MOTT MACDONALD

Cambridge South East Transport Phase 2

Outline Business Case

Appendix J: Distributional Impact Appraisal

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Outline Business Case
Appendix J: Distributional Impact Appraisal

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Executive Summary

This report is a Distributional Impact (DI) appraisal considering the impact of five proposed travel hub and associated public transport (PT) and non-motorised route options for the Cambridge South East Transport (CSET) Phase 2 scheme. The client has assigned colours to each of the five 'do something' options. Each option has been assessed using guidance from WebTAG, though due to a lack of quantitative data at this stage, for some impacts this has been a qualitative assessment.

The summary assessment scores for the DI appraisals can be seen in Table 1 below. Discussion and appraisal surrounding each impact can be found in further chapters.

Table 1: Distributional Impact Appraisal Summary Scores for Scheme Options

	Travel Hub Site A	Travel Hub Site B		Travel Hub Site C	
	Purple	**Brown**	**Pink**	**Black**	**Blue**
User benefits	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Noise	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out
Air Quality	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out
Accidents	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Severance	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Security	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Accessibility	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Personal affordability	Neutral	Neutral	Neutral	Neutral	Neutral

Source: Mott MacDonald

Across all options, the DIs are broadly beneficial. The population within the study areas for the majority of the social groups is broadly in line with the national comparator figure. In addition, the populations within each study area are very similar, therefore proportions do not differ. At Full Business Case (FBC) stage it is expected that these scores might change due to more detailed modelling data being available and therefore amended study areas being used.

1 Introduction

1.1 Appraisal Overview

Mott MacDonald has been commissioned by Greater Cambridgeshire Partnership to support the development of the Outline Business Case (OBC) for the A1307 Cambridge South East Transport (CSET) Phase 2 scheme. This report presents the results of the distributional impact (DI) appraisal of the five schemes that have been shortlisted at OBC stage. This DI appraisal has been carried out at a high level, proportionate to the size of the schemes, the availability of data and the stage of the appraisal. A detailed DI appraisal will be undertaken for the preferred option at Full Business Case (FBC) stage, should more detailed data become available.

1.2 Report Purpose

Each DI is assessed on a seven-point scale of beneficial, adverse or neutral impacts, with a score then input into the Appraisal Summary Table (AST). The seven-point scale for DI appraisal is set out in Table 2.

Table 2: Distributional Impact Scale

Impact	Assessment
Beneficial and the population impacted is significantly greater than the proportion of the group in the total population (>5%)	Large beneficial
Beneficial and the population impacted is broadly in line with the proportion of the group in the total population (-5% - 5%)	Moderate beneficial
Beneficial and the population impacted is smaller than the proportion of the group in the total population (<-5%)	Slight beneficial
There are no significant benefits or disbenefits experienced by the group for the specified impact	Neutral
Adverse and the population impacted is smaller than the proportion of the population of the group in the total population (<-5%)	Slight adverse
Adverse and the population impacted is broadly in line with the proportion of the population of the group in the total population (-5% - 5%)	Moderate adverse
Adverse and the population impacted is significantly greater than the proportion of the group in the total population (>5%)	Large adverse

Source: Mott MacDonald based on WebTAG Unit A4.1 and A4.2

2 Distributional Impact Appraisal

2.1 Introduction

This DI appraisal has been carried out in line with WebTAG Unit A4.2, proportionate to the size of the scheme and the level of quantitative data available at this stage. A DI appraisal considers the variance of transport intervention impacts across different social groups, seeking to identify those social groups that would be adversely or beneficially disproportionately impacted by the intervention(s). A DI appraisal is comprised of three stages: an initial screening stage; assessment of impacts; and appraisal of the impacts. The eight distributional impacts are as follows:

- User benefits
- Noise
- Air Quality
- Accidents
- Security
- Severance
- Accessibility
- Affordability

The social groups that will be assessed for each distribution impact are displayed in Table 3.

Table 3: Scope of Socio-demographic Analysis

Social Group (*tick indicated analysis required for each impact*)	**Distributional Impacts**							
	User benefits	**Noise**	**Air quality**	**Accidents**	**Security**	**Severance**	**Accessibility**	**Affordability**
Income distribution	✓	✓	✓				✓	✓
Children: proportion of population aged under 16		✓	✓	✓	✓	✓	✓	
Young people: proportion of population aged between 16 and 25				✓			✓	
Older people: proportion of population aged 70 and over		✓		✓	✓	✓	✓	
Proportion of population with a disability					✓	✓	✓	
Proportion of population of Black, Asian and Minority Ethnic (BAME) origin					✓		✓	
Proportion of households without access to a car						✓	✓	
Carers: proportion of households with dependent children							✓	

Source: Department for Transport (Dec 2015) WebTAG Unit A4.2 Distributional Impact Appraisal

2.1.1 Step 1: Screening Process

Each indicator is assessed individually using a screening proforma to determine whether it should be appraised further. The screening process should consider whether there are expected positive or negative impacts on specific social groups, whether any potential negative

impacts can be designed out and whether any positive or negative impacts are sufficiently minor and socially and/or spatially dispersed, such that a full DI appraisal is disproportionate to the potential impacts. The screening process has been carried out on each of the eight distributional impacts in accordance with five shortlisted schemes. As the schemes are broadly similar in that the route deviates slightly in a relatively small area and the three potential travel hubs are located relatively close to each other, they have been either scoped in or out together.

2.1.2 Step 2: Assessment of Impacts

Step 2 is comprised of three sub-steps, which seek to confirm the areas impacted by the intervention, identify the social groups in the impact area, in accordance with the guidance in Table 3 and identify amenities within the study area. Step 2 gives an overview of the socio-demographic profile of the area, including amenities that would be utilised by impacted social groups. The results of Step 2 are presented in an output summary table, displaying the proportion of the resident population in the impact area with comparators, and an indication of the presence of amenities within the study area. Assessment of social groups has been undertaken here based on indicative study area, and it is proposed that this will be further refined at FBC stage should detailed modelling data become available, therefore giving more defined study areas.

2.1.3 Step 3: Appraisal of Impacts

Step 3 provides an assessment of the impact for input into the AST. Analysis of the proportions of social groups within the study area against the total population gives beneficial or adverse impacts on a seven-point scale, ranging from large beneficial to large adverse, as highlighted in Table 2. Some impacts, such as user benefits, noise, air quality and accidents, require detailed modelling data to complete a full appraisal. This data is not available at OBC stage for the five shortlisted options and therefore the appraisal at this stage will be less detailed. However, at FBC stage, should more detailed data become available, detailed appraisal will be untaken for all impacts that are scoped in based on the preferred option.

3 Distributional Impact Appraisal of User Benefits

In most cases, transport interventions have been developed for the very purpose of generating benefits to users. User benefits are experienced in certain areas and by certain groups of people. This appraisal seeks to understand the pattern of user benefits and disbenefits generated by an intervention as it develops in order to consider mitigation where there is evidence of the intervention having particularly high benefits or disbenefits to a particular income group.

Transport User Benefits Appraisal (TUBA) values will be produced as part of the future economic appraisal of the scheme. These figures will be used once available to assess the proportion of residents in each of the income deprivation quintiles, to represent the distributional share of user benefits, therefore the scores given as part of this appraisal should be considered indicative only and are subject to change.

3.1 Step 1: Screening

Table 4: Screening Table for User Benefits Impacts

Indicator	(a) Appraisal Output Criteria	(b) Potential Impact (yes / no, positive/negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
User benefits	The TUBA (Transport User Benefit Appraisal) user benefit analysis software or an equivalent process has been used in the appraisal; and/or the value of user benefits Transport Economic Efficiency (TEE) table is non-zero.	Yes, positive impacts expected.	In the absence of detailed user benefits data, benefits have been assumed to be positive.	Yes, proceed to step 2.

Source: Mott MacDonald, based on Department for Transport (Dec 2015) WebTAG Distributional impact appraisal screening proforma

3.2 Step 2: Assessment of Impacts

3.2.1 Step 2a: Confirmation of Areas Impacted by the Intervention

In the absence of detailed TUBA data at this stage, a user benefit study area comprising of Cambridge and South Cambridgeshire local authorities has been assumed. If more detailed modelling data becomes available at FBC stage, this core modelled area is usually utilised as the user benefit study area.

WebTAG guidance suggests that in the absence of detailed TUBA modelling, user benefits should be assessed in relation to income distribution in the impact area.

3.2.2 Step 2b: Identification of Social Groups in the Impact Area

Table 5: Distribution of Residents Across Income Deprivation Quintiles within Cambridge and South Cambridgeshire

	< Most Deprived		Income Quintile		Least Deprived >
	0% -20%	20% -40%	40% - 60%	60% - 80%	80% -100%
Impact area	0.4%	8%	19%	25%	48%
England	20%	20%	20%	20%	20%
England variance	-19.6%	-12%	-1%	5%	28%

Source: 2015 Index of Multiple Deprivation. 2017 Mid-Year Population Estimates

Broadly, across the region there are low levels of income deprivation. Only 0.4% of residents reside in the most deprived income quintile whereas 48% of residents live in the least deprived income quintile, as summarised in Table 5. All but the middle quintile displays significant (as defined in Table 2) variance to the national average.

3.2.3 Step 2b: Identification of Amenities in the Impact Area

As per WebTAG guidance, the identification of amenities within the user benefit impact area has not been conducted due to the impact area being too large to warrant the identification of local attractors and the appraisal focussing on the impact across income deprivation quintiles only.

3.3 Step 3: Appraisal of Impacts

In the absence of quantitative user benefits data for the scheme, user benefits of the options are assumed to be positive.

Table 6: Summary Assessment Scores

	Scheme Options		
	Travel Hub Site A (Purple)	Travel Hub Site B (Pink and Brown)	Travel Hub Site C (Blue and Black)
Most deprived quintile	Slight beneficial	Slight beneficial	Slight beneficial
Second most deprived quintile	Slight beneficial	Slight beneficial	Slight beneficial
Third most deprived quintile	Moderate beneficial	Moderate beneficial	Moderate beneficial
Second least deprived quintile	Moderate beneficial	Moderate beneficial	Moderate beneficial
Least deprived quintile	Large beneficial	Large beneficial	Large beneficial

Source: Mott MacDonald

Table 6 displays the summary appraisal score for each income quintile. There is no difference in this instance between the five scheme options in terms of impacts as the study area is so similar The variance figures in Table 5 have been scored using the seven-point scale method outlined in Table 2. The overall summary assessment score for income distribution, for each of the five scheme options, has been assessed as moderate as this is the average value.

4 Distributional Impact Appraisal of Noise

Noise impacts are likely to occur where an intervention results in changes to traffic flows, speeds or where the physical gap between people and traffic is altered. In addition to the focus on annoyance, which remains an important impact of noise, there is clear evidence of links between environmental noise and health outcomes. Groups particularly vulnerable to noise impacts include children, older people and those with lower incomes. Those with lower incomes may be less able to make adjustments to their homes, such as the installation of double glazing to mitigate against noise impacts, or move to a new house where noise impacts become excessive.

4.1 Step 1: Screening

Table 7: Screening Table for Noise Impacts

Indicator	(a) Appraisal Output Criteria	(b) Potential Impact (yes / no, positive/ negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
Noise	Any change in alignment of transport corridor or any links with significant changes (>25% or <-20%) in vehicle flow, speed or %HDV (Heavy Duty Vehicle) content. Also note comment in TAG Unit A3.	Unknown	The environment team within Mott MacDonald has, at this stage, found that the five options are unlikely to result in significant changes in traffic and associated noise on the existing road network, and noise from the travel hubs is unlikely to be significant.	No, scoped out at this stage.

Source: Mott MacDonald, based on Department for Transport (Dec 2015) WebTAG Distributional impact appraisal screening proforma

At this stage, based on initial assessments from the Mott MacDonald environment team returning a neutral score and due to the lack of detailed modelling data related to noise impacts at this stage, the distributional impacts have been deemed to be neutral and therefore this impact has been scoped out. Should detailed modelling data become available at FBC stage, a full appraisal will be conducted on the preferred option.

5 Distributional Impact Appraisal of Air Quality

Air quality impacts, like noise impacts, are likely to occur where an intervention results in changes to traffic flows, speeds or where the physical gap between people and traffic is altered. At-risk groups for air quality impacts are suggested to be children (who may experience more exposure being outside more frequently) and people already suffering relatively poor health. There are also issues of social injustice to be considered where there are populations with low car ownership who are experiencing the impacts of car usage.

5.1 Step 1: Screening

Table 8: Screening Table for Air Quality Impacts

Indicator	(a) Appraisal Output Criteria	(b) Potential Impact (yes / no, positive/ negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
Air quality	Any change in alignment of transport corridor or any links with significant changes in vehicle flow, speed or %HDV content: • Change in 24 hour Average Annual Daily Traffic(AADT) of 1000 vehicles or more • Change in 24 hour AADT of HDV of 200 HDV vehicles or more • Change in daily average speed of 10kph or more • Change in peak hour speed of 20kph or more • Change in road alignment of 5m or more	Unknown	The environment team within Mott MacDonald has assessed the impact of air quality at present being neutral. At this stage, there are no significant changes expected in relation to the baseline conditions.	No, scoped out at this stage.

Source: Mott MacDonald, based on Department for Transport (Dec 2015) WebTAG Distributional impact appraisal screening proforma

At this stage, based on initial assessments from the Mott MacDonald environment team returning a neutral score and due to the lack of detailed modelling data related to air quality impacts at this stage, the distributional impacts have been deemed to be neutral and therefore have been scoped out. Should detailed modelling data become available at FBC stage, a full appraisal will be conducted on the preferred option.

6 Distributional Impact Appraisal of Accidents

Transport interventions can alter the risk of individuals being killed or injured as a result of accidents. Most transport related accidents, injuries and deaths occur on the road network. There is a strong link between the risks of accidents and the following social groups: children, young males, older people and those from deprived areas.

6.1 Step 1: Screening

Table 9: Screening Table for Accident Impacts

Indicator	(a) Appraisal Output Criteria	(b) Potential Impact (yes / no, positive/ negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
Accidents	Any change in alignment of transport corridor (or road layout) that may have positive or negative safety impacts, or any links with significant changes in vehicle flow, speed, %HGV (heavy goods vehicles) content or any significant change (>10%) in the number of pedestrians, cyclists or motorcyclists using road network.	Expected positive	Changes in the alignment of the transport corridor could have potential impacts on accidents. As the screening process has been undertaken in advance of receiving detailed accident modelling outputs, it should be assumed that a full appraisal will be needed.	Yes, proceed to step 2.

Source: Mott MacDonald, based on Department for Transport (Dec 2015) WebTAG Distributional impact appraisal screening proforma Step 2: Assessment of impacts

6.2 Step 2: Assessment of Impacts

6.2.1 Step 2a: Confirmation of Areas Impacted by the Intervention

In the absence of detailed accident modelling data available at this stage, a study area of 1km around the scheme options and travel hub has been assumed which aims to capture potential impacts of pedestrians and road users living in the area. If detailed accident modelling data is provided at FBC stage for the preferred option, this will be revised to include any links on the network that trigger the appraisal output criteria in column (a) of Table 9 above.

6.2.2 Step 2b: Identification of Social Groups in the Impact Area

As per WebTAG guidance, the distribution of children, young and older people are appraised as part of this chapter, as evidence suggests these groups have a greater risk of being involved in a traffic collision. As mentioned as part of the social appraisal, an accident of note recently involved the fatality of an elderly resident who was crossing the Cambridge Guided Busway at night. Appendices A to H present maps showing the distribution of affected social groups across the five study areas. For the purposes of analysis, the routes have been grouped based on travel hub site because the population for the routes are the same.

Table 10: Proportion of Residents Within the 1km Study Area Surrounding the Travel Hub Site A Route (Purple)

	Children	Young People	Older People
Study area population	2,265	1,057	1,636
Study area proportion	20%	9%	15%
Study area variance	1%	-3%	2%
National average (England)	19%	12%	13%

Source: Mott MacDonald based on 2017 mid-year population estimates

Table 11: Proportion of Residents Within the 1km Study Area Surrounding the Travel Hub Site B Routes (Brown and Pink)

	Children	Young People	Older People
Study area population	2,309	1,078	1,677
Study area proportion	20%	9%	15%
Study area variance	1%	-3%	2%
National average (England)	19%	12%	13%

Source: Mott MacDonald based on 2017 mid-year population estimates

Table 12: Proportion of Residents Within the 1km Study Area Surrounding the Travel Hub Site C Routes (Blue and Black)

	Children	Young People	Older People
Study area population	2,367	1,109	1,745
Study area proportion	20%	9%	15%
Study area variance	1%	-3%	2%
National average (England)	19%	12%	13%

Source: Mott MacDonald based on 2017 mid-year population estimates

For all scheme options, the proportion of residents in each social group is broadly in line with that of the national average, with little variance observed, therefore no disproportionate impacts would be experienced.

6.2.3 Step 2c: Identification of Amenities in the Impact Area

A summary of the numbers and types of amenities that would be impacted by the transport schemes and could act as trip attractors for the impacted social groups are highlighted in Table 13. Here it is evident that there are a number of trip attractors for children and young people including nurseries and schools, universities, sporting facilities such as playing fields and tennis courts, and, surrounding Travel Hub Site C specifically, two playgrounds. There are a vast number of facilities that comprise the Cambridge Biomedical Campus including Addenbrooke's Hospital, The Rosie Maternity Hospital, Royal Papworth Hospital NHS Foundation Trust, and Cambridge and Peterborough NHS Foundation Trust, as well as a number of research, industry and education facilities. These act as trip attractors for those working and studying in the area as well as those attending medical appointments. Maps displaying the locations of these amenities can be found in Appendix I.

Table 13: Numbers of Impacted Amenities Within the Five Study Areas

Amenity	Travel Hub Site A	Travel Hub Site B		Travel Hub Site C	
	Purple	Brown	Pink	Black	Blue
Indoor / Outdoor Leisure / Sporting Activity / Centre	14	15	15	17	17
University	10	10	10	10	10
Education	5	5	5	5	5
Children's Nursery / Crèche	4	5	5	5	5
Preparatory / First / Primary / Infant / Junior / Middle School	4	4	4	5	5
Public / Village Hall / Other Community Facility	3	3	3	4	4
Secondary / High School	2	2	2	3	3
Other Educational Establishment	2	1	2	2	1
Care / Nursing Home	2	2	2	2	2
Church	2	2	2	4	4
College	1	1	1	1	1
Higher Education	1	1	1	1	1
Playground	0	0	0	2	2
Total	**50**	**51**	**52**	**61**	**61**

Source: Mott MacDonald based on Ordnance Survey Address Base Plus

6.3 Step 3: Appraisal of Impacts

At present, **CO**st and **B**enefit to **A**ccidents – **L**ight **T**ouch (COBALT) or other accident analysis has not been undertaken, therefore qualitative accident assessment from the SI appraisal has been used in the absence of data. At present, as discussed in the social appraisal, there is a concentration of accidents in the areas surrounding the travel hub sites and along the current A1307 and A1301. The risk of accidents for the wider road network are likely to be reduced because of fewer cars on the road and the segregated PT and non-motorised user (NMU) route is likely to reduce the likelihood of accidents due to reduced interaction.

As this study area is based on an indicative 1km study area, the final appraisal scores may change once assessed at FBC level should detailed modelling data become available.

Table 14 sets out the summary appraisal score for each option and each social group. This has been assigned using the criteria in Table 2. For all scheme options and based on an indicative 1km study area surrounding the site and route, there will be moderate beneficial distributional impacts experienced by the affected social groups.

Table 14: Summary Assessment Scores

Site	Route	Expected Overall Impact (derived from SI appraisal)	Social Group	Distributional Impact (seven-point scale)
Travel Hub Site A	Purple	Moderate beneficial	Children	Moderate beneficial
			Young People	Moderate beneficial
			Older People	Moderate beneficial
Travel Hub Site B	Brown	Moderate beneficial	Children	Moderate beneficial
			Young People	Moderate beneficial
			Older People	Moderate beneficial

Site	Route	Expected Overall Impact (derived from SI appraisal)	Social Group	Distributional Impact (seven-point scale)
	Pink	Moderate beneficial	Children	Moderate beneficial
			Young People	Moderate beneficial
			Older People	Moderate beneficial
Travel Hub Site C	Black	Moderate beneficial	Children	Moderate beneficial
			Young People	Moderate beneficial
			Older People	Moderate beneficial
	Blue	Moderate beneficial	Children	Moderate beneficial
			Young People	Moderate beneficial
			Older People	Moderate beneficial

Source: Mott MacDonald

7 Distributional Impact Appraisal of Severance

WebTAG guidance suggests that older people, those with disabilities, parents with pushchairs, children and those without car access can suffer the effects of severance disproportionately more than other groups. These groups can often experience longer journey times or are often required to use pedestrian routes that are inappropriate and/or difficult to use. Mitigation measures such as footbridges and underpasses can also cause severance by creating longer journey times for users rather than using at grade crossings.

7.1 Step 1: Screening

Table 15: Screening Table for Severance Impacts

Indicator	(a) Appraisal Output Criteria	(b) Potential Impact (yes / no, positive/ negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
Severance	Introduction or removal of barriers to pedestrian movement, either through changes to road crossing provision, or through introduction of new public transport or road corridors. Any areas with significant changes (>10%) in vehicle flow, speed, %HGV content.	Yes, expected negative	It is expected that the proposed new public transport route alignment could cause changes to the pedestrian crossing provision along the route and in the area surrounding the travel hubs, thereby increasing journey times or causing journeys to change.	Yes

Source: Mott MacDonald, based on Department for Transport (Dec 2015) WebTAG Distributional impact appraisal screening proforma

7.2 Step 2: Assessment of Impacts

7.2.1 Step 2a: Confirmation of Areas Impacted by the Intervention

The impact area has been defined as a 1km study area around each of the five route options and associated travel hub site. 1km is deemed to be an appropriate figure that takes into consideration pedestrian activity around the route and travel hub site.

7.2.2 Step 2b: Identification of Social Groups in the Impact Area

Social groups that are particularly sensitive to severance impacts include children, older people, those with a long-term health problem or disability (LTHD) and no car households.

Table 16: Proportion of Residents Within the 1km Study Area Surrounding the Travel Hub Site A Route (Purple)

	Children	Older People	Population with a LTHD	Households with No Car Access
Study area population	2,265	1,636	1,570	694
Study area proportion	20%	15%	16%	16%
Study area variance	1%	2%	-2%	-10%
National average (England)	19%	13%	18%	26%

Source: Mott MacDonald based on 2017 mid-year population estimates

Table 17: Proportion of Residents Within the 1km Study Area Surrounding the Travel Hub Site B Routes (Brown and Pink)

	Children	Older People	Population with a LTHD	Households with No Car Access
Study area population	2,309	1,677	1,606	705
Study area proportion	20%	15%	16%	16%
Study area variance	1%	2%	-2%	-10%
National average (England)	19%	13%	18%	26%

Source: Mott MacDonald based on 2017 mid-year population estimates

Table 18: Proportion of Residents Within the 1km Study Area Surrounding the Travel Hub Site C Routes (Blue and Black)

	Children	Older People	Population with a LTHD	Households with No Car Access
Study area population	2,367	1,745	1,663	723
Study area proportion	20%	15%	16%	16%
Study area variance	1%	2%	-2%	-10%
National average (England)	19%	13%	18%	26%

Source: Mott MacDonald based on 2017 mid-year population estimates

For each study area associated with each option, and for children, older people and those with a LTHD, the proportion of residents within the study area is broadly in line with that of the national average and therefore these groups would experience moderate beneficial severance impacts. However, the proportion of households with no access to a car is significantly lower than the national average and therefore these residents would be disproportionately impacted. Whilst beneficial severance impacts would still be felt, because the proportion of the population with no car is lower than the national average, the distributional impacts would be less. Maps

displaying the distribution of social groups within the study area can be found in appendices A to H.

7.2.3 Step 2c: Identification of Amenities in the Impact Area

Discussion surrounding the location of amenities within the study areas can be found in Section 6.2.3. For the five scheme options, there are between 50 and 61 education facilities, sporting facilities, community facilities, care homes and churches that could act as trip attractors for one or more of the vulnerable social groups mentioned, therefore increasing severance risks. In addition to these facilities, there are those that are part of the Cambridge Biomedical Campus, which could be particularly relevant for those with long-term health problems or disabilities. Maps displaying the distribution of amenities within the study area can be found in Appendix I.

7.3 Step 3: Appraisal of Impacts

As outlined in the severance chapter of the SI appraisal, moderate beneficial severance impacts are expected in relation to all scheme options. While minor adverse severance impacts could be expected at specific locations, the broader aims and design of the scheme promotes improved severance through a better designed NMU crossing over the A11, specific NMU crossing facilities along the route and broadly unhindered NMU movements alongside the PT route.

As this is based on an indicative study area, the final scores, once appraised at FBC level, may change.

Table 19 sets out the summary appraisal score for each option and each social group. This has been assigned using the criteria in Table 2. For all scheme options and based on an indicative 1km study area surrounding the site and route, there will be moderate beneficial impacts felt by children, older people and those with a LTHD while those without access to a car will experience slight beneficial severance impacts, as there are fewer people in this population group compared to the national figure. The overall assessment scores for each of the five routes have been assessed as Moderate.

Table 19: Summary Assessment Scores

Site	Route	Expected Overall Impact (derived from SI appraisal)	Social Group	Distributional Impact (seven-point scale)
Travel Hub Site A	Purple	Moderate beneficial	Children	Moderate beneficial
			Older people	Moderate beneficial
			Those with a LTHD	Moderate beneficial
			Households with no car access	Slight beneficial
Travel Hub Site B	Brown	Moderate beneficial	Children	Moderate beneficial
			Older people	Moderate beneficial
			Those with a LTHD	Moderate beneficial
			Households with no car access	Slight beneficial
	Pink	Moderate beneficial	Children	Moderate beneficial
			Older people	Moderate beneficial
			Those with a LTHD	Moderate beneficial
			Households with no car access	Slight beneficial

Site	Route	Expected Overall Impact (derived from SI appraisal)	Social Group	Distributional Impact (seven-point scale)
Travel Hub Site C	Black	Moderate beneficial	Children	Moderate beneficial
			Older people	Moderate beneficial
			Those with a LTHD	Moderate beneficial
			Households with no car access	Slight beneficial
	Blue	Moderate beneficial	Children	Moderate beneficial
			Older people	Moderate beneficial
			Those with a LTHD	Moderate beneficial
			Households with no car access	Slight beneficial

Source: Mott MacDonald

8 Distributional Impact Appraisal of Security

Research shows that there are several groups with particular concerns about their personal security, including women, young people, elderly people, people with a LTHD and those from Black, Asian and Minority Ethnic (BAME) communities, who all tend to perceive risk more acutely. The predominant adverse security impacts come from perceived personal security for those walking and cycling from the travel hub site into the centre of Cambridge while security in the travel hub and on PT routes is expected to be positive. Beneficial impacts will also arise from encouraging parking at a secure site compared to a less secure site closer to the centre. Travel hub users will travel from a large area and therefore a distributional impact appraisal may not be deemed necessary and could be scoped out at a later stage.

8.1 Step 1: Screening

Table 20: Screening Table for Security Impacts

Indicator	(a) Appraisal Output Criteria	(b) Potential Impact (yes / no, positive/ negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
Security	Any change in public transport waiting/interchange facilities including pedestrian access expected to affect user perceptions of personal security.	Yes, expected positive	While there are some concerns surrounding personal security on cycle and pathways into the centre, expected security on the PT route and in the travel hub is expected to be good, with the expectation it will increase personal perceptions of safety.	Yes, proceed to step 2

Source: Mott MacDonald, based on Department for Transport (Dec 2015) WebTAG Distributional impact appraisal screening proforma Step 2: Assessment of impacts

8.2 Step 2: Assessment of Impacts

8.2.1 Step 2a: Confirmation of Areas Impacted by the Intervention

A 1km study area has been estimated for the security appraisal. Guidance suggests that for public transport improvements, the study area should include the specific locations where improvements are being made to personal security together with the catchment area for walking to the facility. However, for roadside facilities on the network, i.e. the travel hub, which will be used by a range of users from a very wide study area, it is not appropriate to attempt to identify a study area in this instance. Taking this into account, the 1km impact area considers the population who reside along the proposed route and not the majority of those who would drive to the travel hub for access.

8.2.2 Step 2b: Identification of Social Groups in the Impact Area

According to TAG Unit A4.2, the social groups that are particularly sensitive to personal security concerns are children, older people, residents with a LTHD, BAME residents.

Table 21: Proportion of Residents Within the 1km Study Area Surrounding the Travel Hub Site A Route (Purple)

	Children	Older People	Population with a LTHD	BAME Residents
Study area population	2,265	1,636	1,570	1,702
Study area proportion	20%	15%	16%	17%
Study area variance	1%	2%	-2%	-3%
National average (England)	19%	13%	18%	20%

Source: Mott MacDonald based on 2017 mid-year population estimates

Table 22: Proportion of Residents Within the 1km Study Area Surrounding the Travel Hub Site B Routes (Brown and Pink)

	Children	Older People	Population with a LTHD	BAME Residents
Study area population	2,309	1,677	1,606	1,729
Study area proportion	20%	15%	16%	17%
Study area variance	1%	2%	-2%	-3%
National average (England)	19%	13%	18%	20%

Source: Mott MacDonald based on 2017 mid-year population estimates

Table 23: Proportion of Residents Within the 1km Study Area Surrounding the Travel Hub Site C Routes (Blue and Black)

	Children	Older People	Population with a LTHD	BAME Residents
Study area population	2,367	1,745	1,663	1,762
Study area proportion	20%	15%	16%	17%
Study area variance	1%	2%	-2%	-3%
National average (England)	19%	13%	18%	20%

Source: Mott MacDonald based on 2017 mid-year population estimates

For all study areas and for all affected social groups, the proportion of residents within the study area is broadly in line with that of the national average and therefore these groups would experience moderate beneficial security impacts. Maps displaying the distribution of social groups within the study area can be found in Appendices A to H.

8.2.3 Step 2c: Identification of Amenities in the Impact Area

Discussion surrounding the location of amenities within the study area can be found in Section 6.2.3. For each of the five scheme options, there are between 50 and 61 education facilities, sporting facilities, community facilities, care homes and churches that could act as trip attractors

for one or more of the vulnerable social groups mentioned, therefore increasing security risks. In addition to these facilities, there are those that are part of the Cambridge Biomedical Campus, which could be particularly relevant for those with long-term health problems or disabilities. Maps displaying the distribution of amenities within the study area can be found in Appendix I.

8.3 Step 3: Appraisal of Impacts

The SI appraisal identified potential security impacts for the five scheme options. The most predominant user group of the scheme will likely be commuters, travelling during the day and not necessarily residents living in the locality. It is difficult to assess the distribution of the population who will be using the travel hub site given the large area that commuters travel from. Table 24 utilises the SI appraisal scores for the options and assesses this in accordance with the DI scoring criteria in Table 2, based on a 1km study area surrounding the scheme options and travel hub sites.

Table 24: Summary Assessment Scores

Site	Route	Expected Overall Impact (derived from SI appraisal)	Social Group	Distributional Impact (seven-point scale)
Travel Hub Site A	Purple	Moderate beneficial	Children	Moderate beneficial
			Older people	Moderate beneficial
			Those with a LTHD	Moderate beneficial
			BAME residents	Moderate beneficial
Travel Hub Site B	Brown	Moderate beneficial	Children	Moderate beneficial
			Older people	Moderate beneficial
			Those with a LTHD	Moderate beneficial
			BAME residents	Moderate beneficial
	Pink	Moderate beneficial	Children	Moderate beneficial
			Older people	Moderate beneficial
			Those with a LTHD	Moderate beneficial
			BAME residents	Moderate beneficial
Travel Hub Site C	Black	Moderate beneficial	Children	Moderate beneficial
			Older people	Moderate beneficial
			Those with a LTHD	Moderate beneficial
			BAME residents	Moderate beneficial
	Blue	Moderate beneficial	Children	Moderate beneficial
			Older people	Moderate beneficial
			Those with a LTHD	Moderate beneficial
			BAME residents	Moderate beneficial

Source: Mott MacDonald

All social groups have study area proportions that are broadly in line with the national average and therefore would experience moderate beneficial security impacts. A detailed security appraisal looking in depth at security indicators and weightings for each will be conducted at FBC level on the preferred option to gain a more detailed understanding of the numbers of the population who could be impacted.

9 Distributional Impact Appraisal of Accessibility

Accessibility impacts, as discussed in the social appraisal are focused on the public transport aspect of accessing services, employment and social networks. This approach considers the accessibility needs of more vulnerable user groups, drawing on a range of factors including journey times to reach key destinations, service frequencies, accessible boarding and the end-to-end journey. Access to the transport network can enable vulnerable people to access services and recreational activities, therefore reducing social exclusion. The Accessibility Strategy as part of the Cambridge Local Transport Plan[1] concluded that barriers to accessing services were the length of journeys by public transport and being unable to access services at the times they are needed.

At this stage a high-level analysis has been undertaken based on a 1km study area around the proposed route and the existing route to Haverhill. Dependent on availability of future routing and proposed timetable information, a more detailed strategic accessibility assessment may be undertaken on the preferred option at FBC stage.

9.1 Step 1: Screening

Table 25: Screening Table for Accessibility Impacts

Indicator	(a) Appraisal Output Criteria	(b) Potential Impact (yes / no, positive/ negative if known)	(c) Qualitative Comments	(d) Proceed to Step 2
Accessibility	Changes in routings or timings of current public transport services, any changes to public transport provision, including routing, frequencies, waiting facilities (bus stops / rail stations) and rolling stock, or any indirect impacts on accessibility to services (e.g. demolition & re-location of a school).	Expected beneficial	Changes and additions are proposed to services, routings or timings of current public transport services. The proposed new PT route will result in new waiting facilities.	Yes

Source: Mott MacDonald, based on Department for Transport (Dec 2015) WebTAG Distributional impact appraisal screening proforma

9.2 Step 2: Assessment of Impacts

9.2.1 Step 2a: Confirmation of Areas Impacted by the Intervention

The study area is comprised of the proposed public transport corridor as well as the existing road that the buses will run on between the travel hub site and Haverhill. A 1km study area has been used around these areas as a reasonable estimate of walking distances to a public transport stop. Because of the location of the existing route, all five scheme options have the same population therefore results are presented together.

[1] Cambridgeshire Local Transport Plan (2011-2031)

9.2.2 Step 2b: Identification of Social Groups in the Impact Area.

The social groups who are particularly vulnerable to the effects of poor accessibility are those from income deprived areas, children, young people, older people, those with a LTHD, BAME residents, households without access to a car and households with dependent children.

Table 26: Proportion of Residents in Income Deprivation Quintiles Within the 1km Study Area

	Most Deprived Quintile	Second Most Deprived Quintile	Third Most Deprived Quintile	Fourth Most Deprived Quintile	Least Deprived Quintile
Study area population	0	8,178	15,878	4,885	17,329
Study area proportion	0	18%	34%	11%	37%
Study area variance	-20%	-2%	14%	-9%	17%
National average	20%	20%	20%	20%	20%

Source: Mott MacDonald based on ONS 2017 mid-year population estimates and Indices of Multiple Deprivation 2015

It is evident from Table 26 that the study area has low levels of income deprivation. Only the second most deprived quintile has a proportion of residents that is broadly in line with the national average. The quintile with the highest proportion is the least deprived quintile, with a figure of 37%, 17% greater than the national average. For these residents, financial costs associated with accessing transport would be less of a barrier, and a higher proportion of residents compared to the national average would feel these benefits. There are no residents residing in the most deprived quintile whereas 20% of the population reside in areas with high levels of income deprivation. It is likely that because the area has low levels of income deprivation, cost of travel would act as less of a barrier than it does for the wider population.

Table 27: Proportion of Residents Within the 1km Study Area

	Children	Young People	Older People	Population with a LTHD	BAME Residents	Households with No Car Access	Households with Dependent Children
Study area population	9,628	4,848	5,997	6,830	5,035	3,040	5,668
Study area proportion	21%	10%	13%	15%	11%	17%	32%
Study area variance	2%	2%	0%	-3%	-9%	-9%	3%
National average	19%	12%	13%	18%	20%	26%	29%

Source: Mott MacDonald based on ONS Census 2011 and ONS mid-year population estimates 2017

Within the extended study area to Haverhill, most social groups see proportions broadly in line with that of the national average, however BAME residents and households without car access both see proportions 9% lower than that of the national average, therefore these residents would experience disproportionate accessibility impacts. Maps displaying the distribution of social groups within the 1km route study areas can be found within appendices A to H. As the study areas populations are the same, for clarity maps showing the social groups proportions around the five routes and the route into Haverhill for each of the five scheme options have all been included on one map.

9.2.3 Step 2c: Identification of Amenities in the Impact Area

Haverhill is significantly more populated than those areas surrounding the proposed route and therefore there is a higher concentration of impacted amenities within this study area, with particularly high numbers of schools and sport, social and community facilities. To have high levels of accessibility and a quality of life, a person must have good access to both necessary amenities such as hospitals and education, as well as services such as sporting and leisure facilities. Haverhill has a good distribution of such amenities, for example. community centres, libraries, cinemas and playgrounds. Haverhill presently has a range of available 'necessary' and 'social' services, therefore residents, particularly those with accessibility concerns, may choose to remain in Haverhill rather than travel on the PT route into Cambridge City Centre.

All residents along the route would have the option to travel to Cambridge or Haverhill though it is acknowledged that just because these options exist, people may not wish to or in fact be able to travel to them. Those who are particularly vulnerable to accessibility impacts can often find travel by public transport difficult and therefore may choose to not make use of the PT route, despite it giving the best access in terms of time and distances to services they require.

A map showing the amenities present within the route is set out in Appendix I. This map should be considered alongside the maps showing amenities for each of the five scheme options to best highlight the provision around the travel hubs, as amenities to the west into Cambridge and east into Haverhill remain the same.

9.3 Step 3: Appraisal of Impacts

The SI appraisal identified potential accessibility impacts for the five scheme options, for residents without access to a private car. Table 28 utilises the SI appraisal scores for the options and assesses this in accordance with the DI scoring criteria in Table 10, based on a 1km study area surrounding the scheme options, travel hub sites and extended route into Haverhill.

Table 28: Summary Assessment Scores

Route	Expected Overall Impact (derived from SI appraisal)	Social Group	Distributional Impact (seven-point scale)
All scheme options and route into Haverhill	Slight beneficial	Most deprived quintile	Neutral
		Second most deprived quintile	Moderate beneficial
		Third most deprived quintile	Large beneficial
		Second least deprived quintile	Slight beneficial
		Least deprived quintile	Large beneficial
		Children	Moderate beneficial
		Young people	Moderate beneficial
		Older people	Moderate beneficial
		Those with a LTHD	Moderate beneficial
		BAME residents	Large beneficial
		Households with no car access	Large beneficial
		Households with dependent children	Moderate beneficial

Source: Mott MacDonald

All social groups except BAME residents and households without car access have proportions that are broadly in line with that of the national average. For both BAME residents and those without access to car, the proportions are 9% below the national average and therefore would feel more beneficial impacts related to accessibility. The proportion of households in the study area without access to a car is less than the national average, therefore these residents would feel fewer accessibility impacts associated with social exclusion that can come from not being able to access services via car than those in the wider population do. A detailed accessibility appraisal to explore the accessibility barriers mentioned in the SI appraisal will be conducted at FBC level on the preferred option.

10 Distributional Impact Appraisal of Personal Affordability

The most significant affordability impacts relating to travel costs are experienced by young people and older people and those within low income households, particularly when travelling to employment and education sites.

10.1 Step 1: Screening

Table 29: Screening of Personal Affordability Impacts

Indicator	(a) Appraisal Output Criteria	(b) Potential Impact (yes / no, positive/ negative if known)	(c) Qualitative Comments	(d) Proceed to Steps 2a and 2b
Affordability	In cases where the following charges would occur: • Parking charges (including where changes in the allocation of free or reduced fee spaces may occur). • Car fuel and non-fuel operating costs (where, for example, rerouting or changes in journey speeds and congestion occur resulting in changes in costs). • Road user charges (including discounts and exemptions for different groups of travellers). • Public transport fare changes (where, for example premium fares are set on new or existing modes or where multi-modal discounted travel tickets become available due to new ticketing technologies). • Public transport concession availability (where, for example concession arrangements vary as a result of a move in service provision from bus to light rail or heavy rail, where such concession entitlement is not maintained by the local authority).	Expected to be neutral	As per the Social Impact assessment the scheme is likely to have some affordability impacts in terms of reduced parking charges and potential reduced car fuel costs but being offset by bus fare charges.	Yes

Source: Mott MacDonald, based on Department for Transport (Dec 2015) WebTAG Distributional impact appraisal screening proforma

10.2 Step 2: Assessment of Impacts

10.2.1 Step 2a: Confirmation of Areas Impacted by the Intervention

WebTAG guidance suggests that the study area should be the same as that considered for user benefit analysis. As mentioned earlier, at this stage this has been estimated as the Cambridge and South Cambridgeshire local authorities due to a lack of available TUBA data. This is likely to be revised once TUBA modelling data is obtained.

10.2.2 Step 2b: Identification of Social Groups in the Impact Area

Table 30: Distribution of Residents Across Income Deprivation Quintiles within Cambridge and South Cambridgeshire

	< Most Deprived		Income Quintile		Least Deprived >
	0% - 20%	20 - 40%	40% - 60%	60% - 80%	80% - 100%
Impact area	0.4%	8%	19%	25%	48%
England	20%	20%	20%	20%	20%
England variance	-19.6%	-12%	-1%	5%	28%

Source: 2015 Index of Multiple Deprivation. 2017 Mid-Year Population Estimates

Broadly across the region, there are low levels of income deprivation. Only 0.4% of residents reside in the most deprived income quintile whereas 48% of residents live in the least deprived income quintile, as summarised in Table 30. All but the middle quintile displays significant variance to the national average and therefore the scheme is expected to realise disproportionate impacts. Maps showing the income deprivation distribution in the study area is included in Appendix A.

10.2.3 Identification of Amenities in the Impact Area

As with user benefit analysis, the identification of impacted amenities is not appropriate here due to the wide study area and the study area focussing on the impact across income deprivation quintiles only.

10.3 Step 3: Appraisal of Impacts

At present, the operator of the PT services on the proposed route has yet to be determined and therefore detail surrounding pricing structure is unknown. It is therefore difficult to appraise personal affordability impacts. At present, parking at travel hubs in Cambridge and South Cambridgeshire is free of charge and bus charges are in line with other fares in the region. Currently there are two operators on the Cambridge Guided Busway, each charging different fares for journeys but both in line with other regional charges. Concessions on existing routes are offered for students and families and those with a free bus pass can use the services after 09:30 on weekdays and at any time at weekends. Even though existing similar schemes offer free parking and concessionary travel, it should not be assumed that this scheme will be the same. The reduction in fuel costs and parking charges associated with travel into Cambridge City Centre is likely to be offset by the costs of using the buses. At this stage neutral impacts are expected across all five scheme options, though this could be revised once detailed TUBA data is available and should details around pricing structures become available.

11 Distributional Impact Appraisal Summary

This appraisal has sought to best represent the anticipated beneficial and adverse distributional impacts that could be experienced as a result of the travel hub site, PT and NMU route, proportionate to the stage of assessment and amounts of data available.

Table 31: Distributional Impacts Summary Scores

Impact Area	Scheme				
	Travel Hub Site A	Travel Hub Site B		Travel Hub Site C	
	Purple	Brown	Pink	Black	Blue
User benefits	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Noise	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out
Air quality	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out
Accidents	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Security	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Severance	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Accessibility	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial	Moderate beneficial
Affordability	Neutral	Neutral	Neutral	Neutral	Neutral

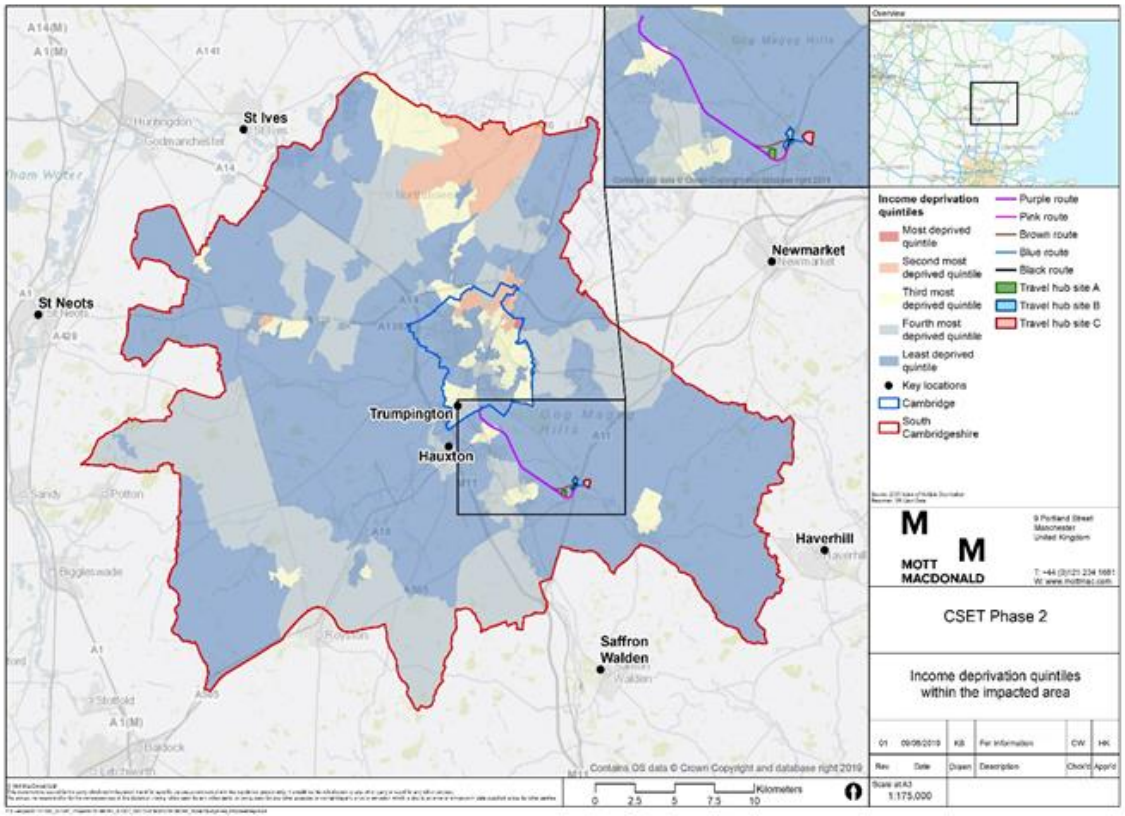
Source: Mott MacDonald

As demonstrated in Table 31, initial qualitative analysis has found that the five scheme options will bring about broadly beneficial distributional impacts, as the proportions of populations within the indicative study areas are broadly in line with that of the national population. As different impacts are felt by different population groups, average scores have been utilised for this tables, with more detail available elsewhere in the report. The proposed scheme options would all see moderate beneficial impacts, with the proportions of people from vulnerable social groups affected broadly in line with that of the national average.

Appendices

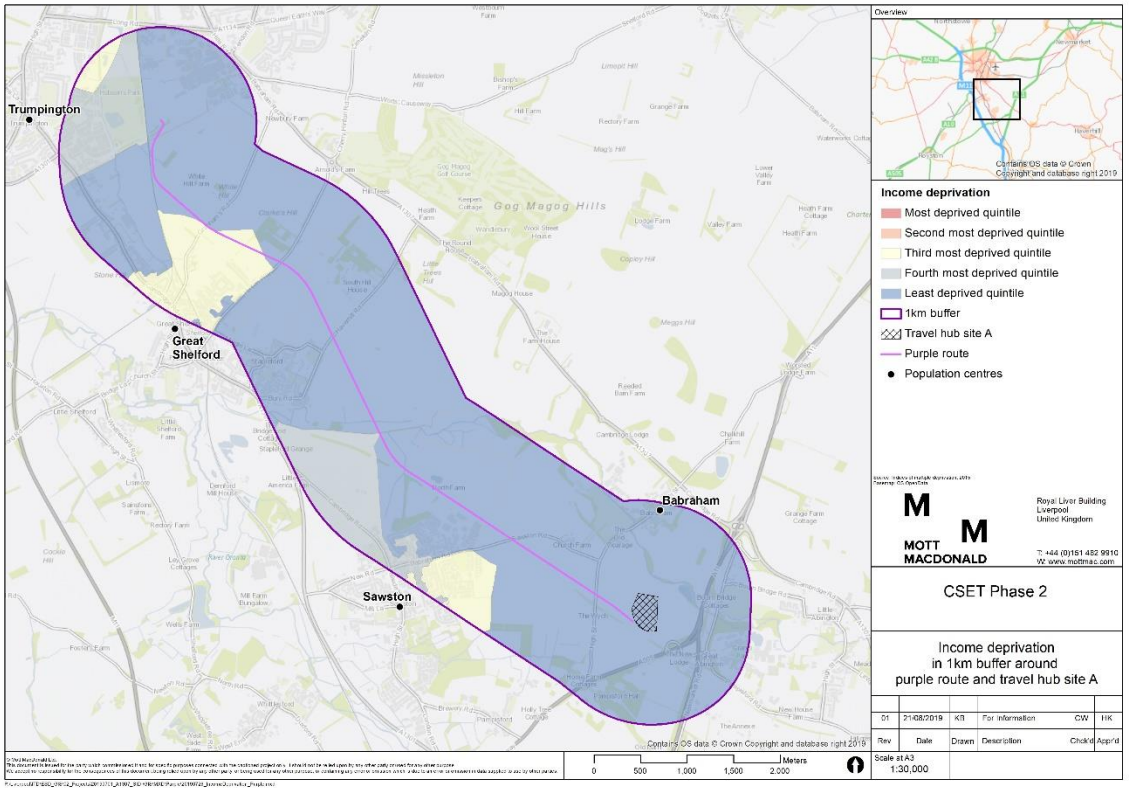
A. Income Deprivation Quintiles

Figure 1: Income Deprivation Quintiles in Cambridge and South Cambridgeshire



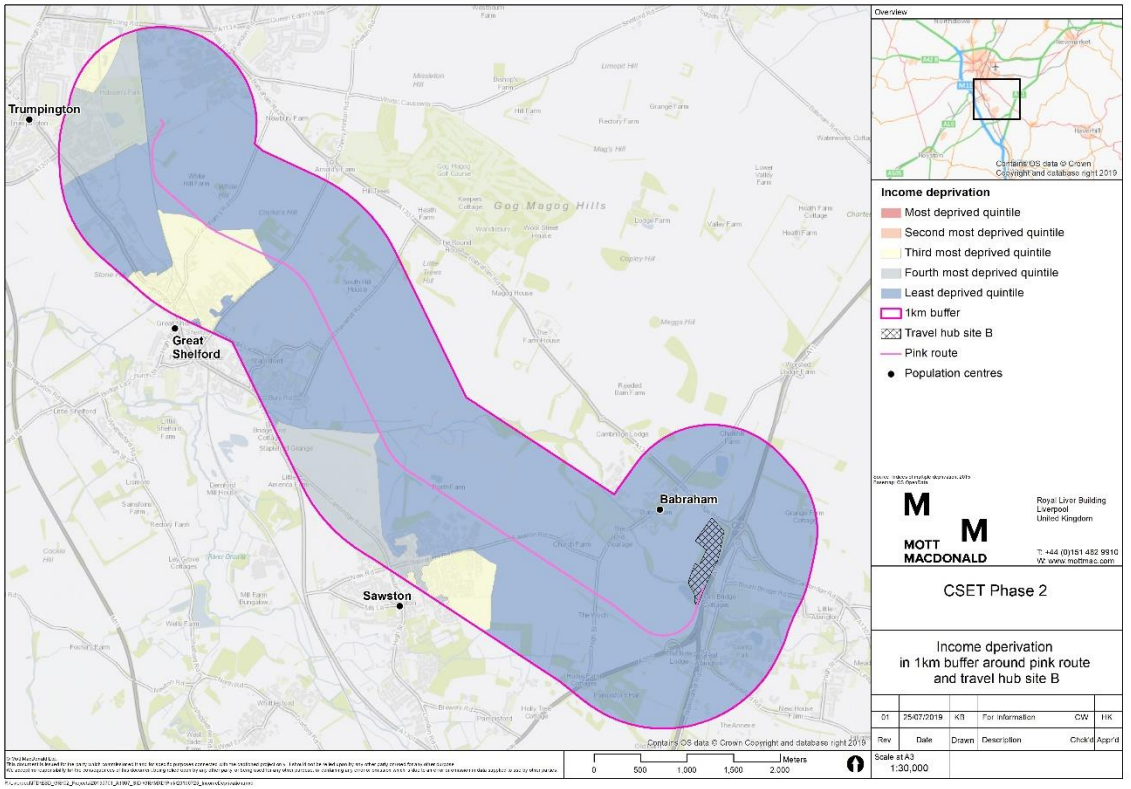
Source: Mott MacDonald based on Indices of Multiple Deprivation (2015)

Figure 2: Income Deprivation Quintiles in 1km Area around Travel Hub Site A and Purple Route



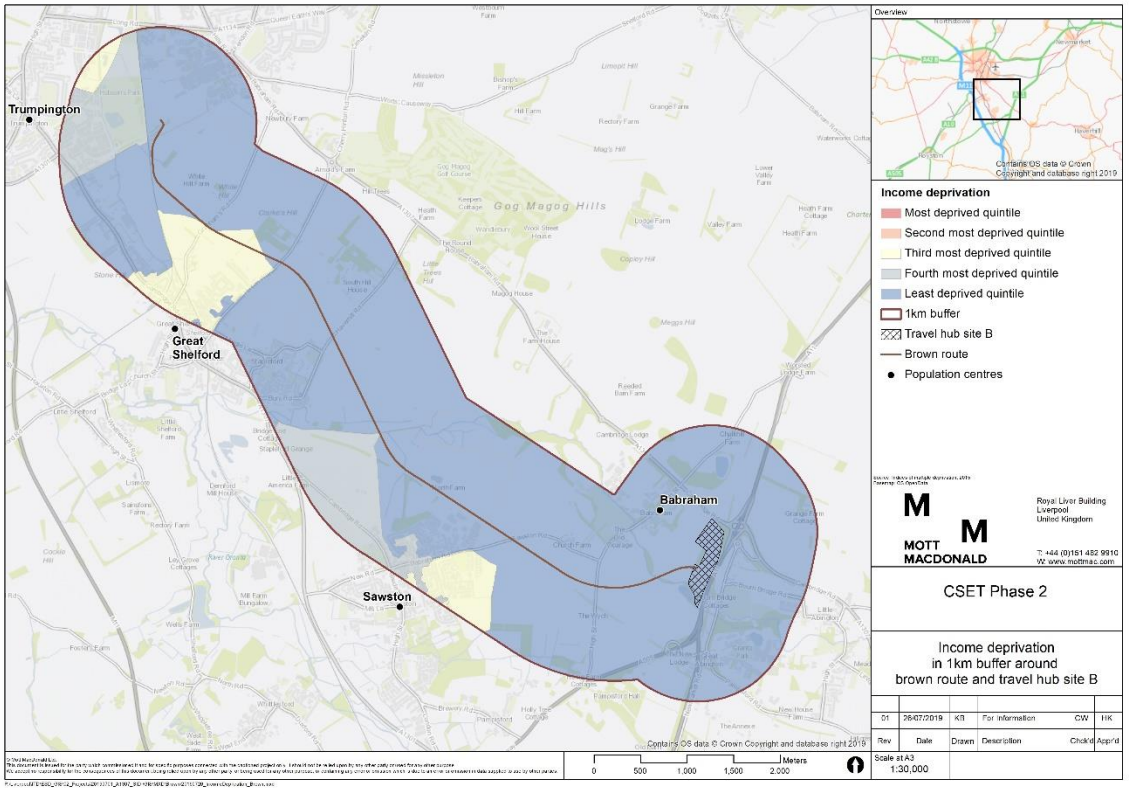
Source: Mott MacDonald based on Indices of Multiple Deprivation (2015)

Figure 3 Deprivation Quintiles in 1km Area around Travel Hub Site B and Pink Route



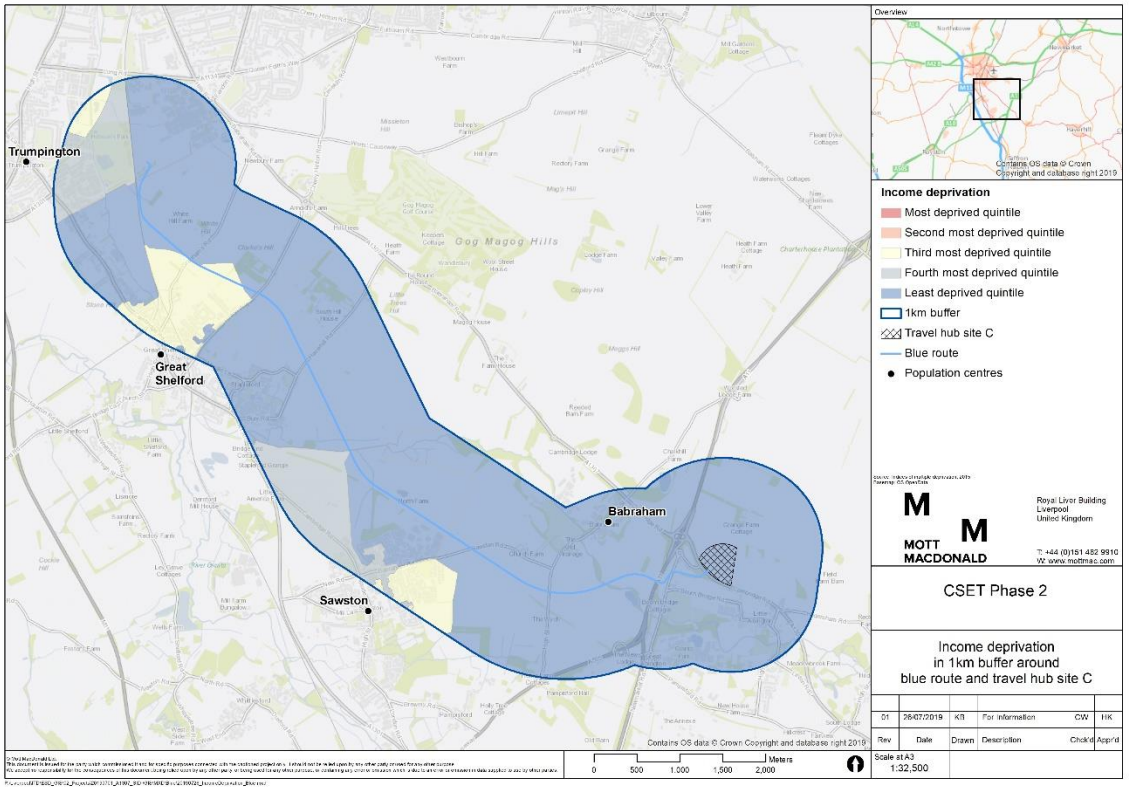
Source: Mott MacDonald based on Indices of Multiple Deprivation (2015)

Figure 4: Deprivation Quintiles in 1km Area around Travel Hub Site B and Brown Route



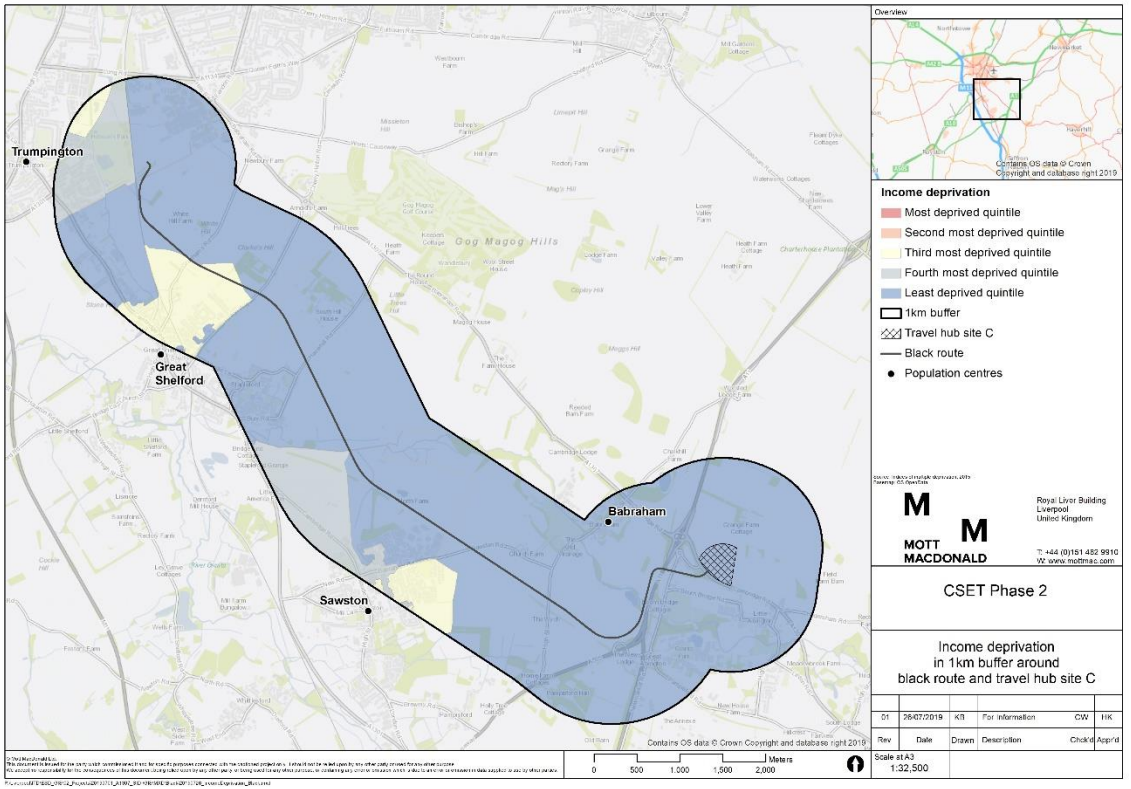
Source: Mott MacDonald based on Indices of Multiple Deprivation (2015)

Figure 5: Deprivation Quintiles in 1km Area around Travel Hub Site C and Blue Route



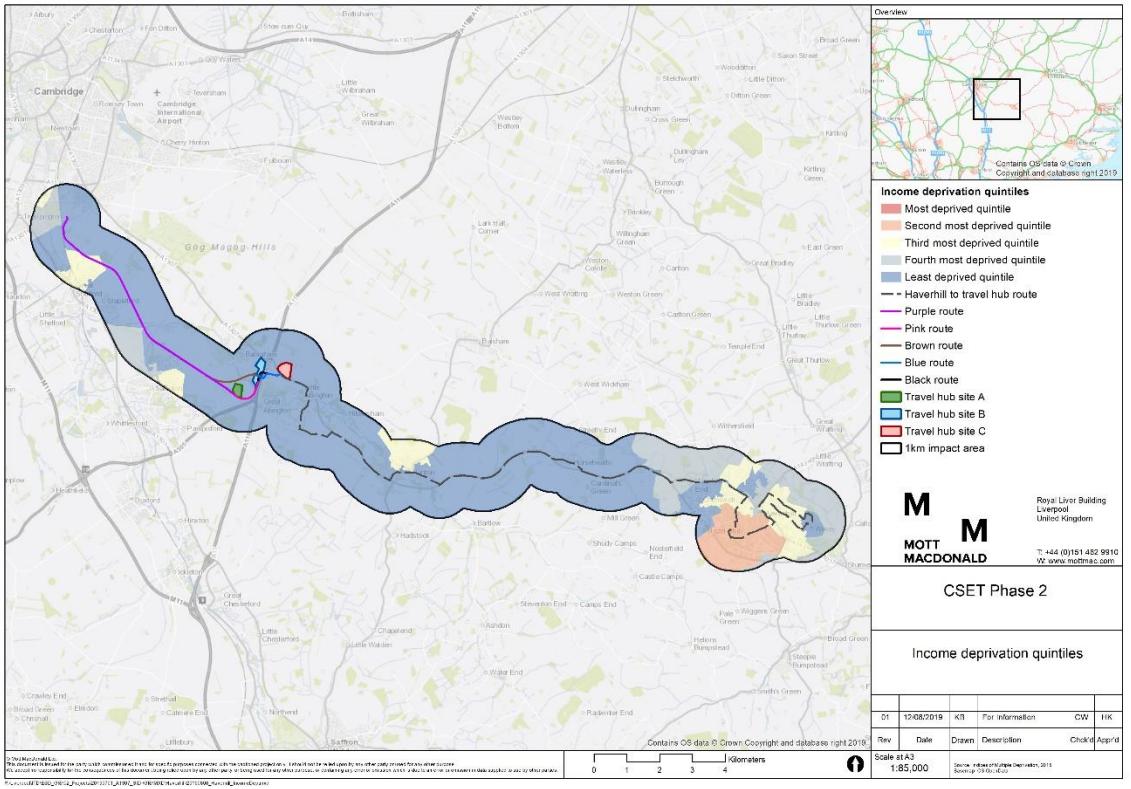
Source: Mott MacDonald based on Indices of Multiple Deprivation (2015)

Figure 6: Deprivation Quintiles in 1km Area around Travel Hub Site C and Black Route



Source: Mott MacDonald based on Indices of Multiple Deprivation (2015)

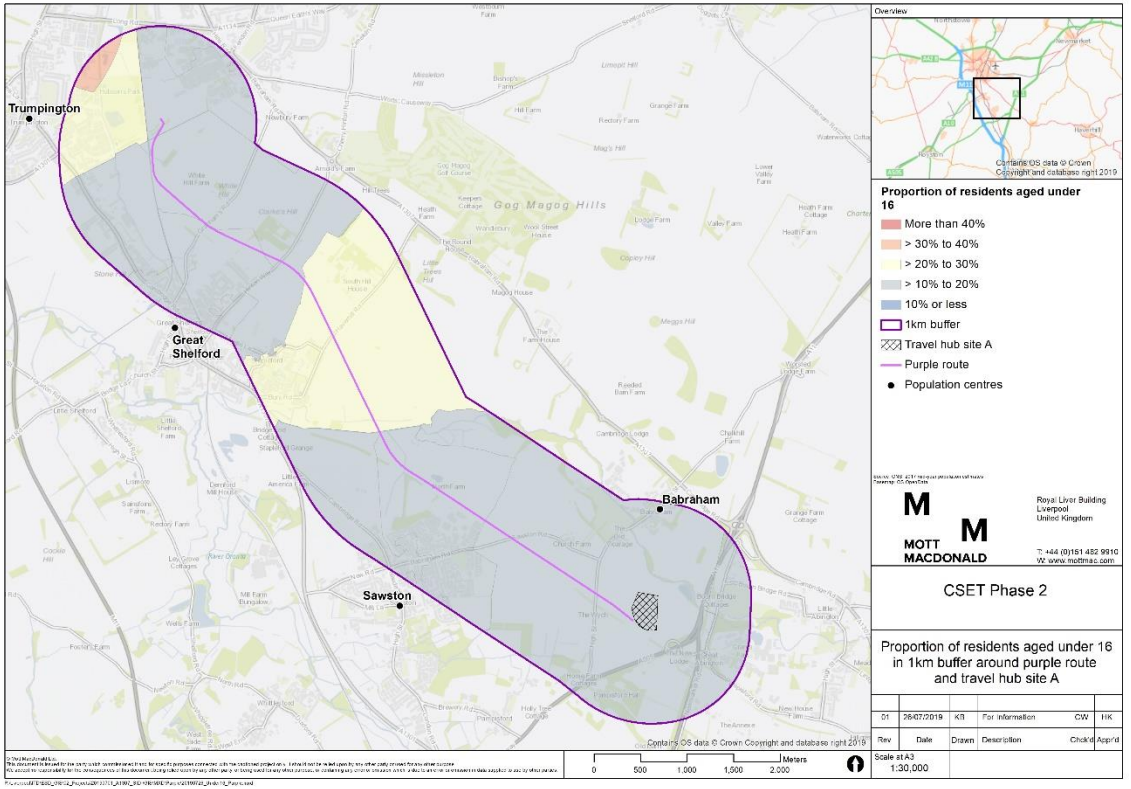
Figure 7: Income Deprivation Quintiles in 1km Area around Proposed Routes and Additional Haverhill Route



Source: Mott MacDonald based on Indices of Multiple Deprivation (2015)

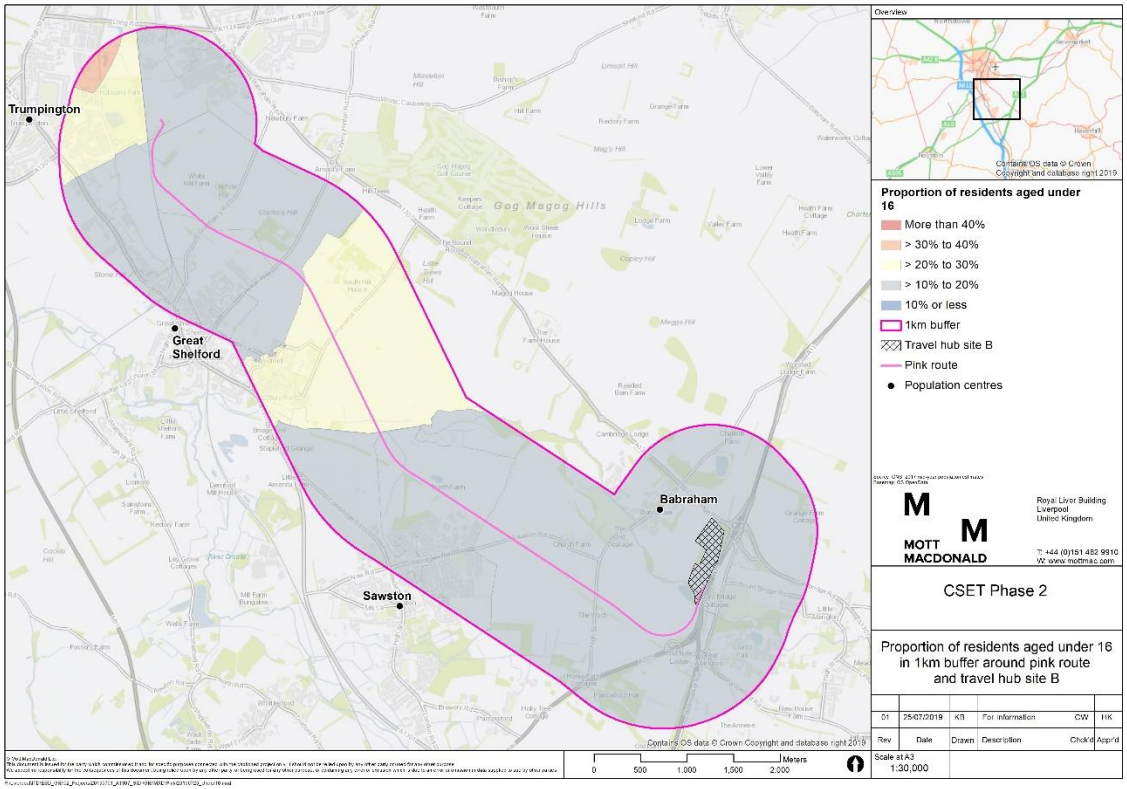
B. Proportion of Residents Aged Under 16

Figure 8: Distribution of Residents Aged Under 16 in 1km around Travel Hub Site A and Purple Route



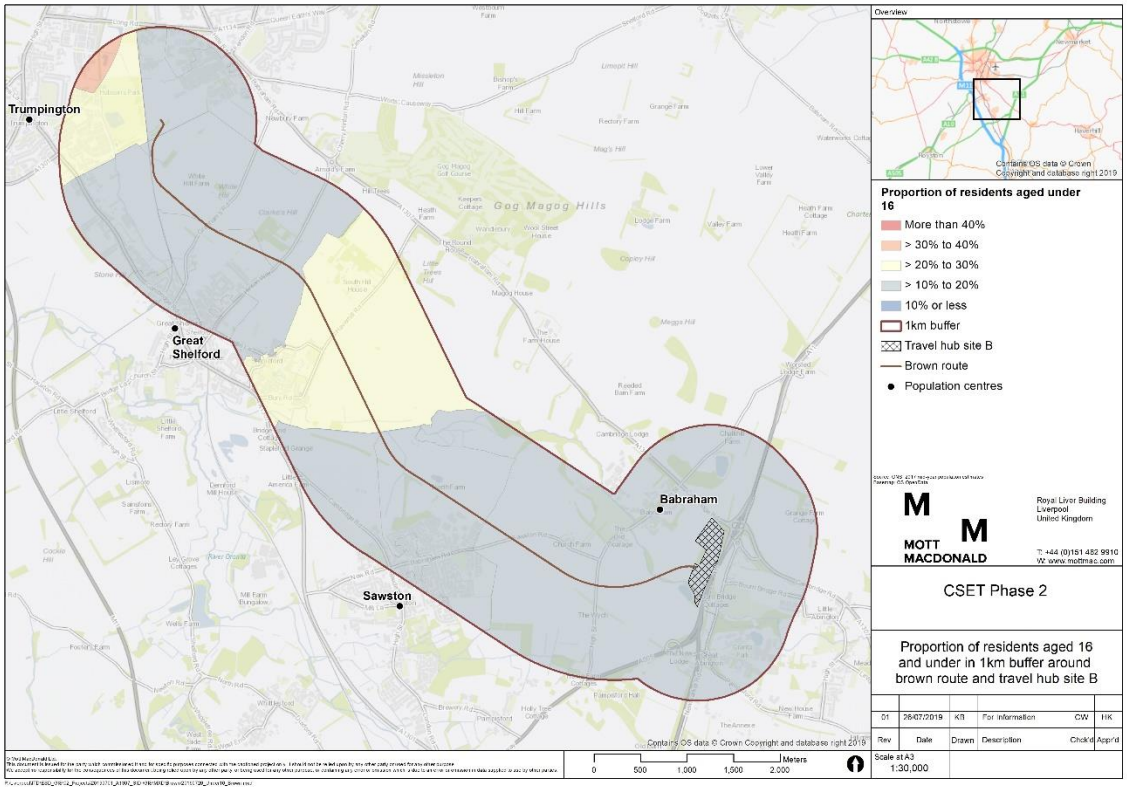
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 9: Distribution of Residents Aged Under 16 in 1km around Travel Hub Site B and Pink Route



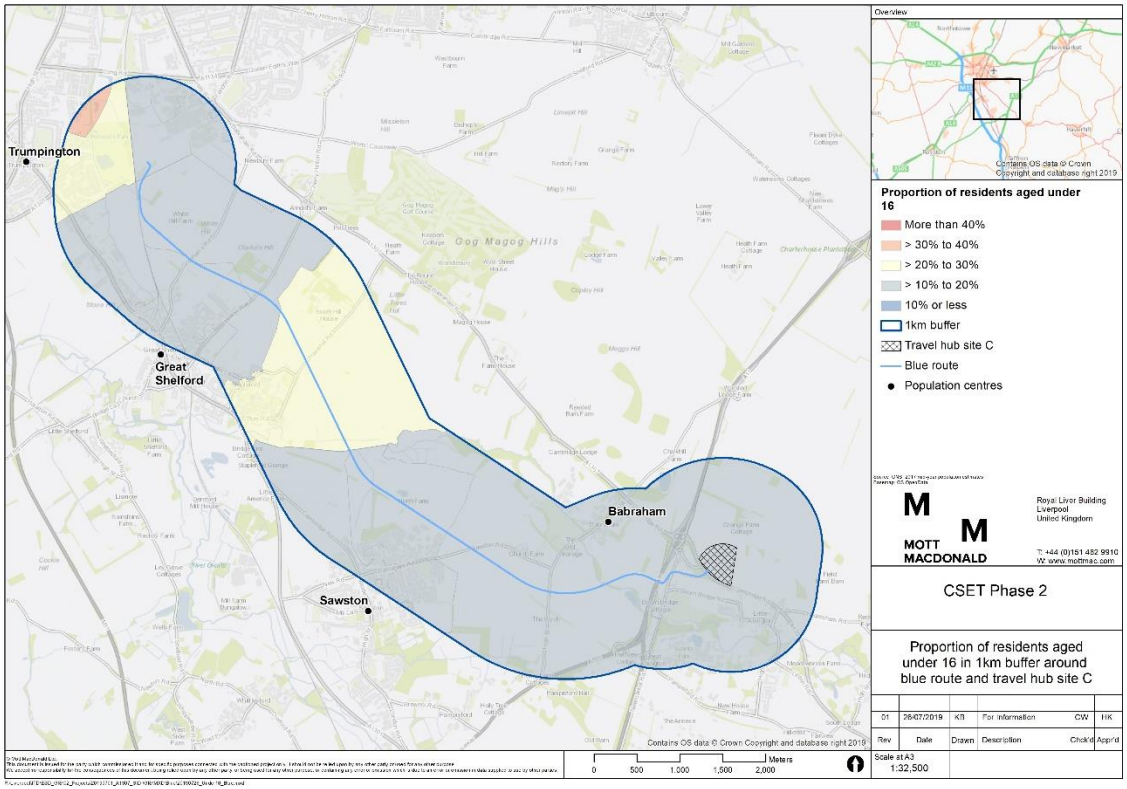
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 10: Distribution of Residents Aged Under 16 in 1km around Travel Hub Site B and Brown Route



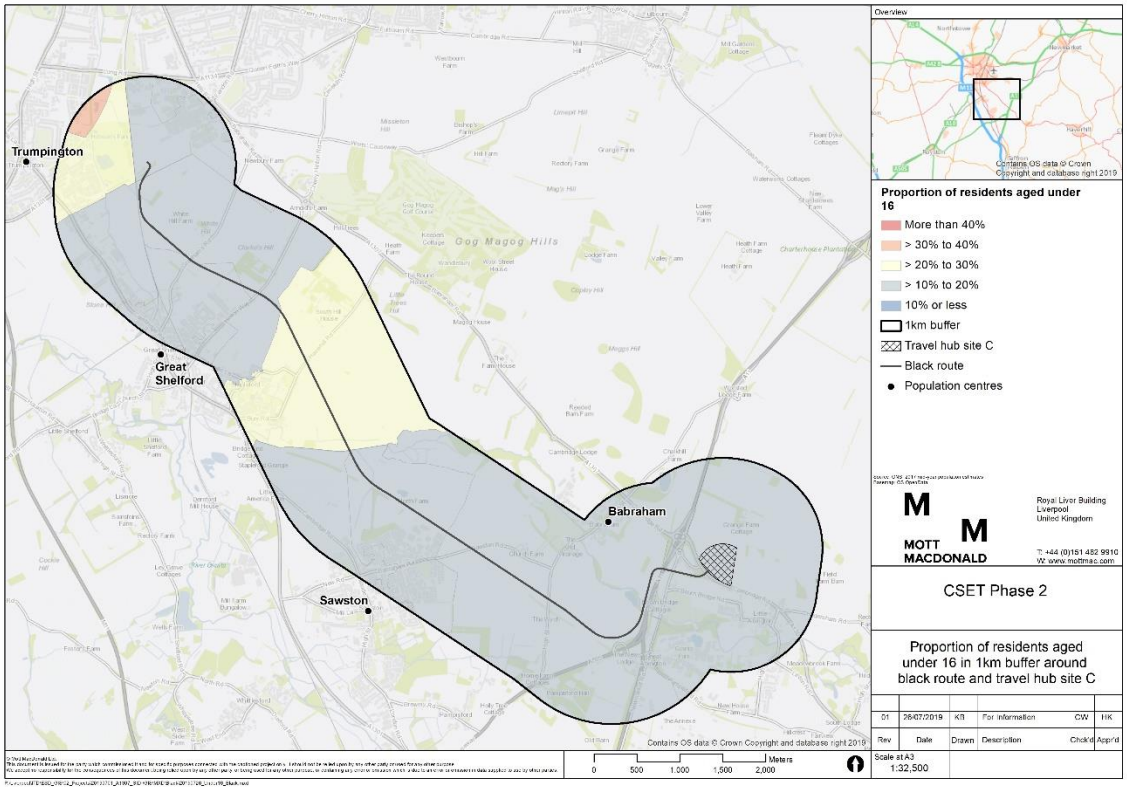
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 11: Distribution of Residents Aged Under 16 in 1km around Travel Hub Site C and Blue Route



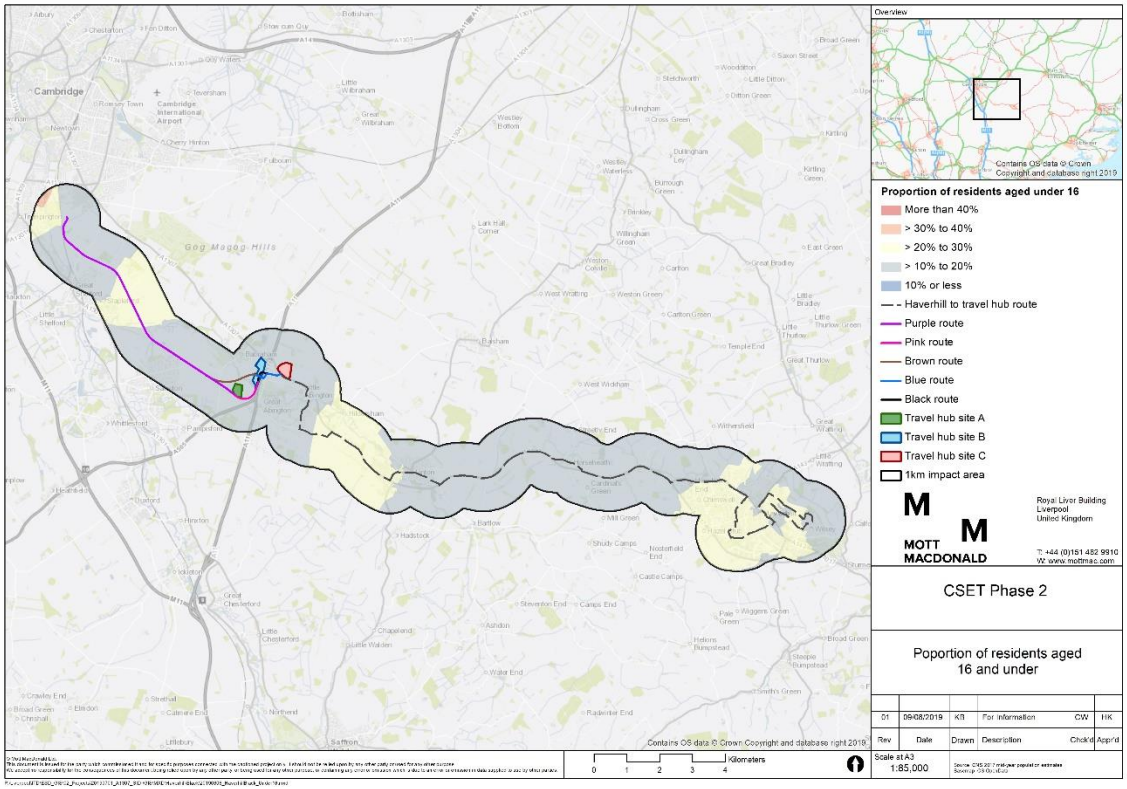
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 12: Distribution of Residents Aged Under 16 in 1km around Travel Hub Site C and Black Route



Source: Mott MacDonald based on 2017 mid-year population estimates

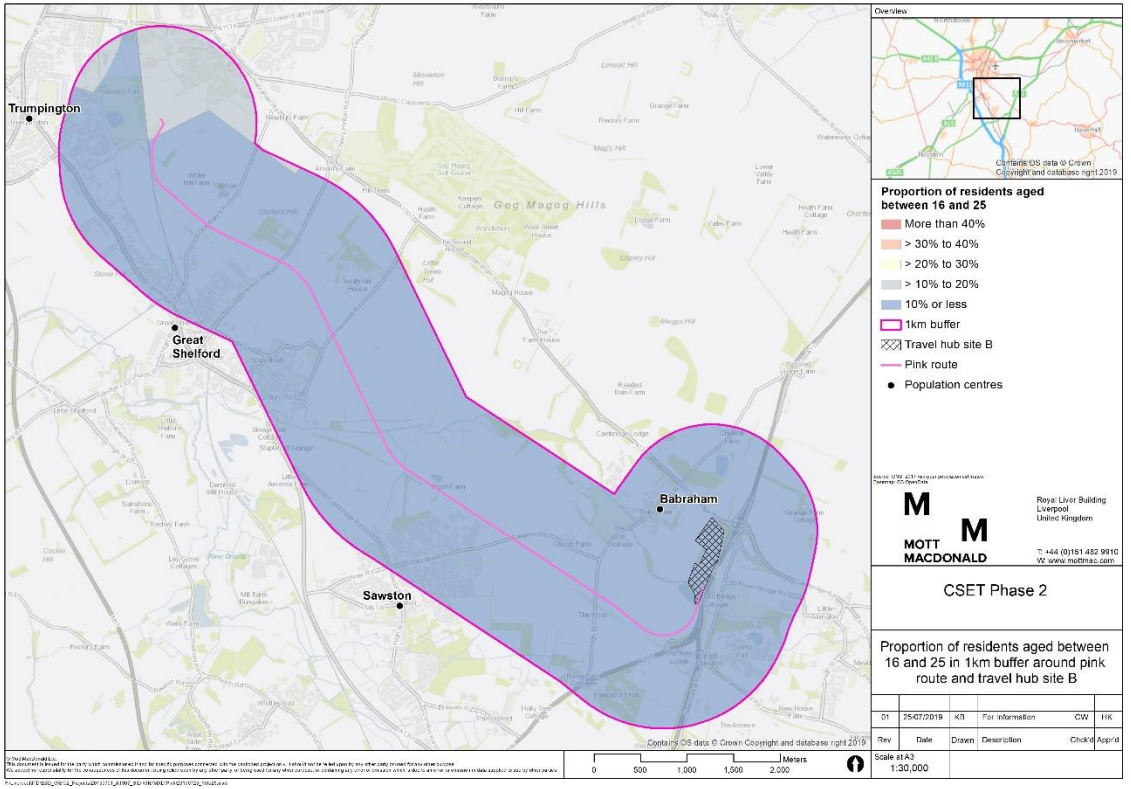
Figure 13: Distribution of Residents Aged Under 16 in 1km around Proposed Routes and Additional Route to Haverhill



Source: Mott MacDonald based on 2017 mid-year population estimates

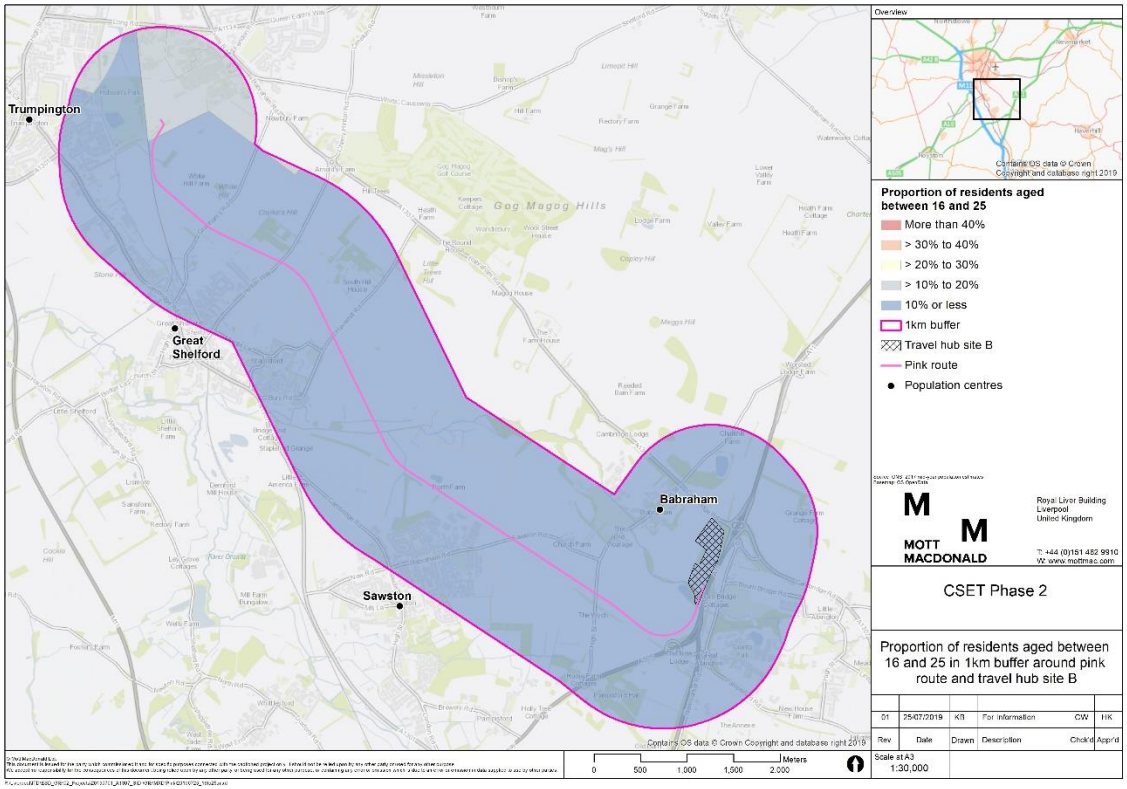
C. Proportion of Residents Aged Between 16 and 25

Figure 14: Distribution of Residents Aged Between 16 and 25 in 1km around Travel Hub Site A and Purple Route



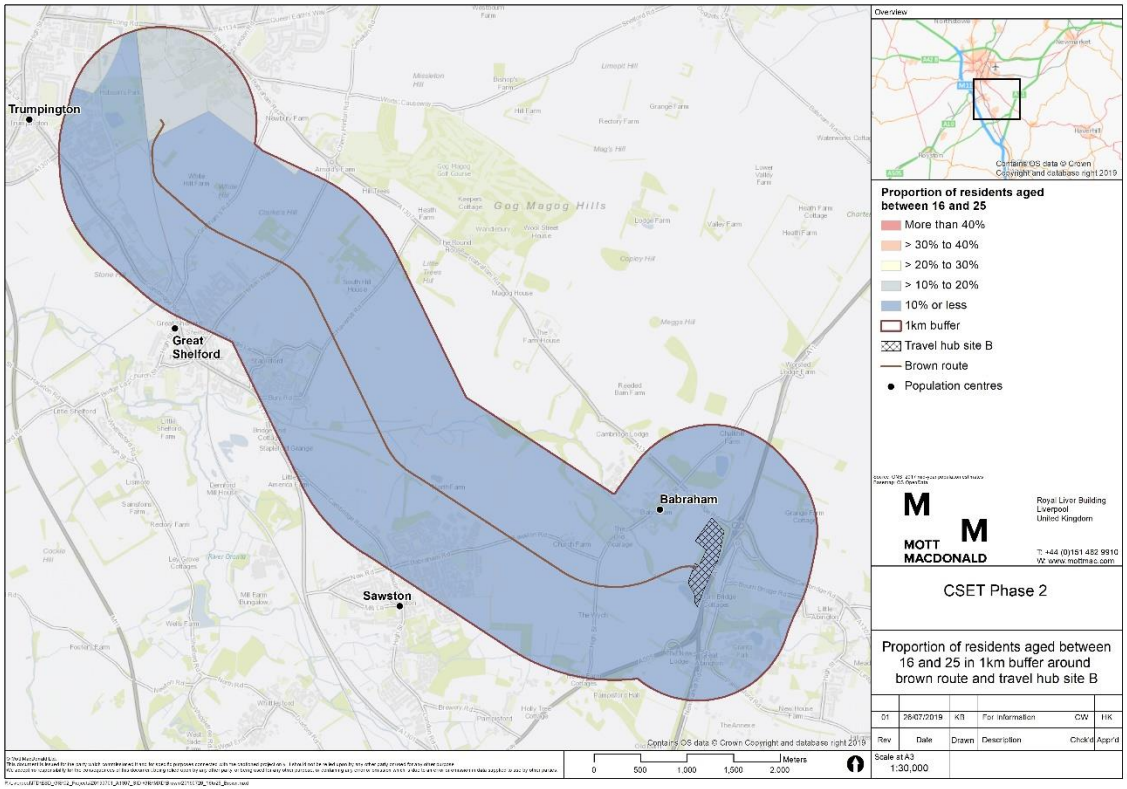
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 15: Distribution of Residents Aged Between 16 and 25 in 1km around Travel Hub Site B and Pink Route



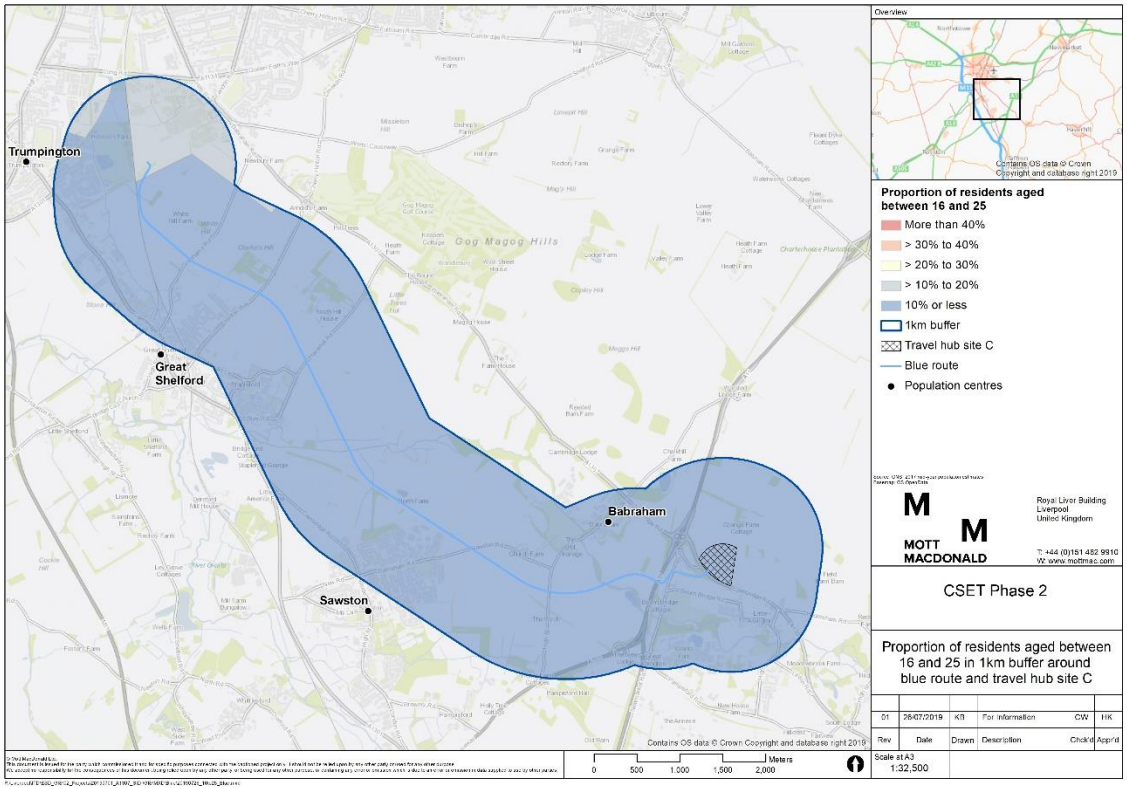
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 16: Distribution of Residents Aged Between 16 and 25 in 1km around Travel Hub Site B and Brown Route



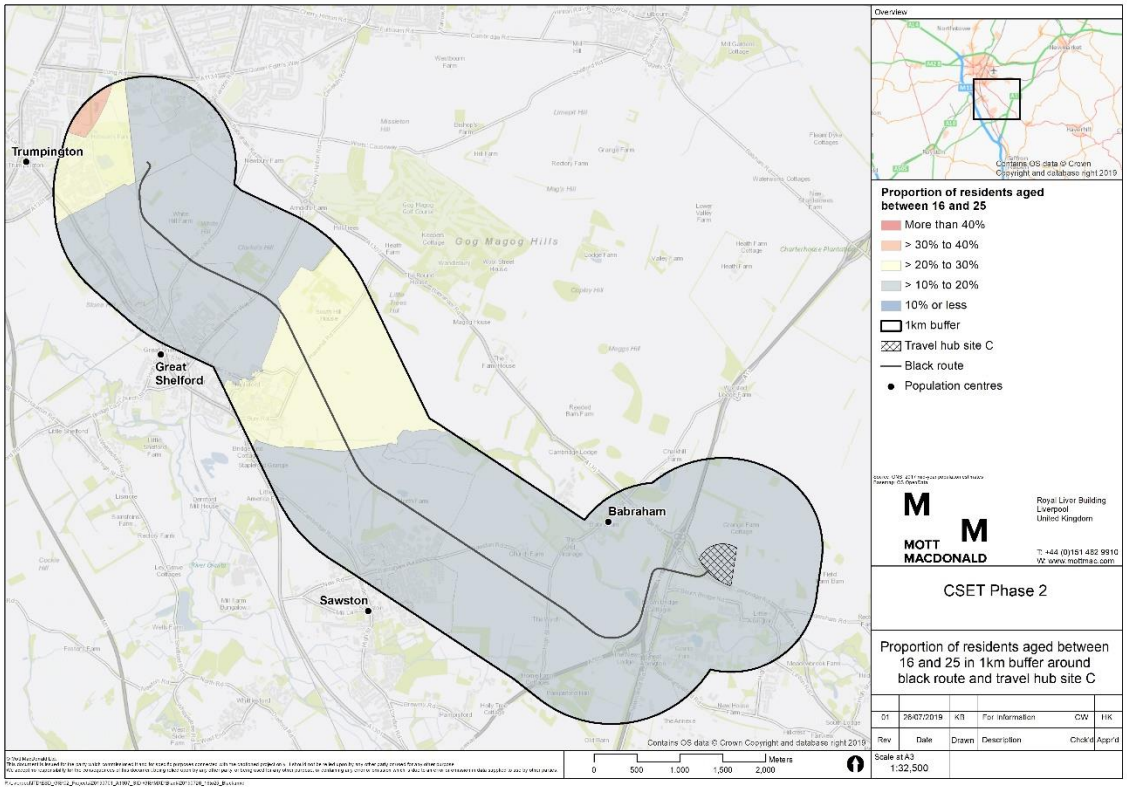
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 17: Distribution of Residents Aged Between 16 and 25 in 1km around Travel Hub Site C and Blue Route



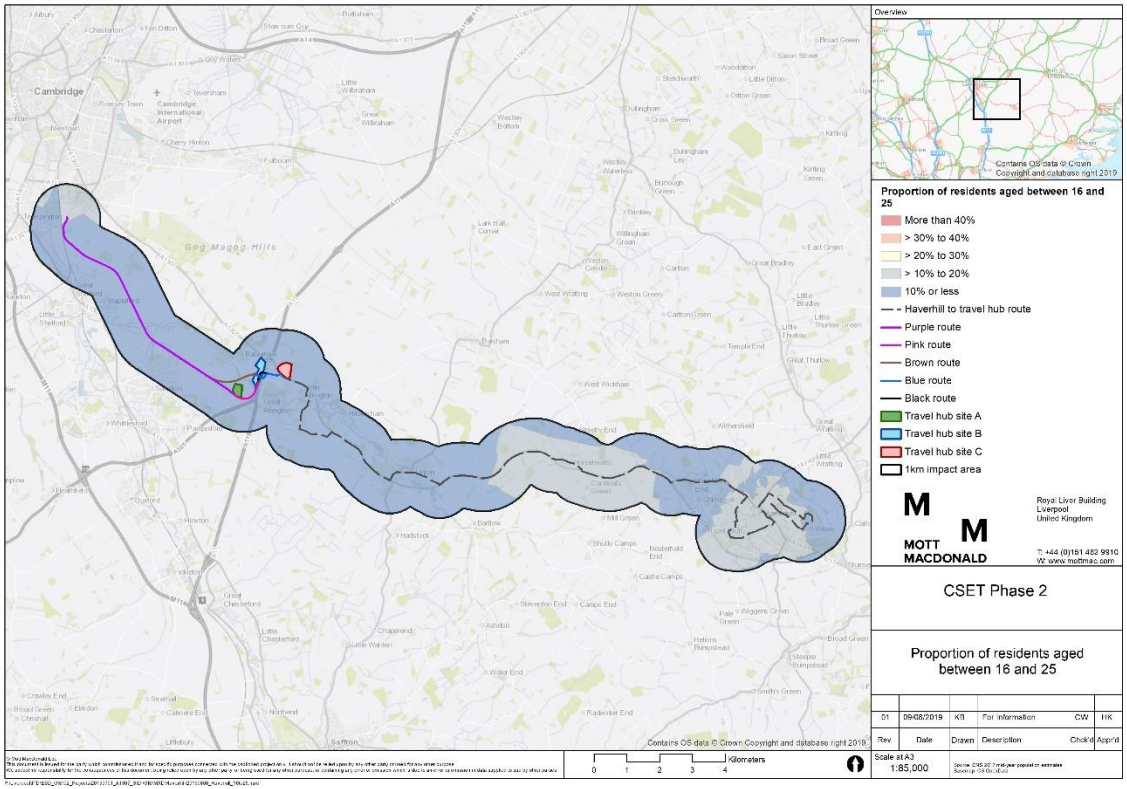
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 18: Distribution of Residents Aged Between 16 and 25 in 1km around Travel Hub Site C and Black Route



Source: Mott MacDonald based on 2017 mid-year population estimates

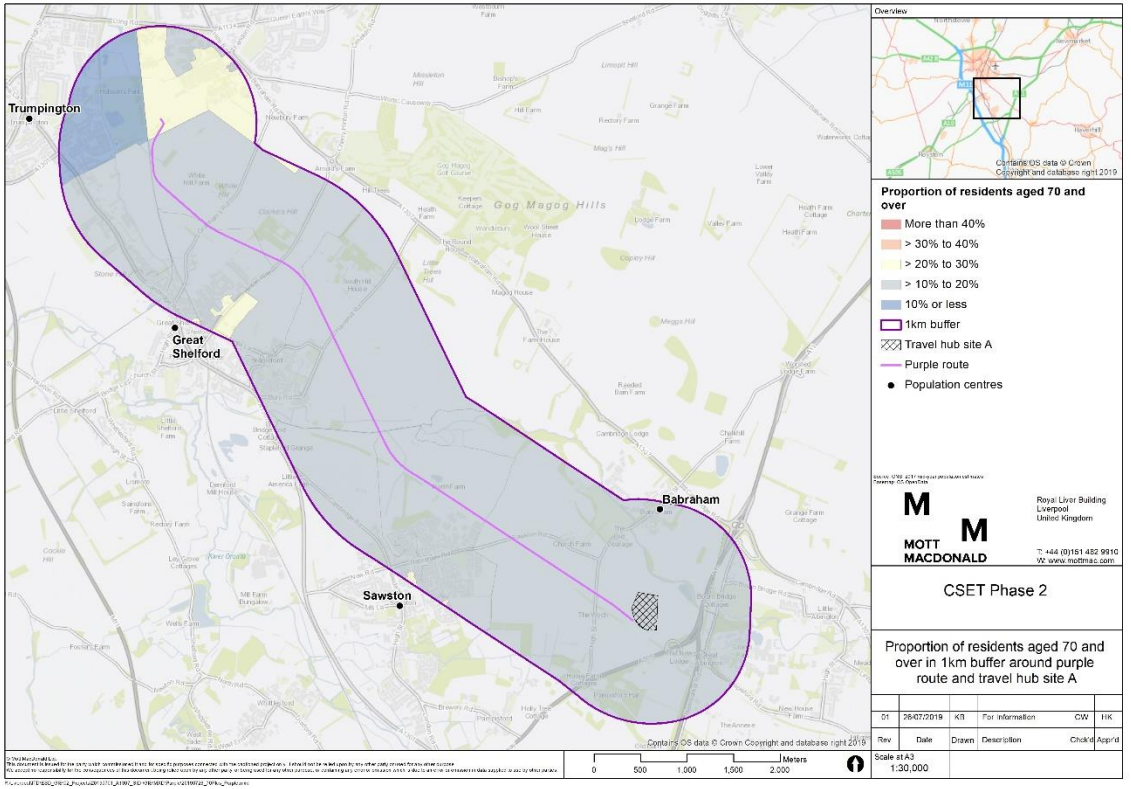
Figure 19: Distribution of Residents Aged Between 16 and 25 in 1km around Proposed Routes and Additional Route to Haverhill



Source: Mott MacDonald based on 2017 mid-year population estimates

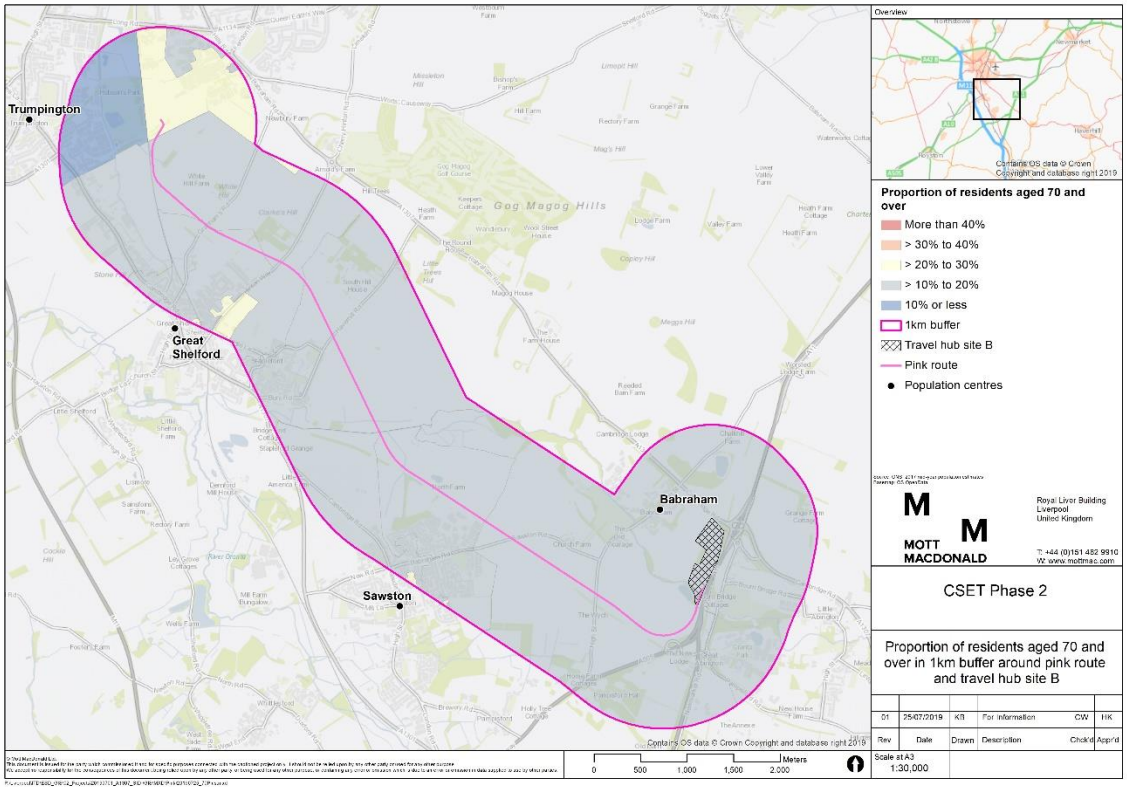
D. Proportion of Residents Aged 70 and Over

Figure 20: Distribution of Residents Aged 70 and Over in 1km around Travel Hub Site A and Purple Route



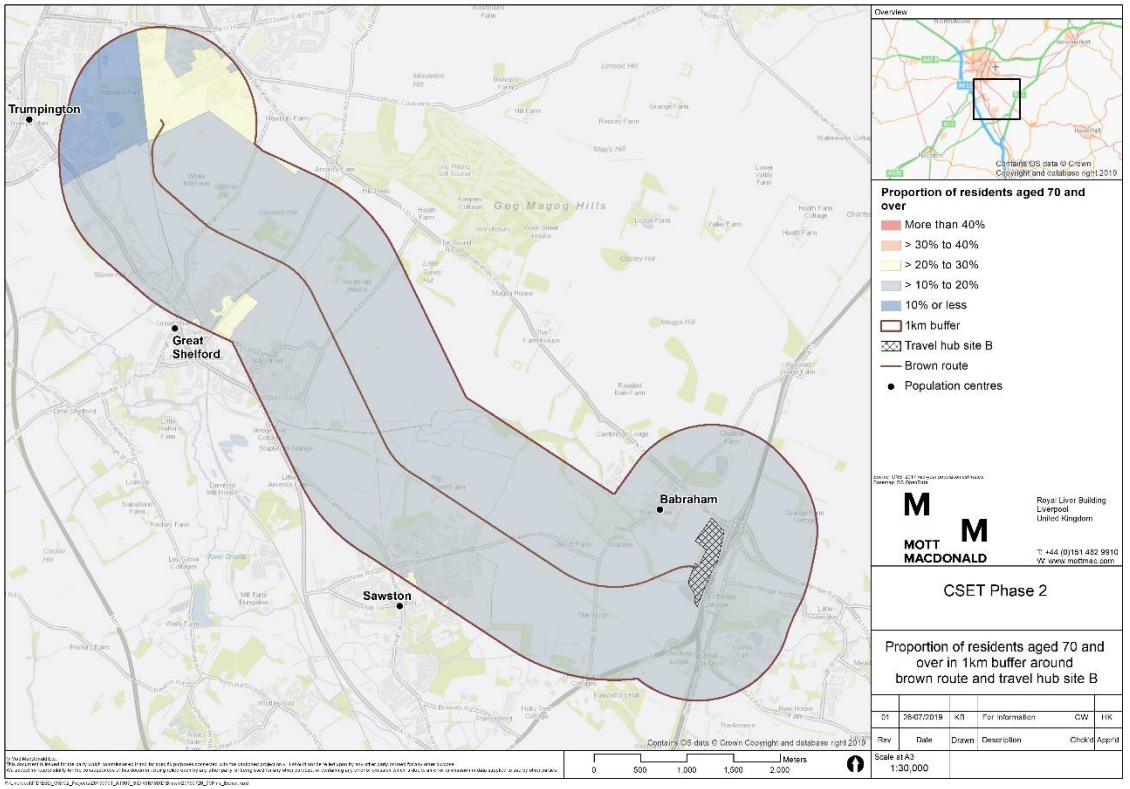
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 21: Distribution of Residents Aged 70 and Over in 1km around Travel Hub Site B and Pink Route



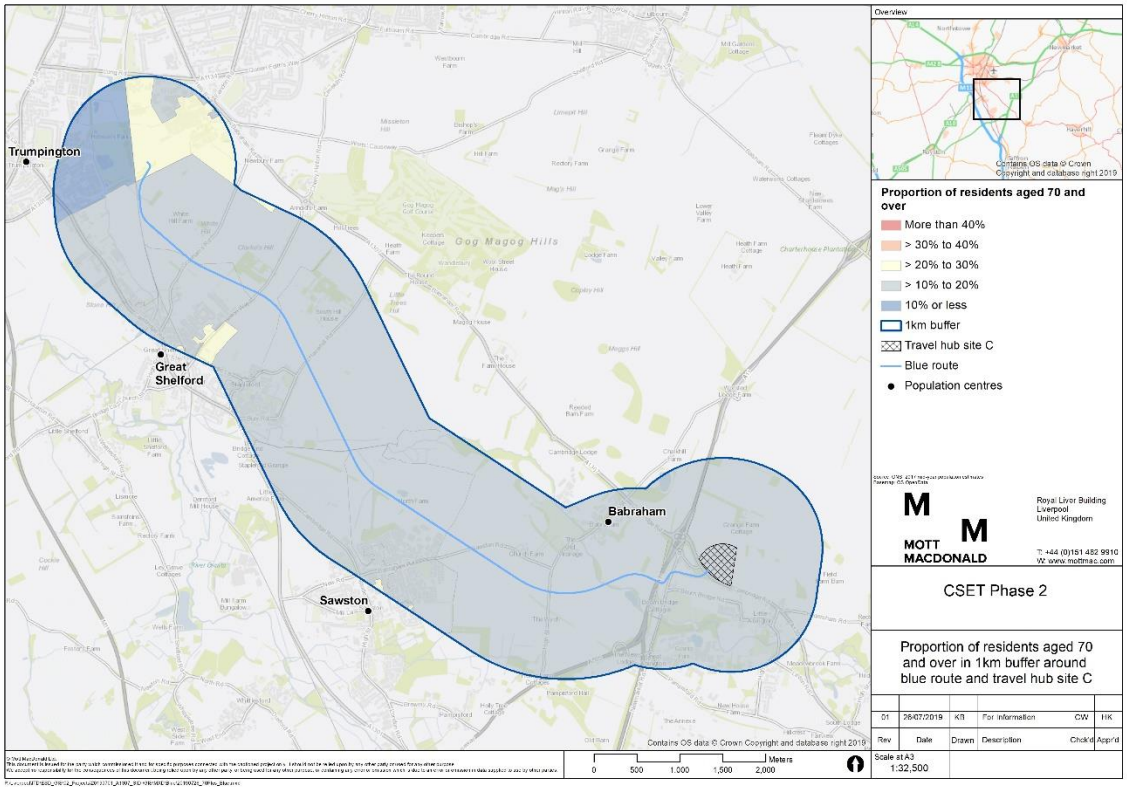
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 22: Distribution of Residents Aged 70 and Over in 1km around Travel Hub Site B and Brown Route



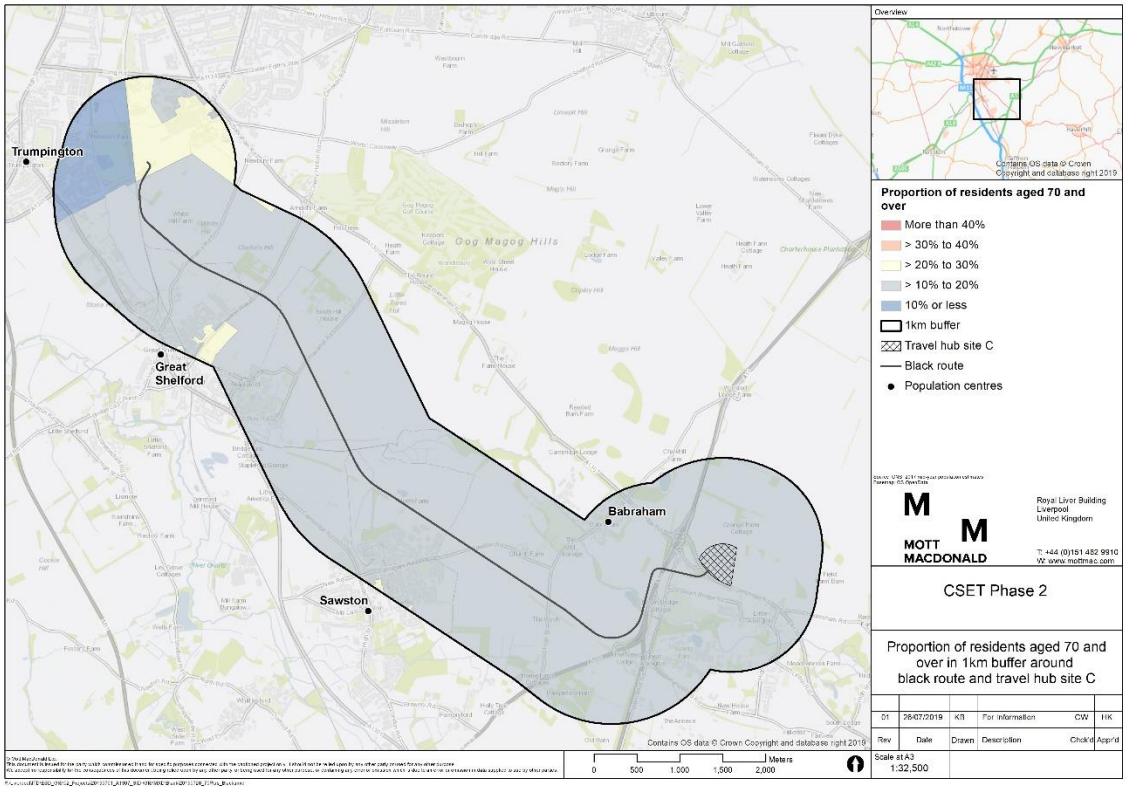
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 23: Distribution of Residents Aged 70 and Over in 1km around Travel Hub Site C and Blue Route



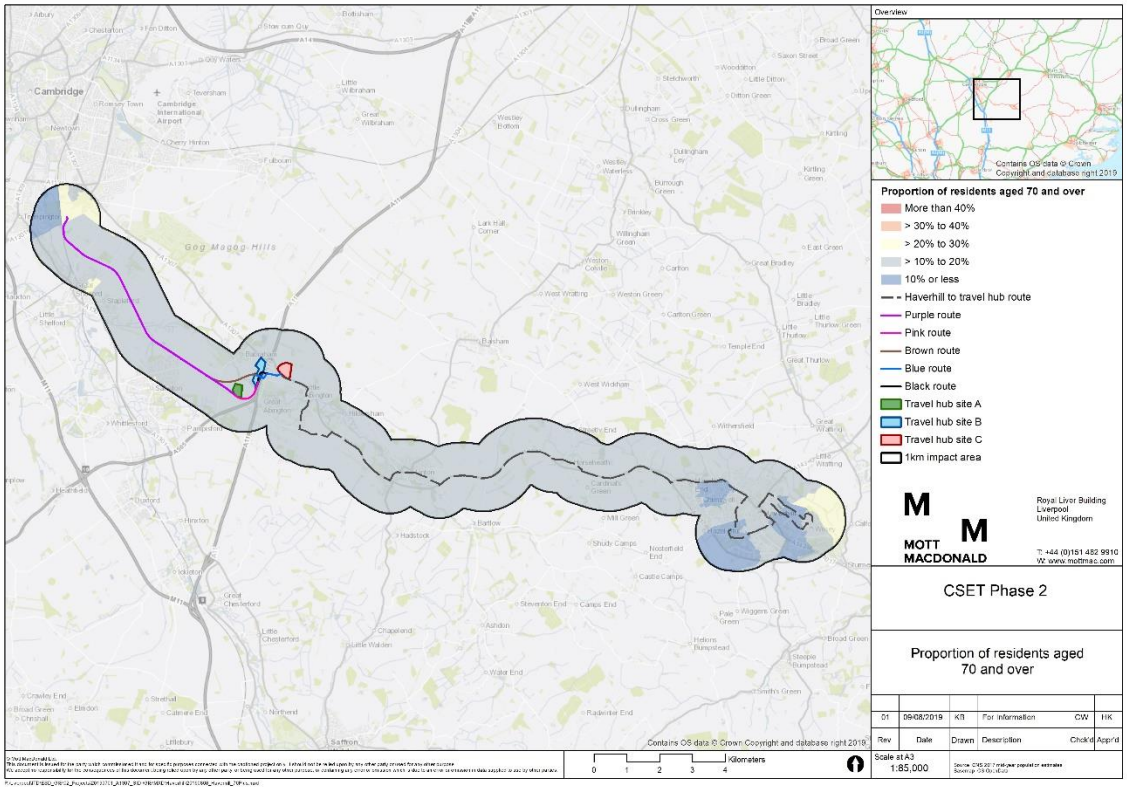
Source: Mott MacDonald based on 2017 mid-year population estimates

Figure 24: Distribution of Residents Aged 70 and Over in 1km around Travel Hub Site C and Black Route



Source: Mott MacDonald based on 2017 mid-year population estimates

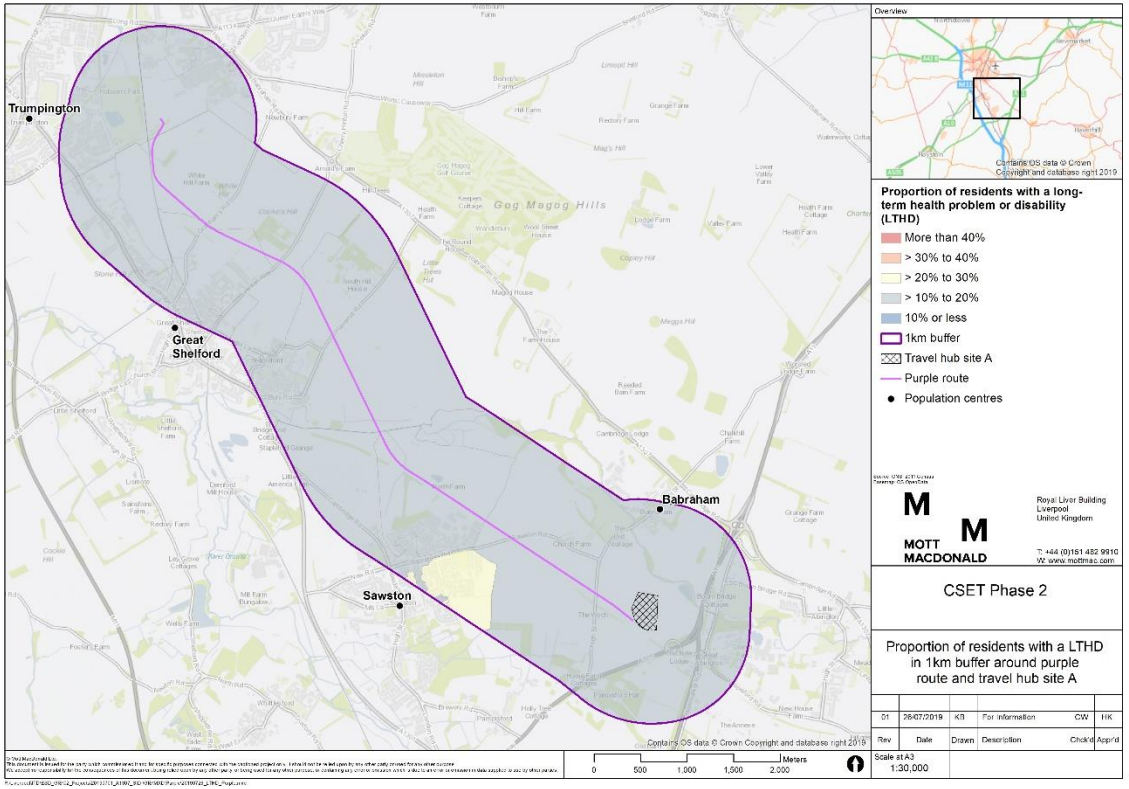
Figure 25: Distribution of Residents Aged 70 and Over in 1km around Proposed Routes and Additional Haverhill Route



Source: Mott MacDonald based on 2017 mid-year population estimates

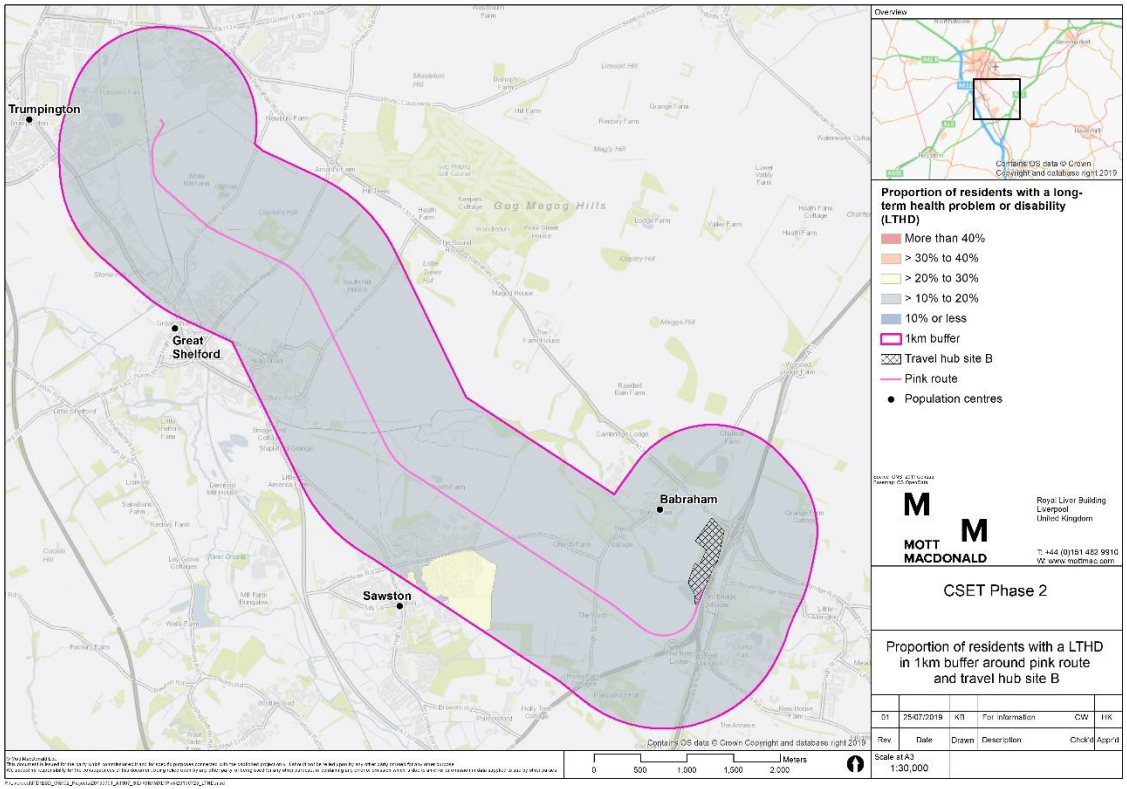
E. Proportion of Residents with a LTHD

Figure 26: Distribution of Residents with a LTHD in 1km Area around Travel Hub Site A and Purple Route



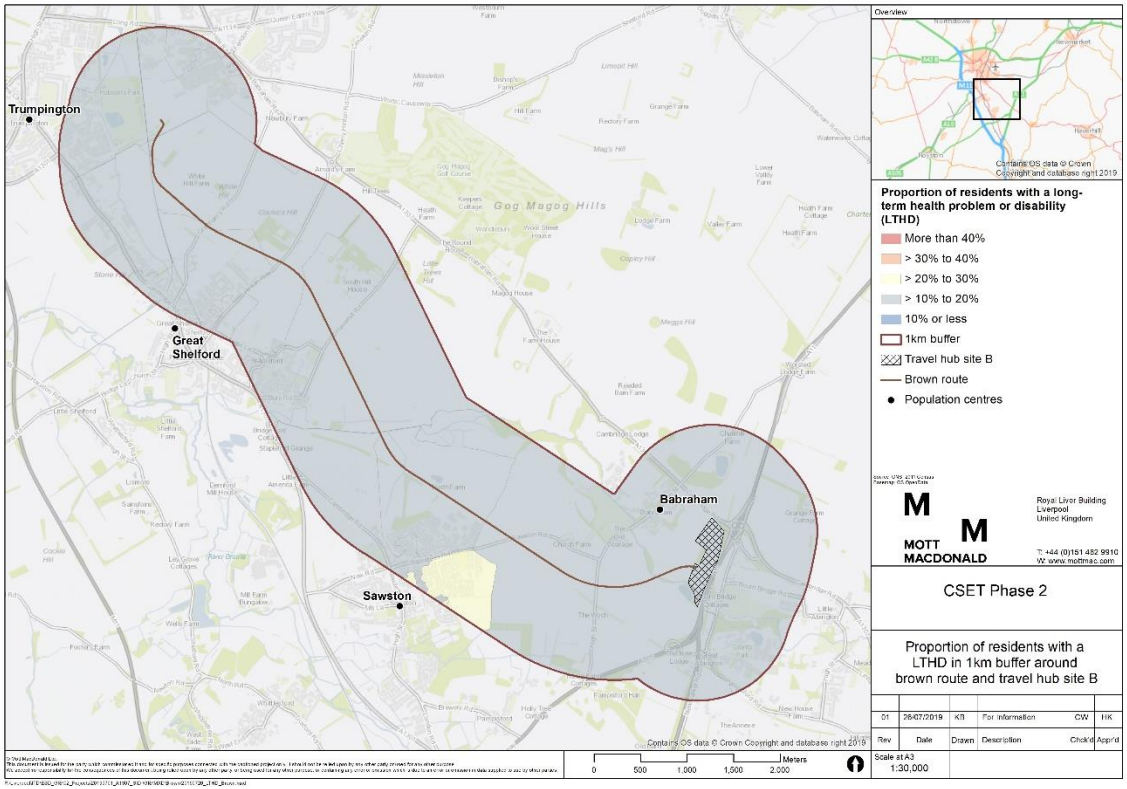
Source: Mott MacDonald based on 2011 Census

Figure 27: Distribution of Residents with a LTHD in 1km Area around Travel Hub Site B and Pink Route



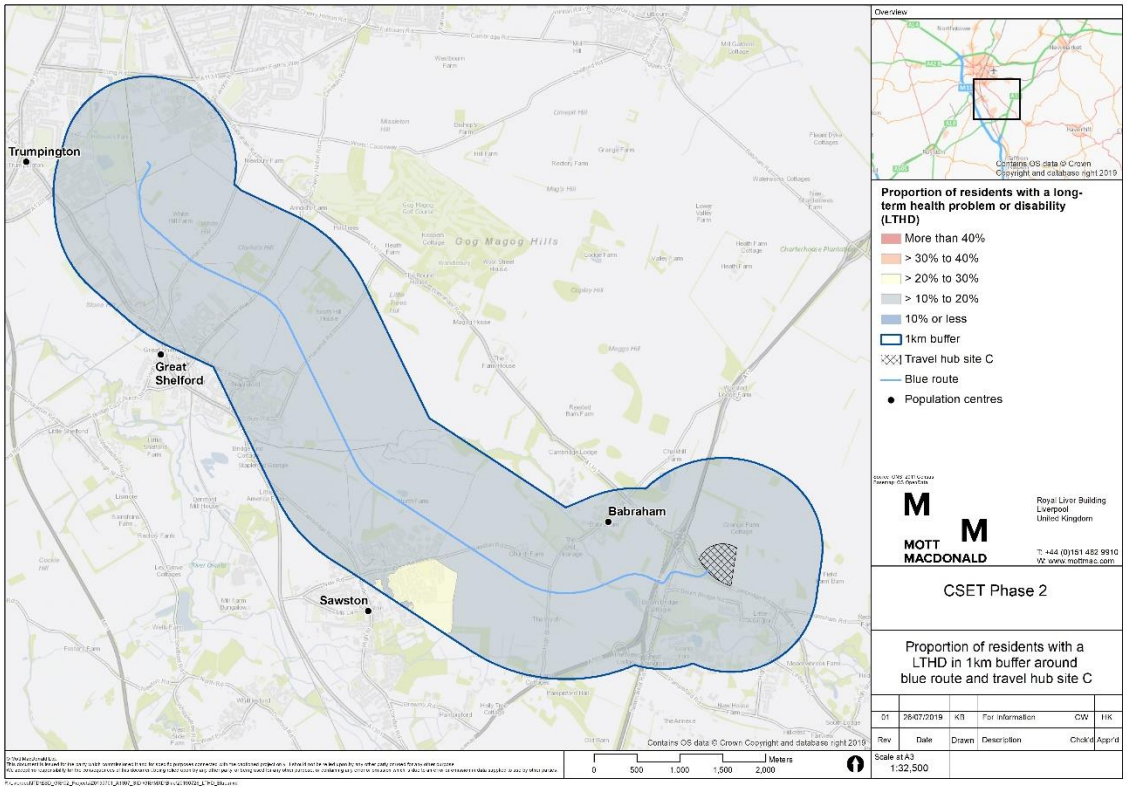
Source: Mott MacDonald based on 2011 Census

Figure 28: Distribution of Residents with a LTHD in 1km Area around Travel Hub Site B and Brown Route



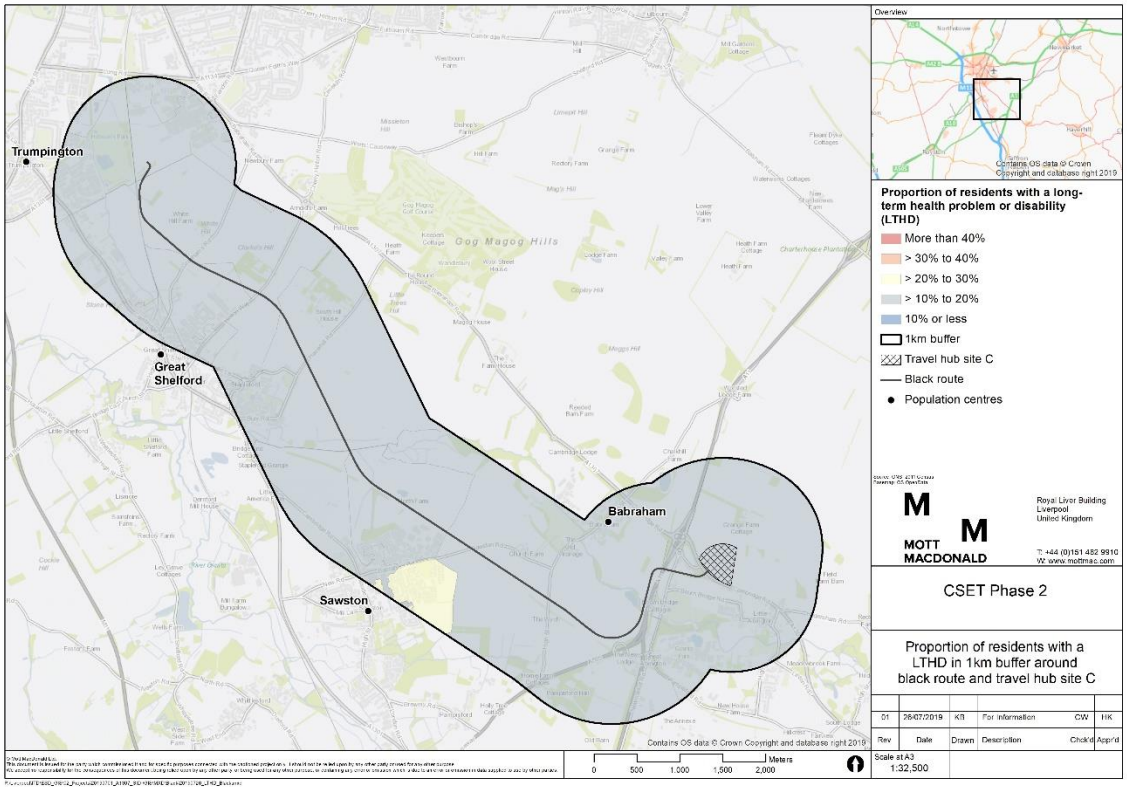
Source: Mott MacDonald based on 2011 Census

Figure 29: Distribution of Residents with a LTHD in 1km Area around Travel Hub Site C and Blue Route



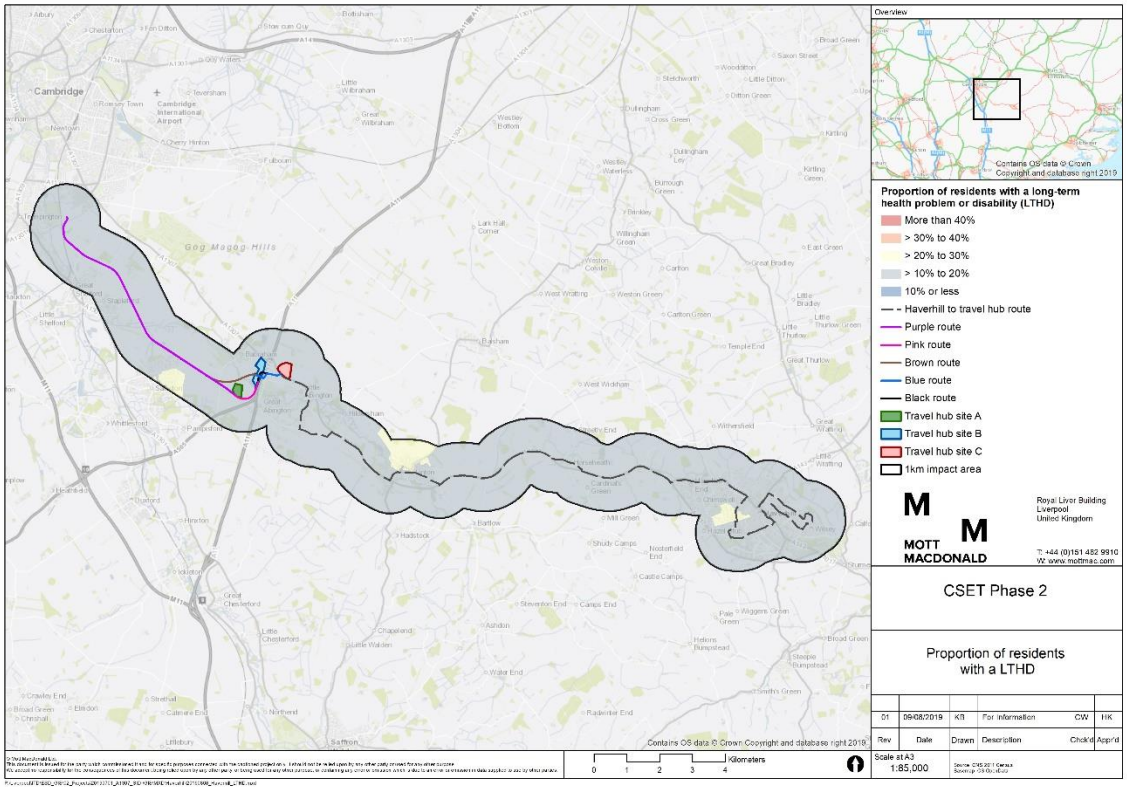
Source: Mott MacDonald based on 2011 Census

Figure 30: Distribution of Residents with a LTHD in 1km Area around Travel Hub Site C and Black Route



Source: Mott MacDonald based on 2011 Census

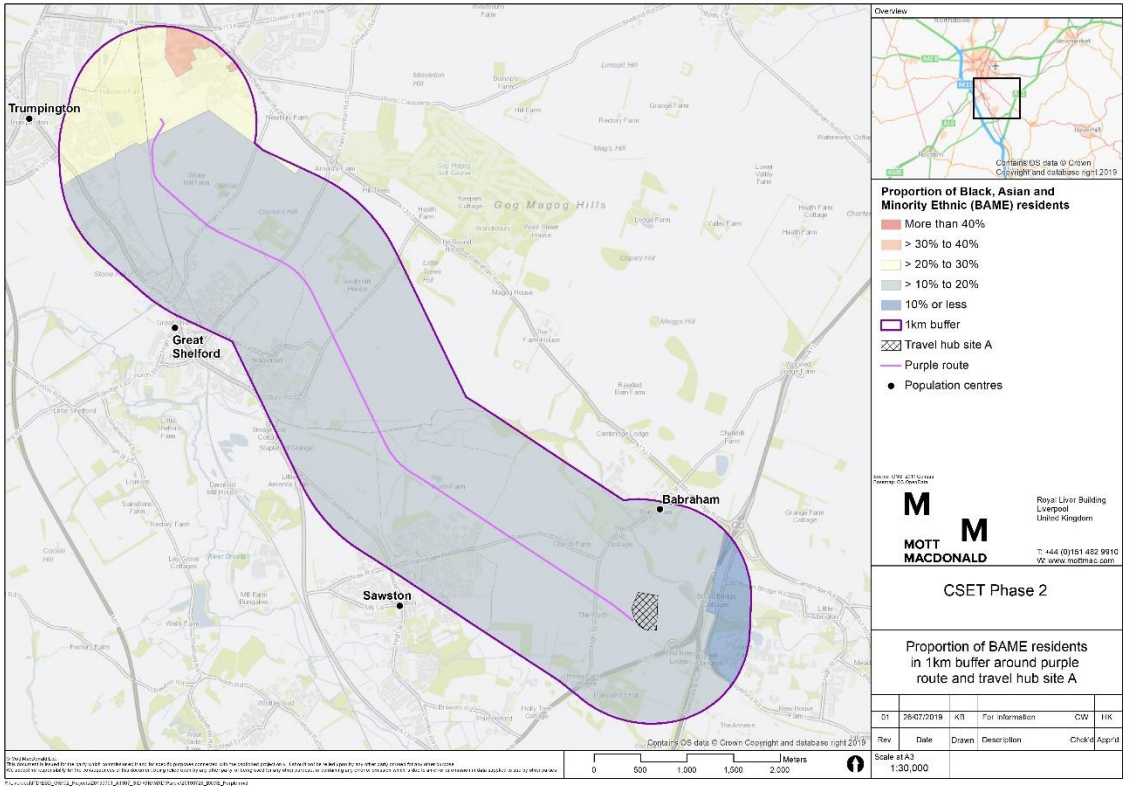
Figure 31: Distribution of Residents with a LTHD in 1km Area around Proposed Routes and Additional Haverhill Route



Source: Mott MacDonald based on 2011 Census

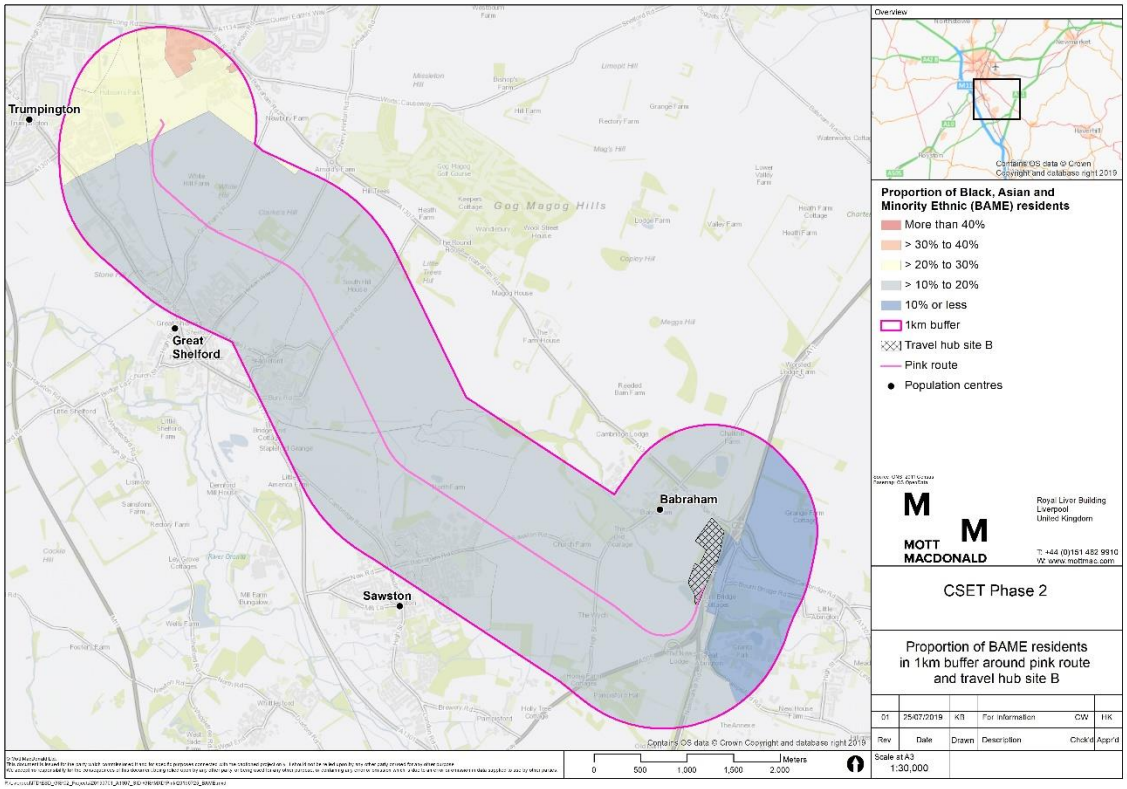
F. Proportion of BAME Residents

Figure 32: Distribution of BAME Residents in 1km Area around Travel Hub Site A and Purple Route



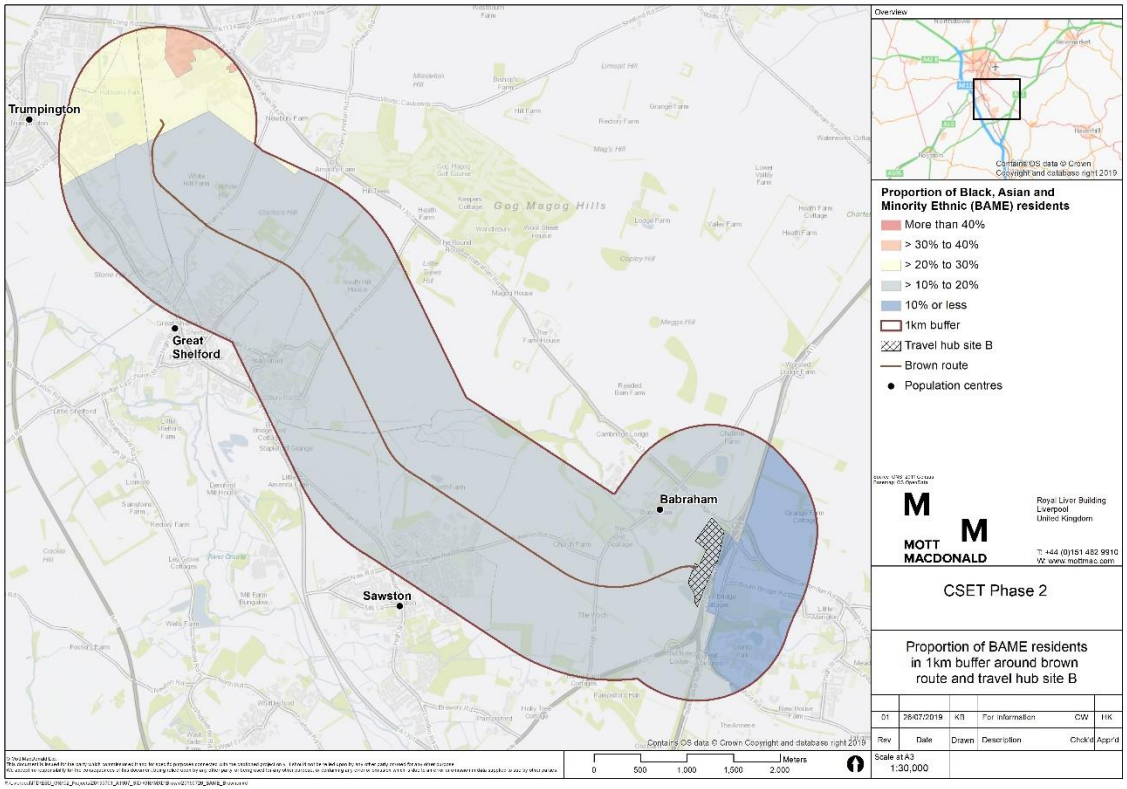
Source: Mott MacDonald based on 2011 Census

Figure 33: Distribution of BAME Residents in 1km Area around Travel Hub Site B and Pink Route



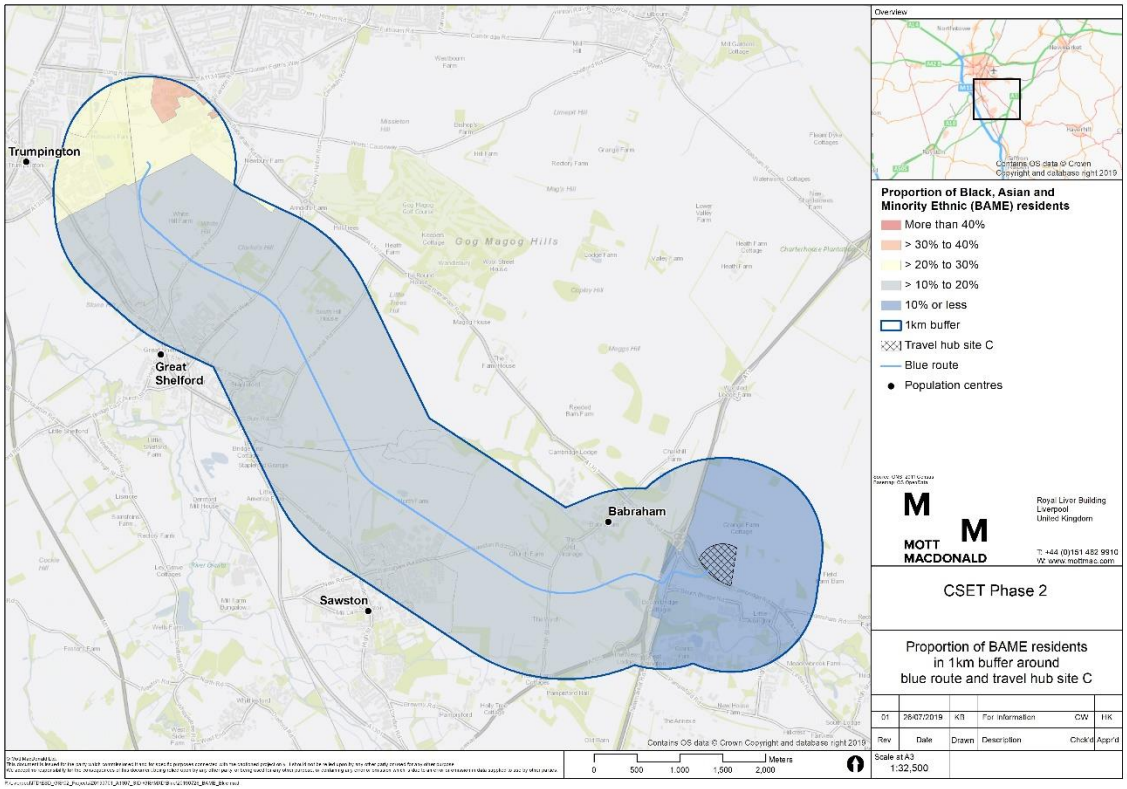
Source: Mott MacDonald based on 2011 Census

Figure 34: Distribution of BAME Residents in 1km Area around Travel Hub Site B and Brown Route



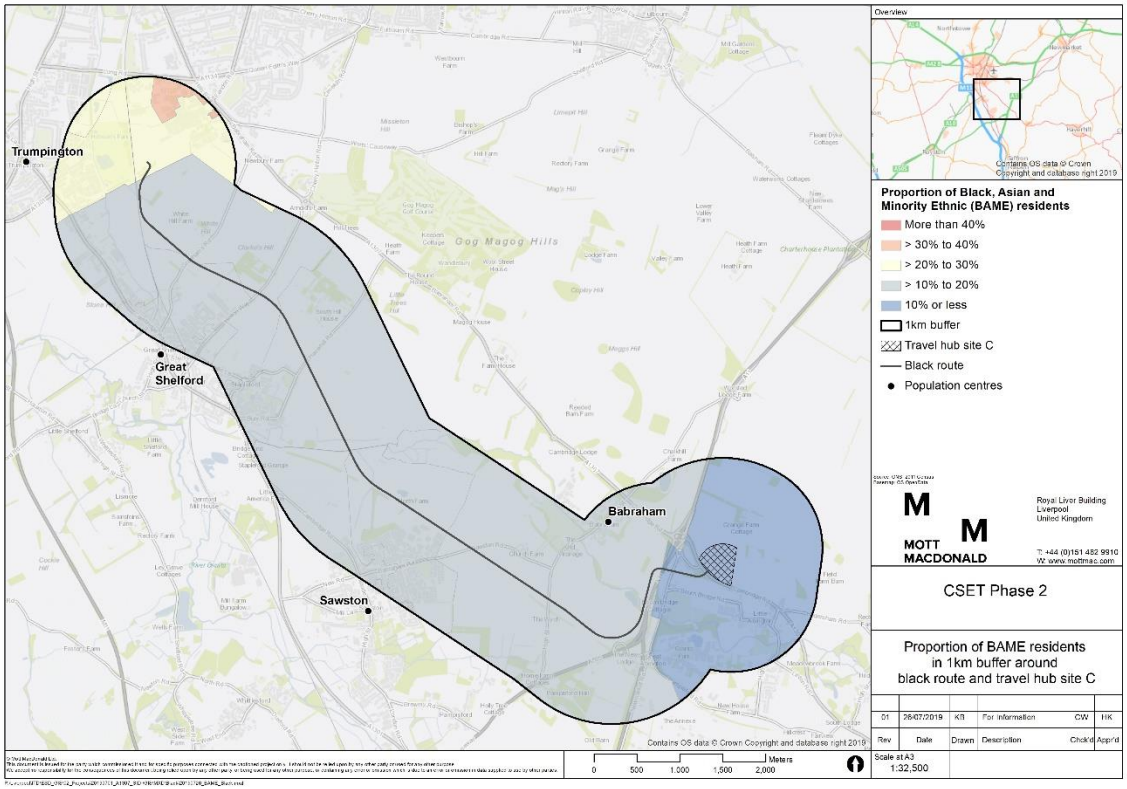
Source: Mott MacDonald based on 2011 Census

Figure 35: Distribution of BAME Residents in 1km Area around Travel Hub Site C and Blue Route



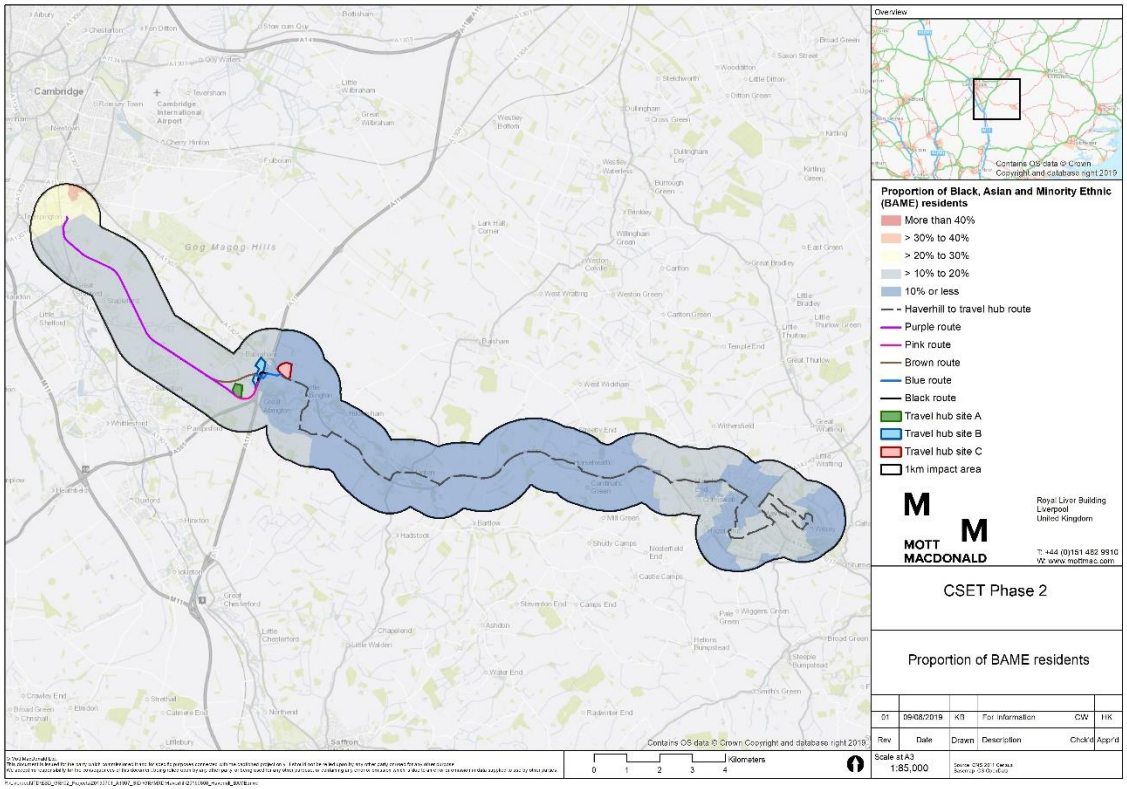
Source: Mott MacDonald based on 2011 Census

Figure 36: Distribution of BAME Residents in 1km Area around Travel Hub Site C and Black Route



Source: Mott MacDonald based on 2011 Census

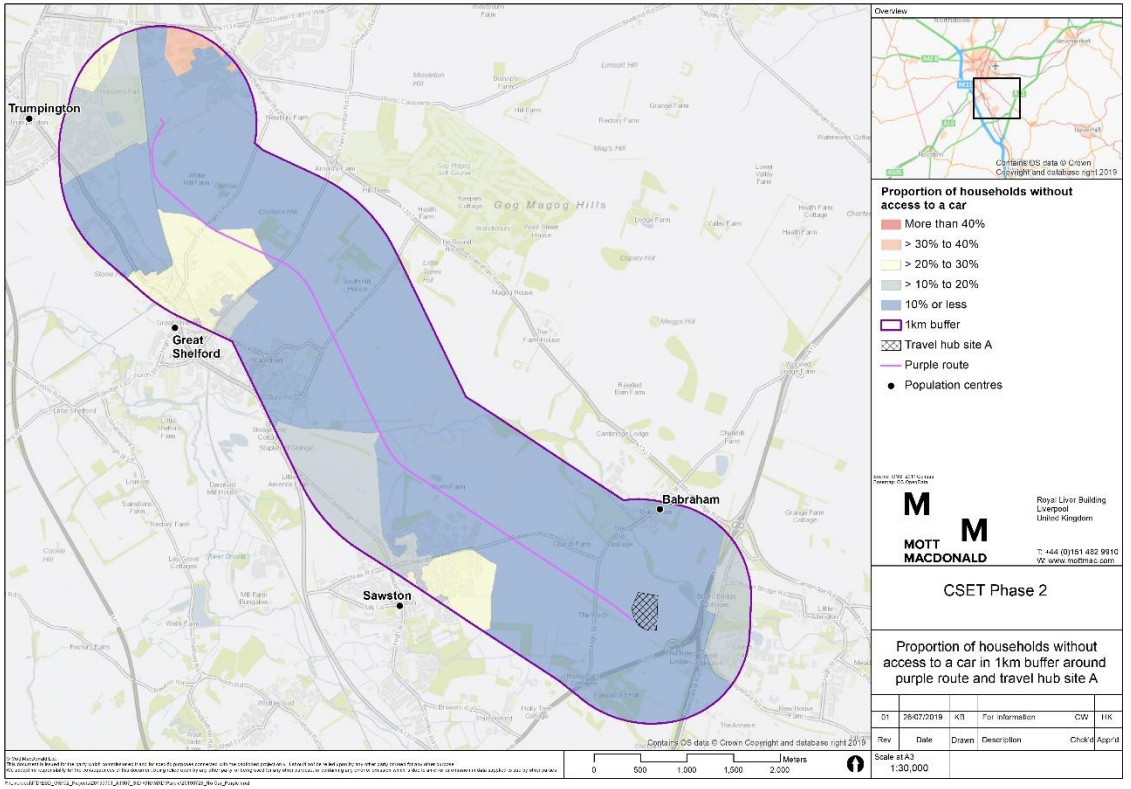
Figure 37: Distribution of BAME Residents in 1km Area around Proposed Routes and Additional Haverhill Route



Source: Mott MacDonald based on 2011 Census

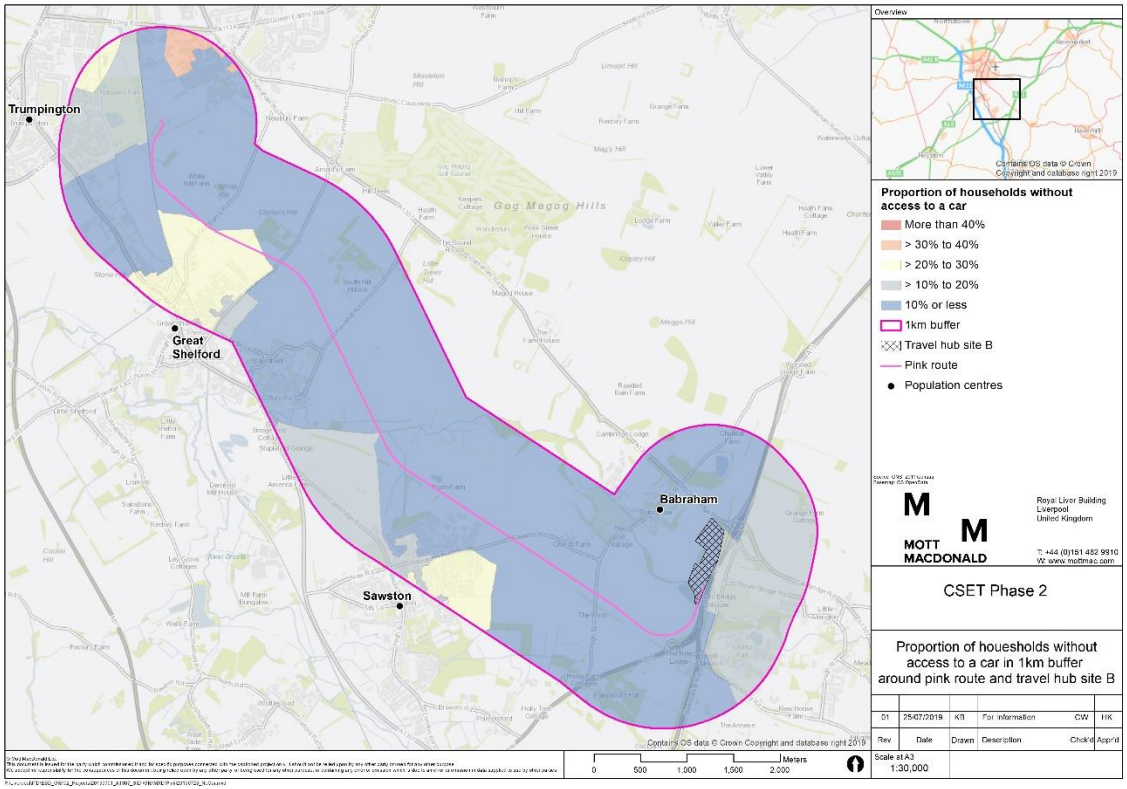
G. Proportion of Households with No Car

Figure 38: Distribution of Households with No Car in 1km Area around Travel Hub Site A and Purple Route



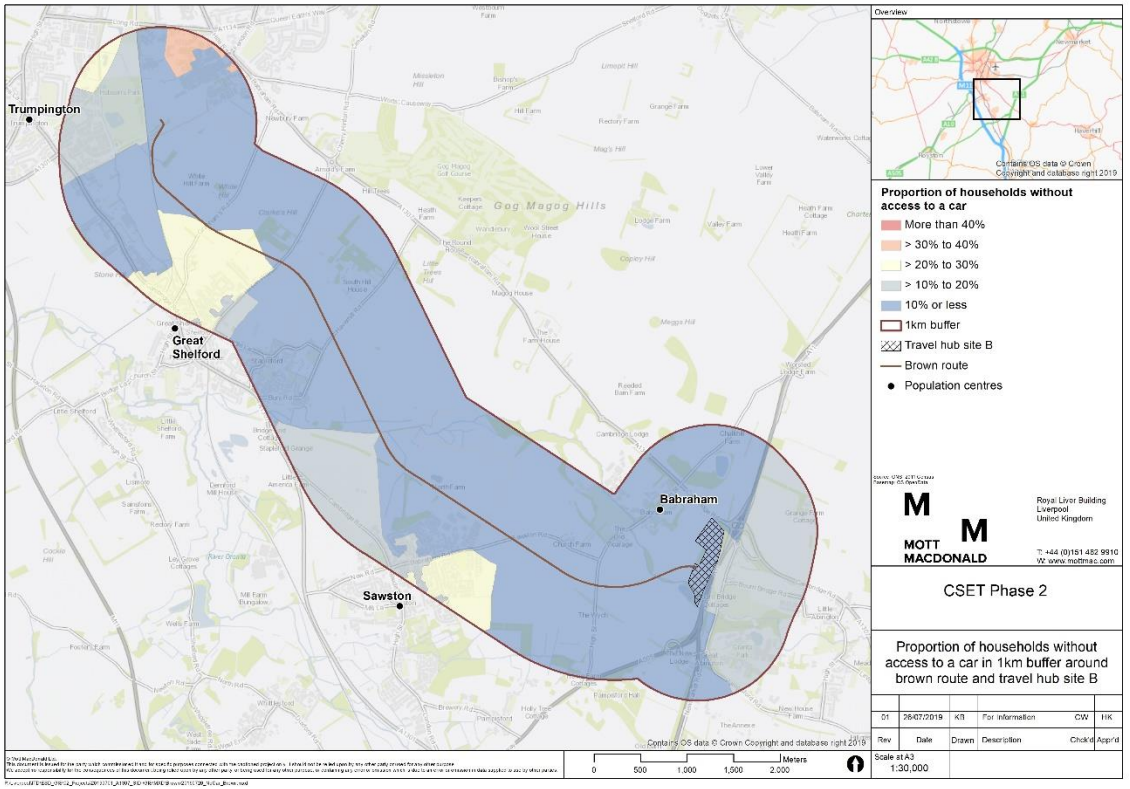
Source: Mott MacDonald based on 2011 Census

Figure 39: Distribution Households with No Car in 1km Area around Travel Hub Site B and Pink Route



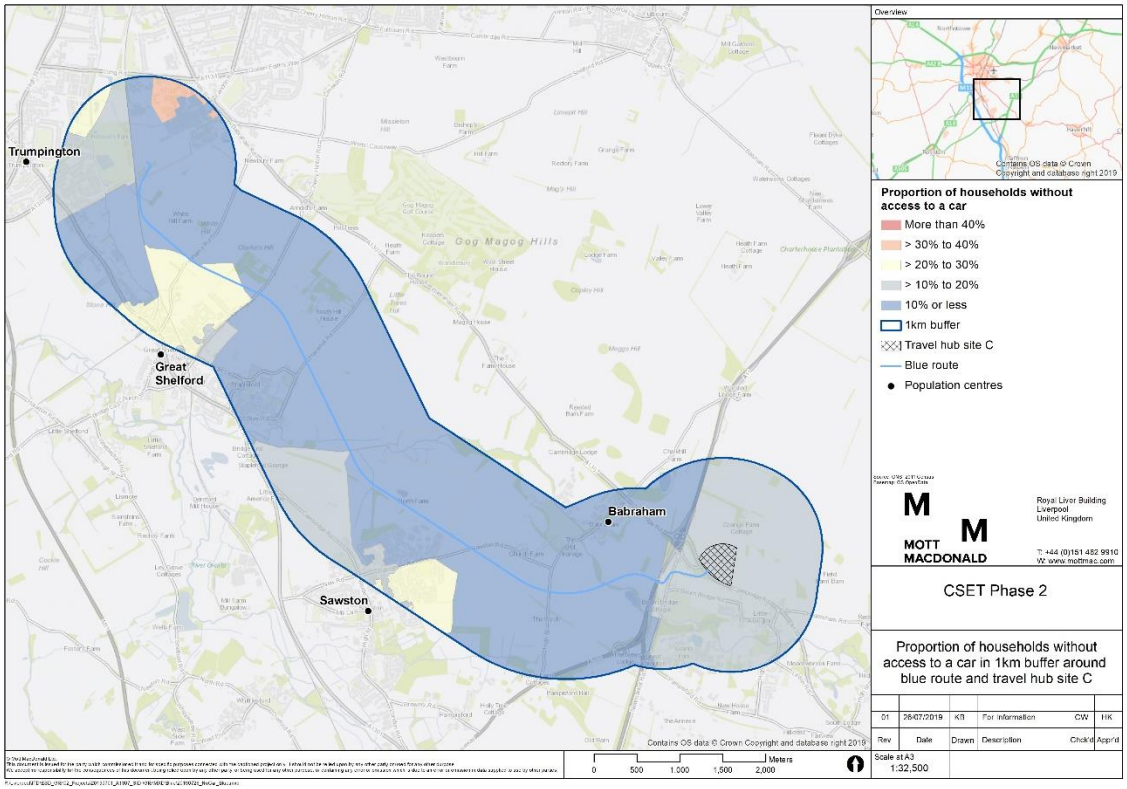
Source: Mott MacDonald based on 2011 Census

Figure 40: Distribution of Households with No Car in 1km Area around Travel Hub Site B and Brown Route



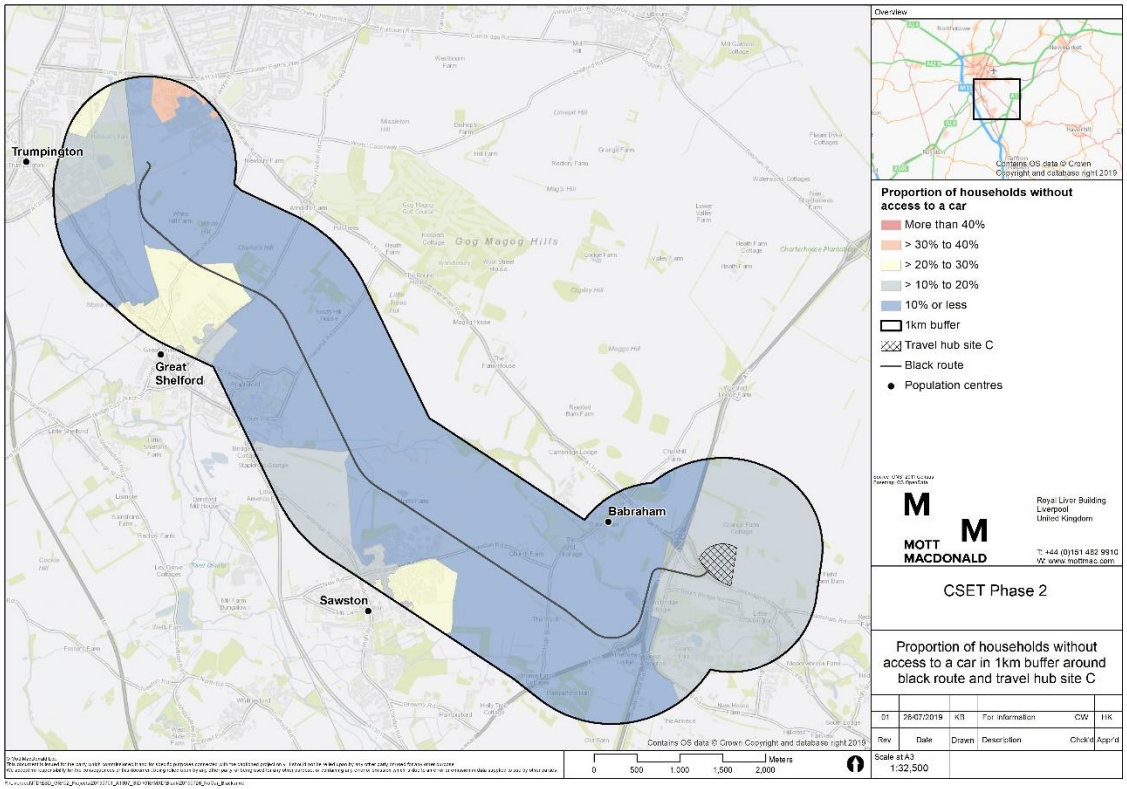
Source: Mott MacDonald based on 2011 Census

Figure 41: Distribution of Households with No Car in 1km Area around Travel Hub Site C and Blue Route



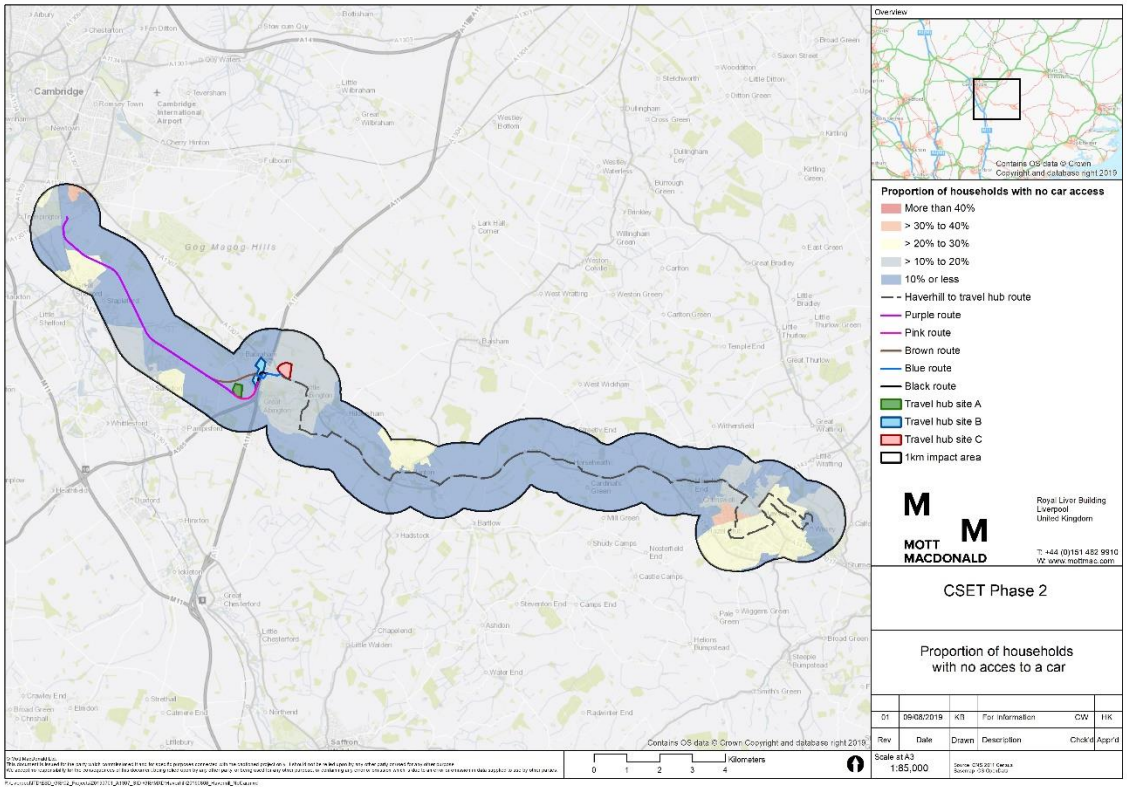
Source: Mott MacDonald based on 2011 Census

Figure 42: Distribution of Households with No Car in 1km Area around Travel Hub Site C and Black Route



Source: Mott MacDonald based on 2011 Census

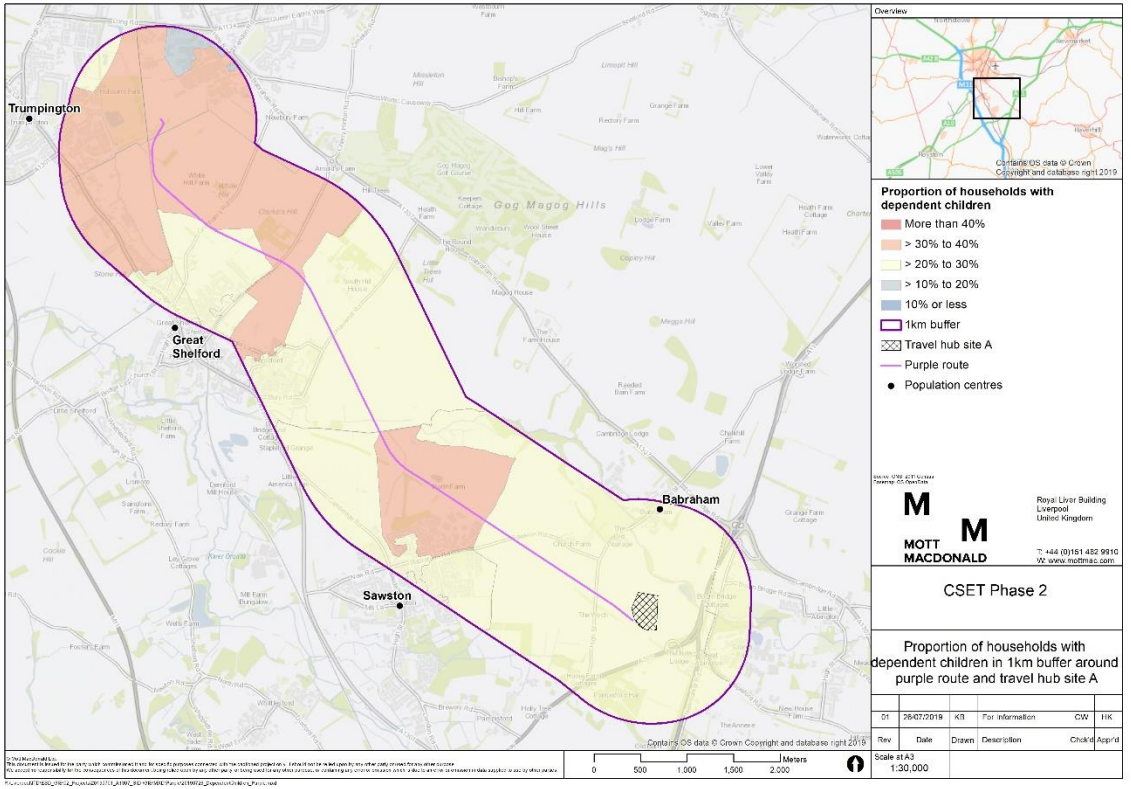
Figure 43: Distribution of Households with No Car in 1km Area around Proposed Routes and Additional Haverhill Route



Source: Mott MacDonald based on 2011 Census

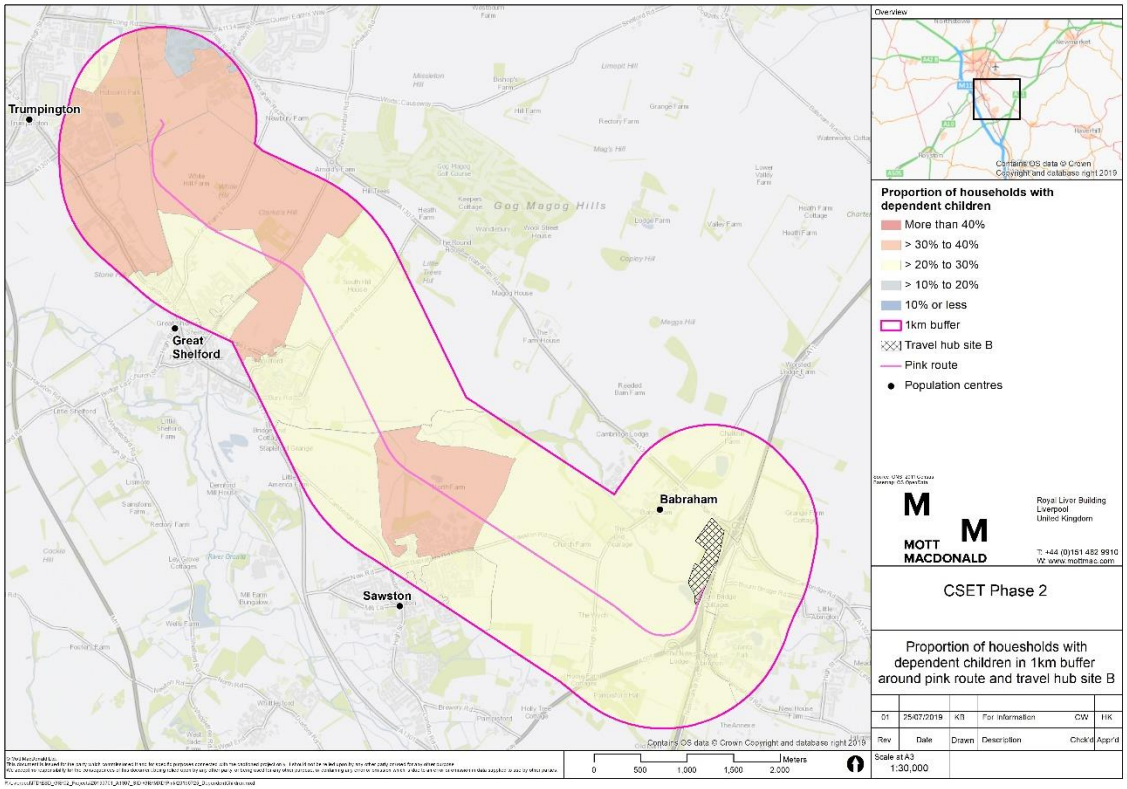
H. Proportion of Households with Dependent Children

Figure 44: Distribution of Households with Dependent Children in 1km Area around Travel Hub Site A and Purple Route



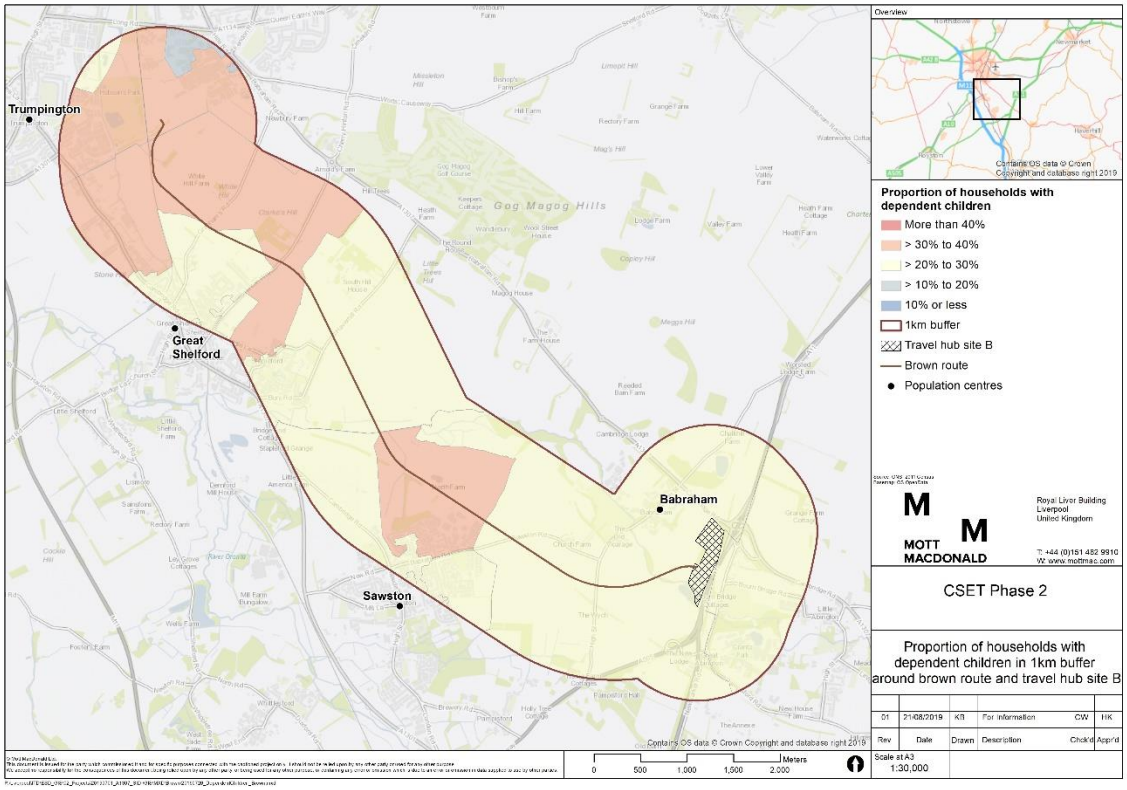
Source: Mott MacDonald based on 2011 Census

Figure 45: Distribution Households with Dependent Children in 1km Area around Travel Hub Site B and Pink Route



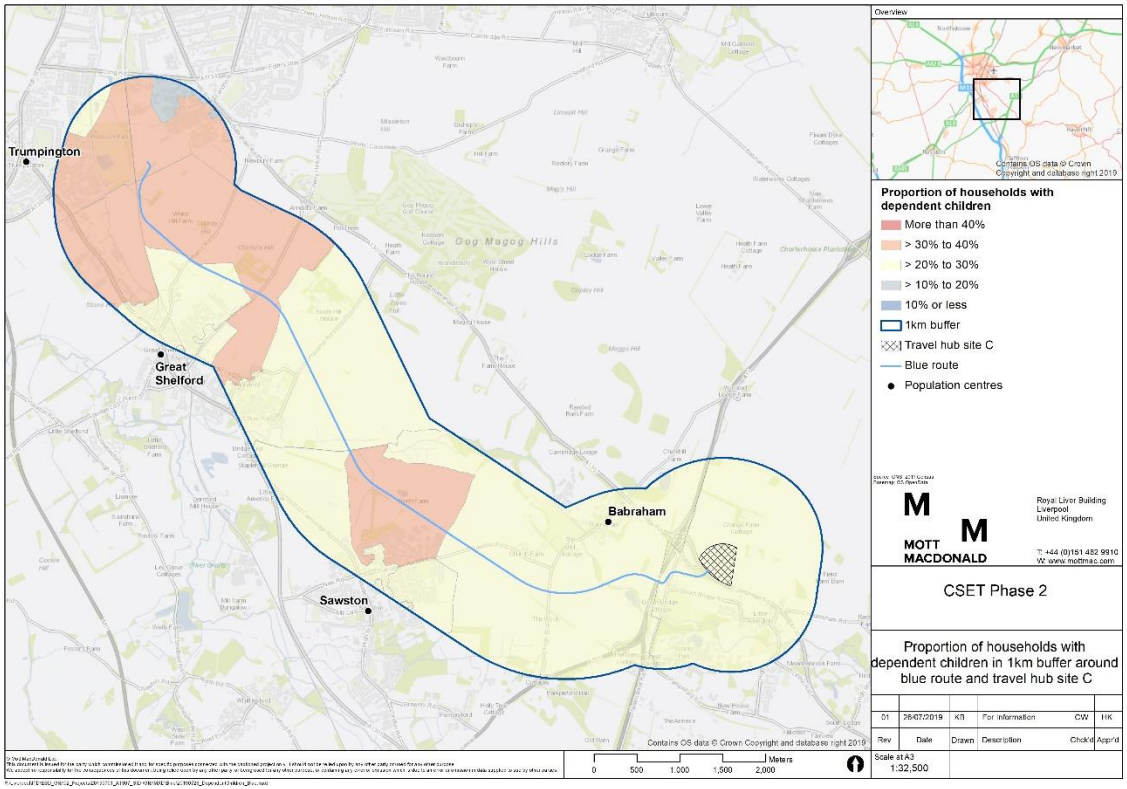
Source: Mott MacDonald based on 2011 Census

Figure 46: Distribution of Households with Dependent Children in 1km Area around Travel Hub Site B and Brown Route



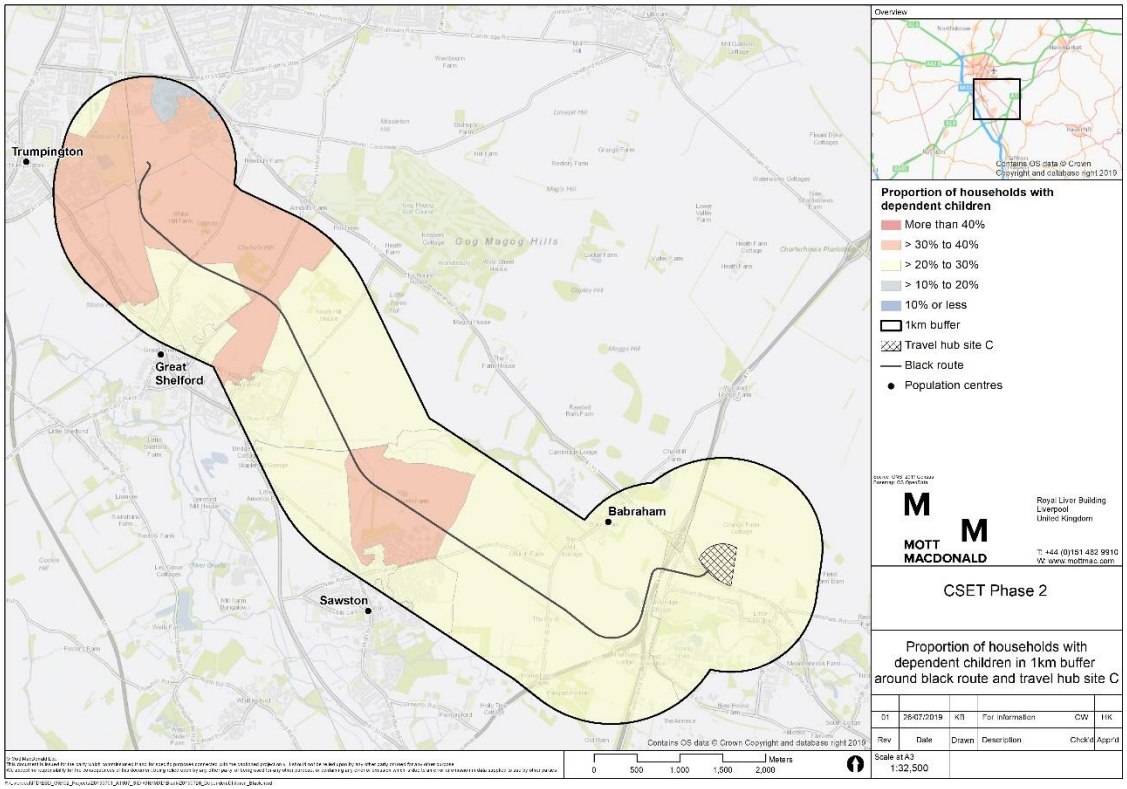
Source: Mott MacDonald based on 2011 Census

Figure 47: Distribution of Households with Dependent Children in 1km Area around Travel Hub Site C and Blue Route



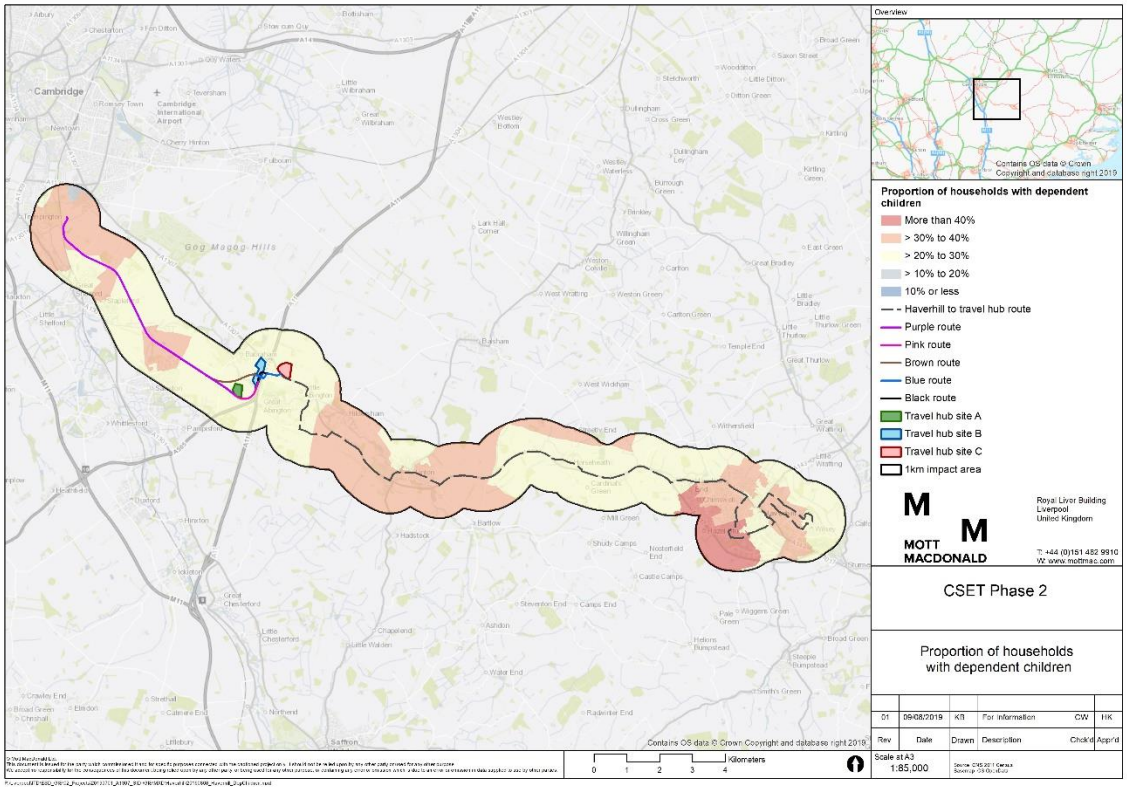
Source: Mott MacDonald based on 2011 Census

Figure 48: Distribution of Households with Dependent Children in 1km Area around Travel Hub Site C and Black Route



Source: Mott MacDonald based on 2011 Census

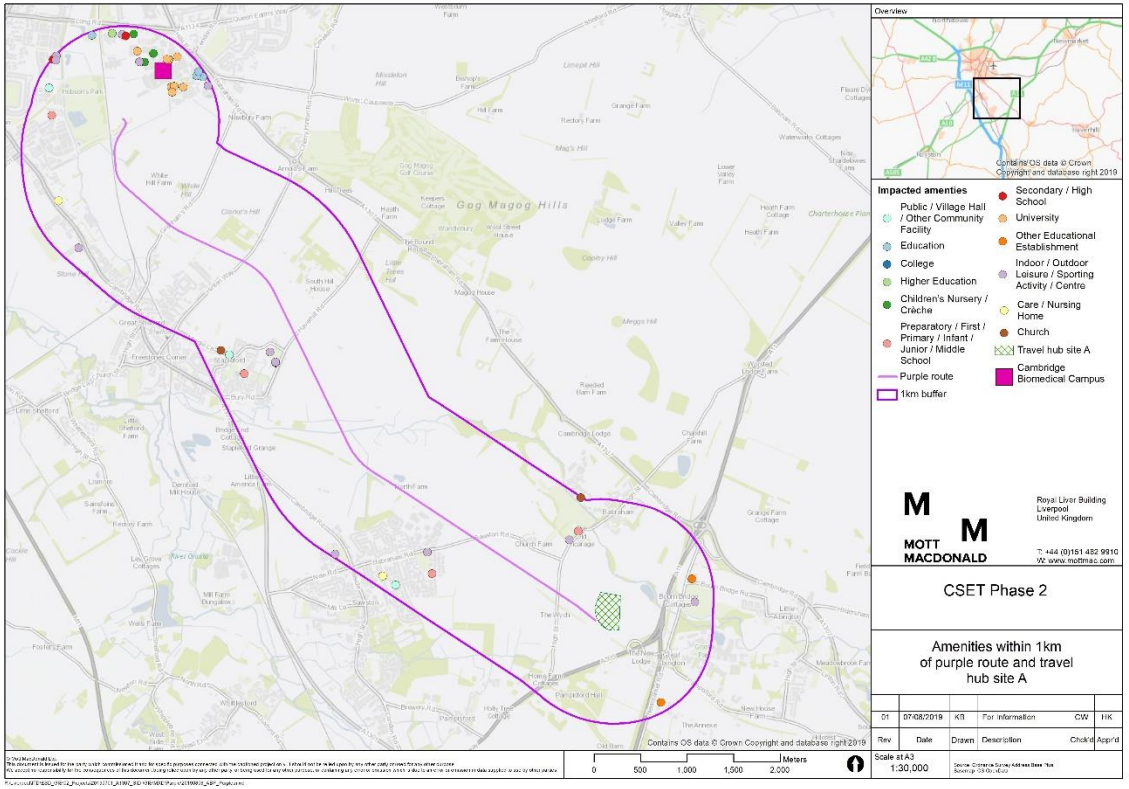
Figure 49: Distribution of Households with Dependent Children in 1km Area around Proposed Routes and Additional Haverhill Route



Source: Mott MacDonald based on 2011 Census

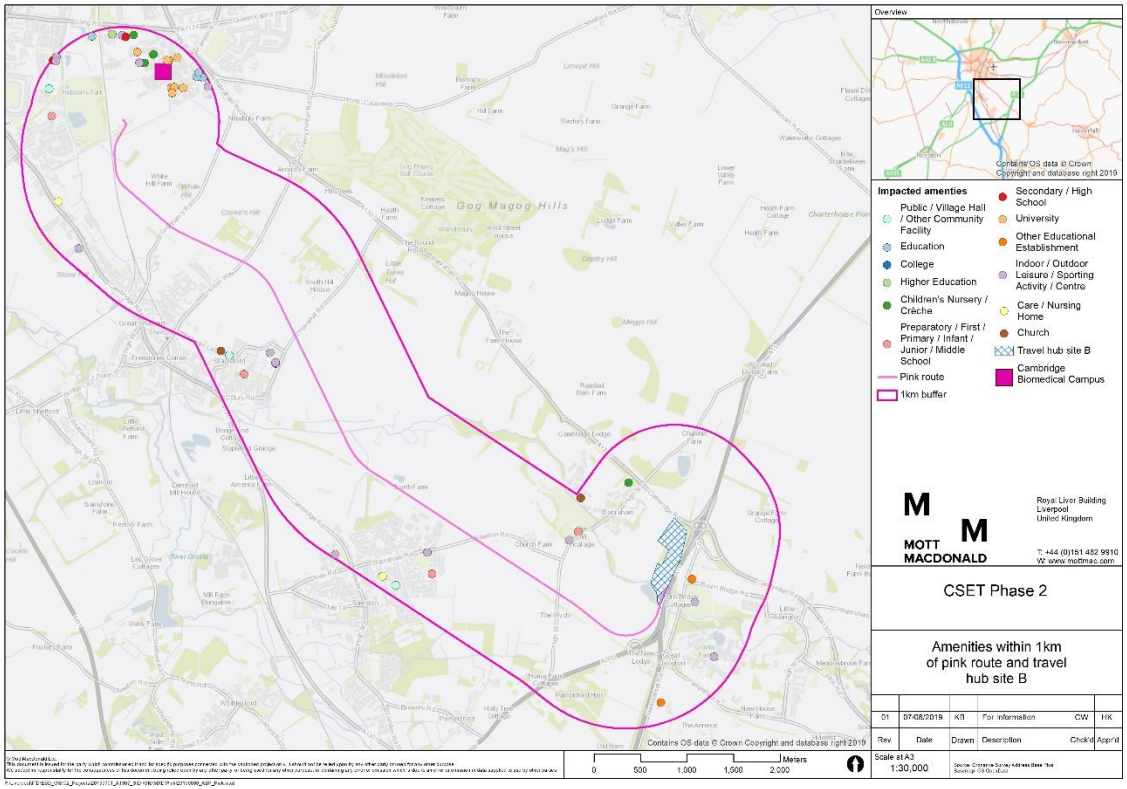
I. Location of Affected Amenities

Figure 50: Location of Affected Amenities in 1km Area around Travel Hub Site A and Purple Route



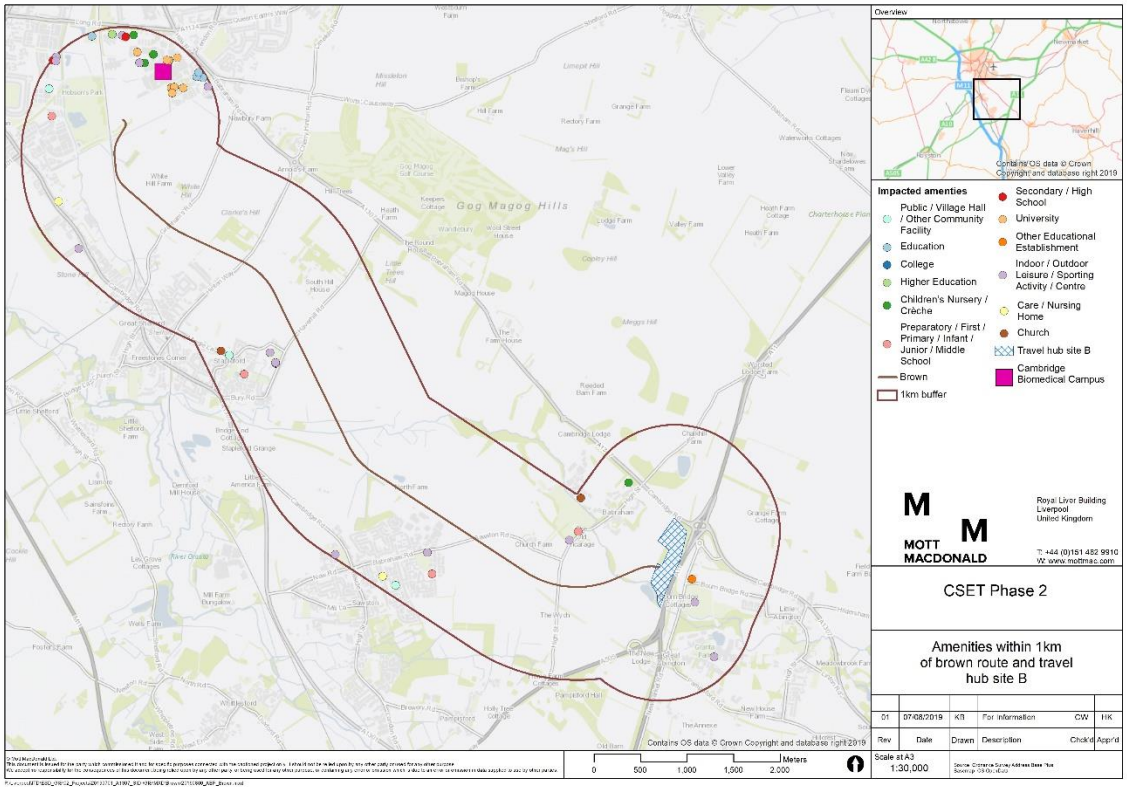
Source: Mott MacDonald based on Ordnance Survey AddressBase Plus

Figure 51: Location of Affected Amenities in 1km Area around Travel Hub Site B and Pink Route



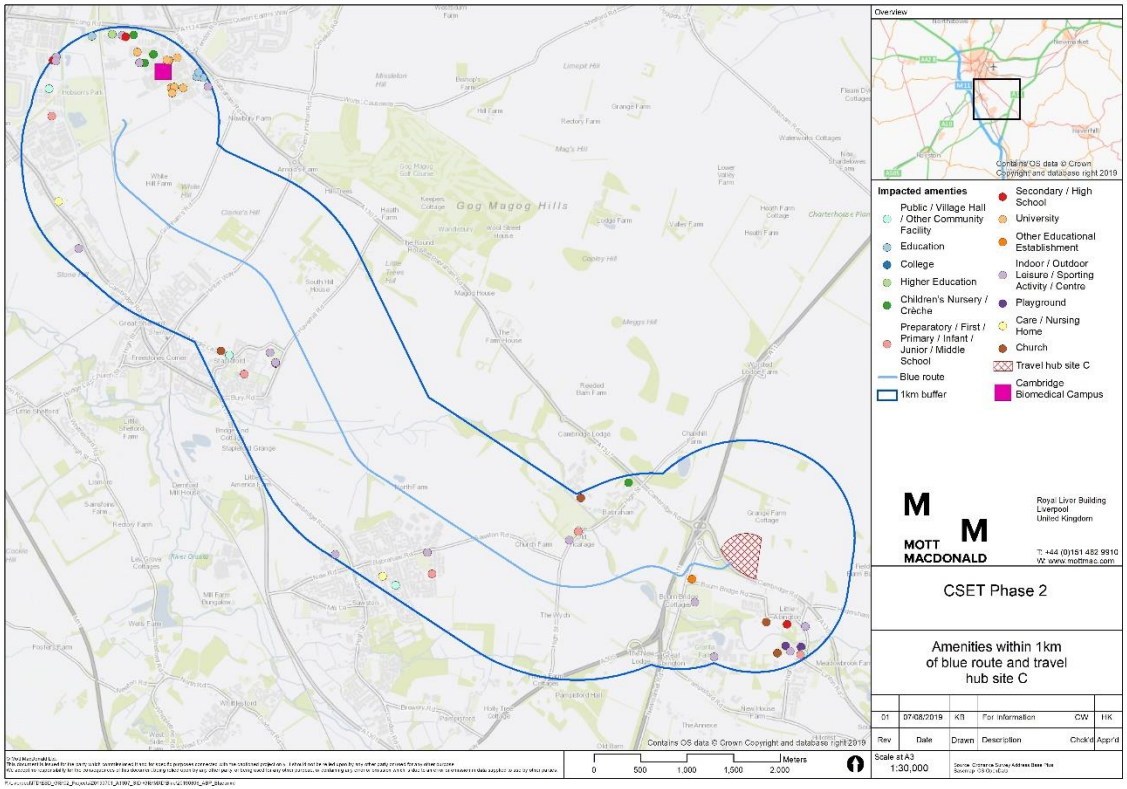
Source: Mott MacDonald based on Ordnance Survey AddressBase Plus

Figure 52: Location of Affected Amenities in 1km Area around Travel Hub Site B and Brown Route



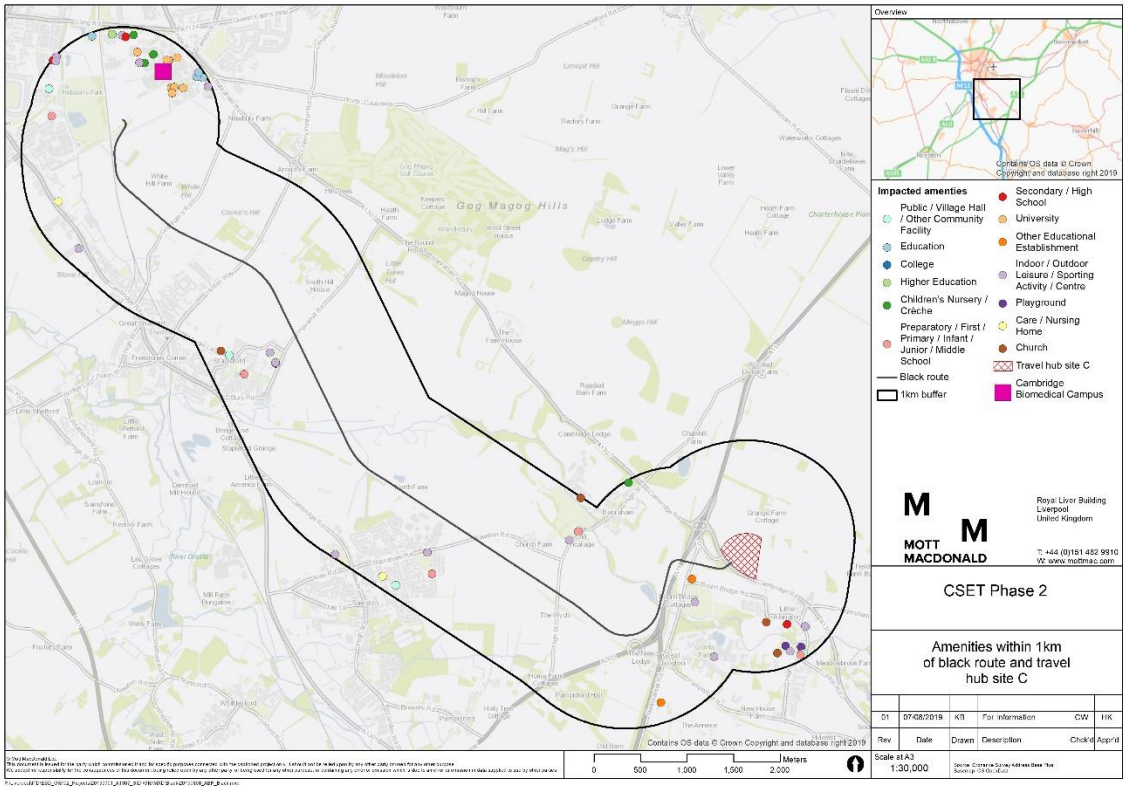
Source: Mott MacDonald based on Ordnance Survey AddressBase Plus

Figure 53: Location of Affected Amenities in 1km Area around Travel Hub Site C and Blue Route



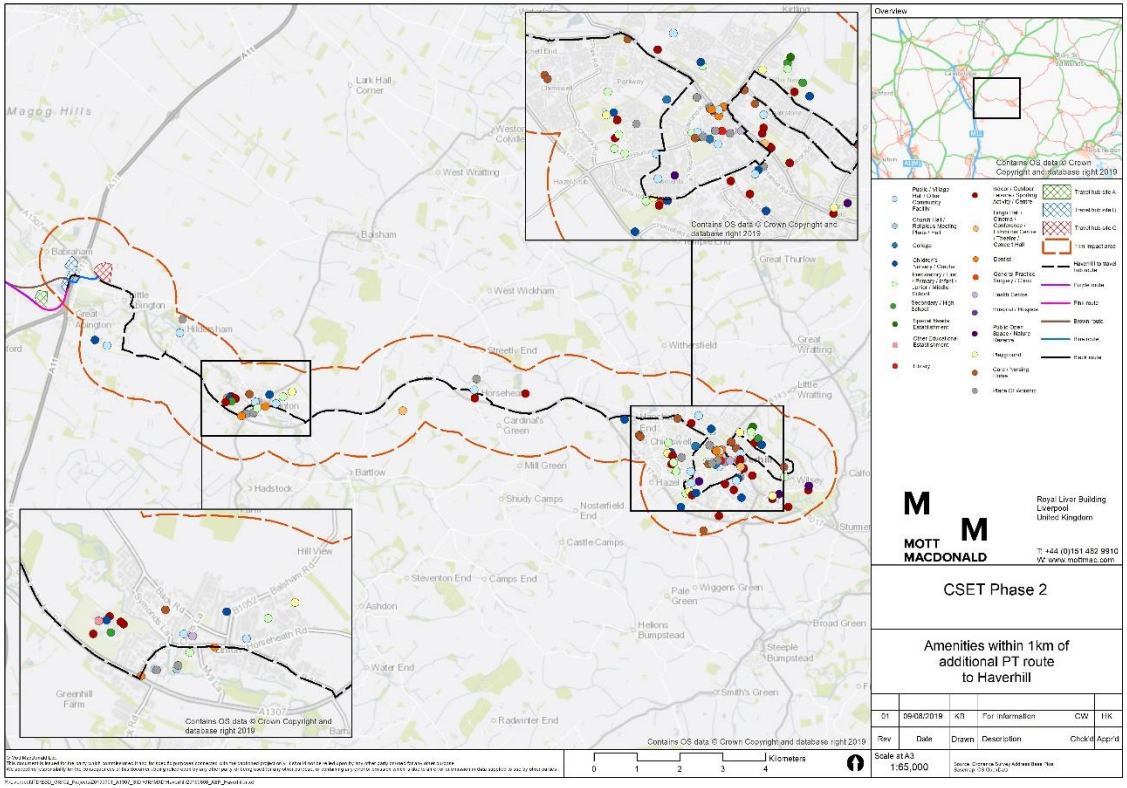
Source: Mott MacDonald based on Ordnance Survey AddressBase Plus

Figure 54: Location of Affected Amenities in 1km Area around Travel Hub Site C and Black Route



Source: Mott MacDonald based on Ordnance Survey AddressBase Plus

Figure 55: Location of Affected Amenities in 1km Area around Haverhill Route



Source: Mott MacDonald based on Ordnance Survey AddressBase Plus