County Durham Travel Patterns

Durham County Council

2011 Census Data Analysis

June 2018

County Durham Travel Patterns – 2011 Census Data Analysis

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Executive Summary

Glossary of Terms:

- Cross County Boundary – Trips with an origin or destination in a neighbouring authority;
- Intra-County – Journeys where both the origin and destination is within County Durham;
- Intra-Zonal - Trips with originate and terminate within the same area; and
- Inter-Zonal – Journeys which terminate in a different area to which they originated.

Census Journey to Work (JTW) data has been used to understand the existing commuting patterns within County Durham and as such identify the potential impacts of various development spatial dispersion patterns being considered by Durham County Council (DCC) as part of the emerging County Durham Plan. The JTW data shows the movement of UK residents between their local authority of residence and local authority of their workplace, classifying these results by mode of travel.

The analysis undertaken highlights that the spatial dispersion of development has the potential to significantly influence the location and magnitude of traffic impacts, in addition to associated environmental and economic impacts. This note has focused on the impacts of housing development set out in the County Durham Plan Issues and Options (2016).The key conclusions drawn from the JTW data and spatial development patterns considered include:

- Provision of housing development in settlements located on the periphery of the County, such as Chester-le-Street and Seaham, will result in a higher number of cross-boundary trips as these areas have a stronger link with neighbouring authorities. This would generally be considered to result in greater car-borne travel, as these trips are less likely to be undertaken by sustainable modes and therefore may result in increased highway impacts such as congestion and vehicular emissions.
- Additionally, cross-boundary work related trips from County Durham to neighbouring Local Authorities represent a leakage of economic activity outside the County.
- Provision of housing development in closer proximity to Durham City will generally increase travel to the City with reduced levels of cross-boundary trips.
- Due to having the largest working population of all the settlements in the County, Durham City is the largest attractor of commuting trips with 21% of all intra-county trips terminating within the City.
- Although Durham County as a whole produces a greater number of out-commuting trips than in-commuting, Durham City attracts over twice as many in-commuting trips as it generates out-commuting journeys (over 36000 and under 14500 respectively).
- Should future housing development be more widely dispersed an increase in long distance trips to Durham City would be likely. However, whilst the average distance of these additional trips to Durham would increase, there would also likely be an increase in trips being retained with each settlement/area or increases in cross-boundary trips, depending on the level of employment growth likely outside of Durham City.
- Development in the City compared to the development in peripheral County areas would likely have the least impact in terms of total traffic kilometres travelled on the network and thus will likely result in less traffic emission based impacts. Development close to the City will attract travel into the City but these will short range trips and as such more likely to be undertaken by sustainable travel modes. The current travel patterns for residents of Durham City already support this, with 40% of all commutes classed as sustainable, the highest in the County (**Appendix L**).

- Existing highway pinch points in Durham City are likely to experience the greatest impact in all spatial options since it is the main attractor of trips in the County. Inevitably, given the trends of travel presented in this document, this greatest impact on pinch points within Durham City will be most apparent in options with development focussed around the City when compared to the wider dispersal option.

1. Introduction

1.1 Background

1.1.1 The requirement of the County Durham Plan is to set out the vision and the framework for the future development of the County, addressing needs and opportunities in relation to housing, the economy, community facilities and infrastructure – as well as a basis for safeguarding the environment, tackling climate change and securing good design.

1.1.2 County Durham is the largest authority in terms of population in the North East Combined Authority and contains many settlements. Of these, Durham City is the largest settlement within the County. Durham City is a major commuter destination, with 25% of all commuting trips from neighbouring Local Authorities into the County finishing in the City, (**Appendix C**) as well as being the most popular destination for the majority of internal commutes.

1.2 Purpose of this Study

1.2.1 To inform Durham County Council's local plan, Jacobs have been asked to review Census Journey to Work (JTW) data for the County (available through the Office for National Statistics' nomisweb database[1]) to understand the major commuting patterns in order to identify the potential impacts of the proposed spatial dispersion of development sites. It should be noted that JTW data does not present the frequency of the work trip, nor any intermediate destinations and no time of day is provided. Therefore an assumption is made that the data is most likely representative of a morning peak period of travel, with the evening peak period of travel exhibiting a reversal in the trends outlined in this note. This is due in part to the AM peak being the time period in which the majority of commuting trips to work take place. The PM period is more commonly influenced by trip chaining[2] therefore the data given is more likely representative of the morning peak.

1.2.2 Three separate sets of local Journey to Work data for County Durham from the 2011 census have been gathered at a Lower Super Output Area (LSOA[3]) level. The first considers trips from local authorities in the North East travelling cross boundary to LSOAs within County Durham; the second considers trips from LSOAs within County Durham travelling cross boundary to other local authorities in the North East; and the third considers trips from LSOAs within County Durham to other LSOAs in the County.

1.2.3 Analysing these datasets helps to better understand the general commuting patterns currently being observed in County Durham. Additionally, it provides a useful insight into the potential travel patterns / key transport trends that may arise as a result of new dwelling and employment development.

1.2.4 To understand the potential travel patterns and strategic impacts associated with alternative options, four alternative options have been considered:

[1] Nomisweb: https://www.nomisweb.co.uk/
[2] Trip Chaining – A series of trips linked together between an initial origin and final destination e.g. a journey that leaves work, stops to drop of a passenger before continuing home.
[3] A geographical hierarchy representing an area with a population between 1000 - 3000

- Main Town Focus - A narrow spatial pattern that will involve a larger quantum of development focused on Durham City as the most accessible location with the largest number of jobs in the County.

- Sustainable Communities – A dispersed spatial pattern of development located in key settlements across County Durham principally in the larger towns including Durham City.

- Sustainable Communities with Central Durham Villages - A dispersed spatial pattern that will involve a quantum of development being diverted from Durham City to the villages surrounding it such as Meadowfield, Coxhoe, Langley Park, Sherburn, Ushaw Moor, Lanchester and Esh Winning.

- Wider Dispersal - A dispersed spatial pattern that will involve a larger quantum of development being located in the settlements across the County.

1.2.5 Plans for each of the above options were presented in the County Durham Plan Issues and Options (2016) and are presented in **Appendix G – J** in this report. Each appendix gives an indication of the distribution of housing for each option.

1.2.6 Journey to Work data from the 2011 Census will be used to demonstrate the impact on travel patterns as a result of the four alternative spatial development patterns in relation to current trends in County Durham.

2. Context

2.1.1 By population, Durham is the largest County or unitary district in the North East of England, with a population of over half a million. It extends from the Durham Heritage Coast in the east to the high moors of the North Pennines in the west, both locations being areas of nationally important landscape. It is a large geographic area covering 223,000 hectares (862 square miles) and is bordered by the major conurbations of Tyne and Wear to the north and Tees Valley to the south.

2.1.2 Largely rural in nature, the County's settlement patterns include a number of larger settlements including these listed below and displayed in **Figure 2-1**.

- Durham City
- Consett
- Peterlee
- Newton Aycliffe
- Chester le Street
- Seaham
- Bishop Auckland
- Spennymoor
- Stanley
- Shildon
- Crook
- Barnard Castle

2.1.3 Travel patterns for these settlements have been obtained by grouping together the Lower Super Output Areas (LSOAs) which represent each of the above settlements and aggregating the JTW data for each.

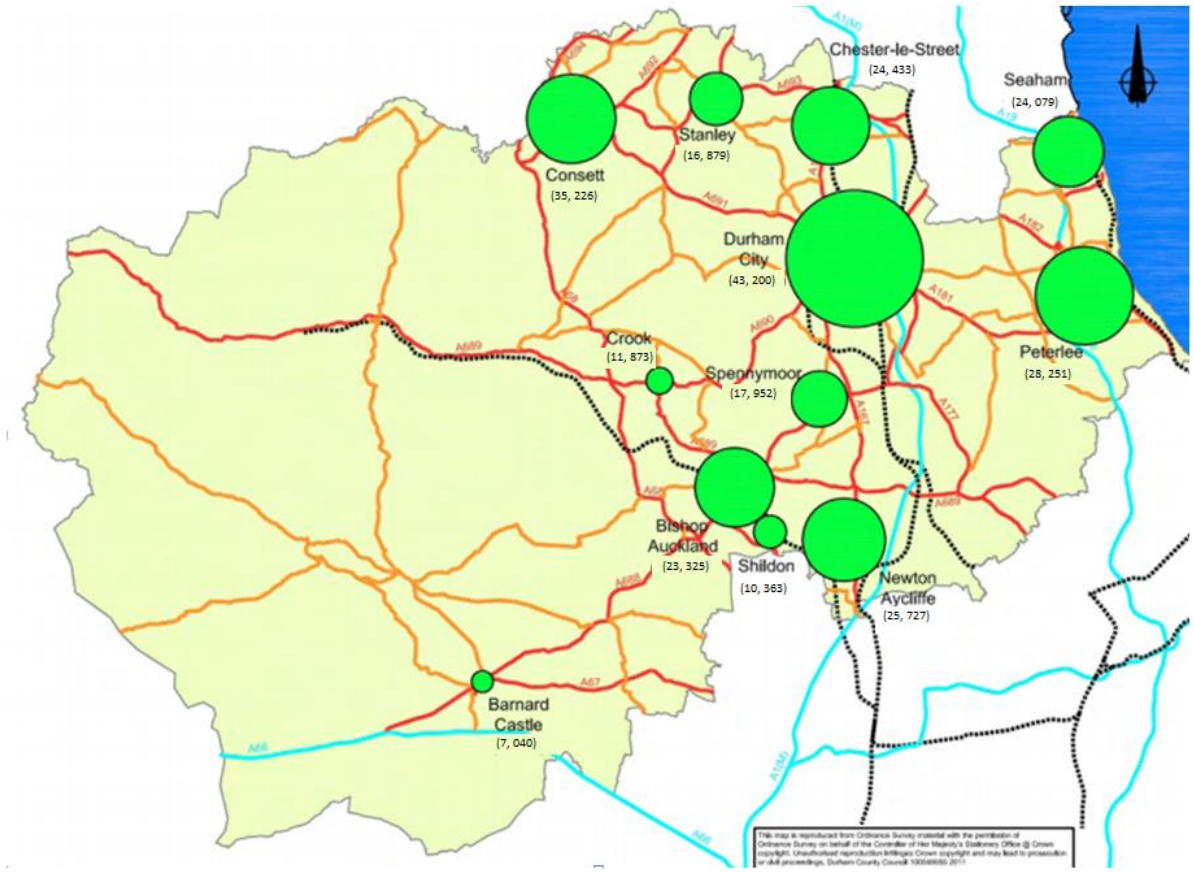

Figure 2-1: Population of Durham City's Largest Settlements

2.1.4 Due to its size and widely dispersed spatial pattern, analysis of travel patterns within the County can be difficult if left at this level of granularity. In order to address this, the County has been split into the nine monitoring areas shown in **Figure 2-2**. These 9 areas replicate the monitoring areas used in the County Durham Plan Issues and Options (2016) document.

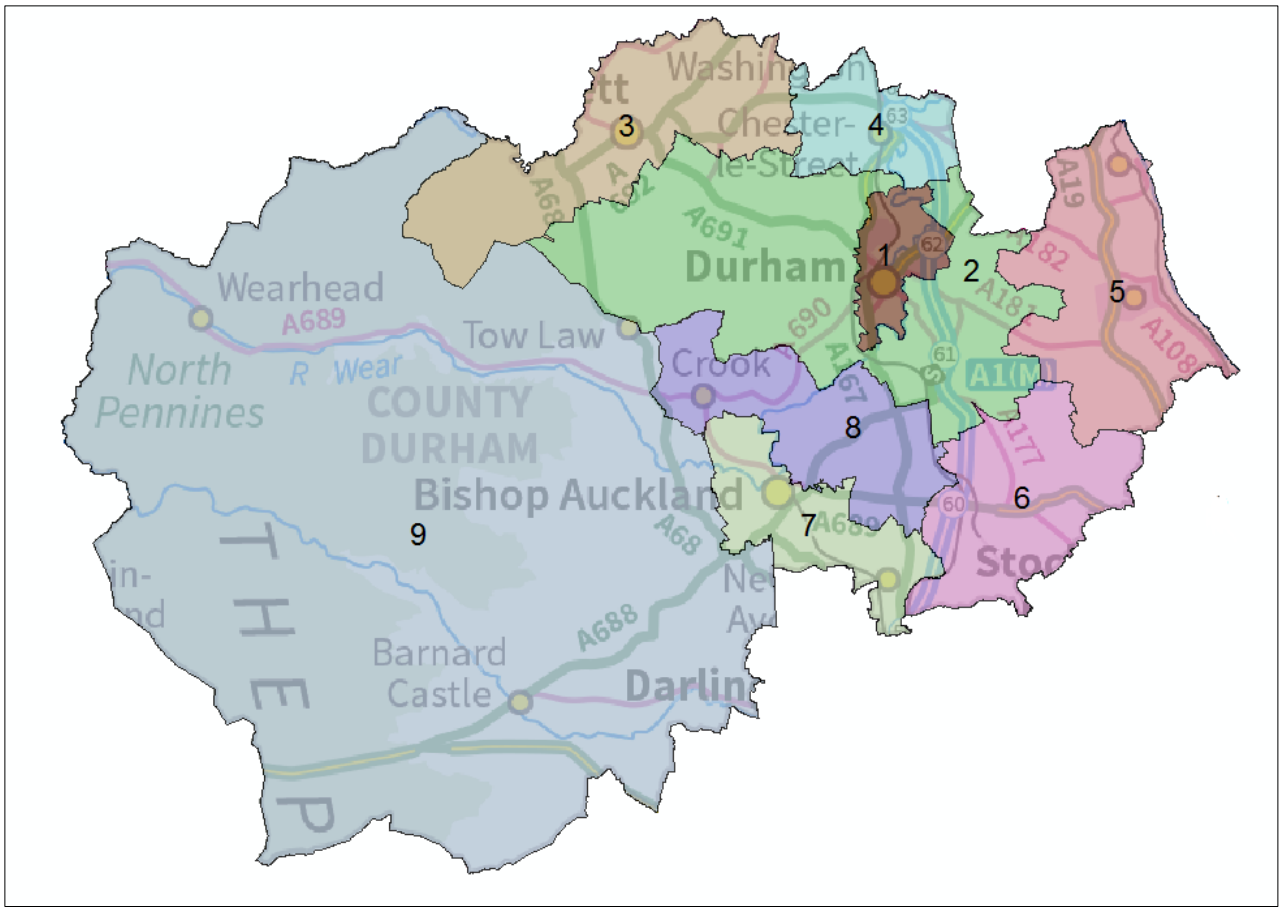

Figure 2-2: Monitoring Areas

2.1.5 Data for each of these areas was collated using the same method as for the main settlements. It should also be noted that the figures derived for each of the nine areas include the LSOA data for the main settlements within that area. The following numbers on the map correspond to the following monitoring areas:

1. Durham City
2. Central Durham
3. North West Durham
4. North Durham
5. East Durham
6. South East Durham
7. South Durham
8. Mid Durham
9. West Durham

3. Data Analysis

3.1 Scope of Analysis

3.1.1 The following section sets out the current travel patterns within County Durham based on Journey to Work data obtained from the 2011 census in relation to:

- 12 individual settlements;
- LSOA based zonal groups of settlements;
- Employment within Durham City;
- Impacts on major highway corridors and pinch points; and
- Potential impacts of future dwelling development options presented in the County Durham Plan Issues and Options (2016).

3.1.2 The analysis has been undertaken with regards to the 12 settlements displayed **Figure 2-1** and the 9 monitoring areas shown in **Figure 2-2**. The reason for this is because these settlements have the largest travel pattern influence on the areas that they form part of. The analysis presents the impacts of dwelling development and growth at an aggregate level, but allows for cross referencing against the travel patterns of the composite settlements in the future should it be necessary.

3.2 Individual Settlements

3.2.1 The Duty to Co-operate was one of the main changes introduced with the passing of the Localism Act in 2011 and as such, understanding the economic, social and environmental linkages with neighbouring authorities is essential. A fundamental aspect influencing this is the travel patterns between these areas.

3.2.2 **Appendix A** shows the current trends of the 12 individual settlements. Within the appendix, Table 1 displays the movements of those journeys traveling to the towns, whereas Table 2 presents the travel pattern of those originating in the defined areas.

3.2.3 **Appendix M** highlights Durham City's significance as the major economic centre. As previously mentioned Durham City is located at the centre of Durham County, yet despite this Durham City attracts almost twice as many cross-boundary movements (7671) as the next largest employment area (Peterlee – 3948) and almost three times as many as Newton Aycliffe (2701).

3.2.4 With regards to trips generated within each of the settlements, despite having the largest population, Durham City is fourth in relation to cross boundary movements. Chester-Le-Street (4643), Seaham (4071) and Consett (3966) all produce a higher number of trips leaving the County, with the 3609 generated by Durham City only marginally higher than the number originating in Newton Aycliffe (3448).

3.2.5 As seen in **Appendix A** (Table 2), the percentage of cross boundary trips produced does vary considerably between settlements. Chester-le-Street and Seaham are associated with nearly 50% cross boundary trips, which is mainly due to the large urban conurbations to the north accessible via the A1 (M) and A19 respectively. The four other settlements on the periphery of County Durham (Consett, Stanley, Newton Aycliffe and Perterlee) have cross border trip production percentages between 25% and 40%. The remaining settlements, located nearer the centre of County Durham, have percentages lower than 25%. These values show that proximity

and access to key strategic routes dictate the likelihood of trips from a settlement within Country Durham travelling to the surrounding Local Authorities.

3.2.6 Table 1 shows that Durham City does not entirely fit this trend as despite being centrally located it attracts a higher proportion of cross boundary movements (21%) that the County average (20%). However, due to its role as the economic centre of the County and access to key strategic routes for both public and private transport modes, this is to be expected. Whilst almost all settlements have a stronger relationship with County Durham than the neighbouring authorities, and as such produce more intra-county trips than cross County boundary trips, there are some settlements where this relationship is weaker than others. This relationship is the inverse of that mentioned in section 3.2 above, with a higher percentage of intra-county trips being produced by the settlements within the central area of the County and a lower percentage produced by those around the periphery. Across the County 31% of working residents in County Durham travelled outside the local authority for employment. The authority's self-containment rate (i.e. share of residents also working in County Durham) was equivalent to 69%.

3.2.7 Another difference in Table 2 between the settlements is the percentage of trips that are retained internally with the settlement itself. The smaller settlements within the central area of the County such as Crook and Spennymoor have lower trip retention. By comparison with Durham City, it can be seen how a much larger settlement with more employment is more likely to be a trip retainer within a region. Durham City retains 73% trips. This trend can be seen in the large peripheral settlements which also have higher retention rates i.e. Consett retains 58% of trips while Newton Aycliffe retains 59% of trips. This is again is likely to be a product of employment opportunity being more pronounced in the larger settlement areas.

3.2.8 Together these examples show that although relatively comparable the nature of trip generation from settlements within County Durham does vary depending on size and location. Due to this varied nature, in order to evaluate County Durham effectively, it would be beneficial to disaggregate it into areas which share similar characteristics.

3.2.9 From this analysis, it can clearly be seen that housing development (i.e. trip generation) in certain settlements such as Chester-le-Street and Seaham will result in a higher number of cross County boundary trips when compared with a settlement closer to Durham City for example. This increase in cross County boundary trips would logically result in greater car borne travel, increased highway network associated impacts such as congestion and emissions in both County Durham and surrounding local authorities. As well as this it would also represent a leakage of economic activity outside the County.

3.3 Aggregated Area Groupings

3.3.1 As mentioned previously, the LSOAs within County Durham were aggregated into nine monitoring areas as illustrated in **Figure 2-2**. **Appendix B** displays the current travel patterns of these.

3.3.2 Following this initial overview of the four options presented by DCC which are shown in **Appendices F – I** and the analysis of the trip patterns of the major settlements outlined in section 3.2, it became apparent that for the remaining analysis the most suitable method would be to assess the monitoring areas in the following four groups:

- Areas 5, 6 and 9 – Only minor changes proposed between the four options;
- Areas 1 and 2 – Central County Durham;
- Areas 7 and 8 – Similar changes proposed for each option; and

- Areas 3 and 4 –North of the County.

3.3.3 Each of the groupings of areas above also share travel pattern characteristics making baseline evaluation and subsequent comparison simpler.

3.4 Area Grouping Rationale

3.4.1 The rationale for the groupings set out in section 3.3 is detailed below and follows on from the initial observations made in section 3.2. The following paragraphs outline the similarities between the areas that have been grouped together and the reasons why it is appropriate to group them into these four groups for the purpose of the future analysis.

East Durham, South East Durham and West Durham

3.4.2 **Figure 3-1** below shows three areas which have been grouped due to their lack of significant variation between the four options.

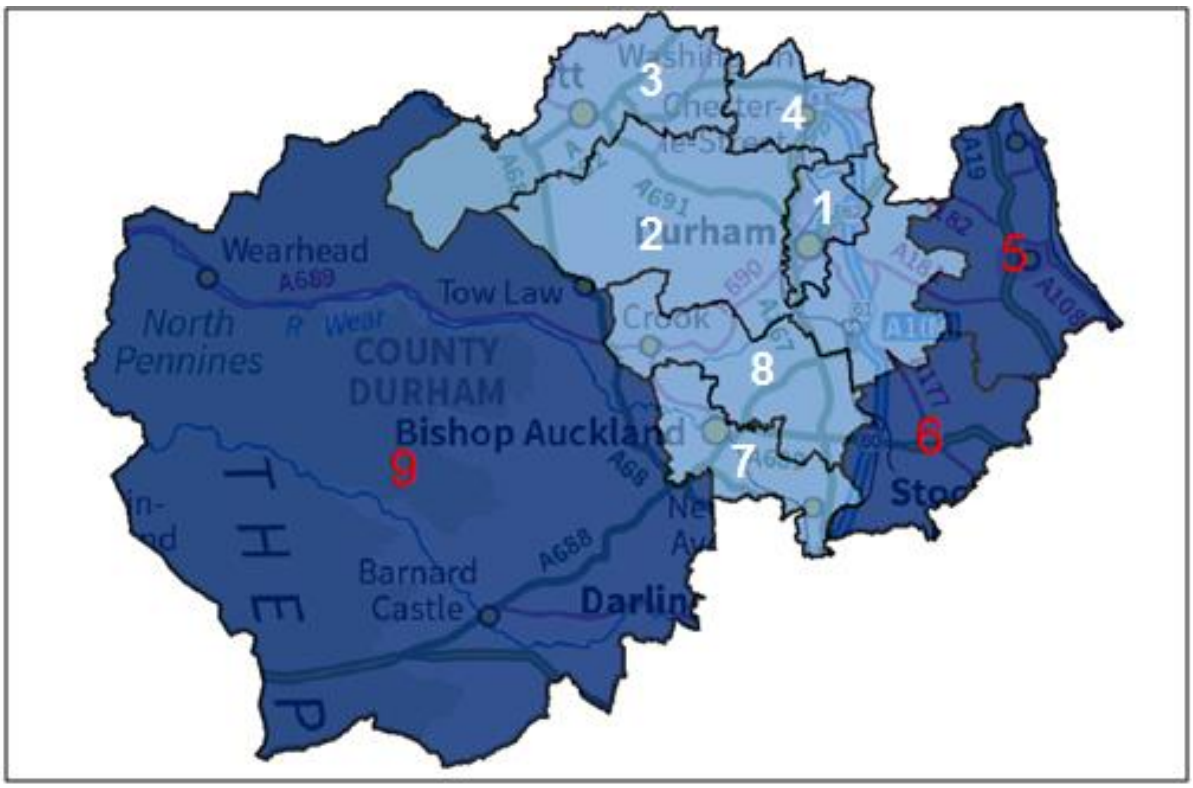

Figure 3-1: Aggregated Areas East Durham, South Durham and West Durham

3.4.3 Whilst the development proposed within a number of other areas varies significantly across the four options, the proposed quantum for East, South and West Durham remains very consistent with a maximum of 2% variation between the different options.

3.4.4 South East Durham never represents more than 2% of the proposed development so is unlikely to have a significant impact on the road network in any of the options. Also, despite covering an area roughly equal in size to the other eight areas combined, no option proposes more than 5% of the housing to be located in West Durham. Giving the combination of its geographical size and

level of proposed development this area is also unlikely to cause a significant impact on the road network.

3.4.5 With regards to trips originating in South East Durham only 58% remain within the County boundary, the second lowest of any area. Of these, only 35% remain within the area; only Central Durham displays a lower level of internal retention.

3.4.6 West Durham sees the second lowest level of journeys crossing the County boundary with only 21% travelling to a neighbouring authority. Of those that remain within the County 18% terminate in South Durham, with 60% being internal to West Durham.

3.4.7 As discussed in section 3.2, whilst the 14% - 16% of the housing proposed within East Durham is significant it is difficult to predict the potential impact of development on this scale without further information regarding the settlement location of the development in this area. The tables in **Appendix B** illustrate the current trends for this area as a whole, showing that if the housing development were to be evenly dispersed two thirds of trips would remain in County Durham, with 79% (as shown in **Appendix D**) of these travelling internally within East Durham, indicating that along with areas 6 (South East Durham) and 9 (West Durham) these three areas exhibit very little variation across the four options.

Central Durham and Durham City

3.4.1 **Figure 3-2** below shows the two central areas which are grouped together. Whilst these zones cover a large geographical area, it should be noted that there is only one major settlement within these two zones; Durham City.

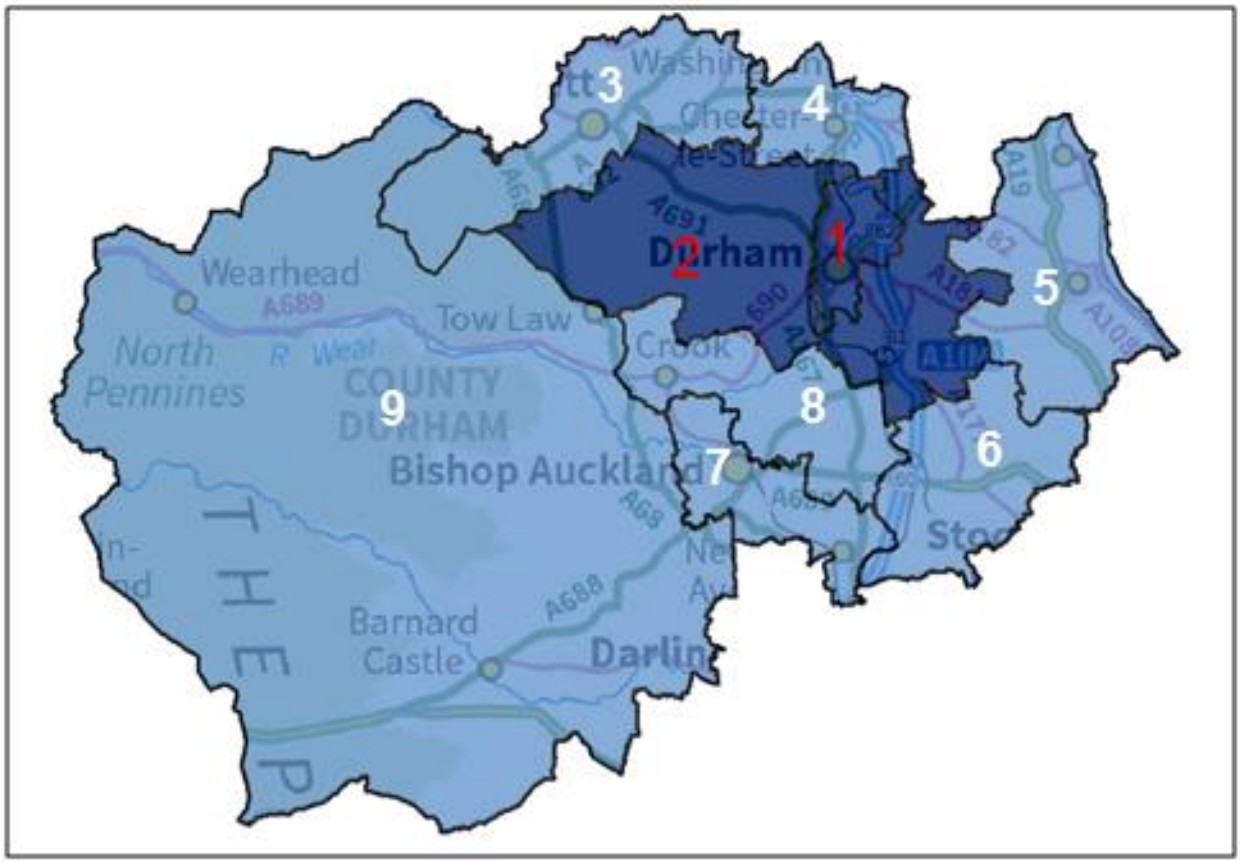

Figure 3-2: Aggregated Areas Durham City & Central Durham

3.4.2 The greatest proposed change over the four options is seen within area Durham City, where the variation is 23% between the Main Town Focus and Wider Dispersal Options. The Main Town Option represents the most Durham centric distribution with 40% of the development proposed to be in area Durham City and Central Durham.

3.4.3 Both of these areas produce a similar percentage of cross boundary trips with around two thirds of journeys staying within the County.

3.4.4 Of those intra-county movements which originate in Durham City and Central Durham, the majority (greater than 70%) stay within one of the two areas.

3.4.5 When comparing the trips patterns in and between the two areas, unsurprisingly, Durham City is the key destination. In Central Durham (the villages beyond the City), it becomes apparent the majority of work journeys go from Central Durham into Durham City, with almost half (43%) of trips originating in Central Durham terminating in the City, compared to its intra-zonal retention in Central Durham of only 28% - see **Appendix D.**

3.4.6 In comparison, not only does Durham City have a higher rate of internal trips (58%), it also produces less movement between the areas with only 21% of trips originating in the City having a destination within Central Durham. This is to be expected as Durham City is a major employment destination with more job opportunities than Central Durham.

3.4.7 This significant net inflow highlights Durham City's prevalence as the major attracter of the area.

Mid and South Durham

3.4.8 **Figure 3-3** below outlines two areas which exhibit similar levels of intra-zonal trip movement.

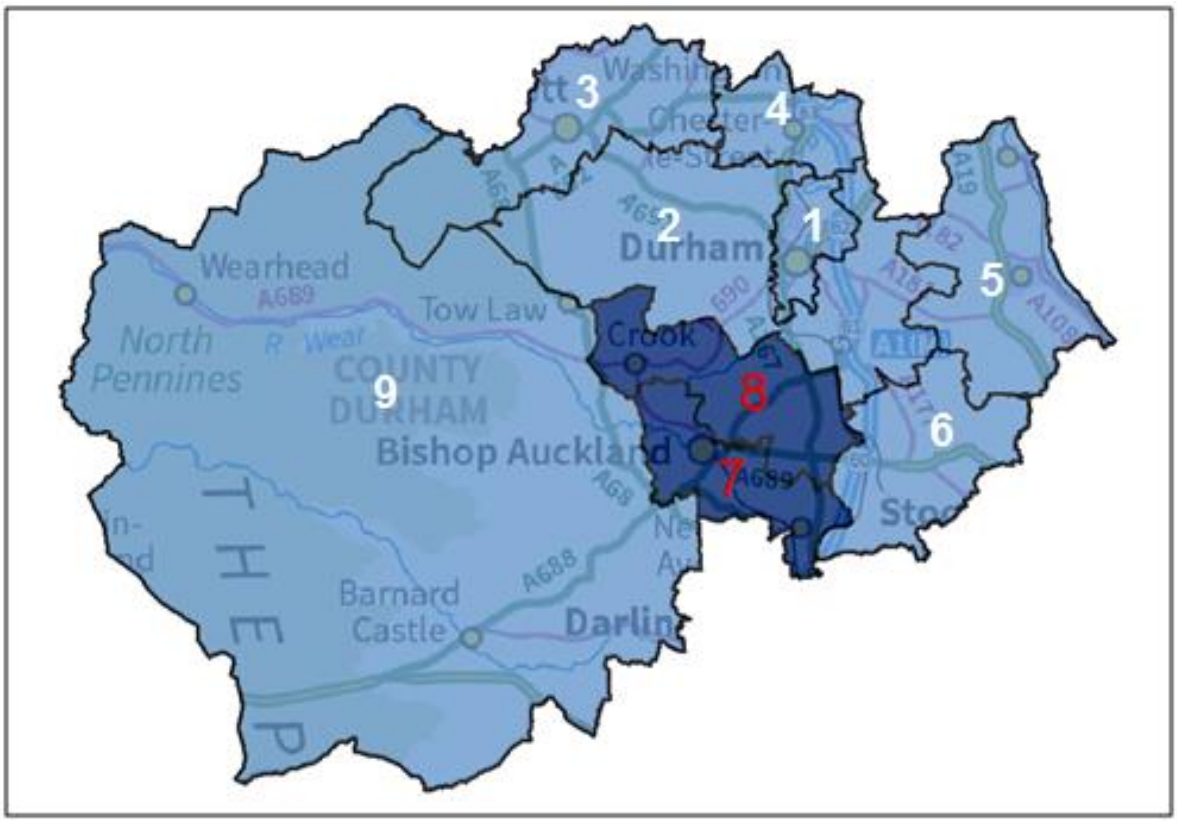

Figure 3-3: Aggregated Areas South Durham & Mid Durham

3.4.9 The level of proposed development in Mid Durham varies from between 11% – 18% across the four options. Whilst it does have the lowest percentage of movements to neighbouring authorities, it also attracts the lowest percentage. However, despite this high County retention rate of trips its intra-zonal retention percentage is low, with just 38% of journeys originating in the area also terminating within it. Nevertheless, it has a comparatively strong relationship with Durham City and excluding the two central areas, only North Durham shows a higher proportion of trips terminating in Durham City (27% compared to 16%).

3.4.10 South Durham also has a high level of County retention with 73% of journeys which originate in the area terminating somewhere within County Durham. However, in contrast to Mid Durham (38%) a significant portion of trips produced by the area (67%) also terminate within the area (see **Appendix D** Table 4). This is most likely due to the higher number of employment jobs, especially in Newton Aycliffe.

North and North West Durham

3.4.11 **Figure 3-4** below indicates the two northern areas that have been grouped together for the further analysis.

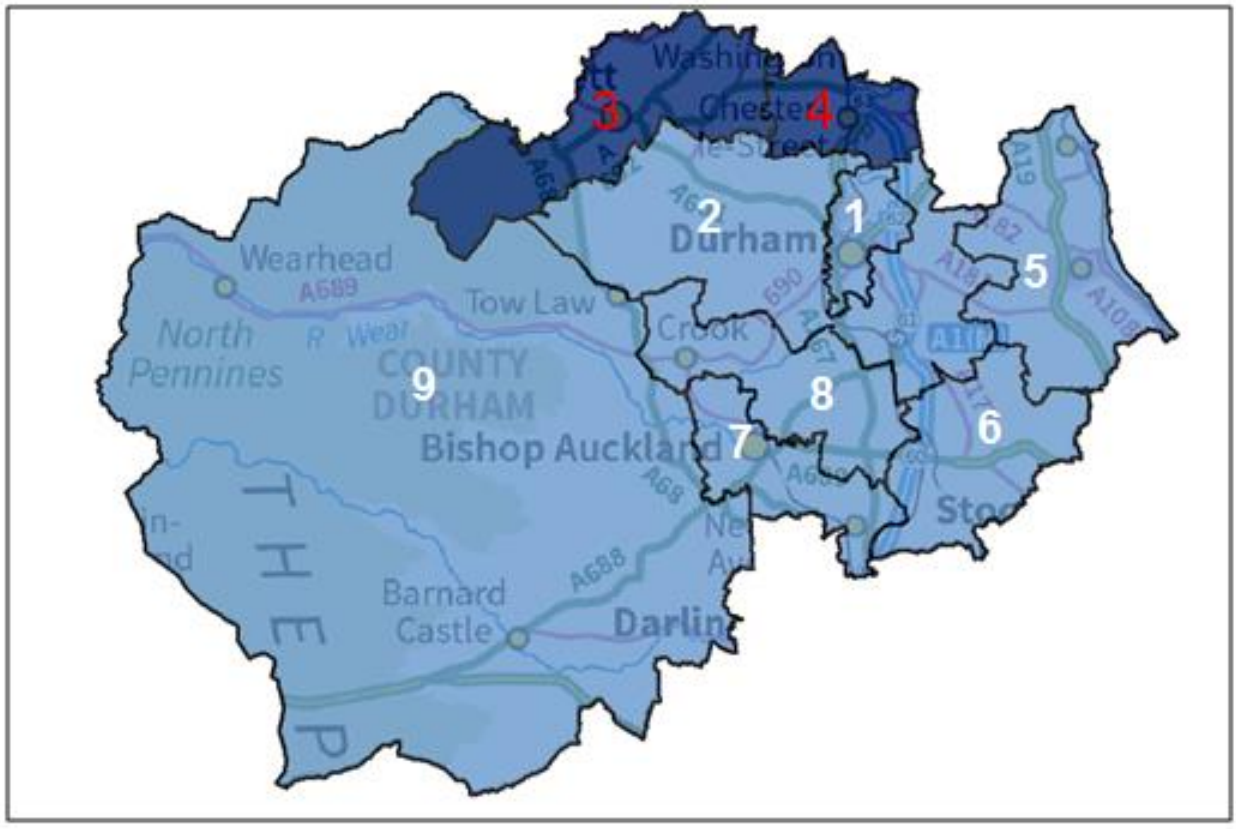

Figure 3-4: Aggregated Areas North Durham & North West Durham

3.4.12 Together, North West Durham (area 3 on map) and North Durham (area 4 on map) make up the north of County Durham, yet the current travel patterns vary significantly between the two.

3.4.13 With regards to trips to the areas, 32% of journeys terminating in North Durham are the result of cross boundary movement, the highest of any area, compared to just 16% in North West Durham. North Durham is also the only area which produces more cross boundary journeys (53%) than it does intra-county trips.

3.4.14 Of all the areas in County Durham, North West Durham has the second highest level of internal trips as a proportion of both journeys originating in the area and those terminating in it - 71% and 80% respectively (**Appendix B**)

Summary of Area Groupings

3.4.15 In summary, the analysis above shows that should housing be located in the peripheral areas of East Durham, South East Durham and West Durham, it would likely result in a high proportion of cross County boundary trips. This is predominantly due to one of the largest settlements within this area grouping (Seaham) having a high volume of out-flowing cross boundary trips, with almost half of the trips originating in the town having a destination within a neighbouring local authority.

3.4.16 Whilst the combined proportion of cross boundary movements for the grouping of aggregated zones above is high, we would see the greatest amount of cross County boundary trips were

development to be placed in the northern most areas of North West and North Durham. However, we would also see a significant increase in movements into Durham City, with over one quarter of the intra-zonal movements originating in North Durham terminating within Durham City. Therefore, were development to be placed in the areas to the north of Durham, there would likely be a significant rise in both cross boundary trips and trips to Durham City.

3.4.17 Development in areas South Durham and Mid Durham would result in a high retention of trips within County Durham, with the majority of these staying within these two areas.

3.4.18 Finally, development in Central Durham and Durham City would result in the greatest amount of trips being kept within County Durham, with the destination preference again being Durham City.

3.5 Existing Employment Patterns

3.5.1 Durham City has the largest working population of all settlements in County Durham and is also the highest attractor of work trips in the County, with 22% of all intra-County trips having the City as their destination. It also has the highest percentage of cross boundary trips with 25% of all cross boundary trips into the County being into Durham City (**Appendix C**). Together these equate to over 36000 trips terminating in Durham City, over twice as many as the next highest attractor Peterlee, which attracts fewer than 15000 trips, and over three times as many as 11000 terminating in Newton Aycliffe (**Appendix M**).

3.5.2 With regards to out-commuting trips Durham City generates less than 8% of the total for the County, with under 14500 journeys having Durham City as there origin. Whilst this is the highest percentage of the total out-commuting trips for any of the settlements, Chester-Le-Street, Seaham and Consett all produce a higher volume of cross boundary movements.

3.5.3 **Appendix K** shows the breakdown of all intra-County trips. It is worth noting that the data does not include cross country boundary movements therefore the figures shown in this table for settlements such as Seaham and Chester-le-Street represent approximately half of their total productions as destinations in other local authorities make up 47% and 49% of trips originating in these two area respectively. Excluding internal trips where the origin and destination are the same settlement, Durham City is the most popular destination for 8 of the 11 other settlements in the County as set out in **Appendix K**. The only three settlements that don't follow this trend are Bishop Auckland, Shildon and Seaham who have more intra-County trips to Newton Aycliffe, Bishop Auckland and Peterlee

3.5.4 Bishop Auckland and Newton Aycliffe are two of the larger settlements in County Durham. Given their proximity it is understandable that they share strong commuting links In fact, a significant percentage of commuter trips leaving Bishop Auckland head to Newton Aycliffe and to nearby Shildon. There is a strong inter-relationship between these settlements. Linked to this corridor of commuting traffic is Shildon which sits between the two, along the A6072. The Bishop Line also connects these settlements by rail.

3.5.5 Seaham is situated near Peterlee, the second largest settlement in County Durham after Durham City. For residents living in Seaham, commuting to Peterlee takes on average 18 minutes compared to the 30 minutes from Seaham to Durham City[4]. However, as highlighted previously, the majority of commuting trips from Seaham don't stay within the County so the absolute number of trips actually travelling to Peterlee is somewhat reduced.

[4] Google Maps, Directions and Journey Time from Seaham to Peterlee, and Seaham to Durham. Average journey time over 3 neutral days for 3 weeks in April 2016.

3.6 Impacts on Key Corridors

3.6.1 In order to best assess the impact of any development on the current road network a number of pinch points and key corridors were identified; A19, A692/A694 and A167.

A19

3.6.2 The A19 lies to the east of Durham City and runs north to south through the County, as shown in **Figure 3-5**. Due to its location it is unlikely to be significantly impacted by development in any area other than East Durham. As mentioned in earlier sections, the effect of development in this area will be dependent on its location within the area.

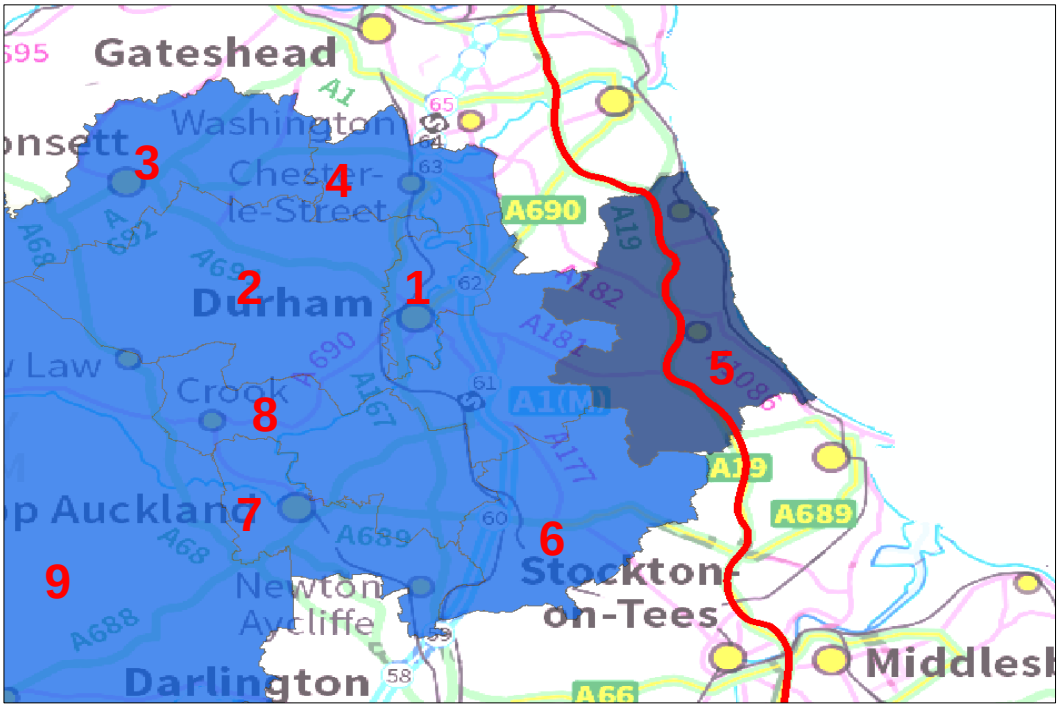

Figure 3-5: A19 through Durham County

3.6.3 If the development was to be spread evenly throughout the area the impact on the corridor with relation to cross boundary movements would be minimal at the southern end of the A19 with current trends showing less than 10% of journeys likely to use this route to exit East Durham.

3.6.4 The impact on the A19 East Durham likely to use this corridor to travel to north of the County, with the majority of those travelling into Sunderland (18%).

3.6.5 However, as covered in section 3.2 this could be greatly affected by the location of the development. For example 10% more development around Seaham would likely increase the effect on the north of the A19 due to Seaham producing more trips travelling to the north of the County than Peterlee were trips are more self-contained. Further detail can be found in **Appendix E** which gives details on the cross County boundary movements of the main settlements within East Durham.

3.6.6 Despite a high proportion of journeys originating in East Durham staying within the area, the relationship between Seaham and Peterlee is relatively weak. This therefore suggests that any

impact on the A19 will be as a result of cross boundary movements originating in Seaham and terminating to the north of East Durham rather than within it.

A167

3.6.7 The A167 is one of the key strategic routes within County Durham however due to its proximity to the A1 and the current zoning structure, analysis of current trends on this route is difficult. This is largely due to the areas covering a large east – west area and as such only a narrow section would use the A167 as an access to Durham City. The location of the A1 in relation to the A167 presents a problem when analysing cross County boundary movements as each is a viable option to exit the County to both the north and the south.

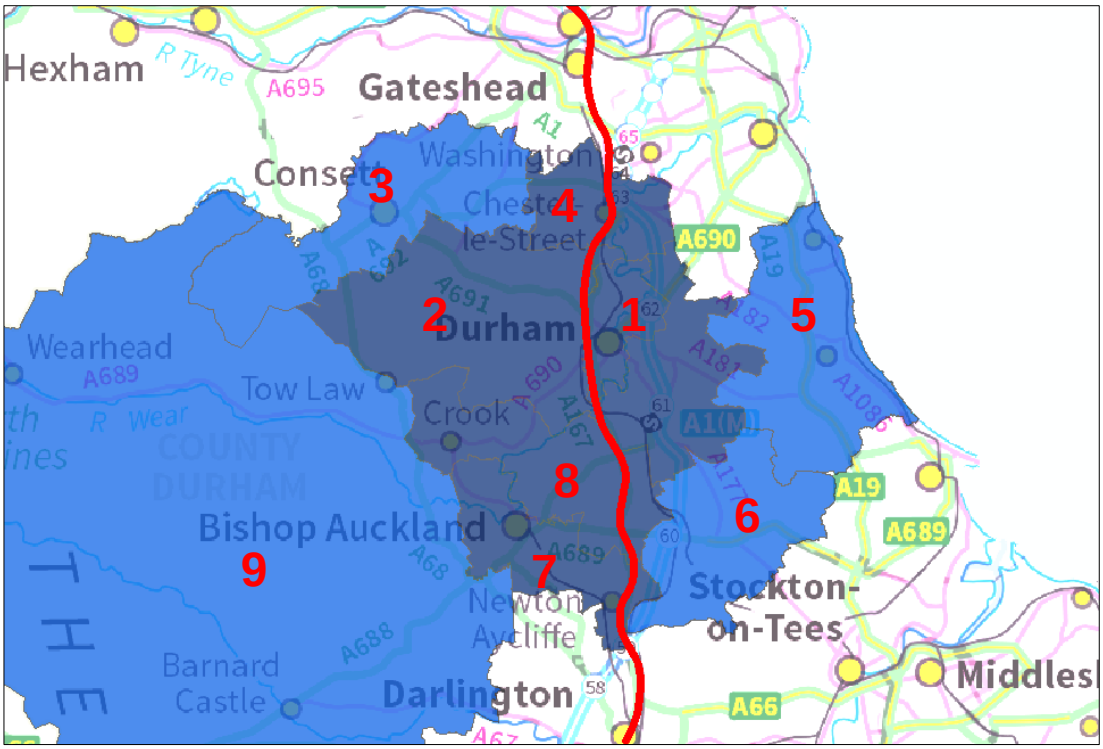

Figure 3-6: A167 through Durham County

3.6.8 Nevertheless a number of locations have been identified where analysis is possible along this corridor; these are discussed below.

3.6.9 For journeys originating in Spennymoor within Mid Durham, the A167 is the likely route both into Durham City and when exiting the County to the south/southeast. However, as can be seen in **Appendix F** only 19% of trips originating in Spennymoor are cross County boundary and even fewer (8%) travel to a destination which would utilise the A167. As such it is unlikely any development in Spennymoor would significantly impact the A167 with regards to cross County boundary movements.

3.6.10 Similarly, only 16% of trips originating in Mid Durham travel to Durham City, with the largest movement being to remain in Mid Durham or terminate in South Durham.

3.6.11 Due to the high intra-zonal retention rate of Bishop Auckland and Newton Aycliffe along with the perceived most likely route out of the County from these locations, it was concluded that potential impacts on the A167 would be minimal compared to other areas, as such no analysis was undertaken on these areas with regards to the A167 corridor.

A692/A694

Figure 3-7: A692 & A694 through Durham County

3.6.12 North West Durham is the area likely to have the largest impact on the cross County boundary movements utilising the A692/A694. As can be seen in **Appendix E** 35% of journeys originating in North West are cross boundary. Of these 35%, approximately three quarters are likely to use either the A693 or A694 as their destinations are Northumberland, Gateshead or Newcastle.

4. Option Assessment – Key Features

4.1.1 The implications of any development with regards to the options are examined in the following section. The options are not presented in order but instead are presented in a format to aid with the analysis and enable comparisons to be drawn.

4.1.2 As previously mentioned in section 3.3 the proposed development in area East Durham, South East Durham and West Durham remains largely consistent and will therefore not be discussed in depth with regards to each option as the effects caused will not change significantly.

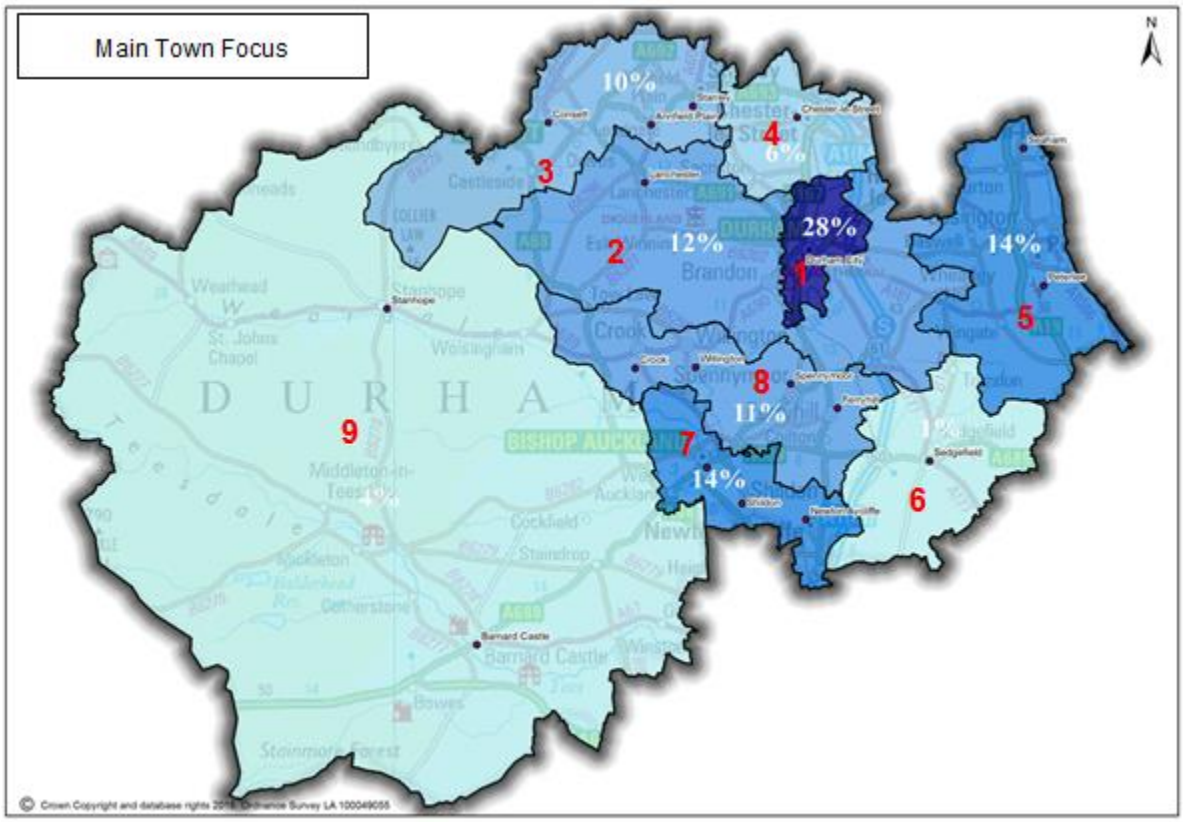

Figure 4-1: Proposed Development - Option - Main Town Focus

4.1.3 The key feature of the Main Town Focus option is the level of development proposed within Durham City. As can be seen from **Figure 4-1**, over one quarter of the dwellings would be located within Durham City and 40% within Durham City and Central Durham combined. Conversely, due to the volume in these two areas the Main Town Focus option also represents the lowest proportion of the development proposed in each of the other 7 monitoring areas in County Durham.

4.1.4 As with all options this would increase the number of journeys into Durham City, however with current trends showing 73% of intra county trips originating in Durham City remaining within the area, by locating the development near the area of employment any increase in trips would likely

be short distance trips. This is significant as journeys over shorter distances are more likely to travel by a sustainable mode or be receptive to sustainable transport initiatives.[5]

4.1.5 The Main Town Focus option also sees the lowest proposed level of development in areas on the outskirts of the County. High levels of development would encourage cross boundary journeys from neighbouring local authorities (for example, high levels of development in Consett (Area 3) would encourage commutes from Newcastle/Gateshead). Larger settlements on the outskirts of the County, such as Chester-le-Street (Area 4) and Seaham (Area 5) already have the highest rates of cross boundary journeys from neighbouring authorities.

4.1.6 Whilst it would be preferred that commuter trips stay within the County and contribute to growth within Durham County, there is also the wider impact traffic effects on the network. It has been highlighted that shorter range trips are likely to be more open to sustainable travel mode switching, but even if this was not the case, longer journeys will likely result in more emissions than shorter journeys. However, in some cases, there are varying factors to take into account, including acceleration and deceleration profiling. Aggressive or excessive acceleration will result in less efficiency from standard vehicles. As such, stop/start conditions have a greater negative impact upon emissions from traffic than free flow conditions. It is suggested then, that any emissions from journeys which are comparable in length would be reduced by choosing a less congested route.

4.1.7 Durham City, like most large urban centres, experiences congestion at peak commute times. However, unlike other large urban centres in the region, the approach radial routes to Durham are relatively free flowing. It isn't until a commuter reaches the edges of the City that they are likely to experience congestion effects. When compared to well-known congestion issues leading into other main urban centres in the region, such as the A1 Western Bypass leading to Gateshead/Newcastle and the subsequent bridge crossings, it could be suggested that any scenario which encourages travel to Durham City instead of cross County boundary will have less emission impacts.

4.1.8 The development distribution for the Wider Dispersal option is shown in **Figure 4-2** below.

[5] Creating Growth, Cutting Carbon – Making Sustainable Local Transport Happen, DfT

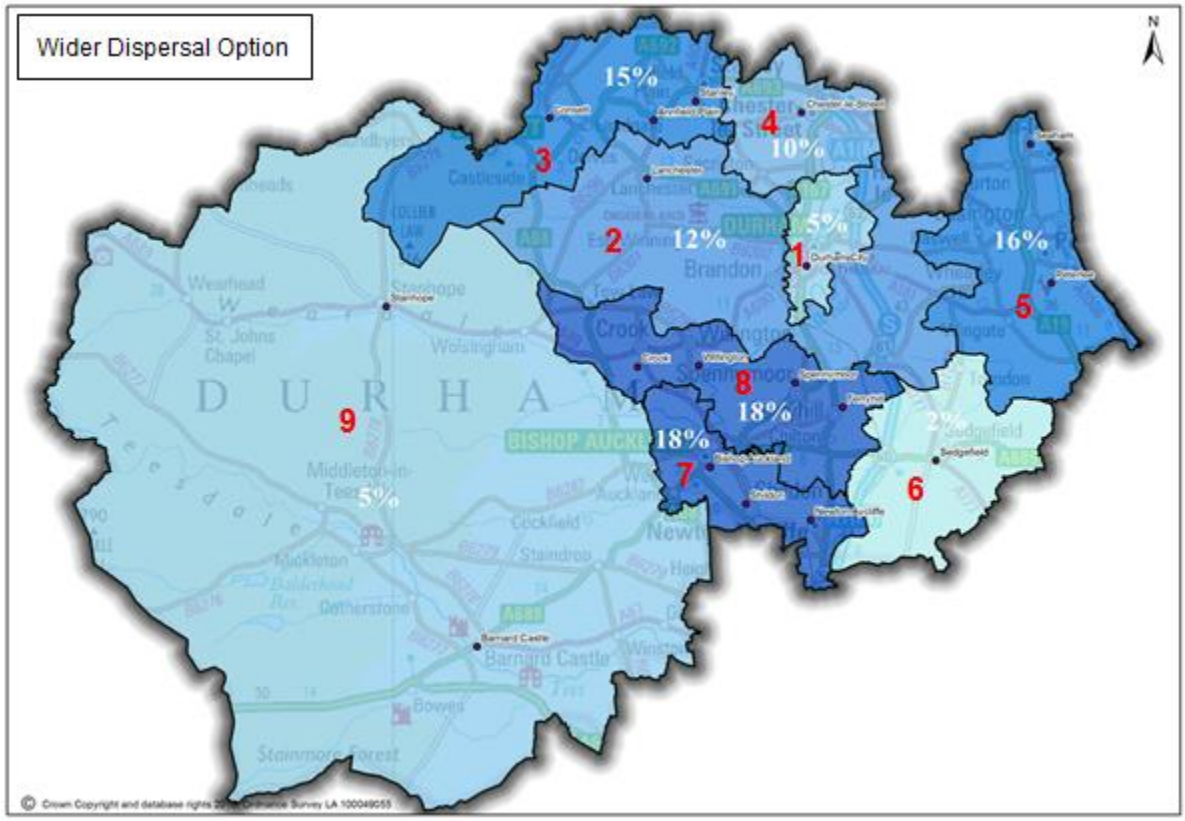

Figure 4-2: Proposed Development - Option - Wider Dispersal

4.1.9 The Wider Dispersal option represents the most widely dispersed spatial pattern, with only 5% of the proposed development located in Durham City. With the exception of Central Durham, this is also the option in which all other areas receive their highest level of proposed development.

4.1.10 As discussed in the previous section, the significant increase in the southern areas (South Durham and Mid Durham) in the Wider Dispersal option presents a potentially detrimental impact on a number of pinch points. Firstly, the combination of the increase in dwellings within these areas and the employment within Durham City it would be expected to see a significant increase in trips to Durham City. Unlike the Main Town Focus option however, these would be over a larger distance and significantly would almost certainly utilise a route which passes through one or two pinch points (Neville's Cross and/or Stonebridge).

4.1.11 Situated in the centre of Darlington where the A68 and A167 meet, the Northgate roundabout would also be expected to experience some impact due to cross boundary traffic. This due to the South Durham and Mid Durham containing over one third of the proposed development in this option, combined with the strength of their travel to work relationship with Darlington (16% and 7% shown in **Appendix E**).

4.1.12 Equally, the Wider Dispersal option would be expected to cause the highest increase in cross County boundary trips from the north of the County. This would be largely due to North Durham having the lowest intra-County retention rate for both trips terminating and originating, with more than half of the journeys originating in the area traveling to neighbouring authorities. The 15% of proposed development located in North West Durham as part of the wider dispersal option is also

the highest percentage of new housing in this area so would also likely increase cross County boundary movements and increase trips on both the A692 and A694.

4.1.13 As well increasing trips to other neighbouring authorities, development in North West Durham would also impact on Western entrances to Durham City at both Kaysburn and Sniperely roundabout. In this option the effects on Sniperley roundabout would be further exacerbated by the development in North Durham, which currently has 27% of its internal (County Productions) trips terminating in Durham City (See **Appendix D)**, a number which would likely increase with an influx of employment in Durham City. North Durham to this area would be expected to use the A167 and therefore the Sniperley roundabout.

4.1.14 With regards to areas 3 – 9, the Sustainable Communities and Central Durham Villages option and the Sustainable Communities option are the same, with an equal level of development proposed in each of these areas. As can be seen from **Figure 4-3** and **Figure 4-4** the difference between the two options is the dispersion around the centre.

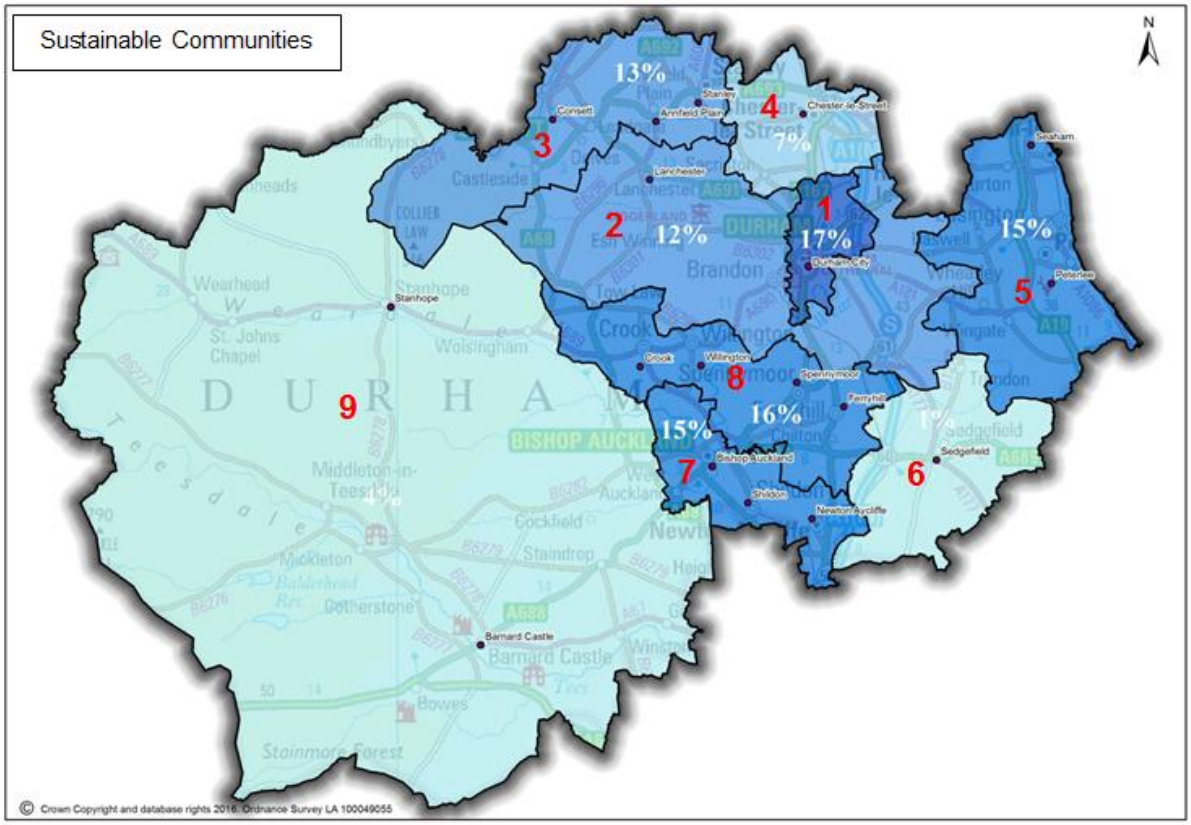

Figure 4-3: Proposed Development - Option - Sustainable Communities

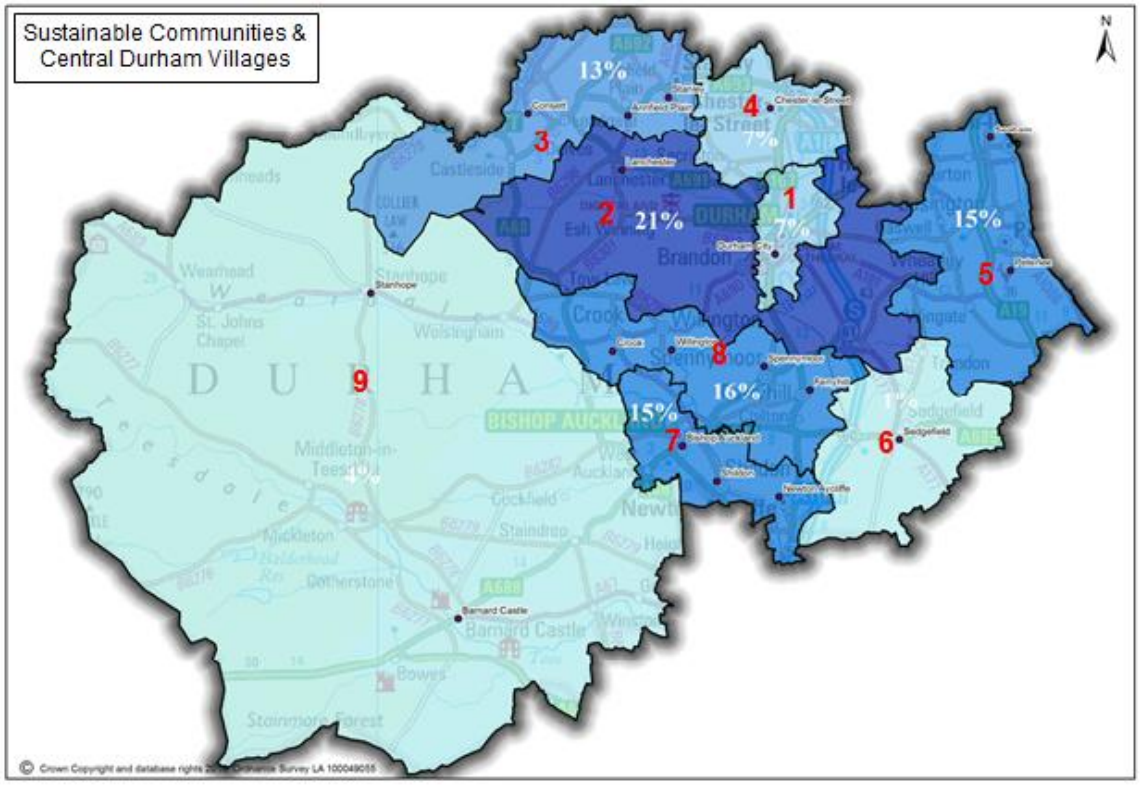

Figure 4-4: Proposed Development - Option - Sustainable Communities & Central Durham Villages

4.1.15 Central Durham as a whole is likely the most susceptible to change within Durham City as it is the only area in the County for which internal trips (Central Durham to/from Central Durham) do not represent the biggest proportion of journeys originating in the area (See **Appendix D**). This highlights that the area currently acts as feeder to other employment areas within the County, particularly for Durham City While there may be options to develop within this area, the current trends suggest that significant employment growth would need to be focussed there because if not, new housing development trips will simply continue to leave the area (predominantly for Durham City). Therefore the existing and future employment within Durham City would see a significant increase in journeys into Durham City as a result of the Central Durham Villages option. Furthermore the largest settlements within Central Durham are to the west and south of Durham so if future development were to follow past trends it would be this area that would likely see the bulk of the housing meaning any increased trips would almost certainly impact at least one of Sniperley roundabout, Toll House Road, Neville's Cross, A691/Kaysburn or Stonebridge.

4.1.16 Given the information above, should housing development be located in Central Durham, it would likely follow exactly the same commuting patterns as housing placed within the City. The main difference though, is that the increased distance would likely lead to more private vehicle trips as there is less opportunity to use sustainable modes and the journeys undertaken would be with increased distance and thus impact negatively upon emissions and potentially further constrain the City based road network.

4.1.17 If development were to be located to the east of Durham City, as much of the employment is in the centre or to the west of the City centre many of the movements would have to cross the centre of Durham City, which would present significant issues as the City already suffers from excessive congestion along corridors through the City, such as at Milburngate Bridge.

4.1.18 Either way, as over one fifth of the development would be located in Central Durham combined with the strength of the link between Durham City and Central Durham, even if the housing was to be dispersed within Central Durham, there would likely still be significant impact on the majority of routes into Durham City.

4.1.19 The likely impacts of the Sustainable Communities are similar to that of the Main Town Focus, the main difference being an increase in journeys to neighbouring authorities and trips into Durham City with the Sustainable Communities options. With the 5% increase in Mid Durham from the Main Town Focus option, these trends would likely be more pronounced in the south than the north. This would likely result in a larger increase in the proportion of trips traveling cross County border to neighbouring authorities to the south in comparison to those to the north. As well as this, the pinch points and routes into Durham City from the south would likely experience a greater impact as a result of the dwelling developments than those approaching Durham from the north.

4.1.20 To summarise, the quantum and spatial pattern of any forecast development is likely to be key in understanding the likely impact upon travel patterns, the road network and associated benefits to the County in the future. This section has highlighted that options that focus dwelling development in the central areas of County Durham, especially the Central Durham area, are likely to see an increase in travel to the City. These options are also likely to witness less cross County boundary trips as a result.

4.1.21 Residents who live close to the City Centre of Durham are approximately one third more likely to use sustainable transport (bus, train, walking, cycling and car sharing) when commuting to work, than the County average (**Appendix L**). Citing a DfT study into the effects of smarter choice programmes concludes:

4.1.1 "The towns were most successful in reducing car driver kilometres for work in the shorter journey distance bands (<10km), where reductions in car driver mileage for commuting accounted for over a third (36%) of overall mileage savings. There was notably less success in reducing journeys in the longer distance bands (10-50km), where car mileage for commuting increased"[6]

[6] DfT research, "The Effects of Smarter Choice Programmes in Sustainable Travel Towns: Research Reports", Cairns et al, Part V, Chapter 20, section 20.6, pg 645.

5. Conclusion

5.1.1 From the analysis, it can be seen that housing development (i.e. trip generation) in certain settlements such as Chester-le-Street and Seaham with result in a higher number of cross County boundary trips when compared with a settlement closer to Durham City for example. This increase in cross County boundary trips would logically result in greater car borne travel, increased highway network associated impacts such as congestion and emissions and represent a leakage of economic activity outside the County.

5.1.2 The LSOA based group analysis shows that should development be located in the peripheral areas East, South East and West Durham it would likely result in a higher proportion of cross County boundary trips. This is predominantly down to Chester-le-Street and Seaham being the main settlements within this area grouping. Were development to be placed across the northern most areas in north and north-west Durham, we would see the greatest amount of cross County boundary trips in comparison to the other area groupings.

5.1.3 Finally, analysis of the four proposed housing options has shown the quantum and spatial pattern of any forecast development is likely to be key in understanding the likely impact upon travel patterns, the road network and associated benefits to the County in the future. This has highlighted that options that focus housing development in the central areas of County Durham, are likely to see an increase in travel to the City. However, the closer new housing is to Durham City, the more opportunities there are for trips to be made by sustainable transport modes.

5.1.4 Focusing development on Durham City will therefore allow Durham County Council and other stakeholders to maximise any opportunities for encouraging sustainable modes of transport and decrease the over reliance on the car. Compared to other settlements in the County, Durham City is the only settlement where sustainable commuter trips rival the numbers of private vehicle trips, with over 40% of trips within the zone being made by a sustainable method.

5.1.5 Conversely, were the development to be placed on the periphery of the County, this would likely either increase the number of cross-boundary movements or increase the length of movements into Durham City, both of which would contribute to an increase in the number of private vehicle trips.

6. Appendices

Appendix A – Cross Boundary Trends (Main Settlements)
Appendix B – Cross Boundary Trends (Aggregated Areas)
Appendix C – Cross Boundary Attractions
Appendix D – Intra-County Productions (Aggregated Areas)
Appendix E – Aggregated Areas to Neighbouring Authorities
Appendix F – Main Settlements to Neighbouring Authorities
Appendix G - Sustainable Communities
Appendix H – Sustainable Communities & Central Durham Villages
Appendix I – Wider Dispersal Option
Appendix J – Option – Main Town Focus
Appendix K – Travel Between Major Settlements
Appendix L – Average Transport Modes for commuters in Major Settlements
Appendix M – Main Settlement Trends (Absolute Values)

Appendix A – Cross Boundary Trends (Main Settlements)

Table 1: Journeys Terminating (in-commuting) in the 12 Main Towns

	County Durham	Neighbouring Authorities	Internal	Aggregated Area
Durham City	79%	21%	27%	1
Consett	87%	13%	59%	3
Stanley	84%	16%	42%	3
Chester-Le-Street	68%	32%	37%	4
Seaham	69%	31%	57%	5
Peterlee	73%	27%	42%	5
Spennymoor	89%	11%	30%	7
Crook	96%	4%	35%	7
Bishop Auckland	91%	9%	27%	8
Newton Aycliffe	76%	24%	46%	8
Shildon	86%	14%	23%	8
Barnard Castle	85%	15%	39%	9
Whole County	80%	20%	N/A	N/A

Table 2: Journeys Originating (out-commuting) in the 12 Main Towns

	County Durham	Neighbouring Authorities	Internal	Aggregated Area
Durham City	75%	25%	73%	1
Consett	70%	30%	58%	3
Stanley	64%	36%	38%	3
Chester-Le-Street	51%	49%	40%	4
Seaham	53%	47%	54%	5
Peterlee	74%	26%	64%	5
Spennymoor	82%	18%	33%	7
Crook	85%	15%	24%	7
Bishop Auckland	80%	20%	40%	8
Newton Aycliffe	66%	34%	59%	8
Shildon	77%	23%	24%	8
Barnard Castle	86%	14%	71%	9
Whole County	69%	31%	N/A	N/A

Appendix B – Cross Boundary Trends (Aggregated Areas)

Table 3: Trips Terminating (in-commuting) in an Aggregated Area

Area	County Durham	Neighbouring Authorities	Internal
Durham City	79%	21%	27%
Central Durham	83%	17%	48%
North West Durham	84%	16%	80%
North Durham	68%	32%	60%
East Durham	74%	26%	83%
South East Durham	73%	27%	49%
South Durham	84%	16%	58%
Mid Durham	90%	10%	56%
West Durham	87%	13%	66%

Table 4: Trips Originating (out-commuting) in an Aggregated Area

Area	County Durham	Neighbouring Authorities	Internal
Durham City	75%	25%	73%
Central Durham	75%	25%	28%
North West Durham	65%	35%	71%
North Durham	47%	53%	47%
East Durham	65%	35%	79%
South East Durham	58%	42%	35%
South Durham	73%	27%	67%
Mid Durham	81%	19%	38%
West Durham	79%	21%	60%

Appendix C – Cross Boundary and Internal Attractions

		Origin	
		Intra-Zonal	Neighboring Authorities
Destination	Durham City	22%	25%
	Central Durham	9%	7%
	North West Durham	14%	11%
	North Durham	5%	11%
	East Durham	16%	23%
	South East Durham	2%	3%
	South Durham	17%	13%
	Mid Durham	9%	4%
	West Durham	6%	4%

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Appendix D – Intra-County Productions (Aggregated Areas)

This appendix details the proportion of where Intra-County trips terminate by origin.

		Destination									
		Durham City	Central Durham	North West Durham	North Durham	East Durham	South East Durham	South Durham	Mid Durham	West Durham	**Total**
Origin	Durham City	58%	21%	4%	3%	5%	1%	4%	4%	1%	**100%**
	Central Durham	43%	28%	7%	5%	5%	1%	5%	5%	1%	**100%**
	North West Durham	12%	6%	71%	5%	2%	0%	2%	1%	1%	**100%**
	North Durham	27%	7%	10%	47%	4%	0%	2%	2%	0%	**100%**
	East Durham	10%	4%	1%	1%	79%	1%	2%	1%	0%	**100%**
	South East Durham	13%	7%	1%	2%	13%	35%	16%	11%	1%	**100%**
	South Durham	8%	3%	1%	0%	2%	1%	67%	11%	7%	**100%**
	Mid Durham	16%	7%	2%	1%	3%	2%	27%	38%	5%	**100%**
	West Durham	7%	3%	2%	1%	1%	0%	18%	7%	60%	**100%**

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Appendix E – Aggregated Areas to Neighbouring Authorities

		Destination											
		County Durham	Darlington	Gateshead	Hartlepool	Middlesbrough	Newcastle upon Tyne	North Tyneside	Northumberland	Redcar and Cleveland	South Tyneside	Stockton-On-Tees	Sunderland
Origin	Durham City	75%	2%	3%	1%	1%	6%	1%	1%	0%	1%	2%	7%
	Central Durham	75%	2%	5%	1%	1%	4%	1%	1%	0%	1%	2%	8%
	North West Durham	65%	1%	12%	0%	0%	10%	2%	4%	0%	1%	0%	5%
	North Durham	47%	1%	17%	0%	0%	10%	2%	2%	0%	2%	1%	17%
	East Durham	65%	1%	2%	5%	1%	2%	1%	1%	0%	1%	3%	18%
	South East Durham	58%	9%	2%	5%	5%	2%	0%	0%	1%	0%	13%	4%
	South Durham	73%	16%	1%	1%	1%	1%	0%	0%	0%	0%	3%	2%
	Mid Durham	81%	7%	2%	1%	1%	2%	0%	0%	0%	0%	2%	3%
	West Durham	79%	11%	1%	0%	1%	2%	0%	1%	0%	0%	2%	2%

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Appendix F – Main Settlements to Neighbouring Authorities

	County Durham	Darlington	Gateshead	Hartlepool	Middlesbrough	Newcastle upon Tyne	North Tyneside	Northumberland	Redcar and Cleveland	South Tyneside	Stockton-on-Tees	Sunderland
Durham City	75%	2%	3%	1%	1%	6%	1%	1%	0%	1%	2%	7%
Seaham	53%	1%	3%	2%	1%	3%	1%	1%	0%	2%	2%	32%
Peterlee	74%	1%	1%	5%	1%	2%	0%	0%	0%	1%	3%	11%
Spennymoor	82%	6%	2%	1%	1%	2%	0%	0%	0%	0%	3%	4%
Bishop Auckland	80%	10%	1%	1%	1%	1%	0%	0%	0%	0%	2%	2%
Newton Aycliffe	66%	22%	1%	1%	1%	1%	0%	0%	0%	0%	4%	2%
Crook	85%	5%	2%	0%	1%	1%	0%	1%	0%	1%	2%	3%
Shildon	77%	14%	1%	1%	1%	1%	0%	0%	0%	0%	2%	2%
Chester-le-Street	51%	1%	15%	0%	0%	10%	2%	1%	0%	2%	1%	16%
Stanley	64%	0%	14%	0%	0%	9%	2%	2%	0%	1%	0%	7%
Consett	70%	1%	9%	0%	0%	9%	2%	4%	0%	1%	0%	4%
Barnard Castle	86%	9%	0%	1%	1%	0%	0%	0%	0%	0%	2%	1%

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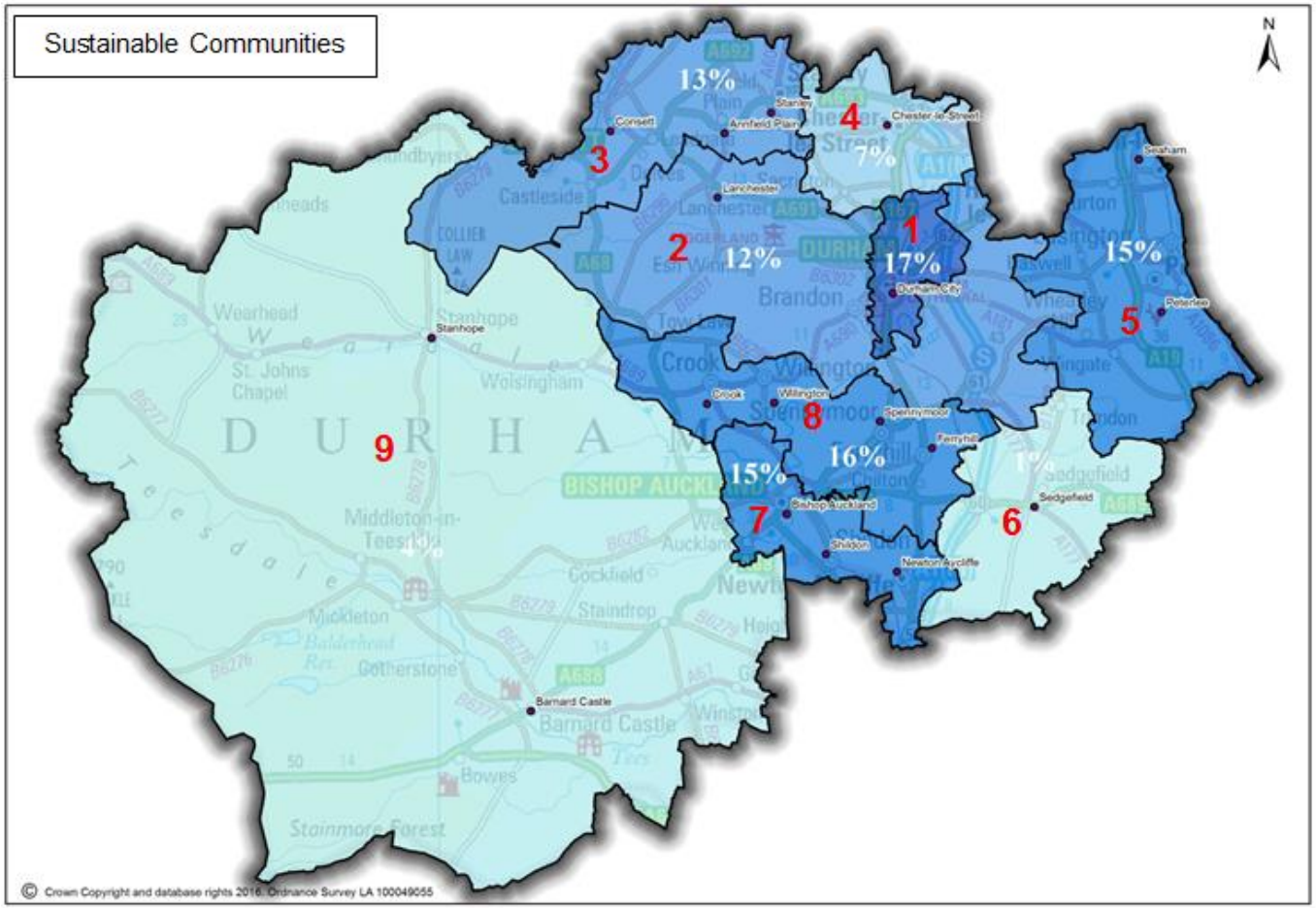
Appendix G – Sustainable Communities Option



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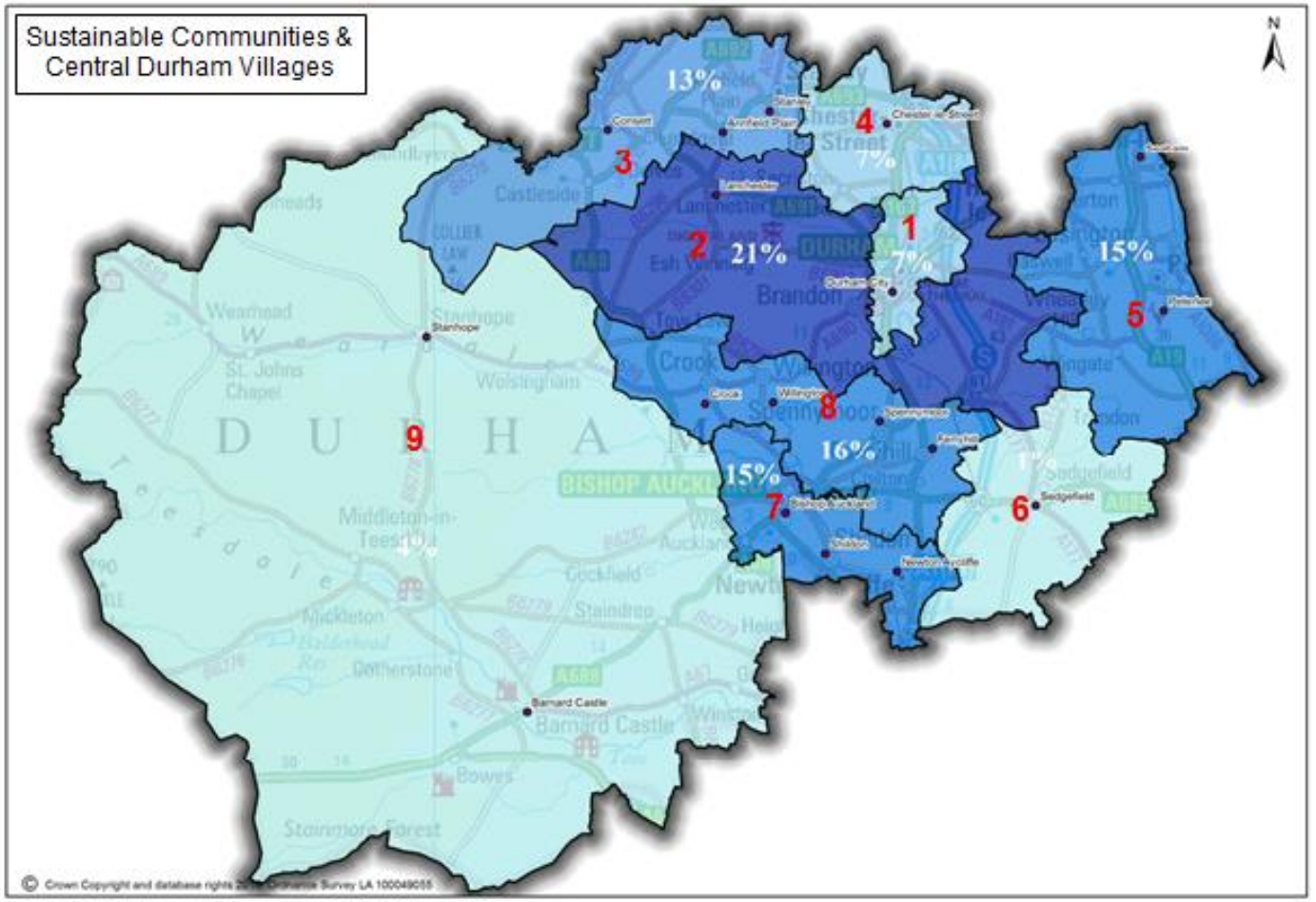
Appendix H – Sustainable Communities & Central Durham Villages Option



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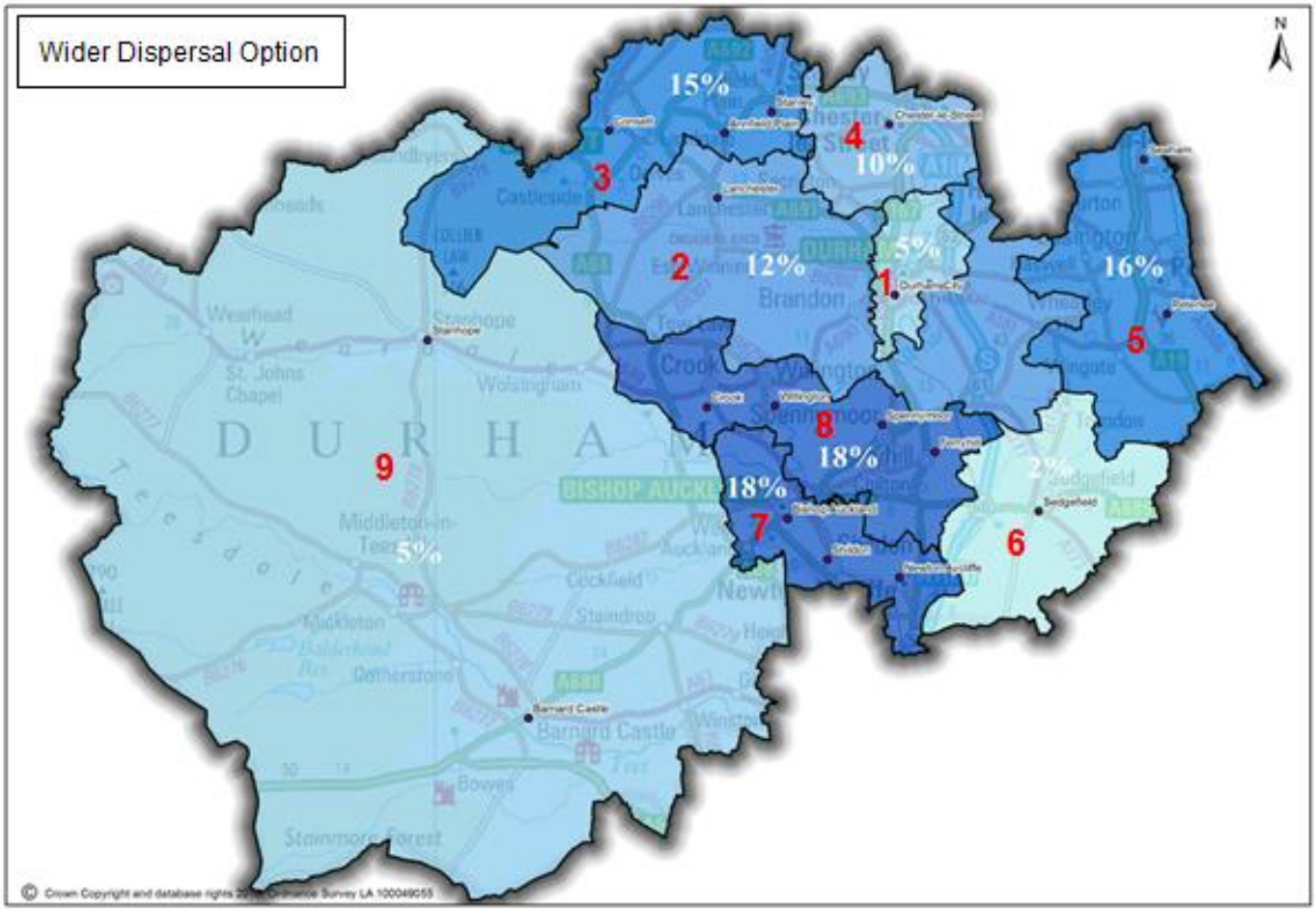
Appendix I – Wider Dispersal Option



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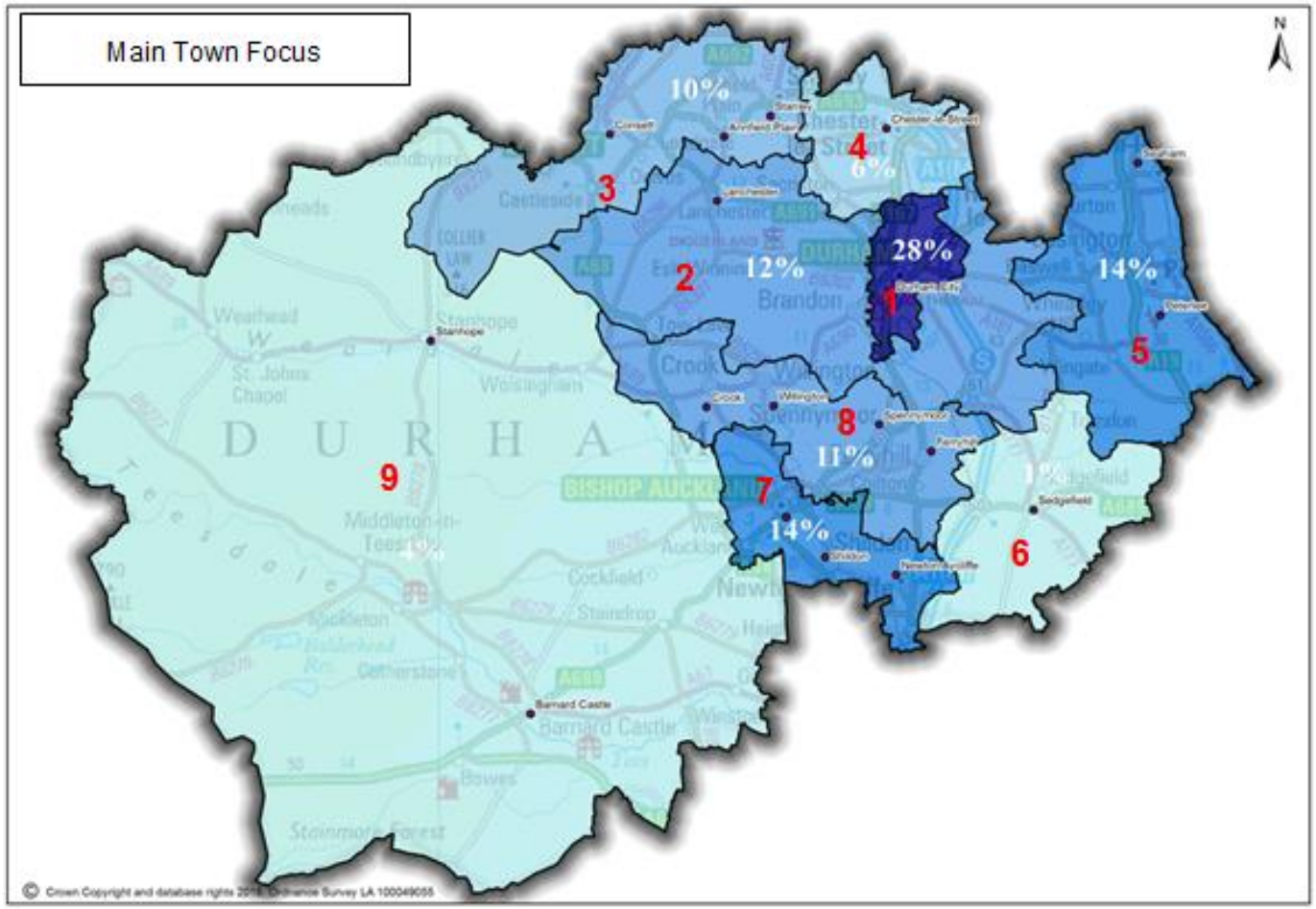
Appendix J – Main Town Focus



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Appendix K – Travel between Major Settlements

		Destination											
		Durham City	Seaham	Peterlee	Spennymoor	Bishop Auck	Newton Aycliffe	Crook	Shildon	Chester-le-Street	Stanley	Consett	Barnard Castle
Origin	Durham City	55%	3%	4%	6%	3%	4%	3%	1%	10%	4%	8%	0%
	Seaham	2%	79%	12%	1%	0%	1%	1%	0%	1%	0%	1%	0%
	Peterlee	4%	13%	75%	1%	0%	2%	0%	0%	1%	1%	1%	0%
	Spennymoor	7%	1%	2%	57%	7%	13%	3%	4%	3%	1%	2%	1%
	Bishop Auck	3%	0%	1%	8%	49%	10%	10%	13%	1%	1%	2%	1%
	Newton Aycliffe	3%	1%	1%	8%	7%	67%	2%	8%	1%	0%	1%	1%
	Crook	4%	0%	1%	4%	13%	4%	65%	5%	1%	1%	3%	1%
	Shildon	2%	1%	1%	7%	22%	18%	7%	38%	1%	0%	1%	2%
	Chester-le-Street	9%	2%	2%	2%	0%	1%	1%	0%	67%	9%	7%	0%
	Stanley	4%	0%	1%	1%	0%	1%	0%	0%	7%	70%	16%	0%
	Consett	2%	0%	0%	1%	0%	0%	1%	0%	2%	9%	83%	0%
	Barnard Castle	2%	0%	1%	2%	10%	5%	2%	4%	0%	0%	1%	72%

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Appendix L – Average Travel Mode for Commuters from Major Settlements.

Settlement	Sustainable Mode of Transport						Non-Sustainable			Sustainable Total	Non-Sustainable Total
	Metro/Tram	Train	Bus	Car/Van (passenger)	Bicycle	Walk/Run	Taxi	Motorcycle/Scooter	Car/Van (driver)		
Bishop Auckland	0.07%	0.70%	4.73%	8.37%	0.57%	15.13%	0.40%	0.46%	68.96%	29.58%	70.42%
Chester-le-Street	0.28%	2.06%	8.27%	6.69%	1.00%	9.63%	0.49%	0.46%	70.44%	27.92%	72.08%
Consett	0.07%	0.38%	5.75%	8.71%	0.87%	11.32%	1.61%	0.31%	70.27%	27.10%	72.90%
Durham City	0.23%	2.89%	7.37%	5.63%	2.05%	22.10%	0.14%	0.39%	58.52%	40.27%	59.73%
Newton Aycliffe	0.10%	0.75%	4.77%	8.70%	3.00%	11.37%	0.71%	0.52%	69.47%	28.69%	71.31%
Peterlee	0.07%	0.28%	4.79%	10.09%	1.21%	14.37%	2.64%	0.55%	65.32%	30.81%	69.19%
Seaham	0.39%	1.49%	7.89%	8.89%	0.80%	11.65%	0.89%	0.40%	66.82%	31.09%	68.91%
Durham County	0.15%	0.89%	6.40%	8.11%	1.03%	10.90%	0.70%	0.49%	70.66%	27.48%	71.85%

Appendix M – Main Settlement Trends (Absolute Values)

Table 5: Journeys Terminating (in-commuting) in the 12 Main Towns

	Intra County	Cross Boundary	Total	Aggregated Area
Durham City	28546	7671	36217	1
Consett	8879	1359	10238	3
Stanley	4301	827	5128	3
Chester-Le-Street	5303	2440	7743	4
Seaham	4327	1977	6304	5
Peterlee	10818	3948	14766	5
Spennymoor	4970	636	5606	7
Crook	1997	88	2085	7
Bishop Auckland	7061	686	7747	8
Newton Aycliffe	8670	2701	11371	8
Shildon	2661	430	3091	8
Barnard Castle	3487	619	4106	9
Whole County	127585	31179	158764	N/A

Table 6: Journeys Originating (Out-commuting) in the 12 Main Towns

	Intra County	Cross Boundary	Total	Aggregated Area
Durham City	10790	3609	14399	1
Consett	9099	3966	13065	3
Stanley	4700	2679	7379	3
Chester-Le-Street	4866	4643	9509	4
Seaham	4571	4071	8642	5
Peterlee	7138	2485	9623	5
Spennymoor	4466	1004	5470	7
Crook	2929	534	3463	7
Bishop Auckland	4729	1158	5887	8
Newton Aycliffe	6675	3448	10123	8
Shildon	2618	794	3412	8
Barnard Castle	1901	307	2208	9
Whole County	127585	58152	185737	N/A