



The Northumberland Line

Distributional Impacts Report

Northumberland County Council

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Quality information

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1. Introduction

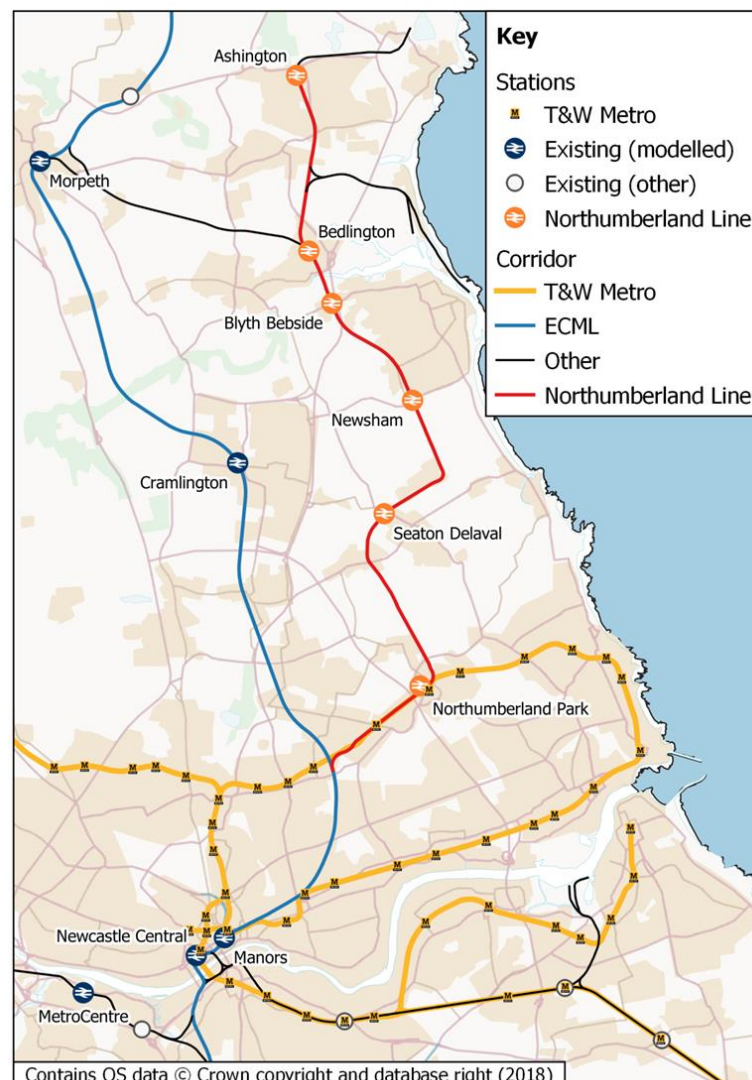
1.1 Overview

AECOM has been commissioned by Northumberland County Council (NCC) to prepare the Outline Business Case for the proposed reopening of the railway line between Ashington and Newcastle to passenger services; the scheme is hereinafter known as the Northumberland Line. As part of the work undertaken, AECOM has carried out a distributional impact assessment of the proposed improvements in accordance with TAG unit A4-2. The outputs from this assessment are summarised in the remaining sections of this report.

1.2 Proposed Scheme

The proposed scheme is for a reintroduction of passenger services on the railway line between Ashington and Newcastle, in order to improve connectivity within, and beyond, the South East Northumberland Corridor (SEN Corridor) area. Currently, freight only trains operate along the Northumberland Line. Improving the links from towns such as Ashington and Blyth is of key importance to encouraging more sustainable access to key regional economic centres across Tyne and Wear. The railway line will not only benefit the community it serves but also the wider North East region. Figure 1-1 shows a map of the Northumberland Line and the locations of the proposed stations along the route.

Figure 1-1: The Northumberland Line Extents



Five new stations will be provided as part of the scheme:

- Ashington
- Bedlington
- Blyth Bebside
- South Newsham
- Seaton Delaval.

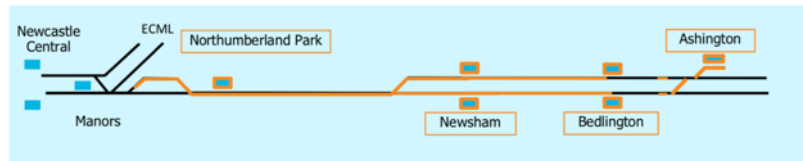
The service will also call at the existing stations of Northumberland Park (where an additional platform will be constructed), Manors and Newcastle Central Station.

To align with potential funding opportunities, it is proposed that the scheme is delivered in two phases. The phases are summarised in Figure 1-2 below.

Figure 1-2: Infrastructure Phases

Phase 1: Initial hourly service

4 new stations; Line-speed increases Benton-Newsham; Double track extension south of Newsham; LX upgrades; Turnback facility at Ashington off Main Line; Junction improvements Bedlington North



Phase 2: Half-hourly service

Passing loop between Holywell LX and Seghill LX, new stations at Seaton Delaval and Blyth Bebside, line-speed increases north of Bedlington.



1.3 Scheme Benefits

By creating an enhanced rail infrastructure that will improve transport opportunities to and from South East Northumberland, the Northumberland Line scheme will deliver the following benefits:

- Provide a real incentive for potential employers to relocate to the area;
- Provide vital infrastructure to deliver the Council's aspirations for population and economic growth as identified within the emerging Northumberland Local Plan;
- Enhance connectivity within and beyond Northumberland to provide wider opportunities for local residents;
- Increase opportunities for developing employment in the wider Tyne and Wear area by providing improved access to labour supply;
- Deliver significant growth in sectors such as the National Renewable Energy Centre (NaREC), offshore oil and gas, renewables, engineering and for the Port of Blyth itself.

1.4 Distributional Impact Appraisal Approach

With any transport scheme, there is likely to be a mixture of positive and negative impacts that will be experienced by different groups of people in different locations and to different magnitudes. It is important therefore, when appraising a transport scheme like the Northumberland Line, that these winners and losers are identified so that they can be fully assessed within the appraisal process. This Distributional Impacts (DI) Appraisal therefore, considers the variance of transport intervention impacts across different social groups for eight different indicators as follows:

- User benefits;
- Noise;
- Air Quality;
- Accidents;
- Security;
- Severance;
- Accessibility; and
- Personal Affordability .

1.5 Report Structure

Following this introductory chapter, this report has been prepared with the following structure, in accordance with Tag Unit A4-2 guidance

- **Chapter 2: Screening** - an initial review of each indicator to identify if further appraisal is necessary;
- **Chapter 3: Assessment** – identification of the spatial area, social groups and amenities considered in the appraisal;
- **Chapter 4: User Benefits** – appraisal of the user benefits from the scheme;
- **Section 5: Noise** – appraisal of the noise impacts from the scheme;
- **Section 6: Severance** – appraisal of the severance impacts from the scheme;
- **Section 7: Accessibility** – appraisal of the accessibility impacts from the scheme;
- **Chapter 8: Summary and Conclusions** – summary of the work undertaken and the conclusions taken forward to the overall Northumberland Line scheme appraisal.

2. Screening Process

2.1 Overview

TAG guidance states that a distributional impact appraisal should be carried out for all transport schemes. However, there is recognition that the process to undertake a full distributional impact appraisal for each indicator can be time and resource intensive. It is therefore recommended that a screening process is undertaken to identify whether each indicator needs to be appraised further. The screening process undertaken for the Northumberland Line is summarised in this chapter of the report.

2.2 Screening Process

As identified in the previous chapter, there are eight indicators that need to be considered for a distributional impact appraisal. Each of these indicators has been assessed individually using the TAG screening proforma. The output of this assessment determines whether the intervention needs to be appraised further. Consideration has been given to the following factors:

- Whether the proposed upgrade to the Northumberland Line will impact on any specific social groups;
- Whether any of the negative impacts can be eliminated through some form of amendment or redesign of the scheme;
- How dispersed the impact of the Northumberland Line is likely to be, to understand if the scale of the impact is disproportionate to the potential impact.

2.3 Screening Outcomes

A summary of the outcomes of the screening process can be found in the following table. A decision on whether to progress to the next step in the appraisal process is also included.

Table 2-1: Screening Outcomes

Impact Area	Conclusion	Outcome
User Benefits	The scheme will provide better connections within, and beyond, South East Northumberland, resulting in journey time benefits across all journey purposes. The benefits are likely to be significant and dispersed across a large spatial area.	Proceed to further assessment
Noise	There will be a reduction in traffic volumes on some roads as a result of the scheme. However, the benefits are not likely to be significant and will be dispersed across a large spatial area. Properties immediately adjacent to the railway line however, will be impacted by the noise from additional trains using the railway line, which requires further appraisal.	Proceed to further assessment.
Air Quality	There will be air quality benefits along roads, which see a reduction in traffic volumes as a result of the scheme. However, the benefits are not likely to be significant and will be dispersed across a large spatial area. The impact on air quality of increased trains on the railway line is expected to be minimal.	No further assessment
Accidents	There will be a reduction in vehicle kms travelled on the highway network as a result of the scheme. This should have a positive impact on the number of accidents. However, this impact will be dispersed over a large spatial area and is not considered to be significant. The increased number of train services on the railway line could lead to more conflict at level crossings however, improvements will be made to the standard of crossings currently in place.	No further assessment
Security	New railway stations will enhance the security of the local area due to more people, CCTV, improved lighting and emergency contact points. However, railway stations can also attract crime and antisocial behaviour. The impact of the scheme on security is therefore considered to be neutral.	No further assessment
Severance	There are a considerable number of level crossings along the line, which are part of key pedestrian routes. The increase in services on the line will mean that level crossing barriers are down for much longer than they currently are; it could also lead to the closure of some level crossings. The impact on severance therefore, is expected to be noticeable within the vicinity of the level crossings.	Proceed to further assessment.
Accessibility	A key objective of the scheme is to improve accessibility by public transport within and beyond South East Northumberland. The Northumberland Line scheme will offer a new mode of public transport to people living and working in the study area. The accessibility benefits of the scheme are therefore expected to be significant and spread across a wide spatial area.	Proceed to further assessment.
Affordability	Bus services already serve the study area, lessening the impact of the railway service on affordability. It is currently assumed that there will be no reduction in bus services once the scheme is delivered. The affordability impacts are therefore likely to be small.	No further assessment

3. Assessment

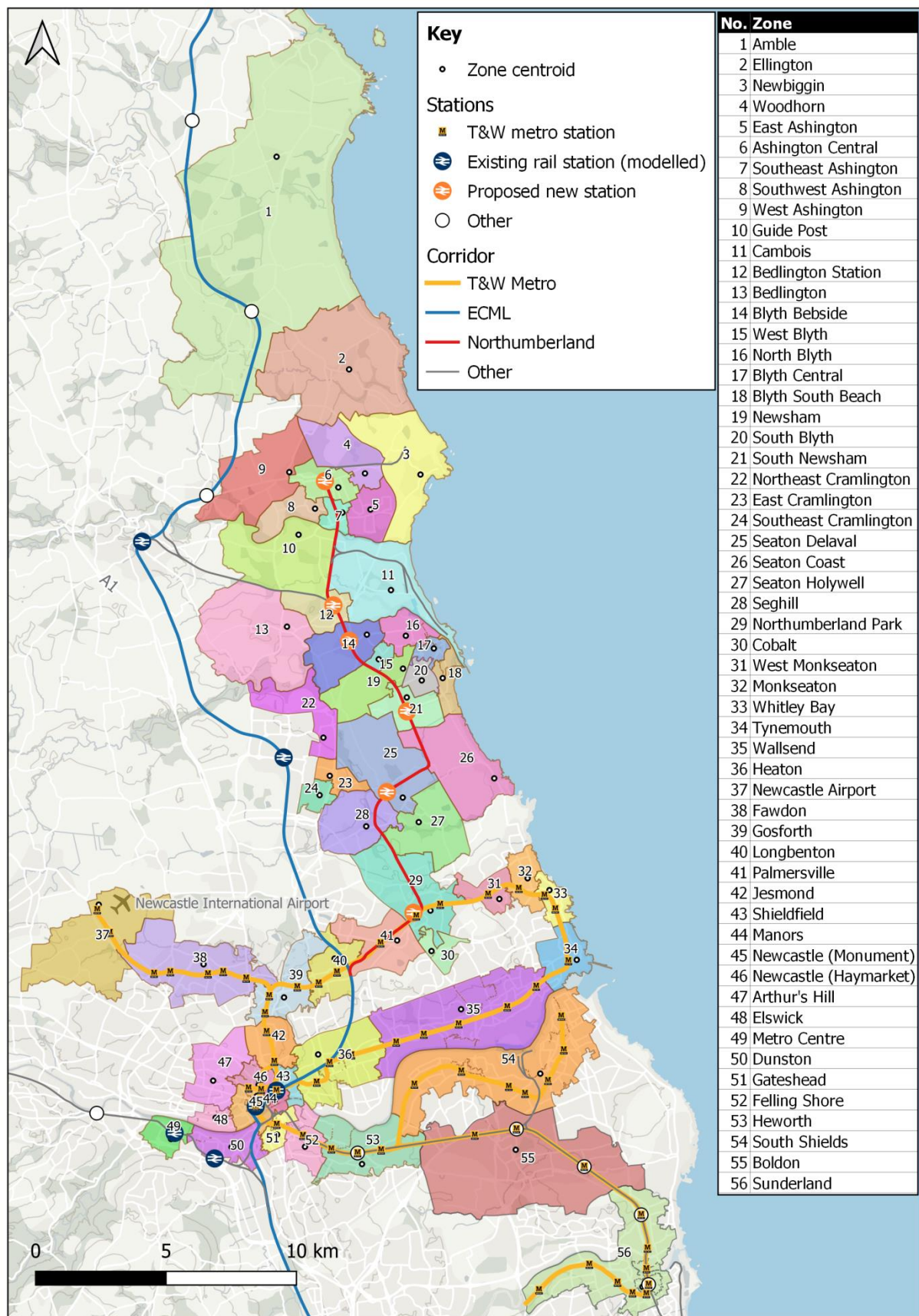
3.1 Overview

The previous chapter of the report identified the likely broad impacts of the Northumberland Line scheme. This chapter of the report investigates these impacts in more detail to confirm where spatial impacts will be experienced and where socio-economic, social and demographic characteristics need to be further considered.

3.2 Area Impacted by the Intervention

The Northumberland Line scheme is expected to impact on trip decision making in the South East Northumberland area only, with the majority of trips expected to be between South East Northumberland and the Tyne and Wear region. To undertake transport modelling and appraisal therefore, a spreadsheet-based mode-choice model was developed that focusses on this area only; possible longer distance trips that may use the Northumberland Line are represented by the application of a demand uplift factor. It is this area that is considered in the distributional impact appraisal for both user benefits and accessibility. The zoning system of the transport model is illustrated in Figure 3.1 overleaf.

Figure 3-1: Zone System of Transport Model



For some of the impacts of the railway line however, the effects are more localised than the area considered in the transport modelling. In these cases, a more appropriate buffer network has been defined around the railway line as discussed in the sections below.

User Benefits and Accessibility

The Northumberland Line is expected to impact on trip-decision making in South East Northumberland and some areas of Tyne and Wear. This will result in improvements in accessibility by public transport and the generation of user benefits. A detailed transport modelling exercise has been undertaken to determine user benefits using a bespoke spreadsheet-based mode-choice model. This has enabled the changes in costs of travel for users to be quantified. TRAAC accessibility mapping has also been carried out to understand what impact the proposed scheme has on journey times to key destinations.

Noise

The noise impacts of the scheme have been considered for the area immediately adjacent to the line, with a buffer of up to 300m from the track defined. Although it is expected that there may be some noise benefits and disbenefits associated with both reductions and increases in car traffic on the highway network, the noise impacts of this are expected to be dispersed and therefore have not been considered.

Severance

The Northumberland Line scheme proposes the upgrade of an existing freight line to passenger services. There are a number of existing level crossings along the line, which will be down more frequently as a result of the proposed scheme. The appraisal of severance has therefore focussed on key amenities in proximity to each level crossing to understand whether the increased downtime of the level crossings will impact on access to services. A buffer around key services of up to 1000m is defined, depending on the amenity being assessed.

3.3 Social Groups in the Impact Area

This section provides an assessment of the social groups affected by the proposals, based on the potential impacts identified in the screening assessment, and the 'affected areas' identified earlier in this chapter. In accordance with TAG Unit A4-2, analysis has been undertaken of the socio-economic, social and demographic characteristics of the following groups:

- The transport users that will experience changes in travel generalised costs resulting from the intervention;
- The people living in areas who may experience the impacts of the intervention even if they are not users; and
- The people travelling in areas identified as likely to be affected by the intervention.

The social groups considered in relation to each impact appraised are outlined in the following table.

Table 3-1: Social Groups

Dataset/Social Groups	User Benefits	Noise	Severance	Accessibility
Income Distribution	✓	✓		✓
Children (under 16)		✓	✓	✓
Young Adults (16-25)				✓
Older People (70+)		✓	✓	✓
Disabled People (% of population)			✓	✓
Black or Minority Ethnic Origin (% of population)				✓
No Car or Van (% of households)			✓	✓

Census data 2011 and the index of multiple deprivation 2019 have been used to assess the socio-demographic characteristics of the study area. The outputs are summarised in Table 3.2 and presented visually at a lower super output area (LSOA) in Section 3.5

3.4 Amenities in the Study Area

The area of impact is large, considering much of South East Northumberland and parts of Tyne and Wear. The full range of amenities, as outlined in TAG Unit A4-2, is therefore available in a number of locations across the study area. As such, all amenities have not been explicitly mapped. Key amenities including schools, GP surgeries and shops have however been mapped as part of the accessibility appraisal.

3.5 Socio-demographic Characteristics of the Study Area

The following figures show the demographic characteristics of the study area compared to the corresponding value for the North East region. Outputs are mapped at an LSOA level. The following outputs are available:

- Figure 3.2: Indices of Multiple Deprivation (2019) for Study Area
- Figure 3.3: Children (under 16) compared to the North East
- Figure 3.4: Young Adults (16-25) compared to the North East
- Figure 3.5: Older People (70+) compared to the North East
- Figure 3.6: Disabled People (% of population) compared to the North East
- Figure 3.7: Black or Minority Ethnic Origin (% of population) compared to the North East
- Figure 3.8: No Car or Van (% of households) compared to the North East.

Table 3-2: Output Summary

Social group and amenities indicator		User Benefits	Noise	Air Quality	Accidents	Security	Severance	Accessibility	Affordability	Local Authority (North East)	England
Resident population in impact area	0-20%	33%	40%							38%	20%
	20-40%	22%	30%							23%	20%
	40-60%	22%	19%							14%	20%
	60-80%	6%	10%							12%	20%
	80-100%	17%	0%							13%	20%
	Children (<16)		17%				20%	7%		18%	20%
	Young adults (16-25)							15%		14%	12%
	Older People (70+)		11%				12%	11%		12%	12%
	People with a disability						14%	29%		29%	26%
	Black Minority Ethnic							8%		5%	15%
	No car households						15%	16%		31%	26%
	Households with dependent children						13%	26%		29%	29%
Indicator population in the impact area										2,596,886	53,012,456
Amenities present within impact area	Schools/nurseries	✓	✓				✓	✓			
	Playgrounds	✓	✓				✓	✓			
	Parks and open spaces	✓	✓				✓	✓			
	Hospitals	✓	✓				✓	✓			
	Care homes/day centres	✓	✓				✓	✓			
	Community centre	✓	✓				✓	✓			

Figure 3-2: Indices of Multiple Deprivation 2019 – Income Distribution

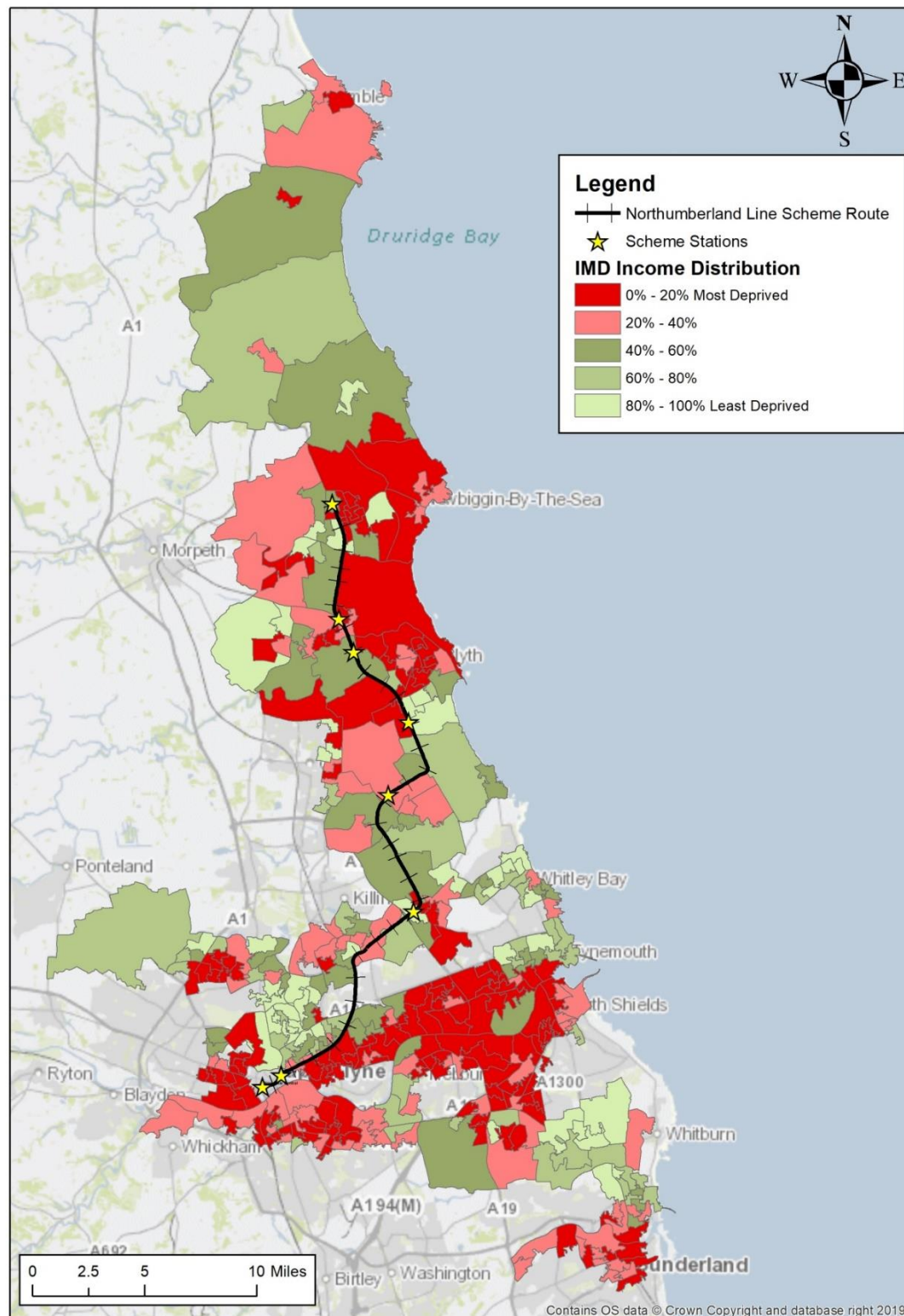
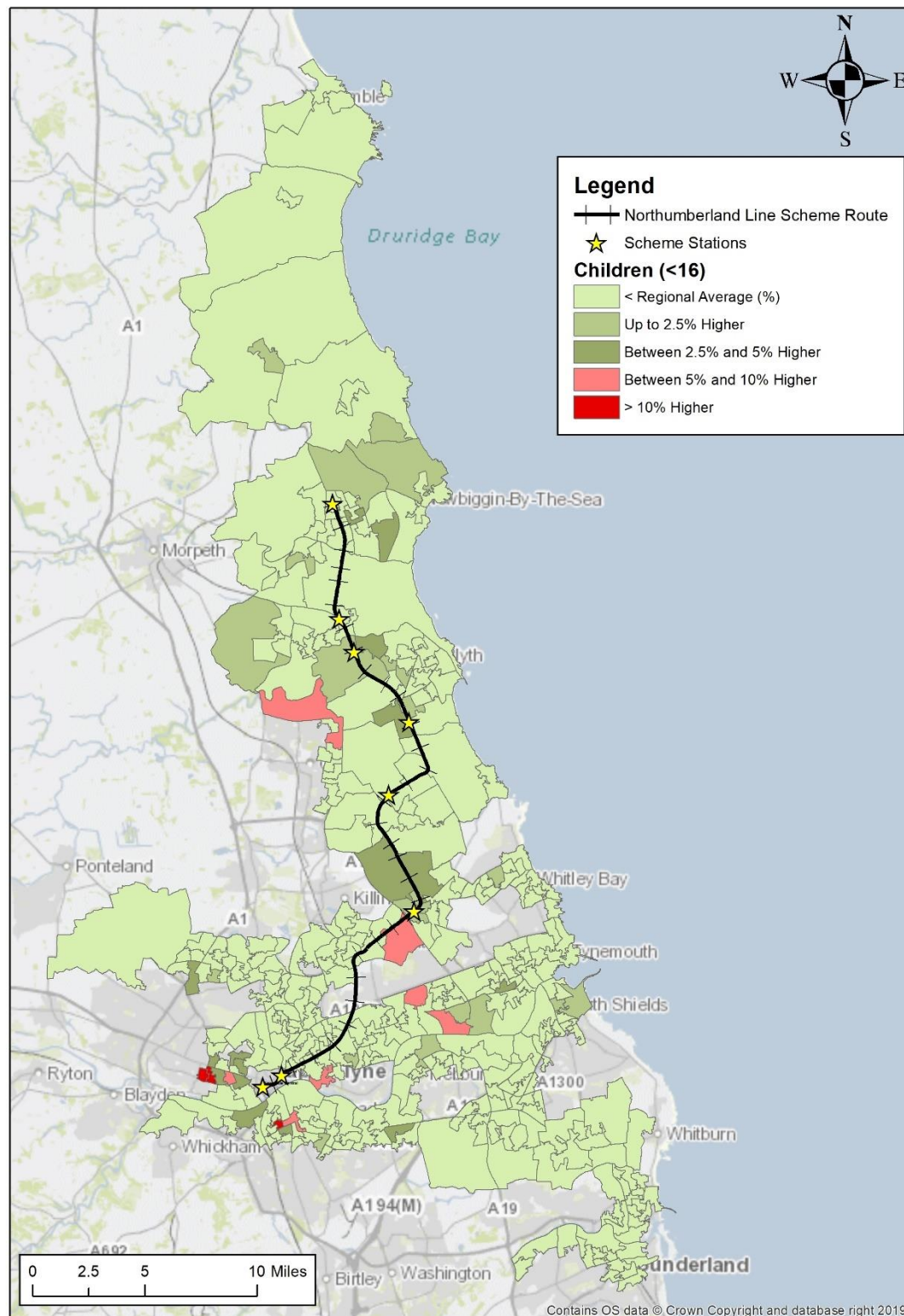


Figure 3-2 shows several LSOAs in South East Northumberland that are in the bottom 20% most deprived in the country. It is hoped that the Northumberland Line scheme will provide better access to jobs for these people.

Figure 3-3: Children (under 16) Compared to North East Average



The proportion of children under 16 compared to the North East average is low across the study area, as seen in Figure 3-3. However, there are several LSOAs located close to the scheme stations that have a higher than the regional average proportion of children.

Figure 3-4: Young Adults (16-25) Compared to North East Average

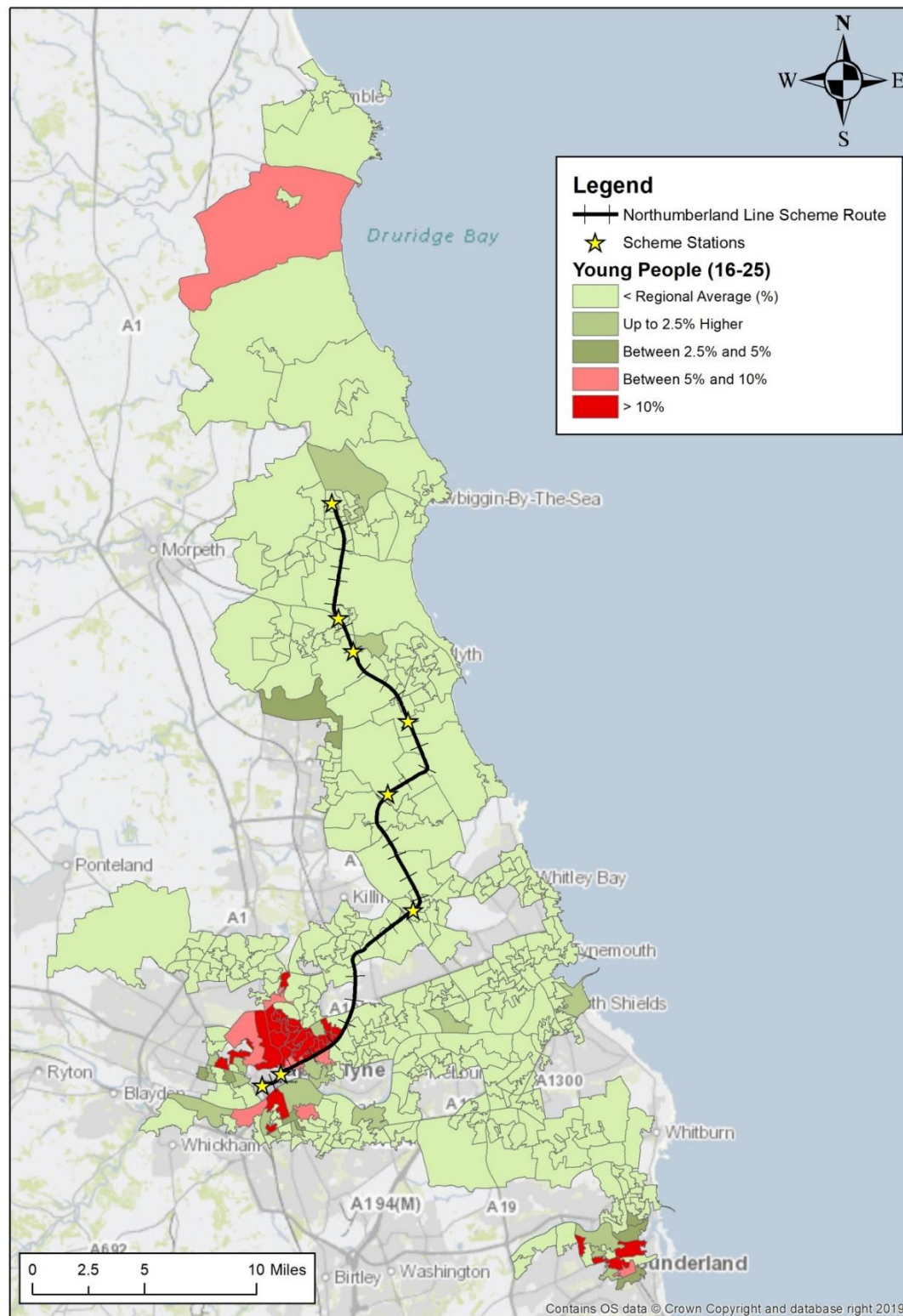
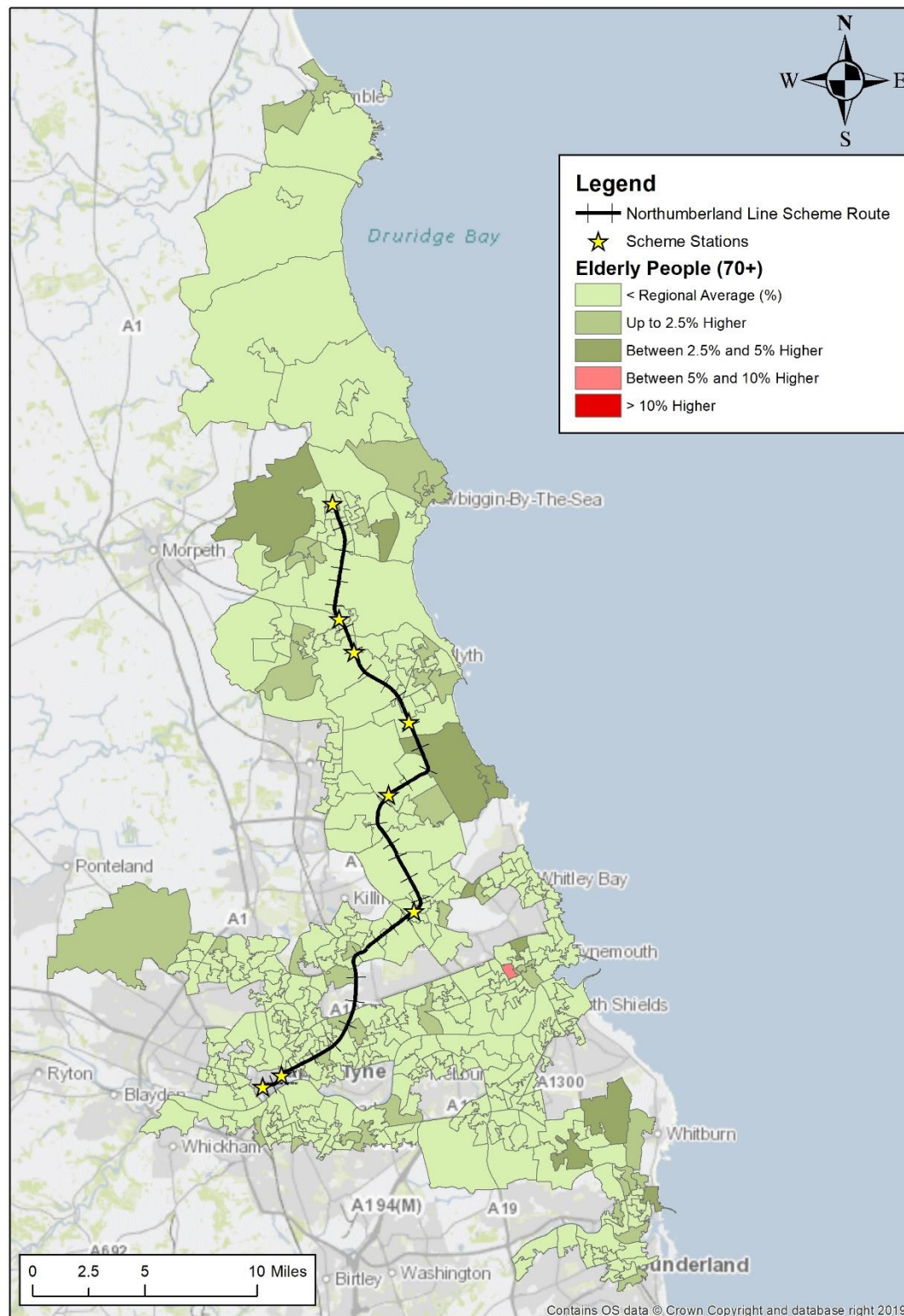


Figure 3-4 shows a high proportion of young adults around Newcastle city centre, because of the high student population. Around the scheme station locations, the young adult population is lower than the regional average.

Figure 3-5: Older People (70+) Compared to North East Average



The elderly population in the study area is less than the regional average, as shown in Figure 3-5. The higher proportions of elderly people tend to be located along the coast and away from the Northumberland Line route.

Figure 3-6: Disabled People (% of the population) Compared to North East Average

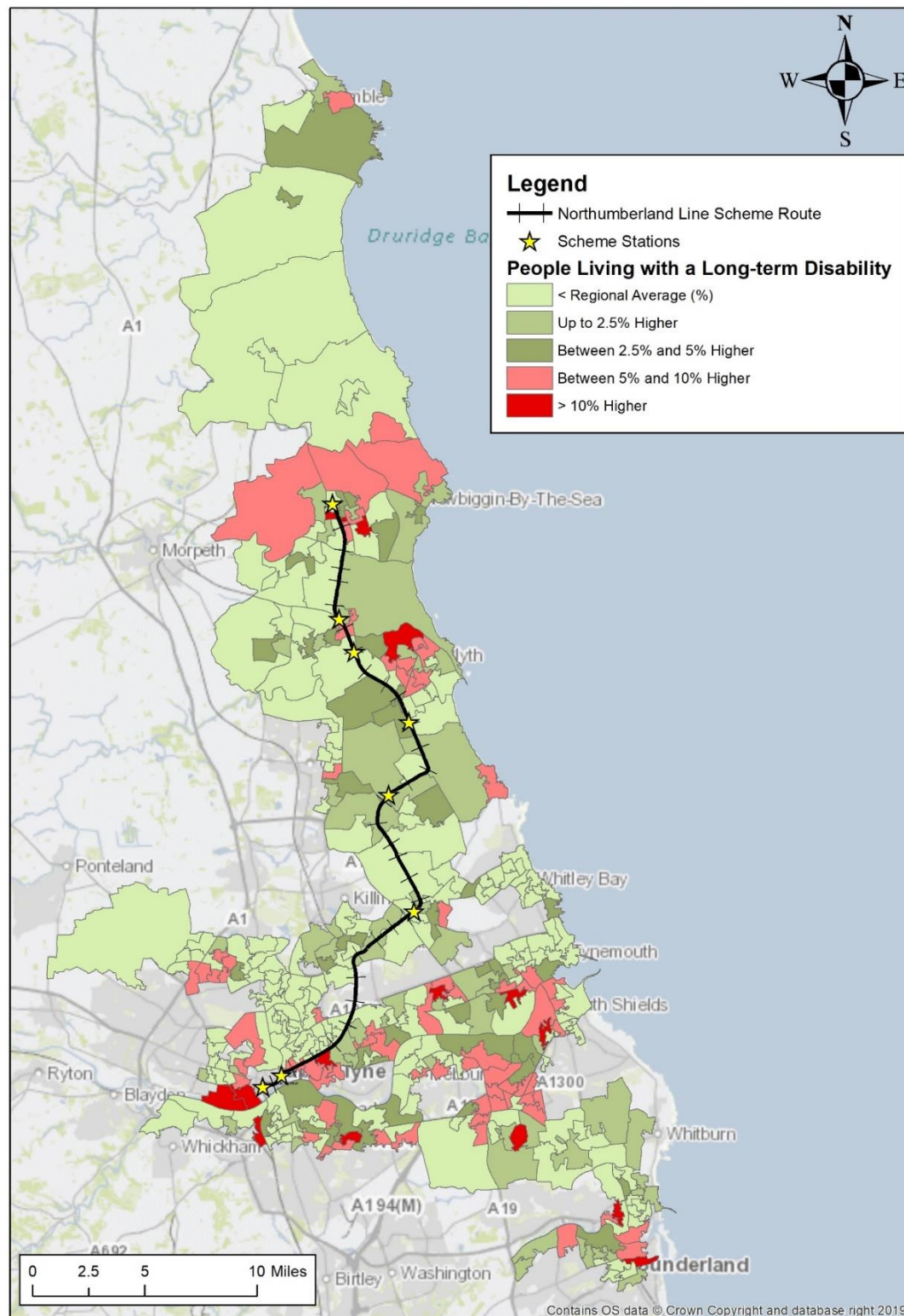
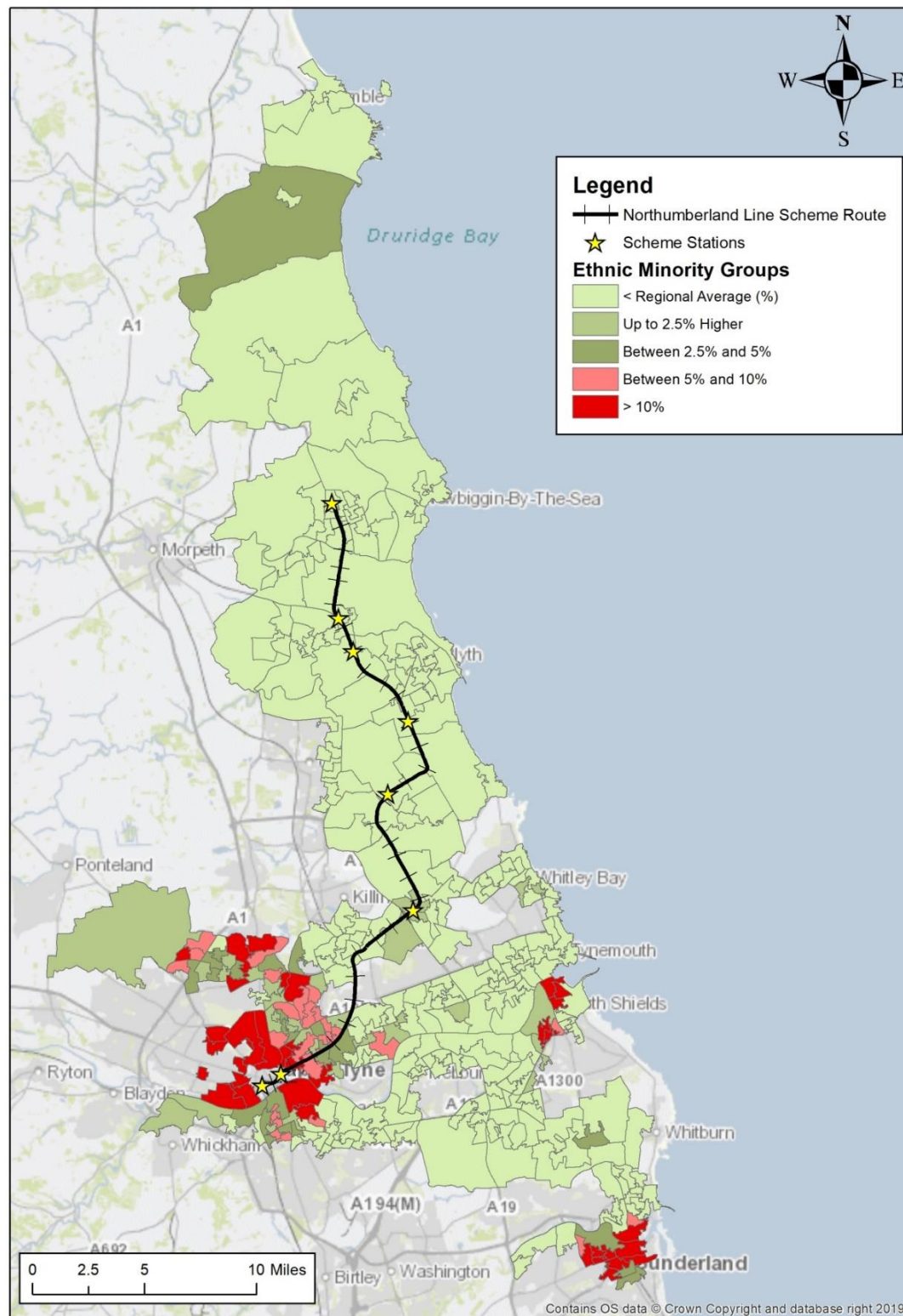


Figure 3-6 shows a high number of people to the north of Ashington living with a long-term disability; with areas of Blyth demonstrating a similar trend. The proposed Northumberland Line will improve public transport accessibility, which could benefit this vulnerable group.

Figure 3-7: Black or Minority Ethnic Origin (% of population) Compared to North East Average



LSOAs in Northumberland have low numbers of ethnic minority populations when compared to the North East average.

Figure 3-8: No Car or Van (% of Households) Compared to North East Average

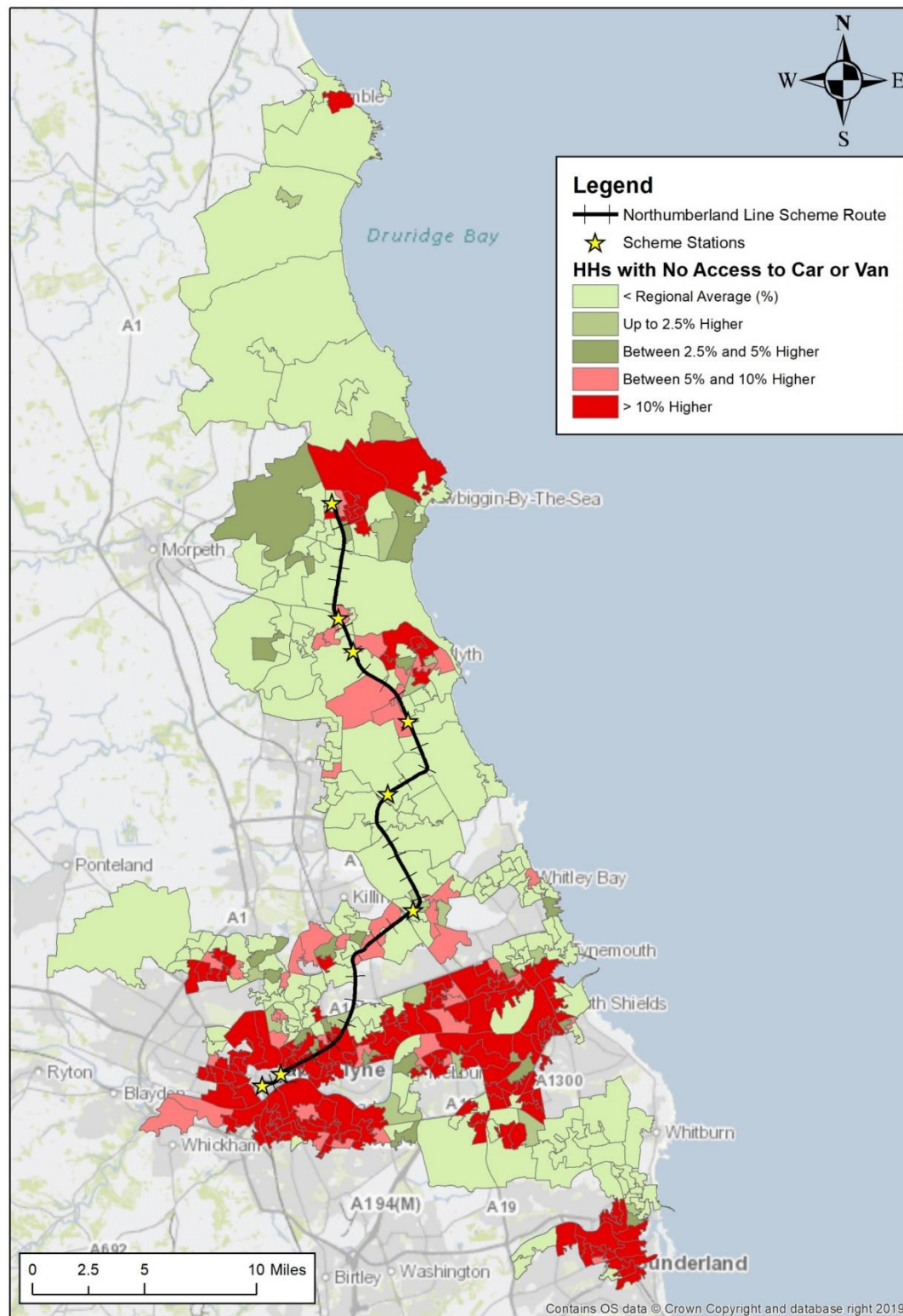


Figure 3-8 shows several LSOAs in Ashington and Blyth have households with no access to a car or van of over 10% higher than the regional average. Where there is a higher proportion of households with no access to private travel then this will result in a heavier reliance on public transport.

4. User Benefits

4.1 Introduction

This section of the report investigates user benefits for the Northumberland Line. The user benefits that the scheme will generate have been calculated using a spreadsheet-based mode-choice model. The methodology used to assess user impacts on different social groups as a result of the proposed scheme is discussed in the following sections.

4.2 User Benefits

Following the screening process, the impacts of user benefits were identified as requiring a full appraisal to provide benefit outputs disaggregated from zone to zone level for the area of interest. The user benefits that the scheme will bring have been assessed through a mode choice spreadsheet model, which was built to represent trip decision - making in the South East Northumberland (SEN) corridor only, and to assess the demand and revenue forecasting for the proposed scheme.

The distributional impact appraisal of user benefits should only consider home based trips as the analysis looks at benefits according to income distribution, which is associated with where a person lives. Business benefits output from the appraisal have therefore been excluded from the analysis. For 'commuting' and 'other' trips, which can be split between 'home-based' and 'non-home based' trips, a factor has been applied using TEMPro v7.2 to remove 'non-home based' trips.

The guidance requires that user benefits are mapped at an LSOA level to be comparable with the income distribution data. In the majority of cases the model zone was bigger than the LSOA area. An assumption was made that benefits were dispersed equally across the model zone and that each LSOA had an equal population. The benefits from the model were therefore disaggregated to LSOA based on spatial area.

Two different scenarios were assessed as part of the appraisal of the Northumberland Line scheme; a franchise-based option (Option T2) and a concession-based option (Option A2). Figures 4-1 to 4-3 demonstrate user benefits mapped in GIS for the T2 scenario; this is the full scheme with a franchise based operational model. GIS mapping for the concession based operational model (Option A2) can be found in Appendix A, although the outputs are broadly similar in terms of the location of benefits.

Mapping is based on Lower Super Output Area (LSOA) level disaggregation of the 2011 census. The mapping of the user benefits shows that the greatest level of benefits occurs within the surrounding area of the stations proposed as part of the scheme. Further afield from the proposed stations, there are benefits located in areas which could drive to proposed park and ride sites along the route. Benefits are noticeable around the Druridge Bay area of Northumberland, associated with longer distance trips depending on the scenario.

The most deprived income groups, according to the index of multiple deprivation, have been illustrated on the GIS mapping.

Figure 4-1: Scenario T2 – 2025 User Benefits (£)

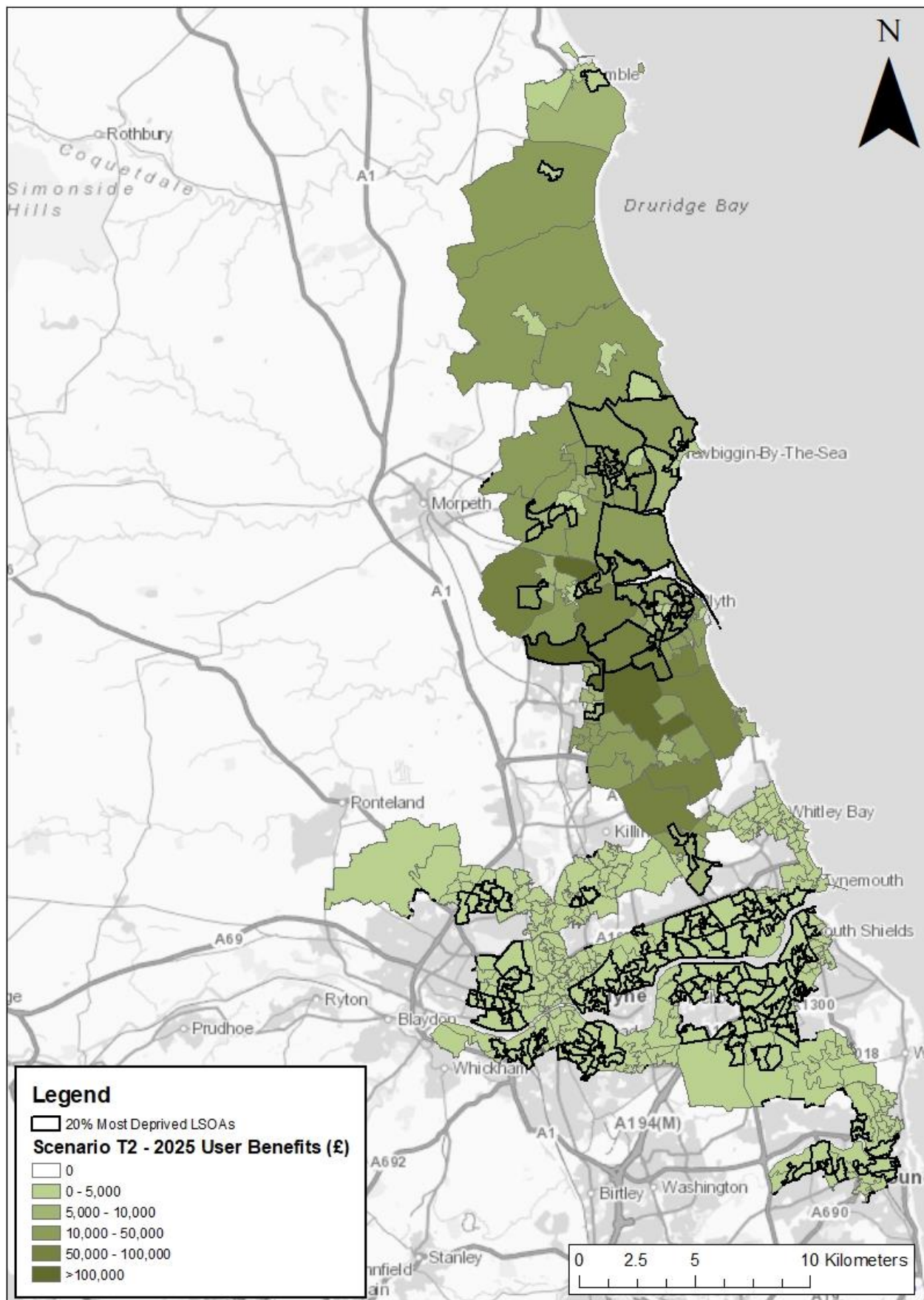


Figure 4-2: Scenario T2 – 2039 User Benefits (£)

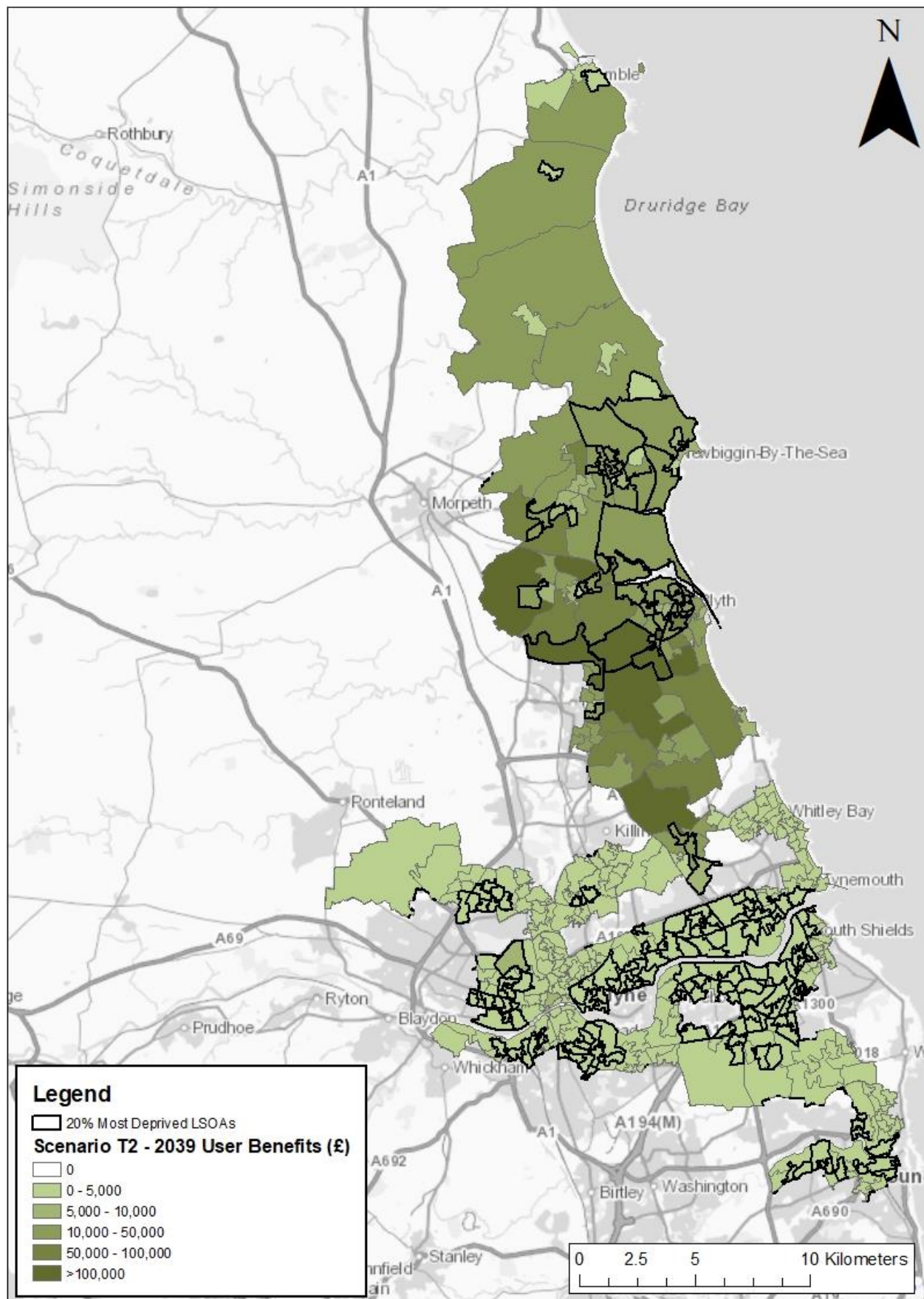
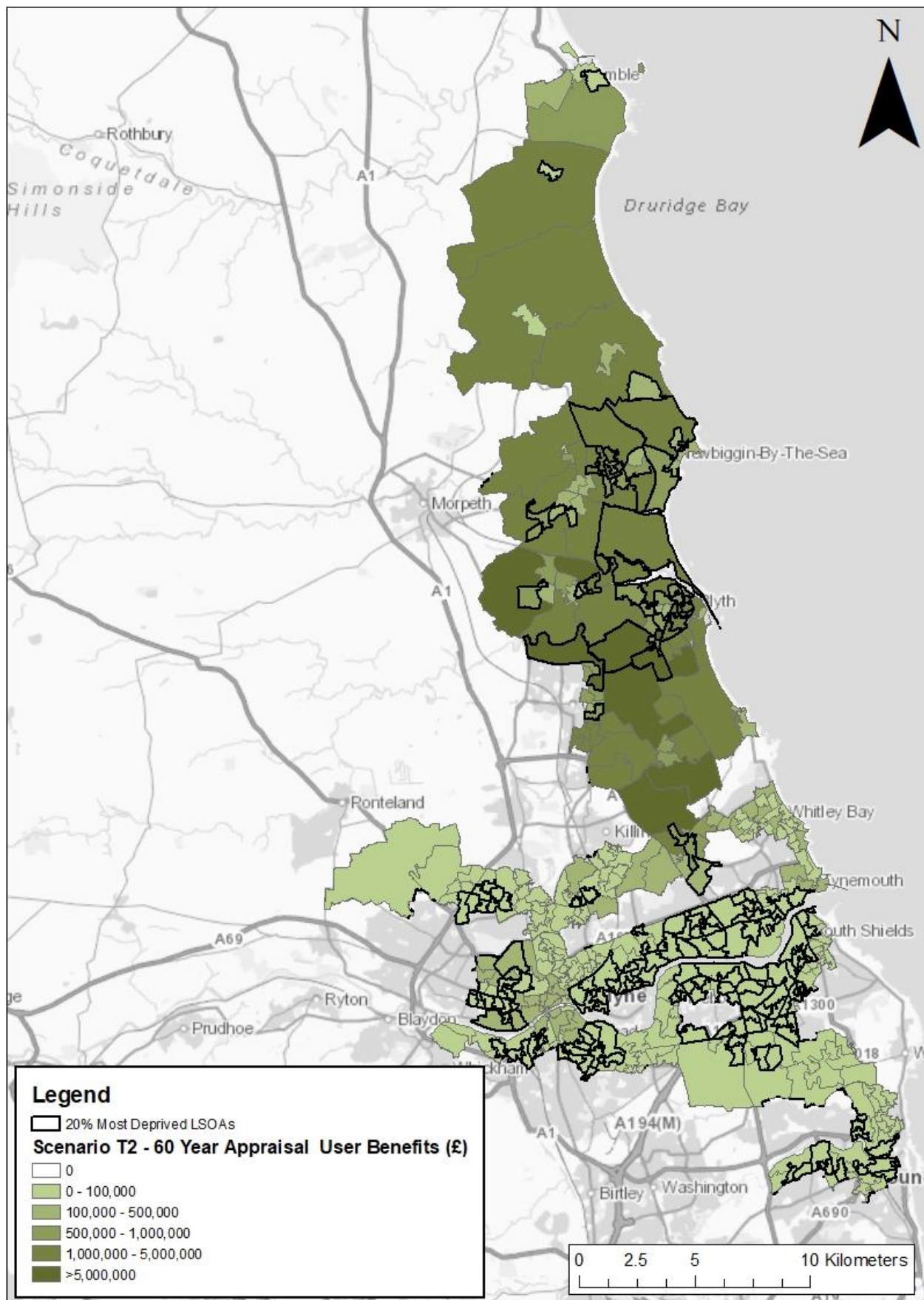


Figure 4-3: Scenario T2 – 60 Year Appraisal User Benefits (£)



4.4 User Benefit Distributional Analysis Results

The results are provided for the full 60-year assessment period. Significant economic changes may take place over the coming years, which may influence the individual scores of the LSOA, which needs to be taken into consideration when comparing user benefits from a 60-year appraisal period to income data for 2011.

The assessment indicators used for User Benefit Distributional Analysis for each scenario over 60-year period are based on the criteria derived from TAG Unit A4.2 as shown in the below.

Table 4-1: Assessment Criteria

Assessment	Description
✓	Beneficial and 5% or more smaller than the proportion of the group in the total population.
✓✓	Beneficial and in line (+/-5%) with the proportion of the group in the total population.
✓✓✓	Beneficial and 5% or more greater than the proportion of the group in the total population.

As previously mentioned, each lower super output area that has been banded into the most deprived Income Deprivation Quintile can be seen in relation to the user benefits in Figures 3-1 to 3-12.

The following tables compare the proportion of user benefits with the proportion of population in each IMD Income Domain for the T2 and A2 scenario over the 60-year assessment period.

Table 4-2: User Benefit Distributional Analysis – Scenario A2 (60 years)

	Most deprived			Least deprived		Total
	0-20%	20-40%	40-60%	60-80%	80-100%	
Total User Benefits (£'s)	84417866	67490741	54896418	23844449	40696836	271346311
Share of User Benefits	31%	25%	20%	9%	15%	100%
Population	280145	169545	101754	68921	97199	717564
Share of Population	39%	24%	14%	10%	13%	100%
Assessment	✓	✓✓	✓✓✓	✓✓	✓✓	

Table 4-3: User Benefit Distributional Analysis – Scenario T2 (60 years)

	Most deprived			Least deprived		Total
	0-20%	20-40%	40-60%	60-80%	80-100%	
Total User Benefits (£'s)	67376577	54967361	44180282	19132979	32391683	218048883
Share of User Benefits	31%	25%	20%	9%	15%	100%
Population	280145	169545	101754	68921	97199	717564
Share of Population	39%	24%	14%	10%	13%	100%
Assessment	✓	✓✓	✓✓✓	✓✓	✓✓	

The results for scenario A2 and T2 show that the two most deprived income areas account for 56% of total benefits. However, these areas also have 63% of the population of the study area.

4.5 Summary

For the user benefits, an impact score needs to be determined based on the following seven point scale:

- Large beneficial/moderate beneficial/slight beneficial;
- Neutral;
- Slight adverse/moderate adverse/large adverse

Over the 60 years, the most deprived areas will receive a lower percentage of the benefits (56%) than the population within these groups (63%). The scheme will therefore have a **moderate beneficial** impact in terms of the distributional appraisal.

5. Noise

5.1 Overview

The proposed Northumberland Line scheme will lead to differences in noise levels within close proximity of the railway line due to changes in the number and type of trains on the line, line speed changes and improvements to the track. There will also be an impact on noise levels within the immediate vicinity of the highway network where the proposed scheme leads to an increase or reduction in the number of vehicles. There are not expected to be any impacts on noise levels overnight due to trains only operating in daytime hours.

To examine the impact of the proposed scheme on noise levels, calculations were undertaken in accordance with the Calculation of Railway Noise (CRN) guidance (Department for Transport, 1995) for two scenarios; with and without the scheme. For the noise appraisal, the full scheme was considered, with stations at both Blyth Bebside and Seaton Delaval included. The noise appraisal at this stage considers changes in noise levels for properties within vicinity of the railway line at distances of between 10m and 300m from the track. Given the absence of a highway assignment model, the impact of the scheme on noise levels within immediate vicinity of the highway network has not been considered.

TAG guidance states that the impact of noise should be considered for three key social groups, which are children, elderly people and households with lower incomes who may find it difficult to adjust to changing noise levels. The analysis therefore focuses on the changes in noise levels for each of these three social groups.

As noise reduction is not a specific objective of the proposed scheme, this distributional impact appraisal for noise is seeking to establish whether the impact of the scheme is significant and/or concentrated or marginal and dispersed. Where the impact is deemed to be significant and concentrated, a detailed quantitative assessment is required.

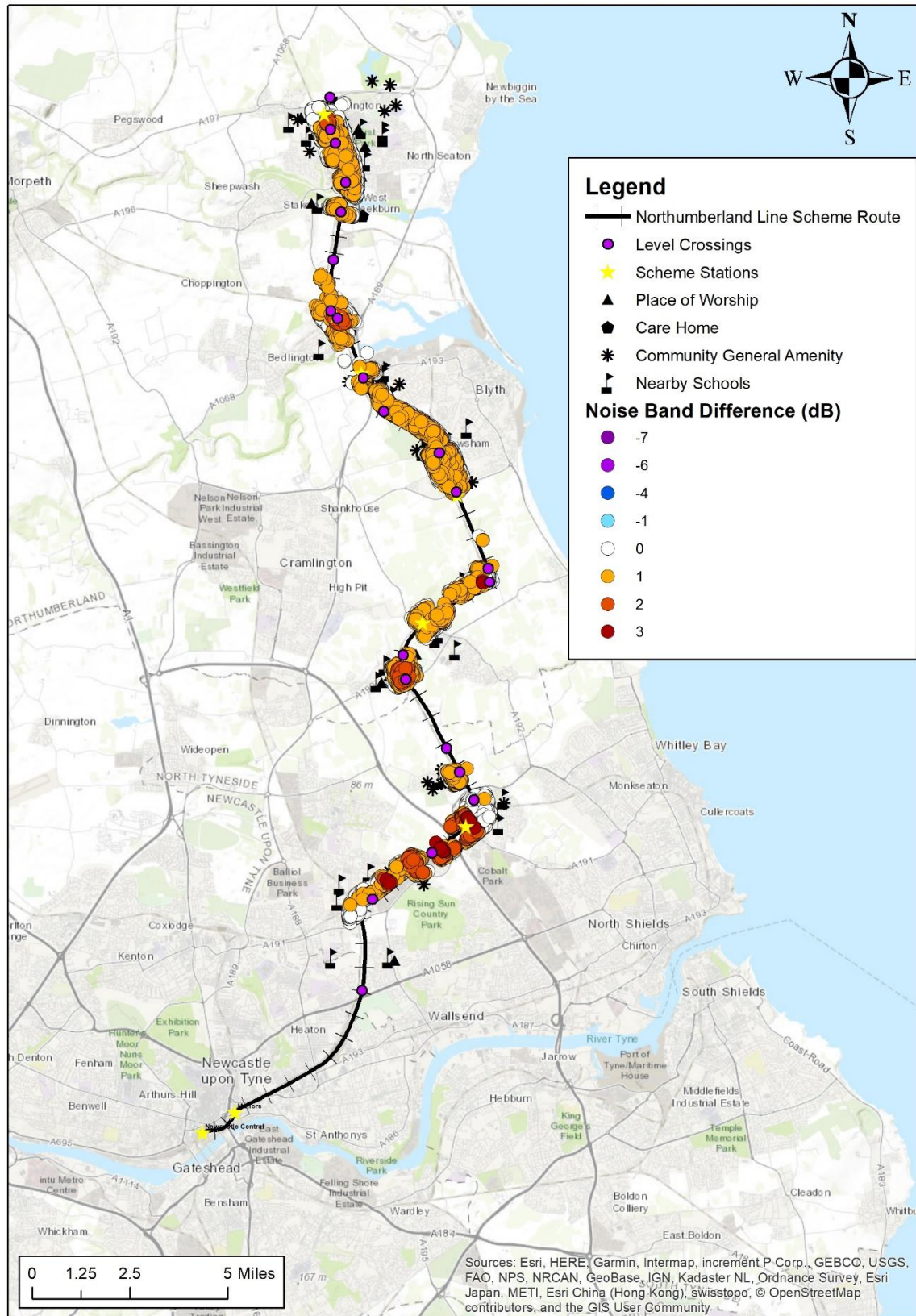
5.2 Results

Changes in noise levels have been calculated for dwellings along the line. At this stage in the appraisal process, the change in noise has been quantified by establishing whether there is a change in noise band, with noise levels presented in 3 decibel-bandings. It is important to note therefore, that a positive or negative change in noise levels can reflect a very small change in noise, as low as 0.1 dB, which may result in the household moving to the higher or lower banding. It is therefore not possible to say whether some of the changes in noise are significant, although the appraisal allows for a good understanding of where there are likely to be noticeable changes in noise levels.

The results which follow illustrate where there is a change in noise, impacted by the scheme for the forecast year. The map shows where there has been a change in noise banding and how many bands each dwelling has changed by. Maps which show the detail around each station can be found in Appendix B.

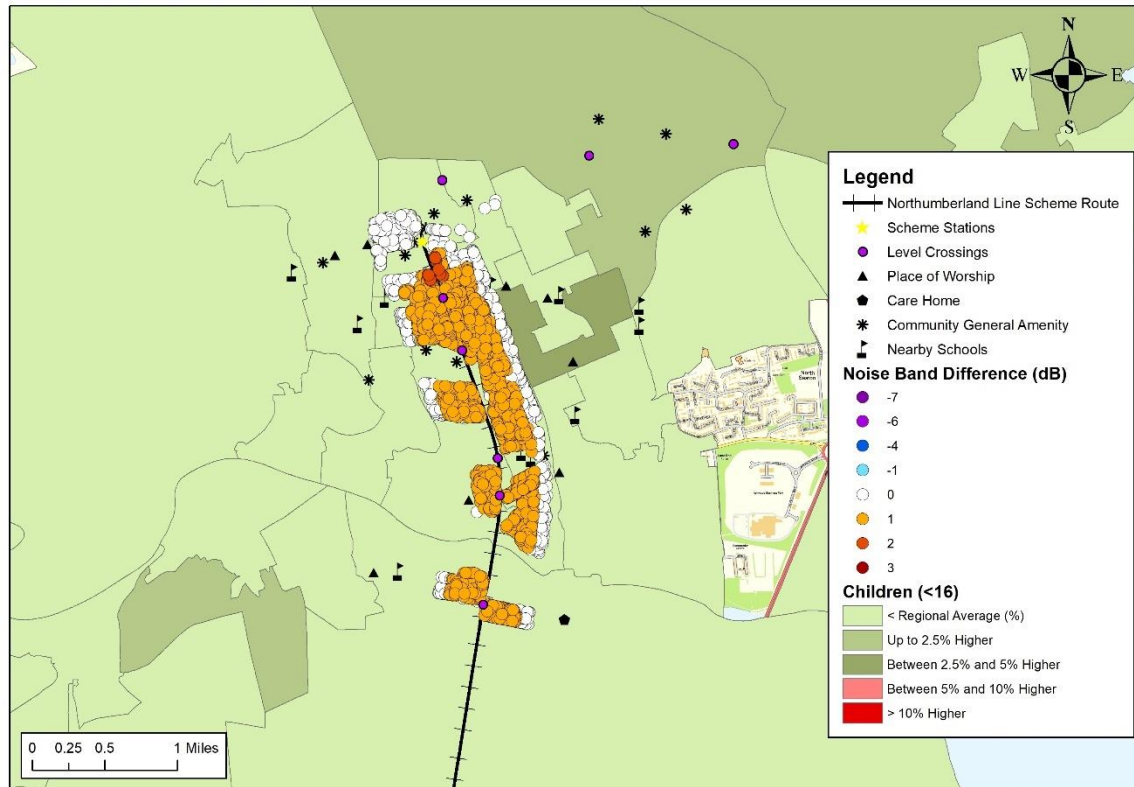
Most of the predicted noise level changes are moves to the adjacent noise level band, indicating a change of between 0.1 and 3.0 dB. To put this in context, it is generally accepted that changes in noise levels of 1 dB or less are imperceptible, and changes of 1 to 3 dB are not widely perceptible.

Figure 5-1: Noise Band Differences along the Northumberland Line



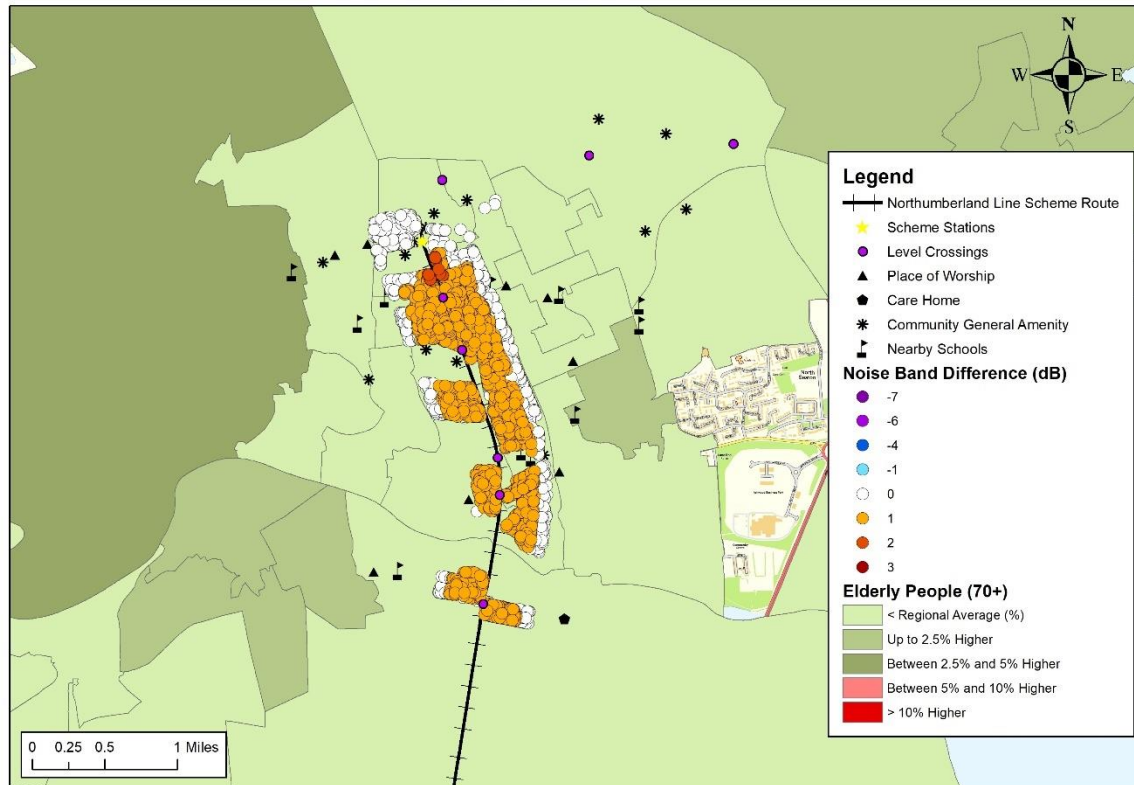
As discussed in the introductory section to this chapter, the impact of changes in noise levels should be considered for three social groups; children, elderly and lower income households. The following maps show the changes in noise against each of these social groups.

Figure 5-2: Change in dB Noise Bands at Ashington - Children (<16)



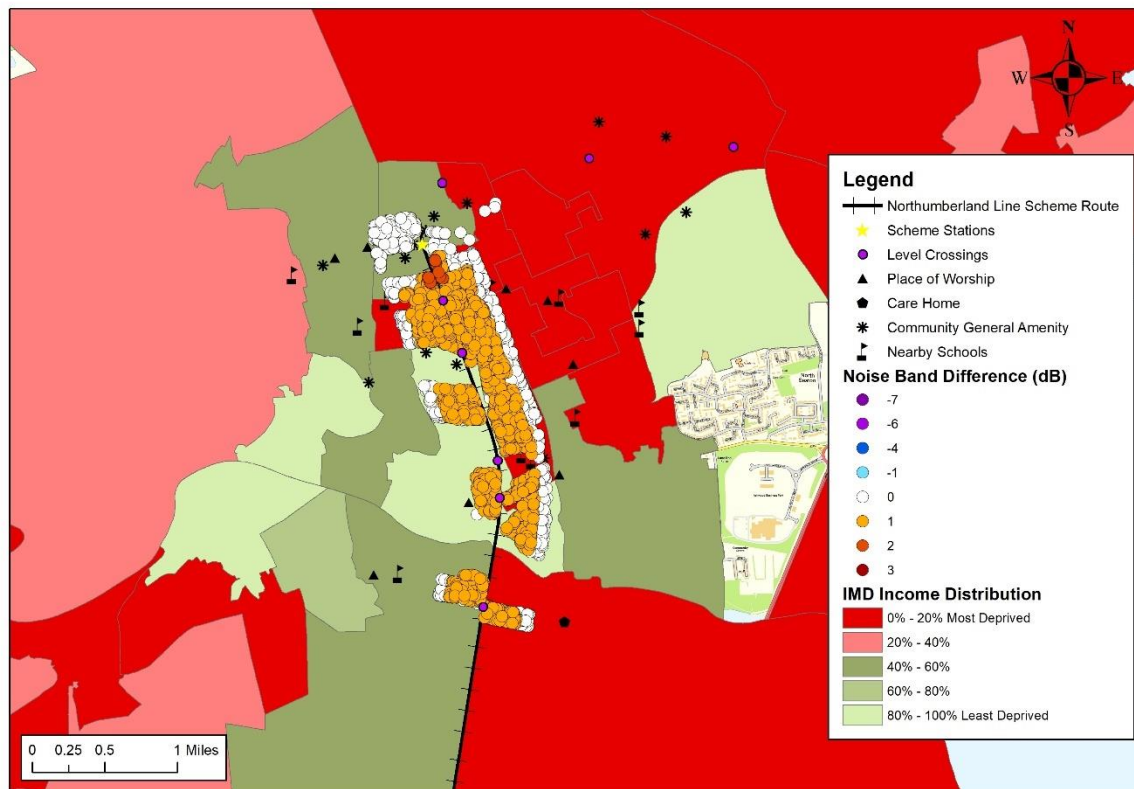
The child population in Ashington is less than the regional average for most of the LSOAs surrounding the station and railway line. Several schools are located close to the track but further afield from where households see a change in noise banding.

Figure 5-3: Change in dB Noise Bands at Ashington – Elderly People (70+)



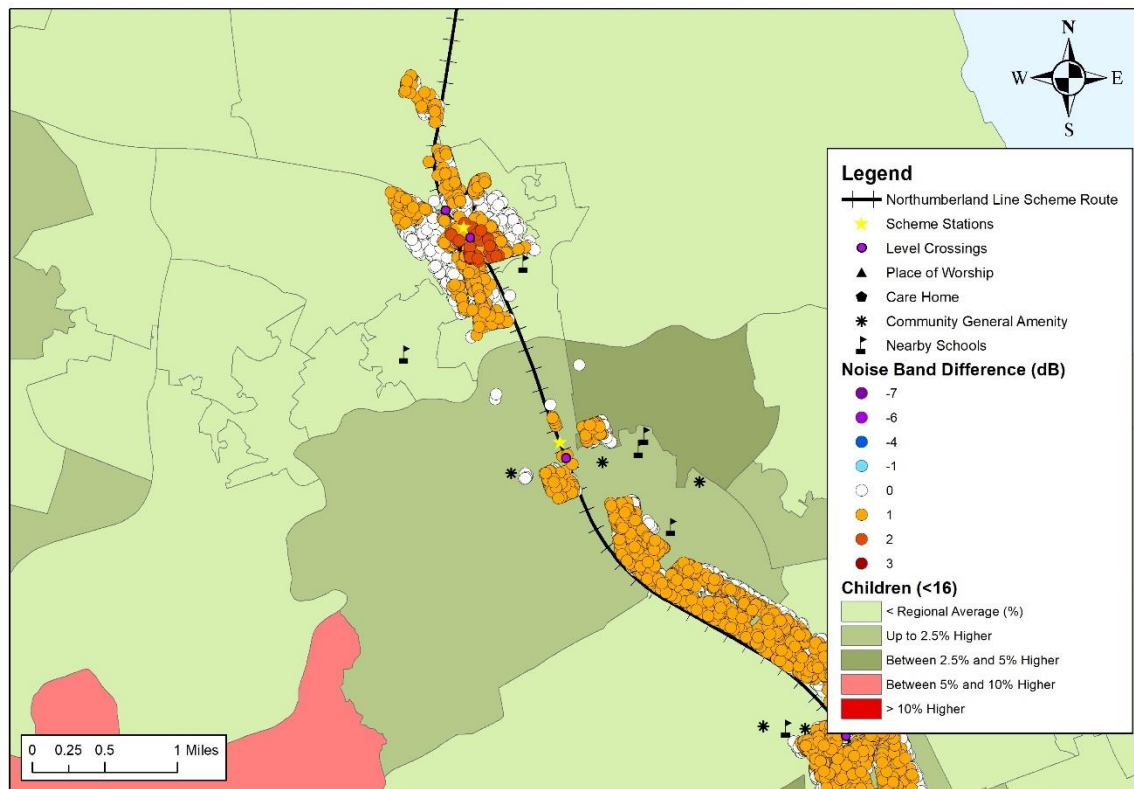
The proportion of elderly people in the vicinity of Ashington station is below the regional average for the North East. One care home is located to the south of Ashington station, but is outside of the impact area for a noise band increase. Therefore, the impact on elderly people is expected to be limited.

Figure 5-4: Change in dB Noise Bands at Ashington – IMD Income Distribution



The IMD income distribution highlights several LSOAs in close proximity to Ashington station that are in the 20% most deprived LSOAs across the country. These households are expected to see an increase in noise as a result of the scheme, although this increase is only one noise band and is therefore not expected to be perceptible. To ensure that the most vulnerable families in society are not negatively impacted by the scheme, measures to mitigate the impact of noise will be considered as the scheme is developed further.

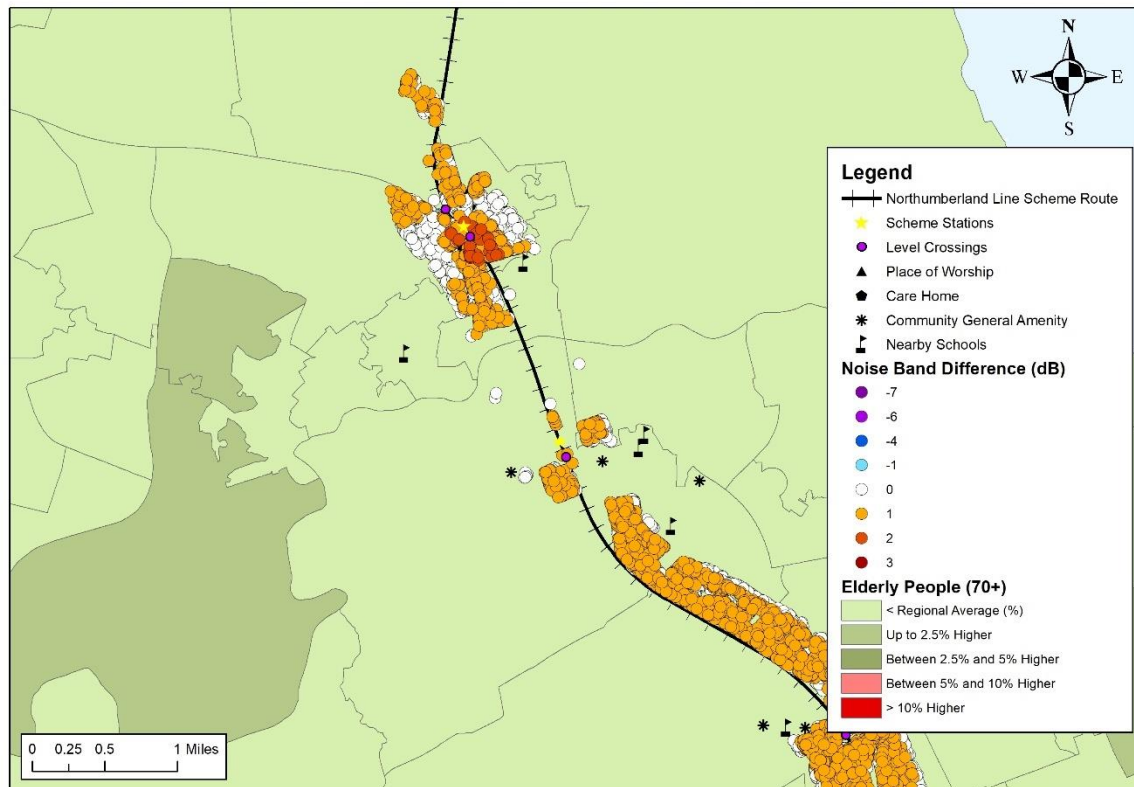
Figure 5-5: Change in dB Noise Bands at Bedlington and Blyth Bebside – Children (<16)



The map shows that the number of children in the Blyth Bebside area is higher than the regional average. Households with children in this location close to the railway line are expected to see an increase in noise levels as a result of the scheme, but the change is not expected to be perceptible.

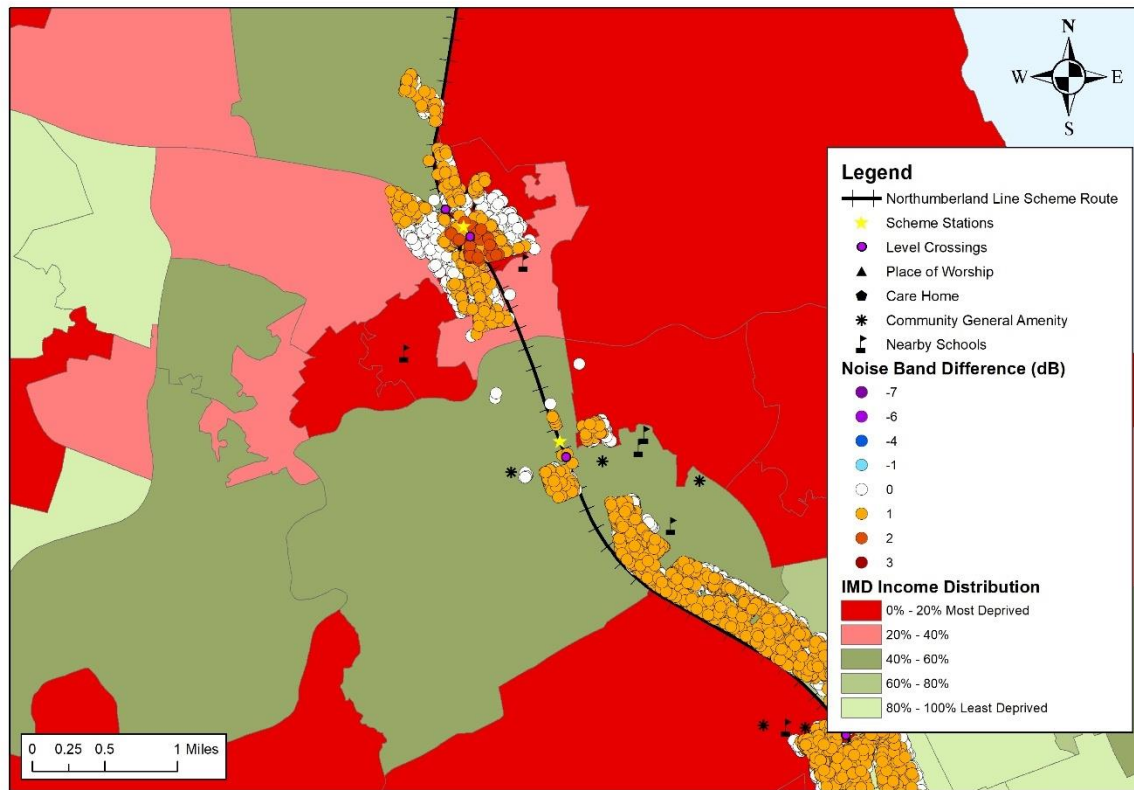
Although the number of children in Bedlington is less than the regional average, there is a school located close to the line where properties are seeing a more noticeable increase in noise levels as a result of the scheme; an increase of 2 noise bands. Mitigation measures may need to be considered in this location as the scheme is developed.

Figure 5-6: Change in dB Noise Bands at Bedlington and Blyth Bebside – Elderly People (70+)



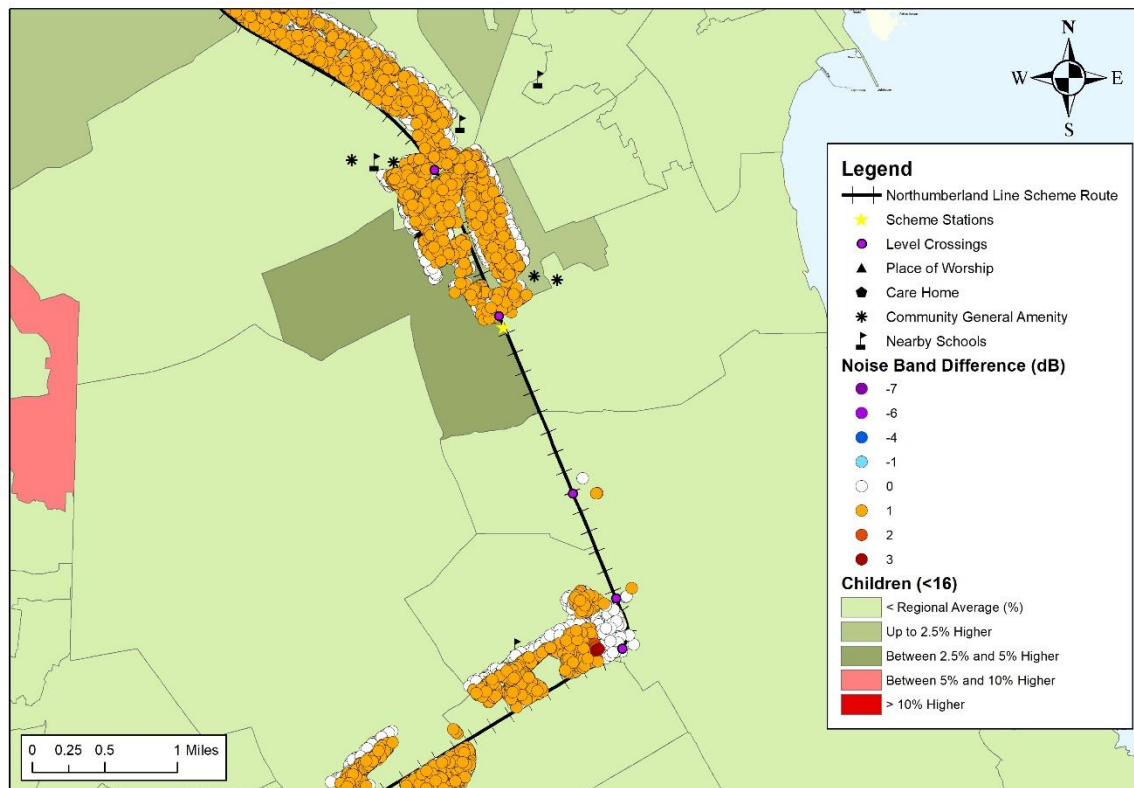
The proportion of elderly people in Bedlington and Blyth Bebside is less than the regional average. There are three care homes located in the impact area of the railway line, although there is only a change of 1 noise band as a result of the scheme. Annoyance could be a factor which may impact this social group, as elderly people are often in their homes during the day time, when most trains will pass along the line.

Figure 5-7: Change in dB Noise Bands at Bedlington and Blyth Bebside – IMD Income Distribution



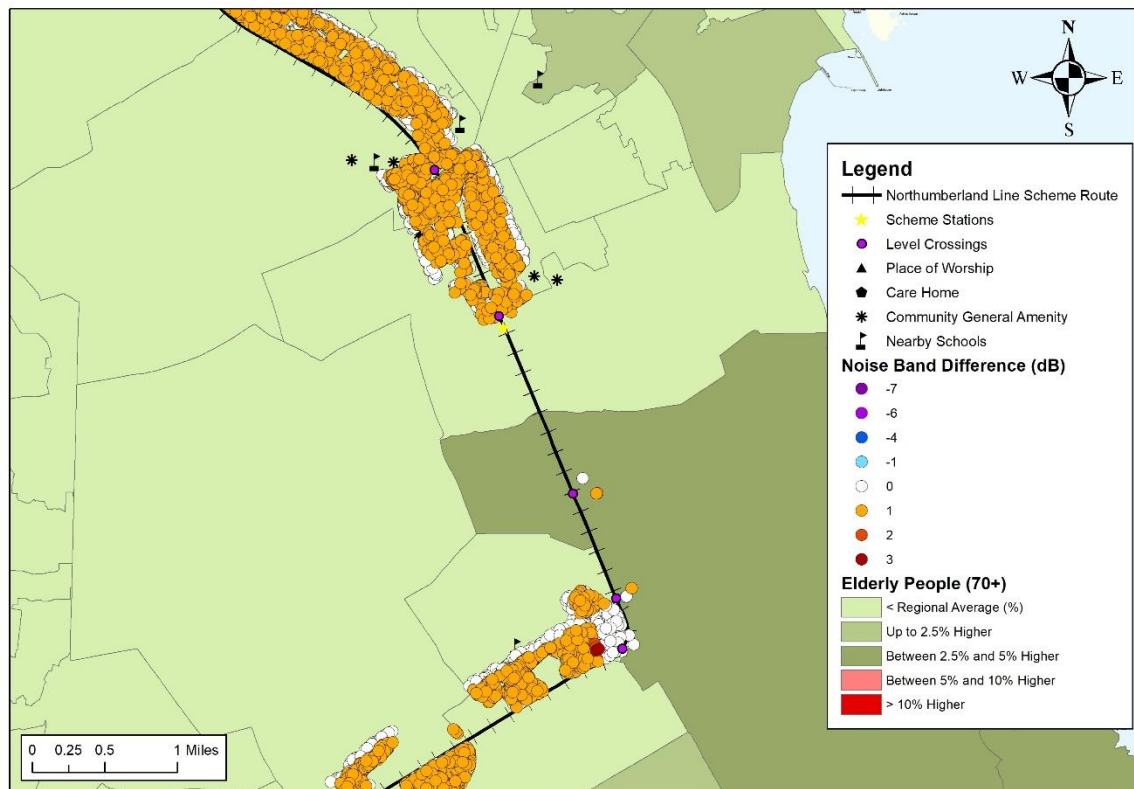
There are several LSOAs close to the railway, which are some of the most deprived in the country when considering income distribution. Some of these households in Bedlington will see noise increasing by two bands as a result of the scheme. It is important that appropriate mitigation against noise is considered during the next stages of development of the scheme to ensure these households are not unfairly disadvantaged.

Figure 5-8: Change in dB Noise Bands at Newsham – Children (<16)



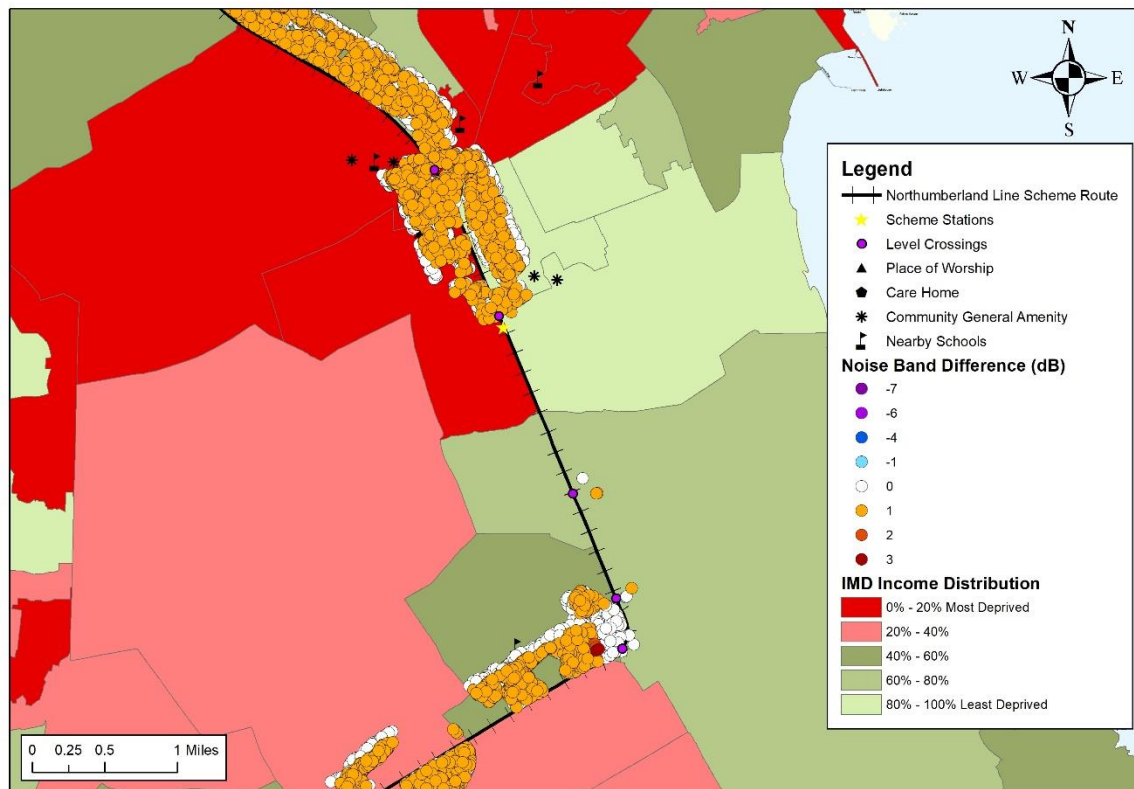
The number of children in Newsham is predominantly less than the regional average across the area however, it is above the regional average close to the line where the greatest noise impact will be realised. There are also several schools located in close vicinity of the line. Although noise levels as a result of the scheme will increase in these locations, this only constitutes a 1 band change in noise, which is not considered to be perceptible.

Figure 5-9: Change in dB Noise Bands at Newsham – Elderly People (70+)



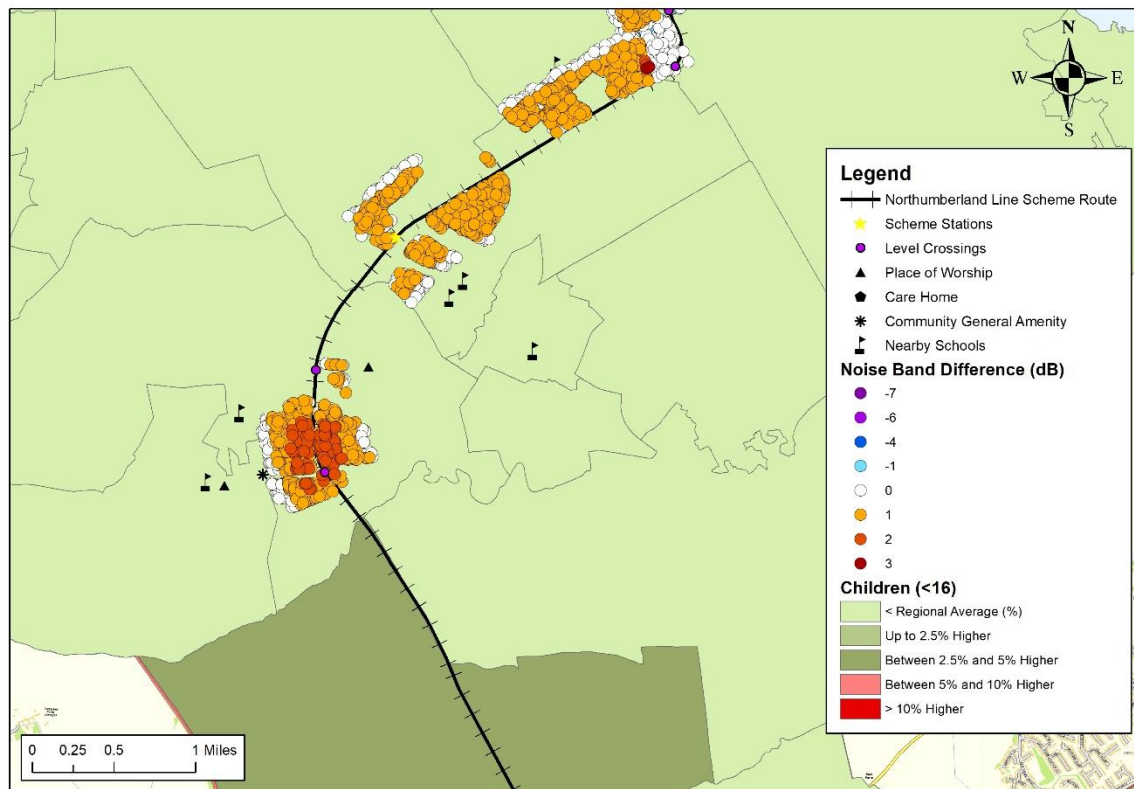
The elderly population around Newsham station is below the regional average. One care home is located within close vicinity of the railway line, although changes in noise in this location are not considered to be perceptible.

Figure 5-10: Change in dB Noise Bands at Newsham – IMD Income Distribution



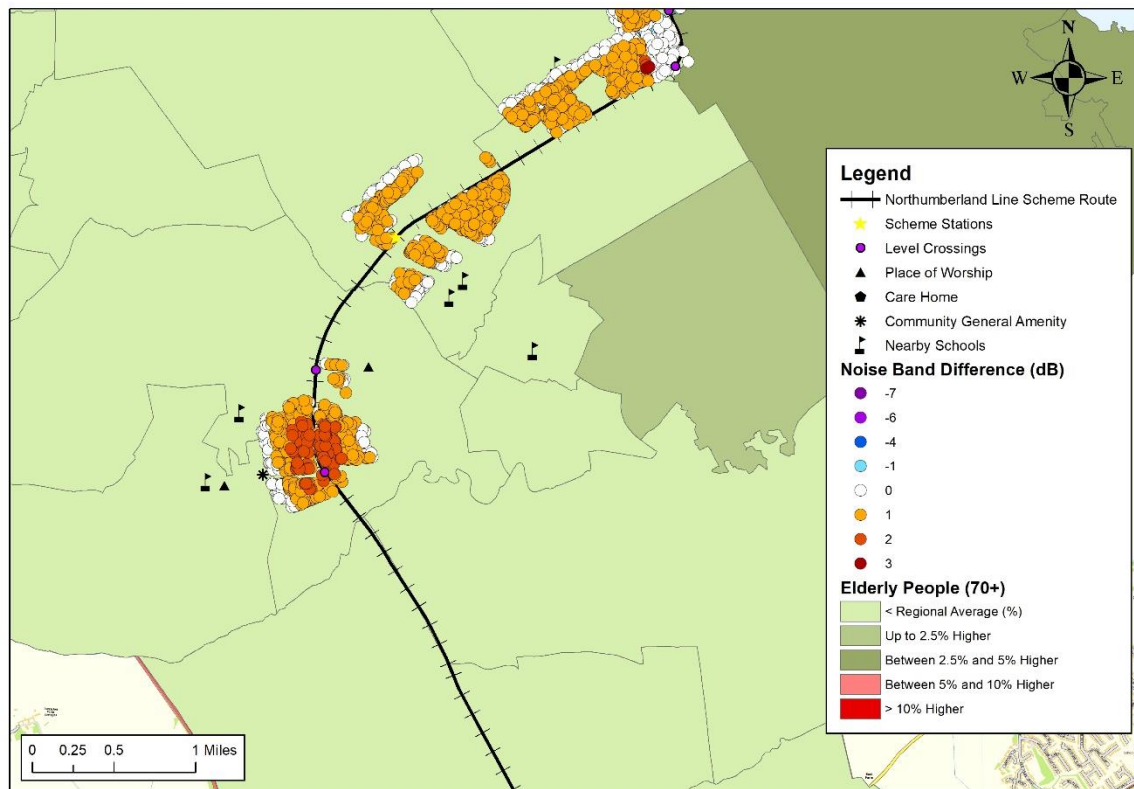
The IMD income distribution highlights the varied incomes around Newsham station, with the area having some of the most deprived households in the country, but also some of the least deprived households. Whilst the scheme will have a negative impact on noise levels for properties located along the line, for the most part, the impacts are small with a change of only 1 noise band. The exception here is around New Hartley, where a small number of properties will see noise levels increase by 3 bands. These properties however, are not located in one of the most deprived LSOAs, which means that the scheme is not unfairly impacting on the most vulnerable in society.

Figure 5-11: Change in dB Noise Bands at Seaton Delaval – Children (<16)



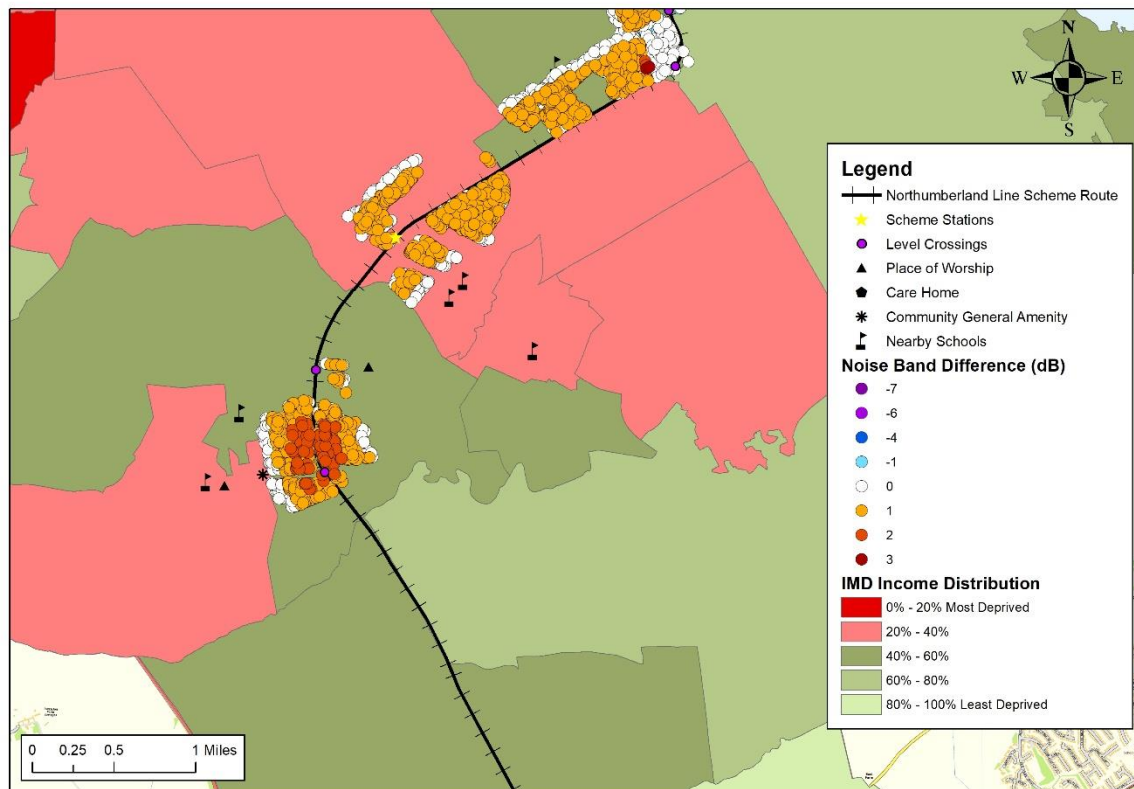
The proportion of children around the line at Seaton Delaval is less than the regional average. There are several schools located in the Seaton Delaval area, although these are set back further from the line where the appraisal is already showing the changes in noise levels for properties will be minimal.

Figure 5-12: Change in Db Noise Bands at Seaton Delaval – Elderly People (70+)



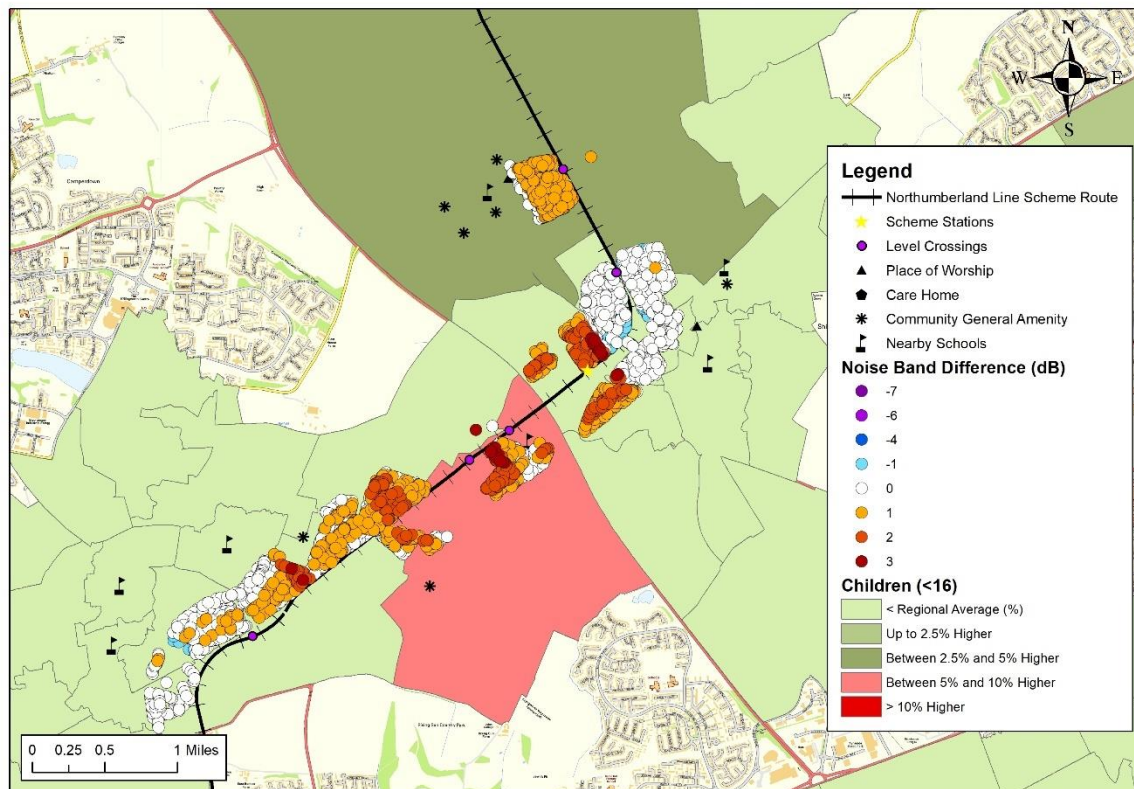
The number of elderly people in Seaton Delaval is less than the regional average. There are no care homes located within the impact area and therefore the impact on elderly people is forecast to be limited.

Figure 5-13: Change in dB Noise Bands at Seaton Delaval – IMD Income Distribution



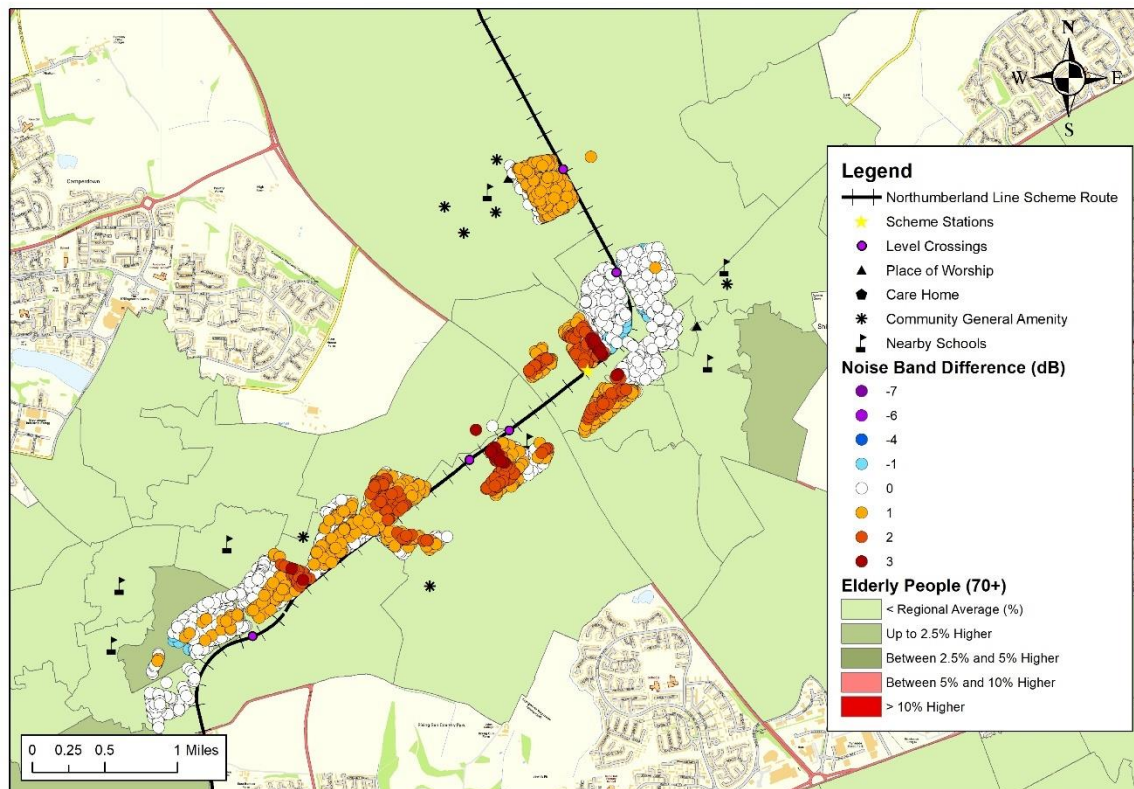
The Seaton Delaval area has some of the most deprived LSOAs in the country in terms of income distribution. However, for the most deprived areas of Seaton Delaval, there is only a 1 band change in noise levels, which is not considered to be perceptible. Further south of the station towards Seghill there is a two band change in noise levels, although this is in an LSOA where the income distribution is in the middle band. The scheme is therefore not unfairly disadvantaging the most vulnerable in society in the Seaton Delaval station area.

Figure 5-14: Change in dB Noise Bands at Northumberland Park – Children (<16)

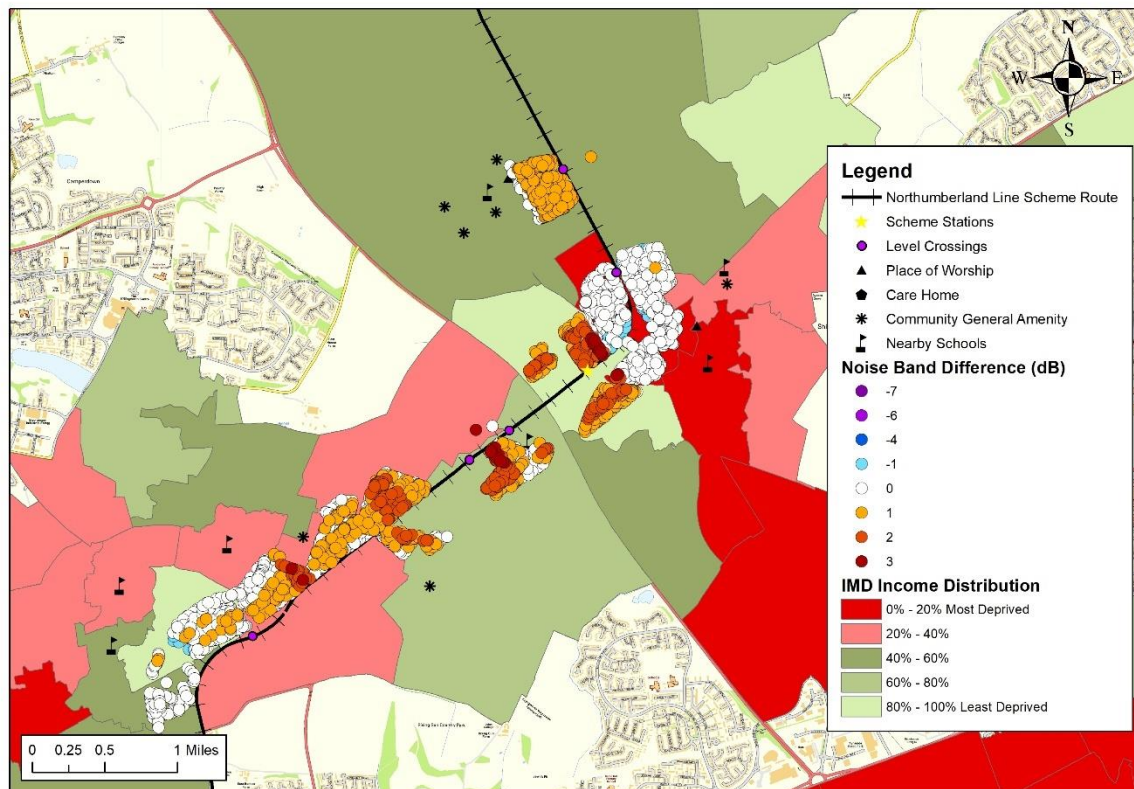


There are a number of properties in the Northumberland Park area which are forecast to see an increase in noise levels, which span several 3dB bands. This is also in an area where the number of children are higher than the regional average. Mitigation of the noise impacts in this area may therefore need to be considered.

Figure 5-15: Change in dB Noise Bands at Northumberland Park – Elderly People (70+)



The elderly population around Northumberland Park station is less than the regional average. No care homes are located within the impact area and, therefore, the impact of a noise increase is likely to be limited on the elderly population in this area.

Figure 5-16: Change in dB Noise Bands at Northumberland Park – IMD Income Distribution

The IMD income distribution around Northumberland Park varies. LSOAs from each of the five income bands are impacted by an increase in noise. The most deprived LSOAs are located around the curve and the majority of properties do not have a change in noise band; a small number of properties will see a benefit. The dwellings with the greatest change in noise bands are located in the two least deprived LSOAs in the area and therefore the scheme is not unfairly impacting on the most vulnerable in society.

5.3 Summary

The results presented for the impacts in noise levels on certain groups illustrate that changes occur along the rail line. This is to be expected as there are new passenger services being introduced that currently are not in existence. However, the scheme also has positive impacts in noise reduction, in particular, adjacent to the Hartley Curve. There are a number of amenities that fall outside of the area of impact, nursing homes, schools etc, which will not be impacted by noise changes whatsoever. However, there are others in the impact area, which will be subject to increases in noise, but the increase in noise levels is not expected to be perceptible. The analysis has identified a handful of specific locations where mitigation through scheme design would be beneficial.

It should also be noted that increases and decreases in noise may be very sensitive to change based on the existing situation without the proposed service. If, for example, the existing noise levels sit at the top or bottom end of the 3 dB noise bandings, then a very modest change could tip the population impacted into the next banding above or below, depending on whether noise levels increase or decrease at that location along the line.

For much of the rail line, there is a change in banding of 1, which reveals that noise will increase at most by up to 3dB. This is not considered to be perceptible by the majority of the population and therefore the overall scoring for the noise distributional impact appraisal is **slight adverse**.

6. Severance

6.1 Introduction

Severance is often an unintended consequence of a transport scheme, whereby barriers are implemented which restrict or prohibit the movement of people. The railway line between Ashington and Newcastle cuts through a number of residential areas where people must cross the line at level crossings. There are 21 level crossings on the section of railway line between Ashington and the East Coast Mainline. Under the existing situation, where the line is only used by a relatively small number of freight trains, the level crossing barriers are not down very often throughout the day.

The upgrade of the existing freight line to accommodate passenger services will mean that level crossings are down more often, and for longer, than the existing situation. This will worsen issues of severance, in locations where the level crossing provides access to key services and facilities. At the current time, it is assumed that all existing level crossings will remain open, although this could change as the scheme develops.

Literature has highlighted the groups of people in society that are potentially vulnerable to the effects of severance as a result of changes to the transport network. Such groups include people without access to a car, older people, people with disabilities and children. Assessment of severance therefore, has analysed where an increase in the downtime of level crossings will impact on access to key services and facilities that these groups of people may want to access. These facilities are schools, shops and GP services.

The methodology adopted and the results of the assessment are presented in the following section of the report.

6.2 Methodology

In accordance with TAG A4-2, key services and facilities along the Northumberland Line have been mapped in GIS. A walking catchment (not crow fly distance) to each service or facility of 1km has also been mapped. Where the catchment extends to the other side of the railway line from the service or facility, it is assumed that severance will worsen as a result of the Northumberland Line. The numbers of vulnerable people within these catchment areas have been calculated.

6.3 Results

Schools, GP surgeries and key shops within the vicinity of the Northumberland Line have been mapped in GIS and can be found in Appendix C. The maps also show the walking catchment around each facility, which gives an indication of the level of severance where this extends to the other side of the railway line. It is noted that only facilities where the catchment is likely to extend across the line have been included in this assessment. Qualitative commentary on what each of the maps is showing is given in the table overleaf.

Table 6-1: Severance Commentary

Facility	Map Name	Commentary
School	Ashington	There are a number of schools in the centre of Ashington within the vicinity of the railway line. However, for the most part, the 1km walking catchment area is on the same side of the railway line. The proportion of children living within these areas is also lower than the regional average.
	Blyth/Bedlington	In both Bedlington and Newsham, there are residential areas the other side of the line, which will be impacted by the increase in downtime of the level crossing barrier. However, the proportion of children in these areas is less than the regional average, suggesting the negative impact on severance is not impacting the most vulnerable in society.
Shops	Ashington	Shops within Ashington are predominantly located to the east of the railway line. The catchment area of people impacted by the increase in level crossing downtime is more difficult to determine because it will be dependent on the type of shop people want to visit. There are also available bridges over the railway line, which should reduce the number of people having to wait at the level crossing.
	Bedlington/Blyth	<p>In Bedlington there are local shops either side of the railway line. Whilst the walking catchment of these shops does not cover areas with a high proportion of elderly people compared to the regional average, a high proportion of disabled people do live in this area. These people are most likely to be impacted by the increase in downtime of the barrier, particularly if they have mobility issues, which may impact on the time in which they can cross the level crossing.</p> <p>Within the Bebside area of Blyth, people living to the west of the railway line will have more difficulties accessing the large supermarket to the east of the railway line. However, this area is not characterised by low car ownership, or a high proportion of elderly/disabled people. There is an area within the centre of Blyth, which will be increasingly severed from the shops at Plessey Road. However, again, this area is not characterised by a high proportion of elderly or disabled people.</p>
	Seaton Delaval	The Seaton Delaval map shows shopping facilities in New Hartley to the west of the railway line. The walking catchment of 1km from the shops is also largely contained to the west of the railway line. The increase in downtime of the level crossing barriers is therefore likely to have limited impact on severance in this location.

GP Surgeries	Ashington	There are GP surgeries to both the east and west of the line. The number of people therefore being required to cross the line in the Ashington area will be minimal.
	Bedlington/Blyth	There is a GP surgery in Bedlington, which is just to the east of the railway line. This leaves a large catchment area to the west of the railway line, which will be required to cross at the level crossing to access that surgery. Part of this catchment area is characterised by a high proportion of disabled people when compared to the regional average. There is a GP surgery located to the west of the railway line to the south of Blyth (Newsham area). The walking catchment area extends to the east of the line. Similar to Bedlington, this catchment area is characterised, in part, by areas with a high proportion of disabled people when compared with the regional average. These vulnerable people could be disadvantaged by the proposals.
	Seaton Delaval	GP surgeries are located in New Hartley and Seghill immediately west of the railway line, with a residential catchment to the east of the line. Neither of these areas are characterised by high proportions of elderly or disabled people when compared with the regional average. The impact on severance of the Northumberland Line is therefore unlikely to unfairly impact on the most vulnerable in society.

The population for each vulnerable group impacted by severance has been calculated and is included in the table below. Where a particular residential location is in the walking catchment area of two facilities, as is the case with some of the shopping areas, the calculations have been adjusted to remove double counting.

Table 6-2: Population Impacted by Severance

Facility	Children (<16)	Older (70+)	Disabled	No Car Households
GPs	269	186	211	194
Shops	578	345	417	441
School	191	120	143	136

Given the length of the railway line and the number of level crossings, the population that is impacted by severance is relatively small.

6.3 Summary

At this stage in the development of the scheme, it is assumed that all level crossings will remain open and therefore the impact on severance is an increase in journey time rather than an increase in distance travelled. It is unlikely that this would have any material impact on a person's willingness to make a journey, but will clearly be a disadvantage compared to the existing situation. The impact at each of the level crossings along the line is therefore considered to be **slight adverse**.

Discussions are still ongoing regarding potential upgrades or closures of level crossings. This could impact on the outcome of this appraisal should distances between services and catchment areas increase. The mapping provided in Appendix C of this report will prove useful in understanding the demographics of the proposal.

7. Accessibility

7.1 Introduction

The appraisal of accessibility within TAG unit A4-2 focusses on public transport accessibility. Existing public transport infrastructure and services connecting Northumberland and Newcastle are limited. Many areas within Northumberland are unable to access Newcastle city centre in less than 60 minutes using public transport and hence, reliance on private cars is high.

The upgrade of the existing freight line to accommodate passenger transport services will improve accessibility to Newcastle city centre, as well as improving connectivity within Northumberland to employment, health, education and leisure facilities.

Transport interventions impact differently on accessibility for different groups of people. TAG Unit 8.3.1 highlights four social groups to consider as part of accessibility appraisals: young people, older people, disabled people and Black and Minority Ethnic (BME) groups. Accessibility for these four groups have been considered as part of the appraisal.

To examine the impact of the Northumberland Line on public transport accessibility, TRACC mapping has been conducted, which visually shows improvements in accessibility for a particular destination. In this appraisal, Newcastle Central Station has been chosen as the focus of this appraisal given that Newcastle city centre is home to a number of key services and facilities and likely to be the dominant destination for Northumberland Line journeys.

TAG A4-2 also recommends considering other elements of the scheme that would impact on accessibility in the form of an accessibility audit. Whilst there will be benefits to assessing the accessibility of the proposed station layouts, the scheme is not currently at a level of design to provide sufficient information. This will be reviewed at subsequent stages of the study.

7.2 Methodology

TRACC software is a leading multi-modal transport accessibility analysis tool, developed in conjunction with the Department for Transport, local authorities and transport planners. TRACC analysis calculates travel times for all modes (including walking and cycling) to give accurate journey times from many origins to many destinations in one calculation. This has been used to calculate the change in accessibility to Newcastle Central Station.

The Northumberland Line scheme, with a service frequency of two trains per hour, has been added into TRACC to assess the change in accessibility in the AM peak hour. The assumed journey times of the service are shown in the following table¹.

Table 7-1: Journey Times of Northumberland Line

Northbound		Southbound	
Station	Journey Time (mins)	Station	Journey Time (mins)
Central Station	0	Ashington	0
Manors	1.5	Bedlington	5.0
Northumberland Park	12.0	Blyth Bebside	8.5
Seaton Delaval	17.0	Newsham	12.0
Newsham	21.5	Seaton Delaval	17.5
Blyth Bebside	26.0	Northumberland Park	22.5

¹ These journey times were sourced from the SOBC. It is acknowledged that these journey times are slightly slower than the scheme journey times now presented in the OBC.

Bedlington	29.0	Manors	32.0
Ashington	35.0	Central Station	35

To examine the impact that the Northumberland Line has on public transport accessibility, the TRACC outputs have been analysed in GIS. The results were split into time bands for each ten minute interval from 0 to 60 minutes. This mapping clearly illustrates the impact of the scheme and the spatial coverage of the population benefiting from the passenger services.

7.3 Results

The TRACC outputs shown in Figures 7.1 and 7.2 display the public transport accessibility to Newcastle Central Station both with and without the Northumberland Line scheme in place. The outputs highlight that in the existing situation, many residents of South East Northumberland are not able to access Newcastle Central Station within one hour by public transport; this includes the large urban areas of Ashington, Blyth and Seaton Delaval. This is based on existing public transport travel times on the highway network, and does not take into consideration expected future growth in traffic congestion. Once the Northumberland Line is operational, many areas of South East Northumberland are able to access Newcastle Central Station in under an hour, with significant benefits within close proximity to the stations. The results at each station are shown in greater detail in **Appendix D**.

To further quantify the impact of the Northumberland Line on the most vulnerable groups in society, the actual changes in the number of people impacted by the proposals has been calculated. This information is documented in Table 7-3 to Table 7-6, in a series of accessibility worksheets. This gives more information about the importance and need for the scheme. For example, those without access to a car could be seen to have more benefit as they have less alternative travel choices than car owners. The statistics are for travel times to Newcastle Central Station for a typical AM peak.

TAG A4-2 provides guidance on determining an appraisal score for each accessibility assessment undertaken. This demonstrates a seven point score, based on the proportion of change (e.g. household numbers) as a result of the intervention. The scoring criteria is outlined in the following table. As part of the quantification of accessibility benefits, a score has been given to each individual criteria and an overall score calculated taking into account overall benefits across different social groups.

Table 7-2: Accessibility Scoring Criteria

Accessibility Assessment Appraisal Criteria	
Changes	Accessibility Analysis Score
>+16%	Large Beneficial
+6 to +15%	Moderate Beneficial
+2% to 5%	Slight Beneficial
-1% to +1%	Neutral
-2% to -5%	Slight Adverse
-6% to -15%	Moderate Adverse
>-16%	Large Adverse

7.4 Summary

The results of the accessibility assessment show that the introduction of passenger rail services on the Northumberland Line will result in significant journey time savings for parts of South East Northumberland. This will benefit some of the most vulnerable in society, including those without access to a car, with car ownership rates in South East Northumberland being lower than the national average. The scoring of accessibility is not as high as might be expected given that the TRACC mapping clearly shows accessibility benefits. This is due to the baseline population covering the whole of the catchment area for the Northumberland Line, which includes larger urban zones in Tyne and Wear. Overall, the accessibility impact of the Northumberland Line has been calculated as **Moderate Beneficial**.

Figure 7-1: Existing Public Transport Journey Times to Newcastle Central Station

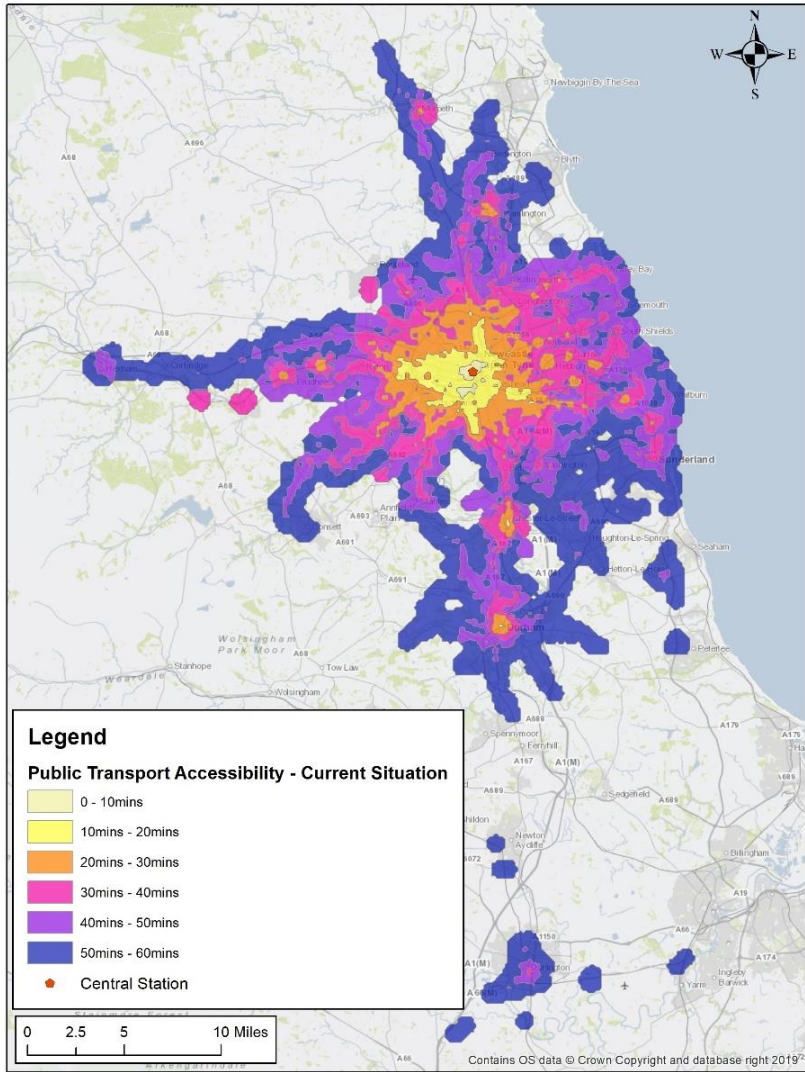


Figure 7-2: Proposed Public Transport Journey Times to Newcastle Central Station

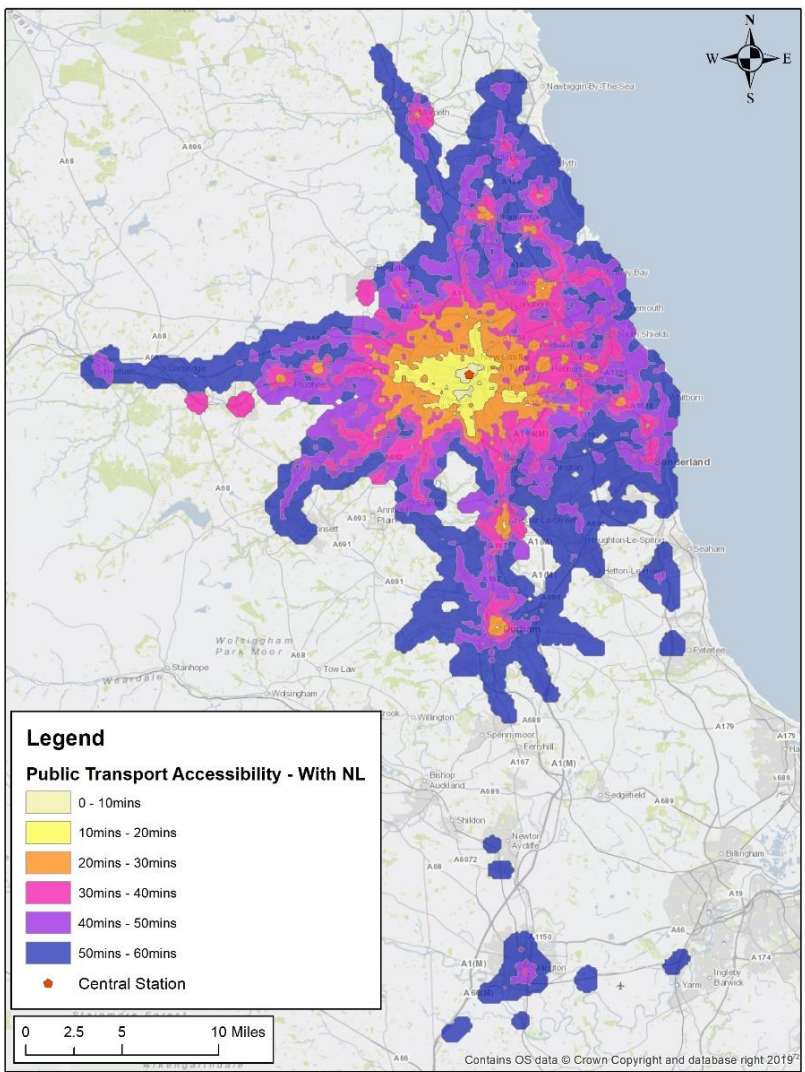


Table 7-3: Accessibility Assessment to Newcastle Central Station (Young and Elderly)

Public transport accessibility of population in the impact area to Newcastle Central Station (08.00 – 09.00) weekday	Without Scheme		With Scheme		% Change		Total Change		Overall Score	
	Young People	Elderly People	Young People	Elderly People	Young People	Elderly People	Young People	Elderly People	Young People	Elderly People
0-10mins	3,699	421	3,699	421	0%	0%	0	0	Neutral	Neutral
11-20mins	27,130	6,382	27,146	6,384	0%	0%	16	1	Neutral	Neutral
21-30mins	38,771	20,029	39,176	20,208	1%	1%	404	179	Neutral	Neutral
31-40mins	38,373	28,264	39,156	28,928	2%	2%	783	663	Slight Beneficial	Slight Beneficial
41-50mins	38,574	27,887	40,797	29,217	6%	5%	2,223	1,330	Moderate Beneficial	Slight Beneficial
51-60mins	46,680	33,046	50,199	36,059	8%	9%	3,519	3,014	Moderate Beneficial	Moderate Beneficial
Total People within 60 mins	193,227	116,030	200,173	121,217						

Accessibility Assumptions**Journey Purpose:** Access to Newcastle Central Station**Travel Time:** AM Peak (1-hour maximum travel time)**Default Walk Distances:** Maximum 800m walk to public transport stop from origin/maximum 800m walk from public transport stop to destination.**Assessment Criteria:** Young people aged 16-25 and elderly people 70+ within the study area.**Overall Score:** Moderate Beneficial**Quantitative Statement:** The Northumberland Line has a moderate beneficial impact on both young and elderly people, particularly when considering the population of the whole modelled area is taken into consideration. The greatest benefits are achieved within the 51-60-minute journey time banding.

Table 7-4: Accessibility Assessment to Newcastle Central Station (Car Ownership)

Public transport accessibility of population in the impact area to Newcastle Central Station (08.00 – 09.00) weekday	Without Scheme		With Scheme		% Change		Total Change		Overall Score	
	Car Household	No Car Household	Car Household	No Car Household	Car Household	No Car Household	Car Household	No Car Household	Car Household	No Car Household
0-10mins	2,114	3,601	2,114	3,601	0%	0%	0	0	Neutral	Neutral
11-20mins	24,356	23,466	24,417	23,471	0%	0%	61	5	Neutral	Neutral
21-30mins	68,456	42,375	69,761	42,779	2%	1%	1,305	404	Slight Beneficial	Neutral
31-40mins	97,867	50,058	100,253	50,892	2%	2%	2,386	834	Slight Beneficial	Neutral
41-50mins	101,308	45,420	107,181	47,797	6%	5%	5,872	2,376	Moderate Beneficial	Slight Beneficial
51-60mins	123,324	52,171	133,190	57,222	8%	10%	9,867	5,051	Moderate Beneficial	Moderate Beneficial
Total Households within 60 mins	417,426	217,090	436,917	225,761						

Accessibility Assumptions**Journey Purpose:** Access to Newcastle Central Station**Travel Time:** AM Peak (1-hour maximum travel time)**Default Walk Distances:** Maximum 800m walk to public transport stop from origin/maximum 800m walk from public transport stop to destination.**Assessment Criteria:** Car and No Car Households within the study area.**Overall Score:** Moderate Beneficial**Quantitative Statement:** The scheme has a beneficial impact on both car and no car households. The greatest positive impacts for those who are currently reliant on public transport is within the 51-60 minute journey time band. Overall however, there is a greater benefit to those who currently have access to a car.

Table 7-5: Accessibility Assessment to Newcastle Central Station (Disabled)

Public transport accessibility of population in the impact area to Newcastle Central Station (08.00 – 09.00) weekday	Without Scheme	With Scheme	% Change	Total Change	Overall Score
	No. of people with a Disability	No. of people with a Disability	No. of people with a Disability	No. of people with a Disability	No. of people with a Disability
0-10mins	2,045	2,045	0%	0	Neutral
11-20mins	20,646	20,658	0%	12	Neutral
21-30mins	52,432	53,071	1%	639	Neutral
31-40mins	71,622	73,335	2%	1,713	Slight Beneficial
41-50mins	70,931	75,246	6%	4,315	Moderate Beneficial
51-60mins	90,602	98,494	9%	7,892	Moderate Beneficial
Total People within 60 mins	308,278	322,849			

Accessibility Assumptions**Journey Purpose:** Access to Newcastle Central Station**Travel Time:** AM Peak (1-hour maximum travel time)**Default Walk Distances:** Maximum 800m walk to public transport stop from origin/maximum 800m walk from public transport stop to destination.**Assessment Criteria:** People living with a long-term disability within the study area.**Overall Score:** Moderate Beneficial**Quantitative Statement:** The Northumberland Line scheme has a moderate beneficial impact on people with a disability. The greatest benefit is to the number of disabled people who will be able to travel to Newcastle Central Station by public transport within 60 minutes.

Table 7-6: Accessibility Assessment to Newcastle Central Station (Black and Ethnic Minority)

Public transport accessibility of population in the impact area to Newcastle Central Station (08.00 – 09.00) weekday	Without Scheme	With Scheme	% Change	Total Change	Overall Score
	Ethnic Minority	Ethnic Minority	Ethnic Minority	Ethnic Minority	Ethnic Minority
0-10mins	2,995	2,995	0%	0	Neutral
11-20mins	22,995	23,006	0%	12	Neutral
21-30mins	17,664	17,894	1%	229	Neutral
31-40mins	14,957	14,931	0%	-26	Neutral
41-50mins	13,189	13,395	2%	206	Slight Beneficial
51-60mins	9,930	10,567	6%	637	Moderate Beneficial
Total People within 60 mins	81,730	82,788			

Accessibility Assumptions**Journey Purpose:** Access to Newcastle Central Station**Travel Time:** AM Peak (1-hour maximum travel time)**Default Walk Distances:** Maximum 800m walk to public transport stop from origin/maximum 800m walk from public transport stop to destination.**Assessment Criteria:** Ethnic Minority Groups within the study area.**Overall Score:** Slight Beneficial**Quantitative Statement:** The changes in accessibility are not as noticeable for black and ethnic minority groups. This is likely due to the low proportion of black and ethnic minority groups in the South East Northumberland area, which will be the main area to benefit from the Northumberland Line scheme.

8. Summary

AECOM has been commissioned by Northumberland County Council (NCC) to prepare the Outline Business Case for the proposed reopening of the railway line between Ashington and Newcastle to passenger services.. As part of the work undertaken, AECOM has carried out a distributional impact assessment of the proposed improvements in accordance with TAG unit A4-2. The outputs from this assessment have been summarised in the previous sections of the report.

As part of the initial screening process to determine the level of appraisal required, four indicators were identified for further appraisal and to quantify the impacts to include in the appraisal summary tables. The outcomes from the initial screening exercise and the quantified appraisal results are summarised in the following table.

Table 8-1: Appraisal Results

Impact Area	Conclusion	Outcome	Appraisal Score
User Benefits	The scheme will provide better connections within, and beyond, South East Northumberland, resulting in journey time benefits across all journey purposes. The benefits are likely to be significant and dispersed across a large spatial area.	Proceed to further assessment	Moderate Beneficial
Noise	There will be a reduction in traffic volumes on some roads as a result of the scheme. However, the benefits are not likely to be significant and will be dispersed across a large spatial area. Properties immediately adjacent to the railway line however, will be impacted by the noise from additional trains using the railway line, which requires further appraisal.	Proceed to further assessment.	Slight Adverse
Air Quality	There will be air quality benefits along roads, which see a reduction in traffic volumes as a result of the scheme. However, the benefits are not likely to be significant and will be dispersed across a large spatial area. The impact on air quality of increased trains on the railway line is expected to be minimal.	No further assessment	N/A
Accidents	There will be a reduction in vehicle kms travelled on the highway network as a result of the scheme. This should have a positive impact on the number of accidents. However, this impact will be dispersed over a large spatial area and is not considered to be significant. The increased number of train services on the railway line could lead to more conflict at level crossings however, improvements will be made to the standard of crossings currently in place.	No further assessment	N/A

Impact Area	Conclusion	Outcome	Appraisal Score
Security	New railway stations will enhance the security of the local area due to more people, CCTV, improved lighting and emergency contact points. However, railway stations can also attract crime and antisocial behaviour. The impact of the scheme on security is therefore considered to be neutral.	No further assessment	N/A
Severance	There are a considerable number of level crossings along the line, which are part of key pedestrian routes. The increase in services on the line will mean that level crossing barriers are down for much longer than they currently are; it could also lead to the closure of some level crossings. The impact on severance therefore, is expected to be noticeable within the vicinity of the level crossings.	Proceed to further assessment.	Slight Adverse
Accessibility	A key objective of the scheme is to improve accessibility by public transport within and beyond South East Northumberland. The Northumberland Line scheme will offer a new mode of public transport to people living and working in the study area. The accessibility benefits of the scheme are therefore expected to be significant and spread across a wide spatial area.	Proceed to further assessment.	Moderate Beneficial
Affordability	Bus services already serve the study area, lessening the impact of the railway service on affordability. It is currently assumed that there will be no reduction in bus services once the scheme is delivered. The affordability impacts are therefore likely to be small.	No further assessment	N/A

As the scheme is developed through the next stage of the study, there may be a need to revisit the appraisal of some indicators as more information becomes available.

Appendix A: User Benefits Maps

Figure A-1: Scenario A2 – 2025 User Benefits (£)

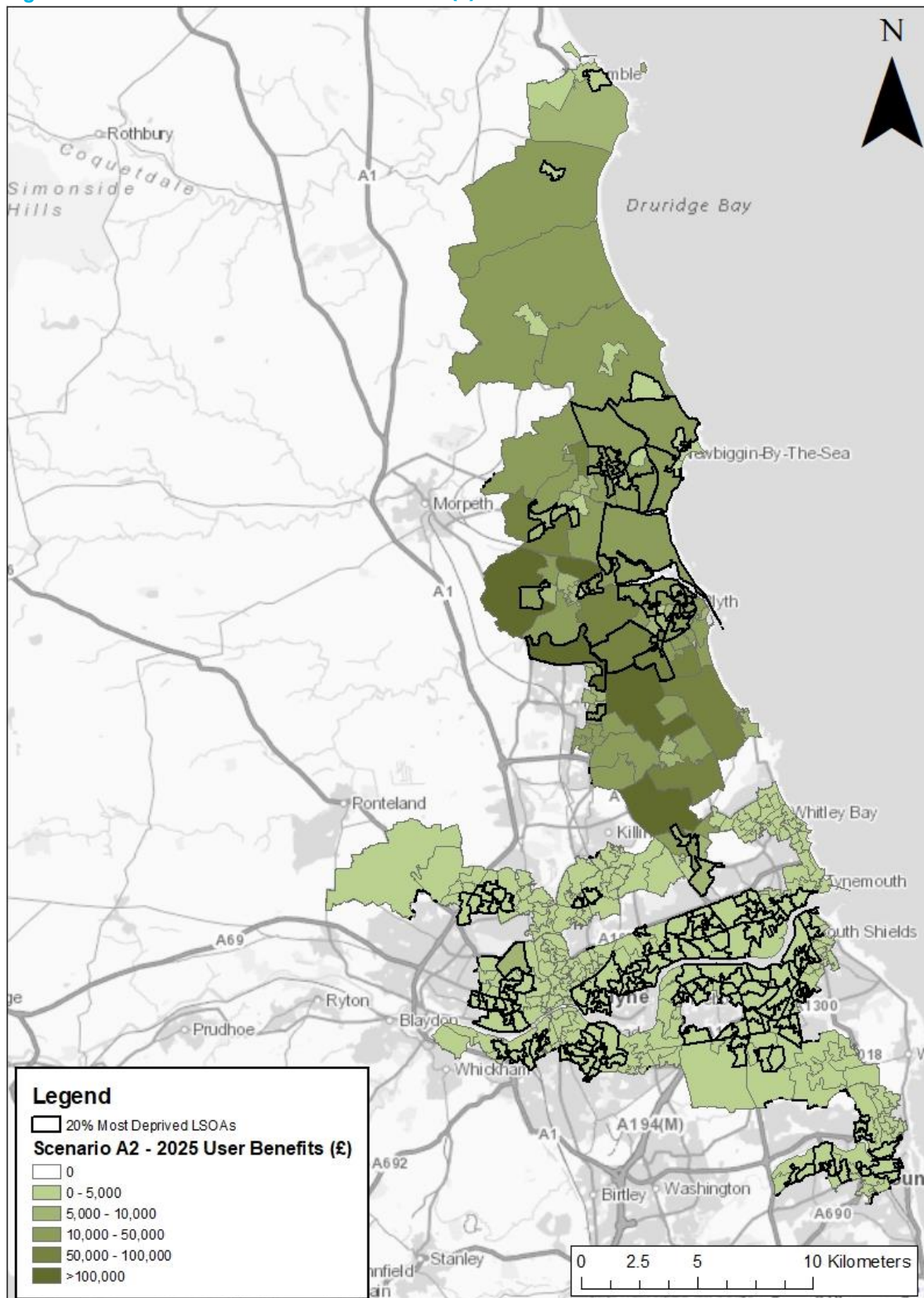


Figure A-2: Scenario A2 – 2039 User Benefits (£)

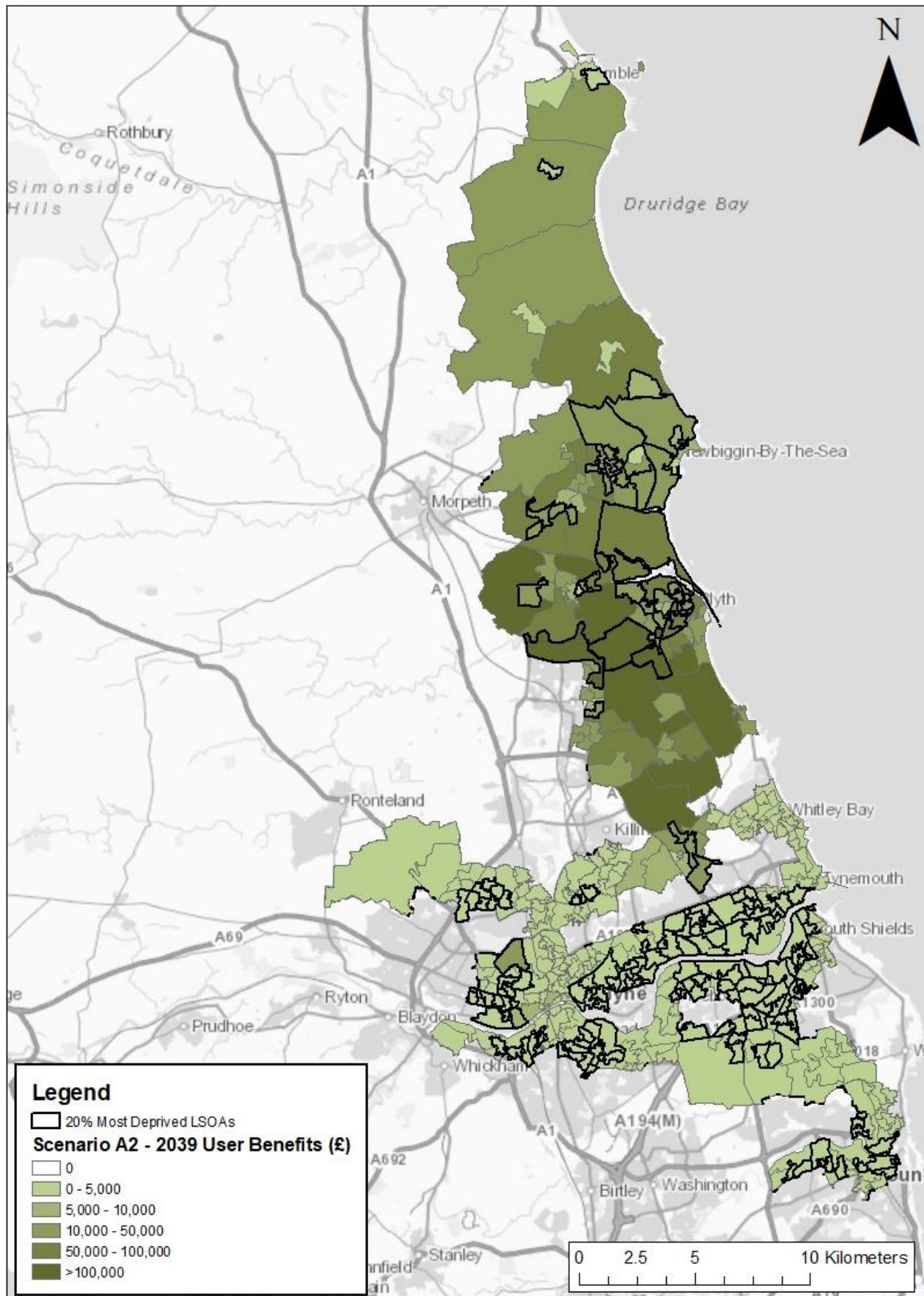


Figure A-3: Scenario A2 – 60 Year Appraisal User Benefits (£)

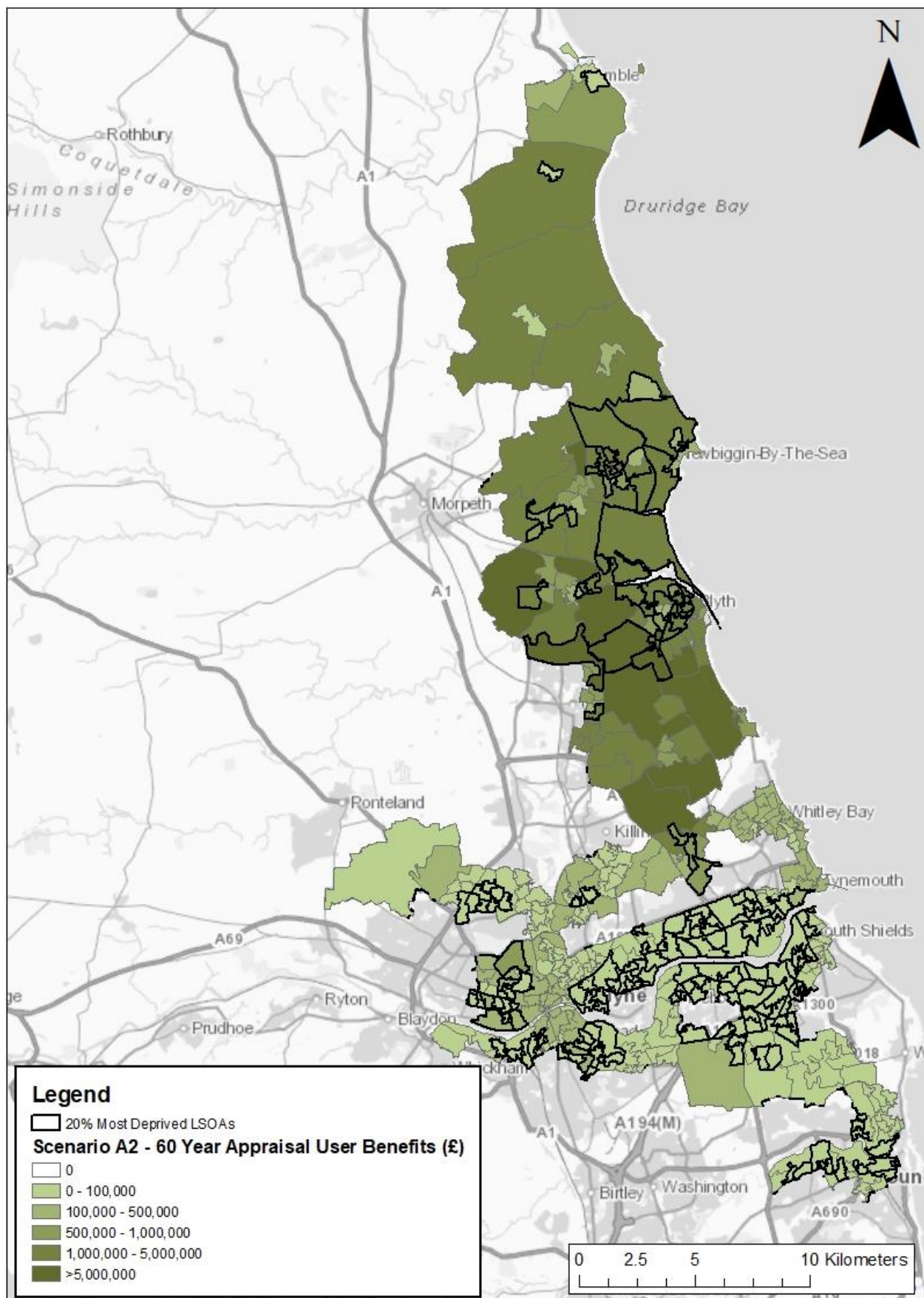


Figure A-4: Scenario A2 – 60 Year Appraisal User Benefits (£) Ashington

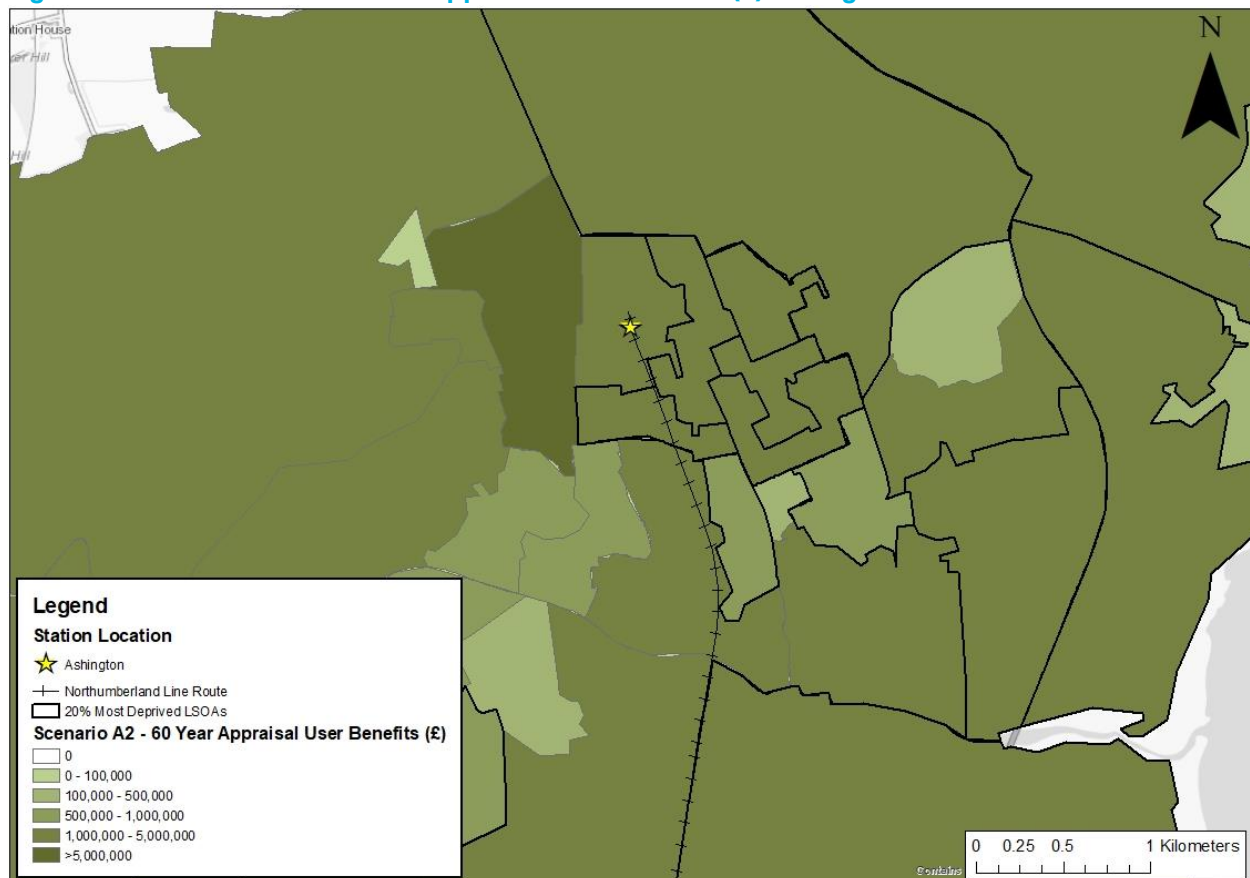


Figure A-5: Scenario A2 – 60 Year Appraisal User Benefits (£) Bedlington/Blyth



Figure A-6: Scenario A2 – 60 Year Appraisal User Benefits (£) Newsham



Figure A-7: Scenario A2 – 60 Year Appraisal User Benefits (£) Seaton Delaval



Figure A-8: Scenario A2 – 60 Year Appraisal User Benefits (£) Northumberland Park

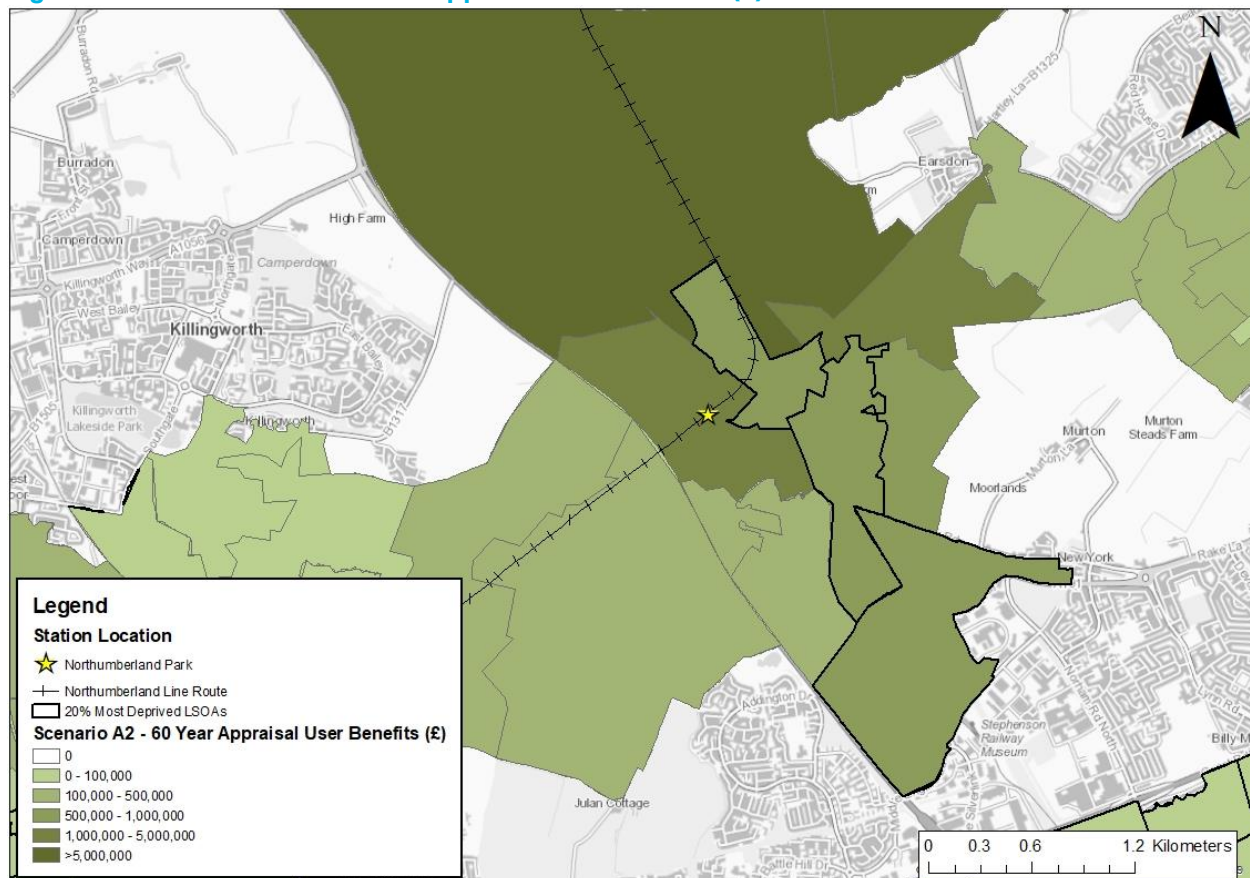


Figure A-9: Scenario T2 – 60 Year Appraisal User Benefits (£) Ashington

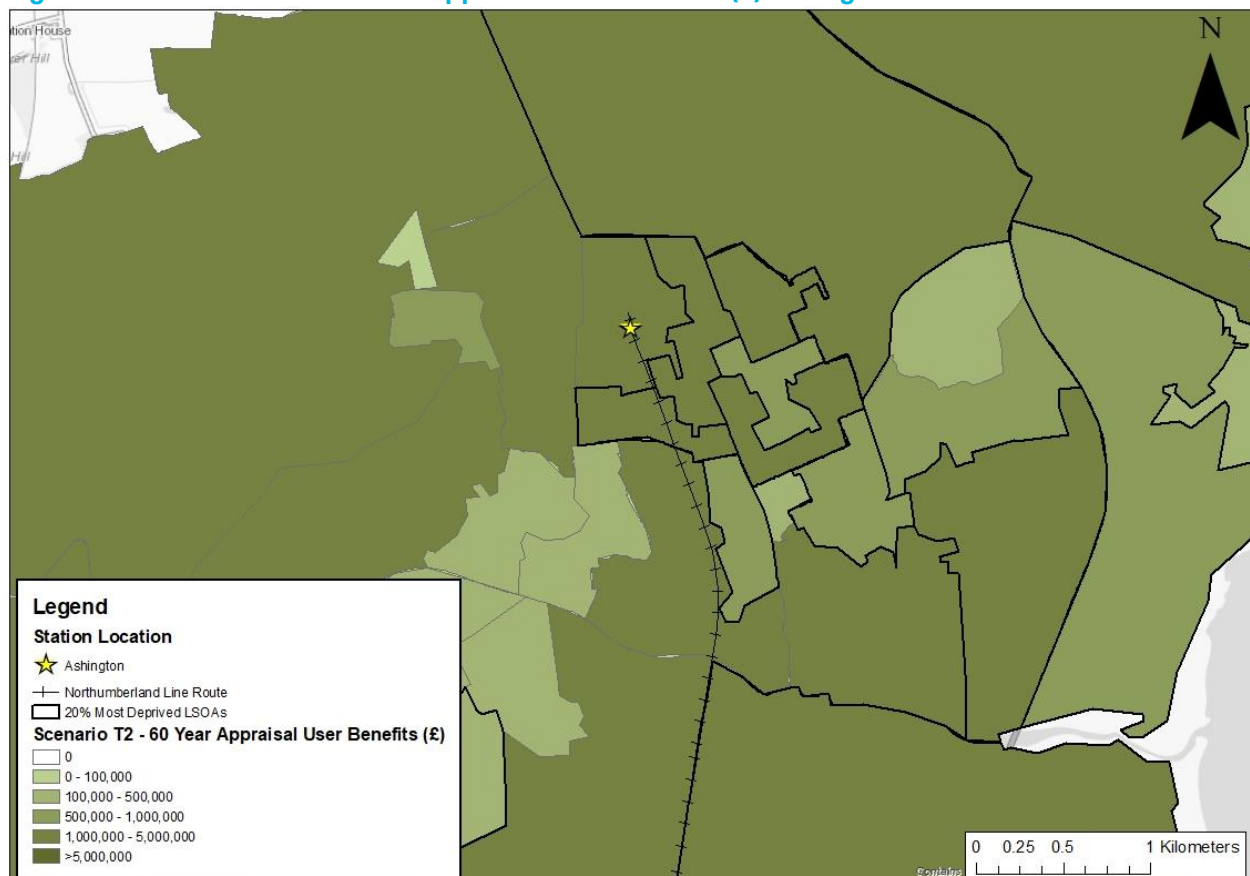


Figure A-10: Scenario T2 – 60 Year Appraisal User Benefits (£) Bedlington/Blyth



Figure A-11: Scenario T2 – 60 Year Appraisal User Benefits (£) Newsham

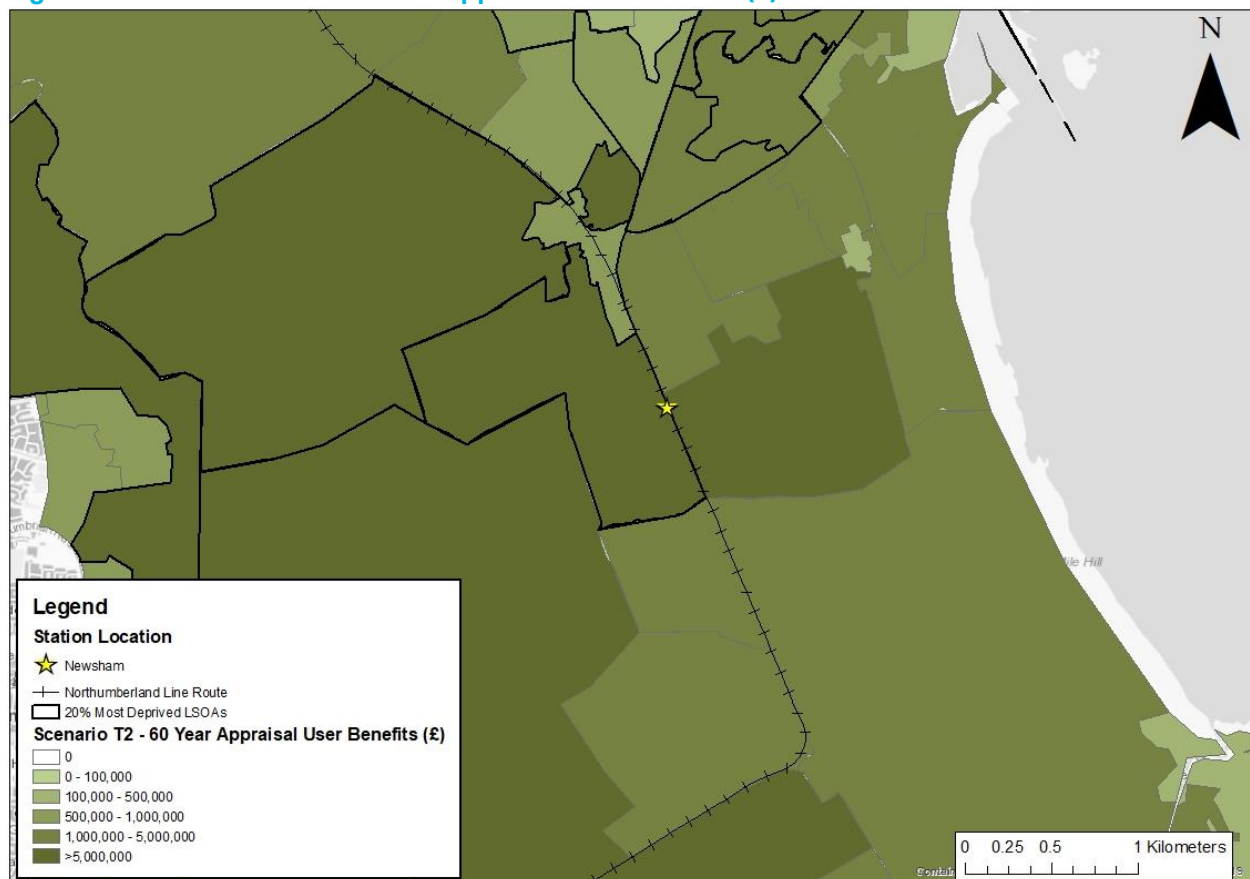
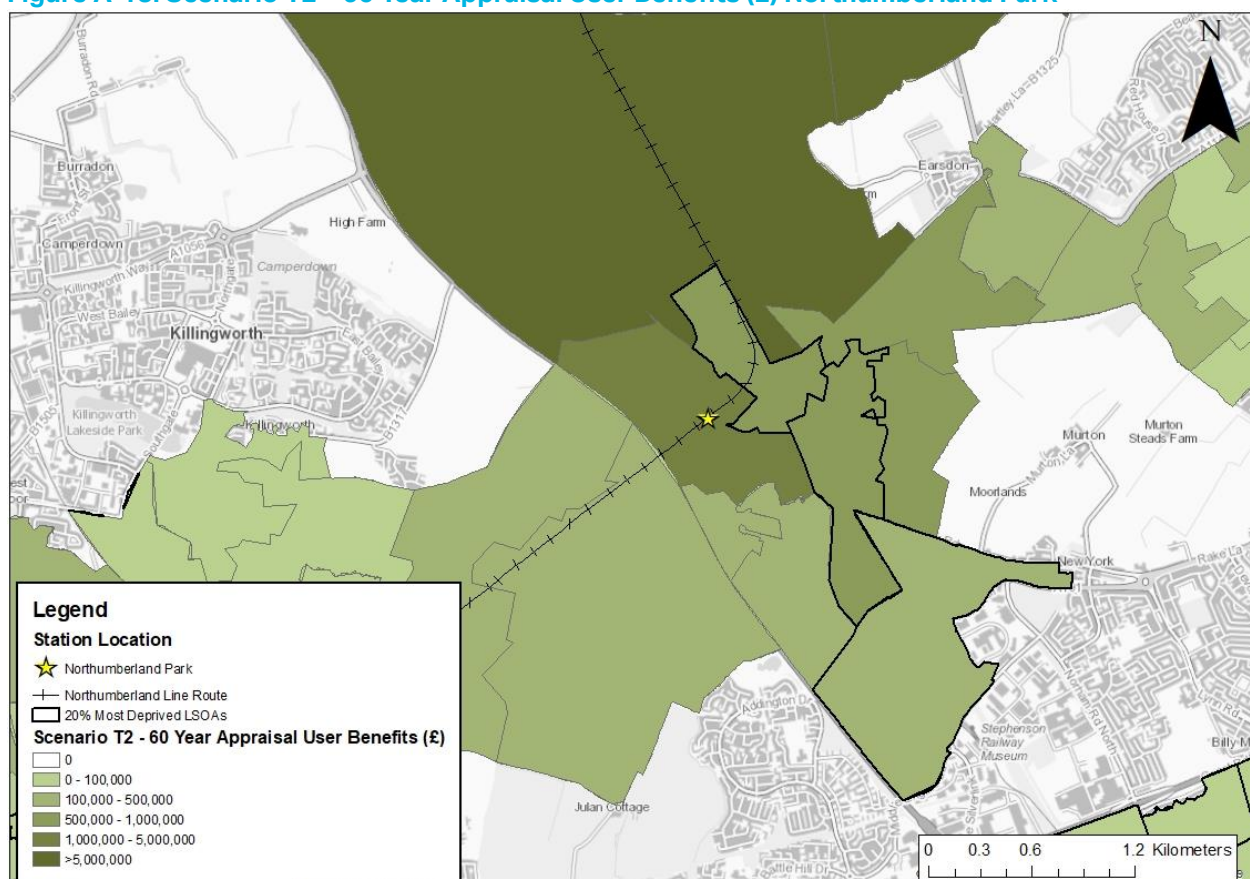


Figure A-12: Scenario T2 – 60 Year Appraisal User Benefits (£) Seaton Delaval



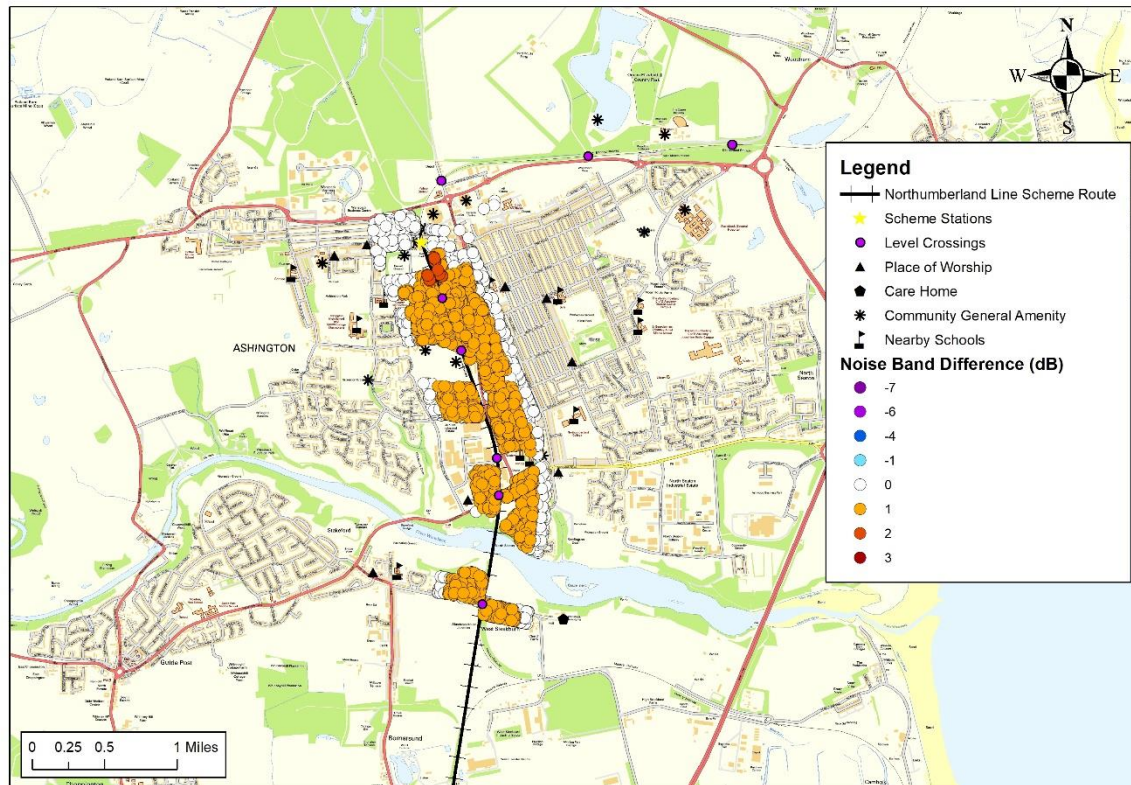
Figure A-13: Scenario T2 – 60 Year Appraisal User Benefits (£) Northumberland Park



Appendix B: Noise Maps

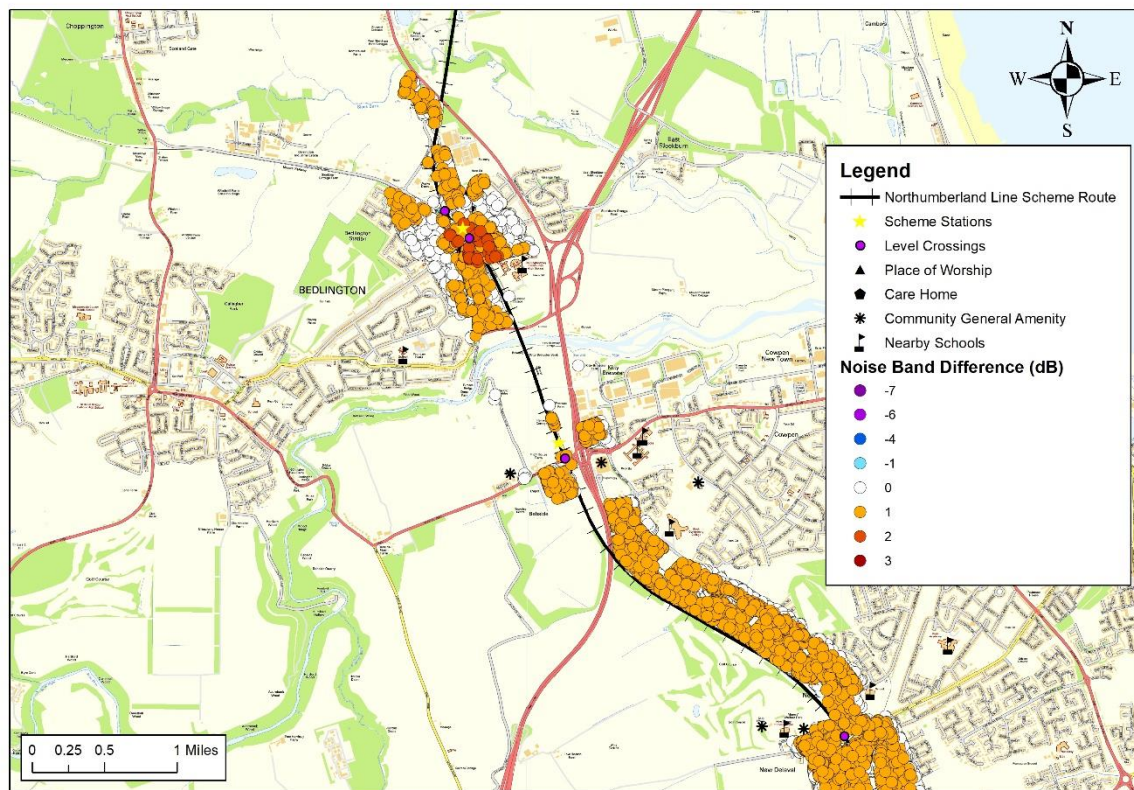
The following maps show the change in noise levels around each of the proposed stations along the Northumberland Line.

Figure B-1: Change between dB Noise Bands in Ashington



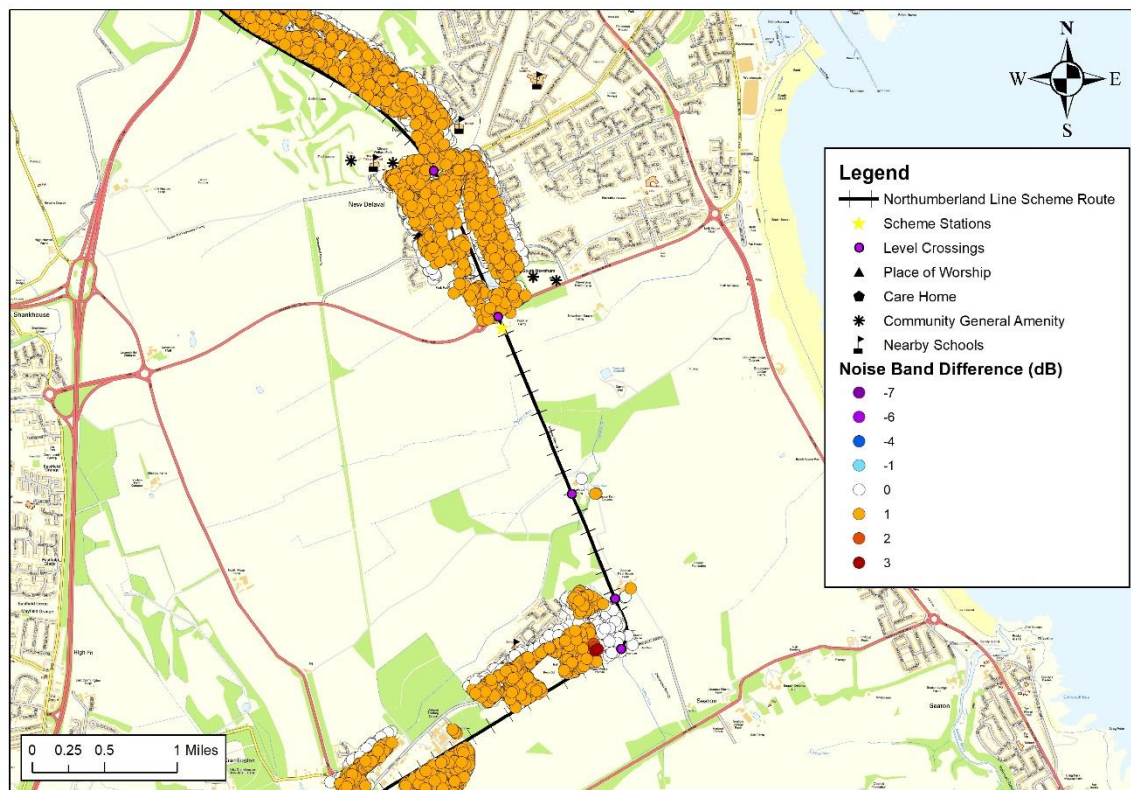
The implementation of the Northumberland Line would see a one noise band increase for dwellings in Ashington close to the railway line. A handful of dwellings close to the proposed station would see a two-band increase due to the impact of trains accelerating and braking into and out of the station.

Figure B-2: Change between dB Noise Bands in Bedlington and Blyth



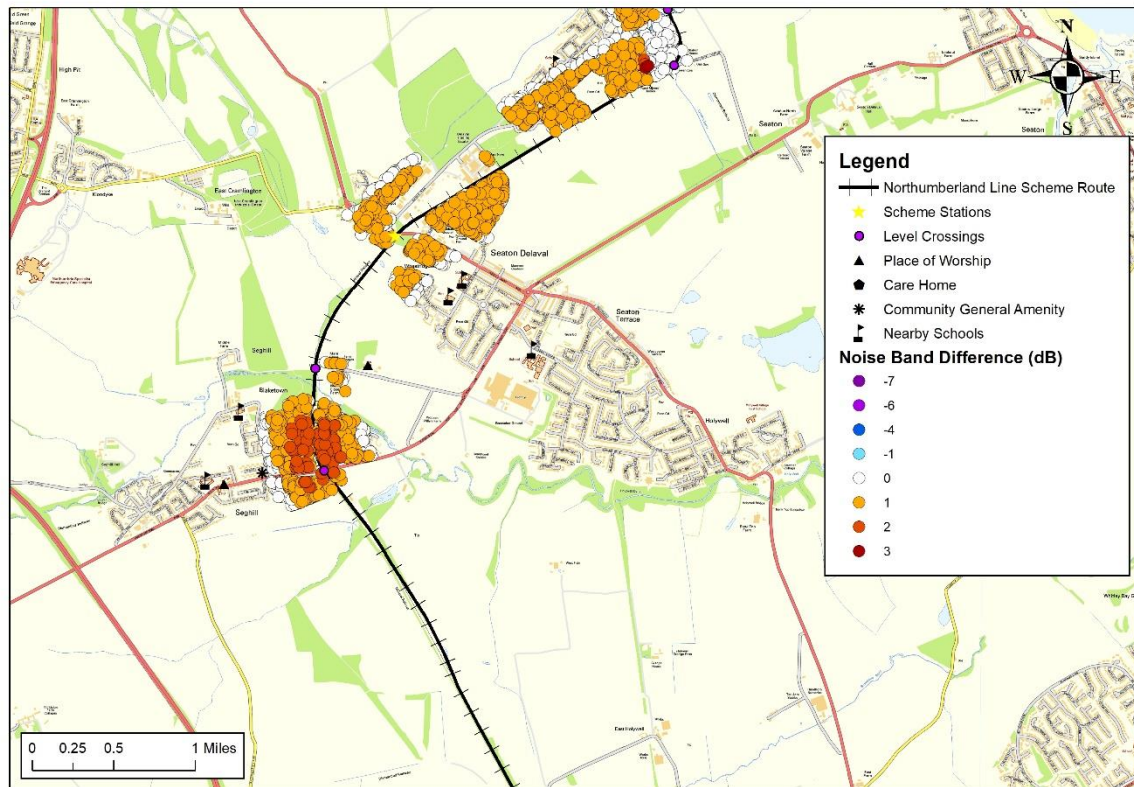
The most significant change in noise band is expected to be around Bedlington station as passenger services accelerate and brake coming into and out of the station. The impact on noise at the proposed Blyth Beside station is limited as it is not as heavily populated as other locations. For properties further afield from the station, there is only expected to be an increase in noise of 1 banding.

Figure B-3: Change between dB Noise Bands at Newsham



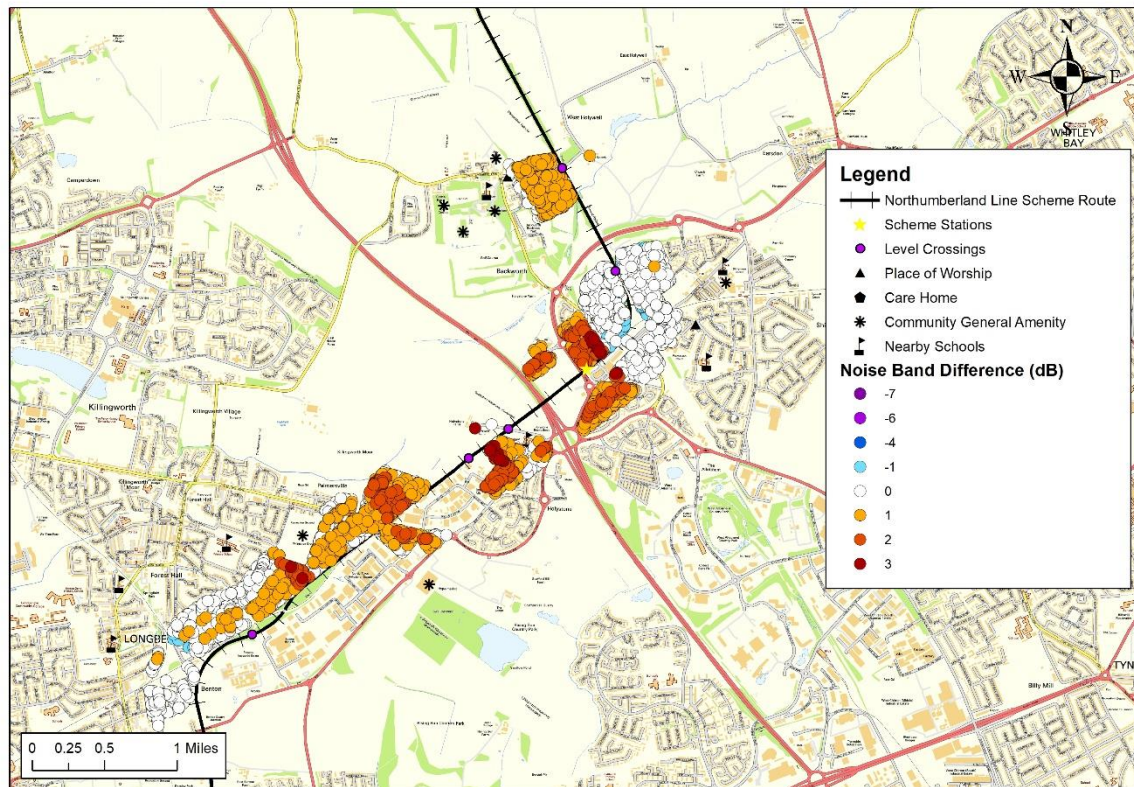
Dwellings in Newsham located along the railway line are projected to have a one noise band increase with the Northumberland Line scheme in place. A handful of properties close to the Hartley curve do see a reduction in noise levels, which is not visible on the map due to the density of dwellings in the area. The reduction in noise is due to the scheme reducing the requirement for locomotives to accelerate away from the Hartley Curve.

Figure B-4: The change in Db Noise Bands at Seaton Delaval



Most dwellings along the Northumberland Line route will experience a one noise band increase as a result of the scheme. The most significant increase in noise is located around the Seghill area, which is expected to see a two noise band increase in the area close to the level crossing.

Figure B-5: The change in Db Noise Bands at Northumberland Park



Close to Northumberland Park, several dwellings are forecast to have a three-noise band increase as a result of the scheme. Several dwellings close to the curve however, are expected to see a reduction in noise band as the scheme reduces the need for trains to accelerate out of the curve.

Appendix C: Severance Maps

The following maps show the walking catchment areas of key services and facilities that will be impacted by an increase in downtime of level crossings along the Northumberland Line scheme

Figure C-1: Walking Catchment Areas of Schools in Ashington and Number of Children

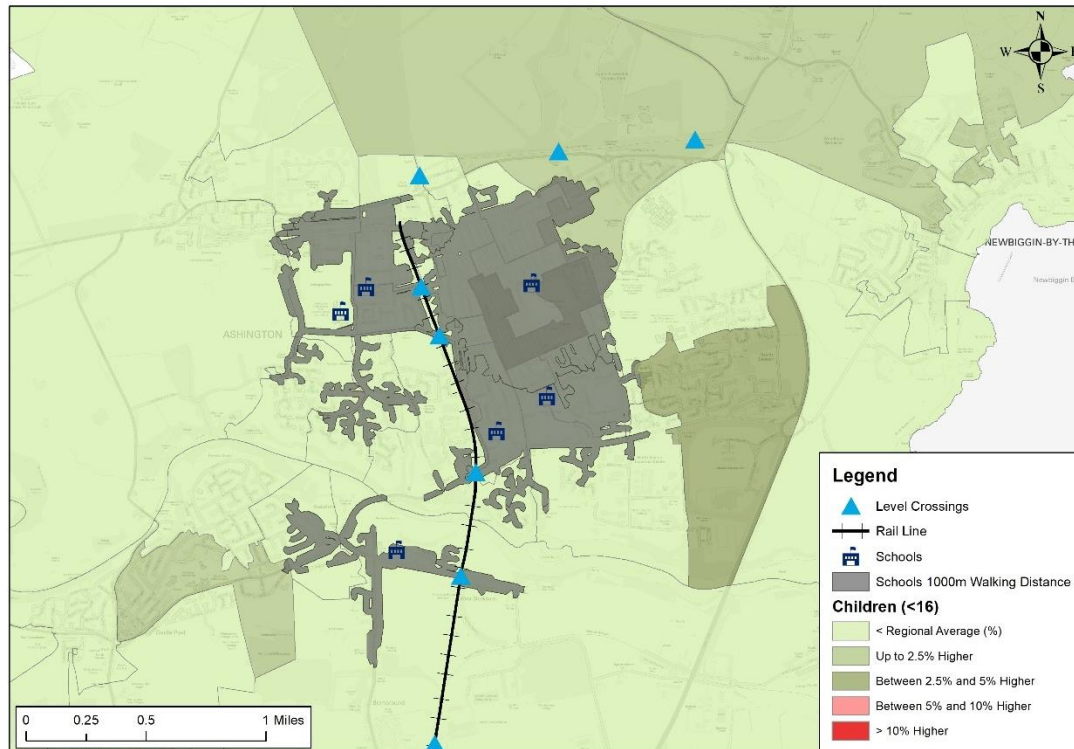


Figure C-2: Walking Catchment Areas of Schools in Bedlington and Blyth and Number of Children

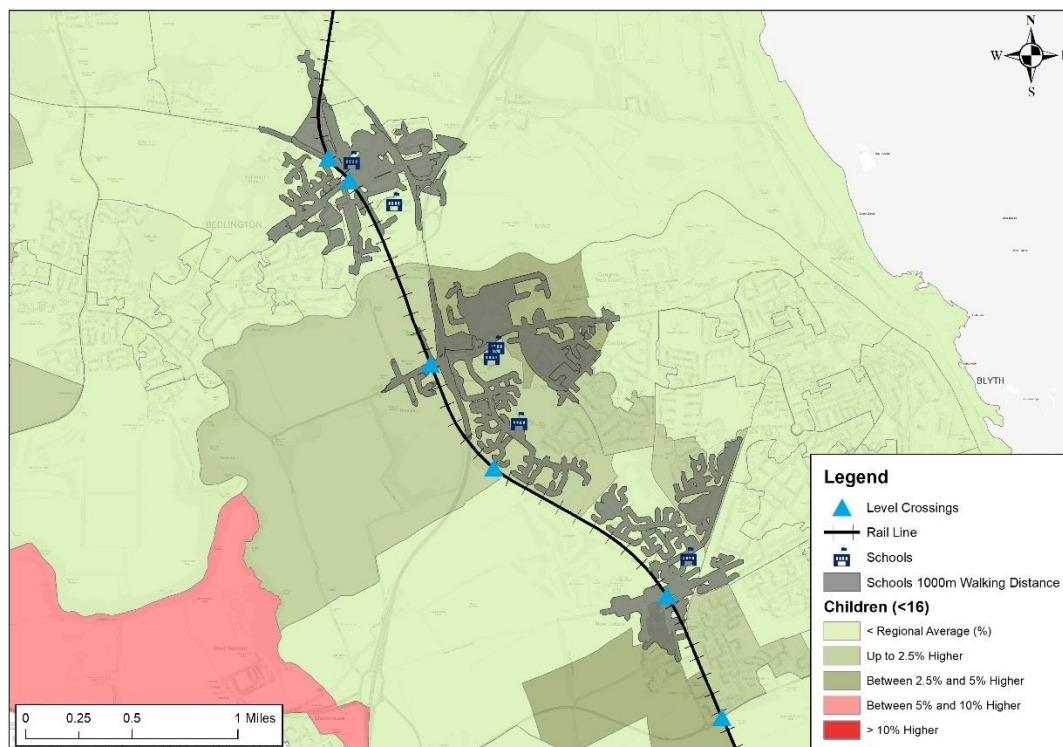


Figure C-3: Walking Catchment Areas of Shops in Ashington and Elderly

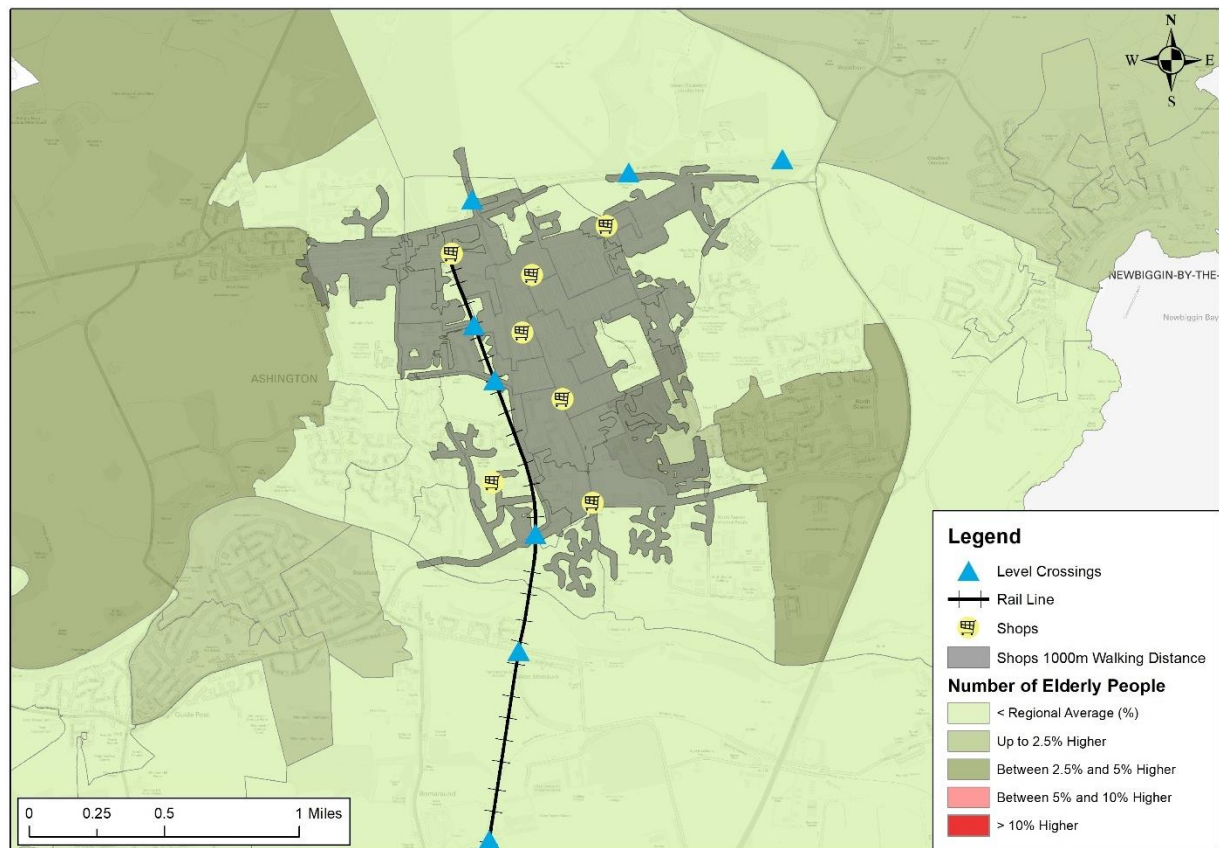


Figure C-4: Walking Catchment Areas of Shops in Ashington and Disabled

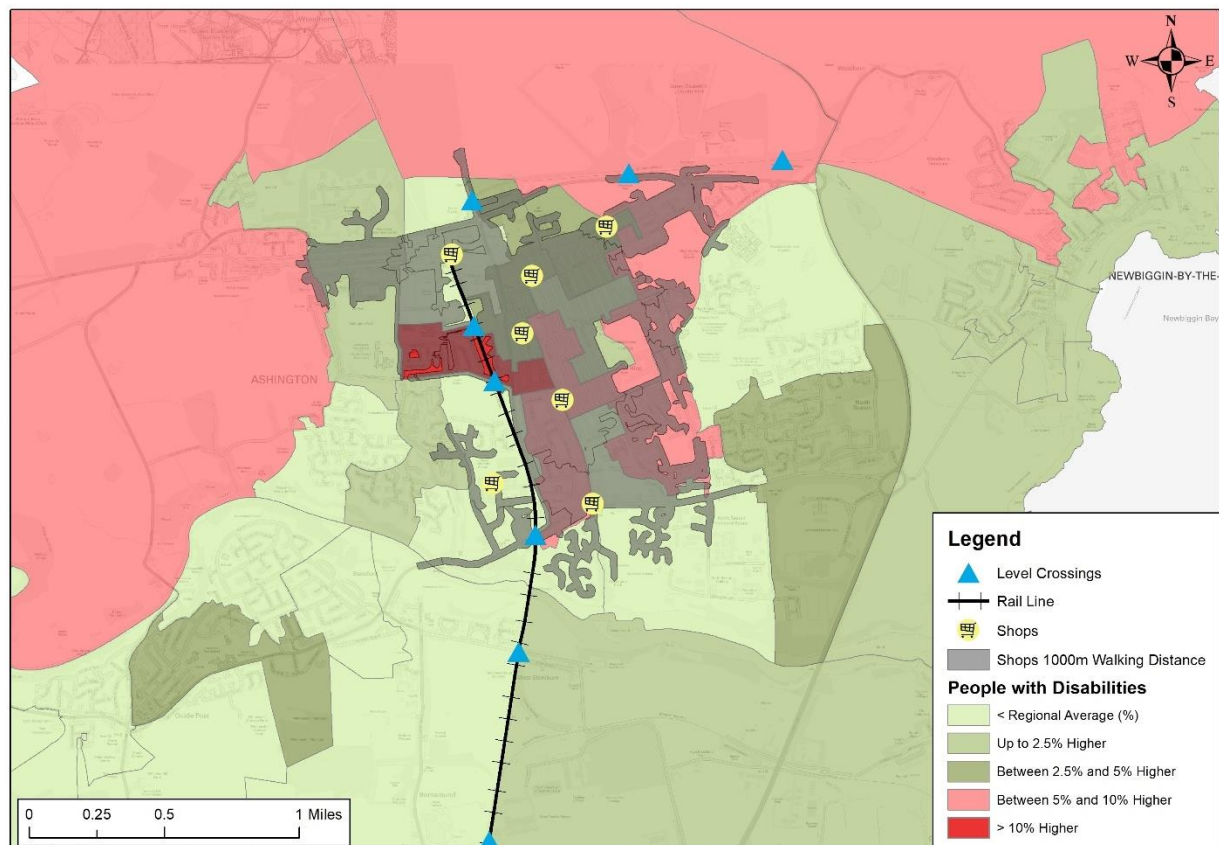


Figure C-5: Walking Catchment Areas of Shops in Ashington and No Car Ownership

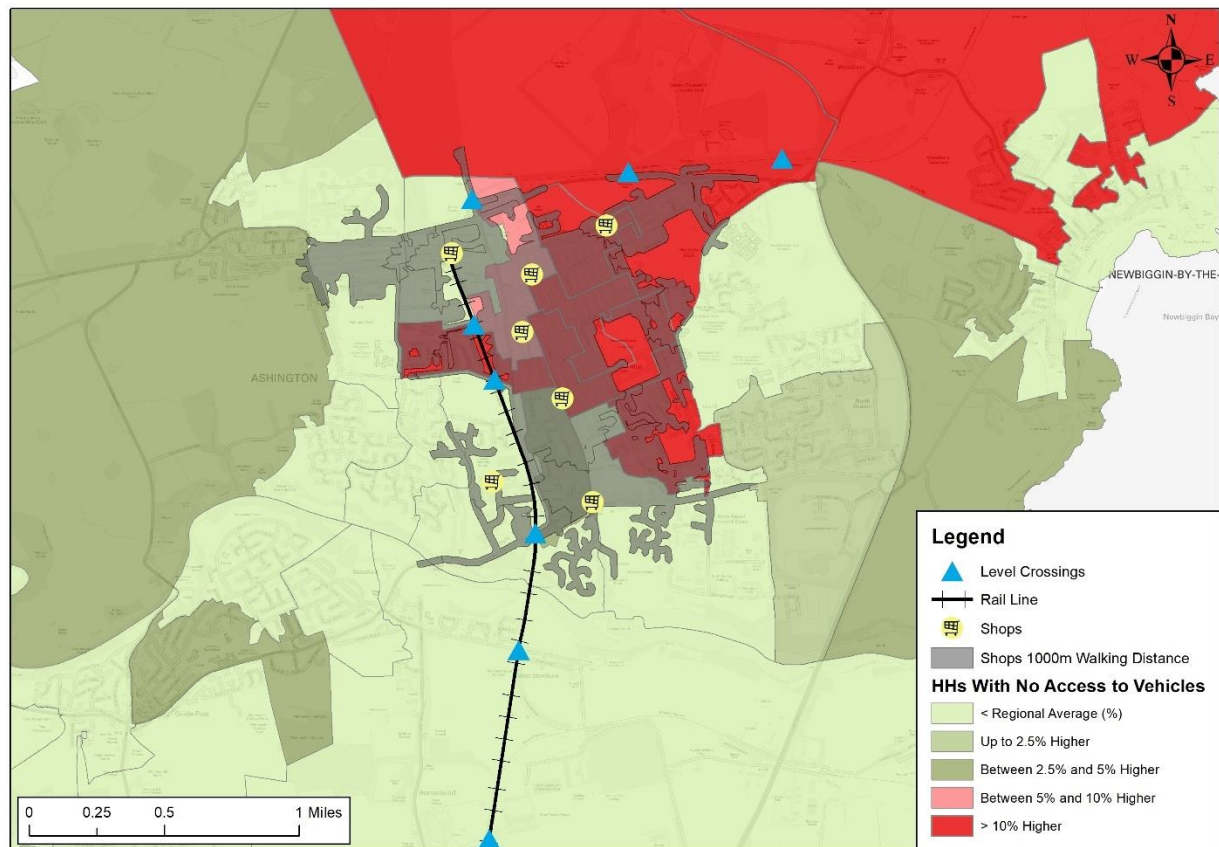


Figure C-6: Walking Catchment Areas of Shops in Bedlington/Blyth and Elderly

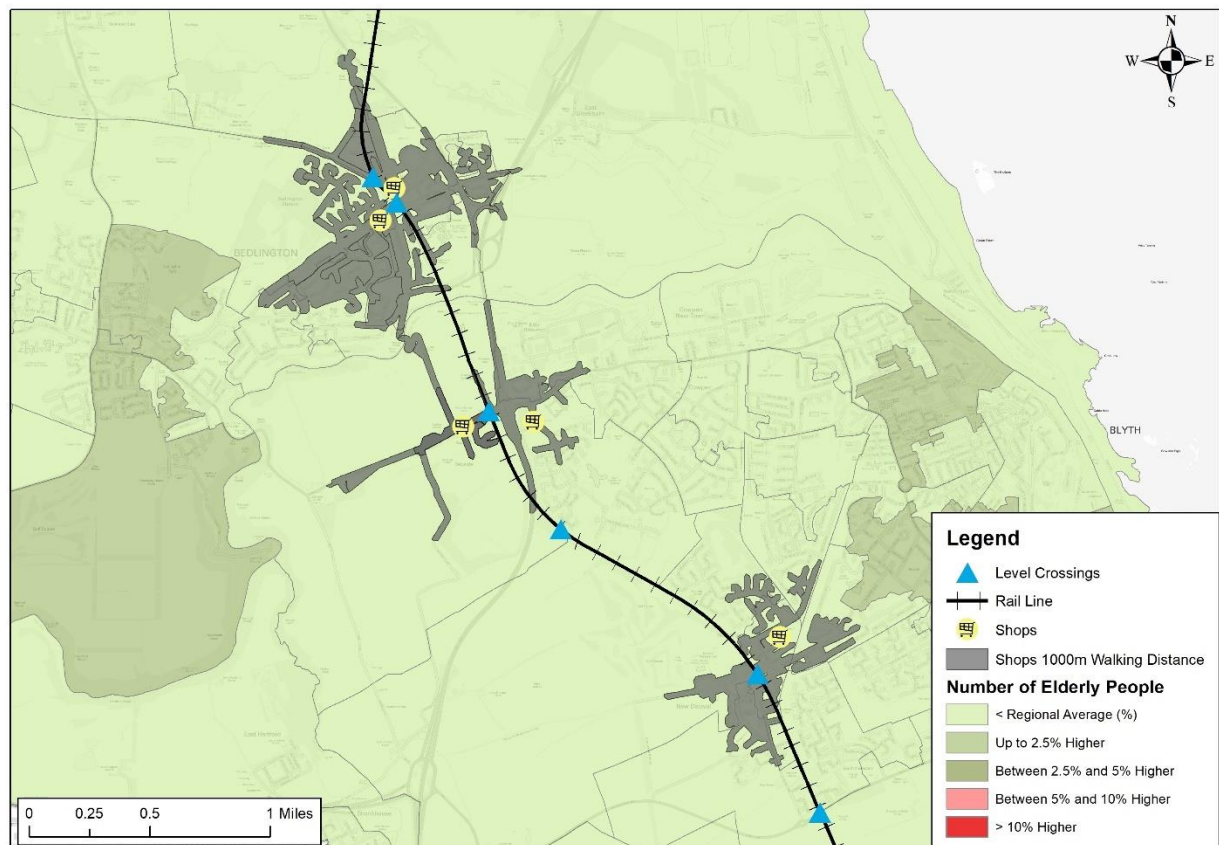


Figure C-7: Walking Catchment Areas of Shops in Bedlington/Blyth and Disabled

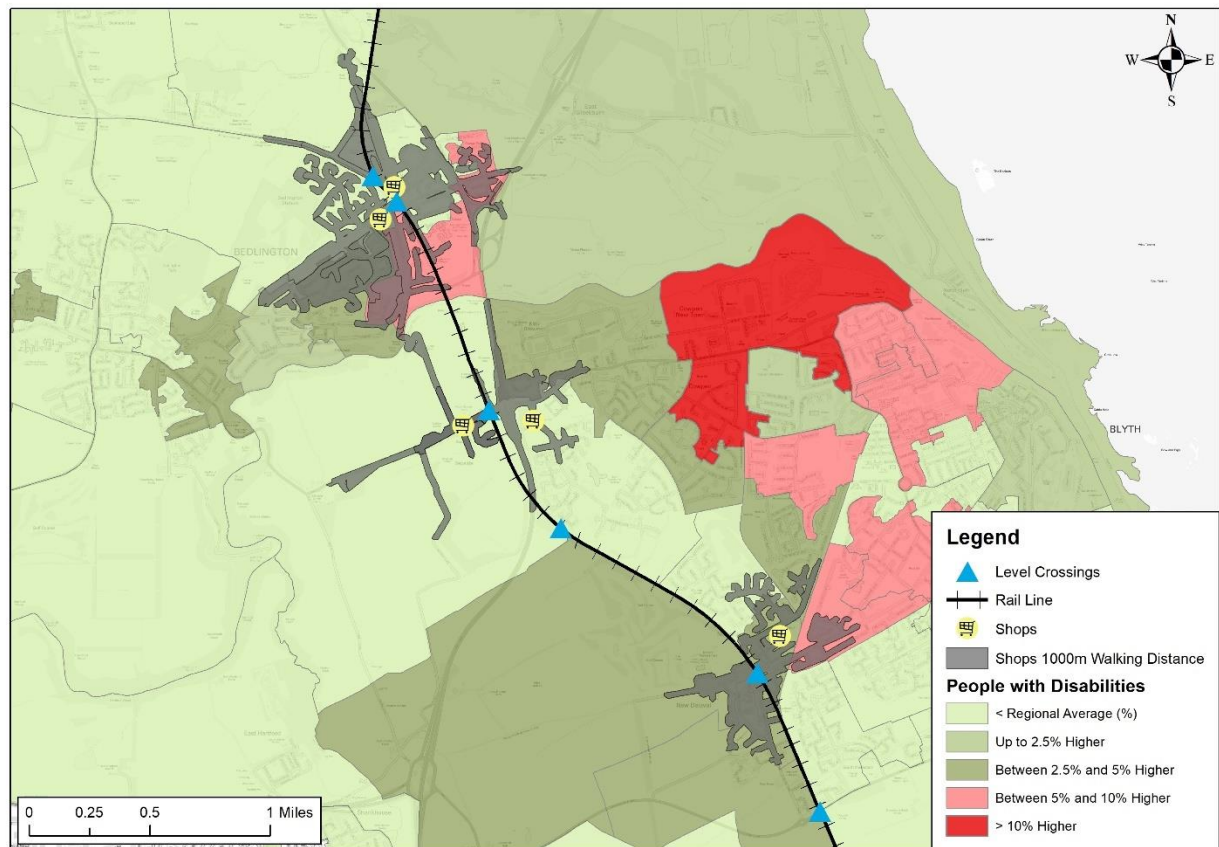


Figure C-8: Walking Catchment Areas of Shops in Bedlington/Blyth and No Car Ownership

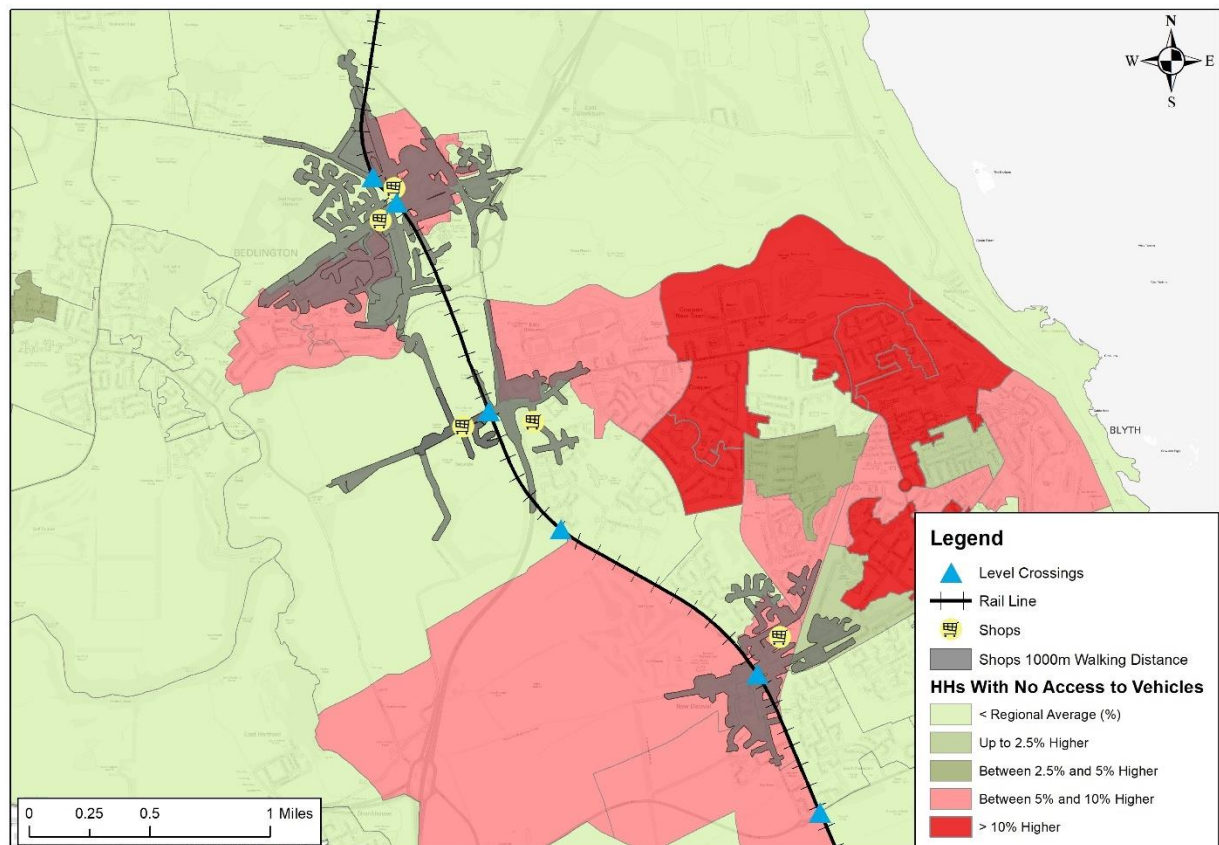


Figure C-9: Walking Catchment Areas of Shops in Seaton Delaval and Elderly

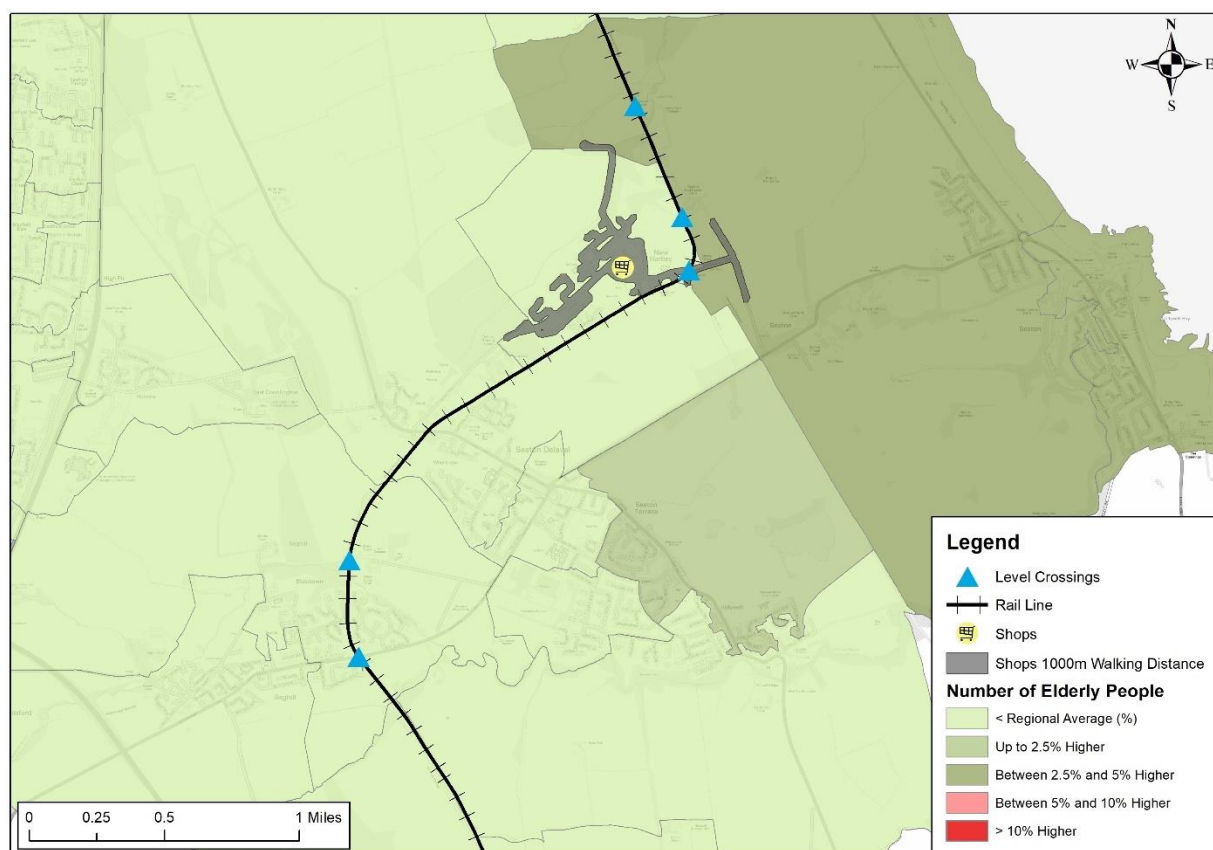


Figure C-10: Walking Catchment Areas of Shops in Seaton Delaval and Disabled

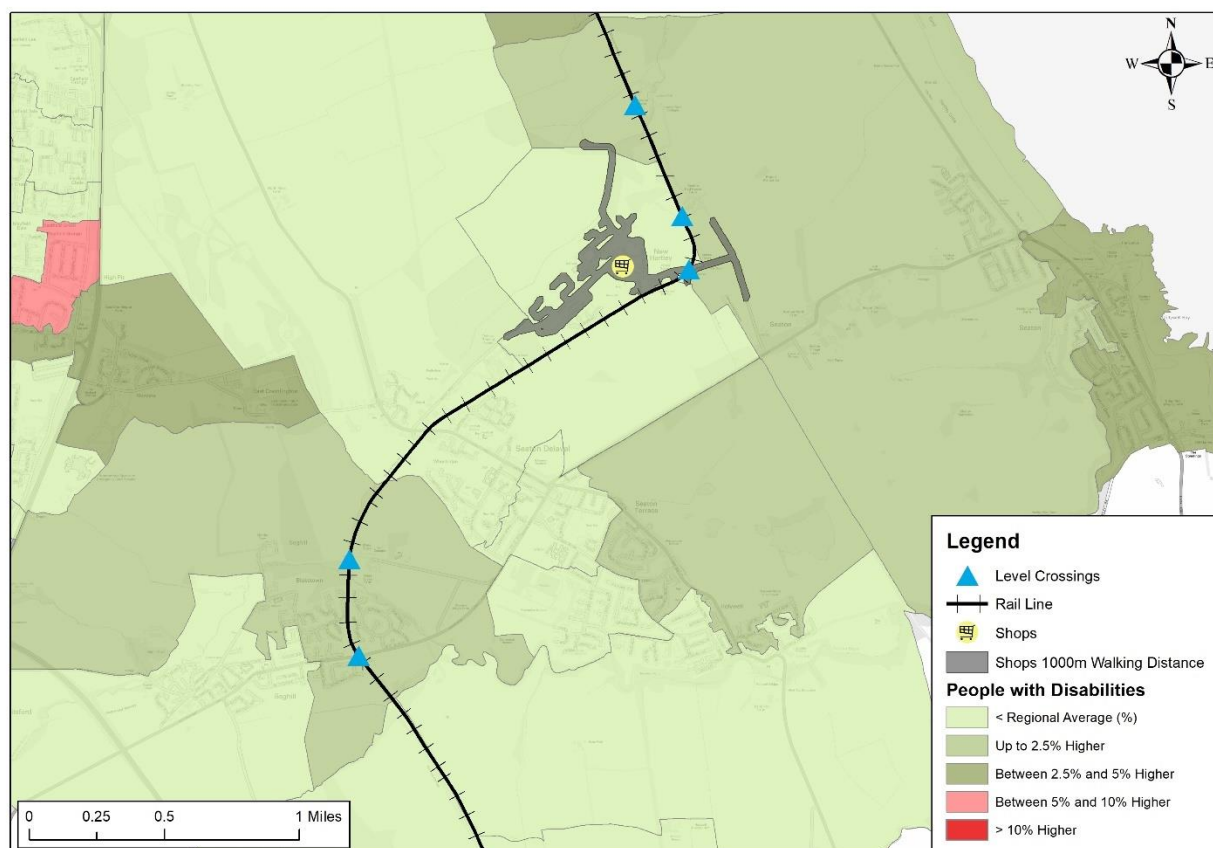


Figure C-11: Walking Catchment Areas of Shops in Seaton Delaval and No Car Ownership



Figure C-12: Walking Catchment Areas of GP Surgeries in Ashington and Elderly

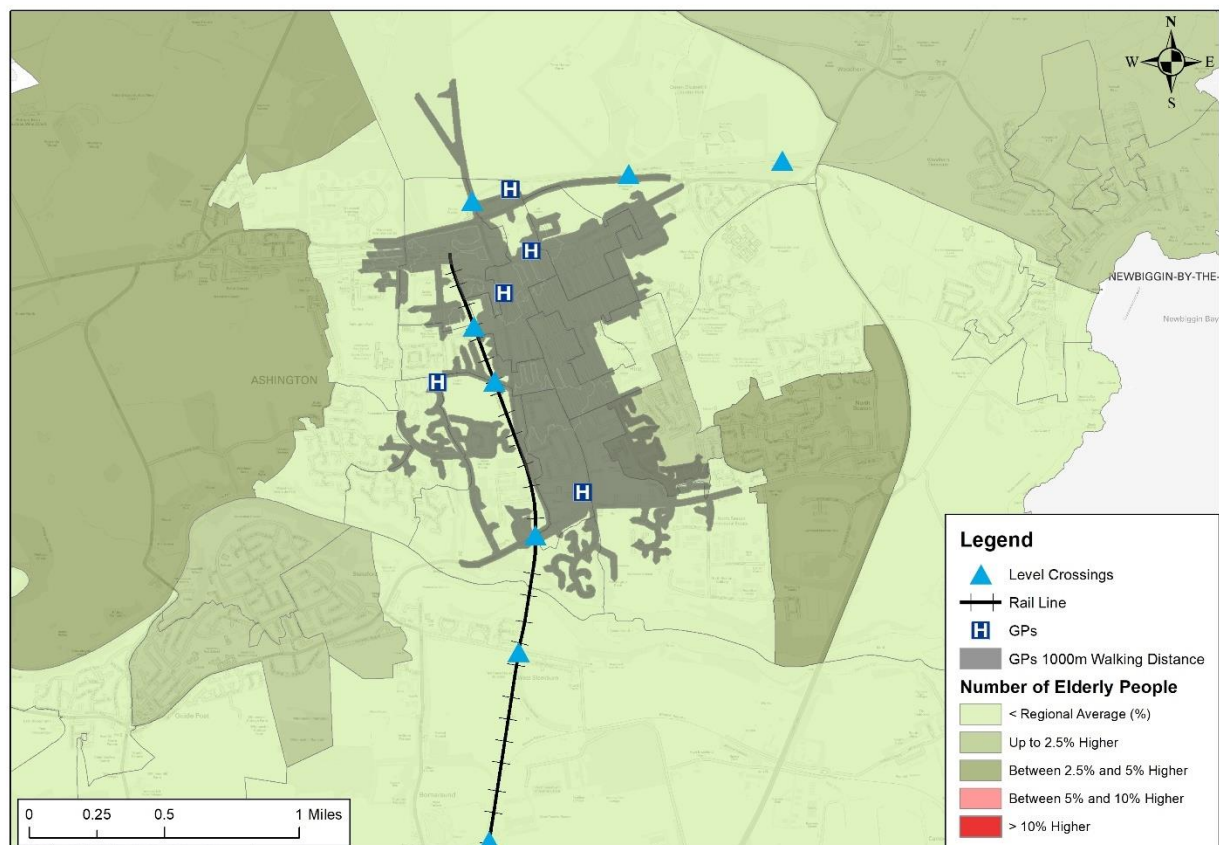


Figure C-13: Walking Catchment Areas of GP Surgeries in Ashington and Disabled

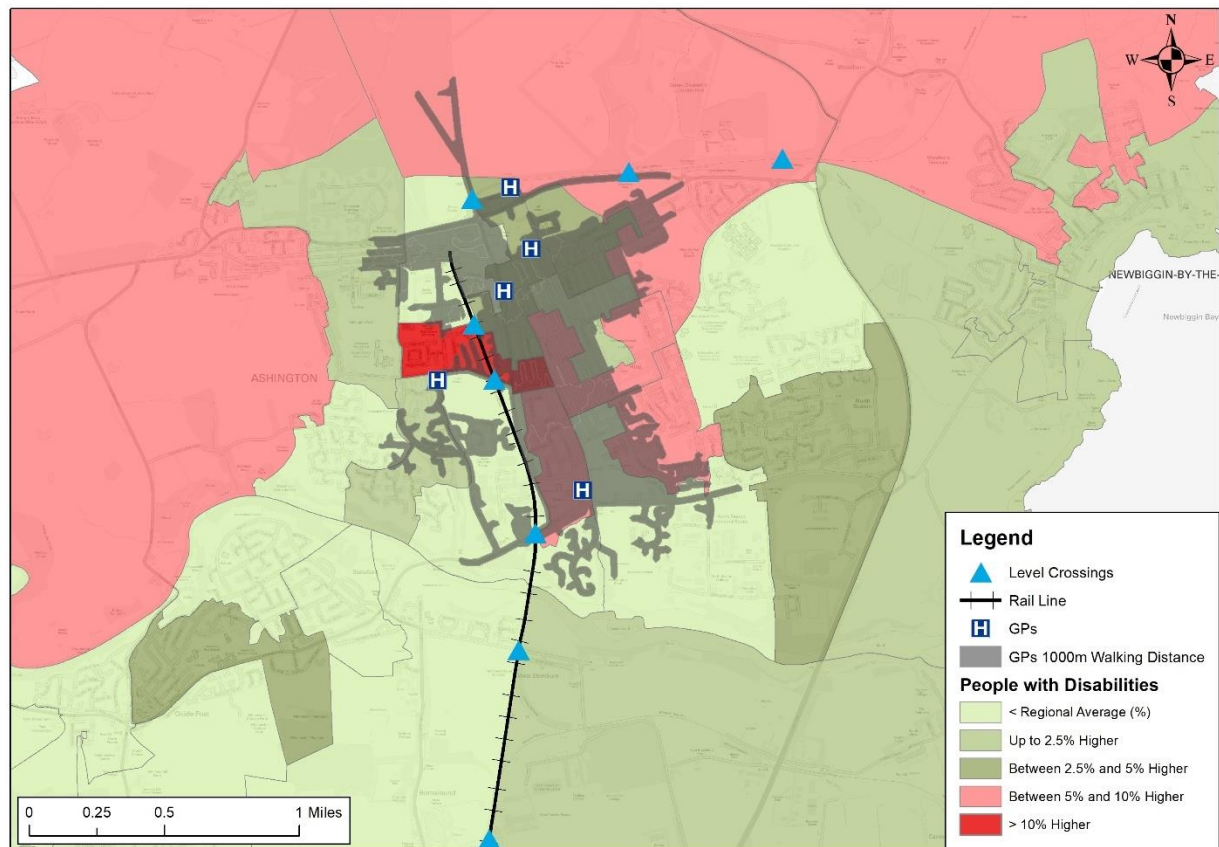


Figure C-14: Walking Catchment Areas of GP Surgeries in Bedlington/Blyth and Elderly



Figure C-15: Walking Catchment Areas of GP Surgeries in Bedlington/Blyth and Disabled

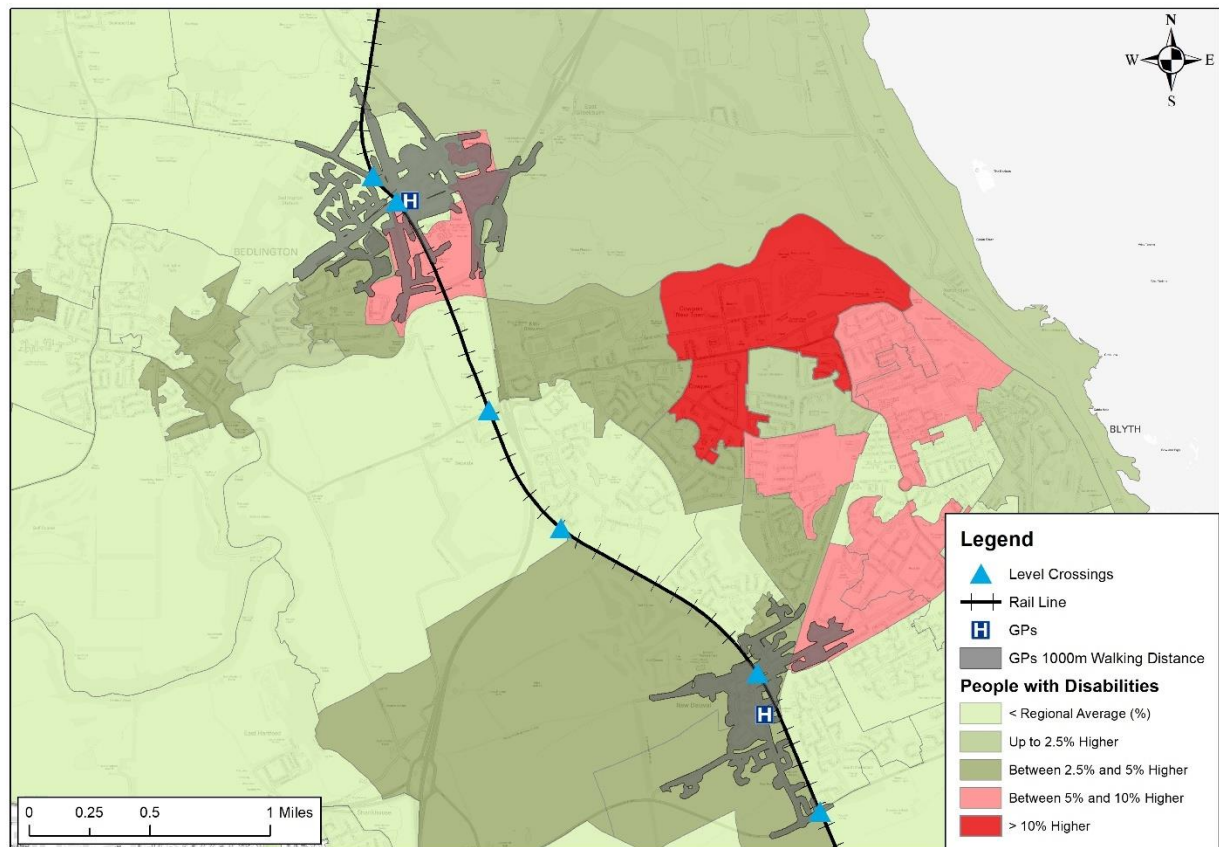


Figure C-16: Walking Catchment Areas of GP Surgeries in Seaton Delaval and Elderly

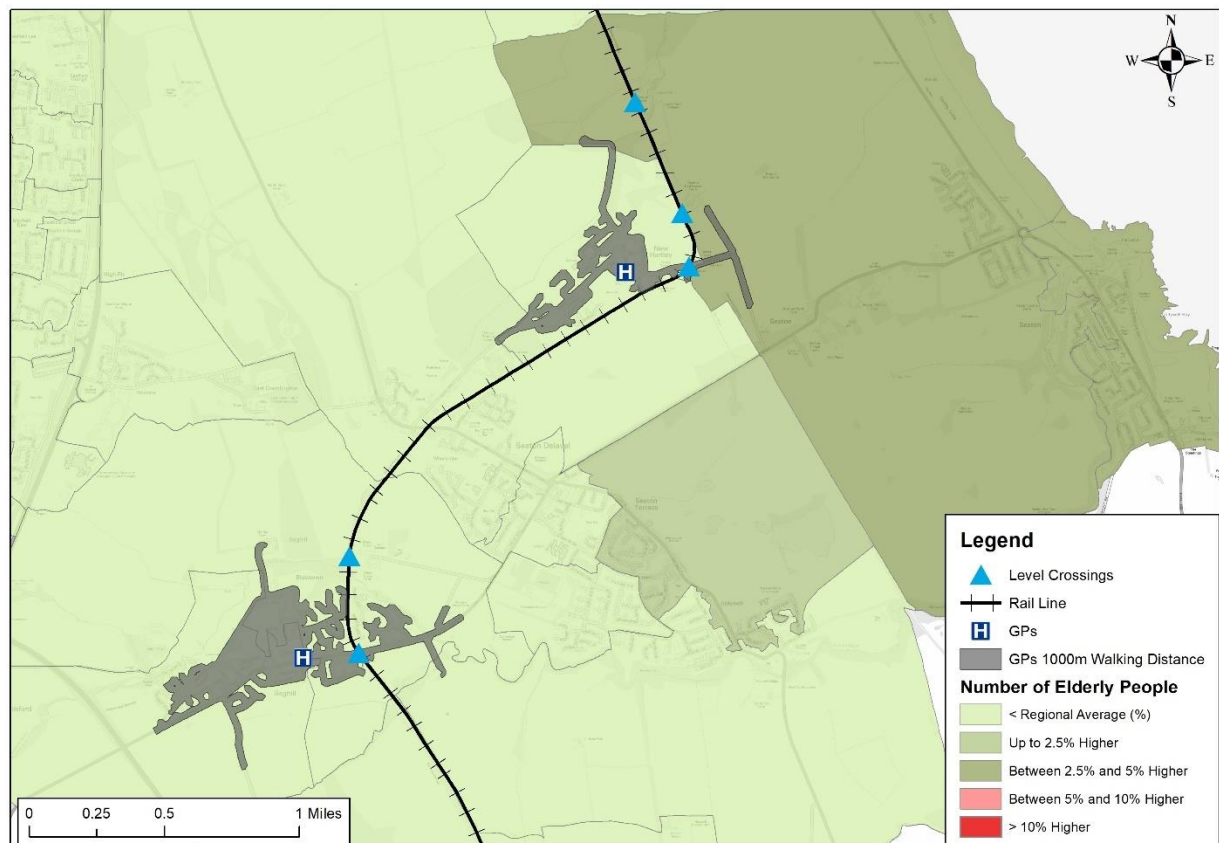
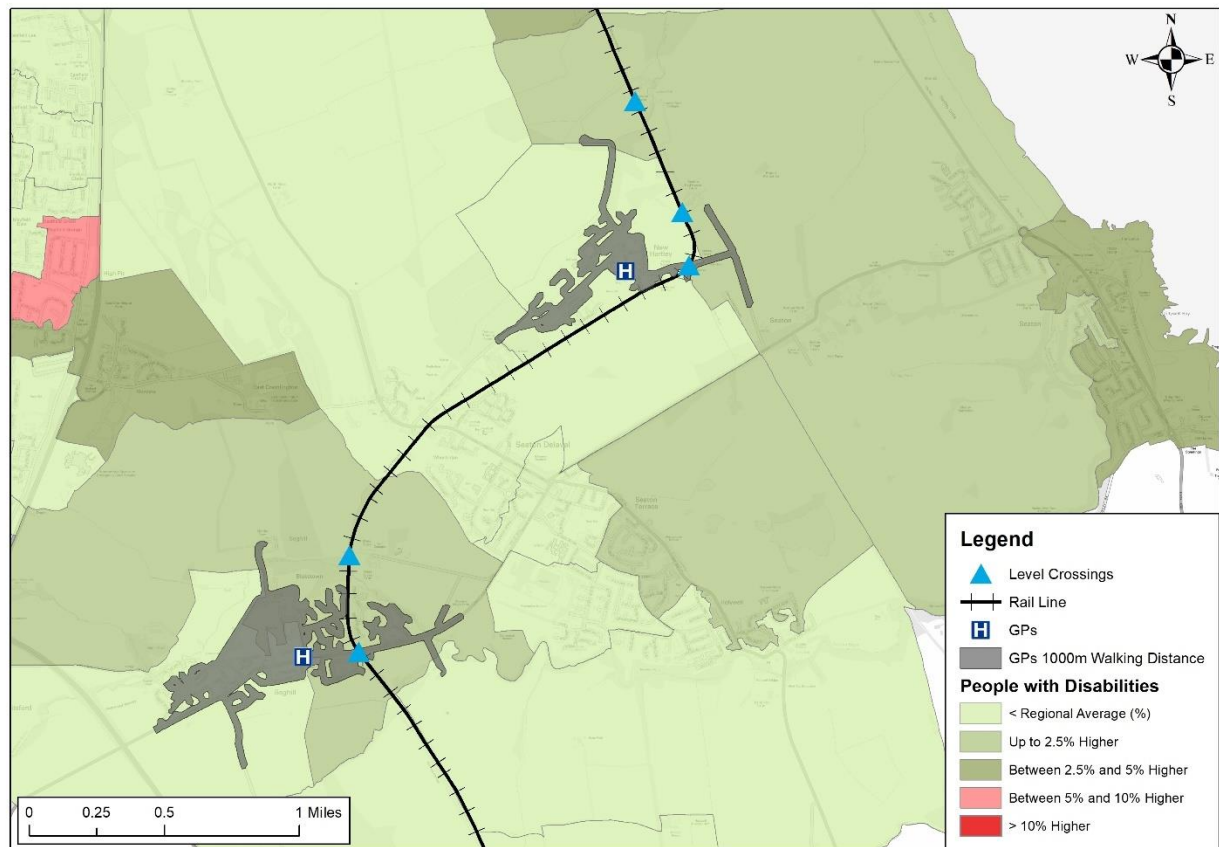


Figure C-17: Walking Catchment Areas of GP Surgeries in Seaton Delaval and Disabled



Appendix D: Accessibility Maps

The following maps show the change in public transport accessibility around each of the proposed stations along the Northumberland Line in the AM peak

Figure D-1: Existing Public Transport Accessibility from Ashington to Newcastle Central Station

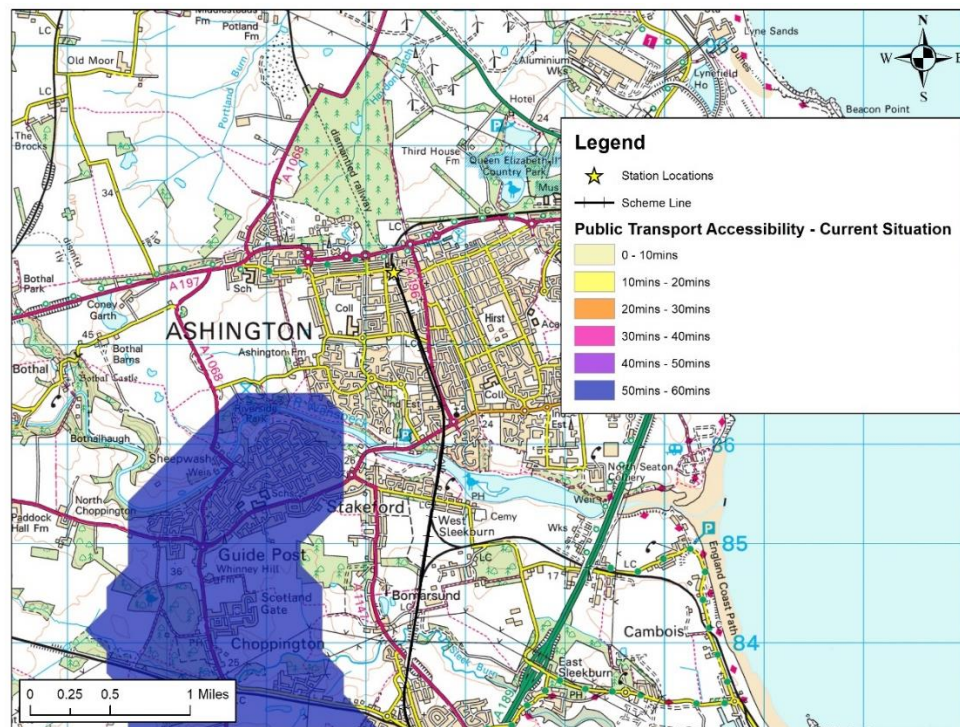
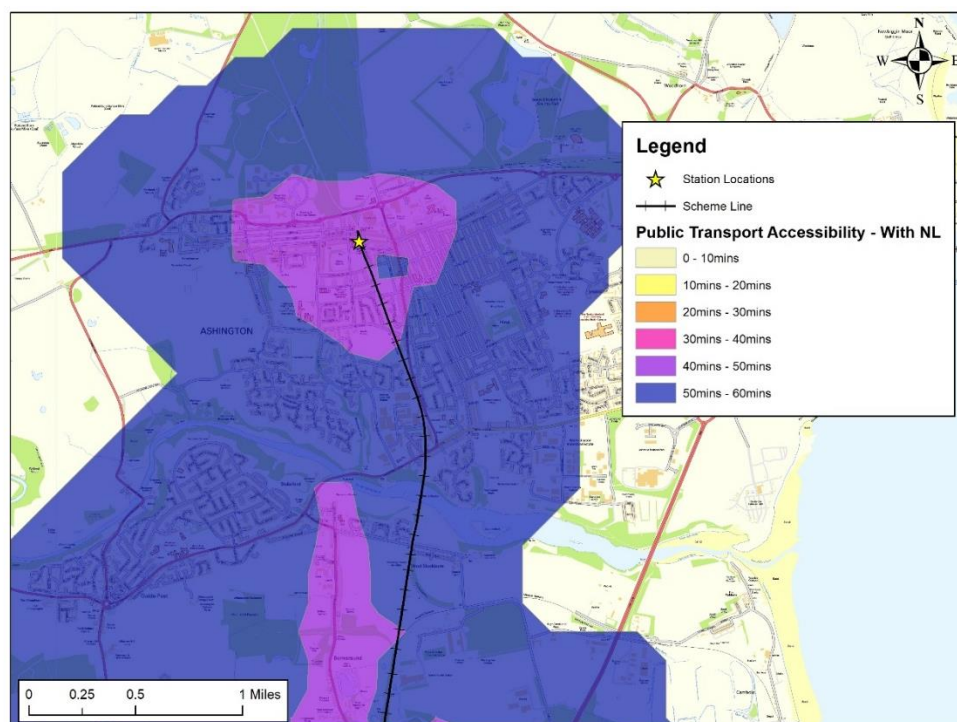


Figure D-2: Proposed Public Transport Accessibility from Ashington to Newcastle Central Station



The Northumberland scheme will result in a larger area of Ashington being able to access Newcastle Central Station within one hour.

Figure D-3: Existing Public Transport Accessibility from Bedlington and North Blyth to Newcastle Central Station

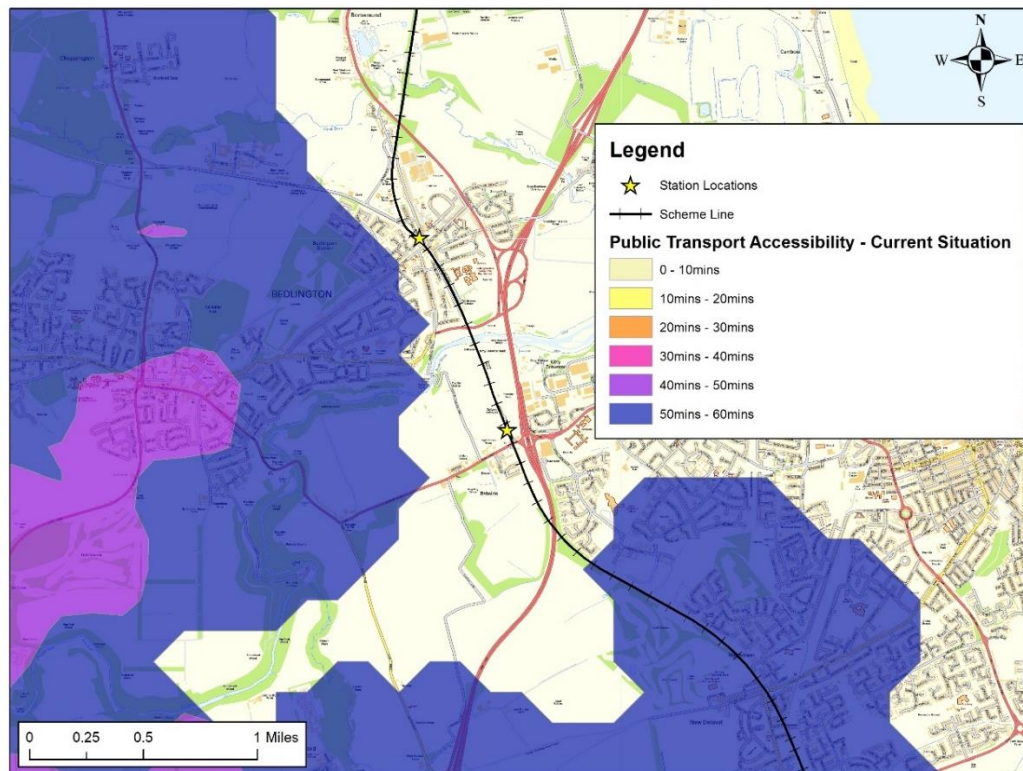
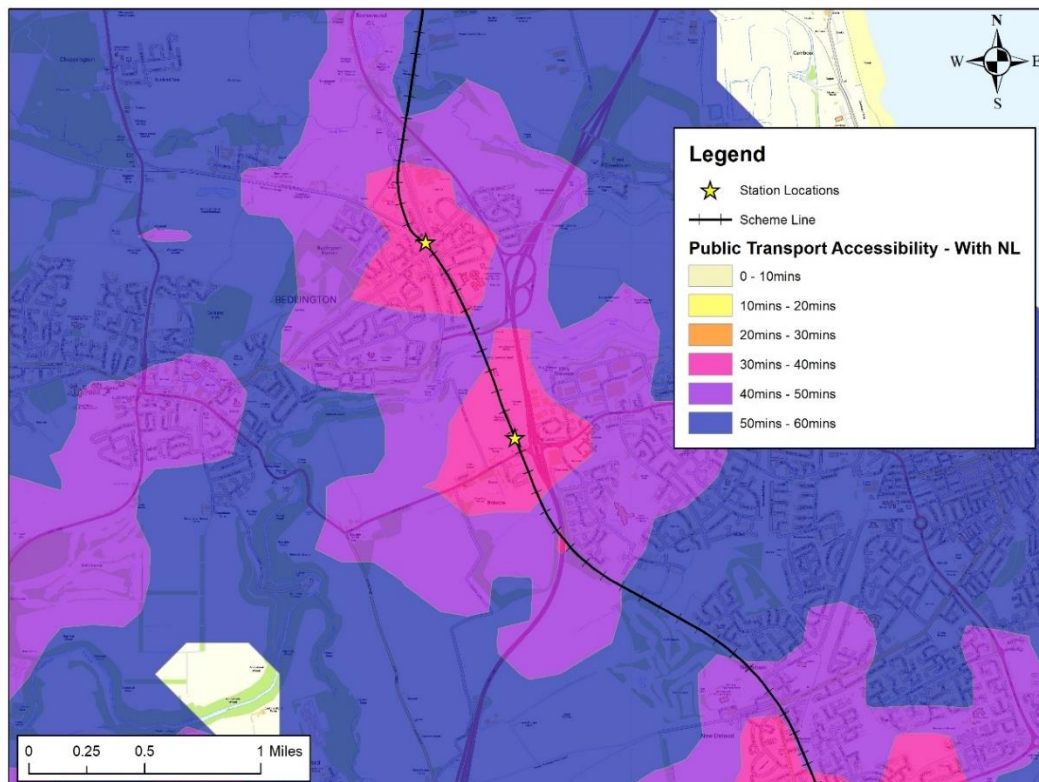


Figure D-4: Proposed Public Transport Accessibility from Bedlington and North Blyth to Newcastle Central Station



There is a noticeable improvement in public transport accessibility with the scheme in place. Taking into account walking time, areas closest to the station can access Newcastle Central Station with 30-40 minutes.

Figure D-5: Existing Public Transport Accessibility from Newsham to Newcastle Central Station

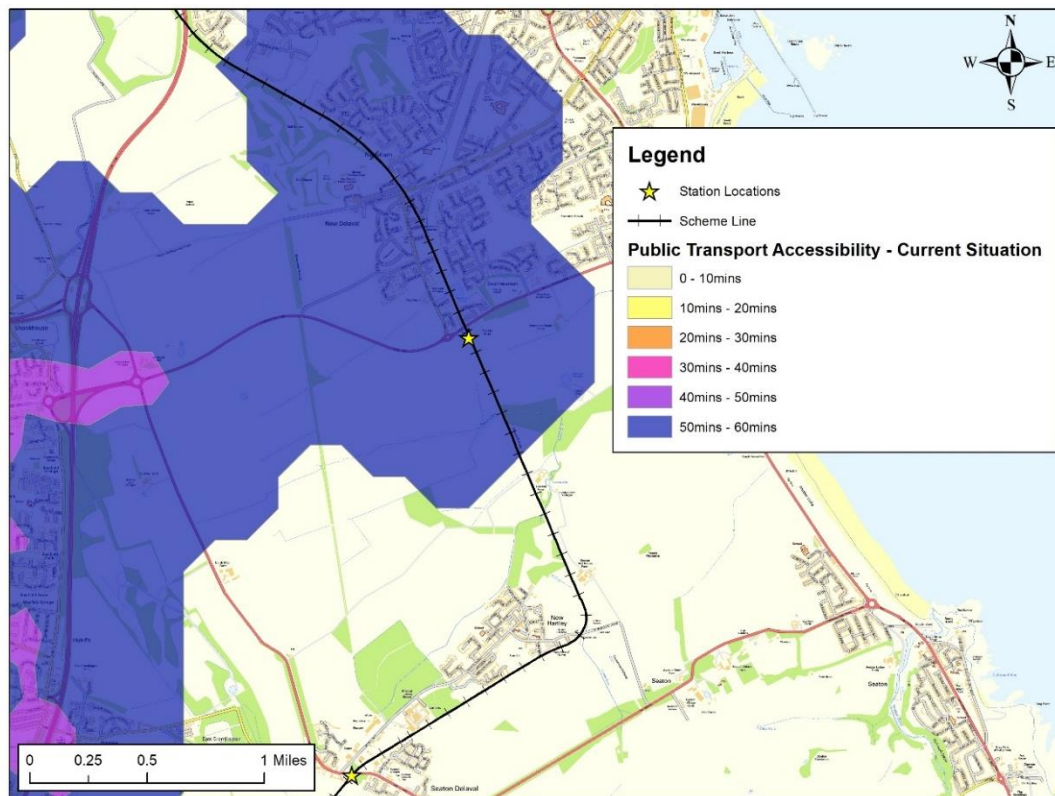
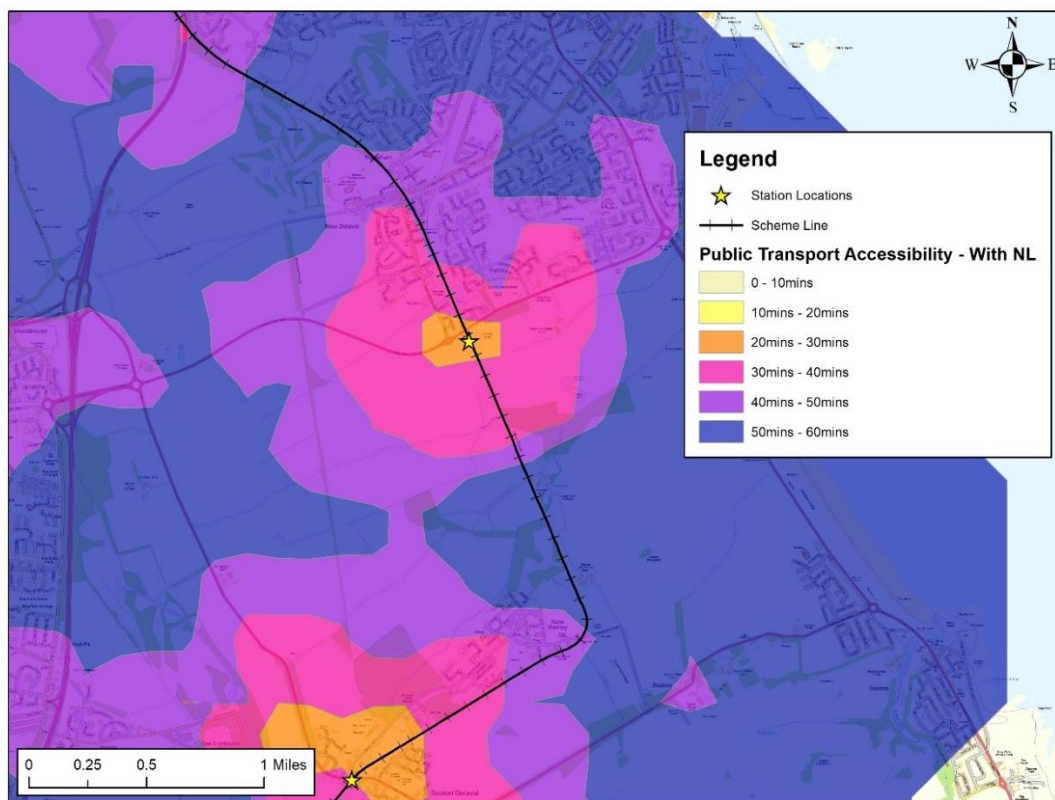


Figure D-6: Proposed Public Transport Accessibility from Newsham to Newcastle Central Station



With the addition of the Northumberland Line for passenger services, the population of Newsham would be able to access Central Station within 20 to 30 minutes. The journey times would be reduced by around 50% for journeys made by public transport, compared to the current situation. The scheme has also opened access to the surrounding area of Newsham.

Figure D-7: Existing Public Transport Accessibility from Seaton Delaval to Newcastle Central Station

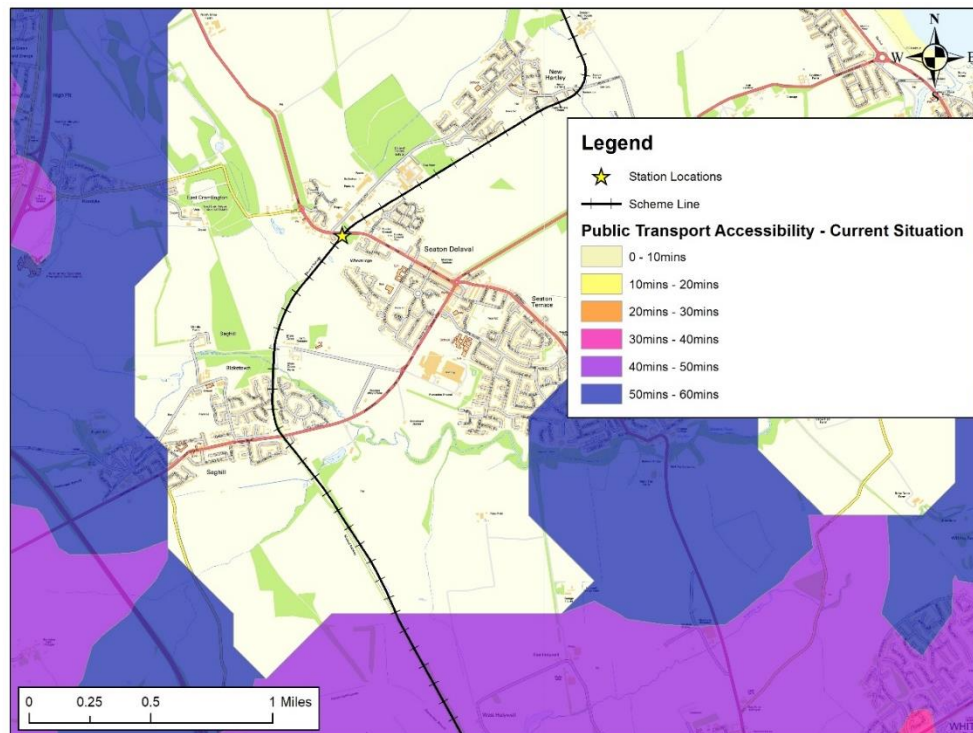
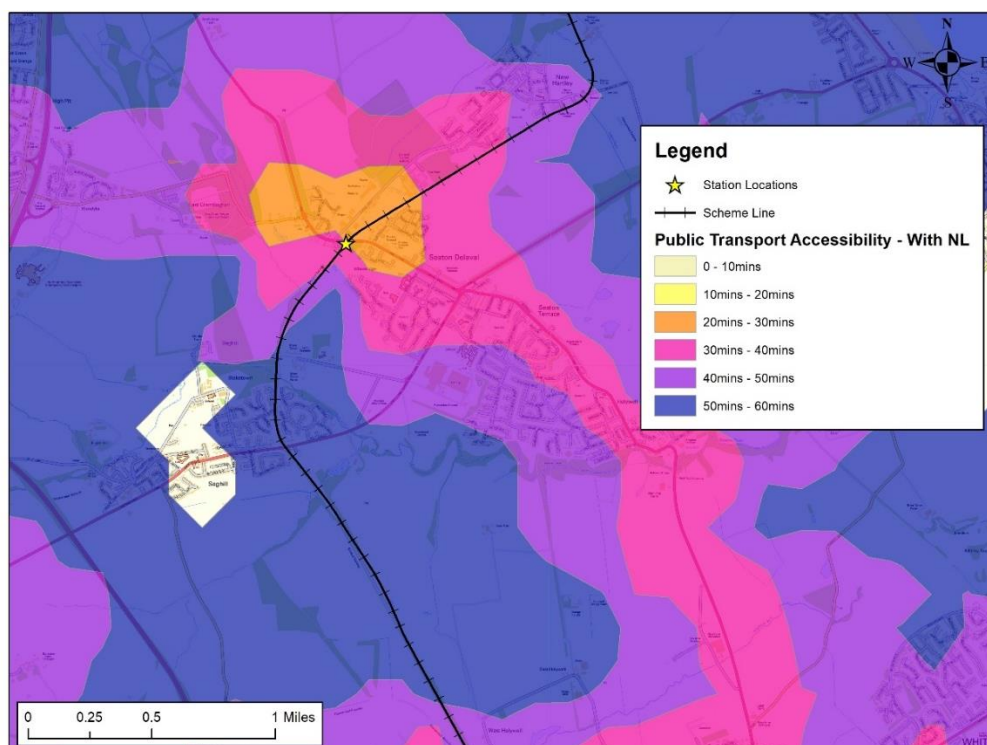


Figure D-8: Proposed Public Transport Accessibility from Seaton Delaval to Newcastle Central Station



With the addition of the Northumberland Line, Seaton Delaval would see a significant improvement in accessibility. The area in the vicinity of the station would see journey times to Central station of between 20 to 30 minutes. Improvements to the highway network to access the station will be needed.

Figure D-9: Existing Public Transport Accessibility from Northumberland Park to Newcastle Central Station

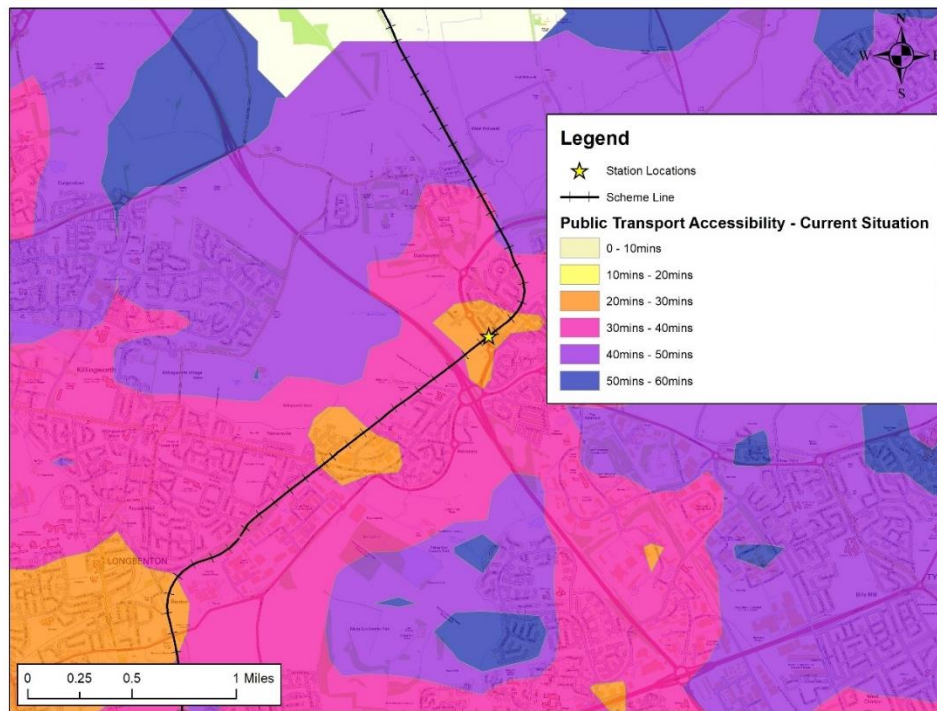
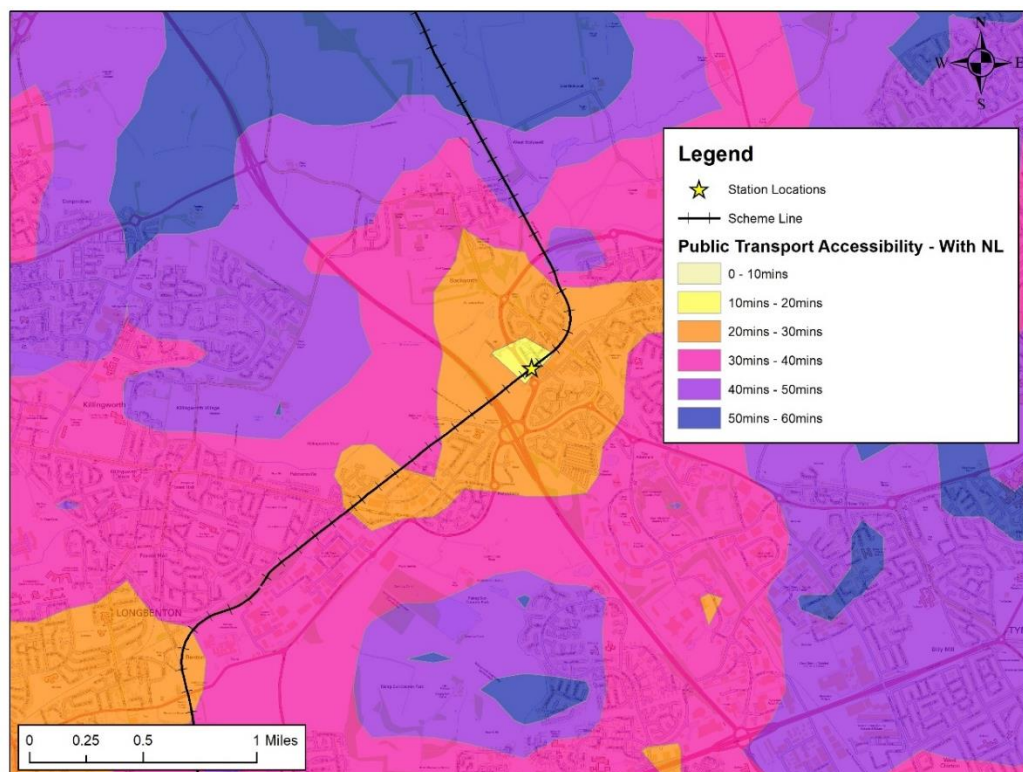


Figure D-10: Existing Public Transport Accessibility from Northumberland Park to Newcastle Central Station



The addition of the Northumberland Line has a limited impact on Northumberland Park in terms of accessibility, as the station was already well connected by Metro. However, the geographical area with a 20 to 30-minute travel time band has increased as there would be additional, and quicker, services provided by the Northumberland Line scheme.