of the overall strategy. Is it about easing congestion, or improving the economy, or connectivity or sustainability? The public need a clear picture about what we are trying to achieve.
- With regards time horizons, has ULEV/automation/new mobility been factored into our planning? Also, has modelling taken account of this and also other external factors such as local growth/housing developments etc?
- Quantifying and incorporating 'new mobility' is critical.
- Use of the word sustainable - sustainable transport is not compatible with business efficiency, walking is not an option for business. School travel and poor integration of signals are all contributors to this. Integrated travel systems are needed to ensure that traffic keeps moving.
- What consideration has been given to sustainable access to new communities (e.g. – those being proposed on the A59 corridor?)
- Should be cautious in setting mobility and business against the environment and sustainability – the two are not mutually exclusive. The government's clean growth strategy very clearly binds the two together.
- The time period for determination of the Harrogate Local Plan is relevant for this project.
- Noted that the current local plan does not base growth on any requirement for a relief road, and modelling has shown that the mitigation measures proposed in the Local Plan will keep traffic at a level similar to current flows, but that additional housing growth on the A59 will inevitably impact on the network, in particular in Knaresborough and how this is managed will be critical.
- Again, reiterating that business growth and the environmental protection is not an 'either/or' situation.
- Businesses are already working more effectively and aiming to be more sustainable. And would be helpful to see a strong lead from local authorities on sustainability such as ULEV, electric vehicles, charging points etc.

Packaging of Interventions

- Is terminology right?
- Access to stations – more parking is the critical issue here, but is hard to deliver due to land.
- Difficulties of accessing stations by bicycle and more generally with interchange and connectivity between modes.
- Lack of an NYCC cycling and walking strategy means that active modes are rarely given the priority they need in order to make them truly more attractive. Means that they are often missed, or the 'poor relations' through the development planning process and only incorporated as an afterthought.
- Should we be asking the public whether there should be a change in policy emphasis (away from car to sustainable modes)?
- Interchanges, park and ride and home zones could all be reintroduced to the packages as possible measures.
- Critical that park and ride is considered in tandem with parking control and also home zones to give them the greatest chance of being beneficial.
- Rail based park and ride should also be a key component.
- For bus based park and ride to be successful if must be part of an investment programme which also delivers bus priority.
- Issues are currently caused with traffic flow, due to newer buses not being compatible with previously delivered bus priority measures (i.e., bus boarders, laybys etc) and this means that buses regularly stick onto the carriageway, impeding the flow of the other traffic.
- Consideration must be given to policy change.
- With regards park and ride, the potential new housing at Greater Hammerton and Flaxby must be part of any viability assessment for park and ride. And park and rail must also be a key consideration.
- Traffic operates better when traffic signals are not working.
- The 'dropping well' traffic island impedes the flow of traffic and is an issue for taxis.
- Signal coordination is critical.
- Integration between modes must be delivered.
- Multimodal ticketing isn't listed as a measure - this is being rolled out by TfN, albeit that delivery into the provinces will be less of a priority than in the cities.
- Traffic management may deliver reductions in emissions of NOx and PM10, but carbon emissions will not reduce unless mode shift occurs.

COMMENTS FROM ENGAGEMENT GROUP MEETING 3 (11th September 2018):

Comment No	Comment Query	Project Team Response
1	Clarification was requested on why the report would be taken to both Harrogate and Knaresborough Area Constituency Committee and Skipton and Ripon ACC – some group members felt this was unnecessary and that only Harrogate and Knaresborough ACC should receive the report. This would be consistent with the study area. Comments from the Skipton and Ripon ACC should be given less weight than those from Harrogate and Knaresborough.	The request for the report to be taken to both committees had been made by elected members. Officers recognised the concerns raised and said they would discuss with Committee Services the best approach on recording the comments made at the committee meetings.
2	Clarification sought on the meaning of 'possible public consultation' as mentioned in the presentation slides. Asked for the slides to be updated accordingly.	This was noted. Officers explained that where the slides talked about possible consultation, this was in the context of receiving approval from the Executive to go out to consultation, not with regards to whether or not consultation should be undertaken at all. Officers sought to clarify again that the decision they would be seeking from the Executive, would be approval to undertake extensive public consultation based on the findings of the OAR Addendum.
3	Clarification requested on whether disbenefits and negative impacts would be calculated as well as benefits and positive impacts.	The project team responded that the transport model looks at traffic movement across the network, and therefore will show decreases and increases. In addition, the intervention summary sheets detail potential barriers or potential negative impacts. Further detail on this is contained in the EAST in the OAR, and should schemes progress, there would be further consideration of these impacts in the appraisal summary table and also that an environmental impact would be undertaken. Explanation was also given that in terms of DfT reporting, 'benefits' can be positive or negative, so in fact what is actually being analysed is the impact of the intervention.
4	Explanation was sought on the comparison of uplifts between schemes, area wide (relief road) vs area specific (reallocation of road space for example). How is this comparable when one targets two streets and one targets the whole district?	Project team explained that all of the testing at this stage is intended to be indicative, but it is based upon the further option development work for which the purpose was to be less generic about interventions and look at where they could realistically be delivered. Much more detailed and extensive modelling and appraisal would be undertaken should options be progressed. The limitations and caveats on this analysis will all be set out in the OAR addendum. Also to note that the Harrogate town centre interventions will be subject to an overall uplift, which takes the specific focus in this area into account.

5	Is lack of data (i.e., detailed cycle count data/active travel model) a disadvantage?	Project team explained that the level of data, particularly with regards to active modes (walking and cycling) is poor, but this is not unusual, and that only two areas in the UK have operational walking and cycling models. Also set out that for this stage of scheme development, it would not be proportionate to undertake wide scale data collection at significant cost. This would be undertaken if necessary at a later stage. WSP advised that they are using all available data to ensure that the modelling is as accurate as possible
6	How are packages going to be developed to form the optimum solution? And how will active travel be locked in to those packages.	Project team again reiterated that there was absolutely a degree of flexibility on the package contents, and that the purpose of this further stage of this option development is to provide a greater level of analysis which can, if approved, be put to the public to illustrate the various options which could deliver congestion relief.
7	Question was asked as to why are only 2 streets identified in road space reallocation.	See above – further, the project team further explained that the testing of this was considered to be indicative and the streets chosen were selected in light of the other complementary package measures that have been put forward. Further work had been undertaken to localise interventions where possible as a key deliverable of this additional work. And packaging had been challenged and reviewed as part of the baseline review. And packaging of measures is appropriate given the complex transport issues in Harrogate.
8	Clarification was sought on how the relief road would be modelled and whether one alignment or all three will be tested.	The project team explained that three existing relief road alignments would be tested through the model. Whilst these have been tested already through initial modelling (as set out in the OAR) they have not been tested in combination with other package elements. Analysts will be running the model three times to test the three relief road options plus the other interventions, and this will give an early indication of package performance.
9	One group member suggested that a more definitive alignment of the relief road had been promised for this meeting.	Project team set out that this must be due to a misunderstanding, as there was no element within the commission relating to further design development of the relief road. The main aim of the analysis being undertaken in development of the addendum was to further development of the non-relief road interventions. Project team also advised that it would be highly unusual to confirm any further details on the alignment at this stage as a consequence of the extent of additional analysis that would be required in advance of selecting a preferred option. Relief road assessment can be made without a defined route – because the model used at this stage is a strategic model.

10	Clarification was requested on why some of the relief road options have been discarded if development was indeed in such early stages.	Explanation was given that the decision taken to discard most northern relief road option was due to two aspects; a development site location and NYCC's inability to defend the northern alignment as reason for refusal of development, and in addition, its poorer performance through the initial modelling undertaken on various relief road options. Details on this process and the reasons for recommendation of the rescinding of the route are set out clearly in the Executive committee report relating to this matter, which can be found on the County Council's website.
11	Question as to whether, as last time, there will there be a press conference when the Committee report is published. Feeling that the press release in advance of the committee report last time was unhelpful and therefore should be avoided this time.	Project team suggested that no decision has been made on this as yet but noted the comments.
12	Question asked as to whether the recommendations made in the OAR Addendum will be based only on the economic case.	Project team explained that the OAR addendum will set out potential recommendations based on the outcome of the cost benefit analysis. To have got to this stage in the process, measures will have been sifted through the EAST, considered by officers during the long list to short list, and then assessed qualitatively, in addition to the quantitative analysis undertaken. Should measures be further developed, as part of any business case preparation, significant assessment of their wider impacts will be undertaken, to ensure that implications are understood.
13	Project team were asked why only large cities seems to have been used in the comparative studies.	Project team responded that where a suitable comparator towns existed, this data has been used. However, for many interventions, these comparable towns do not exist, and as a consequence, data from elsewhere has been used that looked at locations both larger and smaller than Harrogate. It was reiterated that in all cases, professional judgement of the application of figures has been applied and the resulting potential uplifts/reductions have been agreed upon following dialogue between WSP's specialists, the project team at NYCC, and also specialists from other disciplines within NYCC. This approach is commensurate with the stage of scheme development and again, is a standard approach in option development, in line with webTAG guidance.
14	Clarification was sought on whether tourism / retail benefits etc. are included in the assessment at this stage. Similarly, the group asked for details of the stage at which public	Project team responded that tourism and retail had been considered qualitatively, as part of the OAR case for intervention. In addition to that, if the scheme progressed to the stage where a business case be developed, then wider impacts would be appraised. It was confirmed that TUBA software, being used as part of this appraisal, provides

	health / air quality etc. would be considered and assessed.	quantification of impacts in relation to Greenhouse Gases and that Active Mode Appraisal considers health related to physical activity.
15	Question as to whether the ARUP report produced for HBC been considered?	Project team confirmed that all available data sources had been reviewed and fed into the project through the stage one report and the OAR. Project team also noted that HBC have commissioned a review and refresh of the Arup report.
16	One group member reiterated that the study relates to Harrogate and Knaresborough, yet there was no mention of Knaresborough in the summary sheets included in the presentation today.	Project team responded that the examples chosen were only 5 of 24 interventions, and that as had been discussed at the previous workshops, many of the interventions are relevant to Knaresborough. Project team said that to cover every intervention in turn would have taken at least 2-3 hours and that the examples chosen were intended to be illustrative of the various approaches to assessment being undertaken.
17	Public consultation should present AQ and public health benefits / dis-benefits.	Project team reiterated that should approval be given to go to consultation, the materials produced for consultation will be extensive and thorough, and will set out the various impacts, positive and negative, of the interventions. This will be commensurate to the stage of the study which, as above, considers high level appraisal of Greenhouse gases and health.
General Comments / Feedback		
Thanks to the project team for listening and noting views. Having a more genuine and transparent consultation is key to engendering support for projects. Has been an informative and helpful process, so thanks again to the project team.		

Appendix B

INTERNAL STAKEHOLDERS LIST

INTERNAL STAKEHOLDERS

Name	Organisation / Team
Cathy Summers	NYCC Integrated Passenger Transport
Mary Welch	NYCC Integrated Passenger Transport
Keith Roebuck	TransDev
James Smith	NYCC Traffic Signals
Fiona Ancell	NYCC Road Safety
Caroline Wilkinson	NYCC Active Travel
Abi Holt	NYCC Development Planning
Tom Horner	Harrogate Borough Council
Mark Kibblewhite	NYCC Economic Growth
David Kirkpatrick	NYCC Parking Strategy

Appendix C

LONG LIST OF INTERVENTIONS

LONG LIST OF INTERVENTIONS

Category	Scheme Reference No	Intervention Description
Information	A1	Variable messaging
	A2	Real time passenger information (RTPI)
	A3	Area wide signage strategy
	A4	Publicity campaigns and incentives for more sustainable travel
	A5	Improved digital provision - Open Harrogate website and app, gamification/sustainable travel challenges
	A6	Personalised journey planning
Demand Management	B1	Extend pedestrianisation of Harrogate central core
	B2	Traffic management / low emission zone
	B3	High occupancy (2+) lanes
	B4	Area wide travel planning
	B5	Create cell system in Harrogate town centre
	B6	Management of side road access to improve main route efficiency
	B7	HGV ban at peak times/loading restrictions
	B8	Town centre 20mph speed limits/zone
	B9	Car sharing
	B10	Car clubs (Electric vehicles)
	B11	Work with schools to ameliorate the impact of school run (e.g. encourage sustainable school travel, review start/end times etc.)

Highways	C1	Relief road
	C2	Inner ring road
	C3	Network optimisation
	C4	Area wide signal strategy review
	C5	Reallocation of road space
Parking	D1	Area wide review of car parking management, supply and charging and development of area wide strategy
	D2	Park and ride (bus)
Public Transport	E1	Bus/rail station interchange development and public realm improvements
	E2	Bus priority on key routes
	E3	Quality bus corridors
	E4	Focus on new developments providing sustainable transport options
	E5	Demand responsive services
	E6	Reopen disused railway lines
	E7	Shuttle bus from railway stations
	E8	Relocation of Starbeck railway station
	E9	Parkway stations
	E10	New rail halts
	E11	Improved access to stations
	E12	Encouraged use of rail for internal journeys
Cycling	F1	Implementation of the Cycling Infrastructure Plan for Harrogate, Knaresborough and surrounding area
Walking	G1	Area wide public realm strategy

Appendix D

SHORT LIST RECOMMENDATIONS

RECOMMENDATIONS FOR SHORT LIST

Information Interventions

A1 - Variable Messaging

Intervention Description:

This intervention includes employing Variable Messaging Sign (VMS) technology across the study area to inform travellers of conditions on the transport network in an attempt to influence travel behaviour, including route choice, this would potentially include:

- Use of VMS signing on strategic routes and the surrounding local road network to inform motorists of incidents, events and closures affecting routes, enabling drivers to make informed route choices. Data would be fed from Harrogate's Urban Traffic Control system and/or other monitoring methods such as Bluetooth or radar systems.
- Use of vehicle activated signing at appropriate locations to re-enforce safe speeds and highlight potential hazards on routes.
- Car parking information to advise of available parking in the town to avoid abortive journeys.

Provision of this intervention can alert users of the transport network to issues on the network and allow travel to be adjusted accordingly helping reduce congestion, improve journey time reliability and overall efficiency of the network.

Assessment Comments:

- This intervention provides a reasonable score against objectives - it provides benefit through providing real time information to road users enabling areas of congestion to be avoided, improving journey times and reliability as well as resilience and efficiency of the network.
- Quick delivery/implementation - no real land issues or acceptability concerns.
- Relatively low cost.
- Enhanced benefit in a package of measures.

A1 - Variable Messaging
Further consultation comments: ■ This intervention is viewed as potentially offering good transport information, but not providing a solution to traffic congestion. ■ It will allow links to the forthcoming journey time monitoring system, allowing real time traffic information to motorists. ■ Offers potential for event management and car park availability management, so helping to reduce circulation movements. ■ Also provides potential to encourage sustainable travel modes through journey time comparisons.
Recommendation: Include within short list of interventions.

A2 - Real Time Passenger Information (RTPI) – Public Transport

Intervention Description:

The introduction of RTPI systems in Harrogate and Knaresborough could allow passengers access to live arrival/departure information for public transport services via a variety of different sources, including mobile phone applications, platform-level signage and automated public address systems.

Provision of RTPI can provide benefits to users by improving confidence in the service by reducing uncertainty, frustration and anxiety felt by passengers whilst waiting for public transport services. It also enables the public to make informed decisions as to their route/mode of travel. RTPI can also benefit public transport operators with fleet management, bus performance and schedule adherence.

Overall, RTPI would help to:

- Improve the image of public transport and increase patronage within the towns;
- Reduce the number of car trips within the town and the associated adverse impacts of congestion by enabling more trips by public transport.

Assessment comments:

- Reasonable score against objectives - it provides benefit through providing real time information to bus passengers enabling journeys to be planned accordingly and provide confidence and information on service availability.
- Quick delivery/implementation - no real land issues or acceptability concerns.
- Relatively low cost.
- Enhanced benefit in a package of measures.

Further consultation comments:

- There is limited RTPI locations available on the bus network, and it is not available to all operators.
- Other RTPI options should be explored – mobile data.
- Links to interventions A4, A5, A6.

Recommendation:

Include within short list of interventions with wider options to be considered (such as mobile data).

A3 - Area Wide Signage Strategy – potentially including tourist, HGV and wayfinding signage

Source: www.placemarque.com

Intervention Description:

An area wide signage strategy is suggested in order to establish a clear and legible hierarchy of signage across the study area in order to aid orientation as well as encouraging use of the most appropriate routes when navigating in and around the Harrogate urban area. This would involve a review of the existing provision of all signage to reduce sign clutter and ensure clear and consistent signage across the urban area is provided.

Clear and appropriate provision of information and signage would help to:

- Manage traffic along mixed priority routes and improve traffic calming measures.
- Improve road efficiency by diverting HGV traffic to the most appropriate routes.
- Reduce congestion and network stress on key routes.

Assessment comments:

- Good contribution to achievement of objectives. Effective signage can reduce trips in town centres helping reduce congestion issues. Wayfinding can aid NMU travel.
- Deliverable with few issues.
- Low cost to develop.
- Short timescale to develop

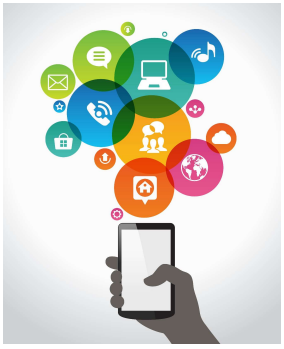
Further consultation comments:

- Signage should include promotion of cycle routes.
- Potential to reduce/reroute HGV movements to appropriate routes. Will need to identify HGV destinations.
- Signage needs to coordinate with other publicity and digital journey planning.
- Parking signage should be structured to avoid uneccessary circulation journeys looking for available parking. Possibly linked to A1 VMS signage intervention and existing parking availability signing.

Recommendation:

Include within short list of interventions.

A4 - Publicity Campaigns and Incentives for More Sustainable Travel



Intervention Description:

The aim of this intervention is to promote and encourage a greater uptake of sustainable transport modes, in particular for shorter journeys. This could involve a range of incentives and publicity campaigns to raise awareness of the sustainable transport choices available within Harrogate. This may include:

- Marketing, promotion and awareness raising.
- Challenges/competitions e.g. walking or cycling to school or work.
- Subsidised public transport tickets.
- Prize draws for sustainable travel use.
- Preferential parking for use of electric vehicles, car clubs etc.

Providing the above can 'nudge' people to travel by more sustainable modes, helping reduce congestion through a reduction in car trips in the town, as well as providing environmental benefits.

Assessment comments:

- Good score against objectives. Overall campaign will help in the education process of sustainable travel and an overall general shift towards these options.
- Deliverable with few issues.
- Low cost to fund campaign.
- Relatively short time scale.

Further consultation comments:

- LSTF programme of works has focussed on visitors to the area.
- Need to extend the programme to address the local short journey trips made within the study area.
- This intervention is interdependent with A5 Improved digital provision, A6 Personalised journey planning, F1 Cycling strategy, G1 Public realm strategy.
- Further target of school travel to promote sustainable travel required.
- Provision of training required (eg. bike maintenance, safe cycle riding).

Recommendation:

Include within short list of interventions – noted that this could build upon the 2017-18 Open Harrogate Access Fund project.

A5 - Improved Digital Provision – Open Harrogate Website and App, Gamification/Sustainable Travel Challenges

Source www.openharrogate.co.uk

Intervention Description:

This intervention would involve further developing the pre-existing Open Harrogate Application and possibly creating other digital provisions to reach a wider proportion of the population and incentivise sustainable travel. Digital provision can also provide intuitive, easy to use journey planner tools that highlight the benefits of sustainable travel such as information on health, environment and financial benefits.

The gamification aspect can include, amongst others, promotion of challenges through:

- Step-o-metre apps.
- Cycle distance measurements apps.
- Most calories burned in a week.

Sufficient engagement with this intervention can increase sustainable transport use aiding improvements in congestion, the environment and general health of the residents, workers and visitors in the town.

Assessment comments:

- Reasonable score against objectives - it will provide awareness of and incentive to use sustainable travel options, such as walking and cycling.
- Improved community cohesion as a result of sustainable travel challenges, will further help to support the public modal shift.
- App has the ability to reach a large proportion of the public and will be effective in a package of measures.
- The costs and time are low as well as deliverability easy.

Further consultation comments;

- Links required to personal journey planning to incentivise sustainable transport.
- Provide links to training opportunities for cycling skills.

Recommendation:

Include within short list of interventions – currently understood that the App does not work on iPhone.

A6 - Personalised Journey Planning

Intervention Description:

Personalised Journey Planning (PJP) interventions seeks to tackle the habit or preference of driving through providing greater awareness of, and confidence in, using sustainable travel options. This is achieved by providing people with clear information, advice and motivation to use sustainable travel modes. In Harrogate, it is envisaged this would highlight the various travel options available for journeys to work, retail, conference centres and tourist destinations.

The use of PJPs in Harrogate could help reduce the number of car trips through modal shift to sustainable modes. This would help reduce impacts of congestion as well as providing benefits to the environment and the general health and wellbeing of the residents, workers and visitors in the town.

Assessment comments:

- Good score against objectives and relatively simple to deliver in coordination with other interventions.
- Marketing is required to raise awareness of the intervention in order to encourage people to take part in the scheme, as well as improving public transport/sustainable modes as incentives.

Further consultation comments:

- Can be effective in removing the barriers to modal shift in individual journeys, but is manpower intensive.
- Need to consult individuals directly to influence travel behaviour.
- NYCC are deloping an app to provide live parking information to motorists.

Recommendation:

Include within short list of interventions although to note and discuss the level of survey completions (particularly residential) as part of Access Fund project – may have limited potential.

Demand Management Interventions

B1 - Extend pedestrianisation of Harrogate Central Core (potentially peak time only- controlled by rising bollards)

Source: Google Street View

Intervention Description:

This intervention would prioritise pedestrian movements within the central core of Harrogate. This could reduce car dominance and associated congestion, improving the townscape and helping to make the town centre more attractive to businesses and visitors. It is envisaged this would include the provision of appropriate high quality materials to delineate the pedestrianised areas, in keeping with the historic qualities of the town.

The reduction in vehicular access to and through the town centre, particularly HGVs, would also help to:

- Generate modal shift to more sustainable modes including walking and cycling.
- Improve safety in the town.
- Improve public health.
- Reduce pedestrian severance throughout the town.

Assessment comments:

- Large beneficial impacts in achieving objectives, in particular in the town centre through reducing numbers of vehicles (particularly HGVs) that impact the townscape, improving modal shift to NMUs, improved access for pedestrians, improved safety and improved health of residents.
- Deliverable in terms of provision of bollards and signage but public/stakeholder acceptability may be an issue.

Further consultation comments:

- Further pedestrianisation should include Cambridge Road and James Street.
- Need to allow HGV access for deliveries (time limited).
- Likely to receive opposition from businesses in the affected area.
- Fear that restricting vehicular access will inhibit the commercial viability and reduce the attractiveness of the town centre.

Recommendation:

Include within short list of interventions.

B2 - Traffic Management / Low Emission Zone

Intervention Description:

This intervention would help to minimise the number of vehicles accessing the town centres (particularly HGVs) through discouraging access. This would operate through the use of Automatic Number Plate Recognition (ANPR) cameras reading vehicle number plates and allowing free entry to exempt vehicles that enter a particular cordon in the central core area. Publicity and introduction of appropriate signage across the towns would also be required to ensure full awareness of the system.

The reduction in vehicular access to and through the town centre, particularly HGVs, would also help to:

- Increase the modal shift to more sustainable means by removing traffic.
- Improve safety in the town.
- Improve public health.
- Improve air quality in the town centre
- Reduce pedestrian severance throughout the town.

Assessment comments:

- Large beneficial impacts in achieving objectives, in particular in the town centre through reducing numbers of vehicles (particularly HGVs) that impact the townscape, improving air quality through reduced vehicular travel in the centre, improving modal shift to NMUs, improved access for NMUs, improved safety and improved health of residents.
- Deliverable in terms of provision of infrastructure to set up and enforce the charge (done elsewhere e.g. London, Durham) but public/stakeholder acceptability may be an issue. Suggest it is taken forward but may prove to be unacceptable/unfeasible.

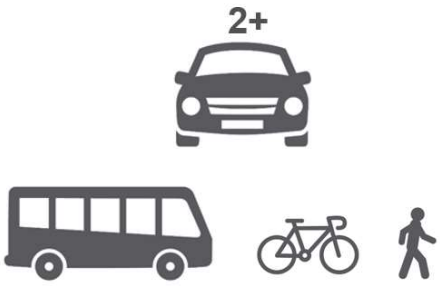
Further consultation comments:

- The defintion of the low emmission zone would need to be better understood to realise the potential benefits.
- It is not felt that there are alternative routes available for vehicles that are likely to be affected by a LEZ (through traffic).
- Harrogate and Knaresborough have a number of air quality management areas which could benefit from a LEZ.
- Likely to be expensive to install and enforce.

Recommendation:

Include within short list of interventions with caveats around deliverability and acceptability.

B3 - High Occupancy (2+) Vehicle Lanes



Intervention Description:

Provision of High-Occupancy Vehicle (HOV) lanes involves the reallocation of road space by giving priority to vehicles with more than one occupant to encourage car-sharing or use of public transport.

High occupancy lanes would be implemented on key routes through the study area, operating at peak times for the exclusive use of vehicles with a driver and one or more passengers. This would aim to:

- Reduce congestion.
- Increase public transport patronage.
- Improve the environmental conditions in the town centres.

Assessment comments:

- Relatively low achievement of objectives expected. Although traffic volumes may be reduced overall impact expected to be small. Difficulties in implementing an appropriate scheme and could have relatively high costs if land acquisition required and possible resistance from public/stakeholders.

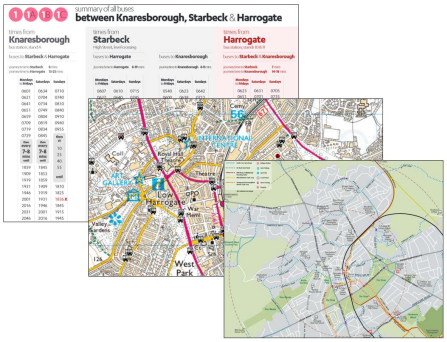
Further consultation comments:

- Not considered to be a viable option for the study area, as there is limited space available for creating HOV lanes.
- Any available highway space/reallocation of existing highway should be targeted to bus lanes or cycle lanes

Recommendation:

Do not progress to the short list of interventions due to lack of contribution to the objectives and deliverability issues due to space constraints.

B4 - Area Wide Travel Planning – workplace travel plans, event management



Intervention Description:

This intervention includes the implementation of Travel Plans, including packages of measures aimed at promoting sustainable travel, at organisations across the study area. This can include organisations that generate/attract large numbers of trips such as large employers and educational establishments within Harrogate and the surrounding area, as well as aiding in the planning for large events, such as the Great Yorkshire Show, to reduce their impact.

The aim of these Travel Plans is to:

- Help reduce overall congestion in the town, particularly during the peak commuting periods in the morning and evening rush hour.
- Further help to reduce the impact of large scale events hosted in Harrogate and promote the town's image further as a conference and tourist destination.

Assessment comments:

- A relatively good score against objectives through helping 'push' trips to more sustainable modes. The intervention has the potential to reach a large proportion of people helping reduce reliance upon car travel.
- Stakeholder resistance is unlikely due to the minimal impact it is likely to have upon third parties. The relative low cost and short timeframes makes it suitable to form part of a package of measures to be considered further.

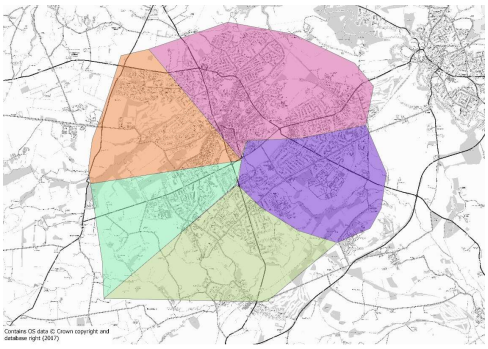
Further consultation comments:

- The level of new development in the Harrogate and Knaresborough area is likely to generate considerable additional traffic on the network. Travel Plans for the new developments needs to be monitored to ensure targets are met.
- Existing employment sites need to be included to change existing commuting travel patterns.
- Build on existing travel planning advice for major events to publicise sustainable transport options, including use of Hornbeam Park for access to the showground.
- Possible use of temporary park and ride sites for major event management.
- There is an existing arangement between the Convention Centre and HBC to make available off-street parking for major events.

Recommendation:

Include within short list of interventions.

B5 - Create Cell System in Harrogate Town Centre – potential routing subject to vehicle type



Intervention Description:

A cell system would involve restricting and managing the flow of vehicles within the town. This would result in certain vehicle types being limited to certain areas, one way road systems and potential restrictions in access during specific times.

Together these can contribute towards:

- Congestion relief.
- Reliability improvements for public transport/increased usage.
- Network resilience improvement.
- Improved air quality due to less stationary traffic.

Assessment comments:

- Potential to score highly, with many objectives being met. Congestion could be reduced in certain locations and may encourage use of sustainable modes with environmental benefits.
- However, it will require large amounts of planning and there may be public/stakeholder resistance. Additionally it was considered it would be very difficult to ensure all land uses were adequately served by the cell system and there may be unintended adverse impacts, such as severance, arising where the routing of transport may not be suitable for particular land uses. Physical constraints could also potentially create issues.

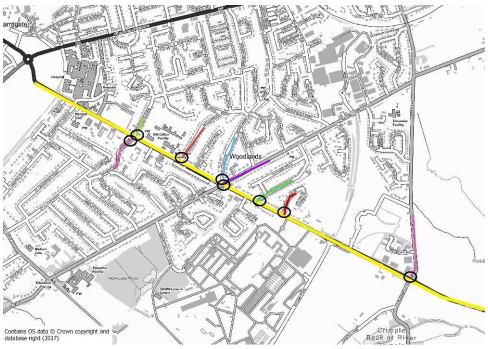
Further consultation comments:

- Considered to be too complicated a system of traffic management for the area, and is likely to be difficult to monitor and enforce.
- Could result in additional parking pressure in some cells.
- May adversley affect businesses across the study area.

Recommendation:

Do not progress to the short list of interventions, due to issues of deliverability and monitoring as well as potentially adverse impacts.

B6 - Management of Side Road Access to Improve Main Route Efficiency



Intervention Description:

This intervention aims to improve general traffic flow through the town, particularly at peak times. It would seek to improve main route efficiency by minimising the disruption caused by side road traffic. This could be achieved through a traffic signal review and minimising side road priority, potentially closing some accesses and creating one way systems on side roads in order to minimise disruption with right/left turners off the main route. The benefits of providing this include:

- Reducing congestion.
- Improving route efficiency.
- Improving air quality.

Assessment comments:

- Score is very low and likely to cause disruption for residents adjacent to the main routes. Other interventions will be required in order to fully improve the efficiency.

Further consultation comments:

- Access to main roads from side roads is not considered to be a main contributor to congestion and delay on main roads.
- Likely to face public opposition.
- May result in longer journeys and result in more pollution in residential areas.

Recommendation:

Do not progress to the short list of interventions, due to poor score against objectives, public acceptability issues and potentially adverse impacts.

B7 - HGV Ban at Peak Times/Loading Restrictions

Intervention Description:

This intervention involves implementing restrictions as to the locations that HGVs are permitted to travel during peak hours. This would likely target the town centre.

Implementation of this intervention would aid reduction in traffic flows (particularly within the town centre) at peak times, helping to ease peak traffic pressure, as well as improve network efficiency with less delays resulting from slow moving HGVs. Restrictions could be used to spread the peak of HGV traffic throughout the day for commercial vehicles so as to minimise their impact.

This measure would help to improve air quality through minimising congestion and would help improve journey time reliability. It would also help to further reduce the impacts on the townscape encouraging greater investment and boost tourism. The reduction in commercial HGVs within the town centre would help to reduce impacts of severance for pedestrian within the town centre.

Assessment comments:

- High score against objectives. However there could be issues associated in terms of stakeholder / public support given perceived impact upon businesses.
- Other network changes will be required in order to enhance the effectiveness of the intervention and reduce congestion issues.

Further consultation comments:

- A potential benefit to air quality management areas and other congested sections of the network.
- Would this apply to through routes as well as town centre access? Need to consider alternative routes when HGV ban applies.
- Lack of enforcement could make this intervention ineffectual.
- Operational hours need to be balanaced against the commercial viability of the town centres.

Recommendation:

Include within short list of interventions.

B8 - Town Centre 20mph Speed Limits/Zones

Intervention Description:

The implementation of 20mph speed limits within the town centre could result in both actual and perceived benefits of safety in the town. This could benefit Non-Motorised Users, particularly cyclists, resulting in a modal shift towards sustainable modes of transport. Further benefits could potentially be realised through smoother flowing traffic and an improved town centre environment as a result of the limit. All of these benefits could help to improve the town's image which may be beneficial to the town's economy particularly the tourist industry.

Assessment comments:

- Reasonable score against objectives and it would work well in coordination with other interventions to enhance and improve effectiveness of sustainable transport interventions.
- Public/stakeholder acceptability is unknown and providing it is supported could be implemented relatively quickly.

Further consultation comments:

- Any speed reducing measures associated with the intervention should use speed cushions on bus routes, rather than full carriageway width humps or platforms.
- Zones should include all residential areas, not just the town centre.

Recommendation:

Include within short list of interventions.

B9 - Car Sharing

Intervention Description:

Car sharing involves people, who would have otherwise travelled as single-occupancy vehicle users, travelling together and sharing their journey. Car sharing offers potential to reduce overall car trips within Harrogate, relieving congestion on the road network and the associated negative impacts of car use. Car sharing still offers the convenience of car travel but allows greater efficiency in the use of private vehicles.

Assessment comments:

- Although this intervention has a low score, it would be low cost and quick to deliver with some promotion within Harrogate.
- Although it can be considered independent of other interventions, it could tie in well with some other sustainable solutions, such as workplace travel plan strategies and would work well in a package of measures.

Further consultation comments:

- Existing car share and lift share schemes are already in operation within the study area. These could be better publicised to increase their effectiveness.
- Potential to extend the scheme to other larger emplyers, in conjunction with workplace travel plans.
- Not considered to be a major influence on reducing travel demand, but should form part of the overall sustainable travel package.

Recommendation:

Include within short list of interventions.

B10 - Car Clubs (Electric Vehicles)

Intervention Description:

An electric vehicle car club would provide the use of electric vehicles within the study area, available for hire and use by the general public. Car clubs provide the convenience of car use when it is required but without the expenses and inefficiencies associated with car ownership. This, in turn, can then reduce the number of cars using the highway network reducing congestion and associated negative impacts. It could also help promote Harrogate as a forward thinking, dynamic and sustainable town; aiding promotion of tourism and attracting business to the town.

Assessment comments:

- Score against objectives is relatively low but an (electric) car club would allow for the public to have a wide variety of travel options and the choice to only use a car when it is necessary.
- This would help reduce the overall traffic flows and increase the modal shift towards more sustainable methods of travel.
- Some small issues would need to be addressed in terms infrastructure requirements, though overall costs could be reduced through revenue generation.
- It is suggested to be taken forward as part of a wider package of measures.

Further consultation comments:

- Intervention would need considerable investment in vehicles to become a viable scheme.
- Electric charging points would need to be installed, possibly on Victoria Avenue.
- The effectiveness of the scheme could depend on the distance from the vehicle storage location.
- Congestion reduction potential will be low, but will improve air quality.

Recommendation:

Include within short list of interventions.

B11 - Work with Schools to Ameliorate the Impact of School Run (e.g. encourage sustainable school travel, review start/end times etc.)

Intervention Description:

Travel to school is accountable for a large proportion of peak time trips, particularly in the morning. A strategy to reduce the number of trips by non-sustainable means could therefore have a significant impact on peak time congestion.

Strategy measures can include shifting school start and end times to avoid peak commuting times, as well as encouraging sustainable travel through education and school based challenges. In turn this can help improve general public health, improve network resilience and relieve congestion. Facilitating sustainable travel to school, offers potential for this behaviour to continue as children grow up and become independent, continuing the trend of young people being less car-oriented in adulthood.

Assessment comments:

- This intervention scores reasonably well against the objectives, however it is recognised that the school run has a significant impact on AM peak hour traffic.
- The intervention is deliverable with minimal issues and can be done so over a reasonable timeframe.
- It would benefit from other sustainable interventions and general shift towards more sustainable modes.

Further consultation comments:

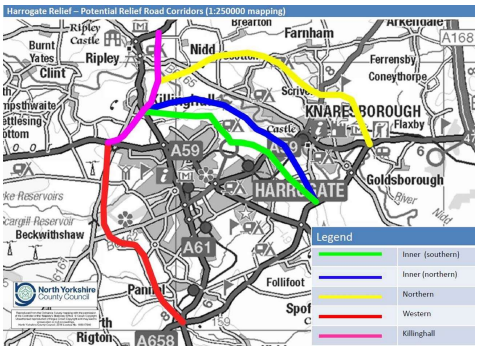
- Additional infrastructure at schools may be required (secure cycle shelters).
- NYCC school transport policy should be reviewed to encourage modal shift from private car journeys.
- There is an existing programme of educating and encouraging pupils in sustainable transport.
- Potential to spread school start and finish times outside the highway peak period, especially AM peak.
- Need for improved cycling and walking links to schools.
- The school run is seen as the ‘tipping point’ on the capacity of the network.

Recommendation:

Include within short list of interventions.

Highways

C1 - Relief Road



Intervention Description:

The introduction of a relief road to remove traffic from Harrogate town centre has been identified as a potential intervention. Provision of a relief road could reduce the impact of traffic within the town, helping improve the safety of Non-Motorised Users (NMUs) and improving network resilience. Reduced trips along key routes would improve conditions for those living and working in Harrogate as well as reducing issues of pedestrian severance and NMU safety. This could have benefits for businesses in the town as well as those wanting to travel through the area, including promoting east-west connectivity. Improved journey times and journey time reliability would benefit the economy of the town and surrounding area. Improved reliability of journey times within the town can also help encourage the use of public transport.

Assessment comments:

- Good level of achievement of objectives. In particular in terms of reducing congestion in the town centre and improving journey times, reliability and efficiency. It can also encourage greater uptake of NMUs in the town centre.
- Deliverability - physical construction possible but structures likely required over watercourses etc. as part of design, scheme likely to adversely impact designated environmental sites and CPO to be required. Public/stakeholder acceptability likely to be an issue.

Further consultation comments:

- Concern raised over the effectiveness of each of the relief road options. Each option only appears to relieve the existing corridor that it is closest to, with little impact on the town centre area of Harrogate, except the Inner routes.
- Corridors less affected by a relief road will still require congestion management measures included in other interventions.
- Relief Road may generate out of town retail sites, affecting attractiveness of town centre and possibly generating further traffic movements.

Recommendation:

Include within short list of interventions.

C2 - Inner Ring Road

Intervention Description:

This option would include the construction of an inner ring road within Harrogate with the aim of improving network resilience and reducing congestion within the town centre. It would aim to improve journey times and incentivise the use of bus use due to increased reliability. This can help reduce the problem of high network pressure during peak times and school commutes. The reduction of traffic on other routes can provide safety benefits and encourage an uptake in active modes, particularly cycling.

Assessment comments:

- Reasonable level of achievement of objectives. In particular in terms of reducing congestion in the town centre and improving journey times, reliability and efficiency.
- It can also encourage greater uptake of NMUs in the town centre if traffic flows are reduced.
- There may be issues of severance in the town as a result of an inner ring road.
- Deliverability - physical construction possible but CPO of residential areas may be required to provide land for the road, which may make the scheme unacceptable to public/stakeholders.

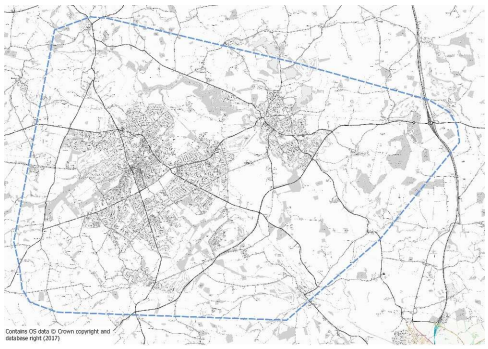
Further consultation comments:

- Considered to be an undeliverable option (CPO and cost).
- Existing highway network would not be able to provide a viable inner ring road.

Recommendation:

Do not progress to the short list of interventions due to issues of feasibility, deliverability and public acceptability.

C3 - Network Optimisation



Intervention Description:

This intervention would begin with a review of how the existing road network within the study area operates in order to see if changes can be made which will contribute to the Objectives. This could include facilitating certain movements to reduce the time traffic is static and hence reduce air and noise pollution, whilst also restricting other movements to reduce intrusive traffic flow in the town centre. This could help to encourage the use of new infrastructure such as a relief road. This intervention could include changes to traffic signal settings and other traffic management measures as well as the restriction of vehicle types (such as HGVs) which slow down general traffic and increase noise and air pollution. Optimisation overall would help to improve the resilience of the network, make best use of existing and new infrastructure, improve safety and reduce environmental impacts.

Assessment comments:

- Reasonable level of achievement of objectives. In particular in terms of reducing congestion in the town centre and improving journey times, reliability and efficiency.
- Deliverability - no land or engineering issues.
- Relatively low cost to deliver but effectiveness will be enhanced by other interventions, so suggest it is only taken forward as part of a package of measures - in particular C4.

Further consultation comments:

- Network optimisation is likely to be linked to the better use of traffic signals to manage predominant traffic flows (see intervention C4).
- Intervention should also consider the movement of cycles.
- Localised junction improvements should be considered eg. Woodlands.
- Possible inclusion of traffic signals on Empress roundabout to stop blocking back on the circulatory carriageway.
- Removal of on-street parking to aid traffic flow.

Recommendation:

Include within short list of interventions.

C4 - Area Wide Signal Strategy Review

Intervention Description:

This intervention looks to assess and review signals within the study area to help optimise and alleviate congestion that may be created from inefficient signal timing. This could include a review of:

- The “green wave” along key routes
- Public transport priorities
- Increased “red phase” time on side road accesses

This would seek to improve network resilience, traffic flow/congestion and reduce journey times. Improved reliability of travel times may increase public transport use and help to meet air quality targets through the minimisation of stationary traffic particularly within AQMA areas.

Assessment comments:

- Relatively low score against objectives as a stand-alone scheme.
- Its effectiveness can be enhanced through provision with other schemes such as network operation, so suggest it is only taken forward as part of a package of measures - in particular C3.

Further consultation comments:

- A journey time monitoring system is currently being installed, which will inform a new UTMC system, to be installed in 2019. This could also inform a VMS system and journey planning information portals.
- Currently running fixed time plans on the main corridors into and out of Harrogate. A number of signal sites are running MOVA and most are connected to the UTC system.
- SCOOT regions have been considered previously and could offer potential for network improvement, but requires manual monitoring resource.
- 3 additional signal sites to be installed on Otley Road. Current proposal is to remove the signals at Bond End and replace with mini roundabouts.
- Signalised pedestrian crossings should be straight across, not staggered to improve pedestrian accessibility. Provision of Toucan crossings at all cycle crossing points, and should be considered at crossing points on an expanded cycle network (see intervention F1).
- Consider signalising the Empress roundabout to reduce blocking back.
- Introduce signals at the exit from the bus station.

Recommendation:

Include within short list of interventions.

C5 - Reallocation of Road Space

Intervention Description:

This intervention looks to reassess and reallocate road space in order to relieve congestion and improve journey times by encouraging the modal shift towards sustainable travel modes. Reallocation could improve the safety of NMUs and help to ensure reliable journey times. This could include the prioritisation of non-car modes and public transport, cycle lanes and cycle only routes. Overall, the aim of this intervention is to reduce the reliance upon private car ownership, improve public health and reduce vehicle emissions.

Assessment comments:

- Good score against scheme objectives - in theory the intervention can help reduce congestion in the town centres through removal of traffic in certain areas however, may limit accessibility to town centre for all modes.
- Deliverability is questionable given the lack of road space available for reallocation.
- Low cost to reallocate space (if additional land is not required). High cost if land required.
- Medium, timescale as depending on level of reallocation access strategies and consultations will be required.
- Dependency - it would need to work as part of a wider package of measures such as NMU strategies and PT (bus) strategies.
- Proposal is wide ranging so it is suggested it is not taken forward but will be considered further in similar schemes such as bus priority and cycle strategy.

Further consultation comments:

- Considered this will be difficult to achieve without affecting the capacity of the highway.
- Removal of on-street parking in some areas may allow localised reallocation of road space.
- This is likely to only be possible when combined with other measures to reduce the traffic demand, so could be included alongside other interventions.
- Reallocation of road space to sustainable transport is likely to be contencious.

Recommendation:

Include within short list of interventions, linked to parking strategy, network optimisation, relief road and signals strategy.

Parking Interventions

D1 - Area Wide Review of Car Parking Management, Supply and Charging and Development of Area Wide Strategy

Intervention Description:

A review of the overall car parking strategy for the town including management, supply and pricing system, would look to minimise the flow of traffic to the town centre. This can be achieved by either restricting the availability of parking or adjusting the pricing regime across the town and discourage driving into the town, with the aim of reducing congestion within the town centre and helping to improve safety, particularly for NMUs. It could also help address issues of severance and contribute towards meeting climate targets and encourage the growth of tourism within the town due to the benefits of reduced traffic in and around Harrogate town centre.

Assessment comments:

- Good score against scheme objectives - the intervention can help reduce congestion in the town centres through discouraging car traffic in certain areas and encouragement of shift to sustainable modes.
- Deliverability of a review/strategy is relatively straightforward but there may be some public / stakeholder acceptability issues for some recommendations particularly regarding increased costs.
- Low cost to reallocate space (if additional land is not required)
- Medium, timescale as depending on initiatives proposed there may be some consultations and legal processes creating delays to implementation.
- Dependency - it can be delivered independently but would complement other demand management interventions

Further consultation comments:

- Considered to be a key element of any package.
- Reduction in parking could affect the attractiveness of the commercial centre of Harrogate.
- Greater supply of parking required at outlying train stations – Pannal, Hornbean Park, Knaresborough to facilitate mode shift to train into the centre of Harrogate.
- On-street parking should be removed in favour of cycling/ped provision and improved traffic flow.
- Any reduction in parking near the town centre should be replaced with alternative provision, such as park and ride sites.
- Reduction in the use of disc parking close to the town centre.
- Possible introduction of residents parking zones.
- NYCC are currently exploring a Smart Parking app. To inform motorists of the availability and location of parking spaces, which has the potential to reduce traffic circulation around the town centre.

D1 - Area Wide Review of Car Parking Management, Supply and Charging and Development of Area Wide Strategy
Recommendation: Include within short list of interventions – noted that NYCC / HBC are currently looking to commission so may be more appropriate to include delivery of the strategy, rather than development, as part of a longer term package.

D2 - Park and Ride

Option Description:

Park and Ride provision in Harrogate would aim to reduce the flow of traffic within the town centre by incentivising out of town parking through implementation of a Park and Ride scheme. This would target reductions in congestion within the town centre and help to improve the safety of all road users, particularly NMUs. As a result this can in turn work towards the achievement of environmental targets (such as air quality and carbon emissions), improve the aesthetics of the town and encourage growth of tourism.

This intervention could help to improve the town's permeability whilst promoting sustainable transport solutions and minimising the effect that additional associated traffic can cause.

Assessment comments:

- Relatively low score against objectives.
- Scheme may be difficult to deliver due to requirement of appropriate sites for delivery.
- Park and ride services can reduce congestion within and along the key routes into the town centre with associated environmental benefits. However, P&R can introduce issues elsewhere from people driving to the P&R site, it can also discourage use of rural bus services with people opting to drive to the P&R site. Adverse environmental impacts can also be experienced from the construction and operation of the site(s), particularly if built on a greenfield site.
- Benefits would be better realised as part of a package of bus priority and parking measures.

Further consultation comments:

- Provision of park and ride sites should be at points before motorists experience the main effects of congestion i.e. Killinghall, near Pannal/Burn Bridge roundabout on A61, near Kestrel roundabout on A661.
- Park and ride should be linked to existing bus services (i.e. 36) to provide the link into/from the town centre.
- The attractiveness of park and ride will only be realised if associated bus movements have priority over other traffic.
- Would be viewed as a positive improvement if viewed alongside changes in parking as a result of D1 Parking Strategy Review.
- Suggested numerous times by Members and the public as a potential solution to congestion issues

Recommendation:

Include within short list of interventions for further consideration of feasibility and potential benefit; further exploration is considered to be justified primarily as a result of the level of support.

Public Transport Interventions

E1 - Bus/Rail Station Interchange Development and Public Realm Improvements

Intervention Description:

This intervention would aim to create a fully integrated and modern transportation facility that meets the needs of Harrogate. It would potentially comprise a modern bus station and rail station facility in close proximity to one another in order to provide improved integration between transport modes. This would make the use of these modes increasingly viable and provide an attractive gateway to Harrogate which can encourage greater investment and economic benefits in the town.

Public realm improvements and improved pedestrian access to an interchange could increase the permeability of the town and access to bus and rail travel. This may reduce car usage and issues of congestion and delay, with associated environmental benefits in the town.

Assessment comments:

- Good level of contribution to achievement of objectives.
- Deliverability is possible but challenges relating to need for planning consent, land issues and funding.
- High cost to implement.
- Implementation would be a relatively long period of time.
- It's effectiveness would be enhanced with a number of other public transport initiatives.

Further consultation comments:

- Existing Station Gateway project may be addressing some of the issues stated.
- Seen as a positive benefit to the town centre.
- Better integration between bus and rail users needed.
- Need to reduce carriageway width of Station Parade to provide a more cohesive link to the town centre.
- Need to provide signals at the exit from the bus station to reduce delay to bus services.
- Better pedestrian crossing facilities across Station Parade are required.
- Need for better cycle parking at the station to provide for sustainable transport integration.
- Potentially a key scheme for a non-relief road Package.

Recommendation:

Include within short list of interventions.

E2 - Bus Priority on Key Routes

Intervention Description:

Provision of bus priority could help improve the efficiency and reliability of buses within Harrogate, making bus travel a more viable and attractive transport choice in the town. This can reduce the dependence on car use, reducing the volume of traffic travelling to/from the town centres, thereby reducing congestion and providing safety and environmental benefits. Bus priority measures can include:

- Segregation / road space reallocation e.g. provision of bus lanes.
- Traffic management changes to prioritise buses.
- Traffic signal control to prioritise buses.
- Bus stop improvements.

Assessment comments:

- Relatively low score against objectives.
- Scheme is difficult to deliver due to lack of available highway space to provide adequate bus priority.
- Signal improvements could be incorporated as part of network optimisation intervention.

Further consultation comments:

- Limited opportunities to provide a coherent package of bus priority measures, given the limitiations of available highway space and the constraints of The Stray. Any coherent package will result in capacity constraint for other vehicles.
- Any provision is likely to be localised to specific junctions on the network, but is still likely to be a trade off between provision for buses and general traffic capacity.
- Traffic signals are seen as the best opportunity for creating priority for bus services, see intervention C4.
- Wetherby Road offers potential for bus priority along a good proportion of its route, especially in combination with relief road proposals as this route will experience the greatest relief to traffic movements.

Recommendation:

Include within short list of interventions noting links with other interventions, C1 Relief Road, C3 Network Optimisation, C4 Signals Strategy Review, D2 Park & Ride.

E3 - Quality Bus Corridors (QBC)

Intervention Description:

QBCs are strategic routes that are designed to enhance and increase bus use, through improved reliability and efficiency as well as enhancing passenger waiting facilities. This can reduce the dependence on car use, reducing the volume of traffic travelling to/from the town centres, thereby reducing congestion and providing safety and environmental benefits. QBCs include:

- Provision of bus lanes.
- Junction Improvements.
- Traffic management changes to prioritise buses.
- Traffic signal control to prioritise buses (including coordination with Urban Traffic Control).
- Real Time Passenger Information.
- Bus stop improvements.
- Updating bus fleet e.g. replacing old buses with modern low-emission vehicles.

Assessment comments:

- Reasonable score against objectives.
- Scheme is difficult to deliver due to lack of available highway space to provide bus corridors.
- Significant CPO would likely be required, potentially of Stray land which would require subsequent allocation of compensatory land elsewhere.

Further consultation comments:

- The existing network does not provide the opportunity for creating a coherent QBC, see comments in E2.
- Route 36 (high frequency route between Leeds and Ripon) operates as a QBR, with good branding both on and off bus, high frequencies and travels along one of the main routes through the study area. Localised changes at signal controlled junctions could improve the efficiency and reliability of this route, especially access to and from the bus station.

Recommendation:

Do not include in the short list of interventions, due to deliverability issues, but the importance of providing enhanced public transport provision is recognised.

E4 - Focus on New Developments Providing Sustainable Transport Options

Intervention Description:

This intervention is designed to ensure any new development is well connected by all transport modes, with a priority towards sustainable transport modes. Provision and ease of access for sustainable transport options can encourage their use, rather than the private car, reducing the number of vehicles on the road network, improving journey times, resilience, safety and environmental improvements. Elements of this measure include:

- Sustainable travel to be designed into new developments.
- Private vehicle priority reduced where feasible.
- Travel Plans.
- Linkages to existing NMU routes and public transport options.
- Provision of walking and cycling provision where applicable.
- Encouragement for employers/residents to sign up to sustainable travel initiatives.

Assessment comments:

- Good score against objectives and deliverable with relatively few issues.
- Relatively low cost to include as part of a package of sustainable measures.

Further consultation comments:

- New developments will increase the demand for transport into and around the town centres and their development offers the potential to shape travel patterns from an early stage with good sustainable transport options included within them.
- Need to ensure that new developments are served by public transport from opening to ensure new travel demand can be captured by sustainable transport modes from an early stage.
- Travel plans for new developments should be monitored to ensure targets are met.

Recommendation:

Include within short list of interventions.

E5 - Demand Responsive Services

Intervention Description:

This option comprises a user-oriented form of public transport characterised by flexible routing and scheduling of small/medium size vehicles providing a shared transport mode. It would operate from different pick-up and drop-off locations according to the passengers' needs. This includes "dial-a-ride" type services where customers would contact a central provider and options of times and locations for specified pick-up and drop offs would be provided. Schemes such as these are typically useful for people with mobility issues and in rural areas where public transport options can be scarce. Provision of services such as this can reduce the number of private car trips into Harrogate by providing alternative, shared, options.

Assessment comments:

- Relatively low score against objectives. Uptake may not be sufficient to meet scheme objectives.
- It can be delivered with few issues and for a relatively low cost.
- Timescales are dependent on availability or not of existing services (which could be enhanced).

Further consultation comments:

- A scheme already exists, currently rebranding as GO LOCAL, which provides a demand responsive service. It operates at off peak times and is pre-bookable.
- Low demand, unlikely to have much impact on congestion.

Recommendation:

Do not include in short list of interventions, due to low score against objectives and low demand for existing service.

E6 - Reopen Disused Railway Lines

Intervention Description:

Reopening disused railway lines is an intervention suggested to improve public transport provision through greater connectivity for places no longer served by the rail network as well as helping tackle overcrowding on the existing rail network. This aims to improve attractiveness and viability of rail travel, encourage greater use and making it a more favourable mode of travel, than the private car, to/from Harrogate reducing congestion in the town and providing improved safety and environmental benefits. This could involve re-opening of the following lines:

- Harrogate - Leeds (via Wetherby).
- Harrogate - Ripon – Northallerton.

Assessment comments:

- Reasonable/low score against objectives.
- The scheme is very difficult to deliver due to significant costs involved in reinstating the lines and provision of relevant infrastructure, timetabling etc. CPO may also be required.

Further consultation comments:

- This conflicts with the provision of cycle routes in the area which are using some of the old railway lines in the area.
- Likely to be very difficult to deliver. Implementation time and costs are likely to be high.

Recommendation:

Do not progress to short list of interventions, due to deliverability issues as a result of associated costs.

E7 - Shuttle Bus from Railway Stations

Intervention Description:

A shuttle bus that links Harrogate's train stations with retail areas, large businesses, conference centres, educational establishments and tourist attractions may encourage sharing of trips from the station and improve integrated travel improving confidence for users of the station/town. This can reduce car trips to/from the town helping reduce the adverse issue relating to congestion.

Assessment comments:

- Relatively low score against objectives but can be delivered relatively easily, quickly and with relatively low cost.
- Unlikely to have a significant uptake given the small size of Harrogate and Knaresborough.

Further consultation comments:

- Many local services already link to Harrogate, Knaresborough and Starbeck stations. Potential to divert existing bus services via Pannal and Hornbeam Park stations to provide additional connections.
- Existing bus services are predominately radial from Harrogate centre. Interchange will therefore offer little advantage.

Recommendation:

Do not progress to short list of interventions, due to poor score against objectives and likelihood of impact.

E8 - Relocation of Starbeck Railway Station

Source: Google Street View

Intervention Description:

Relocation of Starbeck Station was suggested in order to relieve the issues resulting from traffic congestion associated with the level crossing. This would seek to improve the network flow efficiency and resilience as well as provide environmental and safety improvements as a result of reduced congestion and queuing traffic.

Assessment comments:

- Low score against objectives.
- Scheme is difficult to deliver due to land requirements and likely high cost of CPO.
- Stakeholder/public acceptability support unlikely due to the high cost and impact of CPO in urban area potentially including residential buildings.
- High cost to deliver.

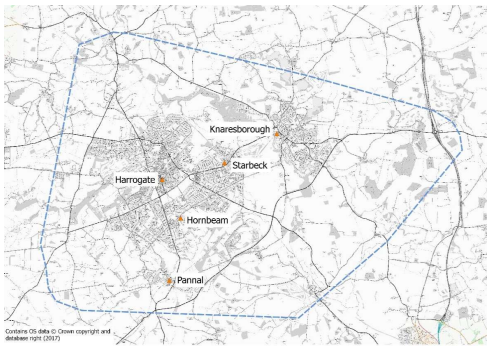
Further consultation comments:

- Starbeck level crossing can cause long delays to traffic travelling between Harrogate and Knaresborough. Crossing down times average 8 minutes.
- Bus services are delayed and cannot provide a reliable service running to timetable because of the crossing.
- Improvements in crossing down time would reduce congestion and delay and improve air quality in the Starbeck area.

Recommendation:

Do not progress to short list of interventions, due to poor contribution to the ojectives, associated high costs and requirement to compulsory purchase land.

E9 - Parkway Stations



Intervention Description:

A parkway railway station is a station that primarily provides a park and ride rail interchange rather than directly serving an urban centre.

Provision of a parkway railway station as either a new station or expansion of existing stations outside of Harrogate town centre has been suggested as it could provide greater access to rail particularly for strategic trips out of Harrogate. This could reduce the number of trips to the town centre by car, alleviating congestion and encouraging environmental improvements through use of a more sustainable travel mode than the private car. It could also improve the permeability of the town, while minimising the effects of increased car usage associated.

Assessment comments:

- Scores reasonably well against objectives through encouraging sustainable mode use but very high costs and deliverability issues likely.
- It can also redistribute some local traffic creating congestion elsewhere.

Further consultation comments:

- Location of parkway stations will be critical to the effectiveness of the scheme.
- Greater frequency of trains required to increase attractiveness of provision.
- Cost of provision may prohibitive.
- Possible opportunities linked to new development proposals

Recommendation:

Include within short list of interventions with consideration to be given to current service levels and potential adverse impacts to wider rail operations.

E10- New Rail Halts

Source: https://thespencergroup.co.uk

Intervention Description:

Introduction of new rail halts serving key employment areas, educational facilities, new developments and suburbs of the town could help encourage use of rail travel to Harrogate, Knaresborough and beyond. This in turn can reduce congestion in the town by removing vehicle trips within the town centre - encouraging environmental improvements through use of more sustainable travel modes. Suggested locations of halts include:

- Knaresborough East
- Claro Industrial Estate
- The Stray

Assessment comments:

- Scores reasonably well against objectives through encouraging sustainable mode use but very high costs and deliverability issues likely with a requirement for appropriate permissions, consents and land acquisition in urban areas which will likely have very high costs and adverse impacts to businesses and residents.
- Provision of additional halts would also likely impact timetabling and operation of the lines.

Further consultation comments:

- Deliverability issues to provide land and access for rail halts close to destinations.
- Likely to require an increase in service frequency to become attractive.

Recommendation:

Include within short list of interventions with consideration to be given to current service levels and potential adverse impacts to wider rail operations.

E11- Improved Access to Rail Stations



Intervention Description:

Improving access to rail stations could encourage more rail travel to/from Harrogate and Knaresborough which in turn could reduce traffic congestion and its associated adverse impacts in the town by removing vehicle trips. Improved access for NMUs in particular can help reduce car travel to/from the stations. Improved access can comprise:

- New/improved footbridges and lifts, in particular to help those with mobility issues
- Provision of improved accessibility infrastructure for cyclists and pedestrians
- Improved cycle storage facilities
- Accessible changing/toilet facilities
- Provision of wayfinding and tactile paving

Assessment comments:

- Scores reasonably well against objectives through encouraging sustainable mode use and could be effective as part of a package of measures.

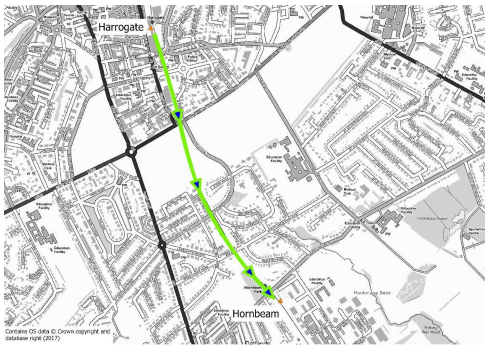
Further consultation comments:

- Need to provide sustainable transport links to each station, and cycle parking facilities.
- Additional parking facilities required at rail stations to encourage rail use.
- Links with packages E9 Parkway stations and E10 Rail halts.

Recommendation:

Include within short list of interventions.

E12 - Encouraged Use of Rail for Internal Journeys



Intervention Description:

There are a number of railway stations within the study area and the use of rail for internal trips, within the study area, has been suggested.

Encouraged use of rail travel within Harrogate and Knaresborough can reduce congestion by reducing internal vehicle trips. This can be achieved by:

- Promotion of rail travel
- Reduced fares for short rail journeys (within Harrogate urban area and Knaresborough)

This intervention could also help to improve air quality and aesthetics of the town centre. Reduced traffic can also help to minimise pedestrian severance and increase the modal shift towards more sustainable modes of travel due to a perception of improvements to safety.

Assessment comments:

- Relatively low score against objectives as, although it can encourage sustainable mode use, given the size of the towns the practical take up for travel by rail within the town would likely be small and hence the contribution to achieving objectives is small.
- When considering the short distances involved it was considered the overall costs of travel including time of travel to/from stations (at either end) time waiting for trains and financial implications may make this impractical for many short journeys. Consequently it is not considered to be taken forward.

Further consultation comments:

- Although there are intermediate stations along the line, interchange time and current frequency of service is unlikely to make this an attractive option for mode shift.

Recommendation:

Do not progress to the short list of interventions, due to low score against objectives and likely impact.

Cycling Interventions

F1 - Implementation of Cycling Infrastructure Plan for Harrogate Knaresborough and surrounding area

Intervention Description:

Implementation of the cycling infrastructure plan, developed as part of NYCC's Access Fund package of measures, would seek to make Harrogate district, and in particular the urban area, a place where cycling becomes a natural choice for shorter journeys. This will include making cycling accessible for all, with improvements to infrastructure, increased training opportunities as well as increasing promotion and 'joined up thinking' across organisations involved in cycling.

This can help provide benefits of reduced congestion in the towns as well as improving generally the health and wellbeing of residents, workers and visitors in Harrogate.

Assessment comments:

- Good level of contribution to achievement of objectives.
- Deliverability of a strategy unlikely to be an issue but may be challenges in delivering some of the proposals.
- Low cost to implement.
- Can be delivered in relatively short timescales and not dependent on other interventions but would work well in a package of NMU interventions.

Further consultation comments:

- LSTF focussed more on visitors to Harrogate. Need to provide an expanded network to/from destinations more appropriate to residents e.g. schools, workplaces, hospital, leisure facilities, to help deliver a modal shift.
- Need for more secure cycle parking at destinations, including schools, railway stations, bus station, town centre.
- Cycling on The Stray should be deregulated to encourage greater use of cycles.
- Potential to remove on-street parking and provide cycle lanes should be fully explored, especially on the approaches to the town centre.
- Need for a better cycle link between Harrogate and Knaresborough.
- Consider the intorduction of a bike hire scheme (possibly dockless) to encourage cycle trips.
- Need to ensure there are good cycling links to/from new developments to encourage cycle usage at an early stage.
- Cycle maintenenace and cycle rider training (as provided by Access Fund) should be made available to residents to encourage greater cycle take-up.

F1 - Implementation of Cycling Infrastructure Plan for Harrogate Knaresborough and surrounding area
Recommendation: Include within short list of interventions.

Walking Interventions

G1 - Area Wide Public Realm Strategy

Source: Harrogate Borough Council

Intervention Description:

An area wide public realm strategy would provide a coordinated approach to improvements in the public realm to ensure a high quality and consistent approach for proposals impacting the streetscape. The main objective of the strategy would be to ensure the streets and public spaces within the Harrogate urban area are designed to bring maximum benefit to residents, businesses and visitors as well as encouraging walking and cycling for shorter trips. Measures included in the strategy would seek to implement a change in priority from dominance of vehicles to prioritising pedestrian movements.

This can improve the health and wellbeing of residents, workers and visitors in Harrogate as well as making the town more attractive for investment, business and tourism.

Assessment comments:

- Good level of contribution to achievement of objectives.
- Deliverability of a strategy unlikely to be an issue but may be challenges in delivering some of the proposals.
- Low cost to implement.
- Can be delivered in relatively short timescales and not dependent on other interventions but would work well in a package of NMU interventions.

Further consultation comments:

- Improved pedestrian priority at traffic signals would encourage more walking trips. This should include provision of straight across crossings and additional crossing points on key walking routes.
- Improved walking connections within Knaresborough to the town centre and access to public transport services.
- Links to extension of pedestrianisation and possible 20mph speed limits/zones.

Recommendation:

Include within short list of interventions.

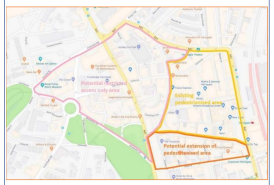
Appendix E

PACKAGE FORMATION

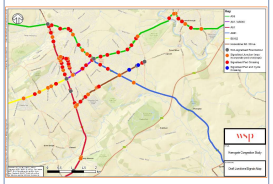
Package B Interventions – Demand Management and Behavioural Change Package

A1 – Information – Variable Message Signs

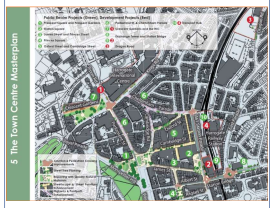
B1 – Demand Management – Extend pedestrianisation of Harrogate central core



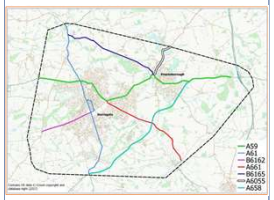
C3 / C4 – Highways – Network Optimisation and Area Wide Signal Strategy Review



E1 – Public Transport – Bus / Rail Interchange Development and Public Realm Improvements



A4 – Information – Publicity Campaigns and Incentives for more sustainable travel



B2 – Demand Management – Traffic Management / Low Emission Zone

- Further study required to identify location(s) to be covered
- Aims and objectives to be defined
- Types of exemptions
- Air Quality Management Areas
- Based on congestion or air quality

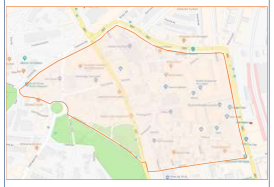
B10 – Demand Management – Car Clubs (Electric Vehicles)

- Area-wide and site based operation potential
- Dedicated parking bays on-street and on private land.
- Focus on key trip generating sites
- Area-wide promotion to residents and businesses
- Focus on young people before they buy their 1st car

A2 – Information – Real Time Travel Information

- In vehicle technology
- Mobile apps
- Emerging Mobility as a Service solutions
- On-demand agile bus services
- Fixed Real Time Passenger Information systems
- Variable Message Signs

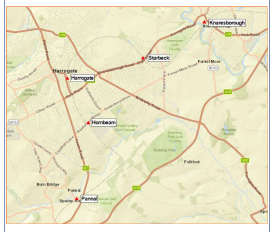
B7 – Demand Management – HGV / Commercial Vehicle Restrictions at Peak Times



C5 – Highways – Reallocation of Road Space

- Parking Review and Strategy
- Cycling Infrastructure Plan
- Extended pedestrianised area
- Station Gateway
- Potential reallocation as a result of relief road

E11 – Public Transport – Improved Access to Rail Stations



A5 – Information – Improved Digital Provision Open Harrogate website and App

- Updated Open Harrogate app
- Updated Open Harrogate website
- Open data access to enhance app functionality
- Integrate with new transport platforms (MaaS) and ride/bike sharing
- Gamification to encourage more sustainable travel choices

B4 – Demand Management – Area Wide Travel Planning

- Resident and Business travel surveys
- Personalised Journey Planning
- Marketing and communications
- Links to Open Harrogate
- Links to MaaS

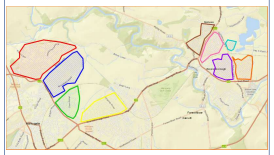
B11 – Demand Management – School Travel Plans

- Perceived as a significant cause of congestion in the peak periods
- Need to refresh existing School Travel Plans
- Opportunity to inform and influence travel behaviour at an early stage, shaping future travel

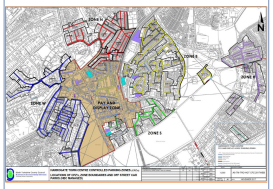
A3 – Information – Area Wide Signage Strategy

- Car park signage
- HGV / LGV signage
- Cycle route signage
- Town centre fingerpost signs
- Wayfinding totems
- Key destinations / attractions

B8 – Demand Management – Town Centre 20mph Speed Limits / Zones



D1 – Parking – Area Wide Parking Review and Strategy



F1 – Cycling – Implementation of Cycling Infrastructure Plan

A6 – Information – Personalised Journey Planning

- Personalised journey plans to encourage sustainable travel modes
- Present a range of options for regular trips
- Reduce congestion
- Benefits to the environment and health
- Links to 'live' conditions such as congestion, parking, timetables

B9 – Demand Management – Car Sharing

- Existing car share scheme is under-utilised
- Area wide and site-based operation potential
- Promotion and engagement
- Potential dedicated car share parking spaces

E4 – Public Transport – Sustainable Transport Options at New Developments

- Potential to alter behaviour at a key transition point
- Opportunity to provide sustainable transport options within the new development
- Travel Plans enforceable by local authority

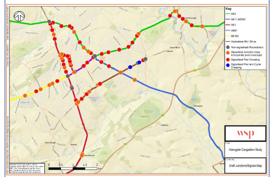
Interventions in both packages | **Interventions in Package B only**

Package E Interventions – Relief Road plus Highway Operational Improvement Measures, Sustainable Transport and Urban Realm Improvement Package

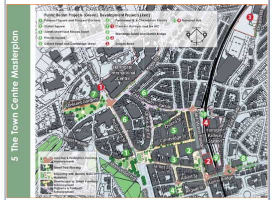
A1 – Information – Variable Message Signs

B1 – Demand Management – Extend pedestrianisation of Harrogate central core

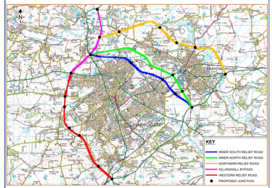
C3 / C4 – Highways – Network Optimisation and Area Wide Signal Strategy Review



E1 – Public Transport – Bus / Rail Interchange Development and Public Realm Improvements



C1 – Highways – Relief Road



A2 – Information – Real Time Travel Information

- In vehicle technology
- Mobile apps
- Emerging Mobility as a Service solutions
- On-demand agile bus services
- Fixed Real Time Passenger Information systems
- Variable Message Signs

B7 – Demand Management – HGV / Commercial Vehicle Restrictions at Peak Times

C5 – Highways – Reallocation of Road Space

- Parking Review and Strategy
- Cycling Infrastructure Plan
- Extended pedestrianised area
- Station Gateway
- Potential reallocation as a result of relief road

E11 – Public Transport – Improved Access to Rail Stations

D2 – Parking – Park and Ride

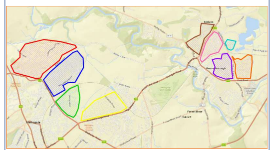
- A59
- A661
- A61

- Reliant on related bus priority
- Use of existing bus services
- Relief Road dependent

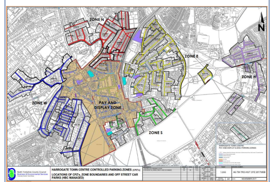
A3 – Information – Area Wide Signage Strategy

- Car park signage
- HGV / LGV signage
- Cycle route signage
- Town centre fingerpost signs
- Wayfinding totems
- Key destinations / attractions

B8 – Demand Management – Town Centre 20mph Speed Limits / Zones

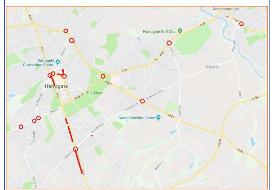


D1 – Parking – Area Wide Parking Review and Strategy



F1 – Cycling – Implementation of Cycling Infrastructure Plan

E2 – Public Transport – Bus Priority on Key Routes



Interventions in both packages | Interventions in Package E only

Appendix F

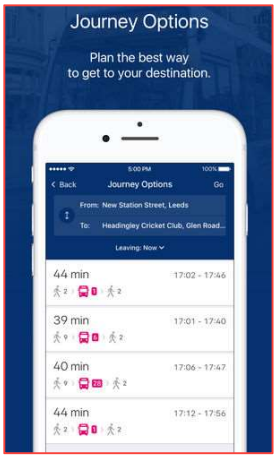
FURTHER OPTION DEVELOPMENT: INTERVENTION SUMMARY SHEETS

FURTHER OPTION DEVELOPMENT - INTERVENTION SUMMARY SHEETS

Name	A1 – Information – Variable Message Signs
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	There are a number of forms that variable messaging could take: <u>Installation of VMS</u> ▪ The base intervention would be deployment of Variable Messaging Signage (VMS) technology across the study areas, to inform travellers of key, up-to-date, real and predictive information across all modes in order to influence behaviour and route decisions. Key information could include events, disruption, congestion, incidents and road closures. ▪ Conveying relevant information to drivers can result in benefits including optimisation of traffic flow, reduced congestion and delay, and more effective management of unique events to minimise adverse impacts. <u>Parking Information Provision</u> ▪ Parking availability information can be communicated through multiple channels including VMS signage, improved online web presence and a smart phone application. In conjunction with modifications to parking capacity, this measure has the potential to reduce internal car trips through providing this information before drivers begin their journey, and also by reducing the need to drive around searching for a parking space. ▪ Provision of open data, to be picked up by other channels (e.g. Google), may reduce the costs of delivering this intervention. <u>In-Vehicle Information Systems (IVIS)</u> ▪ IVIS provides drivers with information that would be otherwise unavailable to them. Information on weather conditions, traffic and hazards can be communicated. This intervention would seek to exploit new technological developments, particularly those pertaining to vehicle-to-vehicle connectivity, 4G, Internet of Things (IoT) and connected infrastructure. ▪ IVIS already exists, to some extent, in many vehicles (standards are currently being agreed) and allows for a reduction in on-street infrastructure over time. This intervention would be focused on utilising technological developments to enhance this information provision with locally targeted information on parking availability, local traffic conditions and journey times for alternative modes. This particular measure could specifically target localised journeys, which have been shown to be a key contributor to congestion in Harrogate and Knaresborough.
Potential location	▪ Seven Potential locations, within the study area, are considered viable for installation of VMS infrastructure. The indicative locations have been selected based upon their general location, whether they form part of a key route, proximity to key junctions, potential for influencing route decisions and likely feasibility. ▪ The Potential locations are summarised below and shown in the plan, overleaf: 1) A59 Skipton Road - Key access road into Harrogate located to North West extent of study area. 2) A61 Ripley - A61 near Ripley to the north of the study area 3) A1 / A59 to Knaresborough - Key access route to both Harrogate and Knaresborough connecting with the Strategic Road Network through the A1

	4) A61 / Swindon Lane - Connects with roundabout linking with key access route to Harrogate (A61) 5) A661 Wetherby Road - Near-to junction with A658 providing access into central Harrogate 6) A658 Harrogate Road - Near-by A658/A61 roundabout, key route providing access to study area from the south/Bradford 7) A6055 Hazel Bank - Ahead of turn-off for Farham Lane.  ▪ The map also shows the colour coded routing options for the respective VMS locations i.e. the key routing options for traffic. As the map shows, key access roads to both Harrogate and Knaresborough are covered by the proposed indicative locations of VMS signage.
Related interventions	▪ **A3: Area Wide Signage Strategy** – There is scope to align these initiatives and for VMS to be considered as a route to delivering new / improved signage. ▪ **B2: Traffic Management/Low Emission Zone** – VMS would be used to convey information relating to any designated 'zone'. ▪ **C3: Network Optimisation** – VMS could be used to re-direct traffic and optimise efficiency of the wider network. ▪ **D1: Area-Wide Car Parking Strategy** – Variable message signs will support any car parking strategy, providing routing to and availability information for car parks.
Example(s)	▪ Warrington - VMS fixed information system ▪ Hertfordshire County Council – Intelligent Transport Systems Strategy 2009/10 – 2019/20 ▪ Reading - Variable Message Signs
Indicative cost	**MEDIUM** ▪ Will involve installation works to facilitate some 'hard' infrastructure in the form of VMS signage. Supporting infrastructure such as Bluetooth detectors could give real time travel times on key corridors, ▪ Will be subject to ongoing maintenance and operational costs and staffing has the potential to be key. ▪ Will need to interface with open data initiatives and display other mode data to encourage modal shift.

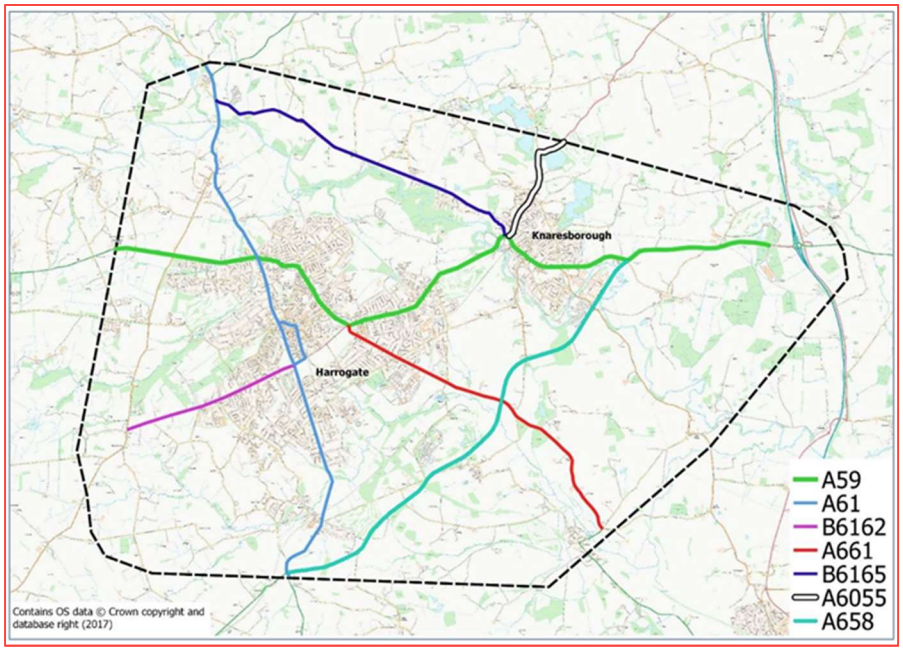
Indicative timescale	**SHORT** ▪ A ‘Medium’ to ‘Long’ timescale may apply for some of technologically focused options which could make up this intervention e.g. enhanced information provision within connected vehicles.
Additional info	▪ None

Name	A2 – Information – Real Time Travel Information
Packages	▪ **Package B** – Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	Information to travellers can be delivered via a variety of methods: ▪ In-vehicle technology such as satnav / infotrainment systems are able to deliver real time and predictive information to drivers on the most appropriate route for a journey, and is also able to react to events or congestion to suggest alternative routes. ▪ Mobile apps, such as that shown to the right, are available across all travel modes, including road travel, train operators and bus service providers. These can include live departure boards for rail and bus services, bus stop QR code or numbers to text for next departure information. ▪ Emerging Mobility as a Service solutions are combining real time journey planning, payments and booking across all modes to provide users with tailored information and choices.  ▪ Similarly emerging on-demand, agile bus services may have their own information, payment platforms which may need integrating within the whole RTPI system and associated data sets. ▪ Fixed systems, such as bus stop Real Time Passenger Information (RTPI) panels, can also be used to provide travel information to passengers at bus stops, using GPS to determine the arrival time of the next service. Bus stop RTPI is already in place along the A61, operated by TransDev. There is the opportunity to expand the coverage to include other locations and routes serving residential areas in the study area. ▪ Linking to A1, Variable Message Signs can deliver real time journey times to motorists, as frequently displayed along motorways, displaying travel time to interchange points or destinations. ▪ Experiments are being undertaken in the UK to deliver real time information to in-vehicle displays, potentially delivering an enriched level of information over that possible with VMS signs. ▪ Real and predictive travel information is increasingly expected by customers and has a role to play in enabling modal shift.
Potential location(s)	▪ This intervention can be delivered in a variety of ways, some of which are location specific. However, for the most part, this will be based on technology and will be available through IT channels such as websites, mobile apps or the provision of data to 3rd parties for use within other applications / platforms.
Related interventions	▪ **A1: Variable Message Signs** – As above, information could be communicated via Variable Message Signs. ▪ **A4/A5: Information Provision and Open Harrogate** – There is scope to communicate RTPI through Open Harrogate/similar channels. TfN is currently moving in this direction and Open Data Institute Leeds is now the UK Transport Hub. ▪ **E1: Bus / Rail Interchange Development and Public Realm Improvements** - The Station Gateway development will provide the opportunity to deliver and prominently display RTPI, particularly for the interchange between rail and bus journeys.
Example(s)	▪ Nottingham Bus Stop RTPI

	▪ WYCA yournextbus service
Indicative cost	**LOW - MEDIUM**
	▪ Infrastructure can be expensive – there are assumed costs associated with the installation of RTPI displays at bus stops and other locations, as well as the use of technology to underpin this and ongoing operational and maintenance costs. ▪ The actual cost will be dependent on the number of routes, as well as the number of individual bus stops/shelters, where RTPI systems are implemented. It is noted that the cost may vary considerably based upon the number of routes identified for this intervention. ▪ There is an option to go 'infrastructure light' and use Apps / text as main means of dissemination. While currently there are likely to be equality issues with this approach, over time they may become less.
Indicative timescale	**SHORT - MEDIUM**
	▪ It should be possible to implement this measure in a relatively short timescale, as there are no land issues or acceptability concerns associated with it. ▪ As this intervention involves the installation of infrastructure in the form of RTPI display units, as well as supporting infrastructure where required, interfaces with data platforms and open data initiatives this may extend timescales to 'Medium'.
Additional info	▪ Open Harrogate local bus route map used as baseline information and obtained from http://openharrogate.co.uk/wp-content/uploads/2014/03/Harrogate-Bus-Routes-D2.pdf

Name	A3 – Information - Area Wide Signage Strategy
Package(s)	▪ **Package B** – Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ Signage, in all its forms, is critical in guiding residents, workers and visitors into and around a town centre, whether by foot, cycle, public transport or private vehicle. Signage can also have a significant impact upon attractiveness and visitor experience. ▪ Good signage can also encourage drivers to make journeys along the most appropriate routes and, help encourage travel by more sustainable modes. ▪ Any Signage Review, and resulting Strategy, would need to consider the following: ▪ A town centre, such as Harrogate, requires access for HGVs / LGVs / vans to service commercial premises in the heart of the town, and to business premises and out of town retail areas. The signage for HGV's will also need to encompass any time or route restrictions. ▪ Signage for cyclists is likely to be centred along the key corridors where cycle facilities are provided or along identified routes. This may also be applicable to pedestrian movements but will also encompass fingerpost or totem-style signage (Wayfinding) within and around the town centre areas. ▪ Good signage to car parks can reduce traffic movements around a town centre and prevent additional circulating traffic movements when searching for a parking space. Using VMS (A1) to inform users of available parking spaces could enable more efficient use of the highway. 
Potential location(s)	▪ Area Wide Strategy. The signage strategy could be developed on a hierarchical basis, based upon the distance from the town centres, e.g. strategic destinations, key study area destinations, mode type signage (HGV routes, cycle routes, car park signage, pedestrian signage).
Related interventions	▪ **A1: Variable Message Signs** – VMS would need to be considered as part of any Signage Strategy. Potential to use of VMS for car park availability, event route management, incident management etc. ▪ **B2: Traffic Management / Low Emission Zone** - Subject to the zone being implemented, the signage strategy would need to support the low emission zone through conveying information at key entry and exit points. ▪ **B7: HGV Ban at Peak Times / Loading Restrictions** - In a similar manner to B2, signage would need to be used to convey information to HGVs and underpin enforceability. ▪ **F1: Cycling Infrastructure Plan** - The development of a Cycling Infrastructure Plan will require new and existing cycle routes to be adequately signed in a consistent manner.
Examples	▪ York ▪ Sleaford, Lincolnshire

Indicative cost	**LOW - MEDIUM**
	▪ Cost for review and Strategy development likely to be 'Low' – subsequent implementation would likely increase this to Medium (VMS cost considered separately).
Indicative timescale	**SHORT - MEDIUM**
	▪ The strategy could be developed in a relatively short timescale; implementation likely to increase timescales to 'Medium'.
Additional info	▪ None

Name	A4 – Information – Publicity Campaigns and Incentives for More Sustainable Travel
Package(s)	▪ **Package B** – Demand management and behavioural change
Description	▪ This intervention can be considered to be part of the overall Area-Wide Travel Planning intervention discussed in B4. ▪ The aim is to bring about behaviour change, with a shift from private vehicle to more sustainable modes, through education and incentives (e.g. cycle training, public transport taster tickets). ▪ These types of projects have been supported by DfT since 2011, through the Local Sustainable Transport Fund, Sustainable Travel Transition Year and Access Fund.
Potential location(s)	▪ Any marketing and communications campaign, and associated incentives and engagement activity, will incorporate the whole of the study area (shown below), although some initiatives may be more targeted in their delivery. 
Related interventions	▪ **A5: Improved Digital Provision – Open Harrogate Website and App** – Scope to align with, and incorporate this measure, as part of expansion of Open Harrogate incentives and marketing campaign. ▪ **A6**: **Information – Personalised Journey Planning** – As above, scope to incorporate this measure, particularly as part of resident and business engagement activities. ▪ **B4: Demand Management – Area-Wide Travel Planning -** Demand Management Area-wide Travel Planning – Area wide travel planning will form a sub component of this intervention and, along with other Related interventions, will underpin its effectiveness.
Examples	▪ A to Better, Norfolk ▪ Go Smarter, North East
Indicative cost	**LOW** ▪ Considered 'Low' cost in comparison to many of the other interventions under consideration, as consists of predominantly 'soft' information and marketing measures, rather than infrastructure based interventions.

Indicative timescale	**SHORT** ▪ 'Short' timescale for implementation, as the current 'Open Harrogate' scheme could be further expanded with a refreshed marketing campaign and supporting sustainable transport initiatives and engagement activity. In additional, existing collateral could be used.
Additional info	▪ It should be noted that a similar project is currently being delivered; the North Yorkshire Access Fund 'Open Harrogate' project is being led by North Yorkshire County Council and delivered by WSP. The key aim is to increase the number of people using sustainable travel options with a focus on active travel (cycling and walking). Further detail is included in B4. ▪ Existing Open Harrogate website can be found at http://openharrogate.co.uk/ ▪ Go Smarter North East Website - http://www.gosmarter.co.uk/

Name	A5 – Information – Improved Digital Provision Open Harrogate Website and App (Gamification and Sustainable Travel Challenges)
Package(s)	▪ **Package B** – Demand management and behavioural change
Description	▪ This intervention relates to intervention A4, and would likely form a component of a refreshed and/or expanded Open Harrogate initiative. More specifically, it is envisioned that this intervention would incorporate the following:  o An updated and refreshed Open Harrogate app compatible with the latest mobile devices and operating systems (iOS and Android) focused on individual journey planning, promoting sustainable modes, navigation and content to inspire users to consider their travel choices. o An updated and refreshed Open Harrogate website with similar content to the app but will act as the central point of the multi-channel campaign providing users with more comprehensive information and providing links to download the app, as well as to relevant external information. The app must be supported by a marketing and communications package targeting local residents, as well as visitors to Harrogate and Knaresborough, to ensure usage. A mobile optimised website may also be provided as an alternative to ensure wider use. o In addition to the app, this intervention incorporates open data access i.e. sharing local transport data with major transport bodies (TfN) as well as major technology companies including Google and City Mapper; this will ensure maximum cross boundary penetration and will significantly enhance the functionality of the Open Harrogate app/mobile optimised website. o In future, there may also be scope to integrate new transport platforms such as MAAS (Mobility as a Service) and ride/bike sharing to ensure that Open Harrogate acts as a central cross-channel destination for transport information across multiple modes; this will underpin its effectiveness and usage in future. o The Open Harrogate App/Website may also incorporate a gamification element to encourage more sustainable travel choices with the possibility of using smartphone usage and data to measure actual behaviour change. Gamification options may include: - Active travel competitions and leader boards amongst workplaces, schools, groups or local areas of Harrogate and Knaresborough - 'Points' for sustainable travel choices or and winning competitions which can be redeemed for rewards - Virtual badges and rewards for key achievements - Links with social media and other related apps e.g. fitness tracking - Opportunity to link with travel planning and intervention A4. - Where possible, gamification elements will incorporate a financial incentive to ensure maximum impact. This may come in the form of active/sustainable travel focused vouchers in partnership with local businesses and transport operators, or cash prizes. o It is important to note that A5 should be implemented as a package of measures (A4, A6) in order to achieve maximum impact.
Potential location(s)	▪ This intervention would incorporate the location maps included in the previous intervention (A4) in terms of targeting the study area, and key residential and business areas within the main study area.

Related interventions	▪ **A4: Information – Publicity Campaigns and Incentives for More Sustainable** Travel – there are several inter-dependencies and the interventions will share the same brand to maximise impact and engagement. ▪ **A6: Information – Personalised Journey Planning** – PJP work may fall under the wider Open Harrogate initiative. There is the opportunity to cross promote measures.
Examples	▪ The use of applications and gamification is an emerging concept in UK transport planning with limited practical examples. Research has shown the concept has promise but further study is needed in the area[1]. ▪ The 'Beat the Street' (Reading) gamification project aimed to encourage people to walk, cycle or run during April and May 2015. Peoples' activity was recorded by logging their journeys by tapping cards against sensors called 'Beat Boxes', 200 of which were located on lamp-posts across Reading. Following the project, 8/10 people thought that Beat the Street helped them be more active (84%), walk more than usual (78%) and feel healthier (78%)[2].
Indicative cost	**LOW**
	▪ Relatively low cost in comparison to many of the other interventions under consideration. Most significant costs would stem from development time on app and website, as well as ongoing maintenance. Development costs would vary based on the level of functionality required.
Indicative timescale	**SHORT**
	▪ There is a short timescale associated with this measure as the Open Harrogate Website, and mobile app, already exist. This intervention pertains to an update and refresh of the website and application. ▪ However, it is noted that further development work and new functionality, particularly relating to gamification measures, may take longer to implement.
Additional info	▪ Existing Open Harrogate website can be found at http://openharrogate.co.uk/

[1] http://portal.research.lu.se/portal/files/38958047/1_s2.0_S2214367X17301643_main.pdf
[2] http://www.intelligenthealth.co.uk/best-foot-forward-for-reading-as-beat-the-street-returns/

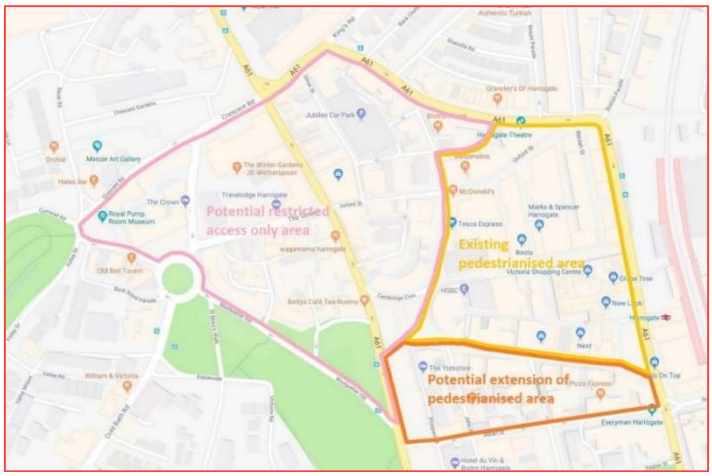
Name	A6 – Information – Personalised Journey Planning (PJP)
Package(s)	**Package B** – Demand management and behavioural change

Description	
	▪ This intervention refers to offering both residents and local employees Personalised Journey Plans (PJP's), which present a range of different travel options for regular trips.
	▪ Personalised Journey Planning (PJP) has been shown to have the potential to reduce the number of trips, for particular journey purposes, made using private motor vehicles (PMV).
	▪ Research shows a typical reduction of between 8% to 12%, for car driver trips, and 5% to 7%, for car driver mode share[3] PJP can also deliver further benefits through increased social inclusion and increased levels of physical activity through use of active modes. Direct exposure of individuals to the travel planning process, through involvement in PJP, was also seen to contribute towards acceptance of other sustainable measures.
	▪ Clear information and advice is provided through the PJP to encourage individuals to consider more sustainable modes including active travel (cycling and walking).
	▪ The use of PJPs in Harrogate could help reduce the number of car trips through modal shift to sustainable modes. This would help reduce impacts of congestion as well as providing benefits to the environment and the general health and wellbeing of the residents, workers and visitors in the town.
	▪ Potential to consider a greater focus on technology in delivery of journey plans in future through various options:
	  ○ A chat based interface could be offered to deliver online travel planning and influence travel decisions. This may be particularly useful in terms of influencing the travel decisions of visitors to Harrogate and Knaresborough.
	  ○ Links could be provided to 'live' online journey plans, which can be accessed through the internet and mobile devices; this would include live condition-based inputs such as congestion, parking and delays.
	▪ It is important to note that A6 should be implemented as a package of measures (A4, A5) to achieve maximum impact.

Potential location(s)	▪ Applies to same geographic area as other information interventions i.e. A4 and A5 in that it targets key residential and business locations within the study area.
Related interventions	▪ **A4: Information - Publicity Campaigns and Incentives for More Sustainable Travel** – It is critical that PJPs would form a component of a wider 'Open Harrogate' style behaviour change programme targeting both residents and businesses. ▪ **A5 – Information – Improved Digital Provision**: PJPs can be promoted through digital channels to maximise uptake and the level of impact.
Examples	▪ A to Better, Norfolk
Indicative cost	**VERY LOW** ▪ This is a relatively low cost measure, the production of PJPs can be out-sourced and are relatively inexpensive to produce. Individuals and businesses to participate could be captured as part of the wider Open Harrogate programme (costs considered separately).

[3] http://www.evidence-project.eu/images/pdf/Personalised_Travel_Planning_In_Depth_Review.pdf

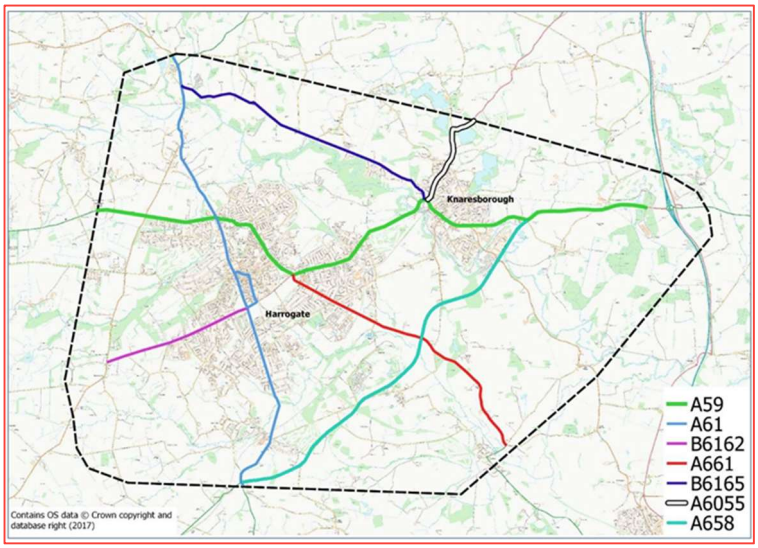
Indicative timescale	**SHORT - MEDIUM** ▪ Due to the relatively simplistic nature of this intervention, it has a short timescale attached – a prolonged programme of delivery may push it into 'Medium' timescales.
Additional info	▪ None

Name	B1 – Demand Management - Extend Pedestrianisation of Harrogate Central Core
Package(s)	▪ Package B – Demand management and behavioural change ▪ Package E - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ This intervention considers an extension to the existing pedestrianised area in central Harrogate. ▪ Consideration of the following would be required: o Servicing arrangements for shops and businesses in hours or out of hours; o Those with special needs (Access for All); o Potential for shared space for cyclists, subject to the outcome of the ongoing DfT review of guidance on shared space; and o Whether exceptions would be made for autonomous vehicles for certain use cases.
Potential location(s)	▪ The areas considered for intervention are those that are currently used extensively by pedestrians, but are heavily dominated by vehicular movements. James Street is a main commercial thoroughfare on the boundary of the existing pedestrianised area but pedestrian movements and footway widths are restricted by on-street parking on both sides of the road. The pedestrianisation of this area would also deliver a significant public realm improvement to the town centre. ▪ The A61 Parliament Street is a busy retail area and forms a significant barrier to pedestrian movements between the town centre retail area and the Montpellier quarter due to northbound A61 traffic. The town centre area can be enhanced by removing through traffic from this road and diverting it along Montpellier Hill and Crescent Road. This area can become a restricted access area, providing limited access to properties and parking. It would also allow public realm improvements to the war memorial area and Montpellier gardens. ▪ An alternative would be to make Parliament Street bus only northbound, so that accessibility to bus services on the west side of the town is maintained and journey time reliability is improved. ▪ The signal controlled junction between the A61 and Crescent Road/Kings Road is also likely to benefit from capacity improvements by the redistribution of traffic from one of the main arms of the junction. Bus detection could also be employed on the approaches, especially if Parliament Street remains open to bus services. ▪ These locations are shown on the plan below: 
Related interventions	▪ **B7: HGV Ban at Peak Times/Loading Restrictions** - This intervention would be complementary to an extension of the pedestrianised area by removing traffic from the

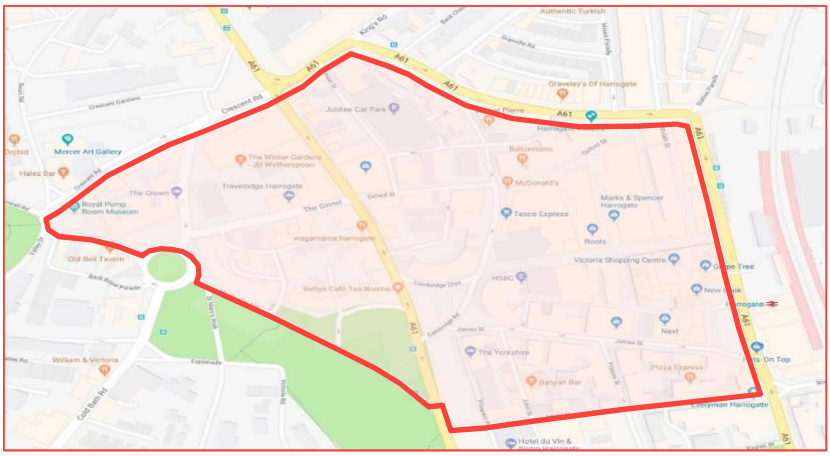
	central core at specific times – the need for access for service vehicles would need to be considered. ▪ **C3: Network Optimisation** - The redistribution of traffic around the Montpellier quarter would require detailed consideration of network operation at the Montpellier roundabout and other junctions along the alternative route, as well as the signal controlled junction between Crescent Road. Kings Road and the A61 Parliament Street/Ripon Road. ▪ **C4: Signal Strategy Review** - The redistribution of traffic, as a result of extended pedestrianisation, would require consideration of town centre traffic signals operation to optimise capacity. ▪ **C5: Reallocation of Road Space** - A reallocation of road space would be required to extend pedestrianisation of particular areas, and road space elsewhere should also be considered as part of this process. ▪ **D1: Area-Wide Car Parking Strategy** - This intervention could provide opportunities for the redistribution of on-street parking spaces. ▪ **E1: Station Gateway Improvements** - This intervention will overlay the Station Gateway proposals. ▪ **E2: Bus Priority on Key Routes** - Parliament Street could become a key bus only route on the approach to the bus station. ▪ **F1: Cycling Infrastructure Plan** - This will be complementary as reallocation of road space along Parliament Street would allow for introduction of a cycle lane.
Examples	▪ York 'Footstreets' ▪ Leeds City Centre – New Briggate aspirations
Indicative cost	**MEDIUM**
	▪ Highway infrastructure changes are likely to be required along with improvements to public realm.
Indicative timescale	**LONG**
	▪ Likely to entail extensive stakeholder consultation. ▪ Possible effects on Stray land will extend the consultation and approvals period (may also impact deliverability).
Additional info	▪ None

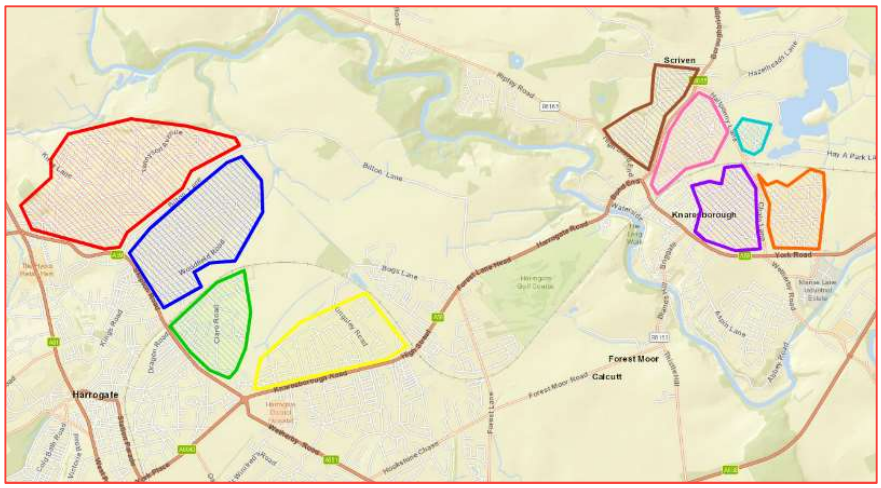
Name	B2 – Demand Management - Traffic Management / Low Emission Zone
Package(s)	▪ **Package B** – Demand management and behavioural change
Description	▪ A low emission zone is an area where restrictions are placed on the type of vehicles that can enter the area based on their air quality emission levels. All vehicles have a Euro emissions rating; the latest and highest rating is the Euro 6 standard and reduces pollutants by 96% compared to the first Euro 1 limits in 1992. Vehicles exceeding pre-determined air quality emission levels are either required to pay a fee to enter or may be banned from the area.  ▪ Traffic management zones (or congestion charge zones) are similar, in that they charge for vehicles entering or travelling within a zone, but are aimed more toward reducing congestion than to improvements in quality. This is usually applied to all vehicles, except some exemptions e.g. public service vehicles. ▪ The areas to be covered can be very localised areas, such as to reduce pollutants in pre-defined air quality management areas such as town centres e.g. Durham, or can be applied to much wider areas e.g. Leeds Clean Air Zone proposals or London low emission zone.
Potential location(s)	▪ The extent of a traffic management or low emission zone for Harrogate and Knaresborough would be defined following a feasibility study on the purpose and aims of implementing a zone. ▪ It would be critical to ensure that the aims and objectives are clear – e.g. improvement to quality of life for those living, working and visiting Harrogate without unduly impacting the economy, reducing congestion or improving air quality. ▪ Exemptions would need to be considered and service access retained.
Related interventions	▪ **A3: Area Wide Signage Strategy** - The introduction of any such zone would require clear signage. ▪ **B1: Extend Pedestrianisation Zone** - Any potential zone would need to complement the pedestrianised area of the town.
Examples	▪ Durham Congestion Charge Scheme. ▪ Leeds Clean Air Zone scheme (currently at feasibility stage).
Indicative cost	**MEDIUM** ▪ Any scheme will require monitoring of entry points to the zone, probably by Automatic number plate recognition (ANPR) cameras, extensive signing, and continued enforcement and payment management.
Indicative timescale	**MEDIUM** ▪ Any scheme that is proposed is likely to require considerable stakeholder consultation before it can be implemented.
Additional info	▪ The uptake of electric vehicles is increasing in Harrogate. Over time this will offset car / van pollution while HGVs will remain. A blended approach will be necessary

	▪ Encouraging EV uptake would need to be considered.

Name	B4 – Demand Management – Area-Wide Travel Planning
Package(s)	▪ **Package B** – Demand management and behavioural change
Description	▪ This intervention relates to a sustainable travel behaviour change campaign, supported by a marketing and communications strategy, which will be targeted at key residential and business locations within the study area. ▪ It should be noted that a similar project is currently being delivered; the North Yorkshire Access Fund 'Open Harrogate' project is being led by North Yorkshire County Council and delivered by WSP. The key aim is to increase the number of people using sustainable travel options with a focus on active travel (cycling and walking). ▪ The Open North Yorkshire (and Open Harrogate) programme incorporates residential, school and business engagement elements, as well as a supporting marketing and communications campaign to raise awareness of the scheme and encourage behaviour change. Specific residential and business areas were targeted for engagement, residential areas were focused on new developments where there may be the greatest potential for achieving behaviour change. ▪ It is envisioned that this intervention would incorporate a continuation and expansion of the current Open Harrogate initiative, with a supporting marketing and communications campaign. Specific initiatives as part of this may include, but are not limited to, the following: o Resident and business travel surveys identifying barriers to more sustainable transport use; o Personalised Journey Planning, Cycle Training and other incentives to enable individuals to consider changing their travel behaviour; o A marketing and communications campaign consisting of both online and offline elements to raise awareness of the project. o Local level competitions and promotions to drive engagement and push individuals to consider their own travel choices. o Consideration of Mobility as a Service, which provides choice and encourages mode shift.
Potential location(s)	▪ Any marketing and communications campaign, and associated incentives and engagement activity, will incorporate the study area (shown below). This will inform the geographic extent of targeted marketing, as well as other activities and incentives. 

Related interventions	▪ **A4: Information – Publicity Campaigns and Incentives for More Sustainable Travel -** Travel planning activity will be supported by the wider Open Harrogate programme and marketing activity. ▪ **A5**: **Information – Improved Digital Provision – Open Harrogate Website and App** – Scope to align with, and incorporate this measure, as part of expansion of Open Harrogate incentives and marketing campaign. ▪ **A6: Information – Personalised Journey Planning** – As above, scope to incorporate this measure, particularly as part of resident and business engagement activities
Examples	▪ Sustainable Travel Towns - Darlington, Peterborough and Worcester ▪ A to Better, Norfolk ▪ Go Smarter, North East
Indicative cost	**MEDIUM** ▪ Potentially low cost initiatives in comparison to other interventions under consideration, as consists of predominantly 'soft' information and marketing measures, rather than infrastructure based interventions. ▪ However, staffing, coordination and potential duration likely to increase costs to 'Medium' band.
Indicative timescale	**MEDIUM** ▪ Short timescale for introduction as current 'Open Harrogate' project could be further expanded with a refreshed marketing campaign and supporting sustainable transport initiatives and engagement activity. In additional, existing collateral could be used. ▪ An ongoing campaign, in order to have an increased impact, would likely increase timescales to 'Medium'.
Additional info	▪ Existing Open Harrogate website can be found at http://openharrogate.co.uk/ ▪ Go Smarter North East Website - http://www.gosmarter.co.uk/

Name	B7 – Demand Management - HGV / Commercial Vehicle Restrictions at Peak Times
Package(s)	▪ **Package B** – Demand management and behavioural change ▪ **Package E** - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ Restricting HGV / commercial vehicle entry, during the busiest times of day, can have a significant impact upon congestion and delay. This is both as a result of removing large, slow, vehicles from key routes in the peak hours while also ensuring that stationary vehicles do not obstruct the carriageway while loading and unloading.
Potential location(s)	▪ The existing restrictions on HGV movements, around Harrogate town centre, correlates with the existing extents of the pedestrianised core. The pedestrianised area restricts movement except for loading between 10:30am and 4pm. ▪ With the potential to expand the pedestrianised area, loading restrictions could be introduced for the same area (shown below), to provide public realm improvements to Harrogate town centre. 
Related interventions	▪ **A3: Area Wide Signage Strategy** - The introduction of extended loading restrictions will require additional signing and will need to be considered as part of any Signage Strategy. ▪ **B1: Extend Pedestrianisation Zone** – Removing commercial traffic from this area at peak times, alongside the introduction of an extended pedestrian zone, has the potential to encourage more trips on foot for shorter journeys.
Indicative cost	**LOW** ▪ The additional costs associated with this intervention relate primarily to the provision of additional signage around the extended areas, and enforcement of the loading restrictions.
Indicative timescale	**MEDIUM** ▪ The requirement for consultation would result in 'Medium' timescales for implementation.
Examples	▪ York 'Footstreets'
Additional info	▪ Out of hours deliveries may require consideration of a logistics strategy, particularly in relation to management of noise.

Name	B8 – Demand Management - Town Centre 20mph Speed Limits/Zones
Package(s)	▪ **Package B** – Demand management and behavioural change ▪ **Package E** - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ This intervention refers to the implementation of 20mph speed limits within specific town centre areas. ▪ The implementation of 20mph speed limits within the town centre could result in both actual and perceived benefits of safety within the town. This could benefit Non-Motorised Users, particularly cyclists, resulting in a modal shift towards sustainable modes of transport. ▪ 20mph zones may be implemented by signage only, or with supporting vertical / horizontal speed reduction measures. It is noted that enforceability may be an issue limiting the potential effectiveness of this measure if based on signage alone – supporting speed reduction measures would contribute to enforcing the reduced speed limit.
Potential location(s)	▪ Areas have been selected based upon current average speeds, and on feasibility, with a focus on 'internal' roads rather than key access roads. Existing speed restrictions have also been considered. ▪ The plan below shows indicative proposed locations for the implementation of a town centre 20mph speed limit zone. ▪ The map highlights broad areas where 20mph speed limits could be more widely implemented. It is noted that some roads within these identified areas already benefit from 20mph speed limits; this intervention relates to a more consistent, wider implementation of 20mph speed limits within the area under analysis. 
Related interventions	▪ **A4: Publicity Campaigns and Incentives for More Sustainable Travel** - Reduced traffic speeds will assist with enhancing the attractiveness of active travel within the study area, due to improved perceptions of safety as a result of lower speeds. This applies to all information provision enhancements under the Open Harrogate initiative. ▪ **C3: Network Optimisation and Signals Strategy** – Reduced average traffic speeds have the potential to contribute to network efficiency. ▪ **F1: Implementation of Cycling Infrastructure Plan** – As above, reduced traffic speeds will contribute to encouraging greater levels of active travel, such as cycling, due to improved perceptions of safety.

Examples	▪ Edinburgh ▪ Bristol ▪ Sherwood, Nottingham
Indicative cost	**LOW - MEDIUM**
	▪ On a basic level this is a relatively low cost measure, which will involve the installation of new signage in the selected areas indicating the extents of the 20mph zone. ▪ It should be noted that the cost band is likely to increase to 'Medium' if physical speed management measures (horizontal or vertical) are to be installed.
Indicative timescale	**MEDIUM**
	▪ The planning process required to enable a change in speed limit within selected locations may take some time to finalise.
Additional info	▪ 'Home Zones' could form a complementary measure to the implementation of 20mph limits. Home zones are residential streets where people and vehicles share the street space safely, and on equal terms; quality of life takes priority over the ease of traffic movements through the area.

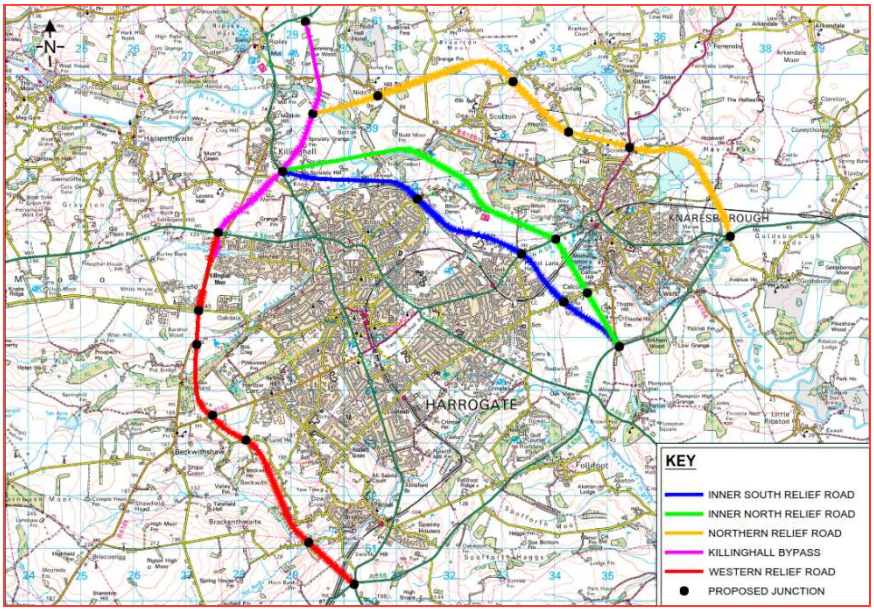
Name	B9 – Demand Management - Car Sharing
Package(s)	▪ **Package B** – Demand management and behavioural change
Description	▪ Car sharing has the potential to significantly reduce the number of vehicles on the road, by combining trips being made to the same destination. ▪ It should be noted that there is an existing car share scheme in operation in Harrogate, but that it does not appear to attract high levels of usage. ▪ Any car share scheme has the potential to operate at two levels: area-wide and site-based. ▪ The area-wide element would be promoted to all residents of the Harrogate and Knaresborough study area with a view to encouraging and facilitating car sharing for a range of trips. ▪ The site-based element would focus on key trip generating sites, such as employment areas, to attempt to gain participation where there is most potential for car sharing. Those employers that operate on a shift basis will be particularly targeted for participating due to large numbers of staff starting and finishing at the same times. ▪ Additional publicity and promotion through the related sustainable transport initiative interventions would potentially increase use. ▪ Further development of the scheme could be to provide dedicated car share parking spaces within public car parks to encourage their use. 
Location	▪ Any car sharing scheme would primarily look to target trips ending within the urban areas of Harrogate and Knaresborough.
Related interventions	▪ **A4/A5/A6: Sustainable Travel Initiatives and Publicity -** Car sharing could be promoted as part of the sustainable travel publicity associated with Open Harrogate, and could form a component of the offering. ▪ **B4: Area Wide Travel Planning –** The promotion of car sharing could be incorporated into this approach to maximise benefits. ▪ **B10: EV Car Clubs** – There is potential for the introduction of a car club to operate alongside a car sharing club. ▪ **D1: Area Wide Parking Review and Strategy**- Any review of parking should include for a review of dedicated car sharing spaces to be made available.
Examples	▪ Liftshare, Norfolk ▪ Nationwide, Swindon ▪ International Examples e.g. North America
Indicative cost	**LOW** ▪ This a relatively low cost intervention. Costs are likely to include the operation and maintenance of website or app to advertise the scheme and allow people find car share

	matches. Other costs could include the provision of car sharing spaces for car sharers on a site-by-site basis.
Indicative timescale	**SHORT**
	▪ This intervention could be implemented relatively quickly as there are 'off the shelf' car share scheme operators and an initiative is already in place in Harrogate, which could be built upon.
Additional info	▪ The extent of the reduction in trips is dependent upon various aspects of the scheme; for example, the implementation scope - site-wide or area wide. ▪ Car share schemes commonly work well in rural areas, where fuel prices are high and distances are long.

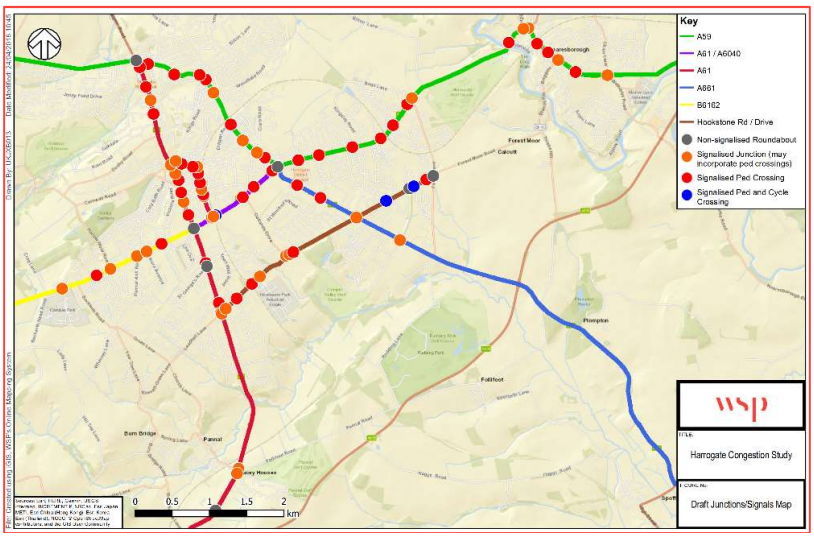
Name	B10 – Demand Management - Car Clubs (Electric Vehicles)
Package(s)	▪ **Package B** – Demand management and behavioural change
Description	▪ As with the car share scheme (B9), any car club could operate at two levels: area-wide and site-based. For both it is recommended that a variety of vehicle types are provided. ▪ The area-wide element would be promoted to all residents and businesses of the Harrogate and Knaresborough area with a view to encouraging and facilitating use for a range of trips. This could be supported by a marketing and promotion element focusing on young people before they purchase their first vehicle with messaging focused around "Why buy a car?" and promoting the benefits of car clubs around cost and convenience.  ▪ The site-based element would focus on key trip generating sites, such as employment areas, where there is an established demand for vehicle trips. This approach could also target employers for using car clubs instead of their own vehicle pools or grey fleet. There is also potential to work more closely with the education sector to bring car club access to staff and the local community. ▪ Car clubs usually have dedicated parking bays on-street and on private land where permitted. This assists with the vehicles having high levels of visibility and accessibility and supporting their usage. However, there are increasing examples where fixed bays are being replaced with the use of local authority operated bays, in order to provide greater levels of flexibility. ▪ This measure can result in many benefits including reduced car ownership and congestion on the local network, and reduced pressure on parking provision.
Potential location(s)	▪ The car club scheme would cover the urban areas of Harrogate and Knaresborough.
Related interventions	▪ **A4/A5/A6**: **Sustainable Travel Initiatives and Publicity** - Car Clubs will form a key component of any extension or enhancement of Open Harrogate, and can be promoted as part of the programme across multiple channels. ▪ **B4: Area Wide Travel Planning –** The promotion of car clubs could be incorporated into this approach to maximise benefits. ▪ **B9: Car Sharing –** Car sharing and car clubs can be promoted jointly and are likely to share the same platform.
Examples	▪ York ▪ Durham ▪ Leeds
Indicative cost	**LOW - MEDIUM** ▪ This a relatively low cost intervention (assuming promotion costs are included within other interventions e.g. Area Wide Travel Planning). Costs could include the operation of website or app to advertise the scheme and allow people find car share matches. Other small costs could include the provision of car sharing spaces for car sharers on a site-by-site basis.

	▪ If a decision was taken to maximise flexibility through the use of LA parking spaces, this would result in a level of lost parking revenue.
Indicative timescale	**SHORT**
	▪ This interventions could be implemented relatively quickly as there are 'off the shelf' car share scheme operators.
Additional info	▪ http://www.co-wheels.org.uk/ (The UK's biggest car club).

Name	B11 – Demand Management - School Travel Plans
Package(s)	▪ **Package B** – Demand management and behavioural change
Description	▪ School travel is perceived to be a significant cause of congestion during the peak periods and therefore a priority area for targeting in terms of demand management. ▪ NYCC would work with all schools in the study area to refresh their existing Travel Plan or create a new one where appropriate. ▪ The Travel Plan measures will be wide-ranging but also appropriate to the individual schools, their environment, pupils and staff. ▪ School Travel Plans provide the opportunity to inform and influence travel behaviour at an early stage. School Travel Plans can integrate with the curriculum to delivery travel planning in an educational and informative manner. 
Potential location(s)	▪ All primary and secondary schools in the Harrogate and Knaresborough area.
Related interventions	▪ **A4/A5/A6: Sustainable Travel Initiatives and Publicity**: Engagement with schools will form a component of a wider package of sustainable travel measures/Open Harrogate. ▪ **B4: Area Wide Travel Planning**: School Travel Plans would form a critical component of area wide travel planning. ▪ **B9: Car Sharing**: As key employers, schools could be targeted as part of any expansion or enhancement of the existing car sharing scheme. ▪ **B10: Car Clubs**: As with B9, schools will be targeted as part of the car clubs option. ▪ **E4: Sustainable Travel Options for New Developments:** Sustainable travel to school will be covered as part of engagement with new residential developments.
Examples	▪ England-wide examples available
Indicative cost	**VERY LOW - LOW** ▪ Travel Plans are a very low cost intervention, with the main costs being related to resources. For the School Travel Plans the resource requirement will be with NYCC and the schools to ensure consistent delivery. ▪ Costs have the potential to increase to 'Low' if implementation of measures / supporting infrastructure is also included.
Indicative timescale	**SHORT - MEDIUM** ▪ School Travel Plans can be quickly developed and implemented, although it may take time to target all of the schools in the area.
Additional info	▪ None

Name	C1 – Highways - Relief Road
Package(s)	▪ **Package E -** Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ The concept of a relief road for Harrogate was first put forward in the 1990s, when initial development work was undertaken to investigate potential options – as shown on the plan above. ▪ While any relief road option would be designed to ultimately relieve traffic flows on the key corridors within the study area, it is recognised that the complex issues experienced within Harrogate will not be adequately addressed by a road in isolation but will need to be part of a mutually supporting package of complementary measures.
Potential location(s)	▪ As with all of the proposed interventions, there has been no detailed design of relief road alignments undertaken as part of this study. ▪ Historically, a number of options for a relief road have been considered. At this early stage of work it was considered appropriate to revisit these options, in order to establish high-level indications of benefits, before undertaking any further development work. ▪ The options that have been considered as part of this study, to date, are shown on the plan below:  ▪ High level appraisal, undertaken as part of the OAR, indicates that the 'Inner' Relief Road options (North and South), with a Killinghall tie-in, are likely to lead to the greatest reductions in traffic flows.
Related interventions	▪ **A3**: **Area Wide Signage Strategy –** A relief road would provide a priority route for vehicles making east-west movements, without the need to use the existing key routes within the study area. The provision of a road for this purpose, if it were to go ahead, would need to be fully incorporated within any Signage Strategy, to ensure maximum benefit. ▪ **C3/C4: Network Optimisation and Signal Strategy** - The introduction of a relief road would reduce traffic on the existing key routes, and would complement improvements to the existing signals network. ▪ **C5: Reallocation of Road Space –** Traffic relief on key corridors has the potential to release sufficient capacity to allow for reallocation of road space for more sustainable modes (buses / cyclists).

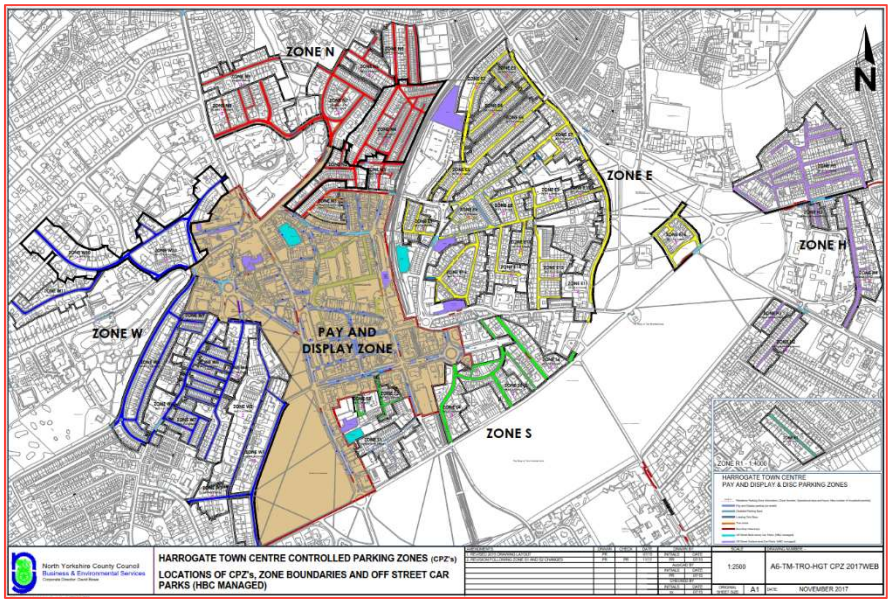
	▪ **D2: Park & Ride –** The introduction of Park and Ride is considered to be more viable when delivered alongside provision of a relief road. Park and Ride services are considered be most attractive to users where there is capacity available to provide bus priority on key routes (linked to E2, below); this capacity would most likely be achieved through reductions in traffic volume as the result of a relief road. ▪ **E2: Bus Priority on Key Routes** – Justification as above
Indicative cost	**VERY HIGH** ▪ The construction costs for a relief road will be very high when compared to any other intervention.
Indicative timescale	**LONG** ▪ The routes to funding, for any potential relief road option, would require the preparation of Outline and Full Business Cases alongside detailed consultation; this would be followed by detailed design and procurement exercises which, would lead to associated timescales being classified as 'Long'.
Examples	▪ A684 Bedale, Aiskew and Leeming Bar Bypass ▪ East Leeds Orbital Route (ELOR) ▪ Worcester Southern Relief Road ▪ Wakefield Eastern Relief Road ▪ Grantham Southern Relief Road
Additional info	▪ A relief road, in isolation, was shown to be the worst performing 'Package' as part of the assessment undertaken for the OAR. This is due to the complex and varied nature of congestion issues within the study area.

Name	C3 / C4 – Highways - Network Optimisation and Area-Wide Signal Strategy Review
Package(s)	▪ **Package B** – Demand management and behavioural change ▪ **Package E** - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ Traffic signals can play a major role in managing traffic flow on a highway network. They can be used for single simple crossing junctions through to complex inter-linked series of junctions. The technology available can react and adapt to changing traffic flow conditions or incidents on the network to maximise highway capacity. It can also be used to prioritise movements through the network, such as providing a 'green wave' for all traffic along a section road or for particular vehicle types as with bus detection. ▪ The traffic signals within Harrogate and Knaresborough would benefit from the installation of an Urban Traffic Control SCOOT (Split, Cycle and Offset Optimisation Technique) system to manage the interaction between the various signals installations and to maximise their potential. This would allow some improvement in the coordination between the sets of signals to maximise the highway capacity and reduce delay on the network. ▪ Further development could also see the installation of a UTMC (Urban Traffic Management and Control) system, allowing disparate data from, say traffic signals, car parks, air quality monitoring stations, variable message signs, real time travel information etc. to be amalgamated and shared between the systems to maximise road network potential. This can be further enriched by the 'Connected Vehicle Agenda' – understanding where vehicles are on the network can contribute significantly to optimisation and management of capacity. ▪ Traffic signals can also be used to 'gate' traffic into congested areas, effectively limiting the flow of traffic to the available capacity and reducing the build-up of stationary traffic in sensitive areas, or where blocking back across junctions impedes other traffic flows. Implementation of traffic signals schemes at existing roundabouts, where these conditions regularly occur, could have safety and accessibility benefits as well resulting in downstream network improvements.
Potential location(s)	▪ This intervention, in terms of a Strategy, would be area wide. There are some locations in the study area where improvements could potentially be made to the existing network to optimise the performance. Most of these locations relate to the existing traffic signals locations (shown on the plan below), but there are also some additional opportunities that relate to specific issues on the network. 

Related interventions	▪ **A1: Variable Message Signs** - VMS could be complementary to a signals strategy if a UTMC were to be introduced. ▪ **E2: Bus Priority on Key Routes** - Traffic signals could be used to provide a measure of bus priority at key locations. ▪ **F1: Cycling Infrastructure Plan** - It is likely that any development of cycle routes within the study area will include crossings, which may entail new or amended crossing facilities to aid cyclist movements.
Examples	▪ Preston UTMC ▪ Glasgow SCOOT
Indicative cost	**HIGH** ▪ The cost for development and implementation of a signals strategy is likely to be medium to high, depending on the level of intervention that is recommended. The inclusion of a UTC/UTMC system to manage all the signals in the study area will add significant cost when compared to altering the existing signals operation.
Indicative timescale	**MEDIUM** ▪ It is considered that minor changes to the operation of the existing signals could be conducted relatively quickly, but new signals installations and the possible introduction of a UTC/UTMC system will extend delivery time.
Additional info	▪ As part of this Further Option Development work interventions C3 and C4 have been combined. As further work was undertaken it became clear that the key to delivering network optimisation (C3) would be through a traffic signals strategy (C4); as such, it was not considered appropriate to separate these interventions.

Name	C5 – Highways – Reallocation of Road Space
Package(s)	▪ **Package B** – Demand management and behavioural change ▪ **Package E** - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ Reallocating road space to other users, such as cyclists and public transport, has the potential to contribute significantly to mode shift by assigning priority to vehicles other than the private car. ▪ This intervention considers reallocating some of the existing highway network to serve particular users or movements to better serve the aims and objectives of the study area. ▪ It is likely to be dependent on the implementation of other interventions or strategies that will allow the reallocation to take place. 
Potential location(s)	▪ A parking strategy for Harrogate and Knaresborough could potentially allow space currently allocated for on-street parking to be used for other purposes, such as on-road cycle lane provision or additional footway widths or public realm improvements. ▪ The development of the Cycling Infrastructure Plan has identified five comprehensive cycle routes, which are currently being investigated in more detail. It is likely that sections of the A59 Knaresborough Road and A59 Skipton Road will require some reallocation of road space to provide the cycle facilities required. ▪ The potential to extend the pedestrianised area into the Montpellier quarter could allow substantial reallocation of road space around the Cenotaph to public realm space, and improve the retail environment along Parliament Street to be less dominated by vehicular traffic. The existing highway along Parliament Street could become a bus and cycle only link. This intervention would also see James Street and its side roads transformed to a pedestrian only environment. ▪ Station Parade and Cheltenham Parade are currently being studied to provide a gateway to the town centre from the public transport interchange at the rail station and to reduce the severance effect of Station Parade between the town centre and the east side of the town. This may allow existing highway space to be used for cyclists and to improve pedestrian provision. ▪ The potential to reallocate existing highway space to other highway users will result if the relief road intervention is realised. This is likely to be seen along the main transport radial routes of the A61, A661 and A59.
Related interventions	▪ **B1: Extend Pedestrianised Area** – Road space will need to be re-allocated to enable wider pedestrianisation and, as such, these two interventions are complementary to, and largely dependent upon, one another. ▪ **C1: Relief Road** – A relief road would free up capacity on the key routes within the study area, which will facilitate a reallocation of road space. ▪ **C3/C4: Network Optimisation and Signals Strategy** – Changes to signals may be needed to facilitate re-allocation of road space. ▪ **D1: Area Wide Car Parking Review and Strategy** – If car parking is reduced in any areas this may open up new opportunities for reallocation of this space and surrounding access roads. ▪ **D2**: **Park and Ride:** Park and Ride is most likely to be feasible if road space can be reallocated to assign priority to buses over the private vehicle.

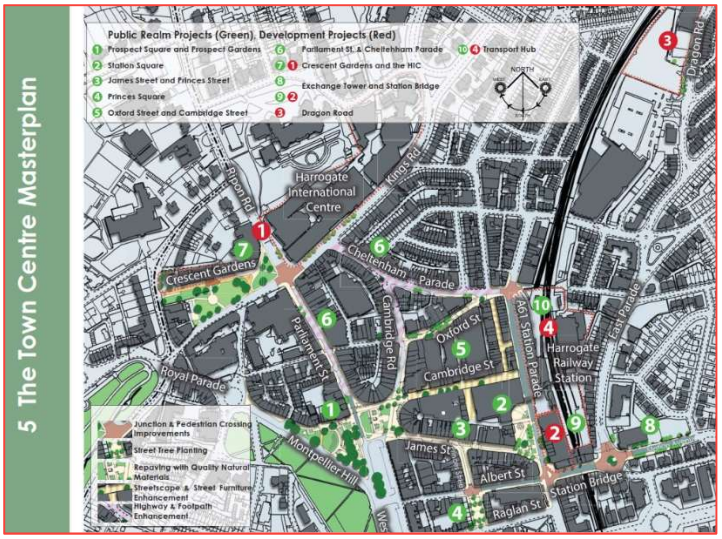
	▪ **E1: Bus/Rail Interchange Development and Public Realm Improvements** – In order to enable public realm improvements it may be necessary to re-allocate road space. ▪ **E2: Bus Priority on Key Routes** – The effectiveness of bus priority measures would be enhanced through reallocation of road space, to provide buses with priority and ease of access. ▪ **F1: Implementation of Cycling Infrastructure Plan** – Dependent on the specific nature of measures included in the plan, it may be necessary to re-allocate road space to allow for the construction of dedicate cycle lanes in some locations.
Examples of intervention	▪ Leeds Public Transport Improvement Programme – however, it is likely that the relief road intervention will unlock the capacity within the existing highway network to achieve the aims of this intervention so any findings may not be applicable.
Indicative Cost	**LOW - MEDIUM** ▪ It is envisaged that this intervention will primarily be considering prioritising the use of some parts of the existing highway to serve a particular purpose e.g. creation of a cycle route by removing on-street parking. Consequently, construction costs are likely to be low. ▪ Costs may escalate if bus priority is determined to be feasible.
Indicative timescale	**MEDIUM - LONG** ▪ Timescales are likely to be 'Medium' – 'Long', due to the level of consultation required to implement any changes.
Additional info	▪ This intervention was added in to Package E following the review of the Shortlist and Packaging.

Option Name	D1 – Area-Wide Parking Review and Strategy
Package(s)	▪ **Package B** – Demand management and behavioural change ▪ **Package E** - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ Parking availability and supply within and around Harrogate town centre contributes to the level of traffic movements around the town centre. Harrogate has seen changes to its retail and leisure offer, with new development potentially shifting parking demand. With an emerging Local Plan, changing consumer expectations/ habits, a competitive business tourism sector and other development projects there is an opportunity to enhance/modify car parking to support strategic priorities. ▪ There is a growing perception that the amount/location of on-street parking in Harrogate detracts from its built/natural environment and restricts opportunities to enhance the public realm. It is also considered that kerb space and deliveries contribute to this. An integrated review would consider all these factors – focusing on people, place and activity to achieve better outcomes ▪ The Harrogate Town Centre Masterplan states that together with the County Council and town centre stakeholders, the Borough Council should review the on-street and off-street parking regime within the town centre. ▪ A parking review would consider how the existing parking provision is used, the suitability of the provision, future parking demand, and will work towards improving traffic management, enhancing the built/natural environment, supporting the local visitor economy, and promoting sustainable travel initiatives.
Potential location(s)	▪ Parking is provided in three forms: off-street parking in car parks, on-street pay and display parking primarily around the town centre area, and a disc zone parking provision in residential areas outside the pay and display zone. These are shown on the plan below.  ▪ Any review, and subsequent Strategy, would consider the study area, with a focus on the urban centres.
Related interventions	▪ **A1: Variable Message Signs** – VMS will be complementary to a parking strategy, due to the potential to provide real time car park availability information.

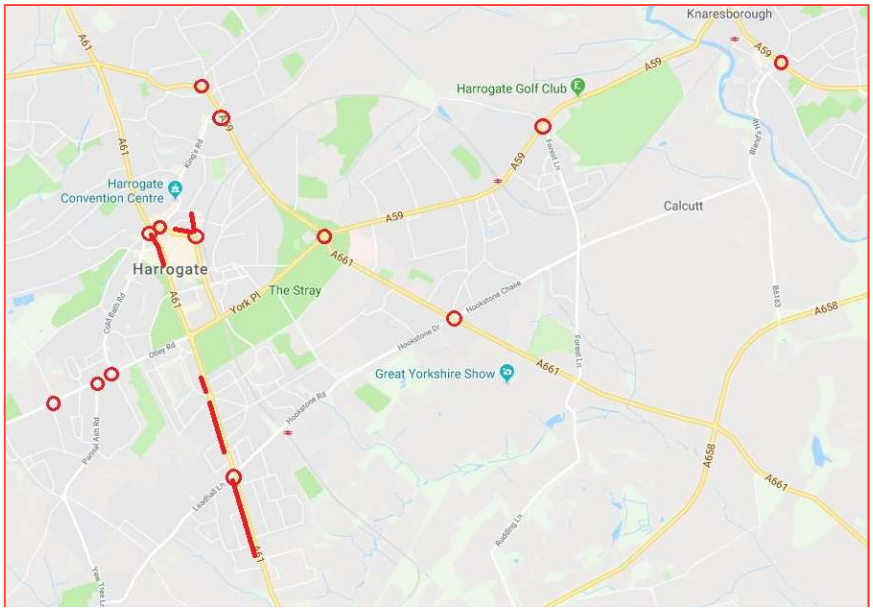
	▪ **B1: Extend Pedestrianisation Zone** – This intervention is likely to impact the existing provision of parking around the town centre. ▪ **D2 Park and Ride –** The introduction of Park & Ride would need to be underpinned by the findings and outcomes of any parking review and, if considered viable, would need to be an intrinsic part of any Strategy.
Examples	▪ Warwick District Car Park Strategy 2018-2028 ▪ Winchester District Car Parking Strategy 2014 - 2018
Indicative cost	**LOW - MEDIUM** ▪ It is considered that an initial review and Strategy development will be Low cost; any subsequent changes to parking provision, as a result of this review, may require infrastructure costs which would likely increase this to Medium. ▪ This excludes consideration of any costs associated with Park & Ride implementation.
Indicative timescale	**SHORT - MEDIUM** ▪ It is considered that an initial parking review, and Strategy development could be undertaken to Short timescales. However, changes to the parking regime is likely to result in extensive stakeholder consultation, and may require additional infrastructure provision, which could extend timescales to Medium term or even Long term if Park and Ride (D2) were to be implemented.
Additional info	▪ Longer term, parking needs may go down as a result of shared mobility solutions and autonomous vehicles – although this may be some time away.

Name	D2 – Park and Ride
Package(s)	▪ **Package E** - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ Park & Ride has the potential to reduce trips on the internal highway network, and on key routes, by providing an integrated travel solution for those travelling longer distances. 
Potential location(s)	▪ The locations previously identified, as part of a 2012 study by Jacobs, as having the potential to support a P&R site are: o A59; o A661 Wetherby Road; and o Dunlopillo (Pannal). ▪ It is considered that P&R is most feasible if based upon using an existing bus service, the most obvious service being the 36 running along the A61, rather than provision of specific bus services. However, the A661 Wetherby Road may prove to be a more attractive corridor, particularly alongside the introduction of a relief road which would free up capacity on the route which could be utilised for bus priority.
Related interventions	▪ **C1: Relief Road** – A relief road is considered to be fundamental to the introduction of Park and Ride in Harrogate. Without the release in capacity on the existing highway network, as a result of a relief road, any P&R service is likely to be unattractive to potential users. ▪ **C5: Reallocation of Road Space** - Reallocating road space to provide dedicated facilities for bus services to support a P&R service is likely to be critical to its success. ▪ **D1 Area Wide Parking Strategy** – Any Parking Strategy would need to consider the potential for P&R, although likely to only be viable within Package E, due to the relief road impact. Decisions on parking regimes within the town would need to be such as to encourage use of a P&R site further from the centre. ▪ **E2 Bus Priority on Key Routes** - This intervention is considered fundamental to providing a P&R service as bus priority along the service route(s) and improved journey times will provide the attraction to use the service.
Examples	▪ Durham ▪ York
Indicative cost	**HIGH** ▪ It is anticipated that the cost will be high as land acquisition will be required to accommodate parking, and highway improvements will be required to support the service provision.
Indicative timescale	**LONG** ▪ As the provision of a relief road intervention is fundamental to this intervention, delivery time would be long.

Additional info	▪ This intervention was added in to Package E following the review of the Shortlist and Packaging. ▪ There have been previous studies undertaken for North Yorkshire looking at the viability of providing Park & Ride services within the study area. Overall, no strong case has previously been made for P&R in Harrogate. ▪ Qualitatively it has been considered attractive as part of an integrated strategy but analysis has suggested that the take up will probably not justify the costs, unless combined with strong parking measures in the town centre. ▪ However, the following should be noted: o Previous analysis has considered capital and revenue costs and income, and there appears to have been no consideration of wider social costs and benefits which current guidance would require. o None of the analysis has considered P&R in the context of a properly constructed Parking Strategy for Harrogate. ▪ A Parking Strategy for Harrogate is one of the options identified for detailed consideration. As part of this it is recommended that analysis, similar to that undertaken previously, should be undertaken using data from the updated model and using parking assumptions based upon any proposed Strategy.

Name	E1 – Public Transport – Bus/Rail Interchange Development and Public Realm Improvements
Packages	▪ **Package B** – Demand management and behavioural change ▪ **Package E** - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ The public transport interchange area on Station Parade forms an essential link in the Masterplan for Harrogate Town Centre. ▪ The Transport Hub refers to the area to the east of Station Parade incorporating the railway station and associated operational land, the bus station, a small public car park, and the Harrogate Tap public house. The existing layout and appearance of these facilities has long been identified as being in need of improvement. The railway station itself provides a poor gateway to Harrogate with limited facilities, and there is scope to improve the integration of the railway, bus station, facilities for cyclists, taxi services and the large multi-storey Victoria car park. ▪ The key principles for the future redevelopment of the Transport Hub in order to demonstrate how the future redevelopment of this site will contribute to the wider strategy for the town centre are: o Improved booking hall facilities to the railway station providing new retail and food and drink units; o The retention of the historic building currently occupied by the Harrogate Tap; o The improvement of links between the bus station and railway station to encourage and ease modal transfer; o Maintaining access to the Victoria car park and integrating it with other transport facilities; o New drop-off and dedicated taxi facilities, exploring potential opportunities to incorporate these on land to the east of the railway line; o Improved facilities providing cycle parking and offering cycle hire facilities for visitors; o New office and/or residential accommodation at upper floors; and o Public realm improvements to Station Parade, including enhanced links to, and an improved outlook from, Cambridge Street.
Potential location(s)	▪ The Masterplan for Harrogate Town Centre, as described above, is shown in the plan below: 

Related interventions	▪ **A4/A5/A6: Sustainable Travel Initiatives and Publicity** – Any interchange improvements could be communicated as part of the sustainable transport initiatives and supporting promotional activity. ▪ **B1: Extend Pedestrianisation Zone** – Further pedestrianisation may be required to enable the implementation of this intervention. ▪ **B2: Traffic Management / Low Emission Zone** – Enhanced traffic management or a low emission zone may be a complementary measure as it has to capacity to further enhance the public realm and interchange access. ▪ **B7: HGV Ban at Peak Times / Loading Restrictions** – A HGV ban would contribute to enhancing the public realm and interchange access. ▪ **C5: Reallocation of Road Space** – Reallocation of road space may be required to underpin the public realm improvements. ▪ **D1: Parking Review** – Parking availability may need to be modified to support public realm improvements and enhance access to interchanges. ▪ **D2: Park and Ride** – Park and Ride should be considered as part of any changes to bus/rail interchanges. ▪ **E2: Bus Priority on Key Routes** – Bus priority would act as a complementary measure providing enhanced public transport accessibility to bus/rail interchanges and encouraging greater take up of public transport use.
Examples	▪ Leeds City Station Regeneration ▪ Sheffield Midland Station Gateway Project
Indicative Cost	**HIGH** ▪ This intervention will provide a key public realm improvement and will create a visible entrance to the town centre. This is likely to require high quality treatment.
Indicative timescale	**MEDIUM** ▪ As a town centre masterplan covering this area is already adopted the planning process should allow for the intervention to be completed with a medium timescale.
Additional info	▪ Intervention G1: Public Realm Improvements has been removed from the process as it is considered to be encapsulated within this intervention.

Name	E2 – Public Transport – Bus Priority on Key Routes
Package(s)	▪ **Package E** - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ The provision of bus lanes on the existing highway network is restricted by the need to maintain capacity for other vehicles and by the restrictions of land governed by The Stray Act 1985. This effectively limits the provision that can be made along much of the A661 and the A59. ▪ However, other interventions could create opportunities to provide sections of bus priority.
Potential location(s)	▪ The potential reduction of traffic on existing approaches to Harrogate town centre if the relief road is realised could allow existing highway capacity to be used to provide priority for bus services, which may also generate a positive attraction for park and ride facilities. ▪ The potential to extend the pedestrian zone to include the Montpellier quarter could give rise for Parliament Street to be made a bus and cycle only link, creating a better approach to the bus station. ▪ The public realm improvements included in the town centre masterplan for the Station Parade and public transport interchange area has the potential to allow bus priority along Station Parade and Cheltenham Parade on the approach to the bus station. ▪ There is the potential for providing bus priority at some of the many sets of traffic signals in the study area. The technology contained within the controllers for the signals allows for bus detection and small alterations to the signals plans to allow hurry calls or extended green times to minimise delay to services. It is also possible to create 'green waves' along a section of road or closely spaced signals to reduce delay. ▪ The map below shows the locations where bus priority may be possible and would benefit services and passengers. The circles represent junctions where traffic signals technology could be used to minimise delay to services. The lines represent lengths of carriageway where it may be possible to introduce sections of bus lane. 
Related interventions	▪ **B1: Extend Pedestrianised Area** - This intervention will facilitate a potential bus only link along Parliament Street. ▪ **C1: Relief Road** - This intervention is likely to be fundamental in freeing highway capacity that could be utilised by bus priority techniques and infrastructure.

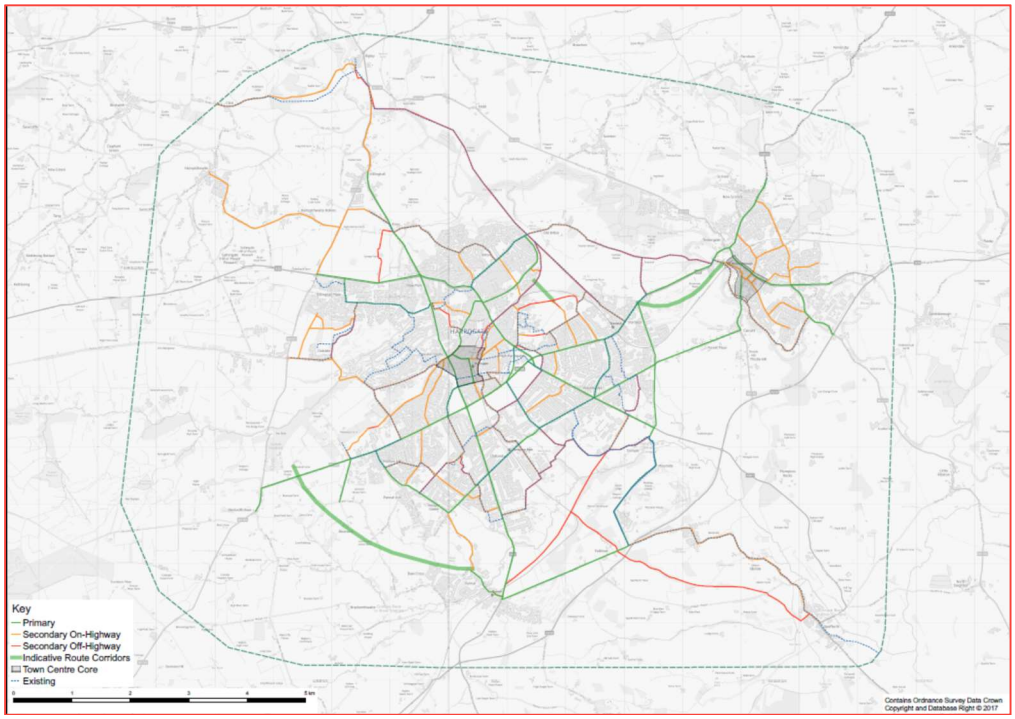
	▪ **C3 / C4: Network Optimisation / Signals Strategy** - The use of signals technology, such as bus detection, will be important in providing priority for buses and will need to be incorporated into any signals strategy. ▪ **C5: Reallocation of Road Space** - This intervention is likely to only be applicable from the release of capacity on the existing highway network as a result of the potential relief road intervention. ▪ **D2: Park and Ride** - The provision of bus priority would support P&R and would likely be critical to its success. ▪ **E1: Bus/Rail Interchange and Public Realm Improvements** – Bus priority would encourage mode shift and support the improvements being made within Harrogate itself.
Examples	▪ York
Indicative cost	**MEDIUM**
	▪ It is envisaged that bus priority could be provided on parts of the network with minimal changes to the existing carriageway, but would be dependent on the benefits accrued on the existing highway network from provision of a relief road.
Indicative timescale	**LONG**
	▪ Because this intervention would rely on the provision of a relief road, the majority of bus priority that could be provided could not be realised until the relief road is built.
Additional info	▪ This intervention was added in to Package E following the review of the Shortlist and Packaging.

Option Name	E4 – Sustainable Transport Options at New Developments
Package(s)	▪ **Package B** – Demand management and behavioural change
Description	▪ Travel Planning measures, targeted at new developments has the potential to alter behaviour at a key transition point (e.g. moving home, starting a new job) prior to habits being formed. ▪ The opportunity to provide sustainable transport options will lie in the planning process. In terms of infrastructure, the appropriate interventions or contributions would need to be agreed with the developer, for example, walking and cycling infrastructure. ▪ In terms of non-infrastructure, a Travel Plan should be enforced through the planning process that the developer has to create and implement. The Travel plan will require close support and monitoring by NYCC to ensure effectiveness.
Potential location(s)	▪ All significant new developments within the study area.
Related interventions	▪ **A4/A5/A6: Sustainable Travel Initiatives and Publicity** – Promoting sustainable transport options at new developments will form a component of the wider engagement programme associated with Open Harrogate. ▪ **B4: Area Wide Travel Planning** – Travel planning specifically at new development will form a component of the wider area travel planning measure. ▪ **B9: Car Sharing** – Car sharing will be promoted to residents as a more sustainable option for travel to work. ▪ **B10: Car Clubs (EVs)** – Car clubs will be promoted to residents as part of this intervention.
Examples	▪ UK-wide examples available
Indicative cost	**LOW** ▪ The infrastructure improvement costs are not likely to be significant, with some walking and cycling infrastructure being an inherent part of the design of a new development e.g. filtered permeability and slow vehicle speeds. ▪ The development and delivery of a Travel Plan is also a relatively low cost intervention. For the local authority the costs are covered through planning contributions.
Indicative timescale	**LONG** ▪ Based on the Local Plan timescales, this intervention covers the full timescale range as it applies to developments that come forward from the present time to the end of the Local Plan period.
Additional info	▪ None

Option Name	E11 – Public Transport – Improved Access to Rail Stations
Package(s)	▪ **Package B** – Demand management and behavioural change ▪ **Package E** - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ Improving access to rail stations could encourage more rail travel to/from Harrogate and Knaresborough which in turn could reduce traffic congestion and its associated adverse impacts in the town by removing vehicle trips. Improved access for NMUs can help reduce car travel to/from the stations ▪ This intervention may include improved NMU access, footbridges, lifts, cycle storage facilities, accessibility improvements, signage and wayfinding.
Potential location(s)	▪ The specific proposed improvements for each of the stations under analysis are summarised below: ○ **Harrogate** The development of options to enhance accessibility to Harrogate station have not been examined as part of this work. It is noted that there is ongoing work as part of the 'Station Gateway' project which includes measures focused on improving station access across multiple modes. ○ **Knaresborough** Improved signage particularly on High St, public realm improvements on Station Rd with potential for enhanced provision for pedestrians and cyclists, increase in cycle parking and installation of lift. ○ **Hornbeam Park** Possible extension of dedicated cycle and footways providing access to station from Hornbeam Park Ave, increase in number of cycle lockers, potential for additional parking bays or installation of EV charging bays to encourage greater EV usage. ○ **Pannal** Increase in cycle racks, improved signage on Pannal Bank/Station Rd, potential for improved NMU access through a new signalised crossing near station in conjunction with public realm improvements, may be scope to increase parking provision as a key 'park and rail' site as well as installation of EV charging bays. ○ **Starbeck** Increase in cycle lockers and stands, improved signage on High St, potential to convert existing island crossing near station into a dedicated pedestrian and cyclist crossing ▪ The map shows the locations of the key stations considered, as set out above. 
Related interventions	▪ **C4: Area Wide Signal Strategy** – Some proposed changes may incorporate modifications to signals. ▪ **D1: Area Wide Review of Car Parking Management** – Car parking at stations would need to be considered as part of this intervention.

	▪ **F1: Cycling Infrastructure Plan** – Improvements for cyclist access to stations would be aligned with an infrastructure plan.
Examples	▪ Sheffield Midland Station Gateway Project
Indicative cost	**MEDIUM - HIGH**
	▪ This intervention contains multiple components and, as such, the cost varies based on the nature and complexity associated with implementing the respective component. ▪ Overall, as a package, the Indicative cost has been deemed as 'Medium' to 'High' as it involves physical infrastructure changes and enhancements of varying scale.
Indicative timescale	**MEDIUM**
	▪ Assigned a 'Medium' timescale as some components may take longer to implement, particularly 'harder' infrastructure measures such as cycleways or public realm improvements. Again, this will vary depending on the final package of measures.
Additional info	▪ National Rail Station profiles used to obtain information on facilities.

Option Name	F1 – Implementation of Cycling Infrastructure Plan for Harrogate, Knaresborough and Surrounding Area
Package(s)	▪ **Package B** – Demand management and behavioural change ▪ **Package E** - Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Description	▪ The Harrogate Cycling Infrastructure Plan (HCIP) was developed by WSP on behalf of NYCC, as part of the Open Harrogate project, in order to establish a number of 'bid ready' cycle schemes for when funding opportunities arise. ▪ Phase 1 of HCIP was to develop a cycling network that served current and future trip generators across the area. Phase 1 included several stakeholder engagement workshops and utilised emerging DfT tool, such as the Propensity to Cycle Tool. ▪ The purpose of Phase 1 was to develop a long-term (20-30 year) vision for a cycle network in the area that the Council and partners can work towards delivery as and when opportunities arise. ▪ The output of Phase 1 was a network plan showing primary and secondary links.
Potential location(s)	▪ Following Phase 1 NYCC instructed WSP to look at four priority corridors that emerged following the stakeholder engagement and the Phase 1 data. ▪ Five corridors were taken forward in total, however, the Harrogate to Knaresborough corridor had already been progressed by HBC so was not included in the current Phase 2 work. The corridors are: 1. Harrogate to Knaresborough 2. Bilton to Starbeck 3. Bilton to Hornbeam Park 4. Jennyfield to Harrogate Town Centre 5. Hornbeam Park to Starbeck ▪ The HCIP network is set out below:

	
Related interventions	▪ **B1: Extend Pedestrianisation Zone** – An extension to pedestrianised areas could be complementary to this intervention through freeing up more space for cycling infrastructure. ▪ **B8: 20mph Speed Limits / Zones** - The implementation of 20mph limits is likely to enhance the attractiveness of cycling and enhance NMU road safety. ▪ **C1: Relief Road** – The relief road would reduce traffic within central, congested areas, which will result in a more attractive environment for cyclists and other NMU's and may open up opportunities for more cycling infrastructure. ▪ **C5: Reallocation of Road Space** – Reallocation of road space may be required in some location to enable the implementation of the Infrastructure Plan. ▪ **D1: Area-Wide Car Parking Strategy** – Changes to parking provision may be complementary and should consider provision of cycle storage facilities. ▪ **E4: Sustainable Travel Options for New Developments** – Cycling infrastructure enhancements can be promoted to residents, and any significant modal transition to cycling at new developments is dependent on good quality infrastructure.
Examples	▪ A comprehensive, high quality cycle network for an urban area the size of Harrogate and Knaresborough is not comparable with any existing towns in the UK. ▪ Greater London and the principal UK cities such as Birmingham, Manchester and Leeds are implementing cycle networks of this nature with the first interventions being constructed in the last 4-5 years. ▪ Examples of high quality cycle infrastructure along the lines of what is envisioned for the area include: o Wilmslow Road cycle way (Manchester) o Leeds-Bradford cycle superhighway o A34/A38 cycle routes (Birmingham) o East-West cycle superhighway (London) o Quietways (London)

Indicative cost	**HIGH**
	▪ It is considered that the cost of implementing the 5 routes is likely to be high, especially as some pass along key traffic corridors.
Indicative timescale	**MEDIUM**
	▪ Timescales likely to be 'Medium', due to the need to secure funding and uncertainty around when this could come forward, while considering that the current work to get schemes bid-ready will facilitate the process.
Additional info	▪ None

Appendix G

APPROACH TO APPRAISAL TABLE

INTERVENTION IMPACT APPRAISAL SUMMARY

This note sets out how the interventions, within the currently proposed packages B and E, are to be appraised, in order to more effectively establish the potential impact they could have on both the current and future issues within Harrogate and Knaresborough.

The different package elements, if all delivered, could result in a combined impact greater than estimated, or, it is possible that the impacts experienced would be less if the same individuals are those changing behaviours. The following assumptions have been made for the purposes of this early stage appraisal:

- All changes in the traffic model have been treated separately for the appraisal of package B and package E;
- Changes applied for the Active Mode Appraisal of package B:
    - Uplifts have been treated separately for the appraisal of: A7, B11, E4, E1b/E11b (Knaresborough), F1, B8a and B8b; and
    - A single uplift value has been applied to account for the combined impact, of the following interventions, on Harrogate town centre: B1a, B1b, B2, C3/4, C5, E1a:
        - Walking – Core 30%, High 45%, Low 10%
        - Cycling – Core 15%, High 25%, Low 5%
- Changes applied for the Active Mode Appraisal of package E:
    - Uplifts have been treated separately, and applied cumulatively, in the appraisal of: E1b/E11b (Knaresborough), F1, B8a and B8b; and
    - A single uplift value has been applied to account for the combined impact, of the following interventions, on Harrogate town centre: B1a, B1b, C1, C3/4, C5, E1a:
        - Walking – Core 30%, High 45%, Low 10%
        - Cycling – Core 15%, High 25%, Low 5%

For the purposes of the Active Mode Appraisal, an opening year of 2025 has been assumed and used as the base year for the 20 year appraisal period of all of the AMA applicable interventions; this ensures that the level of benefit they could potentially achieve is determined on a consistent basis in order for conclusions to be drawn.

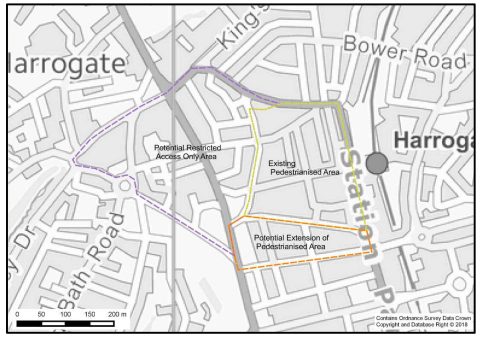
For the traffic modelling, two forecast years are required to undertake economic analysis of a project of this scale using modelling software. Although the package approach means that it is likely that interventions would be delivered to different timescales, for the purposes of this appraisal it is necessary to have consistent appraisal years; these have been agreed as follows:

- 2025 – Possible “Opening” year of interventions; and
- 2040 – Future “Design” year, consistent with the Local Plan period.

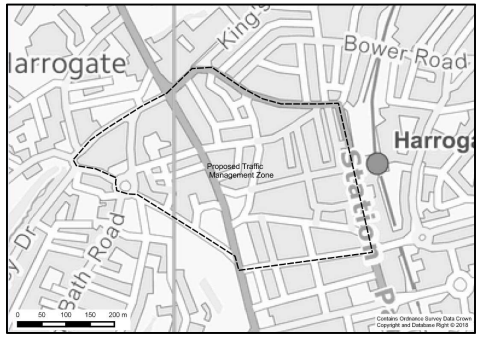
Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
A1: Variable Message Signage	B & E	▪ The base intervention would be deployment of Variable Messaging Signage (VMS) technology to inform travellers of up-to-date, real and predictive information in order to influence behaviour and route decisions. Key information could include events, disruption, congestion, incidents and road closures. ▪ Assumed that VMS implemented in the following locations: o A59 Skipton Road - Key access road into Harrogate located to North West extent of study area. o A61 Ripley - A61 near Ripley to the north of the study area o A1 / A59 to Knaresborough - Key access route to both Harrogate and Knaresborough connecting with the Strategic Road Network through the A1 o A61 / Swindon Lane - Connects with roundabout linking with key access route to Harrogate (A61) o A661 Wetherby Road - Near-to junction with A658 providing access into central Harrogate o A658 Harrogate Road - Near-by A658/A61 roundabout, key route providing access to study area from the south/Bradford o A6055 Hazel Bank - Ahead of turn-off for Farham Lane.	Y	N	N	N	N/A	N/A	N/A

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
A2: Real Time Info	B & E	▪ Real Time Information Displays at bus stops ▪ Assumes technology (both on buses and apps) will be progressed by others ▪ To be applied at all stops on A661 and A59 routes	Y	N	N	N	N/A	N/A	N/A
A3: Signage strategy	B & E	▪ The Signage Strategy will cover the entire study area ▪ It will only include fixed signs for all highway users. ▪ It will include improvement and rationalisation of signage	Y	N	N	N	N/A	N/A	N/A

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
A7: Area wide behaviour change package including: B4: Area wide travel plans A4: Publicity campaign A5: Website & app A6: Personalised journey planning	B	▪ A package of measures focused on increasing sustainable transport use and reducing single occupancy car use will be implemented. ▪ The programme will cover the entire study area for a period of 5 years. The benefits realised through the programme will be maintained due to the cultural and behavioural shift and the improved facilities for sustainable travel use.	Y	Y	Y	Y	Uplift applied across active mode users in the built-up area of Harrogate and Knaresborough: **Walking** – Core 10%, High 15%, Low 5% **Cycling** – Core 20%, High 30%, Low 10% (Uplifts based on Sustainable Travel Towns findings)	N/A (Model Demand Changes only)	A reduction of 10% applied to all car trips with an origin and destination within Harrogate and Knaresborough urban areas (Reductions based on Sustainable Travel Towns findings)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
B1a: Extend pedestrian zone	B & E	▪ The extension to the pedestrian zone is assumed to involve closures and higher-cost areas of public realm enhancement. ▪ For purposes of assessment it is assumed pedestrianisation would include the area (as shown on the plan below) covering James Street and the roads linking to Albert Street (i.e. Prospect Place, John Street and Princes Street). Albert Street and the A61 which form the boundary of the extended zone would not form part of the pedestrianised zone. 	Y	Y	Y	Y	Included as part of a Harrogate Town Centre Package of improvements with a value to account for combined impact on Harrogate town centre: **Walking** – Core 30%, High 45%, Low 10% **Cycling –** Core 15%, High 25%, Low 5% (Uplifts based on evidence ranges of around 30%-160% footfall increases)	Model network changes to consist of closure of links to ban vehicles on James Street and relevant sections of Prospect Place, John Street and Princes Street that connect to Albert Street.	N/A (Model Network changes only)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
B1b: Restricted access within town centre core	B & E	▪ Restricted access assumed to include a range of low-cost closures in access to vehicle traffic and higher-cost areas of public realm. ▪ For purposes of assessment it is assumed restricted access will be applied to area inside Montpellier Hill, Crescent Road, A61 and Cambridge Road as per the plan shown in B1a ▪ The restrictions will include making Parliament Street northbound only for buses with one-way routes assigned to the other routes within the area.	Y	Y	Y	Y	Included as part of a Harrogate Town Centre Package of improvements with a value to account for combined impact on Harrogate town centre: **Walking** – Core 30%, High 45%, Low 10% **Cycling –** Core 15%, High 25%, Low 5% (Uplift based on uplifts found in similar scheme in Brighton, Nottingham and London)	Model network changes to consist of link closures: ▪ Changes to Parliament Street banning buses from travelling southbound. ▪ Changes to Parliament Street to limit to buses only northbound ▪ Creation of one-way links within the restricted zone to prevent 'rat-running'	Reduced demand in area of restrictions with transfer of trips elsewhere on network. 5% Car reduction in town centre zones (The 5% assumption is based on an assumed modal shift to active modes. Also, this 5% reduction considers the impact of both B1a and B1b.)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
B2: Traffic Management Zone	B	▪ For this assessment the restriction assumes a charge is applied to all vehicles entering the traffic management 'zone' ▪ Additional / Higher charges could be applied to higher emission vehicles but that is not included within the appraisal at this stage ▪ The area covered by the zone is assumed to be: Montpellier Hill, Crescent Road, A61, Station Parade and Albert Street (as illustrated below) 	Y	Y	Y	Y	Included as part of a Harrogate Town Centre Package of improvements with a value to account for combined impact on Harrogate town centre: **Walking** – Core 30%, High 45%, Low 10% **Cycling –** Core 15%, High 25%, Low 5% (Uplift based on research from increased cycling following London congestion zone, assumed that local uplift could be half values seen in London)	Model network changes to assign a higher 'cost' to trips crossing a cordon (to include the links set out in the Scheme Definition).	Reallocation of trips from town centre zones to adjacent zones. Nominal toll charge to be included in model to demonstrate change in trip routeing.

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
B7: HGV restrictions	B & E	▪ For this assessment the restriction has been assumed to apply to the same area as the zone for B2 and would restrict movement except for loading. ▪ The intervention assumes only signage is used	Y	Y	N	Y	N/A	Closure of links for HGV use – extents as in B1. Reallocate trips not connected to the network / assume trips retimed to IP.	HGVs banned from links in the area within Montpellier Hill, Crescent Road, A61, Station Parade and Albert Street. Remove HGV trips to town centre zones from model
B8a: Home Zones	B & E	▪ 7 Home Zones assumed be created in the study area – 2 in Bilton, 1 in Jennyfield, 2 in Starbeck, 1 in Oatlands and 1 in Knaresborough. ▪ The Home Zones assumed to include: ○ Converting existing residential streets into through routes for pedestrians and cycle users only. ○ Home Zones are supported by wider 20mph zones (B8b) so there is stepped approach to reducing speed. ○ Communal spaces ○ Play spaces ○ Planting and vegetation ○ Some car parking provision where applicable	Y	Y	Y	Y	Uplift in localised zones where Home Zones may be implemented: **Walking** – Core 15%, High 25%, Low 5% **Cycling** – Core 15%, High 25%, Low 5% Uplift would be applied cumulatively with B8b	Reduced coded speeds for links within the Home Zones (as set out in Scheme Definition) Stopping up of links, as appropriate	25% reduction in traffic flows localised to areas identified for home zones i.e. for trips between modelled zones within the same Home Zone area) (This assumption is based on the average reduction experienced across a number of Home Zones)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
B8b: 20mph zones	B & E	▪ The 20mph zones includes all highways across the study that are not A or B roads. ▪ They will include signage along with traffic calming / speed reduction measures as appropriate	Y	Y	Y	Y	Uplift applied to proportion of local roads across the study area: **Walking** – Core 15%, High 25%, Low 5% **Cycling** – Core 15%, High 25%, Low 5% Uplift would be applied cumulatively with B8a	Reduced coded speeds for all non-A/B roads within the study area.	N/A (Model Network changes only)
B9: Car sharing	B	▪ The car sharing scheme will expand the existing area wide scheme with a focus on key employment areas. ▪ The scheme will link to the area wide behaviour change package (A7).	Y	Y	N	Y	N/A	N/A (Model Demand Changes only)	A reduction of 10% applied to all car trips with an origin and destination within Harrogate town centre, Cardale Park, Hornbeam and Hospital (This assumption is based on research indicating reductions of car trips of up to 30% for areas where there were limited options for non-car travel – so effectiveness greater in those places)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
B10: Car clubs	B	▪ Car club vehicles will be located in each of the Home Zones in B8a along with town centre locations in Harrogate and Knaresborough to focus on employment hubs.	Y	N	N	N	N/A	N/A	N/A
B11: School Travel Plans	B	▪ School Travel Plans will be implemented to a high standard across all schools (both primary and secondary) in the study area. ▪ This will include: ○ revenue funding to develop the plan and deliver initiatives; and ○ capital funding allocation per school to implement infrastructure improvement ▪ Also assumed a NYCC member of staff employed part-time to support development and delivery	Y	Y	Y	Y	Uplift to be applied to estimated change in staff travel across schools within the study area: **Walking** – Core 10%, High 15%, Low 5% **Cycling** – Core 20%, High 30%, Low 10%	N/A (Model Demand Changes only)	3% applied to all car trips with an origin and destination within Harrogate and Knaresborough. AM peak model only (Based on TfL research indicating around 6% reduction in single occupancy car numbers and evidence of staff car mode share reductions – assumed change would be less in areas outside London)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
C1: Relief Road	E	▪ A new highway link aimed at reducing demand for vehicle traffic movement through the centre of Harrogate.	Y	Y	Y	Y	Included as part of a Harrogate Town Centre Package of improvements with a value to account for combined impact on Harrogate town centre: **Walking** – Core 30%, High 45%, Low 10% **Cycling –** Core 15%, High 25%, Low 5% (Uplifts assume a similar increase in numbers from a similar scheme in an approved Business case)	New link to be coded in the model.	N/A (Model Network changes only)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
C3/C4: Network optimisation with RR	E	▪ The highway network will be optimised by routing vehicle traffic to use the relief road (C1) and reducing vehicle traffic in Harrogate town centre.	Y	Y	Y	Y	Included as part of a Harrogate Town Centre Package of improvements with a value to account for combined impact on Harrogate town centre: **Walking** – Core 30%, High 45%, Low 10% **Cycling –** Core 15%, High 25%, Low 5% (No relevant quantified evidence available however assumed uplifts could be similar to relief road as the rationale of removing town centre trips is the same)	Changes to a small number of key junctions on the existing network to reduce capacity and thus encourage use of the RR	N/A (Model Network changes only)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
C3/C4: Network optimisation without RR	B	▪ The highway network will be optimised through junction and signal timing changes to route vehicle traffic to the A and B roads and reducing vehicle traffic on other links in Harrogate town centre.	Y	Y	Y	Y	Included as part of a Harrogate Town Centre Package of improvements with a value to account for combined impact on Harrogate town centre: **Walking** – Core 30%, High 45%, Low 10% **Cycling –** Core 15%, High 25%, Low 5% (No relevant quantified evidence available however assumed uplifts could be similar to relief road as the rationale of removing town centre trips is the same)	Changes to a small number of key junctions, to make minor capacity improvements to represent the potential outcome of optimisation work	N/A (Model Network changes only)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
C5: Reallocate road space	B & E	▪ The reallocation of road space could include a range of measures including pedestrian improvements, bus priority, home zones, cycle lanes ▪ To avoid duplication of other interventions the assessment assumes this intervention will focus on road space reallocation on Parliament Street and Station Parade in particular to create more space for people walking and cycling	Y	Y	Y	Y	Included as part of a Harrogate Town Centre Package of improvements with a value to account for combined impact on Harrogate town centre: **Walking** – Core 30%, High 45%, Low 10% **Cycling –** Core 15%, High 25%, Low 5% (Uplift based on uplifts found in similar schemes in Brighton, Nottingham and London)	Reduction in road width on Parliament Street and Station Parade.	N/A (Model Network changes only)
D1: Parking strategy	B & E	▪ Parking strategy work underway, assumed that the parking strategy would apply across the study area and could help to reduce demand, however, no appraisal to be undertaken at this stage	Y	N	N	N	N/A	N/A	N/A

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
D2: Park & Ride	E	▪ A three site Park & Ride system based on the provision of car parks on primary routes into the town centre supported by existing public service buses. ▪ The sites would be located to the north and south of Harrogate on the A61 and to the east of Knaresborough on the A59. The 36 service would serve both the north and south sites while the east site would be served by the 1 service. ▪ The services would be supported by bus priority measures (E2), where feasible, at both junctions and on highway links. ▪ The service would be accompanied by demand management of parking (D1) within Harrogate with either reductions in long stay parking availability or increases in long stay tariff levels, or, indeed, both.	Y	Y	N	Y	N/A	N/A (Model Demand Changes only)	Reduce car trip numbers along routes from park and ride sites to town centres by 5% (assuming that these are now being undertaken by PT). (Evidence highlighted a range of interception rates, 5% was approximate average of these)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
E1a: Public transport hub Harrogate	B & E	▪ Aware current work underway but for this assessment assumed intervention will deliver an improved bus-rail interchange at both Harrogate and at Knaresborough stations	Y	Y	Y	N	Included as part of a Harrogate Town Centre Package of improvements with a value to account for combined impact on Harrogate town centre: **Walking** – Core 30%, High 45%, Low 10% **Cycling –** Core 15%, High 25%, Low 5% (No directly relevant quantified evidence found – uplifts based on approved WSP led Business Case work elsewhere)	N/A	N/A

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
E1b: Public transport hub Knaresborough E11: Access to Stations (Knaresborough only)	B & E	▪ Aware current work underway but for this assessment assumed intervention will deliver an improved bus-rail interchange at both Harrogate and at Knaresborough stations.	Y	Y	Y	N	Uplifts applied to active mode use based on station surveys and Office for Rail Regulation data on station users, including uplift for interchanging passengers: **Walking –** Core 30%, High 45%, Low 15% **Cycling** – Core 30%, High 45%, Low 15% (No directly relevant quantified evidence found – uplifts based on approved WSP led Business Case work elsewhere)	N/A	N/A
E2: Bus priority	E	▪ The bus priority provision would be provided on links and junctions on the A61 and at junctions on the A661 and A59. ▪ The bus priority provision will include bus lanes and priority provided through traffic signals noting the constraints on road space.	Y	N	N	N	N/A	N/A	N/A

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
E4: Sustainable transport at new residential developments	B	▪ Hard and soft measures will be implemented at all new residential developments ▪ Benefits apply above and beyond agreed TAs ▪ Impacts to be based on vision / targets rather than outcomes	Y	Y	Y	Y	Uplifts applied to trip numbers provided in approved Transport Assessments for committed sites: **Walking** – Core 10%, High 15%, Low 5% **Cycling** – Core 5%, High 8%, Low 2%: 8% (No directly relevant quantified evidence found - uplifts based on targets for modal shift in other WSP work)	N/A (Model Demand Changes only)	Forecast models contain committed developments (as of 2015), with trip rates applied based on HBC or relevant TA. Additional car trip reductions to be applied at 18% for committed housing sites at or above 50 dwellings (No relevant quantified outcome evidence found - uplifts based on targets for modal shift in new housing sites elsewhere, which WSP is involved in)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
E11: Access to stations (excluding Harrogate – as covered in Harrogate town centre package and Knaresborough Station – covered as part of the Transport Hub proposal above)	B & E	To enable sustainable travel to railway stations in the study area (Pannal, Hornbeam Park and Starbeck), a range of infrastructure measures could be implemented, this could include some of the following: ▪ Walking routes ▪ Cycle routes ▪ Cycle parking facilities ▪ Footbridge / Lifts ▪ Signage ▪ Parking / Drop-off ▪ Interchange with bus, cycle hire, taxi	Y	Y	Y	Y	Uplifts applied to active mode use based on station surveys and Office for Rail Regulation data on station users: **Walking** – Core 30%, High 45%, Low 15% **Cycling** – Core 30%, High 45%, Low 15% (Uplift based on research of change elsewhere with reduction applied to take account of local context and type of enhancement)	N/A (Model Demand Changes only)	A reduction of 2% applied to all car trips to /from zones containing Pannal, Hornbeam Park, and Starbeck rail stations. (No quantified evidence found – 2% considered a reasonable uplift as a result of access changes)

Option Ref	Package	Scheme Definition for Purposes of Impact Assessment & Indicative Costs	Impact Assessment				Active Mode Appraisal Uplifts	Proposed Model Network changes (agreed with NYCC)	Proposed Model Demand changes (agreed with NYCC)
			Qualitative	Quantitative	In AMA	In Traffic model			
F1: Cycle improvements	B & E	The Harrogate Cycle Infrastructure Plan (HCIP) has been developed by WSP on behalf of NYCC. The HCIP consists of a long-term, evidence based cycle network along with a list of priority routes. Five of the priority routes are being taken forward for feasibility assessment at present are: ▪ Harrogate to Knaresborough ▪ Bilton to Starbeck ▪ Bilton to Hornbeam Park ▪ Jennyfield to Harrogate town centre ▪ Hornbeam Park to Starbeck The proposed network will consist of high quality cycle provision on links and junctions that creates a safe, coherent, comfortable, direct and attractive cycle network.	Y	Y	Y	Y	Uplift in localised area where scheme applies: **Cycling** – Core 20%, High 30%, Low 10% (Uplift based on other examples of infrastructure e.g. London Greenway, Sustrans route in Lincoln)	N/A (Model Demand Changes only)	A reduction of 3% applied to all car trips with an origin and destination within Harrogate and Knaresborough (No quantified evidence found – reduction based on possible modal shift that could occur long term)

Appendix H

COMPARATIVE STUDY: IMPACT SUMMARY SHEETS

COMPARATIVE STUDY: IMPACT SUMMARY SHEETS

Name	A1 – Information – Variable Message Signs
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ The base intervention would be deployment of Variable Messaging Signage (VMS) technology to inform travellers of up-to-date, real and predictive information to influence behaviour and route decisions. Key information could include events, disruption, congestion, incidents and road closures. ▪ Assumed that VMS implemented in the following locations: o A59 Skipton Road - Key access road into Harrogate located to North West extent of study area. o A61 Ripley - A61 near Ripley to the north of the study area o A1 / A59 to Knaresborough - Key access route to both Harrogate and Knaresborough connecting with the Strategic Road Network through the A1 o A61 / Swindon Lane - Connects with roundabout linking with key access route to Harrogate (A61) o A661 Wetherby Road - Near-to junction with A658 providing access into central Harrogate o A658 Harrogate Road - Near-by A658/A61 roundabout, key route providing access to study area from the south/Bradford o A6055 Hazel Bank - Ahead of turn-off for Farham Lane.
Evidence base	Variable message signs for the highways sector, referred to as strategic VMS, encompass signs and systems to aid traffic management, predominately for major road schemes and bridge flow control.[1] Applications include: ▪ Driver information and control ▪ Variable speed limit signs ▪ Lane control indicators ▪ Lane control ▪ Controlled motorway indicators ▪ Traffic management systems VMS may only be used to display traffic signs, as defined in the Road Traffic Regulation Act. Their use to display any other message renders the installation unlawful. Messages should be as short as possible while being fully comprehensible to drivers.[2] The use of VMS to inform drivers of traffic conditions has been proven successful in terms of improving network travel times and reducing environmental impacts.[3] Studies undertaken across Europe in the 1990s found that, where just one VMS was used, only one third of passing drivers noticed the information; in cases where multiple signs were

[1] http://www.vmstech.co.uk/strategic.htm
[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/397832/150123_TAL_Variable_Message_Signs_for_web_publication_.pdf
[3] https://www.tandfonline.com/doi/abs/10.1080/01441640420001960 80?src=recsys&journalCode=ttrv20

	used, this increased to approximately 89%. A separate study, undertaken in the UK, reported that, on average, 13% of drivers changed their route in accordance to information provided on 13 corridors across London, Piraeus, Southampton and Turin. [4] It is considered that VMS could be utilised in Harrogate in order to support the management of the large scale events that regularly take place. Systems could potentially be used to improve driver route selection, reduce travel time and mitigate traffic flow to reduce congestion[5].
Impact assessment	**Quantitative** ▪ N/A (Qualitative appraisal only) **Qualitative** ▪ Keeps car users up to date ▪ Improve driver route selection **Assumptions** ▪ The locations of the VMS signs have been assumed as per Intervention Summary Sheets presented and agreed at HCS Engagement Group.
Cost	**Develop**: £ 26,600 **Implement**: £ 70,000
Timeframe	**Develop:** 2019/20 **Implement:** 2020/21–2021/22 **Maintain**: 2022/23 – 2039/40

[4] http://www.evidence-project.eu/images/pdf/Traffic_Management_In_Depth_Review.pdf
[5] https://nexusresearch.files.wordpress.com/2015/03/honghuo_planb.pdf

Name	A2 – Information – Real Time Information
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ Real Time Information Displays at bus stops ▪ To be applied at all stops on A661 and A59 routes
Evidence base	▪ Reading Buses is already using open data to improve bus journeys for people in the area. Through a number of initiatives to make information more easily available, the company has seen a 48% increase in passenger numbers since 2009.6 ▪ Operations such as ArrivaClick in Liverpool enable people to book their exact route and see when they will travel, how much they will pay and pay digitally. Passengers see real-time information on their phones – and watch their bus as it travels towards them. ▪ In a study by TfL, 56% of those who checked live bus arrival information before arriving at the bus stop changed their behaviour based on that information7 ▪ Live arrival information has been found to be welcomed by bus users and should be prioritised[8] An example of RTPI is the Integrated Transport Knowledge Base (ITKB) which was applied throughout the West Midlands. The scheme looked to deliver: ▪ Intelligent multi-modal journey planner for mobile phone and web systems; ▪ Automated timetable production for leaflets, mobile and web; ▪ Electronic bus registration by operators and fed to Vehicles & Operator Services Agency (VOSA); ▪ RTI prediction engine for improved co-modal information to passengers; ▪ Enquiry management system to replace existing inefficient system; ▪ Integrated Transport Knowledge Base for all travel modes ensuring information integrity; and ▪ Shared core database with West Midlands Transport Information Services (WMTIS) The scheme cost a total capital of £1.25m with no annual operating costs. It was successful in achieving targets with an increase of 16.7million trip legs and an additional £1.3m in revenue benefits each year; as a result, a very high BCR of 9.5 was achieved[9]. The Leeds Public Transport Investment Programme will see Leeds City Council working with the West Yorkshire Combined Authority to deliver 1,000 new real time information displays to the city's bus shelters. This decision was partly driven by the strong desire from the public for improved information to help them plan their journeys. Evidence suggests over 70,000 bus passengers a day make journeys without the benefit of real time information. An additional 40,000 passenger's benefit from only basic real-time information. Leeds City Council identified £7.2m for this project which is being led by the Combined Authority. ▪ The key benefits of real time information displays are cited as being:

[6] https://www.gov.uk/government/news/real-time-information-to-transform-bus-travel-in-england
[7] http://content.tfl.gov.uk/value-of-time-at-the-stop-summary.pdf
[8] http://content.tfl.gov.uk/digital-bus-report.pdf
[9] http://www.evidence-project.eu/images/pdf/Travel_Information_In_Depth_Review.pdf

	▪ Improved customer satisfaction. They reduce the perceived waiting time and if a bus is late, and this is communicated to customers in real time, they are far less likely to complain. ▪ Increased patronage. Some evidence suggests real time information can deliver a 2% uplift although as noted above there are many different types system ▪ Improved planning. Some display offerings would allow operators (or authorities) to replace paper timetables rather than simply supplement them. Some systems negate the need for a timetable at all such as the London Underground. The ambition to continue investing in real time information is shared by many large authorities including Nottingham City Council who have a similar sized programme of investment in this technology. It should be noted that many authorities do not share this ambition and have concerns this technology will become obsolete when all bus users have smart phones. 80% of adults own a smart phone and this is growing by 4% a year. Smartphone technology has the potential to significantly reduce both capital investment required to put displays in place and the revenue required to maintain them.
Impact assessment	**Quantitative** ▪ N/A (Qualitative appraisal only) **Qualitative** ▪ Improved customer satisfaction. They reduce the perceived waiting time and if a bus is late, and this is communicated to customers in real time, they are far less likely to complain. **Assumptions** ▪ Assumes technology (both on buses and apps) will be progressed by others
Cost	**Develop**: £ 91,200 **Implement**: £ 240,000
Timeframe	**Develop:** 2019/20 **Implement:** 2020/21–2021/22 **Maintain**: 2022/23 – 2039/40

Name	A3 – Information – Signage Strategy
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ The Signage Strategy will cover the entire study area ▪ It will only include fixed signs for all highway users. ▪ It will include improvement and rationalisation of signage
Evidence base	Having a signage strategy helps to de-clutter the roads. A signage strategy can have many other benefits too including: ▪ Improving the streetscape by identifying and removing unnecessary, damaged and worn out signage; ▪ Rationalising signs to help ensure they are provided only where required; ▪ Minimising the environmental impact of signage through careful design, including siting, size and colour; ▪ Reducing the costs associated with providing traffic signs and lighting units; and Reducing the need for maintenance, for example for sign cleaning, lamp changing and foliage cutting.[10] Signage is crucial to an area and plays an important role in visitor and residential user accessibility. Signage can impact the attractiveness of an area as well as have economic impacts guiding businesses and deliveries. Signage is multi-modal and affects users on foot, cycling and in motor vehicles.[11]
Impact assessment	**Quantitative** ▪ N/A (Qualitative appraisal only) **Qualitative** ▪ Improved customer satisfaction. They reduce the perceived waiting time and if a bus is late, and this is communicated to customers in real time, they are far less likely to complain. **Assumptions** ▪ Assumes technology (both on buses and apps) will be progressed by others
Cost	**Develop**: £ 57,000 **Implement**: £ 150,000
Timeframe	**Develop:** 2019/20 **Implement:** 2020/21–2021/22 **Maintain**: 2022/23 – 2039/40

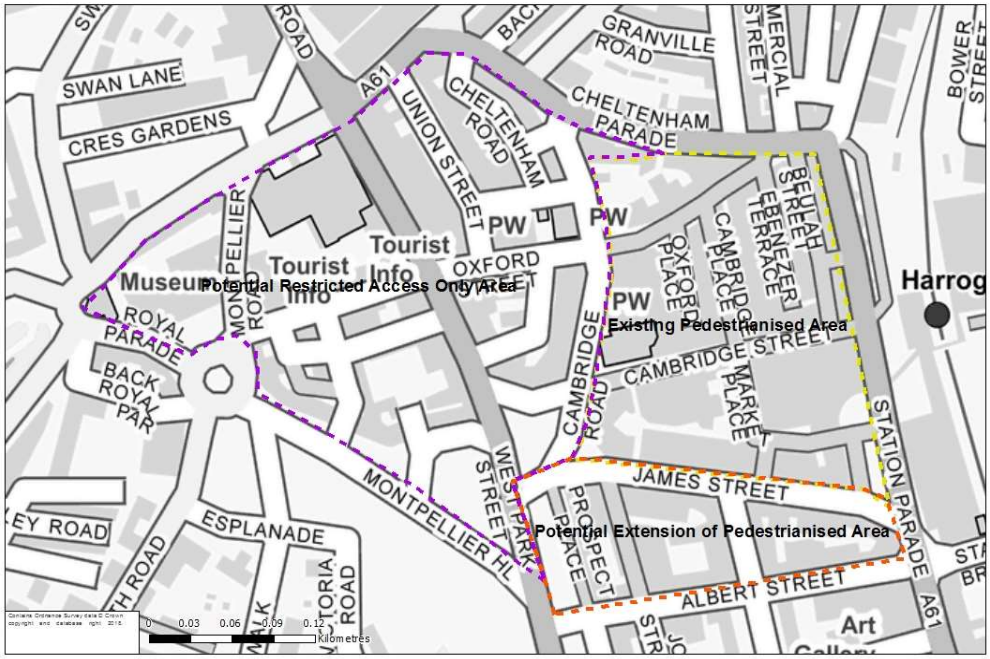
10 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/43525/tal reducing-sign-clutter.pdf

11 Signage Strategy for Sleaford (2018), North Kesteven District Council

Name	A7 – Information – Area Wide Behaviour Change Package
Package(s)	▪ **Package B**: Demand management and behavioural change
Scheme definition for the purpose of impact assessment	▪ A package of measures focused on increasing sustainable transport use and reducing single occupancy car use will be implemented. ▪ The programme will cover the entire study area for a period of 5 years. The benefits realised through the programme will be maintained due to the cultural and behavioural shift and the improved facilities for sustainable travel use. ▪ A7 includes the other measures as part of a package approach: B4 – Area Wide Travel Planning, A4 – Publicity Campaign, A5 – Website and app & A6 – Personalised Journey Planning
Evidence base	**Sustainable Travel Towns** The three towns of Darlington, Peterborough and Worcester took part in the five-year DfT 'Sustainable Travel Towns (STT)' programme between 2004 and 2009. The STT programme included the implementation of a range of soft measures with the overall aim being to reduce the use of private motor vehicles. Together, £15 million was spent across the three towns, of which £10 million was funded by DfT. The main focus of the programme was on personal journey plans, travel awareness campaigns, walking and cycling promotion and public transport information and marketing. Additional smaller amounts were spent on workplace and school Travel Plans. A team totalling 6-10 people per town were employed in order to help implement these initiatives. The impacts of the STT programme were: ▪ Over the lifecycle of the programme the proportion of respondents who originally stated that they did not walk or cycle fell by 11%; ▪ The proportion who originally reported that they cycled daily increased by 6%. ▪ The towns defied the national falling trend of cycle users at the time, with cycle trips per resident increasing by 26%-30%. ▪ Similar results for walking were also achieved, with a 10%-13% increase despite a national decline. ▪ Car trips within the towns, when considered together, fell by 9% while car driver distance per resident fell by 5%-7%[12] The three Sustainable Travel Towns were successful in achieving travel behaviour change, and reducing the car driver trips and mileage travelled by residents, whilst encouraging substantial increases in the use of other modes. The reduction in car driver trips, and consequent effects on traffic volume, will have had favourable effects on traffic congestion, carbon and other environmental emissions, and the increase in walking and cycling will have had favourable effects on health and fitness. There are indications of some improvement in quality of life and consumer satisfaction.
Impact assessment	**Quantitative** From the evidence collected in the evidence base, professional experience and knowledge of the local context the following impacts will be assessed. The following uplifts to walking and cycling levels will be used in the Active Mode Appraisal:

[12] http://www.evidence-project.eu/images/pdf/Personalised_Travel_Planning_In_Depth_Review.pdf

	Cycling uplift across study area: ▪ Core: 20% ▪ Low: 10% ▪ High: 30% *Walking* uplift across study area: ▪ Core: 10% ▪ Low: 5% ▪ High: 15% The following changes to demand in the traffic model will be applied: ▪ 10% reduction in car trips with an origin and destination within Harrogate and Knaresborough. **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of A7 include: ▪ Improved physical health and fitness due to more people using active modes of transport ▪ Improved mental health and quality of life due to cleaner air and safer environments ▪ Reduction in carbon emissions due to a reduction traffic congestion **Assumptions** The following assumptions have been made when attempting to create impacts of implementing A7: ▪ A 6-year programme of implementation (see timescales below) ▪ Comprehensive programme of soft measures delivered effectively and in alignment with best practice. **Caveats** The following caveats are relevant: ▪ Examples are not in Harrogate or similar areas, so potential impacts have had to be adapted. ▪ The uplift figures have been rounded to the nearest 5%.
Cost	**Develop**: £ 1.2m **Implement**: £ 3.75m
Timeframe	**Develop:** 2019/20 **Implement:** 2020/21–2025/26 **Maintain**: 2026/27 – 2039/40

Name	B1a – Demand Management – Extend Pedestrian Zone
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ The extension to the pedestrian zone could include treatments ranging from low-cost closures in access to vehicle traffic through to higher-cost areas of high quality public realm. ▪ For purposes of assessment it is assumed pedestrianisation would include the area (as shown on the plan below) covering James Street and the roads linking to Albert Street (i.e. Prospect Place, John Street and Princes Street). Albert Street and the A61 which form the boundary of the extended zone would not form part of the pedestrianised zone. 
Evidence base	**Exeter City Centre**[13] Exeter has been revitalising its city centre with a series of improvements to the public realm. The pedestrian environment has been improved by both the removal of vehicle traffic and by traffic management and an increase in pedestrian and shared spaces. High quality paving, public art, seating, tree planting and lighting have been used. Permeability and connectivity in the city centre have been improved and the various schemes have allowed pavement cafés to develop, so enlivening the city centre. This has been a phased programme of enhancement including major development schemes, such as the mixed-use development of Princesshay, to create new retail space and reinvigorate the city centre through a connected pedestrian network of public spaces and a high quality public realm. The work has been a partnership between the City Council, Devon County Council and other stakeholders such as the Dean and Chapter of Exeter Cathedral and private developers. ▪ Increase in footfall of around 30% between 2002 and 2010

[13] https://www.livingstreets.org.uk/media/1394/2011-making-the-case-full-report.pdf

	▪ Increase in the price of zone A retail rent from £220 per square foot in 2006 to £225 per square foot in 2008 which have been maintained in Princesshay in 2009 compared with declining rents in towns in the region. **Brighton New Road** New Road is a busy commercial street with bars, restaurants, shops, a library and two theatres. Gehl Architects, Landscape Project and Stockley worked with Brighton and Hove City Council to redesign the road and create a shared space with high quality granite paving across the whole area. The use of a tactile strip of paving has ensured that the visually impaired are able to negotiate the space in safety. The area has been de-cluttered with road markings and signs all but removed. This has resulted in a pedestrian friendly environment without the need to apply formal restrictions to motor traffic. Seating and lighting have been used to ensure the space is attractive to travel through and spend time. ▪ 162% increase in pedestrian activity ▪ 93% reduction in traffic volume ▪ 600% increase in sedentary activities
Impact assessment	**Quantitative** From the evidence collected in the evidence base it has been estimated that an extended pedestrian zone will increase walking mode share. This change will be included in the Active Mode Appraisal as part of a Harrogate town centre package with uplift values aiming to account for the combined impact of numerous measures on Harrogate town centre. The following uplifts are to be applied to the town centre active mode users: *Walking* – Core 30%, High 45%, Low 10% *Cycling* – Core 15%, High 25%, Low 5% The following changes to the traffic model network will be applied: ▪ Closure of links to ban vehicles on James Street and relevant sections of Prospect Place, John Street and Princes Street that connect to Albert Street. **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of an extended pedestrian zone include: ▪ Improved physical health and fitness due to more people walking for journeys ▪ Improved mental health and quality of life due to cleaner air and more enjoyable environments ▪ Improved safety perception of pedestrians due to removal of motorised vehicles ▪ Enhanced and enlivened areas by creating new opportunities in spaces **Assumptions** The following assumptions have been made when attempting to create impacts of implementing an extended pedestrian zone: ▪ No uplifts in cycling have been included as the links are assumed to be pedestrian only. ▪ Assumed pedestrianised area is shown in the figure above.

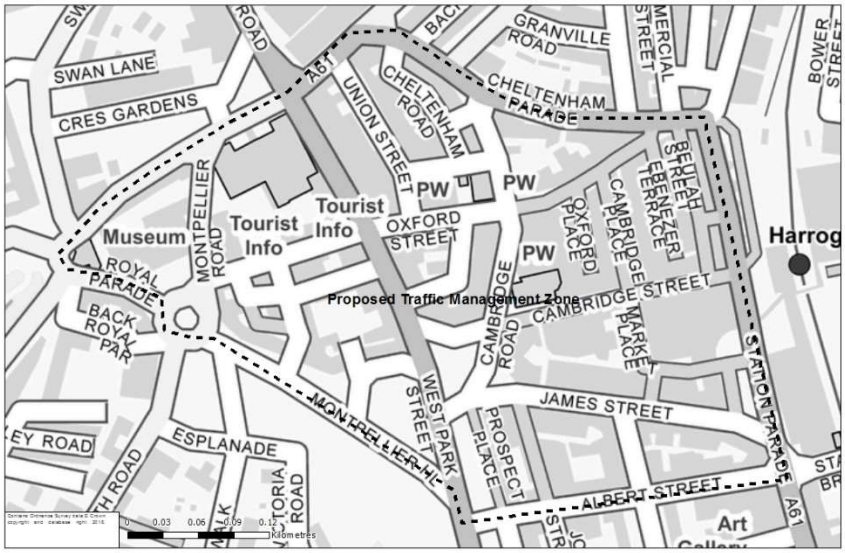
	Caveats The following caveats are relevant: ▪ Examples are not in Harrogate or similar areas so potential impacts have had to be adapted. ▪ The uplift figures have been rounded to the nearest 5%.
Cost	**Develop**: £ 207,480 **Implement**: £ 546,000
Timeframe	**Develop:** 2019/20 **Implement:** 2020/21–2023/24 **Maintain**: 2024/25 – 2039/40

Name	B1b – Demand Management – Restricted Access (Harrogate Town Centre Core)
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ Restricted access could include treatments ranging from low-cost closures in access to vehicle traffic through to higher-cost areas of high quality public realm. ▪ For purposes of assessment it is assumed restricted access will be applied to area inside Montpellier Hill, Crescent Road, A61 and Cambridge Road as per the plan shown in B1a ▪ The restrictions will include making Parliament Street northbound only for buses with one-way routes assigned to the other routes within the area.
Evidence base	**Brighton New Road** New Road is a busy commercial street with bars, restaurants, shops, a library and two theatres. Gehl Architects, Landscape Project and Stockley worked with Brighton and Hove City Council to redesign the road and create a shared space with high quality granite paving across the whole area. The use of a tactile strip of paving has ensured that the visually impaired are able to negotiate the space in safety. The area has been de-cluttered with road markings and signs all but removed. This has resulted in a pedestrian friendly environment without the need to apply formal restrictions to motor traffic. Seating and lighting have been used to ensure the space is attractive to travel through and spend time. ▪ 162% increase in pedestrian activity ▪ 93% reduction in traffic volume ▪ 600% increase in sedentary activities **Maid Marion Way, Nottingham**[37] Scheme overview ▪ Voted as one of Britain's worst streets ▪ Transformed from a traffic dominated corridor to a more pedestrian friendly part of the city ▪ Remodelling of dual carriageway ▪ Wide pedestrian crossings ▪ Generous pavements due to large areas of public space ▪ Areas of tree planting along footway ▪ Street furniture installed including bike parking ▪ Street clutter, including guard rails, removed ▪ Dedicated bus lane added Impacts ▪ 56% increase in weekday pedestrians (2005 compared to 2003) ▪ 29% increase in Saturday shopper pedestrians (2005 compared to 2003)

	Kensington High Street[14] Scheme overview ▪ Kensington High Street underwent complete redevelopment over the course of six stages, completed in 2003. ▪ Simplified road markings ▪ Recalculation and coordination of traffic signals (to ensure that traffic flows but does not have time to build up speed) ▪ Additional pedestrian crossings (enable pedestrians to cross the road in a single movement) ▪ Pavements have been widened and realigned to match original building lines. ▪ Trees and cycle parking have been introduced ▪ Street clutter has been removed Impacts ▪ Pedestrian flows increased by 7%, ▪ cycle flows increased by 30% at peak morning times, ▪ traffic flows decreased ▪ traffic casualties decreased by almost 49%, ▪ Surveyed users, including wheelchair users, the partially sighted, parents, and those aged >65 were positive about the changes made, and considered the area more attractive, cleaner and safer.
Impact assessment	**Quantitative** From the evidence collected in the evidence base it has been estimated in the active mode appraisal that restricted access within the town centre core will increase walking and reduce car usage in Harrogate. This change will be included in the Active Mode Appraisal as part of a Harrogate town centre package with uplift values aiming to account for the combined impact of numerous measures on Harrogate town centre. The following uplifts are to be applied to the town centre active mode users: *Walking* – Core 30%, High 45%, Low 10% *Cycling* – Core 15%, High 25%, Low 5% *Trip reduction*: ▪ 5% reduction in car trips in town centre zones The following changes to the traffic model network will be applied: ▪ Changes to Parliament Street banning buses from travelling southbound. ▪ Changes to Parliament Street to limit to buses only northbound ▪ Creation of one-way links within the restricted zone to prevent ‘rat-running’ **Qualitative** ▪ Improved physical health and fitness due to more people using active modes of transport for journeys ▪ Improved mental health and quality of life due to cleaner air and more enjoyable environments

[14] https://www.gov.uk/government/publications/healthy-high-streets-good-place-making-in-an-urban-setting

	▪ Improved safety perception of vulnerable road users due to the removal of some or all motorised vehicles **Assumptions and caveats** ▪ For purposes of assessment it is assumed restricted access will be applied to area inside Montpellier Hill, Crescent Road, A61 and Cambridge Road as per the plan shown in B1a
Cost	**Develop**: £ 17,100 **Implement**: £ 45,000
Timeframe	**Develop:** 2019/20 **Implement:** 2020/21–2023/24 **Maintain**: 2024/25 – 2039/40

Name	B2 – Demand Management – Traffic Management Zone
Package(s)	▪ **Package B**: Demand management and behavioural change
Scheme definition for the purpose of impact assessment	▪ For this assessment the restriction assumes a charge is applied to all vehicles entering the 'zone' between 10am and 4pm ▪ The area covered by the zone is assumed to be area inside Montpellier Hill, Crescent Road, A61, Station Parade and Albert Road 
Evidence base	Congestion Charging and Low Emission Zones (LEZs) can be similar in their nature, and how they are executed, but have differing objectives. Both feature a defined area, with a charge applied to people who want to enter the zone while driving a vehicle. In Congestion Charging zones, the charge usually applies to all private vehicles as the objective is to reduce general traffic levels within the zone. In Low Emission Zones, the charge is generally applied to certain vehicle types depending upon their levels of emissions; with the objective of LEZs being to reduce emissions within the zone, and not necessarily linked to traffic levels, low emission vehicles would not be charged to enter. There can be a crossover of both types of zones; for example, in London, the Congestion Charge has exemptions for low and ultra-low emission vehicles. The Durham Road User Charge Zone, introduced in 2002, aims to reduce traffic congestion, improve air quality and create safer and more attractive streets[15] in the historic core of the city. This scheme is implemented across a very limited area and has reduced traffic on the road by 85%, while also increasing pedestrian activity and bus patronage[16].
Impact assessment	**Quantitative** From the evidence collected in the evidence base it has been estimated in the active mode appraisal that a traffic management zone/low emission zone will increase walking and reduce car usage in Harrogate. This change will be included in the Active Mode Appraisal as part of a Harrogate town centre package with uplift values aiming to account for the

[15] http://www.durham.gov.uk/article/3437/Durham-Road-User-Charge-Zone-congestion-charge

[16] www.ciht.org.uk/download.cfm/docid/560EA947-66D1-490D-8E91A97F34D979D0

	combined impact of numerous measures on Harrogate town centre. The following uplifts are to be applied to the town centre active mode users: *Walking* – Core 30%, High 45%, Low 10% *Cycling* – Core 15%, High 25%, Low 5% The following changes to the traffic model will be applied: ▪ Model network changes to assign a higher 'cost' to trips crossing a cordon (to include the links set out in the Scheme Definition) ▪ Reallocation of trips from town centre zones to adjacent zones. **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of a traffic management zone include: ▪ Improved physical health and fitness due to more people using active modes of transport for journeys ▪ Improved mental health and quality of life due to cleaner air and more enjoyable environments ▪ Improved safety perception of vulnerable road users due to the removal of some or all motorised vehicles **Assumptions and Caveats** ▪ Examples in the evidence base are not in Harrogate or similar areas so potential impacts have had to be adapted.
Cost	**Develop**: £ 80,000 **Implement**: £ 250,000
Timeframe	**Develop:** 2019/2020 **Implement:** 2020/21 **Maintain**: 2021/22 – 2039/40

Name	B7 – Demand Management – HGV Restrictions
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ For this assessment the restriction has been assumed to apply to the same area as the zone for B1 and B2 and would restricts movement except for loading between 10:30am and 4pm ▪ The intervention assumes only signage is used
Evidence base	Access restrictions involve the removal, filtering or control of particular vehicle types on certain routes or in parts of a town/city. Most evidence and studies conducted focus upon Urban Freight Consolidation Centres (UFCC), where HGV traffic is consolidated to one area depot outside of the urban centre. Deliveries are then completed using alternative vehicles which are more suitable for, and have less of an impact on, the road network. This approach has been proven to be particularly effective in areas that suffer from congestion or pollution issues linked to road traffic. Since 2004, businesses in Bristol and Bath have been using Freight Consolidation to manage their deliveries more effectively. The Freight Consolidation Service is a partnership between courier service DHL and the Councils in Bristol and Bath. The consolidation scheme employs a small number of electric vehicles, in place of diesel trucks, helping to free up congested roads within the cities and resulting in improved air quality. A review of 17 UFCC evaluation studies found a 30-80% reduction in HGV trips, and a 30-45% reduction in HGV kilometres, attributed to the change in transport activity associated with goods handle by the UFCC.
Impact assessment	**Quantitative** The following changes to the traffic model network will be applied: ▪ HGVs banned from links in the area within Montpellier Hill, Crescent Road, A61, Station Parade and Albert Street. ▪ Removal of HGV trips to town centre zones. **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of HGV restrictions include: ▪ Removal of HGV trips from the town centre. ▪ Reduced congestion in the town centre. ▪ Improved mental health and quality of life due to cleaner air and more enjoyable environments ▪ Improved safety perception of vulnerable road users due to the removal HGVs on local roads. **Assumptions** ▪ The restriction has been assumed to apply to the same area as the zone for B1 and B2 ▪ Assumed movement restrictions except for loading between 10:30am and 4pm ▪ Assumed only signage is used

	Caveats ▪ Examples in the evidence base are not in Harrogate or similar areas so potential impacts have had to be adapted.
Cost	**Develop**: £ 7,600 **Implement**: £ 20,000
Timeframe	**Develop:** 2019/2020 **Implement:** 2020/21 **Maintain**: 2021/22 – 2039/40

Name	B8a – Demand Management – Home Zones
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ Seven Home Zones assumed be created in the study area: two in Bilton, one in Jennyfield, two in Starbeck, one in Oatlands and one in Knaresborough.
Evidence base	Home Zones are residential streets (or areas of residential streets) where quality of life takes precedence over vehicle traffic. Home Zones aim to extend the benefits of slow traffic speeds within residential areas and give greater priority to non-motorised users; car users should "feel that the car is a guest on the street". The aim is to improve the quality of life on residential roads by making them places for people, instead of just being thoroughfares for vehicles.[17] What could a Home Zone include? ▪ Convert existing through residential streets for vehicles into through routes for pedestrians and cycles only ▪ Home Zones can be supported by wider 20mph zones so that there is a stepped approach to reducing speed ▪ Communal spaces ▪ Planting and vegetation ▪ Some car parking provision The following impacts were observed following the implementation of Home Zones: ▪ Traffic volumes reduced by an average of 24% ▪ Average speeds also reduced by an average of 24% with 85th percentile speeds falling by an average of 25% ▪ 64% of residents were in favour of their home zone ▪ Children were using the streets for long periods engaging in a wide variety of play activities.18 The surveys asked about walking and cycling behaviour before and after the interventions. Although most residents thought the streets were now safer to walk or cycle, there was no significant change in the prevalence of walking or cycling. As each intervention only applied to a small area and conditions outside those areas were largely unchanged there would be no reason to expect any significant modal shift. **Five Roads Home Zone, Ealing**[19] An example of a Home Zone being implemented is in Ealing. The public perception of the scheme was positive in terms of traffic volume, speed, safety, air quality and the quality of the environment. These perceptions were corroborated by reductions in motor vehicle flow and speed. Below are some recorded results from the scheme: ▪ 67% of respondents thought that all residents benefitted from the home zone ▪ 40% of respondents thought it had improved the friendliness of the neighbourhood

[17] https://nacto.org/wp-content/uploads/2015/04/home_zones_department_transport.pdf
[18] http://www.evidence-project.eu/images/pdf/Incl_Urban_Design_In_Depth_Review.pdf
[19] Webster, D., Tilly, A., Wheeler, A., Nicholls, D., Buttress, S. 2006. Pilot Home Zone Schemes: Summary of the Schemes. TRL Report 654. TRL Limited, Crowthorne

	▪ 24% of respondents thought it made the area look better ▪ 72% of respondents thought vehicle speed had reduced and measured average vehicle speed had reduced from 19 to 16 mph ▪ 83% of respondents thought motor traffic volume had reduced and measured vehicle flows more than halved from 1400 to 668 per day ▪ 64% of respondents thought traffic danger to children had reduced ▪ 74% of respondents thought traffic noise had reduced ▪ 73% of respondents thought traffic pollution had reduced ▪ 50% of respondents thought walking was more pleasant ▪ 20% said they spent more time outside the front of their home ▪ 14% of children said they spent more time outside near the home
Impact assessment	**Quantitative** From the evidence collected in the evidence base, professional experience and knowledge of the local context the following impacts will be assessed. The following uplifts to walking and cycling levels will be used in the Active Mode Appraisal: *Cycling* uplift across localised zones where Home Zones may be implemented: ▪ Core: 15% ▪ Low: 5% ▪ High: 25% *Walking* uplift across localised zones where Home Zones may be implemented: ▪ Core: 15% ▪ Low: 5% ▪ High: 25% The following changes to demand in the traffic model will be applied: ▪ 25% reduction in traffic flows localised to areas identified for home zones The following changes to the traffic model network will be applied: ▪ Reduced coded speeds for links within the Home Zones (as set out in Scheme Definition) ▪ Stopping up of links, as appropriate. **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of implementing home zones include: ▪ Improved physical health and fitness due to more people using the prioritised active modes of transport ▪ Improved mental health and quality of life due to more enjoyable environments ▪ Improved safety perception of vulnerable road users due to slower traffic speeds ▪ Pride in area and sense of community with introduction of communal spaces

	Assumptions The following assumptions have been made when implementing Home Zones in Harrogate; for them to include: ▪ Converting existing residential streets into through routes for pedestrians and cycle users only. ▪ Home Zones are supported by wider 20mph zones (B8b) so there is stepped approach to reducing speed. ▪ Communal and play spaces ▪ Planting and vegetation ▪ Some car parking provision where applicable ▪ 7 Home Zones assumed be created in the study area **Caveats** ▪ Examples in the evidence base are not in Harrogate or similar areas so potential impacts have had to be adapted.
Cost	**Develop**: £ 464,056 **Implement**: £ 1.22 m
Timeframe	**Develop:** 2019/20 **Implement:** 2020/21 – 2022/23 **Maintain**: 2023/24 – 2039/40

Name	B8b – Demand Management – 20mph Zones
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ The 20mph zones includes all highways across the study that are not A or B roads. ▪ They will include signage along with traffic calming / speed reduction measures as appropriate
Evidence base	When collecting evidence on the impacts of 20mph zones in the UK, the following results were found: ▪ A pilot 20mph scheme in Edinburgh saw a 7% increase in journeys on foot, and a 5% increase in cycling journeys, with car usage reducing by 3%. ▪ In Bristol, walking trips increased between 10% and 36%, and cycling counts between 4% and 37%, following the implementation of 20mph speed limits. [20] ▪ In the Sherwood area of Nottingham an area-wide 20mph zone was introduced and, in the first year of implementation, saw walking and cycling increase by 17.5% which was above the increase at control sites across the city (11.2%).[21] ▪ The implementation of 20mph zones in Portsmouth saw little apparent impact on mode share.[22]
Impact assessment	**Quantitative** From the evidence collected in the evidence base, professional experience and knowledge of the local context the following impacts will be assessed. The following uplifts to walking and cycling levels will be used in the Active Mode Appraisal: *Cycling* uplift across study area: ▪ Core: 15% ▪ Low: 5% ▪ High: 25% *Walking* uplift across study area: ▪ Core: 15% ▪ Low: 5% ▪ High: 25% The following changes to the traffic model network will be applied: ▪ Reduced coded speeds for all non-A/B roads within the study area. **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of implementing 20mph zones include: ▪ Improved physical health and fitness due to more people using active modes of transport

[20] https://www.rospa.com/rospaweb/docs/advice-services/road-safety/drivers/20-mph-zone-factsheet.pdf
[21] http://www.nottinghamcity.gov.uk/transport-parking-and-streets/transport-projects/local-sustainable-transport-fund-schemes-and-initiatives/nottingham-20mph-city/
[22] http://www.evidence-project.eu/images/pdf/Environmental_Zones_In_Depth_Review.pdf

	▪ Improved mental health and quality of life due to more enjoyable environments ▪ Improved safety perception of vulnerable road users due to slower traffic speeds **Caveats** ▪ Examples in the evidence base are not in Harrogate or similar areas so potential impacts have had to be adapted. ▪ Most links in town centre already coded at 36kph to reflect cruise speeds. Reduction to 20mph (32kph) is unlikely to make a difference. Not replicated in model.
Cost	**Develop**: £ 114,000 **Implement**: £ 300,000
Timeframe	**Develop:** 2019/20 **Implement:** 2020/21 – 2022/23 **Maintain**: 2023/24 – 2039/40

Name	B9 – Demand Management – Car Sharing
Package(s)	▪ **Package B**: Demand management and behavioural change
Scheme definition for the purpose of impact assessment	▪ The car sharing scheme will expand the existing area wide scheme with a focus on key employment areas. ▪ The scheme will link to the area wide behaviour change package (A7).
Evidence base	▪ One study reported that, on average, car sharers made five or six car driver trips of less than 25 miles per month; this was compared to an average of 56 such trips for non-car share drivers[23] Another study corroborated the fact that car sharing can reduce vehicle kilometres travelled, with a decrease of 27% observed[24] ▪ The extent of the reduction is dependent upon various aspects of the scheme; for example, the implementation scope - site-wide or area wide. There is evidence that car sharing is effective when employers provide and encourage this service, particularly when a return journey is guaranteed in an emergency. Nationwide in Windmill Hill Swindon, is a good example of this, with 30% of their staff car sharing to and from work. ▪ Car share schemes commonly work well in rural areas, where fuel prices are high and distances are long. ▪ Schemes can deliver large benefits, with one example being an estimated saving of 960kg of carbon per year from the removal of just 1 commuting trip; as a result, the average BCR for these schemes is very high, at around 72.[25] The research supporting this best practice guide demonstrates that car sharing schemes have produced significant increases in multi occupancy car use (a 21% increase on average), with no corresponding detrimental impact on other sustainable modes – a real reason to deliver effective car sharing solutions for an organisation. Liftshare[26]: ▪ Bettys and Taylors Group – 119 members ▪ HBC – 178 members ▪ Harrogate and District NHS Foundation – 155 members ▪ NYCC – 218 members ▪ HarrogateCareShare.com – 1854 members Impacts: ▪ Save money by sharing travel costs ▪ Cut congestion ▪ Reduce pollution/improve air quality ▪ Reduce the stress of driving due to social nature of car sharing ▪ Reduce demand for car parking spaces ▪ Staff retention ▪ Reduce business miles

[23] Cairns, S. (2011) Accessing cars. Different ownership and use choices. RAC foundation. UK [Online] http://www.racfoundation.org/assets/rac_foundation/content/downloadables/accessing_cars-cairns-main_report.pdf
[24] Martin, E. & Shaheen, S. (2011) Greenhouse gas emission impacts of carsharing in North America. IEEE transactions on intelligent transportation systems, 12(4), 1074-1086
[25] http://www.evidence-project.eu/images/pdf/New_Models_of_Car_Use_In_Depth_Review.pdf
[26] https://liftshare.com/uk/community/harrogate

Impact assessment	**Quantitative** ▪ A reduction of 10% applied to all car trips with an origin and destination within Harrogate town centre, Cardale Park, Hornbeam and Hospital Car sharing is included within the OAR under B9 and a 1% reduction was applied to all car trips with an origin and destination within Harrogate town centre, Cardale Park, Hornbeam Park and Hospital, to reflect the intervention in the traffic model. This is a lot less than the examples above as it was considered that these examples represent locations with a particularly high potential for car sharing. For example, Nationwide at Windmill Hill, Swindon is a call centre where large numbers of people arrive and leave at the same time at the start/end of shifts. While this potential may exist at several locations in Harrogate and Knaresborough it is assumed, at this stage, that it would not be the majority. **Qualitative** ▪ Improved mental health as can help to reduce the stress of driving due to social nature of car sharing ▪ Improved staff retention **Assumptions and caveats** ▪ Employer buy-in and support of the scheme.
Cost	**Develop**: £ 3,200 **Implement**: £ 10,000
Timeframe	**Develop:** 2019/20 **Implement:** 2020/21 – 2022/23 **Maintain**: 2023/24 – 2039/40

Name	B10 – Demand Management – Car Clubs
Package(s)	▪ **Package B**: Demand management and behavioural change
Scheme definition for the purpose of impact assessment	▪ Car club vehicles will be located in each of the Home Zones in B8a along with town centre locations in Harrogate and Knaresborough to focus on employment hubs.

Evidence base	Norfolk Car Club
	▪ When you join Norfolk Car Club you can use not only the cars in Norfolk, but also over 500 vehicles across the UK which form the Co-wheels network.
	▪ Norfolk Car Club provides new cars and vans for members to drive on a pay-as-you-go basis.
	▪ Some of the qualitative benefits that have been taken from customer testimonies are:
	  ○ Convenience
	  ○ Great value for money.
	  ○ Accessible
	▪ Save time
	▪ Save money
	▪ Car club members have smaller carbon footprints as they travel fewer miles, in more efficient cars.
	Members are also more likely to travel 'actively' by walking and cycling for short journeys.

Impact assessment	**Quantitative** ▪ N/A – (Qualitative appraisal only) **Qualitative** ▪ Convenience ▪ Considered good value for money. ▪ Accessible ▪ Save time ▪ Save money ▪ Improved physical health and fitness due to more people using active modes of transport for short journeys **Assumptions and Caveats** ▪ The Car Club network will be situated in locations that cater to both people's residential locations, as stated in the scheme definition.
Cost	**Develop**: £ 115,200 **Implement**: £ 360,000
Timeframe	**Develop:** 2020/21 **Implement:** 2021/22 – 2022/23 **Maintain**: 2023/24 – 2039/40

Name	B11 – Demand Management – School Travel Plans
Package(s)	▪ **Package B**: Demand management and behavioural change

Scheme definition for the purpose of impact assessment	▪ School Travel Plans will be implemented to a high standard across all schools (both primary and secondary) in the study area.
	▪ This will include:
	  ○ revenue funding to develop the plan and deliver initiatives; and
	  ○ capital funding allocation per school to implement infrastructure improvement
	▪ Also assumed a NYCC member of staff employed part-time to support development and delivery

Evidence base	Research from across the UK shows an average 23% reduction in staff car mode share across 28 schools with active Travel Plans[27]. School Travel Plans in London have resulted in 5.5% reductions in single occupancy vehicle trips.[28] Specific examples from elsewhere in the UK have shown increases in level of walking (35% to 54% in Hertfordshire) and cycling (2% to 6% in Hertfordshire and 1% to 12% in Norfolk) for school pupils.[29]
Impact assessment	**Quantitative** From the evidence collected in the evidence base it has been estimated in the active mode appraisal that school travel plans will increase walking and reduce car usage in Harrogate. The results from three different scenarios are shown below. These are based on 20% mode shift from car – 5% to cycling 10% to walking. *Cycling* uplift applied to estimated change in staff travel across schools within the study area: ▪ Core: 20% ▪ Low: 10% ▪ High: 30% *Walking* uplift applied to estimated change in staff travel across schools within the study area: ▪ Core: 10% ▪ Low: 5% ▪ High: 15% *Car trips* ▪ 3% applied to all car trips with an origin and destination within Harrogate and Knaresborough. AM peak model only. **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of implementing school travel plans include:

[27] Cairns, S., & Newson, C. (2006). Making School Travel Plans Work: Effects, Benefits and Success Factors at English Schools. Wasted Miles, Wasted Money: A less congested, more energy efficient future, CICC Publications.
[28] https://www.london.gov.uk/sites/default/files/gla_migrate_files_destination/archives/assembly-reports-transport-school-travel-plans.pdf
[29] https://www.transportforqualityoflife.com/u/files/Making_School_Travel_Plans_Work_Nov_2010.pdf

	▪ Improved physical health and fitness due to more people using active modes of transport ▪ Improved mental health and quality of life due to more enjoyable environments ▪ Improved safety perception of vulnerable road users around the school due to less motorised vehicles **Assumptions** ▪ It is assumed that a NYCC member of staff will be employed part-time to support the development and delivery of school travel plans **Caveats** ▪ Examples in the evidence base are not in Harrogate or similar areas so potential impacts have had to be adapted.
Cost	**Develop**: £ 111,360 **Implement**: £ 348,000
Timeframe	**Develop:** 2019/20 **Implement:** 2020/21 – 2024/25 **Maintain**: 2025/26 – 2039/40

Name	C1 – Highways – Relief Road
Package(s)	▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ A new highway link aimed at reducing demand for vehicle traffic movement through the centre of Harrogate.
Evidence base	An Active Mode Appraisal of the Melton Mowbray Distributor Road estimated a demand uplift of 4% for cycling.[30]

Impact assessment	**Quantitative**
	
	From the evidence collected in the evidence base it has been estimated there would be an increase in Active Mode use. This change will be included in the Active Mode Appraisal as part of a Harrogate town centre package with uplift values aiming to account for the combined impact of numerous measures on Harrogate town centre. The following uplifts are to be applied to the town centre active mode users:
	
	Walking – Core 30%, High 45%, Low 10%
	Cycling – Core 15%, High 25%, Low 5%
	
	The following changes to the traffic model network will be applied:
	▪ Coding of a new link (x3 corridor options as follows):
	  ▪ (i) Inner South with Bilton Link
	  ▪ (ii) Inner North
	  ▪ (iii) Inner South without Bilton Link
	
	Qualitative
	▪ Diverting traffic away from town centre can results in the following benefits:
	  ○ Improved physical health and fitness due to more people using active modes of transport
	  ○ Improved mental health and quality of life due to area feeling more attractive and cleaner
	  ○ Improved safety perception of vulnerable road users due to less motorised vehicles in the town centre
	  ○ Opportunities to reallocate highway space for other purposes, such as other modes or more public space
	  ○ Opportunities for regeneration of areas that previously suffered from heavy traffic flows negatively impacting on the local environment.
	
	Assumptions
	▪ Vehicle users will adhere to advisory signage and re-route via the Relief Road.
	▪ The possible demand reduction benefits of the Relief Road will be 'locked in' through measures to reallocate motor vehicle capacity and priority on routes that are forecast to see reductions in demand.

[30] http://www.alanduncan.org.uk/uploads/store/0e845ed116e797bc800bb2a68440a907.pdf

	Caveats ▪ The walking uplifts are assumed similar to the cycling uplifts in the absence of any data.
Cost	**<u>Inner South with Bilton Link</u>** **Develop**: £19.4m **Implement**: £51.1m **<u>Inner North</u>** **Develop**: £28.2m **Implement**: £74.2m **<u>Inner South without Bilton Link</u>** **Develop**: £18.5m **Implement**: £48.8m
Timeframe	**Develop**: 2019/20 – 2021/22 **Implement**: 2022/23 – 2024/25 **Maintain**: 2025/26 – 2039/40

Name	C3/C4 – Network Optimisation with Relief Road
Package(s)	▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	The highway network will be optimised by routing vehicle traffic to use the relief road (C1) and reducing vehicle traffic in Harrogate town centre.
Evidence base	An Active Mode Appraisal of the Melton Mowbray Distributor Road estimated a demand uplift of 4% for cycling.[31]
Impact assessment	**Quantitative** No relevant quantified evidence available, however, assumed uplifts could be similar to relief road as the rationale of removing town centre trips is the same. This change will be included in the Active Mode Appraisal as part of a Harrogate town centre package with uplift values aiming to account for the combined impact of numerous measures on Harrogate town centre. The following uplifts are to be applied to the town centre active mode users: *Walking* – Core 30%, High 45%, Low 10% *Cycling* – Core 15%, High 25%, Low 5% The following changes to the traffic model network will be applied: ▪ Changes to a small number of key junctions on the existing network to reduce capacity and encourage traffic to divert onto the relief road. **Qualitative** ▪ The network optimisation would complement the qualitative impacts realised through the relief road (C1) by further increasing the amount of traffic redirected away from the town centre. These impacts were: ○ Improved physical health and fitness due to more people using active modes of transport ○ Improved mental health and quality of life due to area feeling more attractive and cleaner ○ Improved safety perception of vulnerable road users due to less motorised vehicles in the town centre ○ Opportunities to reallocate highway space for other purposes, such as other modes or more public space ○ Opportunities for regeneration of areas that previously suffered from heavy traffic flows negatively impacting on the local environment. **Assumptions** ▪ Drivers will re-route according the objectives of the relief road and network optimisation and not go through the town centre.
Cost	**Develop**: £40,000 **Implement**: £105,000

[31] http://www.alanduncan.org.uk/uploads/store/0e845ed116e797bc800bb2a68440a907.pdf

Timeframe	**Develop**: 2023/24 – 2024/25 **Implement**: 2025/26 **Maintain**: 2026/27 – 2039/40

Name	C3/C4 – Network Optimisation without Relief Road
Package(s)	▪ **Package B**: Demand management and behavioural change
Scheme definition for the purpose of impact assessment	The highway network will be optimised through junction and signal timing changes to route vehicle traffic to the A and B roads and reducing vehicle traffic on other links in Harrogate town centre.
Evidence base	An Active Mode Appraisal of the Melton Mowbray Distributor Road estimated a demand uplift of 4% for cycling.[32]
Impact assessment	**Quantitative** No relevant quantified evidence available, however, assumed uplifts could be similar to relief road as the rationale of removing town centre trips is the same. This change will be included in the Active Mode Appraisal as part of a Harrogate town centre package with uplift values aiming to account for the combined impact of numerous measures on Harrogate town centre. The following uplifts are to be applied to the town centre active mode users: *Walking* – Core 30%, High 45%, Low 10% *Cycling* – Core 15%, High 25%, Low 5% The following changes to the traffic model network will be applied: ▪ Changes to a small number of key junctions on the existing network to make minor capacity improvements to represent the potential outcome of optimisation work. **Qualitative** ▪ The network optimisation would result in the following impacts: ○ Improved physical health and fitness due to more people using active modes of transport ○ Improved mental health and quality of life due to area feeling more attractive and cleaner ○ Improved safety perception of vulnerable road users due to less motorised vehicles in the town centre ○ Opportunities to reallocate highway space for other purposes, such as other modes or more public space ○ Opportunities for regeneration of areas that previously suffered from heavy traffic flows negatively impacting on the local environment. **Assumptions** ▪ Drivers will re-route according the objectives of the network optimisation and not go through the town centre.
Cost	**Develop**: £39,900 **Implement**: £105,000
Timeframe	**Develop**: 2019/20 – 2020/21 **Implement**: 2021/22 **Maintain**: 2022/23 – 2039/40

[32] http://www.alanduncan.org.uk/uploads/store/0e845ed116e797bc800bb2a68440a907.pdf

Name	C5 – Highways – Reallocate Road Space
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ The reallocation of road space could include a range of measures including pedestrian improvements, bus priority and cycle provision. ▪ To avoid duplication of other interventions the assessment assumes this intervention will focus on road space reallocation on Parliament Street and Station Parade in particular to create more space for people walking and cycling.
Evidence base	**General Findings** Where general traffic lanes are reallocated to alternative uses, the following impacts have been recorded: ▪ Reduction in general traffic volumes; ▪ Improving journey times for modes given additional priority (e.g. bicycles or buses) ▪ Increase in the use of non-car modes; and ▪ Reduction in casualty numbers.[33] **Lewes Road, Brighton[34]** Scheme overview ▪ Lewes Road is a primary radial route. ▪ Reallocation of one general traffic lane of a two-lane dual carriageway to a bus lane, both north and southbound over a length of 4.5km. ▪ The intervention also incorporated a widened, continuous cycle lane in both directions. Impacts ▪ Bus journey times reduced apart from northbound in the PM peak but this was due to the reduced speed limit and increased demand for boarding the bus services. ▪ Bus passenger numbers increased by 7% (compared to a 4% increase citywide) ▪ Cycle user numbers increased by 14% (additional 298 cycle users) ▪ General traffic levels reduced by 13% over a 12 hour period (2,300 vehicles) ▪ No significant increase in traffic levels on alternative routes ▪ Queue lengths increased significantly at one junction but other junctions were not impacted Car journey times were unchanged northbound and increased by 60-90 seconds during the AM and PM peaks. **Mini-Holland, London Borough of Waltham Forest[35]** Scheme overview ▪ The Borough trialled a range of interventions such as, closing roads except to buses and cycles, roads changed to one-way operation, additional cycle parking and landscaping.

[33] http://www.evidence-project.eu/images/pdf/Roadspace_Reallocation_In_Depth_Review.pdf
[34] Brighton and Hove City Council (2013). Lewes Road scheme Post construction monitoring report. Brighton: Brighton and Hove City Council. Available from http://www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/Lewes%20Road%20%20November%202013%20Monitoring%20Report.pdf
[35] https://www.gov.uk/government/case-studies/public-space-improvements-walthamstow-village

- The scheme was part of the TfL Mini-Holland programme of creating liveable neighbourhoods by reducing general traffic volumes and speeds and enabling increased walking and cycling.

Impacts

- Average daily general traffic flow through the area reduced from 8,500 to 4,800 vehicles.
- Average speed limit reduced to 21mph
- 74% of residents and businesses were in favour of continuing the trial measures.

Kensington High Street[36]

Scheme overview

- Kensington High Street underwent complete redevelopment over the course of six stages, completed in 2003.
- Simplified road markings
- Recalculation and coordination of traffic signals (to ensure that traffic flows but does not have time to build up speed)
- Additional pedestrian crossings (enable pedestrians to cross the road in a single movement)
- Pavements have been widened and realigned to match original building lines.
- Trees and cycle parking have been introduced
- Street clutter has been removed

Impacts

- Pedestrian flows increased by 7%,
- Cycle flows increased by 30% at peak morning times,
- Traffic flows decreased
- Traffic casualties decreased by almost 49%,
- Surveyed users, including wheelchair users, the partially sighted, parents, and those aged >65 were positive about the changes made, and considered the area more attractive, cleaner and safer.

Walworth Road, Southwark, London[37]

Scheme overview

- Improved and new formal and informal crossing points
- Tree planting
- Seating
- Improved management of parking and loading
- Decluttering – 425m of pedestrian guard rail removed and approximately 600 signs and poles

[36] https://www.gov.uk/government/publications/healthy-high-streets-good-place-making-in-an-urban-setting
[37] https://www.gov.uk/government/publications/manual-for-streets-2

Impacts

- Increased footfall
- Increase in pedestrians crossing
- Decrease in shop vacancies
- Growth in amount of time people spend in the street

London Road, Southampton[37]

Scheme overview

- Carriageways narrowed
- Kerbs lowered
- Centre line and other road markings removed
- Footways widened
- New bus shelters with better bus information

Sheaf Square and Howard Street, Sheffield[37]

Scheme overview

- Sheaf Square and Howard Street are two key elements of the Golden Route that connects Sheffield station to the city centre.
- The Golden Route is a series of streets and places in Sheffield that has been a focus for investment and regeneration since being identified in the 2000 City Centre Masterplan.
- Demolition of Dyson house to create a larger square
- Reconfiguration of ring road
- Two crossing points.
    - Signalised on main carriageway
    - Informal crossing of Pond street with raised crossing point
- Bus gate
- Howard street restricted to pedestrians and cyclists only.
    - Places to sit
    - Tree lined

Impacts

- Some pedestrian and vehicle conflict at bus gate

High Row and West Row, Darlington – Part of the Pedestrian Heart[37]

Scheme overview

- Pedestrian Heart project started in 2007 in Darlington
- Aim to bring people back and improve retail offer attracting investment in the town
- Rationalising bus access
    - Bus routes reconfigured
    - Introduction of a bus gate
- Improving pedestrian provision
- All private car parking moved to edge of core

	▪ Space created for market traders to be located on main retail street Impacts ▪ Footfall increased ▪ Significant retail landlords invested further into town ▪ Cycling levels have increased by 30% between 2007 and 2008 **Maid Marion Way, Nottingham[37]** Scheme overview ▪ Voted as one of Britain's worst streets ▪ Transformed from a traffic dominated corridor to a more pedestrian friendly part of the city ▪ Remodelling of dual carriageway ▪ Wide pedestrian crossings ▪ Generous pavements due to large areas of public space ▪ Areas of tree planting along footway ▪ Street furniture installed including bike parking ▪ Street clutter, including guard rails, removed ▪ Dedicated bus lane added Impacts ▪ 56% increase in weekday pedestrians (2005 compared to 2003) ▪ 29% increase in Saturday shopper pedestrians (2005 compared to 2003)
Impact assessment	**Quantitative** From the evidence collected in the evidence base, professional experience and knowledge of the local context it is anticipated that uplifts in active mode use would occur. This change will be included in the Active Mode Appraisal as part of a Harrogate town centre package with uplift values aiming to account for the combined impact of numerous measures on Harrogate town centre. The following uplifts are to be applied to the town centre active mode users: *Walking* – Core 30%, High 45%, Low 10% *Cycling* – Core 15%, High 25%, Low 5% The following changes to the traffic model network will be applied: ▪ Reduction in road width on Parliament Street and Station Parade. **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of reallocating road space include: ▪ Reallocating space for use by modes other than car increases the efficiency of the space in terms of moving people rather than vehicles ▪ Improved physical health and fitness due to more people using active modes of transport ▪ Improved mental health and quality of life due to area feeling more attractive, cleaner and safer.

	▪ Improved safety perception of vulnerable road users ▪ Improved provision for bicycle traffic ▪ Improved provision for pedestrian traffic **Assumptions** The following assumptions have been made: ▪ In Package E, the relief road (C1) will be built to redirect traffic, reducing traffic in Harrogate centre. ▪ No changes in demand to vehicle traffic is being measured. **Caveats** ▪ Examples in the evidence base are not in Harrogate or similar areas so potential impacts have had to be adapted. ▪ Uplift figures have been rounded to the nearest 5%.
Cost	**Develop**: £ 311,600 **Implement**: £ 820,000
Timeframe	**Develop**: 2019/20 – 2020/21 **Implement**: 2021/22 **Maintain**: 2022/23 – 2039/40

Name	D1 – Parking – Parking Strategy
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	This scheme involves the development of a new Parking Strategy for the Harrogate urban area. The strategy would cover all major aspects of parking policy including both on and off-street facilities. Core elements of the strategy would include: ▪ Provision and infrastructure - The overall parking stock will be optimised for both location and capacity ensuring that each site serves the needs of the immediate surrounding area while the whole parking stock works together to provide the correct balance of supply and demand across the town. ▪ Changes to provision will ensure high turnover, short stay spaces are located within the core of the town centre, with low turnover, longer stay spaces located on the periphery of the centre. The design of car parks would be altered, where necessary, to enable ease of access reducing any issues related to queuing or blocking of the highway. A review of on-street provision would ensure the efficient operation of the highway network and that curb space is prioritised very short-stay parking. ▪ Payment systems - To support new approaches to tariffs, an electronic payment system would supplement existing payment approaches. This would enable more flexible tariffs and reduce operational costs. This approach would also reduce 'overstay anxiety' caused by Pay & Display systems by enabling drivers extend their stays remotely. ▪ Tariffs - The tariff system would be reviewed to ensure it works with the policy to ensure longer stay spaces are moved to the edge of the town centre and the central areas are prioritised for shorter stay users. Tariffs would be applied to on-street spaces to move longer stays to off-street spaces and free-up on-street for high turnover parking. Through electronic payment systems, tariffs would be altered to encourage travel outside of the peak periods, such encouraging arrivals before 8:00hrs or departures before 16:00hrs. ▪ Sustainable transport - While overall policy will look to balance supply with demand to ensure the efficient operation of the parking stock, the location of car parks and level of tariffs will encourage longer visits to the town centre either park at peripheral car parks or use alternative modes of travel. Through electronic payment systems, tariffs would be altered to reward the use of low emission/ultra low emission vehicles. Charges would also be altered for permit parking for such vehicles. ▪ On-street zones and controls - On-street parking zones (Residents' Parking Zones) would be reviewed and amended to limit the potential negative impact of the movement of long stay parking to peripheral locations whilst also prioritising appropriate on-street space for short-stay paid parking where appropriate to the individual locations. ▪ Coach and bus parking - A review of coach loading/parking and bus parking will be undertaken to, where possible, locate parking in such locations that limit impacts on the operation of the highway network. ▪ Taxi ranks and loading bays - Other curb side users such as taxi ranks and loading bays would be reviewed to assess the balance of supply and demand and any negative impacts on the operation of the highway network. ▪ Monitoring and data - Improved monitoring systems will be installed, where current infrastructure allows, to gather more robust data on car park usage, enabling the

	opensource sharing of such data to facilitate the operation of live parking occupancy systems.
Evidence base	Evidence is unanimous on the importance of parking to manage car travel demand in urban areas, with parking issues strongly influencing the decision-making process for travellers. Restrictive parking policy measures (i.e. parking pricing) are not seen to have detrimental effects on the local (retail) economy. Parking policies can contribute to a reduction in car commuting. Giving commuters the choice between free parking or its equivalent cash value ('parking cash-out' policies)-have proved to be very effective in reducing car commuting.[38] Wiltshire Local Transport Plan 2011-2026 Car Parking Strategy[39] states that demand management measures will be promoted where appropriate to reduce reliance upon the car and to encourage the use of sustainable transport modes. These measures include: ▪ Maximum car parking standards – the provision of parking associated with new development will be limited to maximum parking standards. These maximum standards, and existing parking stock, will be managed or reduced to reflect local circumstances and the relative accessibility by other modes, in accordance with an accessibility framework and criteria ▪ Public car parking charges – to avoid wasteful competition between adjacent areas within Wiltshire and outside, parking charges should be set to reflect the availability of parking spaces, local travel patterns and the availability of alternative travel mode ▪ Traffic management measures – where there are identified sustainable transport demands, traffic congestion, road safety or air quality issues, traffic management measures will be developed to promote walking, cycling and public transport, reduce reliance on the car, reduce the risk of accidents and improve the environment ▪ Charging measures – opportunities for charging measures, such as road user charging and the workplace levy, will be kept under review.
Impact assessment	**Quantitative** ▪ N/A – Qualitative appraisal only **Qualitative** A qualitative assessment of the potential impacts of the Strategy is set out below: <u>Provision and Infrastructure</u> Peak period traffic will be reduced in the town centre due to the relocation of long stay car parks to the edge of centre. Parking stock in the centre could be reduce due to more efficient use by higher turnover, shorter stays. The design of car parks will reduce queuing onto the highway at peak times of arrivals reducing impact on the network. <u>Payment systems</u> The economy of the town centre will be supported by more flexibility in the length of stay with drivers able to extend their parking rather than being constrained by the rigid Pay & Display periods. <u>Tariffs</u>

[38] http://www.evidence-project.eu/images/pdf/Parking_In_Depth_Review.pdf
[39] http://www.wiltshire.gov.uk/ltp3-car-parking-strategy.pdf

	Blocking of on-street spaces by long stay would be eliminated with the potential to reduce on-street provision due to the more efficient use of space by higher turnover, short stays. Tariffs to encourage travel before or after the peak hours would reduce peak hour traffic. <u>Sustainable transport</u> Some longer stay drivers may transfer to public transport or active modes with the shift from long stay parking to the edge of town centre locations. Air quality would be improved through the encouragement of low emission vehicles by reduced tariffs for such vehicles. <u>On-street zones and controls</u> The review and amendment of on-street controls will move parking to off-street locations enabling more appropriate use of curb space, particularly in more peripheral locations. *Coach and bus parking* Reduced impacts on the operation of the highway network will be brought about by better parking for coaches and buses away from the carriageway. *Taxi ranks and loading bays* Reduced impacts on the operation of the highway will come from a review of taxi ranks and loading bays *Monitoring and data* Better information on parking availability will reduce the amount of searching required and therefore the distances travelled within the town centre. **Assumptions and Caveats** ▪ The delivery of all components of the parking strategy will be implemented city-wide. The effectiveness of a number of measures is dependent on the presence of another, and therefore all complementary measures are required in order to have maximum impact.
Cost	*As the outcomes of any future parking strategy for the study area are currently unknown, and could potentially incorporate a wide range of measures and changes within the towns, it is considered that the benefits and costs can not be appropriately quantified to feed into the economic appraisal at this time.*
Timeframe	**Develop:** 2019/20 – 2020/21 **Implement:** 2021/22 – 2022/23 **Maintain**: 2023/24 – 2039/40

Name	D2 – Parking – Park and Ride
Package(s)	▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ A three site Park & Ride system based on the provision of car parks on primary routes into the town centre supported by existing public service buses. ▪ The sites would be located to the north and south of Harrogate on the A61 and to the east of Knaresborough on the A59. The 36 service would serve both the north and south sites while the east site would be served by the 1 service. Both bus services have high frequencies of at least every 10 minutes. ▪ The services would be supported by bus priority measures (E2), where feasible, at both junctions and on highway links. ▪ The service would be accompanied by demand management of parking (D1) within Harrogate with either reductions in long stay parking availability or increases in long stay tariff levels, or, indeed, both.
Evidence base	Park & Ride is used widely within the UK in similar historic towns and cities including Bath, Canterbury, Chester, Durham, Salisbury, Scarborough, Shrewsbury and York. In 2009, research was conducted on behalf of the Historic Towns Forum into the effectiveness and sustainability of Park & Ride. The overall findings were that 86% of Councils who responded to a survey, who were responsible for historic towns, considered their Park & Ride systems to be a success. Although Park & Ride systems were implemented to reduce congestion, 28% of historic towns stated that there had been an increase in traffic into the towns during peak periods and 14% that there had been increases in daily traffic flows. However, only a small proportion of Councils altered their town parking provision (supply or tariffs), therefore few were implemented with supporting demand management measures, which may have affected the level of town centre traffic and higher uptake of Park & Ride. (Historic Towns Forum, *The Effectiveness and Sustainability of Park and Ride*, RPS 2009) A study into Park & Ride effects on travel was undertaken for DETR by WS Atkins in 1998 and the conclusions were reviewed by Parkhurst et al in 1999/2000. Using eight case studies within the UK, the research showed that overall traffic km increased across as a result of the policy however there was a difference between the urban and non-urban areas. The urban areas, 'inside' of the Park & Ride sites, largely experienced a reduction in traffic km, however, outside of the urban area experienced an increase in traffic. Overall, within the urban area, car km reduced by an average of 3.4km per intercepted car but outside of the urban area car km increased by an average of 7.3km per intercepted car. General findings ▪ P&R facilities are often well patronised, but many schemes actually result in a net traffic increase ▪ Hence, they are most likely to be regarded as a success where the objective is not to reduce car use by shortening car trips, but to provide parking where it can more easily and cheaply be made available: on the periphery of a city or at remote railway stations. However, this amounts to an economic strategy to promote further growth within successful cities such as the major commercial centres with intense

	competition for space and attractive historic cities with protected built environments rather than a sustainable mobility strategy.
Impact assessment	**Quantitative** ▪ Based on the evidence above, a network of three 250 space Park & Ride sites could reduce traffic within the urban area by approximately 2,500 car km per day. However, this could be offset by an increase of 8,000 car km per day outside of the urban area. ▪ Reduce trip numbers by car along routes from park and ride sites to town centres by 5%. **Qualitative** ▪ Improved traveller perception of journeys into Harrogate and Knaresborough, due to parking being more abundant and easier to find at park and ride sites compared to within the city centre. **Assumptions and Caveats** ▪ The impact of Park & Ride will depend on the scale and quality of facilities provided, the price and approach to fares (pay to park or pay on bus), the frequency of services and overall journey time, and the equivalent costs journey times of other ways to travel into the town centre. ▪ The strength of the approach of using existing public service buses is that the extent to which Park & Ride usage will be abstracted from existing bus services will be somewhat mitigated by an increase in shorter journeys on those services. This approach will also reduce the operational costs of the system although the extent of this will depend on the current capacity of the bus services to cater for additional demand and the impacts on timetabling of stopping existing services at the Park & Ride sites i.e. additional buses may be required to support the existing services. ▪ Assumption that 5% reduction in car journeys are now being undertaken by public transport.
Cost	**Develop**: £ 760,000 **Implement**: £ 2.0 m
Timeframe	**Develop:** 2019/20 – 2020/21 **Implement:** 2021/22 – 2022/23 **Maintain**: 2023/24 – 2039/40

Name	E1 – Public Transport Hub
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ Aware current work underway but for this assessment assumed intervention will deliver an improved bus-rail interchange at both Harrogate and at Knaresborough stations
Evidence base	Transport interchange improvements can vary significantly in their scope and scale, for example, entirely new multi-modal interchanges or upgrades of existing facilities. Monitoring the impacts of transport interchange developments is focused on usage changes, as these can be measured at site-level, compared to mode shift which is generally measured at a more strategic level. ▪ Patronage increased 15% over four years following the implementation of a new bus interchange in Hull ▪ A 7% increase was recorded in a one-year period following the implementation of a new bus interchange[40].
Impact assessment	**Quantitative** From the evidence collected in the evidence base, professional experience and knowledge of it is anticipated that uplifts in active mode use would occur. With regard to the Harrogate Public Transport Hub, this change will be included in the Active Mode Appraisal as part of a Harrogate town centre package with uplift values aiming to account for the combined impact of numerous measures on Harrogate town centre. The following uplifts are to be applied to the town centre active mode users: *Walking* – Core 30%, High 45%, Low 10% *Cycling* – Core 15%, High 25%, Low 5% For the Knaresborough Public Transport Hub Uplifts applied to active mode use are based on station surveys and Office for Rail Regulation data on station users, including uplift for interchanging passengers: **Walking –** Core 30%, High 45%, Low 15% **Cycling** – Core 30%, High 45%, Low 15% **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of a public transport hub include: ▪ Increased public transport patronage. ▪ Improved public perception of the public transport offering.

[40] https://www.westyorks-ca.gov.uk/media/2568/appendix-e-evidence-of-measures-delivering-patronage-growth.pdf

	Assumptions The following assumptions and caveats have been made when implementing a public transport hub: ▪ Assumed intervention will deliver an improved bus-rail interchange at both Harrogate and at Knaresborough stations. **Caveats** ▪ Examples are not in Harrogate or similar areas so potential impacts have had to be adapted.
Cost	Harrogate **Develop**: £ 2.9m **Implement**: £ 7.5m Knaresborough **Develop**: £ 950,000 **Implement**: £ 2.5m
Timeframe	**Develop**: 2019/20 – 2020/21 **Implement**: 2021/22 – 2022/23 **Maintain**: 2023/24 – 2039/40

Name	E2 – Bus priority
Package(s)	▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	▪ The bus priority provision would be provided on links and junctions on the A61 and at junctions on the A661 and A59. ▪ The bus priority provision will include bus lanes and priority provided through traffic signals noting the constraints on road space.
Evidence base	WSP has worked on a Bus Rapid Transit (BRT) project identifying potential options on a number of corridors in Norwich. The aim was to deliver a step change in the speed and quality of public transport services linking major growth locations in the Greater Norwich area with the city centre and strategic employment areas. The following potential benefits of BRT in Norwich were identified: ▪ Support the economic competitiveness of Norwich and help to deliver growth and regeneration in a sustainable way ▪ Increase overall public transport patronage and achieve mode shift from the car user ▪ Improve accessibility to the city centre and strategic employment areas ▪ Improve the overall quality of the journey experience for passengers using the system and raise public perceptions of public transport Leeds City Council have identified five routes along which the wish to create quality transport corridors. Features of a quality transport corridor include but are not limited to; ▪ Bus lanes (both physical and virtual) ▪ Bus gates and bus only streets ▪ Junction improvements (increase capacity and or more bus priority) ▪ Park & Ride (primarily large car sites but opportunities also exist for cycle parking at key stops) ▪ High quality bus shelters and associated infrastructure (such as real-time information etc.) ▪ Improved urban realm and enhanced green infrastructure ▪ Improved access to bus stops (wider footways, safer and new crossing facilities etc.) ▪ Improve road safety (particularly when related to pedestrian access to stops) ▪ Improve cycling facilities wherever possible and appropriate The primary objective of the investment is to deliver quicker and more reliable bus services. Contrary to popular belief, reliability, rather than journey times in comparison to the car, is seen as the most important motivating factor for anyone wishing to switch from a car to a bus. Evidence suggests that bus priority measures, when delivered alongside complimentary service improvements, can deliver 10-20% journey time savings and reduce unreliability (or service variability) by 50%. Leeds City Council have identified £50m of the proposed improvements along five routes. The scale of the interventions being delivered across the five routes ranges from minor alterations (lining and signing) to major highway improvements which will take several years to build. This being said most bus priority schemes cost £2-5m per KM inclusive of development costs.

Impact assessment	**Quantitative** ▪ N/A – (Qualitative appraisal only) **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of BRT include: ▪ Increased public transport patronage ▪ Improved accessibility to the city centre and strategic employment areas ▪ Improved the overall quality of the journey experience for passengers, reflected in increased customer satisfaction ▪ Raised public perceptions of public transport
Cost	**Develop**: £45,600 **Implement**: £120,000
Timeframe	**Develop:** 2019/20 – 2020/21 **Implement:** 2025/26 **Maintain**: 2026/27 – 2039/40

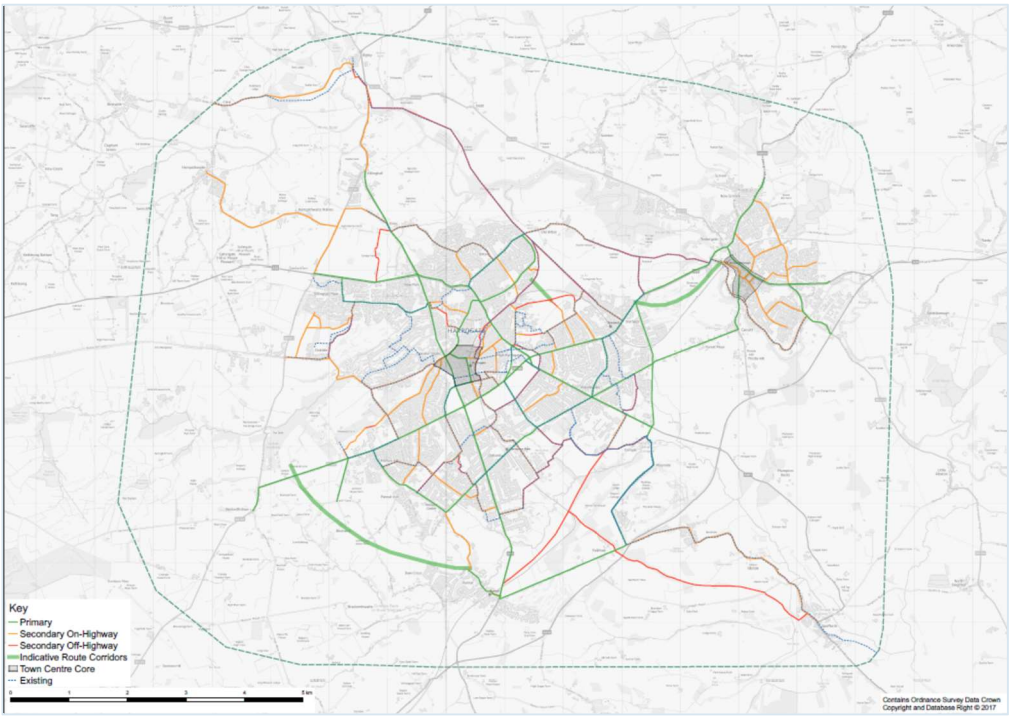
Name	E4 – Sustainable transport at new residential developments
Package(s)	▪ **Package B**: Demand management and behavioural change
Scheme definition for the purpose of impact assessment	▪ Hard and soft measures will be implemented at all new residential developments. ▪ Benefits apply above and beyond agreed TAs. ▪ Impacts to be based on vision / targets, rather than outcomes.
Evidence base	Norfolk County Council Norfolk County Council is responsible for the delivery of five-year travel plans for new residential developments, funding for which may be obtained from the developer through Section 106 agreements. These travel plans are delivered under the 'AtoBetter' project umbrella. The central aim of the AtoBetter project is to work with communities and a range of partners to enable residents in new developments to walk, cycle, and use public transport, or car share for more of their journeys. Creating a community led ethos, where healthy, active and sustainable travel are the norm. Targets for travel via sustainable modes vary at each development depending on the current/baseline situation. For example, sites within Norwich city centre have a target of 21% modal shift; market towns 15% modal shift; and rural areas have a target of 11% modal shift.
Impact assessment	**Quantitative** From the evidence collected in the evidence base, professional experience and knowledge of the local context it is anticipated there would be an uplift in active mode users. The following uplifts applied to trip numbers provided in approved Transport Assessments for committed sites will be used in the Active Mode Appraisal: **Walking** – Core 10%, High 15%, Low 5% **Cycling** – Core 5%, High 8%, Low 2%: 8% The following changes to demand in the traffic model will be applied to committed housing sites of 50 or more dwellings: ▪ 18% reduction in car trips **Qualitative** Increased use of active travel can raise the health and wellbeing of local residents. **Assumptions** ▪ The measure will be funded through developer contributions. **Caveats** The public transport offering, in terms of routes and frequency, and walking and cycling route options, including quality, density and gradient, will affect active mode uptake.
Cost	*To be funded through developer contributions*
Timeframe	**Develop:** 2019/20 – 2039/40

	Implement: 2019/20 – 2039/40 **Maintain**: 2019/20 – 2039/40

Name	E11 – Access to stations
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	To enable sustainable travel to railway stations in the study area (Pannal, Hornbeam Park and Starbeck - Harrogate Station is covered in the Harrogate town centre package and Knaresborough Station is covered as part of the Public Transport Hub proposal above), a range of infrastructure measures could be implemented, this could include some of the following: ▪ Walking routes ▪ Cycle routes ▪ Cycle parking facilities ▪ Footbridge / Lifts ▪ Signage ▪ Parking / Drop-off ▪ Interchange with bus, cycle hire, taxi
Evidence base	Trowbridge Rail Station in Wiltshire recently underwent a series of improvements, which included: ▪ New and extended cycle parking ▪ New waiting shelters ▪ New ticket machines ▪ An electric car charging point[41] This scheme was part funded by the Local Sustainable Transport Fund (LSTF), reflecting the role both access to rail stations, in addition to the use of rail itself, can have in supporting the uptake of sustainable modes of transport. The Sustrans 'Access to Stations' scheme, funded by the LSTF, is aimed at improving the integration of cycle and rail through infrastructure improvements and improved signage of routes at twenty stations in England. These measures are expected to result in one million fewer car trips to and from the rail stations by year three, and therefore also reduce congestion, totalling £7.7 million in decongestion benefits over ten years, and also lead to a commensurate reduction in CO_2 emissions[42].
Impact assessment	**Quantitative** From the evidence collected in the evidence base, professional experience and knowledge of the local context it is anticipated there would be an uplift in active mode users. The following uplifts applied to active mode use, based on station surveys and Office for Rail Regulation data on station users, will be used in the Active Mode Appraisal:

[41] http://www.wiltshire.gov.uk/news/articles/trowbridge-train-station-improvements-officially-unveiled-18-sep-2015
[42] https://www.sustrans.org.uk/policy-evidence/the-impact-of-our-work/access-stations-better-cycle-rail-integration

	Walking – Core 30%, High 45%, Low 15% **Cycling** – Core 30%, High 45%, Low 15% *Car trips* ▪ A reduction of 2% applied to car trips to/from the areas around Pannal, Hornbeam Park and Starbeck rail stations. **Qualitative** Refurbishments of rail stations and upgrades to the facilities and services available will raise passenger satisfaction, and in doing so encourage use of the rail station. This can subsequently lead to modal shift in favour of rail. **Caveats** ▪ Examples in the evidence base are not in Harrogate or similar areas so potential impacts may vary. ▪ The uplift figures have been rounded to the nearest 5%.
Cost	**Develop**: £171,000 **Implement**: £450,000
Timeframe	**Develop**: 2019/2020 – 2039/40 **Implement**: 2020/21 – 2021/22 **Maintain**: 2022/23 – 2039/40

Name	F1 – Cycle infrastructure improvements
Package(s)	▪ **Package B**: Demand management and behavioural change ▪ **Package E**: Relief road, highway operational improvement measures, plus sustainable travel and urban realm improvements
Scheme definition for the purpose of impact assessment	The Harrogate Cycle Infrastructure Plan (HCIP) has been developed by WSP on behalf of NYCC. The HCIP consists of a long-term, evidence based cycle network along with a list of priority routes. Five of the priority routes are being taken forward for feasibility assessment at present are: ▪ Harrogate to Knaresborough ▪ Bilton to Starbeck ▪ Bilton to Hornbeam Park ▪ Jennyfield to Harrogate town centre ▪ Hornbeam Park to Starbeck The proposed network will consist of high quality cycle provision on links and junctions that creates a safe, coherent, comfortable, direct and attractive cycle network. The HCIP network is set out below: 
Evidence base	A key finding is the appropriate infrastructure for cycle traffic is necessary for seeing an increase in cycle use. The following other findings are understood: ▪ The evidence suggests that comprehensive networks of routes for cycle traffic are required. ▪ These need to be built up from components such as safe junctions and bridges which create suitably direct routes for cycle traffic. ▪ What is less clear is the precise nature of the links in a network, or the types of provision at junctions, that might be deemed suitable by users and potential users.

	▪ It is clear also, however, that there is a preference in terms of perception that cycle traffic is separated from motor traffic, i.e. separated routes are required.[43] Research found that implementing infrastructure close to residential areas does not mean an automatic increase in cycle use. Promoting using the infrastructure has more of a significant impact. ▪ Exposure to (use of) infrastructure is significantly associated with a modal shift towards active travel ▪ Passive exposure (proximity to the infrastructure) is not directly associated with a modal shift.[44] **Examples** Below is a list of results from areas where new cycle infrastructure has been introduced and how, if at all, this has affected modal split/shift: ▪ Post implementation of the London Greenway cycle routes through parks, green spaces and lightly trafficked streets showed an average of 18% increase in cycling. ▪ Before and after counts in 2004 on a Cycle Street in Oss, Netherlands demonstrated a cycling increase of 11% and reduction in motor traffic of around 30%. ▪ A study of the implementation of cycle infrastructure in Copenhagen showed the construction of cycle tracks resulted in 18-20% increase in cycle/moped traffic and a decrease of car traffic on those roads, whereas cycle lanes resulted in a 5-7% increase. ▪ Evaluation of the Government's Sustainable Travel Towns project showed a 26% to 30% increase in cycling trips resulting from improved infrastructure ▪ Data relating to the Skellingthorpe Sustrans Cycle Route in Lincoln showed a 25% increase in cycle numbers over a two year period (2012-14). ▪ An update report on a cycle schemes within Lincoln showed a 92% increase in cyclist numbers on Doddington Road and 97% increase on Station Road following improvements to infrastructure.
Impact assessment	**Quantitative** From the evidence collected in the evidence base, professional experience and knowledge of the local context it is anticipated there would be an uplift in active mode users. The following uplifts will be used in the Active Mode Appraisal to cycling levels in the localised area where the scheme applies: *Cycling* uplift - Core 20%, High 30%, Low 10%: The following changes to demand in the traffic model will be applied: ▪ A 3% reduction applied to all car trips with an origin and destination in Harrogate and Knaresborough. **Qualitative** From the research conducted along with professional experience the potential qualitative impacts of cycle infrastructure improvements include: ▪ Improved physical health and wellbeing due to more people using active modes of transport

[43] http://www.evidence-project.eu/images/pdf/Cycling_In_Depth_Review.pdf
[44] https://doi.org/10.1016/j.tra.2016.11.017

	▪ Improved mental health and quality of life due to more enjoyable environments ▪ Improved safety perception of cycling **Assumptions** ▪ Assumed that the new infrastructure will be promoted.
Cost	**Develop**: £ 5.3m **Implement**: £ 13.8m
Timeframe	**Develop**: 2017/18 – 2018/19 **Implement**: 2019/20 – 2024/25 **Maintain**: 2025/26 – 2039/40

Appendix I

PACKAGE COSTS BY INTERVENTION

SUMMARY OF COSTS

This appendix sets out a breakdown of the costs for each of the interventions that are included in package B (Table 1) and package E (Table 2); the costs are presented in 2018 values. Three costs are presented for package E, due to the three potential corridor options for the proposed relief road.

The following assumptions have been made in the estimation of costs at this early stage of scheme development:

- Scheme Opening year for each intervention assumed to be 2025 to ensure consistency across all of the interventions.
- Operational and maintenance costs are not included at this stage.
- Funding profile of packages includes 20% of total costs occurred each year between 2019/20 to 2022/23, reducing to 15% and 5% for the following two years respectively.
- Additional 10% added to costs to account for implementation and design costs for non-infrastructure interventions; 15% for infrastructure schemes.
- Additional 10% added to costs to account for risk.

Table 1 - Package B Costs (in 2018 values):

Intervention	Construction	Design	Risk	Total
A1: Variable Message Signage	£70,000	£10,500	£16,100	**£96,600**
A2: Real Time Information	£240,000	£36,000	£55,200	**£331,200**
A3: Signage Strategy	£150,000	£22,500	£34,500	**£207,000**
A7: Area Wide Behaviour Change Package (including B4, A4, A5, A6)	£3,750,000	£375,000	£825,000	**£4,950,000**
B1a: Extend Pedestrian Zone	£546,000	£81,900	£125,580	**£753,480**
B1b: Restricted Access within Town Centre Core	£45,000	£6,750	£10,350	**£62,100**
B2: Traffic Management Zone	£250,000	£25,000	£55,000	**£330,000**
B7: HGV Restrictions	£20,000	£3,000	£4,600	**£27,600**
B8a: Home Zones	£1,221,200	£183,180	£280,876	**£1,685,256**
B8b: 20mph Zones	£300,000	£45,000	£69,000	**£414,000**
B9: Car Sharing	£10,000	£1,000	£2,200	**£13,200**

B10: Car Clubs	£360,000	£36,000	£79,200	**£475,200**
B11: School Travel Plans	£348,000	£34,800	£76,560	**£459,360**
C3/C4: Network optimisation without Relief Road	£105,000	£15,750	£24,150	**£144,900**
C5: Reallocate Road Space	£820,000	£123,000	£188,600	**£1,131,600**
E1a: Public Transport Hub Harrogate	£7,500,000	£1,125,000	£1,725,000	**£10,350,000**
E1b: Public Transport Hub Knaresborough	£2,500,000	£375,000	£575,000	**£3,450,000**
E11: Access to Stations	£450,000	£67,500	£103,500	**£621,000**
F1: Cycle Improvements	£13,820,078	£2,073,012	£3,178,618	**£19,071,708**
TOTAL	**£32,505,278**	**£471,800**	**£7,429,034**	**£44,574,204**

Table 2 - Package E Costs (in 2018 values):

Intervention	Construction	Design	Risk	Total
A1: Variable Message Signage	£70,000	£10,500	£16,100	**£96,600**
A2: Real Time Information	£240,000	£36,000	£55,200	**£331,200**
A3: Signage Strategy	£150,000	£22,500	£34,500	**£207,000**
B1a: Extend Pedestrian Zone	£546,000	£81,900	£125,580	**£753,480**
B1b: Restricted Access within Town Centre Core	£45,000	£6,750	£10,350	**£62,100**
B7: HGV Restrictions	£20,000	£3,000	£4,600	**£27,600**
B8a: Home Zones	£1,221,200	£183,180	£280,876	**£1,685,256**
B8b: 20mph Zones	£300,000	£45,000	£69,000	**£414,000**
C1(i): Relief Road (Inner including Bilton Link)	£51,069,768	£7,660,465	£11,746,047	**£70,476,280**

C1(ii): Relief Road (Inner North)	£74,159,685	£11,123,953	£17,056,728	**£102,340,366**
C1(iii): Relief Road (Inner South)	£48,757,176	£7,313,576	£11,214,151	**£67,284,903**
C3/C4: Network optimisation with Relief Road	£105,000	£15,750	£24,150	**£144,900**
C5: Reallocate Road Space	£820,000	£123,000	£188,600	**£1,131,600**
D2: Park and Ride	£2,000,000	£300,000	£460,000	**£2,760,000**
E1a: Public Transport Hub Harrogate	£7,500,000	£1,125,000	£1,725,000	**£10,350,000**
E1b: Public Transport Hub Knaresborough	£2,500,000	£375,000	£575,000	**£3,450,000**
E11: Access to Stations	£450,000	£67,500	£103,500	**£621,000**
E2: Bus Priority	£120,000	£18,000	£27,600	**£165,600**
F1: Cycle Improvements	£13,820,078	£2,073,012	£3,178,618	**£19,071,708**
TOTAL Package E(i)	**£80,977,046**	**£12,146,557**	**£18,624,721**	**£111,748,323**
TOTAL Package E(ii)	**£104,066,964**	**£15,610,045**	**£23,935,402**	**£143,612,410**
TOTAL Package E(iii)	**£78,664,454**	**£11,799,668**	**£18,092,824**	**£108,556,947**

Appendix J

ACTIVE MODE APPRAISAL BENEFITS SUMMARY

SUMMARY OF ACTIVE MODE ASSESSMENT BENEFITS

This appendix sets out a breakdown of the Present Value of Benefit (PVB), calculated using the DfT Active Mode Appraisal Toolkit, for each of the interventions contained within packages B and E (where possible and agreed with NYCC). The benefits are presented in 2010 values, in line with WebTAG guidance, for the Core, Low and High Scenarios.

Harrogate Town Centre Interventions Package

Benefit Type	PVB Benefit CORE	PVB Benefit LOW	PVB Benefit HIGH
Health	£5,189,078	£1,729,693	£7,867,172
Absenteeism	£1,740,347	£580,116	£2,639,757
Journey Quality / Ambience	£3,449,746	£3,165,842	£3,667,296
TOTAL	**£10,379,192**	**£5,475,650**	**£14,174,225**

A7: Area Wide Behaviour Change (incorporating B4, A4, A5 and A6)

Benefit Type	PVB Benefit CORE	PVB Benefit LOW	PVB Benefit HIGH
Health	£14,261,723	£7,130,862	£21,392,585
Absenteeism	£2,811,500	£1,405,750	£4,217,250
Journey Quality / Ambience	£6,415,215	£6,240,125	£6,590,305
TOTAL	**£23,488,438**	**£14,776,736**	**£32,200,140**

B8a and B8b: Home Zones and 20mph Zone

Benefit Type	PVB Benefit CORE	PVB Benefit LOW	PVB Benefit HIGH
Health	£6,983,572	£2,327,857	£11,639,287
Absenteeism	£1,375,352	£458,451	£2,292,253
Journey Quality / Ambience	£1,499,296	£1,429,562	£1,569,031
TOTAL	**£9,858,220**	**£4,215,870**	**£15,500,571**

B11: School Travel Plans

Benefit Type	PVB Benefit CORE	PVB Benefit LOW	PVB Benefit HIGH
Health	£226,531	£113,265	£339,796
Absenteeism	£112,545	£56,272	£168,817
Journey Quality / Ambience	£39,940	£38,515	£41,364
TOTAL	**£379,015**	**£208,053**	**£549,978**

E1b/E11: Knaresborough - Public Transport Hub and Station Access Improvements

Benefit Type	PVB Benefit CORE	PVB Benefit LOW	PVB Benefit HIGH
Health	£814,787	£407,394	£1,222,181
Absenteeism	£230,883	£115,442	£346,325
Journey Quality / Ambience	£557,475	£521,118	£593,832
TOTAL	**£1,603,146**	**£1,043,953**	**£2,162,338**

E4: Sustainable Transport at New Residential Developments

Benefit Type	PVB Benefit CORE	PVB Benefit LOW	PVB Benefit HIGH
Health	£736,977	£355,371	£1,118,584
Absenteeism	£145,133	£69,967	£220,299
Journey Quality / Ambience	£1,011,730	£989,633	£1,033,827
TOTAL	**£1,893,841**	**£1,414,971**	**£2,372,710**

E11: Station Access Improvements

Benefit Type	PVB Benefit CORE	PVB Benefit LOW	PVB Benefit HIGH
Health	£1,182,508	£591,254	£1,773,761
Absenteeism	£335,162	£167,581	£502,743
Journey Quality / Ambience	£817,215	£763,919	£870,512
TOTAL	**£2,334,885**	**£1,522,753**	**£3,147,016**

F1: Cycle Improvements

Benefit Type	PVB Benefit CORE	PVB Benefit LOW	PVB Benefit HIGH
Health	£5,955,359	£2,977,679	£8,933,038
Absenteeism	£2,083,819	£1,041,909	£3,125,728
Journey Quality / Ambience	£14,071,806	£13,432,179	£14,711,434
TOTAL	**£22,110,984**	**£17,451,768**	**£26,770,200**

Dale House
Mount View Business
Standard Way Business Park
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wsp.com