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Sunderland Local Plan

Initial Assessment of Transport Impacts
April 2017

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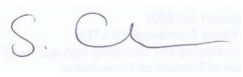
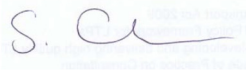
Checked by	Stuart Clarke	Signature (for file)	
Authorised by	Stuart Clarke	Signature (for file)	

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1. Background

1.1 Sunderland Local Plan

1.1.1 Sunderland City Council (SCC) is progressing the preparation of their Local Plan which will set out the long-term vision for development in Sunderland and define the strategic policies to shape spatial and economic development in the city up to 2033.

1.1.2 The Sunderland Local Plan aims to establish a policy framework that guides and shapes development, but is not seen as prescriptive. It will set the parameters for this to be achieved and will encourage and support development in coming forward. It will ensure that Sunderland is a city that is open for business and growth: providing jobs and prosperity for local people; delivering housing to meet the needs and aspirations of all of our communities; and tackling health inequalities and deprivation within the city, whilst protecting the city's important natural and historic environmental assets.

1.1.3 Sunderland's Local Plan is being prepared in the following three parts:

- **Part One - Core Strategy & Development Plan (CSDP):** which will set out an overarching strategy for future change and growth in Sunderland and include detailed development management policies. It is a strategic plan which covers the period 2015 to 2033. The CSDP will cover the whole of the area within Sunderland's administrative boundaries.

  Once adopted, the CSDP will become part of Sunderland's statutory planning framework; guiding decisions on all development and regeneration activity over the period to 2033. The CSDP will replace some of the saved policies of the Sunderland Unitary Development Plan (UDP) 1998 and UDP Alteration No.2 (2007) which covers the Central Sunderland area. Some saved policies will continue to be used in the determination of planning applications until such time that they are replaced by the Local Plan Part 2: Allocations and Designations Plan.

- **Part Two - Allocations & Designations Plan:** which will set out site-specific policies for development, protection, and conservation of land in Sunderland in order to deliver the overall strategy set out within the CSDP.

- **Part Three - International Advanced Manufacturing Park (IAMP) Area Action Plan (AAP) 2017-2037:** which will set out site specific policies for delivery of a large advanced manufacturing park on land to the north of the existing Nissan car manufacturing plant. SCC is working jointly with South Tyneside Council on the preparation of the AAP, as the cross-boundary site is located within the administrative areas of both authorities. Planning applications within the AAP boundary will be primarily assessed against the policies within the IAMP AAP. However, where there are no specific relevant policies contained within the AAP, policies within the CSDP will apply.

1.1.4 Sunderland's growth aspirations up to 2033 will inevitably place pressures on the city's strategic transport network in particular the highway network of trunk roads and other major roads. These pressures need to be managed and planned for as an integral part of SCC's Local Plan. The Local Plan will, therefore, draw on a wide range of strategic policies including housing provision, the economy, transport, and the environment to deliver a 'spatial plan' of integrated policies that encompass all aspects of planning for Sunderland's growth.

1.1.5 As part of the Local Plan preparation, SCC has commissioned Capita to undertake a transportation assessment of the emerging CSDP strategic residential and employment sites to appraise the suitability of the local highway impacted by the traffic generated by the Local Plan proposals. The assessment report will be used to provide an evidence base to support the transport policies in the Local Plan.

1.2 Transportation Assessment of the Emerging Local Plan

1.2.1 The purpose of the transportation assessment is to guide the emerging Local Plan and the supporting Infrastructure Delivery Plan (IDP). The main requirements of the transportation assessment are to assess the suitability of the local highway network impacted by the Local Plan strategic sites and identify potential network improvements to enable the delivery of Sunderland's Local Plan.

1.2.2 There are two key elements in delivering this. Firstly, traffic modelling utilising an existing highway assignment model (SATURN) supported by a discrete settlement based model (gravity model), and secondly a Smarter Choices Assessment to review sustainable development accessibility and the identification of sustainable transport improvements.

1.2.3 To achieve this, the scope of works includes the following:

- An assessment of traffic flows generated by the Local Plan sites and the impact on the road network, especially proposed development site allocations;
- Development of a strategic traffic model which is appropriate to understand the overall impact the Local Plan sites will have on the highway network, as well as an understanding of the localised impacts of the strategic sites. The model is required to cover the full geographical extents of the Core Strategy, incorporate significant planned and committed highway infrastructure proposals, and must originate from a fully calibrated and validated SATURN model (to WebTAG standards), evidence for which is provided in a Local Model Validation Report (LMVR) which is available on request due to the size of the document;
- Scenario testing to be based at 5-yearly intervals throughout the plan period;
- An brief assessment of where and when future travel patterns will trigger the need for capacity improvements at particular junctions;
- An examination of high, medium, and low growth assumptions based on a review of existing strategy, demographic, and economic trends, and mobility and accessibility trends extrapolated into the future; and
- Consideration of the scope for Smarter Choices and sustainable travel, including existing public transport and cycling connections and the identification of high level gaps in transport provision between the large Local Plan sites that are likely to generate and attract large volumes of people.

1.2.4 The transportation assessment has built upon recent transport modelling work using SATURN that was undertaken in developing the major scheme business case for the Sunderland Strategic Transport Corridor scheme (SSTC).

1.2.5 The Sunderland SATURN model has been amended and used to test the Local Plan strategic sites up to 2033, to determine the traffic impacts of the preferred site allocations.

1.2.6 The results of the modelling work has been used to recommend potential highway infrastructure improvements to mitigate the traffic impacts of delivering the Local Plan sites, covering vehicular traffic as well as sustainable transport improvements. 139 housing sites, comprising

of a mixture of SHLAA sites and Housing Release sites, and 66 employment sites identified by SCC have been considered in the transportation assessment.

1.3 Purpose & Report Structure

1.3.1 This report provides the results of the transportation assessment undertaken to determine the likely transport impacts of the emerging Sunderland Local Plan preferred options. The report is structured into the following sections:

- Chapter 2: describes the proposed Local Plan development sites, explaining the residential and employment site allocations and the general locations within the Sunderland sub-areas;
- Chapter 3: introduces the traffic modelling methodology adopted for the assessment, including the development of the strategic SATURN model and the gravity model developed for the settlement based assessment;
- Chapter 4: presents the modelling development scenarios and the four modelling phases that have been assessed in the SATURN model to establish the impacts of the Local Plan upon the highway network. This section also presents the trip generation exercises and the trip distribution process associated with the gravity model;
- Chapter 5: describes the Local Plan trip generation methodology for the residential and employment sites;
- Chapter 6: presents the SATURN modelling outputs and results, and describes the locations on the highway network which can be expected to experience capacity issues, and during which delivery stage of the Local Plan;
- Chapter 7: provides a summary of potential mitigation measures for those junctions that have been forecasted to become oversaturated during the Local Plan period, for which developer funding will be sought;
- Chapter 8: introduces the existing public transport network across the study extents, describes the results of the public transport accessibility assessment, and identifies potential improvements to the public transport network which would improve connectivity between the largest Local Plan sites where movements between the sites are anticipated to be significant;
- Chapter 9: introduces the existing cycling and walking network across the study extents and describes the results of the cycling/walking accessibility assessment. This chapter identifies potential improvements to the cycle network which would improve sustainable access between the largest Local Plan sites where movements between the sites are anticipated to be significant; and
- Chapter 10: concludes the transportation assessment by summarising the traffic modelling and traffic impact, and smarter choices and sustainable travel associated with the Local Plan strategic sites.

2. Local Plan Development Sites

2.1 Residential Sites

2.1.1 The emerging Sunderland Core Strategy and Development Plan proposes the allocation of 15 Housing Release Sites and the South Sunderland Growth Area (4 sites) for residential development. Whilst the remainder of the residential site allocations will be made through the Site Allocations and Designations Plan, for modelling purposes, all of the sites included as deliverable and developable in the SHLAA within the Local Plan period have been included.

2.1.2 The spatial location of the sites denotes a few clusters of sites spread across the five sub-areas with varying degrees of proposed development volume. The largest cluster of proposed residential development with the largest volume of planned dwellings is located in the Sunderland south Growth Area, north of Burdon Lane and adjacent to and surrounding Hall Farm with immediate connections to the A19 in the west.

2.1.3 There are also a number of clusters of residential development proposed for the Coalfield sub-area, generally located along the western boundary of the Coalfield area and in the south of the Coalfield area. There are a very small number of residential developments proposed for the Sunderland central sub-area, including student accommodation.

2.1.4 In the Washington and Sunderland north sub-areas, the proposed residential developments are more dispersed across the area as individual isolated developments rather than being clustered together.

2.1.5 In total, 139 residential sites have been included within the transport modelling undertaken for this transportation assessment, comprising of 124 sites from the SHLAA (which also include the SSGA sites) and 15 Housing Release sites proposed through the Core Strategy and Development Plan.

2.1.6 A plan showing the location of the SHLAA sites and proposed Housing Release Sites is shown in Appendix A.

2.2 Employment Sites

2.2.1 The emerging Core Strategy proposes to safeguard a range of existing employment land for B1, B2, and B8 use. Within these safeguarded areas, the Employment Land Review identified a total of 66 parcels of land available for development. The spatial location of the proposed developments shows a number of employment sites in the Washington sub-region, and across the boundaries of the Sunderland north, Sunderland central, and Sunderland south sub-areas along the River Wear.

2.2.2 A large cluster of employment sites, including the enterprise zone sites, are situated along the A1231 Sunderland Highway in the Washington sub-area.

2.2.3 A small cluster of employment sites is also proposed for the western section of the Coalfield sub-area around Houghton-le-Spring, and along the eastern boundary of the Sunderland south sub-area adjacent to the North Sea.

2.2.4 Whilst not specifically being allocated through the Core Strategy, the proposed employment land at IAMP has also been included within the traffic modelling undertaken for the transportation assessment.

2.2.5 A plan showing the location of the Local Plan employment sites is provided in Appendix B.

3. Traffic Modelling

3.1 SSTC Strategic SATURN Model

3.1.1 The base SSTC strategic SATURN model was developed from the A19 Highways Assessment Model 2 (A19HAM2), a model of the Tyne and Wear area developed by Arup for Highways England (HE). The model was built to undertake various assessments of key junctions on the A19, and was subsequently extended to assess the A19/A184 Testos junction improvement scheme. The modelled area includes all of Tyneside and smaller sections of Wearside and Northumberland.

3.1.2 The A19HAM2 model only considered the area to the north of the River Wear within Sunderland as part of the fully modelled and simulated area, although the residential areas were at a coarse level of detail. The area to the south of the River Wear was in the model as a simple buffer network (not part of the simulated network), and this included parts of Washington and Coalfield.

3.1.3 The SSTC SATURN modelling work therefore, increased on the level of detail that was in the A19HAM2 model. Areas to the north of the River Wear and the area within the central part of Sunderland to the south of the River Wear, was converted to detailed simulation network for inclusion in the fully modelled area for the assessment of the SSTC scheme.

3.1.4 In order to include the central part of Sunderland and the areas south of the River Wear as part of the detailed simulation network, additional SATURN zones were created in the model. These were initially based upon output areas and residential areas formed by two or more output areas, whilst employment areas were based upon workplace zones where possible. Other significant traffic generators, such as retail parks, were included as bespoke zones. Zones were constructed so that they were located within a single lower super output area.

3.1.5 The SSTC strategic SATURN model considers trips made by car, light goods vehicles, and heavy goods vehicles, and the car trips are segmented by trip purpose into commuting, business, and other trips. The traffic demand and flow matrices used in the SSTC strategic model were constructed using information from the following three sources:

- Roadside interviews undertaken in September 2015 to capture existing traffic movements across the River Wear;
- The demand matrices from the A19HAM2 model which were used for traffic to the north and west of the Sunderland urban area. The matrices were growthed to 2015 using rates from the National Trip End Model using the TEMPro software; and
- A synthetic gravity model created using TEMPro trip-end data and average trip length data from the roadside interviews, providing a traffic demand for unobserved movements to the south of Sunderland, as well as 24 hour production-attraction demand for the variable demand model.

3.1.6 The assignment of trips within the SSTC SATURN model uses the Wardrop User Equilibrium assignment for multiple user classes, applying the Frank-Wolfe Algorithm. The principle methodology behind the application of this assignment is that traffic arranges itself in the modelled network such that the cost of travel on all routes used between the origin and destination is equal to the minimum cost of travel.

3.1.7 The SSTC strategic SATURN model represents a 2015 base model, which calibrates and validates to acceptable standards against screenlines, link flows, and journey times. The following data sources were used to calibrate and validate the SSTC SATURN model:

- Roadside interviews at three locations – River Wear screenline (Queen Alexandra Bridge and Wearmouth Bridge), Washington Road and Chester Road;
- Traffic data aggregated into 13 screenline locations around Sunderland;
- Trafficmaster GPS data for Sunderland; and
- In-car journey time surveys for four routes – Washington Road, Wessington Way, Chester Road/The Broadway and Queen Alexandra Bridge/Wearmouth Bridge loop.

3.1.8 The LMVR documents the full methodology adopted to develop the SSTC strategic SATURN model which is available on request.

3.1.9 The calibrated and validated SATURN model developed for the SSTC major scheme business case has been amended and used to assess the preferred development proposals in the emerging Sunderland Local Plan.

3.2 Local Plan SATURN Model

3.2.1 The Local Plan base SATURN model represents 2015 traffic conditions. Background traffic growth from the base 2015 to the assessment year of 2033 was undertaken using TEMPro 7 data. This data allocates a local growth factor for trips based upon Super Middle Output Areas, which was subsequently reduced to take into account committed developments that will be brought forward outside of the Sunderland Local Plan.

3.2.2 Individual growth factors were applied for different trip types and were not just limited to commuter based trips. As such, numerous traffic growth factors were included within the SATURN model based upon each zone and trip type.

3.2.3 The years of assessment for the impact of the Sunderland Local Plan follows the assessment years of the SSTC scheme, +15 years. This coincides with the aspirations of Sunderland's Core Strategy for shaping spatial and economic development in the city for 15-20 years, up to 2033.

3.2.4 The peak hours for assessment of the Local Plan proposals are based upon those contained within the original A19HAM2 SATURN model and retained for the SSTC model. The AM peak within the model is 08:00-09:00hr, with traffic flows contained within this hour used as the AM peak hour traffic flows. The PM peak within the model is 16:00-18:00hrs, the PM peak hour being identified as the average hour within this timeframe.

3.2.5 The strategic SATURN model also includes an inter-peak period of 10:00-15:00 with a subsequent inter-peak hour defined as the average hour within this timeframe. As traffic flows are lower in the inter-peak period when compared to the AM and PM peak hours, the inter-peak has not been used for the transportation assessment of Sunderland's emerging Local Plan.

3.2.6 The SATURN model considers car, light goods vehicle (van), and heavy goods vehicle trips. The car trips are segmented into the following four trip purposes:

- Commuting;
- Business;
- Education; and
- Other.

3.3 Forecasting the Future Year

3.3.1 The transportation assessment has considered a future year of 2033 in line with Sunderland's

Local Plan period. The base year was considered as 2015 and the modelling assessments have considered four future year phases spanning from year zero to year seventeen from the base year. The future year modelling scenarios that have been assessed include the following:

- Phase 0: 0-5 years;
- Phase 1: 5-10 years;
- Phase 2: 11-15 years; and
- Phase 3: 16-18 years.

3.3.2 Whilst the Core Strategy and Development Plan covers an eighteen year plan period from 2015-2033, the transport modelling assessments that were undertaken in early 2017 for the transportation assessment cover a 17 year period because development completions within the first year of the Local Plan period (2015/2016) had already taken place

3.3.3 Traffic growth was applied to the base model traffic flows to forecast the likely traffic demand in 2033. Traffic growth was calculated based on best practice guidance and future housing targets and this is discussed in chapter 4 of this report.

3.3.4 Committed development that would deliver modifications to the highway network are included in the SATURN model; the coding of links and junctions in the model were amended to reflect highway improvements that were approved and programmed to be delivered outside of the Local Plan.

3.3.5 The Local Plan traffic flows relating to specific development sites were added into the demand matrices for the SATURN model. This involved estimating the traffic demand for each development, and distributing these trips across the modelled network.

3.3.6 The model outputs were used to access the impact of these four scenarios. The model outputs include traffic flows, forecast junction capacity, and Ratio to Flow Capacity (RFC).

3.4 Settlement Based Assessment – Gravity Model

3.4.1 A first principles gravity model has been developed for the Local Plan development settlements which fall outside of the detailed simulation network in the SATURN model.

3.4.2 The gravity model was constructed using a more robust trip generation exercise for the Local Plan residential and employment sites, available through the use of locally based survey data. The model produced an origin-destination trip matrix to reflect new trips arising from the Sunderland Local Plan, made by population, employment, and other demographic changes.

3.4.3 The gravity model has been used to forecast the origin-destination pattern of travel in the future years being assessed, and produce demand matrices and traffic distributions that were assigned in the SATURN highway assignment model.

3.4.4 To reflect the new levels of trips/new trip types that will be made as a result of the Sunderland Local Plan sites (changes to the disposition of offices, residential, retail etc.), the gravity model required data concerning the number of trips generated by each zone and the number of trips attracted to each zone, input as origin trip ends and destination trip ends for each zone. These were obtained from the base year trip matrix and represent the base trip ends.

3.4.5 To calculate the future levels of trip making, traffic anticipated from committed development with planning consent, development likely to acquire planning approval, and trip generation from the Local Plan development sites, were added to the base trip ends for each model zone and input into the gravity model to provide the future phase 3 trip matrix.

3.4.6 The future phase 3 trip matrix was also constrained to reflect 67% of trips originating in Sunderland and remaining in Sunderland for employment purposes, and 33% of trips travelling

from outside of Sunderland. New employment sites were also constrained to attract more trips from new housing developments. This is discussed in detail in section 5.4 of this report.

3.4.7 The base year trip matrices and the future year trip matrices were then input into the Local Plan SATURN model.

4. Modelling Development Scenarios

4.1 Trip Generation

4.1.1 The estimated traffic demand for all developments included within the Local Plan modelling scenarios was not estimated from TRICS; a nationally recognised database of trip rates for development sites in the UK, that is used for transport planning purposes to quantify the trip generation of new/proposed development. In general, the TRICS database proportions higher trip rates by using mean averages in the calculations.

4.1.2 Use of the database was deemed not suitable for the transportation assessment as more robust trip generation sources for the Local Plan residential and employment sites was available in the form of locally based survey data. The methodology adopted in the calculation of trip rates for the residential sites is described in section 5.2 and the methodology for the employment sites is described in section 5.4.

4.2 Modelling Scenarios

4.2.1 The future year modelling scenarios that have been assessed as part of the transportation assessment include the following:

- Phase 0: is the base scenario which includes committed developments and traffic growth in the year zero (0) to year five (5);
- Phase 1: includes phase 0 with the committed developments and traffic growth in years six (5) to eleven (10);
- Phase 2: include phase 0 and phase 1 with the committed developments and traffic growth in years twelve (11) to year fifteen (15); and
- Phase 3: is the full Local Plan scenario which includes phases 0 to 2 with the committed developments and traffic growth for the sixteen (16), seventeen (17), and eighteen (18) years.

4.2.2 Phase 0 is the reference case scenario. It includes developments which have planning permission and live applications that are likely to be granted planning approval. Other developments that are likely to gain planning permission by 2033 have been included where information was available. This is not prejudicial to the planning process and is based on guidance on uncertainty as defined by Table A2 in TAG Unit M4 *Forecasting and Uncertainty*.

4.2.3 Phase 3 includes traffic demand for a mix of development types, such as residential, employment, leisure, and retail, and consists of the following assumptions:

- Developments which have been completed between 2011 and 2016;
- Developments which have been granted planning permission (committed development); and
- All developments where a planning application has been submitted to the Local Authority as of May 2016, which have not yet been determined but are likely to be granted planning approval.

4.2.4 Site specific information for committed developments and those likely to be granted planning approval, including estimated peak trip rates and site access onto the highway network, was taken from the relevant supporting planning application documents.

4.2.5 A summary of the trip generation for the residential sites, including the SHLAA and Housing Release Sites, and the employment sites included within phase 0, 1, 2, and 3, are shown in Tables 1 to 4. A detailed list of all of the developments included within the trip generation exercises is shown in Appendix C, which includes both the SHLAA and Housing Release Sites identified for residential development.

Table 1 Phase 0 Trip Generation

Development type	Vehicle trips			
	Morning peak		Evening peak	
	In	Out	In	Out
Residential	691	1657	1609	960
Employment	206	43	37	128

Table 2 Phase 1 Trip Generation

Development type	Vehicle trips			
	Morning peak		Evening peak	
	In	Out	In	Out
Residential	2004	4814	4682	2785
Employment	522	109	94	324

Table 3 Phase 2 Trip Generation

Development type	Vehicle trips			
	Morning peak		Evening peak	
	In	Out	In	Out
Residential	2776	6663	6663	3885
Employment	736	153	133	457

Table 4 Phase 3 Trip Generation

Development type	Vehicle trips			
	Morning peak		Evening peak	
	In	Out	In	Out
Residential	2905	6973	6783	4068
Employment	773	161	140	480

4.2.6 The site access for each Local Plan development site was assumed based upon the location of the site and the characteristics of the adjacent highway network. These assumptions were made for the purposes of the transportation assessment, they are not representative of SCC's preferences or prejudicial to future planning applications that will be prepared in support of the Local Plan.

4.3 Trip Distribution

4.3.1 The trips generated by each new Local Plan development site were distributed across the SATURN model using the gravity model. The gravity model distributes trips based on an assumed relationship between the length of a trip and the number of trips made. Traffic is,

therefore, distributed based on the total forecast traffic generation and the cost of travel between origin and destination zones within the modelled network.

4.3.2 The cost of travel varies depending on trip 'purpose' and, therefore, a separate model was used for each different trip purpose. The trips were disaggregated by purpose using data from the National Trip End Model (NTEM).

4.3.3 The gravity model used for trip distribution in this study was of the form:

$$T_{ij} = \alpha O_i D_j f(c_{ij}) \quad (1)$$

where T_{ij} is the number of trips between origin i and destination j, α is a proportionality factor, O_i is the total number of trips starting at origin i, D_j is the total number of trips ending at destination j and $f(c_{ij})$ is a generalised function of travel costs known as the deterrence function.

4.3.4 The deterrence function used was of the form:

$$f(c_{ij}) = c_{ij}^{n} e^{\beta c_{ij}} \quad (2)$$

where c_{ij} is the cost of travel between origin i and destination j and n, β are parameters to be defined.

4.3.5 Finally, the furness procedure was applied to the future year demand matrices to ensure the trip totals for each development were correct.

4.3.6 It should be noted that the assumptions regarding the highway network and traffic demand in small rural settlements included in the gravity model are simplistic. The highway network only includes key routes and traffic demand is aggregated into broad locations. This means that the costs used within the gravity model are often inaccurate for new trips that could potentially stay within the rural settlements. The result of this is that trips generated by new developments in rural locations are all external to that settlement, which represents a pessimistic assessment of trip generation on the wider highway network that is likely to be an overestimate.

4.4 Traffic Growth

4.4.1 Traffic growth is the change in the number of cars and goods vehicles on the highway network over time. When forecasting the performance of the highway network in the future it is necessary to allow for changes in traffic demand. Traffic growth can be split into two broad areas:

- **New trips:** changes in population, employment, and car ownership which directly affect how many vehicles travel on the highway network; and
- **Frequency of trips:** changes in GDP, income, and travel costs which affect how frequently people travel.

4.5 Forecast Traffic Demand

4.5.1 Growth in traffic demand in the future year modelling scenarios was considered in line with the fixed demand approach as defined in TAG Unit M4 *Forecasting and Uncertainty*. This approach was used so that the impact of the Local Plan development sites could be clearly assessed

between scenarios without the impact of other variables. Other variables include considerations such as, induced or suppressed traffic due to changes in travel costs, changes in travel choice, and changes in peak spreading.

4.5.2 Uncertainty in relation to the growth factors has not been considered as part of the transportation assessment. It was deemed unnecessary as the key outputs of the assessment are the differing impacts between different modelled scenarios.

4.5.3 The NTEM dataset represents the Department for Transport's standard assumptions about growth in travel demand, access to which is provided through TEMPro software. TEMPro version 7.0 has been used to calculate growth factors for cars based on the future year being assessed, trip purpose, time period, and the origin and destination of trips. The assumptions within NTEM were adjusted using the alternative assumptions facility within TEMPro to derive at values representative of the Local Plan proposals.

4.5.4 The Local Plan aspires to deliver at least 13,842 net additional dwellings over the plan period from 2015 to 2033. It is assumed that this will involve the following build and delivery profile, which includes the 124 SHLAA sites and the 15 Housing Release Sites identified for residential development through the draft Core Strategy:

- 3,324 homes will be constructed between 0-5 years;
- 5,107 will be constructed between 6-10 years;
- 3464 homes will be developed 11-15 years; and
- 598 homes will be constructed in 16 and 18 years of the Local Plan period.

4.5.5 These dwelling volumes were used as the baseline for future housing numbers. The housing numbers from the specific developments in each scenario were then subtracted from this baseline and the housing assumptions within TEMPro were adjusted to match this Local Plan target.

4.5.6 This process ensured that the impact of new housing is not double-counted by including the developments in the model directly as well as applying a growth factor. The growth factors still account for other forecast changes that may affect traffic growth, such as demographic changes, car ownership, and economic changes.

4.5.7 As a fixed demand approach was used, fuel and income factors were calculated using TAG Databook Table M4.2.1 *Forecast Fuel Price and Income Adjustment Factors*. These factors are based upon relationships between car travel, household income, and fuel costs.

4.5.8 Growth factors for light goods vehicles and heavy goods vehicles were estimated from the National Transport Model, adjusted using local NTEM factors.

5. Local Plan Trip Generation Methodology

5.1 Strategic Housing Land Availability Assessment

5.1.1 Local Authorities are required to undertake Strategic Housing Land Availability Assessments (SHLAA) to assess potential sites for future housing development. The SHLAA forms part of the evidence base for the emerging Sunderland Local Plan.

5.1.2 The transportation assessment has considered 139 potential sites for residential development covering the plan period up to 2033, which are spread across north, south, and central Sunderland, Coalfield, and Washington. These sites are derived from the draft Core Strategy and SHLAA.

5.2 Local Plan Residential Sites

5.2.1 The vehicular trips generated by each development site were separated into the key journey purposes experienced during the AM and PM peaks. Each journey purpose results in a different trip distribution and gravity models for each different journey type were developed.

5.2.2 Vehicular trips rates were calculated based on traffic data from actual housing developments in the local region. Using 2011 Census data and GIS data, Census Output Areas have been linked to the SATURN zones within the modelled network. Census data provides information about modal split at Output Area level (neighbourhood level), and using a combination of traffic flow information and forecasted employment growth in Sunderland, trip rates were calculated for each output area and corresponding SATURN zone.

5.2.3 Using Census data, car mode share (%) for work journeys were assigned to Output Areas (geographical areas broken down by postcode units - providing consistently sized areas for neighbourhood statistics).

5.2.4 In Sunderland, the range of car usage for work journeys is between 25% - 81%. The lowest calculated trip rate was assigned to the sites with the lowest car usage and the highest calculated trip rate was assigned to the sites with the highest car usage.

5.2.5 The calculated trip rates are shown in Appendix D, based upon mode share data. When calculating these vehicular trip rates, cycling, walking, and public transport accessibility has been considered and the trip rates have been reduced to take account of the levels of accessibility by sustainable modes. The reduction factors are shown in Table 5 on the following page, where H represents high accessibility, M represents medium accessibility, and L represents low accessibility.

5.2.6 The methodology for assessing cycling, walking, and public transport accessibility is described in chapter 8 Public Transport Accessibility and chapter 9 Cycling & Walking Accessibility.

5.2.7 Additionally, vehicular trip rates were reduced for sites with student accommodation. For these sites, trip rates were assumed as zero because all of the student residential sites are located in the city centre areas which have high walking, cycling, and public transport accessibility.

5.2.8 The total number of houses planned to be built during the Local Plan period was provided by SCC, and based upon this number and the total number of houses for which the analysis was undertaken for, growth/constraint factors were applied to each site. All residential sites were linked to a SATURN Zone.

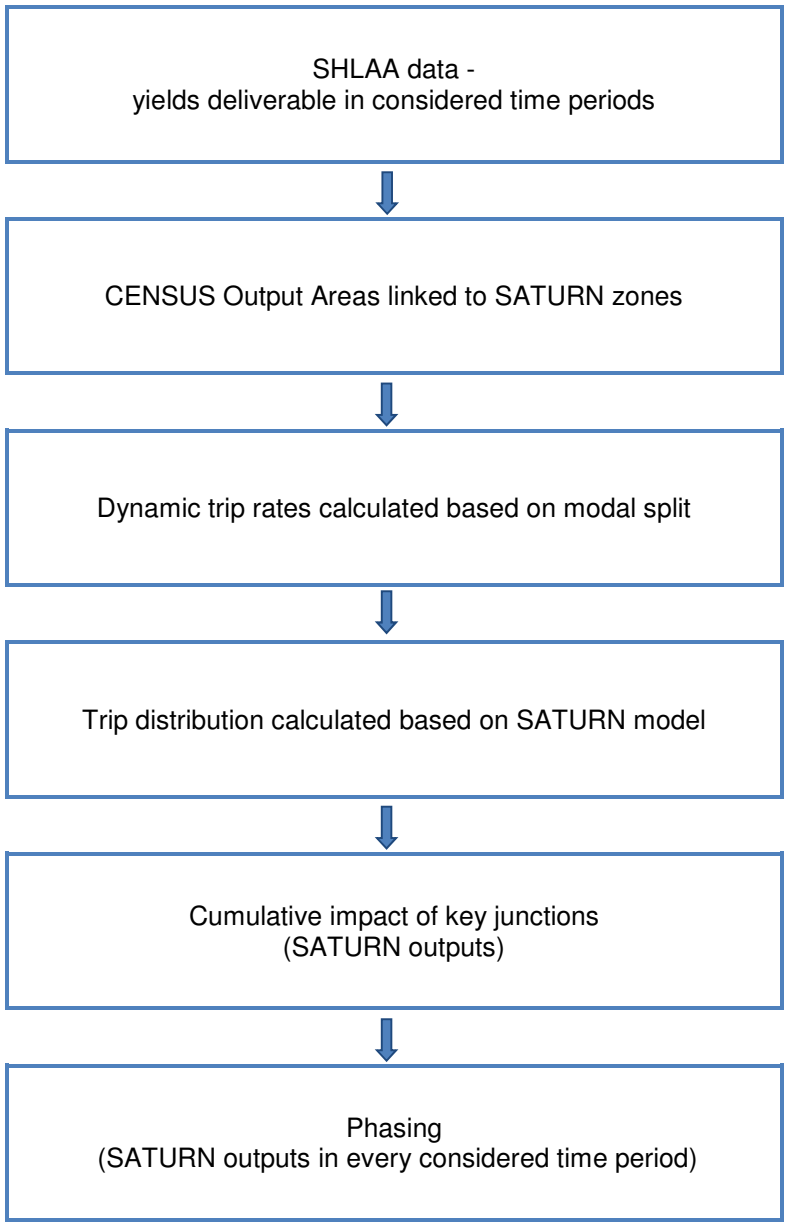
Table 5 Trip Rate Reduction Factors

Public Transport	Cycling	Walking	Reduction Factor
H	H	H	10%
H	H	M	9%
H	H	L	8%
H	M	H	8%
H	M	M	7%
H	M	L	7%
H	L	H	6%
H	L	M	6%
H	L	L	6%
M	H	H	5%
M	H	M	5%
M	H	L	5%
M	M	H	4%
M	M	M	4%
M	M	L	4%
M	L	H	3%
M	L	M	3%
M	L	L	3%
L	H	H	2%
L	H	M	2%
L	H	L	2%
L	M	H	2%
L	M	M	2%
L	M	L	2%
L	L	H	1%
L	L	M	1%
L	L	L	1%

5.2.9 The next stage involved calculating the number of trips in every considered time period using trip rates and yields delivered in each stage.

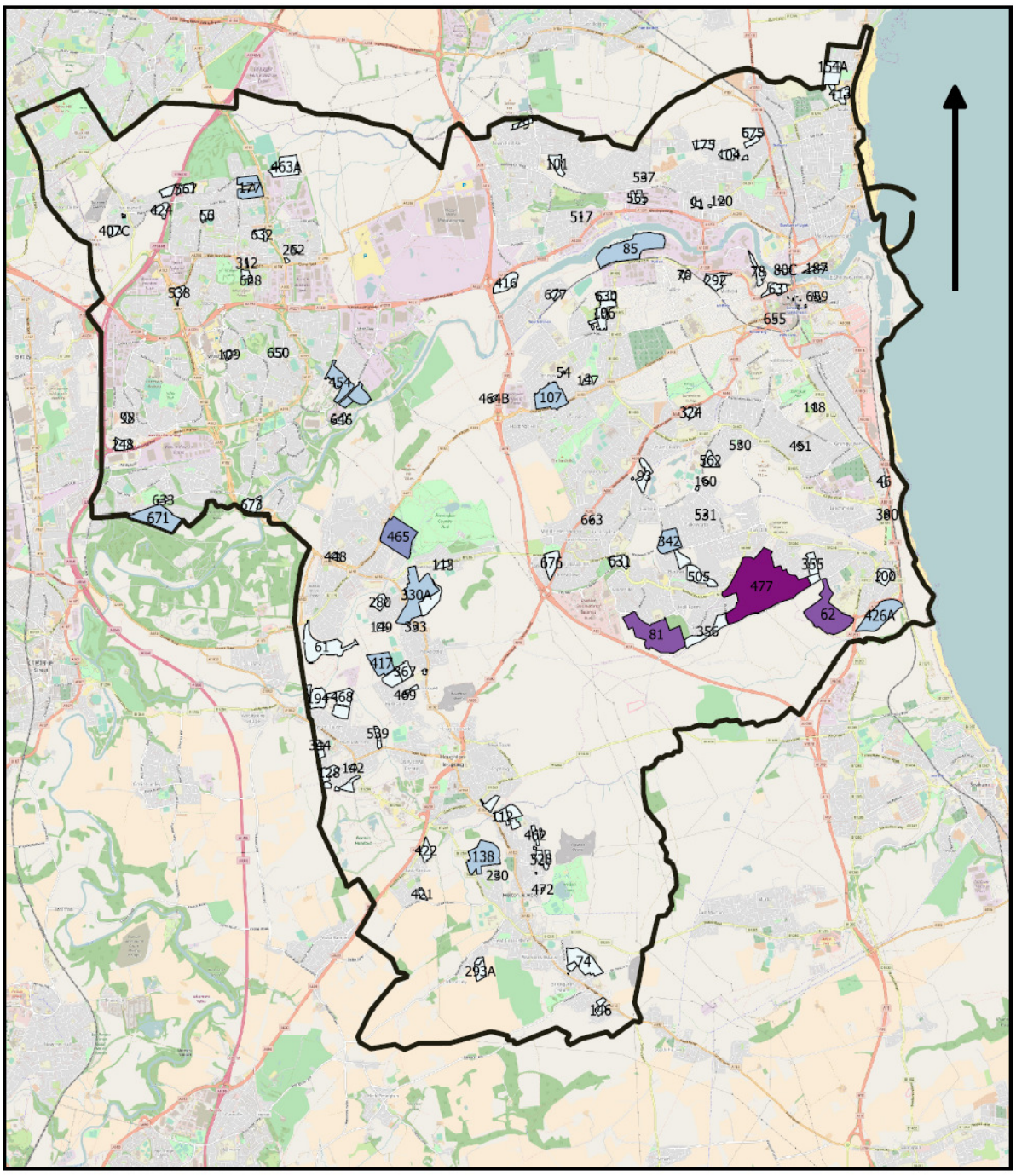
5.2.10 The diagram in Figure 1 shows the methodology for calculating the vehicular trips generated by the Local Plan residential sites and corresponding SATURN zones in the modelled network for the purposes of the transportation assessment.

Figure 1 SATURN Trip Rate Methodology for Residential Sites



5.2.11 Figure 2 below shows the volume of trips anticipated to be generated by each Local Plan residential site.

Figure 2 Trips Generated by the Local Plan Residential Sites



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5.2.12 It is important to note that the 15 sites in Sunderland that are proposed to be released from the green belt and brought forward for residential development as Housing Release Sites, have been subject to the same trip generation methodology as the 124 SHLAA sites.

5.2.13 A summary of the trip generation for the Housing Release Sites produced for phase 0, 1, 2, and 3 is shown in the spreadsheet in Appendix C, with the green belt sites being identifiable in column H of the spreadsheet.

5.3 Employment Land Review

5.3.1 SCC appointed Nathaniel Lichfield & Partners and Lambert Smith Hampton to prepare an Employment Land Review (ELR) for the local authority area in 2016. The purpose of the ELR was to provide SCC with evidence to support the development of Sunderland's Local Plan. The review provided an understanding of the city's current employment land supply and anticipated future employment growth and the impacts of this on land availability up to 2033.

5.3.2 In relation to market area profiles, the ELR considers that the market for employment premises can be divided into three distinctive areas; the Sunderland urban area, the Washington urban area, and the dispersed settlements of the Coalfield.

5.3.3 The study concluded and recommended that SCC needs to allocate between 95ha and 115ha of employment land up to 2033 across the three distinctive market areas. The transportation assessment has considered 66 sites that have been identified for employment land by SCC following the ELR.

5.4 Local Plan Employment Sites

5.4.1 For the purpose of assessing the transport impacts of the Local Plan employment sites, the sites identified in the ELR were reviewed. The area and composition of each site was calculated for each use class including B1, B2, and B8.

5.4.2 In addition to the sites identified through the ELR, SCC is separately preparing an Area Action Plan jointly with South Tyneside Council to release land from the green belt for the IAMP site. The impact of the IAMP site has been considered in the transportation assessment.

5.4.3 Trip rates for the employment sites were calculated based upon data from the North East region from AM peak inbound trip rates to employment sites for B1, B2, and B8 use classes. The trip rates are shown in Tables 6 to 8. This methodology was adopted as the AM inbound trips to employment sites represent the strongest correlation between the number of jobs being generated by the Local Plan and the trip generation calculation.

5.4.4 The trip rates for the Local Plan employment sites were then pro rata for each site based upon the size of the site and the proposed composition of use classes. All employment sites were linked with SATURN Zones.

Table 6 Trip Rates for B1 Use Class

B1	Arrivals
AM	1.552

Table 7 Trip Rates for B2 Use Class

B2	Arrivals
AM	0.516

Table 8 Trip Rates for B6 Class

B8	Arrivals
AM	0.031

5.4.5 Using the trip rates shown in Tables 6 to 8 above, and by estimating arrival and departure trip profiles for various local employment sites in the TRICS database, the volume of inbound and outbound trips for the AM and PM peaks were calculated based upon the relationship shown in Table 9.

Table 9 Relationship: Inbound and Outbound Trips for the AM & PM Peaks

	AM	PM
IN	X	18%*X
OUT	34%*PM OUT	62%*X

5.4.6 The number of jobs planned to be delivered during each of the four Local Plan periods was calculated pro rata using the same proportions as delivered yields for the residential sites. This methodology was adopted because it was unknown at the time of preparing the transportation assessment of how many jobs would be delivered in each of the four Local Plan periods.

5.4.7 The calculated percentage volume of jobs to be delivered in each Local Plan period is shown in Table 10.

Table 10 Percentage of Jobs Deliverable during the Local Plan Periods

5 Years	6-10 Years	11-15 Years	16,17,18 Years
27%	41%	28%	5%

5.4.8 In order to formulate representative vehicular trips that may arise as a result of the new employment sites in Sunderland, mode share from the 2011 Census data for journeys to work by car was applied to the volume of jobs estimated to be delivered over the Local Plan period. The mode share for journeys to work by car was 65% (2011) and this has been applied to the volume of jobs expected to be delivered.

5.4.9 The calculation of the vehicular trip generation for the employment sites is shown in Appendix C.

5.4.10 The 2016 ELR denotes that the existing vehicular trips that originate from within Sunderland and travel to existing employment land in Sunderland represent 67% of total trips to existing employment sites. This is the self-containment rate and this has been applied to the Local Plan vehicle trips, i.e. 67% of the Local Plan trips will originate, remain, and travel to sites within Sunderland. The remaining 33% of Local Plan trips have been assumed to originate from neighbouring authorities outside of Sunderland and travel to existing employment sites within Sunderland.

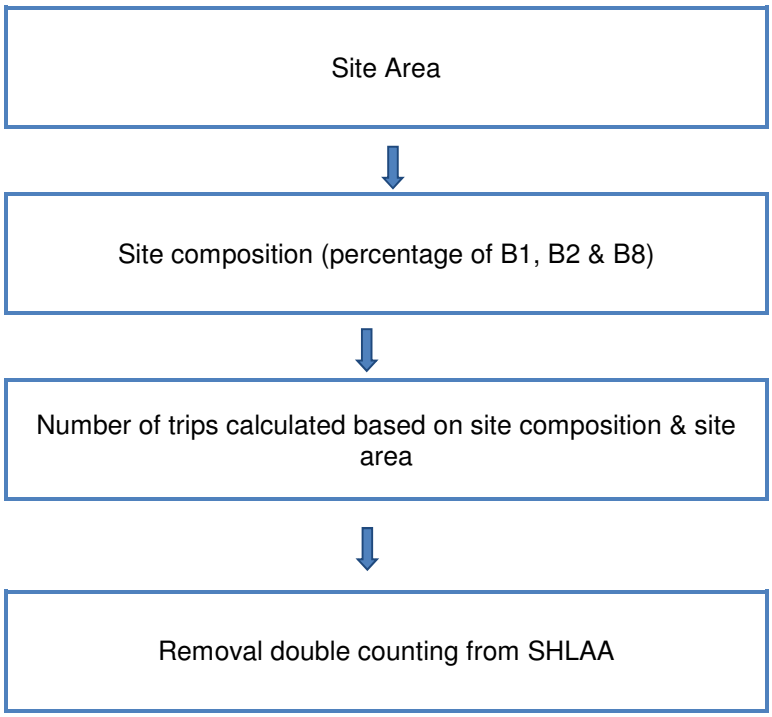
5.4.11 67% of vehicular trips generated by the Local Plan have been assumed to represent self-containment trips, and therefore, to reduce double counting, the assessment of cycling, walking, and public transport accessibility has been undertaken for residential sites only as these trips constitute trips travelling to employment sites.

5.4.12 Employment sites held for expansion by an existing occupier were excluded from the ELR site

allocations on the basis that they are not available to the wider market for economic development and their inclusion would have resulted in double counting of potential job creation.

5.4.13 The diagram in Figure 3 shows the methodology for calculating the vehicular trips generated by the Local Plan employment sites for the purposes of this transportation assessment.

Figure 3 SATURN Trip Rate Methodology for Employment Sites



6. Modelling Outputs & Impacted Junctions

6.1 Ratio of Flow to Capacity

6.1.1 The Ratio of Flow to Capacity (RFC) of a highway link or a junction is one of the principle factors influencing queues and delays on the highway network. RFC is an indicator of the likely performance of a junction under a future year scenario incorporating future traffic demand.

6.1.2 An RFC of 85% (0.85) demonstrates that a junction will operate within capacity and with 15% spare capacity, and an RFC of 86% (0.86) and above suggests a junction will operate within capacity but may experience capacity issues in the future. An RFC of 100%+ (1.00) indicates that a junction will operate beyond the design capacity and become oversaturated, highlighting that traffic delays and congestion are more than likely to occur.

6.1.3 RFC is therefore, a useful tool in helping to devise improvements that will enable a link or junction to operate without major queues and delays if it is predicted to become oversaturated.

6.2 RFC SATURN Node Results

6.2.1 In relation to the SATURN modelling results in Table 11 below, the following points should be noted when reviewing SATURN outputs:

- Large complex junctions in the network have been coded as several nodes joining together to form the junction, for example, nodes 7125, 7127, 7129, 7131 and 7133 are all part of the A1231/A690 junction. This is a coding condition of SATURN and the number of nodes in Table 11 does not equate to the number of junctions;
- Signalised junctions have been added in the simulation results without undertaking signal optimisation as the assessment is to test if the current infrastructure can withstand future demand. A reduction in the RFC at some junctions could be expected if signal optimisation had been undertaken to improve junction performance. However, this would have modified the existing infrastructure and not provided accurate results based upon existing junction operations;
- Gyratory type roundabouts have been coded as signalised junctions in the modelled network and will exhibit higher RFCs given that signal optimisation has not been undertaken; and
- Nodes with very low traffic flows and low capacity also showed higher RFCs but in general there are not to be included as the capacity can be increased with a significant reduction in RFC.

6.2.2 Table 11 shows the RFC results for each node within the SATURN model (multiple nodes are used to code up individual junctions). The RFCs have been presented for each Local Plan phase, including the 2015 base year, for the AM and PM peaks. In the table, red shading indicates a node is operating with an RFC of 1.00+, amber shading shows RFCs of 0.86 to 0.99, and the cells unshaded are locations with RFCs of 0.00-0.85.

6.2.3 Further analysis has been undertaken which shows when individual junctions in the modelled network will experience capacity issues over the Local Plan period, which is discussed in sections 6.4 to 6.6 following Table 11.

Table Key
Red shading - RFC of 1.00+
Amber shading - RFCs of 0.86 to 0.99
Unshaded - RFCs of 0.00-0.85

Table 11 Ratio of Flow to Capacity (RFC) Results for the Modelled Network

	Ratio of Flow to Capacity (RFC)									
Scenario:	**2015 Base**		**Phase 0**		**Phase 1**		**Phase 2**		**Phase 3**	
Junction	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
A19 NB offslip/A1290 Downhill Ln	1.00	0.75	1.41	1.27	1.42	1.28	1.28	1.31	1.45	1.30
Sunderland Highway/A19	0.61	0.94	1.37	1.36	1.41	1.42	1.34	1.53	1.44	1.48
A19/A183 W	0.35	0.54	0.55	0.42	0.54	0.47	0.65	0.50	0.60	0.51
A19N onslip/A183W	0.60	0.93	1.18	1.20	1.37	1.32	1.11	1.39	1.47	1.41
A19S offslip/Parkside south	0.80	0.97	1.04	1.14	1.19	1.20	1.14	1.23	1.25	1.22
A19N offslip/Durham Rd	0.71	0.64	0.84	0.84	1.12	1.10	1.13	1.14	1.19	1.14
A19/Durham Road	0.50	0.57	0.64	0.53	0.69	0.62	0.72	0.64	0.69	0.64
A19N Onslip/Durham Road	0.84	1.07	1.12	1.09	1.34	1.29	1.26	1.36	1.46	1.42
City Way/Emperor Way	0.31	0.38	0.43	0.75	1.22	1.55	1.20	1.66	1.45	1.69
City Way/Monarch Way	0.85	1.15	1.24	1.01	1.23	1.30	1.21	1.28	1.24	1.31
City Way/Camberwell Way	0.40	0.51	0.63	3.37	0.66	2.07	1.04	2.17	0.71	2.01
City Way/Doxford Park Way	0.69	0.74	1.12	1.09	1.41	1.36	1.37	1.33	1.39	1.35
Doxford Park Way/Silksworth Way	0.70	0.69	1.13	1.09	1.68	1.18	5.19	4.66	9.30	5.67
Doxford Park Way/Half Farm Road	0.04	0.06	0.15	0.14	0.26	0.23	0.22	0.20	0.24	0.20
Doxford Park Way/Burdon Road	0.21	0.39	0.55	0.54	1.66	1.71	2.26	1.75	1.92	1.70
Burdon Road/Bardon Lane	0.29	1.02	0.27	0.22	0.83	0.82	0.95	0.88	0.91	0.89
Burdon Road/Bevan Avenue	0.12	0.25	0.10	0.11	1.90	1.68	1.84	1.86	1.87	1.84
Burdon Lane/Ryhope Street South	0.27	0.55	0.37	0.32	1.57	1.48	1.38	1.46	1.50	1.46
Ryhope Street South/Black Road	0.20	0.69	0.76	0.60	1.18	1.20	1.27	1.20	1.19	1.20
Ryhope Street South/Bevan Avenue	0.09	0.30	0.71	0.63	3.69	3.48	2.43	2.83	2.87	2.79
Stockton Road/The Village	0.20	0.40	0.58	0.41	0.84	0.88	0.78	1.01	1.02	1.00
The Village/ Robson Pl	0.14	0.22	0.22	0.28	0.23	0.26	0.30	0.28	0.32	0.28
Sea View/A1018	0.63	0.75	0.65	0.72	1.05	1.10	1.36	1.21	1.27	1.22
A1018/B1287	0.53	0.92	0.87	0.80	1.08	1.06	1.04	1.07	1.07	1.07
Ryhope Road/Sea View	0.32	0.54	0.46	0.60	0.33	0.33	0.40	0.37	0.38	0.37
Ryhope St/Nelson St	0.09	0.29	0.67	0.53	0.64	0.60	0.51	0.60	0.62	0.60
Toll Bar Road/Fenside road	0.29	0.60	0.50	0.51	1.01	0.88	1.01	1.10	1.11	1.09
B1405/Salterfen Road	0.63	0.96	0.98	0.92	1.20	1.26	1.43	1.37	1.38	1.38
A1018/Salterfen Road	0.61	0.95	0.98	0.95	1.07	1.09	1.03	1.10	1.08	1.11

Toll Bar Road/Carrmere Road	0.10	0.23	0.16	0.15	0.36	0.32	0.32	0.38	0.39	0.38
Toll Bar/Hollycarrside Road	0.22	1.00	1.02	0.86	1.05	1.03	1.05	1.06	1.15	1.09
Tunstall Village Green/Burdon Road	0.28	0.49	0.86	0.80	1.16	1.09	2.00	1.48	2.08	1.48
Tunstall Village Lane/Tunstall Village Rd	0.21	0.36	0.46	0.44	0.32	0.54	0.24	0.26	0.34	0.26
Maple Avenue/Paddock Lane	0.18	0.27	0.48	0.38	1.21	0.85	0.64	1.03	1.28	1.04
Tunstall Hope Road/Paddock Lane	0.33	0.50	0.53	0.65	1.08	0.52	0.45	1.08	1.08	1.08
Toll Bar Road/Leechmere Road	0.36	0.64	0.50	0.51	0.72	0.74	0.71	0.71	0.82	0.70
Leechmere Way/Toll Bar Road	0.29	0.37	0.33	0.32	0.57	0.51	0.60	0.67	0.58	0.61
Leechmere/Toll Bar North	0.21	0.30	0.31	0.30	0.39	0.36	0.38	0.38	0.40	0.38
Leechmere Road	0.21	0.29	0.20	0.17	0.26	0.21	0.27	0.24	0.26	0.22
Leechmere Road/Tunstall Road	0.90	1.14	1.25	1.18	2.16	2.13	2.46	2.26	2.26	2.22
Premier Road/Essen Way	0.73	1.28	1.63	1.29	2.71	2.31	2.92	2.72	3.46	2.63
Warwick Terrace/Silksworth Lane	0.43	0.46	0.56	0.73	0.59	0.61	0.53	0.55	0.60	0.53
Silksworth Lane/North Moor Lane	0.33	0.43	0.30	0.33	1.07	1.46	1.60	1.47	1.57	1.34
Silksworth Lane/Silksworth Road	0.46	0.83	0.79	0.85	0.60	0.68	0.67	0.69	0.63	0.69
Silksworth Way/Silksworth Road	0.55	0.89	0.81	0.93	1.10	1.05	1.15	1.14	1.22	1.11
Essen Way/Langley Road	0.43	1.15	0.90	0.58	1.08	0.74	1.37	0.82	1.19	0.71
A690/West Park	0.37	0.70	0.41	0.48	1.07	1.07	0.60	1.08	1.08	1.07
West Park/Herringon Road	0.26	0.29	1.23	1.25	1.40	1.35	1.96	1.39	1.45	1.38
A690/Herrington Road	0.76	1.10	1.75	2.01	1.59	1.44	1.30	1.66	1.41	1.41
A690/North Moor Lane	0.95	1.27	1.24	1.21	1.37	1.23	1.20	1.22	1.26	1.23
Durham Road/Premier Road	0.97	1.33	1.52	0.99	1.13	1.40	1.66	2.25	1.60	1.76
A690/Barnes Park Road	0.39	0.55	0.59	0.46	0.73	0.59	0.82	0.61	0.75	0.65
Queen Alexandra Road/Silksworth Lane	0.55	0.74	0.73	0.69	0.87	0.85	0.93	0.93	0.87	0.86
Durham Road/Richard Avenue	0.33	0.56	0.69	0.62	0.81	0.70	0.93	0.76	0.87	0.73
Durham Road/Ettrick Grove	0.80	1.23	1.11	0.90	1.12	1.02	1.11	1.12	1.11	0.94
Ryhope Road/Ocean Road South	0.71	1.01	0.88	0.91	0.90	1.02	0.92	1.07	0.83	1.05
A1018/Ocean Road South	0.61	1.03	1.00	0.96	0.98	1.04	1.00	1.06	0.98	1.05
Queen Alexandra Rd/Ashbrooke Range	0.46	0.91	0.92	0.92	1.05	1.06	1.02	1.00	1.03	1.04
The Cedars/Ryhope Road	0.52	0.69	0.87	0.71	1.01	1.00	1.00	1.00	1.00	1.00
St Alban's Street/Commercial Road	0.72	1.03	1.05	1.01	1.06	1.02	1.07	1.05	1.09	1.03
Commercial Road/Robinson Terrace	0.70	0.93	0.95	0.87	1.04	0.98	1.15	0.96	1.04	0.97
Ryhope Road/Mowbray Road	0.41	0.46	0.60	0.50	1.12	1.08	1.10	1.10	1.12	1.16

Commercial Road/White House Road	0.72	0.97	1.02	0.93	1.14	1.08	0.99	1.07	1.17	1.08
A690/Barnes Park Road	0.39	0.55	0.59	0.46	0.73	0.59	0.82	0.61	0.75	0.65
Park Road/A1231	0.15	0.31	0.28	0.25	0.69	0.77	0.71	0.80	0.81	0.76
Burn Park/Eden House Road	0.35	0.72	0.55	0.78	0.78	0.91	1.00	0.93	0.92	0.96
New Durham Road/Burn Park Road	0.17	0.28	0.45	0.85	0.57	0.91	0.40	0.93	0.40	0.83
Burn Park/Derby Street	0.16	0.25	0.29	0.30	0.27	0.98	0.39	0.96	0.38	0.93
Chester Road/The Royalty	0.23	0.46	0.35	0.44	0.38	0.41	0.47	0.45	0.47	0.46
Chester Road/St Michael Way	1.00	1.64	0.98	0.91	1.87	1.65	1.55	1.73	1.92	1.64
Grange Terrace/ Thornhill Cres	0.48	0.54	0.75	0.81	0.96	1.08	1.06	1.08	1.00	1.07
A1231/A690	0.77	0.78	0.86	0.75	0.94	1.16	1.16	1.50	1.10	2.19
A690/St Michaels Way	0.58	0.66	0.67	0.78	1.01	1.12	1.11	1.12	1.10	1.12
SB St Michaels Way/ A690	0.52	0.44	0.63	0.75	0.65	0.78	0.68	0.79	0.73	0.80
Mary St/St Michaels Way	0.33	0.37	0.46	0.56	0.45	0.52	0.49	0.51	0.50	0.52
A1231/Belvedere Road	0.79	0.91	0.75	0.88	0.95	0.95	0.94	0.95	0.95	0.94
Lawrence St/Hendon Road	0.70	0.90	0.90	0.87	0.92	0.96	0.97	0.93	0.90	0.93
Borough Road/A1018	0.57	0.77	0.74	0.83	0.66	0.74	0.73	0.76	0.70	0.82
WB West Wear Street/Wearmouth Bridge	0.62	1.08	0.85	1.07	1.01	1.07	1.04	1.07	1.05	1.07
Wearmouth Bridge/St Mary's Way EB	0.30	0.34	0.43	0.40	0.48	0.44	0.46	0.46	0.46	0.45
WB St Mary's Way/Wearmouth Bridge	0.46	0.84	0.74	0.81	0.67	0.73	0.77	0.74	0.75	0.76
SB Wearmouth Bridge/West Wear Street	0.65	1.01	0.82	0.93	0.95	0.94	0.86	0.99	0.86	0.99
Chester Road/St Marks's Road	0.24	0.92	0.98	1.38	1.20	1.06	1.14	1.23	1.14	1.20
Kayll Road/Chester Road	0.97	1.03	0.97	0.93	1.05	1.56	1.12	1.17	1.15	1.26
Ettrick Grove/Chester Road	0.36	0.56	0.38	0.27	0.56	0.33	0.78	0.33	0.45	0.35
The Broadway/Springwell Road	0.97	1.67	1.13	1.21	1.17	1.18	1.22	1.14	1.17	1.16
Chester Road/Grindon Lane	0.58	1.09	0.66	0.56	0.76	0.59	1.07	1.00	0.95	0.50
Chester Road/Pennywell Road	0.82	1.03	1.06	1.06	1.27	1.29	1.18	1.16	2.26	2.17
Chester Road/Greenwood Road	0.71	1.21	0.82	0.79	0.84	0.78	1.13	0.80	0.99	0.81
Chester Road/Prestbury Road	0.31	0.93	1.02	0.96	1.33	1.30	1.47	1.45	1.50	1.56
Prestbury Road/Hylton Road	0.18	0.31	0.33	0.28	0.37	0.34	0.41	0.45	0.44	1.07
Hylton Road/Waterford Green	0.22	0.38	0.39	0.29	0.81	0.33	0.95	0.70	1.02	1.00
Hylton Road/Grindon Lane	0.47	0.84	0.78	0.94	1.14	1.00	1.13	1.04	1.13	1.04
Hylton Road/Portsmouth Road	0.27	0.41	0.52	0.39	0.62	0.41	0.60	0.42	0.59	0.42
Hylton Road/Font Road	0.51	0.53	0.83	0.88	1.22	1.20	1.28	1.20	1.20	1.20

Hylton Road/Kayll Road	0.87	1.02	1.19	0.97	0.97	0.99	1.01	1.12	1.01	1.10
St Luk's Terrace/St Luke's Road	0.14	0.18	0.21	0.40	0.42	0.79	0.40	0.79	0.47	0.83
Pallion New Road/Lisburn Terrace	0.29	1.07	0.38	0.41	0.41	0.46	0.46	0.47	0.45	0.50
Trimdon Street/ Silksworth Row	0.85	1.06	1.00	1.06	1.14	1.18	1.20	1.17	1.24	1.20
Hylton Road/Rutland Street	0.19	0.29	0.24	0.34	0.39	0.50	0.57	0.52	0.52	0.49
Hylton Road/St Marks Road North	0.27	0.96	0.49	0.60	0.53	0.94	0.51	0.96	0.65	0.98
A1018/Dame Dorothy Street	0.64	0.87	0.84	0.81	0.84	0.80	0.77	0.83	0.81	0.83
A1018/Sheepfolds North	0.51	0.66	0.66	0.62	1.90	1.94	1.78	1.99	1.81	2.05
Church Street/Dame Dorothy Street	0.68	1.05	1.03	0.95	1.00	0.90	0.95	0.96	0.96	0.92
North Bridge Street/Roker Avenue	0.74	1.08	0.95	1.11	1.44	1.11	1.03	1.27	1.03	1.27
Roker Avenue/Fulwell Road	0.89	1.11	1.00	0.94	1.00	0.99	0.98	1.01	0.99	1.02
Roker Avenue/Church Street	0.73	1.09	0.96	0.69	0.88	0.71	0.83	0.70	0.83	0.71
Dame Dorothy Street/Harbour View	0.30	0.35	0.38	0.39	0.39	0.36	0.42	0.38	0.38	0.36
Roker Baths Road/Fulwell Road	0.41	0.74	0.58	0.50	0.67	0.49	0.57	0.47	0.65	0.50
Roker Terrace/St George's Terrace	0.25	0.37	0.34	0.38	0.35	0.35	0.38	0.39	0.36	0.36
Whitburn Road/Chichester Road	0.19	0.25	0.31	0.34	0.31	0.31	0.34	0.36	0.32	0.33
Whitburn Road/Dykelands Road	0.96	1.28	1.01	1.01	1.41	1.51	1.62	1.87	1.88	1.94
Newcastle Road/A1018	0.42	0.70	0.57	0.57	0.57	0.53	0.64	0.52	0.56	0.53
A1018/Dovedale Road	0.40	1.03	0.95	0.85	0.95	0.95	1.07	0.95	0.97	0.95
Newcastle Road/Chalton Road	0.90	1.13	1.04	1.04	1.06	1.06	1.10	1.10	1.07	1.11
Newcastle Road/Newhaven Avenue	0.23	0.43	0.35	0.25	0.38	0.36	0.37	0.36	0.40	0.36
Newcastle Road/Crozier Street	0.27	0.46	0.41	0.61	0.44	0.58	0.42	0.64	0.43	0.70
Southwick Road/Stadium Way	0.43	0.75	0.83	0.81	0.92	0.89	0.93	0.97	0.93	0.97
Queens Road/Kier Hardie Way	0.57	0.87	0.74	0.86	0.84	0.91	0.94	1.00	0.86	1.01
Southwick Road/B1291	0.76	0.81	0.96	0.86	1.05	1.05	1.05	1.05	1.05	1.05
A1231/Camden Street	0.86	0.93	0.82	0.68	0.66	0.84	0.72	0.81	0.68	0.81
Camden Street/Trafford Road	0.29	0.37	0.29	0.33	0.28	0.73	0.27	0.81	0.28	0.73
Wessington Way/Queens Road	0.81	0.94	1.01	0.74	1.05	0.95	1.06	0.92	1.06	0.84
Wessington Way/A1231	0.85	1.20	1.07	0.97	1.29	1.20	1.31	1.20	1.31	1.20
Northern Way/Dean Terrace	0.83	0.80	0.85	0.87	0.93	0.84	0.90	0.87	0.94	0.97
Northern Way/North Hylton Road	0.33	0.55	0.49	0.38	0.68	0.60	0.70	0.61	0.72	0.59
Old Mill Road/Wembley Road	0.11	0.19	0.16	0.17	0.21	0.30	0.26	0.35	0.25	0.35
Hylton Road/Castletown Way	0.92	0.91	0.78	0.98	1.00	1.02	0.99	1.02	1.00	1.02

North Hylton Road/Radlett Road	0.45	0.85	0.86	0.59	0.73	0.53	0.93	0.60	0.80	0.73
Castletown Way/Riverside Road	0.63	0.42	0.67	0.48	1.17	1.11	1.11	1.10	2.24	0.80
Wessington Way/Castletown Way	0.94	1.23	1.18	1.07	1.19	1.19	1.21	1.53	1.54	1.18
Wessington Way/Colima Avenue	0.89	1.21	1.87	1.11	1.29	1.57	1.45	1.41	1.35	1.43
Grange Road/Barons Quay Road	0.26	0.34	0.36	0.76	0.54	0.80	0.68	0.85	0.49	0.88
Wessington Way/Ferryboat Lane	0.98	1.21	1.15	1.07	1.29	1.10	1.31	1.21	1.31	1.12
Washington Road/Ferryboat Lane	0.74	1.15	1.08	1.11	1.08	1.16	1.03	1.18	1.08	1.17
Washington Road/Blackwood Road	0.65	1.10	0.99	1.02	1.10	1.04	1.07	1.03	1.10	1.04
Washington Road/Canterbury Road	0.18	0.32	0.28	0.55	0.28	0.68	0.28	0.65	0.33	0.67
Washington Road/Hylton Lane	0.85	1.02	0.88	1.00	1.04	0.95	1.07	0.93	1.03	0.93
Washington Road/Craigavon Road	0.71	0.89	1.00	0.95	1.08	1.06	1.10	1.06	1.08	1.05
Washington Road/Rotherfield Road	0.38	0.90	0.93	0.66	0.92	0.51	1.57	0.53	0.94	0.66
Kingsway Road/Hylton Lane	0.10	0.14	0.29	0.28	0.48	0.53	0.59	0.56	0.50	0.50
A1290/Downhill Lane	0.21	0.47	0.94	1.43	1.51	1.23	1.03	1.32	1.22	1.31
A1290/Nissan Sight	0.67	0.65	1.01	1.04	1.15	1.26	0.90	1.38	1.28	1.36
A1290/Cherry Blossom Way	0.20	0.49	1.11	0.99	7.59	2.10	0.61	3.32	6.79	3.91
Nissan Way/A1231	0.14	0.25	0.55	0.38	3.02	2.01	0.32	3.02	3.76	3.01
Sunderland Highway/ SB Pattinson Road	0.16	0.21	0.26	0.12	0.18	0.15	0.26	0.15	0.18	0.15
NB Pattinson Way/A1231	0.33	0.55	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67
Sunderland Highway/ NB Nissan Way	0.11	0.19	0.17	0.25	0.26	0.26	0.26	0.24	1.07	1.00
Glover Road/Spire Road	0.11	0.37	0.53	0.49	0.70	0.66	0.49	0.95	0.82	0.95
A1231/Spire Road	0.15	0.53	0.62	0.60	0.88	0.74	0.65	1.03	0.93	1.03
A1231/Horsley Road	0.20	0.34	0.97	0.27	0.37	0.33	0.31	1.01	0.47	1.01
Northumberland Way SB Onslip/Sunderland Highway	0.21	0.34	0.19	0.36	0.22	0.34	0.31	0.34	0.27	0.35
Northumberland Way /Sunderland Hwy Offslip	0.19	0.22	0.31	0.29	0.29	0.25	0.33	0.17	0.30	0.17
Northumberland Way NB Onslip/Sunderland Hwy	0.17	0.26	0.26	0.34	0.34	0.37	0.38	0.38	0.36	0.38
Northumberland Way NB/Sunderland Hwy Offslip	0.22	0.30	0.32	0.35	0.37	0.36	0.38	0.30	0.36	0.29
Washington Hwy SB Offslip/A1231	0.75	0.92	1.01	1.01	1.03	1.09	1.05	1.14	1.05	1.14
Sunderland Hwy EB Offslip/Washington Hwy SB	0.84	0.97	1.05	0.73	1.00	0.73	0.79	0.72	0.96	0.70
Washington Hwy NB Offslip/A1231	0.51	0.73	0.82	0.94	0.83	0.98	0.68	0.94	0.93	0.95

A1231 WB Offslip/Washington Hwy	0.83	0.93	0.94	1.02	0.93	1.01	1.07	1.06	1.02	1.06
A182 - Salter's Ln	0.00	0.01	0.69	0.81	1.70	1.27	1.67	1.36	1.99	1.37
A182 - Murton Ln	0.00	0.00	1.44	1.54	1.45	1.54	1.45	1.55	1.29	1.55
WB A182 - B1284	0.01	0.01	1.43	1.69	2.35	2.23	2.86	4.34	3.41	4.81
SB A182 - B1284	0.00	0.00	0.48	0.39	0.31	0.46	0.28	0.50	0.35	0.50
A182 - Caroline St	0.01	0.01	0.15	0.36	2.12	2.73	2.17	2.48	2.27	2.57
A182 - Regent St	0.00	0.00	0.05	0.00	1.66	1.70	1.33	1.47	1.48	1.50
A182 - The Bungalows	0.00	0.00	0.54	0.26	1.35	1.40	1.27	1.46	1.34	1.42
B1260 - B1284	0.01	0.01	0.32	0.28	0.40	0.32	0.42	0.43	0.41	0.47
B1284 - Cygnet Way	0.00	0.01	0.60	0.43	0.90	0.52	0.61	0.66	1.01	0.67
A690 - Slip Roads/ Cygnet Way	0.02	0.02	1.00	0.74	1.23	0.87	1.11	1.04	1.26	1.06
A182 - B1260	0.01	0.01	1.21	2.31	2.58	3.46	2.63	3.10	2.72	2.98
B1404 - B1260	0.00	0.01	0.97	0.29	2.34	1.06	1.50	1.32	1.41	1.23
B1404 - Salters Lane	0.26	0.26	0.40	0.29	0.76	0.65	0.68	0.70	0.91	0.69
A1052 - Dairy Lane	0.01	0.01	0.50	0.63	0.50	0.54	0.51	0.48	0.52	0.49
A1052 - Britannia Terrace	0.24	0.40	1.70	1.66	1.63	1.73	1.91	1.93	1.85	1.94
A690 - A1052 NB off slip	0.00	0.00	0.92	0.90	0.85	1.05	0.78	1.00	0.76	0.96
A690 - A1052 Dairy Lane entry	0.00	0.00	0.42	0.40	1.15	0.56	1.05	0.82	1.17	0.88
A690 - A1052 SB off slip	0.00	0.00	0.70	0.52	0.77	0.55	0.85	0.58	0.83	0.62
A690 - A1052 A182 entry	0.00	0.00	0.97	0.63	1.16	0.69	1.09	0.84	1.22	0.93
A690 - B1404 - NB parallel slip	0.00	0.00	0.18	0.19	0.21	0.22	0.20	0.23	0.19	0.23
A690 - B1404 - A182 Hillside Way	0.00	0.00	0.28	0.19	0.50	0.27	0.53	0.38	0.57	0.42
A690 - B1404 - A182 SB off slip	0.00	0.00	0.08	0.11	0.03	0.04	0.02	0.02	0.02	0.02
A690 - B1404 - Lake Road entry	0.00	0.00	1.09	1.04	1.18	1.21	1.42	1.25	1.50	1.28
Vigo Ln - Picktree Ln	0.45	0.80	1.03	1.09	1.04	1.04	1.05	1.04	1.03	1.04
Picktree Ln - Bonemill Ln	0.47	0.72	1.02	0.97	1.19	1.11	1.14	1.15	1.26	1.14
Bonemill Ln/ Vigo Ln	0.31	0.61	0.66	0.75	0.75	0.90	0.74	0.93	0.78	0.94
A182 - Coaley Ln	1.01	1.02	2.00	2.00	2.00	2.00	2.00	2.00	2.11	2.00
A182 - B1286	0.86	1.07	1.48	1.35	1.97	1.77	1.46	2.06	2.47	2.13
A182 - A183	1.00	1.04	1.45	1.29	1.97	1.75	2.16	2.00	2.26	2.06

6.3 RFC SATURN Junction Results

6.3.1 The SATURN outputs have been used to determine when junctions on the modelled network will begin to experience capacity issues over the whole Local Plan period. Junctions that have been shown to trigger capacity issues have been identified; those which will generate an RFC of 0.91 and above. Modelled junctions with RFCs of 0.00 to 0.90 have not been included in this analysis as the results demonstrate that these junctions are not likely to become oversaturated as a result of the Local Plan development traffic.

6.3.2 As part of this individual junction analysis, the first Local Plan period when a junction triggers capacity issues has been discussed below. For example, if a junction is anticipated to experience capacity issues during phases 0 and 3, then phase 0 has been recorded as the trigger time for when the junction will require some form of mitigation to resolve future capacity issues as a result of future traffic demand.

6.3.3 The GIS plans in Appendix E illustrate the junction locations and the RFC results for each of the four modelled phases.

6.4 RFC SATURN Junction Results for the AM Peak

6.4.1 During the AM modelled peak:

- 70 junctions will trigger capacity issues during phase 0;
- 40 junctions will trigger capacity issues during phase 1;
- 11 junctions will trigger capacity issues during phase 2; and
- 6 junctions will trigger capacity issues during phase 3.

6.4.2 Tables 12 to 15 show the junctions that are likely to trigger capacity issues during phase 0, 1, 2, and 3 of the Local Plan for the modelled AM peak. Cells highlighted in amber show RFCs of 0.91 to 1.00 and cells shaded in red indicate RFCs of greater than 1.00.

6.4.3 The plan in Appendix F shows the corresponding junction reference numbers contained in the "Ref" columns in the results tables below.

Table 12 RFCs for Junctions with Capacity Issues during Phase 0 for the AM Peak

Ref	Junction Name	RFC	Ref	Junction Name	RFC
131	NB Pattinson Way/A1231	2.67	**104**	Newcastle Road/Chalton Road	1.04
154	A182 - Coaley Ln	2.00	**94**	Church Street/Dame Dorothy Street	1.03
118	Wessington Way/Colima Avenue	1.87	**151**	Vigo Ln - Picktree Ln	1.03
41	A690/Herrington Road	1.75	**27**	Toll Bar/Hollycarrside Road	1.02
148	A1052 - Britannia Terrace	1.70	**82**	Chester Road/Prestbury Road	1.02
33	Premier Road/Essen Way	1.63	**55**	Commercial Road/White House Road	1.02
43	Durham Road/Premier Road	1.52	**152**	Picktree Ln - Bonemill Ln	1.02
155	A182 - B1286	1.48	**129**	A1290/Nissan Sight	1.01
156	A182 - A183	1.45	**134**	Washington Hwy SB Offslip/A1231	1.01

136	A182 - Murton Ln	1.44	**110**	Wessington Way/Queens Road	1.01
137	WB A182 - B1284	1.43	**101**	Whitburn Road/Dykelands Road	1.01
1	A19 NB Offslip/A1290 Downhill Ln	1.41	**143**	A690 - Slip Roads	1.00
2	Sunderland Highway/A19	1.37	**96**	Roker Avenue/Fulwell Road	1.00
32	Leechmere Road/Tunstall Road	1.25	**49**	A1018/Ocean Road South	1.00
6	City Way/Monarch Way	1.24	**90**	Trimdon Street/ Silksworth Row	1.00
42	A690/North Moor Lane	1.24	**125**	Washington Road/Craigavon Road	1.00
40	West Park/Herringon Road	1.23	**122**	Washington Road/Blackwood Road	0.99
144	A182 - B1260	1.21	**62**	Chester Road/St Michael Way	0.98
88	Hylton Road/Kayll Road	1.19	**25**	A1018/Salterfen Road	0.98
3	A19N onslip/A183W	1.18	**24**	B1405/Salterfen Road	0.98
117	Wessington Way/Castletown Way	1.18	**75**	Chester Road/St Marks's Road	0.98
120	Wessington Way/Ferryboat Lane	1.15	**76**	Kayll Road/Chester Road	0.97
78	The Broadway/Springwell Road	1.13	**145**	B1404 - B1260	0.97
9	Doxford Park Way/Silksworth Way	1.13	**132**	A1231/Horsley Road	0.97
8	City Way/Doxford Park Way	1.12	**149**	A690 - A1052 A182 entry	0.97
4	A19N Onslip/Durham Road	1.12	**96**	Roker Avenue/Church Street	0.96
130	A1290/Cherry Blossom Way	1.11	**109**	Southwick Road/B1291	0.96
47	Durham Road/Ettrick Grove	1.11	**95**	North Bridge Street/Roker Avenue	0.95
150	A690 - B1404 - Lake Road entry	1.09	**53**	Commercial Road/Robinson Terrace	0.95
121	Washington Road/Ferryboat Lane	1.08	**103**	A1018/Dovedale Road	0.95
110	Wessington Way/A1231	1.07	**134**	A1231 WB Offslip/Washington Hwy	0.94
80	Chester Road/Pennywell Road	1.06	**128**	A1290/Downhill Lane	0.94
52	St Alban's Street/Commercial Road	1.05	**126**	Washington Road/Rotherfield Road	0.93
134	Sunderland Hwy EB Offslip/Washington Hwy SB	1.05	**149**	A690 - A1052 NB off slip	0.92
4	A19S offslip/Parkside south	1.04	**50**	Queen Alexandra Rd/Ashbrooke Range	0.92

Table 13 RFCs for Junctions with Capacity Issues during Phase 1 for the AM Peak

Ref	Junction Name	RFC	Ref	Junction Name	RFC
16	Ryhope Street South/Bevan Avenue	3.69	37	Silksworth Way/Silksworth Road	1.10
131	Nissan Way/A1231	3.02	38	Essen Way/Langley Road	1.08
138	A182 - Caroline St	2.12	30	Tunstall Hope Road/Paddock Lane	1.08
93	A1018/Sheepfolds North	1.90	20	A1018/B1287	1.08
13	Burdon Road/Bevan Avenue	1.90	39	A690/West Park	1.07
135	A182 - Salter's Ln	1.70	35	Silksworth Lane/North Moor Lane	1.07
11	Doxford Park Way/Burdon Road	1.66	19	Sea View/A1018	1.05
139	A182 - Regent St	1.66	124	Washington Road/Hylton Lane	1.04
14	Burdon Lane/Ryhope Street South	1.57	23	Toll Bar Road/Fenside road	1.01
140	A182 - The Bungalows	1.35	71	WB West Wear Street/Wearmouth Bridge	1.01
87	Hylton Road/Font Road	1.22	51	The Cedars/Ryhope Road	1.01
5	City Way/Emperor Way	1.22	65	A690/St Michaels Way	1.01
29	Maple Avenue/Paddock Lane	1.21	114	Hylton Road/Castletown Way	1.00
15	Ryhope Street South/Black Road	1.18	63	Grange Terrace/ Thornhill Cres	0.96
116	Castletown Way/Riverside Road	1.17	68	A1231/Belvedere Road	0.95
28	Tunstall Village Green/Burdon Road	1.16	74	SB Wearmouth Bridge/West Wear Street	0.95
149	A690 - A1052 Dairy Lane entry	1.15	64	A1231/A690	0.94
85	Hylton Road/Grindon Lane	1.14	111	Northern Way/Dean Terrace	0.93
4	A19N offslip/Durham Rd	1.12	69	Lawrence St/Hendon Road	0.92
54	Ryhope Road/Mowbray Road	1.12	107	Southwick Road/Stadium Way	0.92

Table 14 RFCs for Junctions with Capacity Issues during Phase 2 for the AM Peak

Ref	Junction Name	RFC	Ref	Junction Name	RFC
81	Chester Road/Greenwood Road	1.13	108	Queens Road/Kier Hardie Way	0.94
79	Chester Road/Grindon Lane	1.07	115	North Hylton Road/Radlett Road	0.93
7	City Way/Camberwell Way	1.04	45	Queen Alexandra Road/Silksworth Lane	0.93
58	Burn Park/Eden House Road	1.00	46	Durham Road/Richard Avenue	0.93
84	Hylton Road/Waterford Green	0.95	48	Ryhope Road/Ocean Road South	0.92
12	Burdon Road/Bardon Lane	0.95			

Table 15 RFCs for Junctions with Capacity Issues during Phase 3 for the AM Peak

Ref	Junction Name	RFC	Ref	Junction Name	RFC
131	Sunderland Highway/ NB Nissan Way	1.07	**134**	Washington Hwy NB Offslip/A1231	0.93
17	Stockton Road/The Village	1.02	**132**	A1231/Spire Road	0.93
142	B1284 - Cygnet Way	1.01	**146**	B1404 - Salters Lane	0.91

6.4.4 The results show that 127 junctions can be expected to trigger capacity issues over the whole Local Plan period during the modelled AM peak. 70 (55%) of these junctions are anticipated to trigger capacity issues during phase 0 of the Local Plan, which includes 24 junctions nearing capacity and 46 junctions forecasted to become oversaturated and operate beyond existing design capacities.

6.4.5 110 (87%) of these junctions are anticipated to trigger capacity issues during phase 0 and phase 1 of the Local Plan during the AM peak.

6.4.6 These results suggests that the majority of the junctions will require substantial remedial works or appropriate alternative link road schemes to be considered prior to phase 0 of the Local Plan to ensure that the forecasted saturated links at the junctions operate within capacity.

6.4.7 As the Local Plan periods progress, the volumes of links/junctions that are forecasted to have capacity issues decreases during phases 1, 2, and 3.

6.5 RFC SATURN Junction Results for the PM Peak

6.5.1 During the PM modelled peak:

- 65 junctions will trigger capacity issues during phase 0;
- 40 junctions will trigger capacity issues during phase 1;
- 12 junctions will trigger capacity issues during phase 2; and
- 5 junctions will trigger capacity issues during phase 3.

6.5.2 Tables 16 to 19 show the junctions that are likely to trigger capacity issues during phase 0, 1, 2, and 3 of the Local Plan for the modelled PM peak. Cells highlighted in amber show RFCs of 0.91 to 1.00 and cells shaded in red indicate RFCs of greater than 1.00.

6.5.3 The plan in Appendix F shows the corresponding junction reference numbers contained in the "Ref" columns in the results tables below.

Table 16 RFCs for Junctions with Capacity Issues during Phase 0 for the PM Peak

Ref	Junction Name	RFC	Ref	Junction Name	RFC
7	City Way/Camberwell Way	3.37	**104**	Newcastle Road/Chalton Road	1.04
131	NB Pattinson Way/A1231	2.67	**150**	A690 - B1404 - Lake Road entry	1.04
144	A182 - B1260	2.31	**129**	A1290/Nissan Sight	1.04
41	A690/Herrington Road	2.01	**122**	Washington Road/Blackwood Road	1.02
154	A182 - Coaley Ln	2.00	**134**	A1231 WB Offslip/Washington Hwy	1.02
137	WB A182 - B1284	1.69	**52**	St Alban's Street/Commercial Road	1.01

148	A1052 - Britannia Terrace	1.66	**6**	City Way/Monarch Way	1.01
136	A182 - Murton Ln	1.54	**134**	Washington Hwy SB Offslip/A1231	1.01
128	A1290/Downhill Lane	1.43	**101**	Whitburn Road/Dykelands Road	1.01
75	Chester Road/St Marks's Road	1.38	**124**	Washington Road/Hylton Lane	1.00
2	Sunderland Highway/A19	1.36	**130**	A1290/Cherry Blossom Way	0.99
155	A182 - B1286	1.35	**43**	Durham Road/Premier Road	0.99
156	A182 - A183	1.29	**114**	Hylton Road/Castletown Way	0.98
33	Premier Road/Essen Way	1.29	**110**	Wessington Way/A1231	0.97
1	A19 NB Offslip/A1290 Downhill Ln	1.27	**152**	Picktree Ln - Bonemill Ln	0.97
40	West Park/Herringon Road	1.25	**88**	Hylton Road/Kayll Road	0.97
78	The Broadway/Springwell Road	1.21	**49**	A1018/Ocean Road South	0.96
42	A690/North Moor Lane	1.21	**82**	Chester Road/Prestbury Road	0.96
3	A19N onslip/A183W	1.20	**125**	Washington Road/Craigavon Road	0.95
32	Leechmere Road/Tunstall Road	1.18	**25**	A1018/Salterfen Road	0.95
4	A19S offslip/Parkside south	1.14	**94**	Church Street/Dame Dorothy Street	0.95
121	Washington Road/Ferryboat Lane	1.11	**96**	Roker Avenue/Fulwell Road	0.94
95	North Bridge Street/Roker Avenue	1.11	**85**	Hylton Road/Grindon Lane	0.94
118	Wessington Way/Colima Avenue	1.11	**134**	Washington Hwy NB Offslip/A1231	0.94
9	Doxford Park Way/Silksworth Way	1.09	**37**	Silksworth Way/Silksworth Road	0.93
4	A19N Onslip/Durham Road	1.09	**76**	Kayll Road/Chester Road	0.93
151	Vigo Ln - Picktree Ln	1.09	**74**	SB Wearmouth Bridge/West Wear Street	0.93
8	City Way/Doxford Park Way	1.09	**55**	Commercial Road/White House Road	0.93
120	Wessington Way/Ferryboat Lane	1.07	**24**	B1405/Salterfen Road	0.92
71	WB West Wear Street/Wearmouth Bridge	1.07	**50**	Queen Alexandra Rd/Ashbrooke Range	0.92
117	Wessington Way/Castletown Way	1.07	**62**	Chester Road/St Michael Way	0.91
80	Chester Road/Pennywell Road	1.06	**48**	Ryhope Road/Ocean Road South	0.91
90	Trimdon Street/ Silksworth Row	1.06			

Table 17 RFCs for Junctions with Capacity Issues during Phase 1 for the PM Peak

Ref	Junction Name	RFC	Ref	Junction Name	RFC
16	Ryhope Street South/Bevan Avenue	3.48	**54**	Ryhope Road/Mowbray Road	1.08

138	A182 - Caroline St	2.73	**63**	Grange Terrace/ Thornhill Cres	1.08
131	Nissan Way/A1231	2.01	**39**	A690/West Park	1.07
93	A1018/Sheepfolds North	1.94	**145**	B1404 - B1260	1.06
11	Doxford Park Way/Burdon Road	1.71	**20**	A1018/B1287	1.06
139	A182 - Regent St	1.70	**109**	Southwick Road/B1291	1.05
13	Burdon Road/Bevan Avenue	1.68	**149**	A690 - A1052 NB off slip	1.05
5	City Way/Emperor Way	1.55	**27**	Toll Bar/Hollycarrside Road	1.03
14	Burdon Lane/Ryhope Street South	1.48	**47**	Durham Road/Ettrick Grove	1.02
35	Silksworth Lane/North Moor Lane	1.46	**51**	The Cedars/Ryhope Road	1.00
140	A182 - The Bungalows	1.40	**53**	Commercial Road/Robinson Terrace	0.98
135	A182 - Salter's Ln	1.27	**60**	Burn Park/Derby Street	0.98
87	Hylton Road/Font Road	1.20	**69**	Lawrence St/Hendon Road	0.96
15	Ryhope Street South/Black Road	1.20	**110**	Wessington Way/Queens Road	0.95
64	A1231/A690	1.16	**68**	A1231/Belvedere Road	0.95
65	A690/St Michaels Way	1.12	**103**	A1018/Dovedale Road	0.95
116	Castletown Way/Riverside Road	1.11	**92**	Hylton Road/St Marks Road North	0.94
4	A19N offslip/Durham Rd	1.10	**59**	New Durham Road/Burn Park Road	0.91
19	Sea View/A1018	1.10	**58**	Burn Park/Eden House Road	0.91
28	Tunstall Village Green/Burdon Road	1.09	**108**	Queens Road/Kier Hardie Way	0.91

Table 18 RFCs for Junctions with Capacity Issues during Phase 2 for the PM Peak

Ref	Junction Name	RFC	Ref	Junction Name	RFC
23	Toll Bar Road/Fenside road	1.10	**17**	Stockton Road/The Village	1.01
30	Tunstall Hope Road/Paddock Lane	1.08	**79**	Chester Road/Grindon Lane	1.00
143	A690 - Slip Roads	1.04	**107**	Southwick Road/Stadium Way	0.97
132	A1231/Spire Road	1.03	**131**	Glover Road/Spire Road	0.95
29	Maple Avenue/Paddock Lane	1.03	**153**	Picktree Ln - Bramhall Dr	0.93
132	A1231/Horsley Road	1.01	**45**	Queen Alexandra Road/Silksworth Lane	0.93

Table 19 RFCs for Junctions with Capacity Issues during Phase 3 for the PM Peak

Ref	Junction Name	RFC	Ref	Junction Name	RFC
83	Prestbury Road/Hylton Road	1.07	**111**	Northern Way/Dean Terrace	0.97
131	Sunderland Highway/ NB Nissan Way	1.00	**149**	A690 - A1052 A182 entry	0.93
84	Hylton Road/Waterford Green	1.00			

6.5.4 The results show that 122 junctions can be expected to trigger capacity issues over the whole Local Plan period during the modelled PM peak. 65 (53%) of these junctions are anticipated to trigger capacity issues during phase 0 of the Local Plan, which includes 23 junctions nearing capacity and 42 junctions forecasted to become oversaturated and operate beyond existing design capacities.

6.5.5 105 (86%) of these junctions are anticipated to trigger capacity issues during phase 0 and phase 1 of the Local Plan during the PM peak.

6.5.6 The results for the modelled PM peak suggest that the majority of the junctions will require substantial remedial works or appropriate alternative link road schemes to be considered prior to phase 0 of the Local Plan. This is to ensure that the forecasted saturated links at the junctions during the first two phases of the Local Plan are mitigated against.

6.5.7 As the Local Plan periods progress, the volumes of links/junctions that are forecasted to have capacity issues decreases during phases 1, 2, and 3.

6.6 Impacted junctions

6.6.1 The results show that a number of the junctions that will trigger capacity issues during phase 0 of the Local Plan will experience oversaturated conditions during both the AM and PM peak periods, and these junctions are shown in Table 20.

6.6.2 The table highlights that the junctions expected to experience capacity issues during the first five years of the Local Plan are located within the immediate vicinity of the largest employment site (IAMP) in Washington and those around the largest cluster of residential sites in the Sunderland South Growth Area around Burdon Lane. This is due to the large increase in traffic associated with the development of these strategic sites.

6.6.3 Consequently, the junctions along the A19 providing direct connectivity between these areas will experience an increase in traffic volumes and capacity pressures.

Table 20 Junctions Reaching Capacity during the AM & PM Peaks

Ref	Junction Name	RFC AM	RFC PM	Ref	Junction Name	RFC AM	RFC PM
1	A19 NB Offslip/A1290 Downhill Ln	1.45	1.30	80	Chester Road/Pennywell Road	2.26	2.17
2	Sunderland Highway/A19	1.44	1.48	82	Chester Road/Prestbury Road	1.50	1.56
3	A19N onslip/A183W	1.47	1.41	84	Hylton Road/Waterford Green	1.02	1.00
4	A19S offslip/Parkside south	1.25	1.22	85	Hylton Road/Grindon Lane	1.13	1.04
4	A19N offslip/Durham Rd	1.19	1.14	87	Hylton Road/Font Road	1.20	1.20
4	A19N Onslip/Durham Road	1.46	1.42	88	Hylton Road/Kayll Road	1.01	1.10

5	City Way/Emperor Way	1.45	1.69	90	Trimdon Street/ Silksworth Row	1.24	1.20
6	City Way/Monarch Way	1.24	1.31	93	A1018/Sheepfolds North	1.81	2.05
7	City Way/Camberwell Way	0.71	2.01	94	Church Street/Dame Dorothy Street	0.96	0.92
8	City Way/Doxford Park Way	1.39	1.35	95	North Bridge Street/Roker Avenue	1.03	1.27
9	Doxford Park Way/Silksworth Way	9.30	5.67	96	Roker Avenue/Fulwell Road	0.99	1.02
11	Doxford Park Way/Burdon Road	1.92	1.70	101	Whitburn Road/Dykelands Road	1.88	1.94
12	Burdon Road/Bardon Lane	0.91	0.89	102	Newcastle Road/A1018	0.56	0.53
13	Burdon Road/Bevan Avenue	1.87	1.84	103	A1018/Dovedale Road	0.97	0.95
14	Burdon Lane/Ryhope Street South	1.50	1.46	104	Newcastle Road/Chalton Road	1.07	1.11
15	Ryhope Street South/Black Road	1.19	1.20	107	Southwick Road/Stadium Way	0.93	0.97
16	Ryhope Street South/Bevan Avenue	2.87	2.79	108	Queens Road/Kier Hardie Way	0.86	1.01
17	Stockton Road/The Village	1.02	1.00	109	Southwick Road/B1291	1.05	1.05
19	Sea View/A1018	1.27	1.22	110	Wessington Way/Queens Road	1.06	0.84
20	A1018/B1287	1.07	1.07	110	Wessington Way/A1231	1.31	1.20
23	Toll Bar Road/Fenside Road	1.11	1.09	111	Northern Way/Dean Terrace	0.94	0.97
24	B1405/Salterfen Road	1.38	1.38	114	Hylton Road/Castletown Way	1.00	1.02
25	A1018/Salterfen Road	1.08	1.11	116	Castletown Way/Riverside Road	2.24	0.80
27	Toll Bar/Hollycarrside Road	1.15	1.09	117	Wessington Way/Castletown Way	1.54	1.18
28	Tunstall Village Green/Burdon Road	2.08	1.48	118	Wessington Way/Colima Avenue	1.35	1.43
29	Maple Avenue/Paddock Lane	1.28	1.04	120	Wessington Way/Ferryboat Lane	1.31	1.12
30	Tunstall Hope Road/Paddock Lane	1.08	1.08	121	Washington Road/Ferryboat Lane	1.08	1.17
32	Leechmere Road/Tunstall Road	2.26	2.22	122	Washington Road/Blackwood Road	1.10	1.04
33	Premier Road/Essen Way	3.46	2.63	124	Washington Road/Hylton Lane	1.03	0.93
35	Silksworth Lane/North Moor Lane	1.57	1.34	125	Washington Road/Craigavon Road	1.08	1.05
37	Silksworth Way/Silksworth Road	1.22	1.11	128	A1290/Downhill Lane	1.22	1.31
38	Essen Way/Langley Road	1.19	0.71	129	A1290/Nissan Sight	1.28	1.36
39	A690/West Park	1.08	1.07	130	A1290/Cherry Blossom Way	6.79	3.91
40	West Park/Herringon Road	1.45	1.38	131	Nissan Way/A1231	3.76	3.01
41	A690/Herrington Road	1.41	1.41	131	NB Pattinson Way/A1231	2.67	2.67

42	A690/North Moor Lane	1.26	1.23	131	Sunderland Highway/ NB Nissan Way	1.07	1.00
43	Durham Road/Premier Road	1.60	1.76	132	A1231/Spire Road	0.93	1.03
47	Durham Road/Ettrick Grove	1.11	0.94	132	A1231/Horsley Road	0.47	1.01
48	Ryhope Road/Ocean Road South	0.83	1.05	134	Washington Hwy SB Offslip/A1231	1.05	1.14
49	A1018/Ocean Road South	0.98	1.05	134	Washington Hwy NB Offslip/A1231	0.93	0.95
50	Queen Alexandra Rd/Ashbrooke Range	1.03	1.04	134	A1231 WB Offslip/Washington Hwy	1.02	1.06
51	The Cedars/Ryhope Road	1.00	1.00	135	A182 - Salter's Ln	1.99	1.37
52	St Alban's Street/Commercial Road	1.09	1.03	136	A182 - Murton Ln	1.29	1.55
53	Commercial Road/Robinson Terrace	1.04	0.97	137	WB A182 - B1284	3.41	4.81
54	Ryhope Road/Mowbray Road	1.12	1.16	138	A182 - Caroline St	2.27	2.57
55	Commercial Road/White House Road	1.17	1.08	139	A182 - Regent St	1.48	1.50
58	Burn Park/Eden House Road	0.92	0.96	140	A182 - The Bungalows	1.34	1.42
59	New Durham Road/Burn Park Road	0.40	0.83	143	A690 - Slip Roads	1.26	1.06
62	Chester Road/St Michael Way	1.92	1.64	144	A182 - B1260	2.72	2.98
63	Grange Terrace/ Thornhill Cres	1.00	1.07	145	B1404 - B1260	1.41	1.23
64	A1231/A690	1.10	2.19	148	A1052 - Britannia Terrace	1.85	1.94
65	A690/St Michaels Way	1.10	1.12	149	A690 - A1052 A182 entry	1.22	0.93
68	A1231/Belvedere Road	0.95	0.94	150	A690 - B1404 - Lake Road entry	1.50	1.28
69	Lawrence St/Hendon Road	0.90	0.93	151	Vigo Ln - Picktree Ln	1.03	1.04
71	WB West Wear Street/Wearmouth Bridge	1.05	1.07	152	Picktree Ln - Bonemill Ln	1.26	1.14
74	SB Wearmouth Bridge/West Wear Street	0.86	0.99	154	A182 - Coaley Ln	2.11	2.00
75	Chester Road/St Marks's Road	1.14	1.20	155	A182 - B1286	2.47	2.13
76	Kayll Road/Chester Road	1.15	1.26	156	A182 - A183	2.26	2.06
78	The Broadway/Springwell Road	1.17	1.16				

7. High-Level Highway Mitigation

7.1 Introduction

7.1.1 For the junctions that have been forecasted to experience the most severe capacity issues; those anticipated to become oversaturated during phase 0 of the Local Plan, potential mitigation to alleviate the impacts have been explored. Please note, the high level mitigation suggestions shown in this chapter of the report have not been modelled as part of the transportation assessment.

7.2 Geographical Locations Requiring Highway Mitigation

7.2.1 The areas of the highway network that will be impacted by traffic generated by the Local Plan development sites are generally centred around the IAMP site (Washington) and the residential sites surrounding Burdon Lane (Sunderland South Growth Area). The highway network adjacent to Burdon Lane, for example, mainly consists of one-lane carriageways which do not provide adequate capacity for the traffic demand generated by the residential sites, which subsequently causes delay and queuing at key junctions, such as those providing access to the A19.

7.2.2 This is suggestive that mitigation should not be explored in isolation for each individual location on the highway network, but should consider the links/approaches to junctions, as well as the operation of the junctions themselves. New bus and cycle connections should also be considered to reduce the need to travel by vehicles.

7.2.3 Some of the Local Plan sites will directly impact upon junctions in Sunderland city centre. Mitigation for this part of the highway network will need to be thoroughly tested and modelled as traffic and transport issues in city centres are often more complex given the volume of traffic, travel demand, and extent of the urbanised area found in these locations.

7.3 Potential Major Highway Mitigation

7.3.1 Appendix N provides a list of potential minor highway mitigation works that have been compiled for the purposes of the transportation assessment.

7.3.2 Table 21 below highlights the potential major highway mitigation works that have been compiled for the assessment. The table includes a list of known and identified schemes provided by SCC that would mitigate capacity issues at the junctions listed. The plan in Appendix F shows the corresponding junction reference numbers in Table 21.

Table 21 Potential Major Highway Mitigation for Impacted Junctions

Junction Ref	Junction Name	Potential Major Highway Mitigation	Council Identified Schemes
9	Doxford Park Way / Silksworth Way	Doxford Park Way/City Way junction to Monarch Way, the carriageway has 1 lane and cannot accommodate additional traffic. Creating an additional lane from Doxford Park Way to Monarch Way	A19 junction improvements and City Way dualling.

		would provide additional capacity.	
12	Burdon Road / Burdon Lane	Increasing the number of lanes on Burdon Lane from 1 lane in each direction to 2 lanes in each direction, and the introduction of a signalised junction at this location to control higher traffic flows on this part of the network. Consideration could be given to bus/cycle provision along Burdon Lane.	Doxford Park / Ryhope Link Road and localised junction improvements.
13	Burdon Road / Bevan Avenue	The same as above.	Doxford Park / Ryhope Link Road and localised junction improvements.
14	Burdon Lane / Ryhope Street South	The same as above.	Doxford Park / Ryhope Link Road and localised junction improvements.
15	Ryhope Street South / Black Road	Introduce traffic signal control.	Doxford Park / Ryhope Link Road and localised junction improvements.
16	Ryhope Street South / Bevan Avenue	Introduce traffic signal control.	Doxford Park / Ryhope Link Road and localised junction improvements.
20	Saint Nazaire Way / B1287	Because of the high volumes of traffic on A1018, vehicles turning from Sea View will not have sufficient gaps in the traffic to make these manoeuvres. Signalising the junction would accommodate the safe turning movements and reduce queuing.	Doxford Park / Ryhope Link Road and localised junction improvements.
27	Toll Bar Road / Hollycarrside Road	High traffic volumes on Toll Bar Road means vehicles turning from Hollycarrside Road will not have sufficient gaps in the traffic to make the turning manoeuvres. Signalising the junction would accommodate these movements and reduce queueing/congestion.	Toll Bar Road / Hollycarrside Road roundabout and localised junction improvements.

42	A690 / North Moor Lane	High traffic demand from Durham Road and vehicles from North Moor Lane will not have sufficient gaps in the traffic to enter the roundabout. Creating a signalised junction with a new layout would alleviate this issue.	Farringdon Bypass.
47	Durham Road / Ettrick Grove	Potential traffic signal controlled junction layout.	A690 Durham Road Corridor improvements.
52	St Alban's Street / Commercial Road	Increase the number of lanes or build a flare on Alban's Street approach.	SSTC5 and localised junction improvements.
55	Commercial Road / White House Road	Hendon Road approach is 1 lane and cannot accommodate traffic going to Commercial Road. Increase the number of lanes or extend flare on Hendon Road.	SSTC5 and localised junction improvements.
136	A690 - Slip Roads	Build additional lane for merge on A690.	A690 / A19 junction improvements.
143	A690 - B1404 - Lake Road entry	Introducing 2 lanes on the exit at Lake Road.	Central Route and localised junction improvements.
4	A19S off-slip / Parkside south	Traffic signal optimisation.	A690 / A19 junction improvements.
39	Parkside South / West Park	Traffic signal optimisation.	A690 / A19 junction improvements.

7.4 NECA Pipeline Schemes

7.4.1 The spreadsheet shown in Appendix G shows the capital project pipeline for Sunderland and includes major highway improvement schemes that will deliver various benefits to the surrounding highway network. This pipeline of works has been cross referenced with the impacted junctions identified in this transportation assessment.

7.4.2 The following NECA pipeline schemes address areas of the highway network that have been identified as having capacity issues:

- Commercial Road/White House Road – being improved by SSTC phase 5;
- A1018 between southern bridgehead of Wearmouth Bridge and the roundabout junction of Hendon Road/Commercial Road;
- Proposed single carriageway road linking SSTC/A1018 Southern Radial Route with the Port of Sunderland;
- Improved transport links with south Sunderland and A690;
- Remodelling of a section of carriageway between A19 and A1018 to create improved transport links;
- Durham Road/A19/A690/B1286 – involving improved transport links with the south of Sunderland and A19 south Sunderland growth area access, the Doxford International Technology Park access (B1286) and the A19 junction study;

- Ryhope Road mitigations – involving the provision of a single carriageway link road between Doxford Park Way and A1018;
- Traffic signal junctions – upgrading and optimisation of existing traffic signal operation at junctions city wide;
- Chester Road/St Marks's Road, Kayll Road/Chester Road, Chester Road/Pennywell Road, Chester Road/Prestbury Road, Chester Road/St Michael Way – involving Chester Road bus corridor junctions; A183/A82, Grindon Mill/Springwell Road, and Royalty Road/Springwell Road;
- Mitigations for Sunderland city centre – involving Park Lane interchange entrance from Stockton Road, St Michael's Way/Durham Road junction, and the proposed link road to St Mary's Way and St Michael's Way/High Street West junction; and
- Mitigations and highway improvements being delivered as part of IAMP are discussed below.

7.5 NECA Pipeline Schemes & Local Plan Modelling Results

7.5.1 Some of the junctions that have been identified as triggering capacity issues as part of the delivery of the Local Plan are included within the existing NECA pipeline of transport schemes in Sunderland.

7.5.2 Table 22 illustrates the junctions identified in this transportation assessment that have been forecasted to trigger capacity issues with the Local Plan delivery, and the NECA schemes already proposed for those junctions. The plan in Appendix F shows the corresponding junction reference numbers in Table 22.

Table 22 NECA Schemes & Local Plan Junctions with Forecasted Capacity Issues

Junction Ref	Junction	Name of Project from the NECA Pipeline of Schemes
1	JB - A19/A1290	IAMP highway infrastructure improvements and A1290 / A19 junction improvements.
2	Sunderland Highway/A19	SSTC4 and A1231 / A19 junction improvements.
3	A19N onslip/A183W	SSTC4 and A183 / A19 junction improvements.
4	A19N Onslip/Durham Road	A690 Durham Road Improvements, A690 / A19 junction improvements.
15	Ryhope Street South/Black Road	Doxford Park / Ryhope Link Road and localised junction improvements.
16	Ryhope Street South/Bevan Avenue	Doxford Park / Ryhope Link Road and localised junction improvements.
42	A690/North Moor Lane	Durham Roads Improvements and Farringdon Bypass.
43	Durham Road/Premier Road	A690 Durham Road Improvements.
47	Durham Road/Ettrick Grove	A690 Durham Road Improvements.
52	St Alban's Street/Commercial Road	SSTC5 and localised junction improvements.

55	Commercial Road/White House Road	SSTC5 and localised junction improvements.
62	Chester Road/St Michael Way	Upgrading of existing traffic signals city wide and city centre junction improvements.
65	A690/St Michaels Way	Upgrading of existing traffic signals city wide and city centre junction improvements.
80	Chester Road/Pennywell Road	Signalisation of junctions and construction of direct access to land to the north in order to facilitate regeneration of the Pennywell housing area. Link 2 £3,000,000. A183 Chester Road corridor improvements.
82	Chester Road/Prestbury Road	A183 Chester Road corridor improvements.
85	Hylton Road/Grindon Lane	Durham Road (A690) / Grindon Lane and A183 Chester Road corridor improvements.
110	Wessington Way/A1231	SSTC4 and A1231 / A19 junction improvements.
114	Wessington Way/Castletown Way	SSTC4 and A1231 / A19 junction improvements.
118	Wessington Way/Colima Avenue	SSTC4 and A1231 / A19 junction improvements.
120	Wessington Way/Ferryboat Lane	SSTC4 and A1231 / A19 junction improvements.
121	Washington Road/Ferryboat Lane	SSTC4 and A1231 / A19 junction improvements.
122	Washington Road/Blackwood Road	SSTC4 and A1231 / A19 junction improvements.
125	Washington Road/Craigavon Road	SSTC4 and A1231 / A19 junction improvements.
128	A1290/Follingsby Lane	IAMP highway infrastructure.
129	A1290/Nissan Sight	IAMP highway infrastructure.
130	A1290/Cherry Blossom Way	IAMP highway infrastructure.
131	Nissan Way/A1231	IAMP highway infrastructure.

7.6 IAMP Committed Highway Improvements

7.6.1 IAMP is the largest employment site in the Sunderland area and a detailed assessment was prepared by SYSTRA JMP Consultants, which included highway improvements and new infrastructure to support the delivery of the IAMP site. The number of jobs in IAMP will increase significantly during the Local Plan period meaning there will be a large impact on the highway network. In reference to IAMP in Table 18 above, the following mitigation will be delivered as part of this extensive site:

1. A1290 to become dual carriageway and tie into existing single carriageway immediately east of West Moor Farm;

2. A1290 to become dual carriageway. Interim tie in to existing Downhill Lane, final proposed tie in to HE's Downhill Lane junction scheme;
3. Construction of new single carriageway road from a new junction on A1290 eastward towards A19;
4. Construction of new single carriageway bridge over A19 from new road in the west to Washington Road in the east;
5. Washington Road carriageway works, road level to be raised to meet new bridge over A19 with localised widening works and retaining structures;
6. Construction of a new single carriageway road to run parallel to the west of the A1290;
7. Construction of new dual carriageway which changes to single carriageway. In the north it will connect to the new bridge being delivered over the River Wear as part of the SSTC works;
8. Construction of a new single carriageway single span bridge over the River Don;
9. Construction of new single carriageway from new bridge over the River Don northward;
10. Highway to be stopped up once alternative access to North Moor Farm is provided;
11. Surface improvements to Follingsby Lane and West Pastures;
12. Diverted access to North Moor Farm;
13. Highways to be stopped up and the Great North Forest Heritage Trail to be diverted;
14. Upgrade to non-motorised user facilities;
15. Construction of a new single carriageway road from Washington Road to connect to new road;
16. Diverted access to Elliscope Farm;
17. Proposed Nissan car park access; and
18. Proposed non-motorised users link to Elliscope Farm.

7.7 Highways England

7.7.1 SCC have consulted HE on Sunderland's Local Plan proposals. In 2016, HE investigated the impact of the Local Plan development aspirations on the strategic road network (SRN).

7.7.2 A colour-coded grading of each Local Plan residential and employment site was provided to SCC to illustrate the impact the sites may have on the SRN. Green sites identified those not deemed to have a significant impact on the SRN, amber sites identified those that required further assessment, and red sites identified those where mitigation would be required to alleviate the impact on the SRN.

7.7.3 The HE adopted a methodology for trip generation and distribution across the SRN, which differs from the SATURN model and gravity model adopted for this transportation assessment. This study has focused upon identifying junctions which are likely to experience capacity issues over the Local Plan period which are discussed in the chapter above.

7.7.4 SCC will hold further consultation with HE concerning the transport impacts of the Local Plan.

8. Public Transport Accessibility

8.1 Metro Services

8.1.1 The Metro, the North East's urban transit system managed by Nexus, connects 60 stations across Tyne and Wear on two railway lines (yellow line and green line). The yellow line extends from St James Park stadium in Newcastle upon Tyne and loops around the coastal areas in North Tyneside and along the southern banks of the River Tyne to South Shields. The green line extends from Newcastle International Airport to South Hylton in Sunderland. 12 stations on the Metro system provide interchange between the yellow line and green line.

8.1.2 Zone C of the green line runs through Sunderland and provides rail connectivity to nine stations including South Hylton, Pallion, Millfield, University, Park Lane, Sunderland, St Peters, Stadium of Light, and Seaburn. These stations are generally located along the southern banks of the River Wear with the Metro system entering Sunderland in the north at Seaburn.

8.1.3 Table 23 shows the transport facilities that are available at the Metro stations in Sunderland. All stations provide cycle parking facilities to support sustainable multi-modal journeys, all stations except three provide car parking provision, and the central Metro stations, including Park Lane and Sunderland, provide rail and bus interchange.

Table 23 Sunderland Metro Stations' Facilities

Station	Cycle Parking	Car Parking	Taxi Rank	Rail Interchange	Bus Interchange
South Hylton	10	24	No	No	No
Pallion	10	0	No	No	No
Millfield	8	12	Yes	No	No
University	12	0	No	No	No
Park Lane	24	630 (Civic Centre)	Yes	Yes	Yes
Sunderland	10	0	Yes	Yes	Yes
St Peters	10	23	2 spaces	No	No
Stadium of Light	10	182	No	No	No
Seaburn	10	11	No	No	No

8.1.4 The average one-directional frequency of Metro services serving the stations in Sunderland is every 12 minutes Monday-Saturday and every 15 minutes on Sundays. All nine stations are positioned in built-up locations with access enabled by walking/cycling through a combination of general highway infrastructure and mode specific infrastructure, such as cycle lanes and bus services.

8.1.5 The platforms at Sunderland station are shared by light rail (Metro) and heavy rail (National Rail) services. Therefore, Sunderland station provides interchange with long distance rail journeys, to places such as Blaydon, Durham, Gateshead, Middlesbrough, and Newcastle, as well as towns/cities further afield including York, Leeds, Liverpool, London, and Edinburgh.

8.1.6 The Metro and the heavy rail systems do not extend into the Coalfield and Washington areas.

8.2 Bus Services

8.2.1 Given the scale and extents of the study area being reviewed in this transportation assessment, there are countless bus stops located within northern, southern, and central Sunderland, Coalfield, and Washington that provide local and regional public transport connections. The bus route map shown in Appendix H shows the extent of the bus routes and connections throughout the study area.

8.2.2 Sunderland city centre, Sunderland central, and parts of the northern and southern sub-areas, are the most built-up urban areas within the study extents. The city centre and surrounding urban fringes provide multiple opportunities for public transport interchange and numerous bus services operate from within and through the city centre. Most of the public transport services originate and are destined for Sunderland Interchange near Park Lane. The main bus operators in the city centre, central, northern, and southern sub-areas are Go North East, Stagecoach, and Arriva.

8.2.3 In comparison, the bus service coverage in the Washington and Coalfield sub-areas is not as comprehensive as the city centre, central, north, and south sub-areas. The existing bus services in Washington and Coalfield are not frequent services and operate mostly during peak periods. The sub-area with the weakest bus service provision is Washington.

8.2.4 Bus services going to/from Washington connect Sunderland with Consett (Go North East 78 and 78A) and Stanley (Go North East 8). An existing bus service going to the IAMP site from Sunderland travels through the central part of Washington (Go North East 56).

8.2.5 In relation to the Coalfield, the accessibility to public transport is high in relation to many of the Local Plan sites. However, the bus services do not provide regular and frequent hourly services and the Coalfield sub-area has been identified as having the lowest public transport accessibility. The Coalfield area is connected with Heworth, Durham, and South Shields by Go North East services, and with Peterlee and Houghton Health Centre by Go North East and Station Taxi services.

8.2.6 Table 24 provides a summary of the bus services and the average weekday hourly frequency.

Table 24 Bus Services & Frequencies in the Study Area

Service	Route	Operator	Hourly Peak Frequency
S3	Hylton Castel – Sunderland - Farrington	Stagecoach	6
S4	Downhill – Sunderland – Barnes Park – Doxford Park	Stagecoach	6
S16	Red House Estate – Sunderland – Sunderland Royal Hospital –	Stagecoach	6
S20	Pennywell - Sunderland	Stagecoach	6
S23	Dene Estate – Sunderland – Thorney Close	Stagecoach	6
S10	Pennywell – Sunderland – Grangetown	Stagecoach	4
S11	Pennywell – Sunderland – Grangetown	Stagecoach	4
S12	Town End Farm – Sunderlan – Doxford Park	Stagecoach	3
S13	Town End Farm – Sunderlan – Doxford Park	Stagecoach	3
SE1	South Shields – Whitburn - Sunderland	Stagecoach	3
SE6	South Shields – Whitburn - Sunderland	Stagecoach	3
SE2	South Shields – Whitburn - Sunderland	Stagecoach	3
S18	South Shields – Chichester – Brockley Whins	Stagecoach	2
SX1	Sunderland – Doxford International	Stagecoach	3
GNE2	Vicarage Farm Est – Sunderland – Barnwell/Harraton - Washington	GoNorthEast	2
GNE2A	Vicarage Farm Est – Sunderland – Barnwell/Harraton - Washington	GoNorthEast	2
GNE8A	Sunderland - Stanley	GoNorthEast	0
GNE78	Sunderland – Chester-le-Street – Stanley - Consett	GoNorthEast	2
GNE78A	Sunderland – Chester-le-Street – Stanley - Consett	GoNorthEast	2
GNE8	Sunderland - Stanley	GoNorthEast	2
GNE9	North Shields - Sunderland	GoNorthEast	3
GNE20A	South Shields – Sunderland – Houghton-le-Spring - Durham	GoNorthEast	3
GNEX20	South Shields – Sunderland – Houghton-le-Spring - Durham	GoNorthEast	3
GNE33	Doxford International/Doxford Park Shops - Sunderland	GoNorthEast	3
GNE20	South Shields – Sunderland – Houghton-le-Spring - Durham	GoNorthEast	3
GNE35A	Heworth – Sunderland – Low Moorsley/Rainton Bridge	GoNorthEast	2
GNE35	Heworth – Sunderland – Low Moorsley/Rainton Bridge	GoNorthEast	2
GNE36	Chester-le-Street - Castletown	GoNorthEast	2
GNE38	Sunderland Tunstall Bank Estate	GoNorthEast	1
GNE38C	Sunderland Tunstall Bank Estate	GoNorthEast	1
GNE39	Pennywell - Sunderland - Doxford International	GoNorthEast	2
GNE238	Sunderland - Barnwell	GoNorthEast	1
GNE39A	Pennywell - Sunderland - Doxford International	GoNorthEast	2
GNEN56	Newcastle - Springwell - Concord - Sunder	GoNorthEa	nights
GNE56	Newcastle - Springwell - Concord - Sunderland	GoNorthEast	4
GNE60	Sunderland - Ryhope - Seaham/Parkside	GoNorthEast	6
GNE61	Sunderland - Ryhope - Seaham/Parkside	GoNorthEast	6
GNEX5	Sunderland - Ryhope - Seaham/Parkside	GoNorthEast	2
GNEX6	Sunderland - Seaham - Peterlee - Hartlepool	GoNorthEast	1
GNEX7	Sunderland - Seaham - Peterlee	GoNorthEast	1
GNEX36	Newcastle - Boldon - Sunderland	GoNorthEast	1
A22	Sunderland – Pewtelee - Durham	Arriva	2
A23	Hartlepool - Sunderland	Arriva	2
AX21	Darlington - Sunderland	Arriva	1
AED2	Houghton-le-Spring - Peterlee	Arriva	1
TB20	Houghton Health Centre – Dairy Lane - Houghton Health Centre	Station Taxis	3

8.3 Public Transport Accessibility Assessment Framework

8.3.1 For reference for this section of the report, the 124 SHLAA sites and 15 Housing Release sites for the Sunderland Local Plan are shown in Appendix A.

8.3.2 The purpose of assessing the public transport accessibility of the Local Plan sites is to determine the existing public transport connectivity available surrounding the site locations. The sites deemed to have low accessibility would require the most public transport improvements to raise the level of accessibility.

8.3.3 The assessment framework developed for grading public transport accessibility for each Local Plan site considers three factors; Metro accessibility, bus accessibility, and bus frequencies/services, which are summarised in Table 25. This criteria was developed by Capita in support of the transportation evidence developed for another Local Authority as part of their emerging Local Plan.

Table 25 Public Transport Accessibility Grading Criteria

Metro Access		Bus Stop Access		Bus Service Frequency	
Distance	**Access**	**Distance**	**Access**	**Service Levels**	**Provision**
Within 500m	High	Within 400m	High	Multiple services with 15 minute frequency	High
500m – 1200m	Medium	400m – 800m	Medium	Multiple services with 30 minute frequency	Medium
More than 1200m	Low	More than 800m	Low	Single service with 30 minute frequency or less	Low

8.4 Ranked Public Transport Accessibility for Local Plan Sites

8.4.1 Using the grading criteria from the assessment framework, each Local Plan residential site has been ranked in terms of the existing level of public transport accessibility. The full grading results for each site is shown in Appendix I, where the sites identified as having high accessibility are shaded in green, medium accessibility shaded in orange, and low accessibility shaded in red.

8.4.2 With consideration to all three of the public transport accessibility grading factors, 35% of the residential sites have been ranked as having high public transport accessibility, 35% have been ranked as having medium public transport accessibility, and 30% have been ranked as having low public transport accessibility.

8.4.3 The sites with high public transport accessibility tend to be located within the vicinity of Sunderland city centre, where bus services and routes begin/terminate and provide interchange with light and heavy rail services at various Metro stations and Sunderland station.

8.4.4 The sites with low public transport accessibility tend to be situated within the Coalfield areas where there are no Metro stations and there are very few bus services that provide moderate hourly frequencies. Almost half of the sites that have been rated as having low public transport accessibility are located within the Coalfield sub-area.

8.4.5 Table 26 below summarises the volume of sites found within each of the Local Plan sub-areas and the grading of public transport accessibility.

Table 26 Public Transport Accessibility Grading Volumes for the Local Plan Sub-areas

Sub-area	Number of Sites: Low Access	Number of Sites: Medium Access	Number of Sites: High Access
Coalfield	21	16	10
Sunderland Central	0	0	13
Sunderland North	4	5	8
Sunderland South	7	15	15
Washington	10	13	3
Sum	42	49	49

8.5 Public Transport Accessibility Grading Criteria

8.5.1 Of the three grading factors used in the public transport accessibility assessment framework, the weakest public transport access is for Metro with only 15% of the residential sites having high or medium access to a Metro station within acceptable distances. Sites with high or medium accessibility to a Metro station are located within Sunderland central, north, and the northern section of Sunderland south where the Metro line operates.

8.5.2 85% of the residential sites have low Metro accessibility, which given the physical location of the Metro system and the stations along the southern bank of the River Wear, this can be expected. The Metro system is not expansive in Sunderland and therefore, the catchment for its use will be limited to the specific locations. The stations could possibly form part of multi-modal journeys given the transport facilities that are provided at the stations.

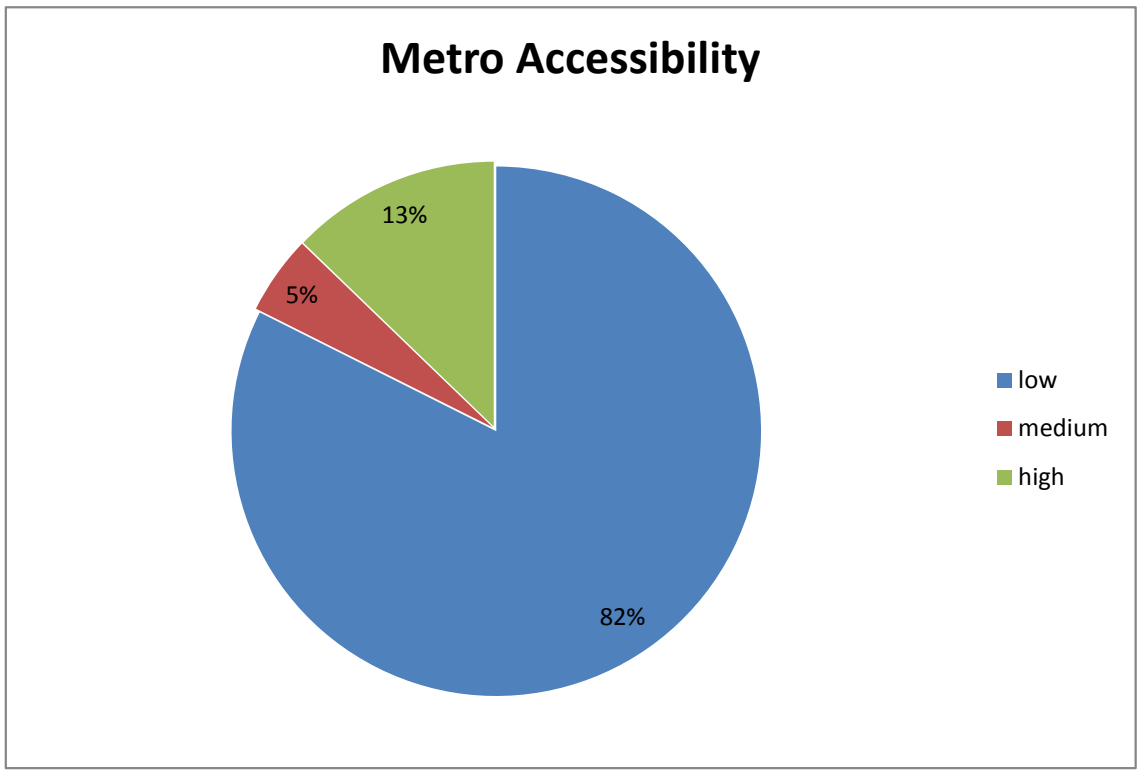
8.5.3 The construction of new Metro stations adjacent to the larger sites would improve Metro accessibility for the key Local Plan sites. But given the physical constraints associated with the existing Metro system, existing access from the emerging Local Plan sites is generally low.

8.5.4 All sites in Coalfield and Washington have low Metro accessibility given that the Metro does not operate in these locations. The Metro accessibility for each of the Sunderland sub-areas is shown in Table 27, and the overall grading of Metro accessibility is shown in Figure 4 below.

Table 27 Metro Accessibility by Sub-area

Sub-area	Number of Sites: Low Access	Number of Sites: Medium Access	Number of Sites: High Access
Coalfield	47	0	0
Sunderland Central	1	1	11
Sunderland North	14	1	2
Sunderland South	31	2	4
Washington	26	0	0
Sum	105	4	17

Figure 4 Metro Accessibility for Residential Sites

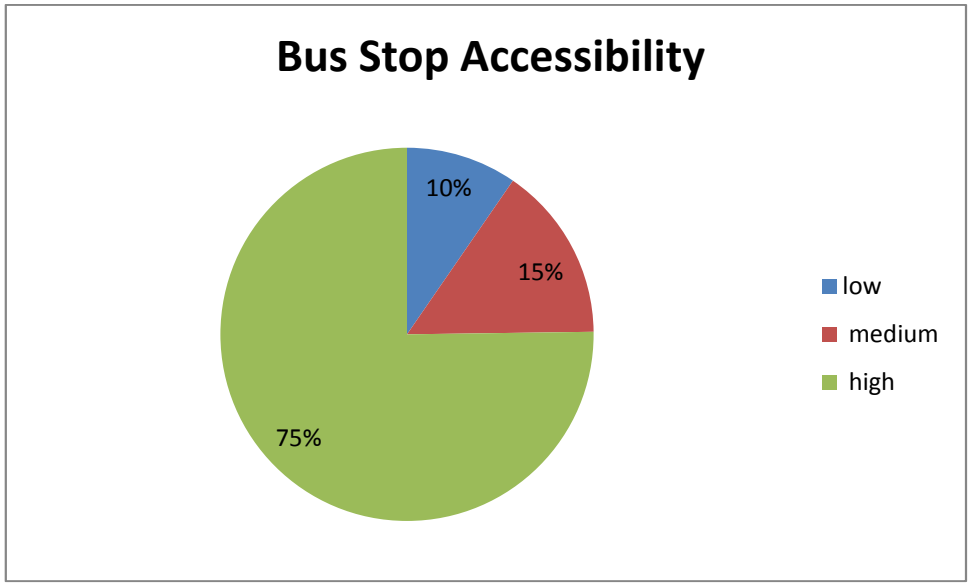


8.5.5 Of the three grading factors used in the accessibility assessment framework, the strongest public transport access is for bus accessibility with 75% of the residential sites having high levels of access to bus services within acceptable distances. Sites with high bus accessibility are located in the Sunderland central and south sub-areas.

8.5.6 Approximately 10% of the residential sites would benefit from improvements to bus services to enhance bus accessibility. These sites are located in the Coalfield, Sunderland south, north, and Washington sub-areas.

8.5.7 The overall grading of bus stop accessibility is shown in Figure 5.

Figure 5 Bus Stop Accessibility for Residential Sites



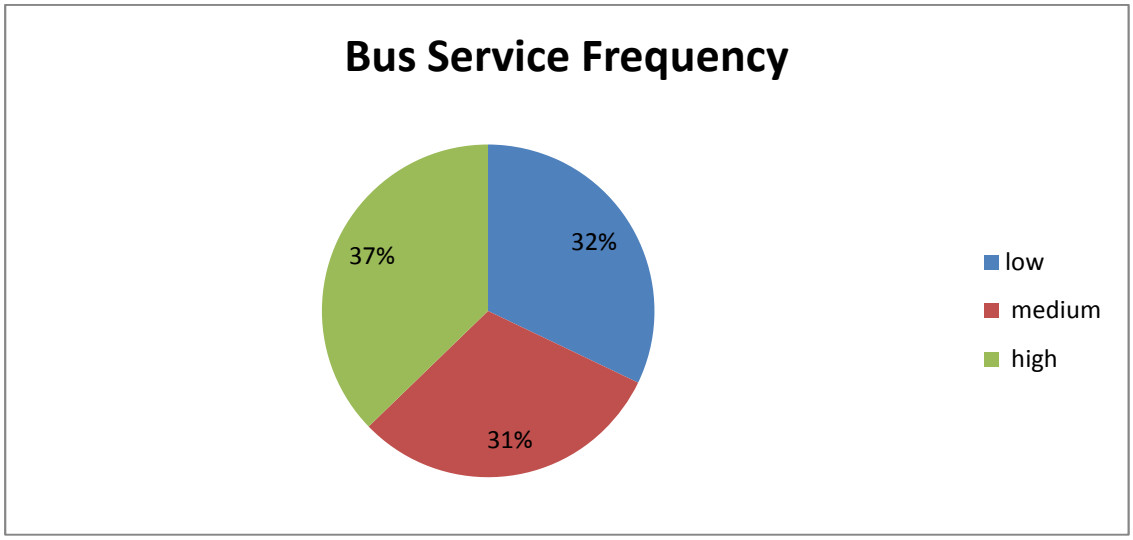
8.5.8 In relation to the third grading factor used in the public transport accessibility; bus frequencies and provision, even though 75% of the residential sites have high levels of access to bus services within acceptable distances, for a number of these sites the bus services do not necessarily provide frequent hourly services.

8.5.9 Only 39% of the residential sites have high bus service frequencies even though accessibility to the bus stops and the services is deemed high. These sites are located mainly in the Sunderland central and south sub-areas.

8.5.10 31% of the residential sites have low bus service frequencies, which is defined as two or less services per hour serving the bus stops within the vicinity of the sites. These sites are located within the Coalfield, Washington and Sunderland south sub-areas.

8.5.11 The overall grading of bus service frequency is shown in Figure 6.

Figure 6 Bus Service Frequency for Residential Sites



8.6 Potential Public Transport Accessibility Improvements

8.6.1 The public transport accessibility assessment framework and corresponding grading criteria have been used to determine the existing level of public transport connectivity at each of the identified residential sites.

8.6.2 The future traffic flows extrapolated from the strategic SATURN model provided volumes of origin and destination demand likely to be generated by travel between the Local Plan residential and employment sites. The modelling data also provide travel routes and distributional data for the travel demand generated by the sites.

8.6.3 A combination of the accessibility assessment results and the anticipated SATURN model travel demand, has enabled an analysis of where there may be gaps in public transport accessibility and provision of services for travel between the Local Plan residential and employment sites. The analysis indicates that there are only a small number of gaps in the existing public transport accessibility across Sunderland and the various sub-areas.

8.6.4 Recommended public transport connections linking the Local Plan sites where travel demand has been forecasted to be high and overall public transport accessibility is deemed low, have been developed and are shown in Appendix J. These suggestions include a combination of making changes to existing public transport connections and bus routes, and providing new bus services in those locations where connections do not exist to serve the Local Plan sites.

8.6.5 The cluster of residential sites numbered 62, 477, 35, and 81 which are located in the Sunderland south sub-area will generate the highest traffic demand from the residential sites included within this assessment. There is very little public transport accessibility between these residential sites (largest residential demand) and the largest employment site and employment attractor, namely IAMP.

8.6.6 Based upon this analysis, the following public transport accessibility enhancements would improve public transport connectivity between the largest residential and employment sites being delivered as part of the Local Plan (Appendix J):

- Connection 1: connecting Local Plan sites located in the northern part of Washington (sites 56, 538, 312, 258, 628, 632, 543, 252) with the cluster of employment sites (62, 64, 66 and 70) around the industrial parks along A1231, as well as Sunderland north sub-area and Sunderland city centre;
- Connection 2: connecting Sunderland city centre with the employment sites located on the Port and Hendon Industrial Estate, connecting to the large residential sites located on Burdon Lane in the Sunderland south sub-area, and connecting with Rainton Bridge North Industrial Estate;
- Connection 3: linking Sunderland city centre with the cluster of residential sites (sites 417, 115, 468 etc) located in the Coalfield sub-area which have the lowest level of public transport accessibility;
- Connection 4: connecting the residential sites situated south of IAMP in Washington to the IAMP employment site and the employment sites at the industrial parks around the A1231;
- Connection 5: linking Sunderland city centre and the Sunderland north sub-area with the residential sites in south-west Washington. This connection includes passing through Turbine Business Park;
- Connection 6: connecting Sunderland city centre with Sunderland south sub-area and with Rainton Bridge North Industrial Estate, via Burton Way, and the western sites in the Coalfield sub-area;

- Connection 7: connecting the major residential sites surrounding Burdon Lane in the Sunderland south sub-area with the major IAMP employment site in Washington, via the A19; and
- Connection 8: an alternative to connection 7 where the route takes an alternative path through the residential sites around Burdon Lane.

9. Cycling & Walking Accessibility

9.1 Introduction

9.1.1 As part of the smarter choices assessment, existing walking and cycling accessibility within the Sunderland study area has been examined in relation to some of the larger residential sites. Similarly to the public transport connectivity review, an accessibility assessment framework has been adopted to provide an indication of the active travel accessibility surrounding the propsoed residential sites.

9.1.2 Whithin Sunderland, there are various means by which people can make sustainable journeys. The urban environment offers various infrastructure types for use by cyclists, including dedicated cycle paths/lanes, shared use paths/surfaces, as well as advisory cycle routes on local roads deemed suitable for cycling. The national cycling network (NCN) also travels through Sunderland and provides connections to the wider North East region. Some sections of the NCN overlaps with the local cycling routes in Sunderalnd.

9.1.3 Most, if not all, urban environments have pedestrian/walking infrastructure. Footways, footpaths, street lighting, pedestrian crossings (controlled and uncontrolled), flush kerbs/tactile paving, and shared use paths are all examples of the infrastructure evident in the developed areas in Sunderland, including all of the sub-areas identified in this assessment.

9.2 Cycling & Walking Acceptable Distances

9.2.1 There are limits to the distances generally considered acceptable for utility cycling and walking. LTN 1/04 - Policy, Planning and Design for Walking and Cycling (Department for Transport) states that *'the mean average length for walking journeys is approximately 1 km (0.6 miles) and for cycling, it is 4km (2.4 miles), although journeys of up to three times these distances are not uncommon for regular commuters'*.

9.2.2 The distances people are prepared to walk or cycle depend on their fitness and physical ability, journey purpose, settlement size, and walking/cycling conditions. The suggested acceptable maximum walking distance for commuter, school, and leisure trips is 2km (Guidelines for Providing for Journeys on Foot (CIHT, 2000), and 5km suggested as the maximum acceptable cycling distance.

9.3 Existing Cycling & Walking Network

9.3.1 Sunderland is conducive to encouraging walking and cycling due to its relatively flat topography with only slight height differential between sea / river level and inland, with no steep hills throughout the walking environment. Sunderland contains a number of small urban areas which provide accessible services within short walking and cycling distances.

9.3.2 A number of the NCN and RCN routes in the North East region travel through Sunderland and the transportation study extents. The majority of the Local Plan sites are not located where there is easy access to these routes. The NCN and RCN routes that are within the study area include the following:

- NCN, Route 7: this route begins at the mouth of the River Wear and travels westbound along the north banks of the Wear in Sunderland central and north sub-areas. The route continues westbound into the Washington sub-area loosely following the path of

the River Wear;

- NCN, Route 1: this route travels along the coastline through Seaburn and Roker and into the mouth of the River Wear on the northern banks. The cycle route crosses the Wearmouth Bridge and connects to The Bridges shopping centre in the Sunderland central sub-area. The cycle route travels into the Sunderland south sub-area along A690 Durham road, and south of Plains Farm, the cycle route travels east through Tunstall and to Ryhope on the coastline; and
- NCN, Route 70: this route travels along the coastline through Seaburn and Roker and the mouth of the River Wear on the northern banks. The cycle route crosses the Wearmouth Bridge and connects to The Bridges shopping centre in the Sunderland central sub-area. The cycle route travels into the Sunderland south sub-area along A690 Durham road, and south of Plains Farm, the route travels south west to Farringdon and into the Coalfield sub-area to Hetton-le-Hole.

9.3.3 South of the River Wear, a mainly traffic free cycle path travels through the Sunderland central and south sub-areas, following the Metro line from University Metro station to South Hylton Metro station. This cycle route then connects to a range of cycle paths/routes through the Sunderland south, Washington, and Coalfield sub-areas.

9.3.4 The Sunderland central sub-area and the Sunderland north and south sub-areas adjacent to central benefit from the most comprehensive cycling connections and infrastructure given the extensive development in these urban areas. The three NCNs in Sunderland connect in Sunderland city centre and provide local and regional cycle connectivity to various locations.

9.3.5 The Coalfield and Sunderland south sub-areas have the least comprehensive cycle connectivity coverage, particularly in the central section of Coalfield where the majority of the cycle paths are advisory and there is very limited dedicated local cycling infrastructure such as cycle lanes (on-road and off-road). NCN 70 which runs through the Coalfield sub-area provides long-distance cycle connectivity, likely to be leisure cycling, rather than providing cycle accessibility between residential and employment settlements.

9.3.6 In relation to the largest employment site (IAMP) and the largest cluster of residential developments (around Burdon Lane, Sunderland south sub-area) being delivered as part of the Local Plan, the existing cycle connectivity and accessibility surrounding these locations includes the following:

- IAMP employment site: a traffic-free route surrounds the IAMP site, which travels along the A1290, Cherry Blossom Way, off-road to the west of the Nissan site, and provides immediate cycle connectivity to various off-road and on-road cycle paths. These include cycle accessibility through Washington via traffic free routes and NCN 7, direct cycle access to the east into the Sunderland north sub-area along the traffic free paths running alongside Washington Road and via NCN 7, which also provides cycle connectivity into Sunderland central and Sunderland south sub-areas via the existing cycle infrastructure. The proposed Local Plan residential sites located within these localities appear to be accessible via existing cycling infrastructure, however, some of the distances between the sites would indicate that the use of the infrastructure would be dependent upon the experience of cyclists; and
- Burdon Lane cluster of residential sites: NCN 70 accessible via Hangmans Lane in the west of Burdon Lane, provides a traffic-free route south into the Coalfield sub-area, as well as north into the Sunderland south sub-area and Sunderland city centre. These routes represent long-distance cycle journeys. Although there is a very limited volume of employment sites that will be located within acceptable cycling distances from this cluster of residential sites.

9.4 Cycling & Walking Accessibility Assessment Framework

9.4.1 For reference for this section of the report, the proposed 124 SHLAA sites and 15 Housing Release sites for the Sunderland Local Plan are shown in Appendix A.

9.4.2 The purpose of reviewing the cycling and walking accessibility of the residential sites is to determine the existing sustainable connectivity available surrounding the site locations. The sites deemed to have low accessibility would potentially require new provision of cycling/walking infrastructure to raise the level of accessibility.

9.4.3 The grading criteria for walking and cycling accessibility, based upon professional judgement, is summarised in Table 28. This was developed for the evidence base for another Local Authority in support of their emerging Local Plan.

Table 28 Cycling & Walking Accessibility Grading Criteria

Walking & Cycling Accessibility Grading		
High Accessibility	**Medium Accessibility**	**Low Accessibility**
Close to strategic cycle/walking network with good access to key destinations	Reasonable distance linking to key destinations	Requires additional information to connect strategic cycle/prow network

9.5 Ranked Cycle & Walking Accessibility for the Local Plan Sites

9.5.1 Using this grading criteria, each residential site has been graded in terms of the existing level of cycling and walking accessibility using the criteria shown in Table 28. The full grading results for each site are shown in Appendix L.

9.5.2 With consideration to the walking and cycling grading criteria, 50% of the residential sites are in locations with high cycling accessibility and about 20% with high walking connectivity. 30% have been rated as having medium cycling and walking accessibility. 20% have been rated as having low cycling accessibility and 50% rated as having low walking accessibility.

9.5.3 Analysis of the site grading results demonstrates that the most comprehensive and accessible cycling/walking connectivity is in the Sunderland central sub-area (and the borders with Sunderland north and south sub-areas) where all sites have high cycling and walking accessibility. The Washington and Sunderland north sub-areas have been graded as having medium accessibility and the Coalfield sub-area has been ranked as having low accessibility, where half of the residential sites in the Coalfield have low cycling accessibility.

9.5.4 Table 29 below summarises the volume of sites found within each of the Local Plan sub-areas and the grading of cycling accessibility.

Table 29 Cycling Accessibility Grading Volumes for the Local Plan Sub-areas

Sub-area	Low Accessibility	Medium Accessibility	High Accessibility
Coalfield	22	9	16
Sunderland Central	0	0	13
Sunderland North	1	4	12
Sunderland South	2	6	28
Washington	2	15	10
Sum	27	34	79

9.6 Potential Accessibility Improvements

9.6.1 All residential sites will be constructed where connections to existing footpaths will be provided for pedestrians entering/exiting the sites, making all sites permeable to surrounding walking infrastructure.

9.6.2 Given the small scale nature of walking; the fact that people can walk wherever they choose to, and the nature of built up environments in Sunderland which provide the necessary infrastructure to enable walking journeys, this transportation assessment has not identified any significant gaps in walking accessibility surrounding the residential and employment sites.

9.6.3 Walking distances between the residential sites and nearby bus stops/public transport services varies approximately between 200m and 800m+. However, the majority of the largest sites are located where public transport services operate on nearby carriageways.

9.6.4 The public transport accessibility plan shown in Appendix J illustrates recommended improvements to public transport provision where additional/extension to existing services would deliver improved accessibility between the residential sites where connectivity is currently limited/none existent.

9.6.5 In relation to cycling accessibility, the area within the Sunderland extents where connectivity is the weakest is the central part of the Coalfield sub-area, where the cycle network connections are sparse. Advisory cycle routes are common with a very small volume of traffic free cycle paths.

9.6.6 Within this area, a cluster of proposed employment sites including Dubmire and Rainton Bridge North Industrial Estates (sites 0, 78, 80, 81, 85, 87) are located within reasonable distances from the Local Plan residential sites (339, 112, 197, 540, 462, 637, 11, 74 etc.). The average distances between these sites is 3.5km-5km, which constitute acceptable cycling distances.

9.6.7 Within Washington, cycling accessibility mainly constitutes advisory cycle paths or paths (where people are advised to walk their bikes). NCN 7, however, provides a good level of cycling connectivity in Washington, and connects the IAMP site with Sunderland city centre.

9.6.8 Based upon this analysis, the transportation assessment suggests the following cycle accessibility enhancements for improved connectivity between the largest residential and employment sites, which are shown in Appendix M:

- Connection 1: linking NCN 70 with the traffic free routes that provide access to Rainton Bridge North Industrial Estate;
- Connection 2: linking the traffic free routes located at the east of A182 with traffic routes into Rainton Bridge North Industrial Estate via B1260;
- Connection 3: linking some advisory cycle paths at the east of A19 with A183 along the B1286;
- Connection 4: linking NCN 1 with NCN 70 via Burdon Lane;
- Connection 5: linking NCN 1 to Sunderland city centre with a new cycle connection along the A1018 and via Hendon Industrial Estate;
- Connection 6: linking NCN 7 with the traffic free cycle path east of A1 (eastern boundary of the borough) via A1231. This link would connect Nissan, Pattinson North and Stephenson Industrial Estate and provide direct cycle routes to the existing traffic free cycle paths located south of the IAMP site; and
- Connection 7: linking the proposed connection 3 above with the advisory cycle paths on the east of A19 south of Market Place Industrial Estate.

9.6.9 At this stage in the Local Plan process, these connections have been suggested to bridge current gaps in cycle accessibility between the largest of the residential sites. Further detailed feasibility studies to inform the IDP to be undertaken by Highways/Traffic Engineers would be required to determine the appropriateness of providing on-road/off-road cycle paths and connections between the sites.

9.6.10 In relation to the largest of the sites which will generate a high footfall of movements, pedestrian crossings would be recommended as part of delivering a high standard of site permeability for sustainable transport and access.

10. Conclusions

10.1 Traffic Modelling & Traffic Impact

10.1.1 The transportation assessment has examined the traffic impacts of the strategic residential and employment sites proposed in the emerging Sunderland Local Plan. The study area included in the assessment is Sunderland, consisting of the Sunderland central, north, south, Washington, and Coalfield sub-areas. The sites examined have included 124 SHLAA sites, 15 additional Housing Release sites, and 66 employment sites spread across the sub-areas. The assessment also included the proposed IAMP development.

10.1.2 A methodical trip generation exercise has been undertaken to determine the anticipated vehicular trips likely to be generated by the Local Plan sites, calculated based upon the number of jobs and houses being delivered, as well as a comprehensive review of committed development trips and future traffic growth.

10.1.3 A strategic SATURN model of the study area has been developed from a model generated to assess the impacts of the SSTC scheme. The future year matrix development and future year traffic distribution has been supported by a settlement based gravity model which considers parts of the study area that were not contained within the SATURN simulation network.

10.1.4 The entire Local Plan period is broken down into four groups; phase 0 (0-5 years), phase 1 (6-10 years), phase 2 (11-15 years), and phase 3 (16 and 18 years). The traffic demand for these four periods have been assessed in the SATURN model for the weekday AM and PM peak periods to highlight the traffic impact of the Local Plan proposals on junctions in the modelled network.

10.1.5 70 junctions and 40 junctions in the AM peak are anticipated to experience capacity issues during phase 0 and phase 1 of the Local Plan respectively. 65 junctions and 40 junctions in the PM peak are anticipated to experience capacity issues during phase 0 and phase 1 of the Local Plan respectively. During the proceeding Local Plan phases, however, the volume of junctions that are forecasted to experience capacity issues reduces significantly, indicating that mitigation works will be required during the first 5 years of the Local Plan.

10.1.6 Of these junctions, 70+ can be expected to become oversaturated during both the AM and PM peaks. These junctions are located within the immediate vicinity of the largest employment site (IAMP) in Washington and those around the largest cluster of residential sites in the Sunderland South Growth Area around Burdon Lane. This is due to the large increase in traffic associated with the development of these sites. Consequently, the junctions along the A19 providing direct connectivity between these areas will experience an increase in traffic volumes and capacity pressures.

10.1.7 Various high level mitigation recommendations have been made for those junctions that are anticipated to become oversaturated during the Local Plan period. These remedial suggestions are indicative at best and will require further investigation and traffic modelling to determine the impact of them on junction performance.

10.1.8 There is a clear indication from the SATURN modelling that the highway network in the Coalfield sub-area will need to be upgraded to accommodate the additional traffic generated by the residential and employment sites in the Local Plan. Whilst major highway interventions are not currently programmed for implementation during the Local Plan period, it is evident that these will need to be brought forward if the sites identified in the Coalfield sub-area are to be delivered.

10.1.9 Furthermore, the suggested improvements and highway mitigations contained in this report would need to be tested in the SATURN model to determine the impacts of the mitigation at the specific junctions and the impacts on the wider highway network collectively. Individual modelling of specific complex junctions' may be required also which would provide a greater understanding of the effects of junction changes which may not be as obvious in the strategic SATURN model.

10.1.10 This further work will be required at this level of detail to inform the proposals for the IDP. On determination of the specific highway modifications required, and following traffic modelling to support these improvements, the costs for the improvements can be divided between the site developers where traffic is deemed to contribute to future capacity issues. The contribution costs should be calculated based upon the share of the impact of each Local Plan site (based upon the number of trips generated at each junction), and the cost share should be applied pro rata for each site.

10.2 Smarter Choices & Sustainable Travel

10.2.1 The transportation assessment has assessed the public transport accessibility of the Local Plan sites to determine the existing public transport connectivity available surrounding the site locations. The grading criteria used included Metro accessibility, bus accessibility, and bus services/frequencies.

10.2.2 35% of the Local Plan sites have been ranked as having high public transport accessibility, 35% have been ranked as having medium public transport accessibility, and 30% have been ranked as having low public transport accessibility. The sites with high accessibility tend to be located within the vicinity of Sunderland city centre and sites with low accessibility tend to be situated within the Coalfield sub-area.

10.2.3 Eight public transport improvements have been suggested to provide bus links between the Local Plan residential and employment sites where significant movements are anticipated to occur, and where low public accessibility has been determined. These are a combination of extensions to existing bus services and the provision of new services linking Sunderland city centre with the key residential sites and the largest employment sites, the distribution for which has been determine by the strategic SATURN model outputs.

10.2.4 The transportation assessment has reviewed the cycling and walking accessibility of the Local Plan sites to establish the existing sustainable connectivity and infrastructure available surrounding the site locations. 50% of the Local Plan sites are proposed in locations with high cycling accessibility, 20% with high walking accessibility, and 30% have been rated as having medium cycling and walking accessibility. 20% have been rated as having low cycling accessibility and 50% have been rated as having low walking accessibility.

10.2.5 The most comprehensive and accessible cycling/walking connectivity has been found to be in the Sunderland central sub-area. The Coalfield sub-area has been ranked as having low sustainable accessibility, where half of the Local Plan sites within this area have been ranked as having low cycling accessibility.

10.2.6 Seven cycling accessibility improvements have been suggested to provide improved sustainable transport connections between the Local Plan residential and employment sites where significant movements are anticipated to occur, and where cycling distances are deemed acceptable for journeys by bicycle.

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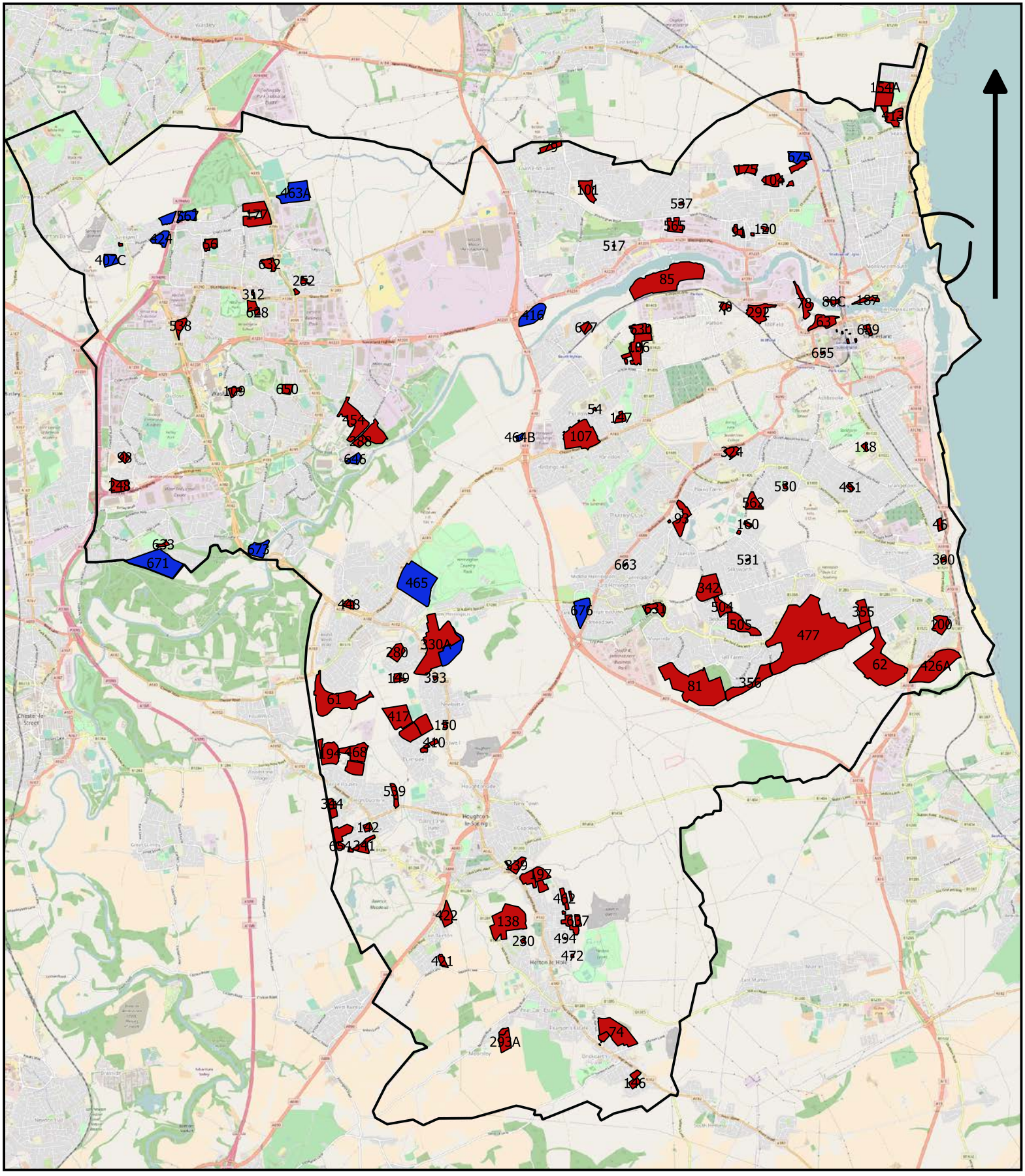
Appendix A SHLAA & Housing Release Sites



Key

- Housing Release Sites
- SHLAA

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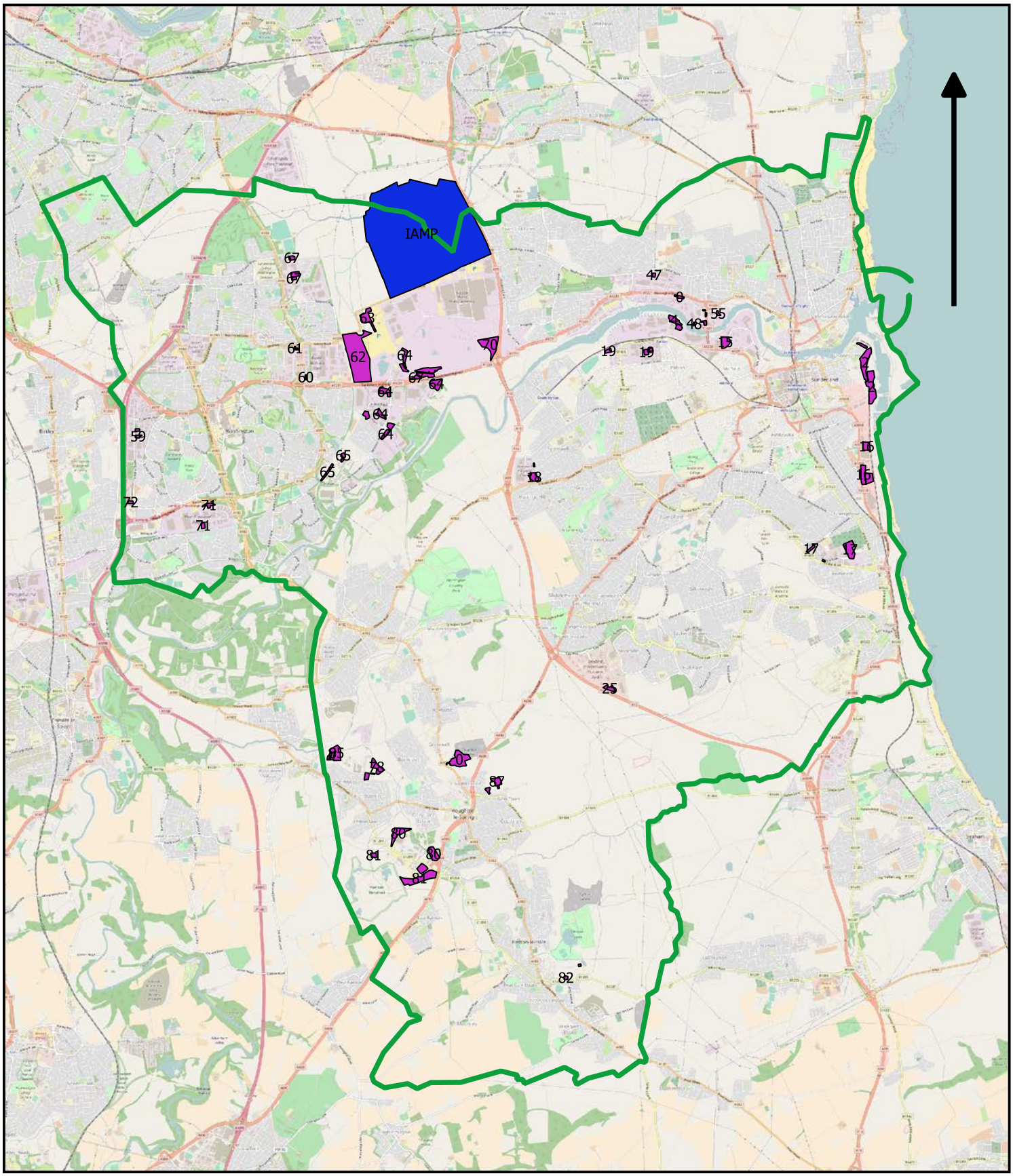
Appendix B Employment Sites



Key

- IAMP
- Employment Sites
- Sunderland Boundary

EMPLOYMENT SITES

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Appendix C Local Plan Residential & Employment Sites Trip Generation

SHLAA_Ref_No	Local_ref_1	Site_Name	Ownership	Monitoring Delivery Sub Area	PDL_or_greenfield	Settlement Break	Green_Belt?	Site_area	Notes	Present_Planning_Status	Planning_App_No	Conclusion_On_Suitability	Conclusion_On_Availability	Conclusion_On_Achievability	New Saturn Zones	Census Code	MSOA	Car%	Initial_LA_Yield_Assessment	PT/Walking/Cycling	Reduction factor	AM rate IB	AM rate OB	PM rate IB	PM rate OB	Deliverable_Within_5_Years	AM trips IB	AM trips OB	PM trips IB	PM trips OB	Deliverable_Within_6_to_10_Years	AM trips IB	AM trips OB	PM trips IB	PM trips OB	Deliverable_Within_11_to_15_Year	AM trips IB	AM trips OB	PM trips IB	PM trips OB	Deliverable yr 16 & 17	AM trips IB	AM trips OB	PM trips IB	PM trips OB	Student Accomodation	Total houses 17 years	Extra Care/Sheltered Accom (self contained units)
46	16/00276/SHLAA	Angram Drive, Grangetown	Private	Sunderland South	PDL	FALSE	FALSE	1.27	90 % net de	Permitted – under cons	09/01165/VAI	Suitable	Available	Achievable	892	E00044370	E02001814	67%	19	HLL	6%	0.228	0.542	0.520	0.324	19	4	10	10	6		4	10	10	6		4	10	10	6		4	10	10	6	FALSE	19	FALSE
54	16/00003/SHLAA	Former Eagle Public House, Portsmouth Road	Private	Sunderland South	PDL	FALSE	FALSE	0.19	100% net d	Permitted – not started	16/00509/FUI	Suitable	Available	Achievable	897	E00044328	E02001811	44%	9	HLL	6%	0.167	0.424	0.438	0.240	9	2	4	4	2		2	4	4	2		2	4	4	2		2	4	4	2	FALSE	9	FALSE
56	16/00103/SHLAA	High Usworth School, Well Bank Road	Council	Washington	PDL	FALSE	FALSE	2.92	75% net de	Lapsed permission	06/03786/FUI	Suitable	Available	Achievable	749	E00045041	E02001797	64%	66	HLL	6%	0.218	0.524	0.506	0.310		0	0	0	0	66	14	35	33	20		14	35	33	20		14	35	33	20	FALSE	66	FALSE
61	16/00300/SHLAA	Former Lambton Cokeworks Site "Elba Park"	Homes & Com	Coalfield	PDL	FALSE	FALSE	21.01	75% net de	Permitted – under cons	09/02328/REI	Suitable	Available	Achievable	879	E00044680	E02001820	72%	359	LMM	2%	0.255	0.597	0.567	0.362	150	38	90	85	54	33	47	109	104	66		47	109	104	66		47	109	104	66	FALSE	183	FALSE
62	16/00044/SHLAA	Ryhope and Cherry Knowles Hospital	NHS Trust/HC	Sunderland South	Mixed (50/5(	FALSE	FALSE	30.30	75% net de	No planning status		Suitable	Available	Achievable	856	E00170229	E02001818	70%	800	MMH	4%	0.243	0.572	0.546	0.345		0	0	0	0	250	61	143	136	86	250	121	286	273	173	100	146	343	327	207	FALSE	600	FALSE
63	16/00045/SHLAA	Vaux Brewery (site of), Gill Bridge Avenue	Council/HCA,	Sunderland Central	PDL	FALSE	FALSE	5.86	75% net de	Permitted – not started	15/02557/HY	Suitable	Available	Achievable	885	E00044181	E02001803	30%	201	HHH	10%	0.131	0.346	0.381	0.189	20	3	7	8	4	150	22	59	65	32	31	26	70	77	38		26	70	77	38	FALSE	201	FALSE
70	16/00004/SHLAA	Site of Foundry (The Forge, Pallion)	University of S	Sunderland South	PDL	FALSE	FALSE	1.31	90 % net d	Permitted - not started	15/02375/FUI	Suitable	Available	Achievable	902	E00044177	E02001801	50%	43	MHH	5%	0.182	0.456	0.460	0.261		0	0	0	0	43	8	20	20	11		8	20	20	11		8	20	20	11	FALSE	43	FALSE
74	16/00301/SHLAA	Murton Lane, Easington Lane	Private	Coalfield	Greenfield	FALSE	FALSE	14.08	75% net de	Permitted – under cons	06/02209/FUI	Suitable	Available	Achievable	882	E00044418	E02001826	57%	387	HLH	6%	0.196	0.483	0.475	0.280	126	25	61	60	35		25	61	60	35		25	61	60	35		25	61	60	35	FALSE	126	FALSE
78	16/00049/SHLAA	Farringdon Row Phase 2-4	Council	Sunderland Central	Mixed (G30 E	FALSE	FALSE	4.59	75% net de	No planning status		Suitable	Available	Achievable	689	E00044183	E02001803	41%	69	HMH	8%	0.158	0.402	0.420	0.226		0	0	0	0		0	0	0	0	69	11	28	29	16		11	28	29	16	FALSE	69	FALSE
79	16/00147/SHLAA	Hylton Lane/Blaydon Ave, Hylton Lane	Gentoo	Sunderland North	Greenfield	FALSE	FALSE	2.51	75% net de	No planning status		Suitable	Available	Achievable	746	E00044882	E02001793	50%	66	HLL	6%	0.180	0.451	0.455	0.258		0	0	0	0	66	12	30	30	17		12	30	30	17		12	30	30	17	FALSE	66	FALSE
81	16/00050/SHLAA	Chapelgarth site	Private	Sunderland South	Greenfield	FALSE	FALSE	35.59	75% net de	Permitted – not started		Suitable	Available	Achievable	898	E00044505	E02001821	71%	750	LMH	2%	0.251	0.591	0.562	0.357	70	18	41	39	25	250	80	189	180	114	250	143	337	320	204	100	168	396	376	239	FALSE	670	FALSE
85	16/00006/SHLAA	Former Groves Site, Woodbine Terrace, Pallion	Private ONH (	Sunderland South	PDL	FALSE	FALSE	31.65	75% net de	No planning status		Suitable	Available	Achievable	673	E00044465	E02001802	42%	700	MHM	5%	0.165	0.420	0.437	0.237		0	0	0	0	150	25	63	66	35	150	49	126	131	71	80	63	160	166	90	FALSE	380	FALSE
86	16/00183/SHLAA	Former Easington Lane Primary School Building	Council	Coalfield	PDL	FALSE	FALSE	1.27	90% net de	No planning status		Suitable	Available	Achievable	818	E00044419	E02001826	51%	75	MLM	3%	0.188	0.470	0.473	0.270		0	0	0	0	75	14	35	35	20		14	35	35	20		14	35	35	20	FALSE	75	FALSE
91	16/00150/SHLAA	Southwick Primary School, Clarence Street	Council	Sunderland North	PDL	FALSE	FALSE	1.80	90% net de	No planning status		Suitable	Available	Achievable	730	E00044796	E02001795	53%	50	HHH	10%	0.179	0.445	0.444	0.256		0	0	0	0	50	9	22	22	13		9	22	22	13		9	22	22	13	FALSE	50	FALSE
93	16/00007/SHLAA	Recreation Field, North Moor Lane, Farringdon	Council	Sunderland South	Mixed (75/2!	FALSE	FALSE	6.13	75% net de	No planning status		Suitable	Available	Achievable	828	E00044817	E02001813	44%	138	HHH	10%	0.160	0.406	0.419	0.230		0	0	0	0	138	22	56	58	32		22	56	58	32		22	56	58	32	FALSE	138	FALSE
98	16/00104/SHLAA	Ayton Village Primary School, Dunlin Drive, Ayton	Council	Washington	PDL	FALSE	FALSE	1.58	90 % net d	No planning status		Suitable	Available	Achievable	667	E00044984	E02001810	61%	43	MLH	3%	0.214	0.522	0.508	0.306		0	0	0	0	43	9	22	22	13		9	22	22	13		9	22	22	13	FALSE	43	FALSE
100	16/00277/SHLAA	Ethel Ave / Brewer Terrace, Ryhope Village	Gentoo	Sunderland South	PDL	FALSE	FALSE	4.92	75% net de	Permitted - under const	12/02259/FUI	Suitable	Available	Achievable	905	E00170247	E02001818	59%	143	HMH	8%	0.197	0.483	0.473	0.281	4	1	2	2	1		1	2	2	1		1	2	2	1		1	2	2	1	FALSE	4	FALSE
101	16/00152/SHLAA	Downhill Phase 1+2, Downhill	Gentoo	Sunderland North	Mixed (50/5(	FALSE	FALSE	4.70	75% net de	Permitted - not started	15/00123/FUI	Suitable	Available	Achievable	664	E00044896	E02001793	44%	88	HMM	7%	0.166	0.420	0.433	0.238	88	15	37	38	21		15	37	38	21		15	37	38	21		15	37	38	21	FALSE	88	FALSE
104	16/00153/SHLAA	Carley Hill School, Emsworth Road	Council	Sunderland North	Mixed (50/5(	FALSE	FALSE	4.20	75% net de	Pre-App		Suitable	Available	Achievable	732	E00044237	E02001794	41%	110	MMM	4%	0.164	0.420	0.438	0.236	40	7	17	18	9	70	18	46	48	26		18	46	48	26		18	46	48	26	FALSE	110	FALSE
106	16/00278/SHLAA	High Ford Estate, Flodden Road	Gleeson Hom	Sunderland South	PDL	FALSE	FALSE	8.37	75% net de	Permitted – under cons	11/01794/FUI	Suitable	Available	Achievable	889	E00170243	E02001802	56%	285	HMH	8%	0.189	0.468	0.462	0.271	175	33	82	81	47	54	43	107	106	62		43	107	106	62		43	107	106	62	FALSE	229	FALSE
107	16/00010/SHLAA	Phases 2-6, West Pennywell	Gentoo	Sunderland South	PDL	FALSE	FALSE	16.72	75% net de	No planning status		Suitable	Available	Achievable	802	E00044333	E02001811	44%	500	HMM	7%	0.166	0.420	0.433	0.238		0	0	0	0	150	25	63	65	36	150	50	126	130	71	60	60	151	156	86	FALSE	360	FALSE
109	16/00105/SHLAA	Glebe Parkway	Gentoo	Washington	PDL	FALSE	FALSE	1.64	90 % net d	Permitted - not started		Suitable	Available	Achievable	618	E00044942	E02001809	48%	44	HHM	9%	0.171	0.428	0.435	0.244	20	3	9	9	5	24	8	19	19	11		8	19	19	11		8	19	19	11	FALSE	44	FALSE
111		Land at Neil Street and the Bat Cave		Coalfield	PDL	FALSE	FALSE	1.61		Permitted – under cons	11/00360/FUI	Suitable	Available	Achievable	882	E00044400	E02001826	72%	26	HLH	6%	0.244	0.573	0.544	0.347	4	1	2	2	1		1	2	2	1		1	2	2	1		1	2	2	1	FALSE	4	FALSE
112	16/00186/SHLAA	Site of former Broomhill Estate.	Gentoo	Coalfield	Mixed (G15 E	FALSE	FALSE	3.89	75% net de	Permitted – not started	12/03140/FUI	Suitable	Available	Achievable	652	E00170241	E02001825	62%	148	HHH	10%	0.202	0.490	0.476	0.288	75	15	37	36	22	73	30	73	70	43		30	73	70	43		30	73	70	43	FALSE	148	FALSE
113		New Herrington Workingmenâ€™s Club, Langley Street, Houghton-le-Spring, I		Coalfield				1.59							407	E00044661	E02001822	64%		MLL	3%	0.225	0.541	0.522	0.320		0	0	0	0	7	2	4	4	2	10	4	9	9	5	0	4	9	9	5	FALSE	17	
115	16/00302/SHLAA	Holmelands, land adjacent to - Hawthorn Street	Gentoo	Coalfield	PDL	FALSE	FALSE	5.75	75% net de	Permitted – not started	15/00815/HYI	Suitable	Available	Achievable	880	E00170240	E02001823	63%	147	LLM	1%	0.226	0.545	0.528	0.322	110	25	60	58	35	37	33	80	78	47		33	80	78	47		33	80	78	47	FALSE	147	FALSE
118	16/00052/SHLAA	Belford House, Ashcroft and Belford Close	Council	Sunderland South	PDL	FALSE	FALSE	0.78	90 % net d	Permitted – under cons	15/01804/FU4	Suitable	Available	Achievable	887	E00044355	E02001812	60%	8	HHM	9%	0.198	0.484	0.472	0.283	8	2	4	4	2		2	4	4	2		2	4	4	2		2	4	4	2	FALSE	8	FALSE
120	16/00293/SHLAA	St Hilda's Church, School and adjacent land	Private/Counc	Sunderland North	PDL	FALSE	FALSE	0.62	90% net de	Permitted – under cons	14/01525/LP4	Suitable	Available	Achievable	663	E00044797	E02001795	44%	17	HHH	10%	0.160	0.406	0.419	0.000	17	3	7	7	0		3	7	7	0		3	7	7	0		3	7	7	0	FALSE	17	TRUE
128	16/00188/SHLAA	Black Boy Road land at (site A)	Private Yuille	Coalfield	Greenfield	FALSE	FALSE	4.78	75% net de	No planning status		Suitable	Available	Achievable	627	E00044449	E02001823	73%	140	HML	7%	0.245	0.573	0.543	0.348		0	0	0	0	140	34	80	76	49		34	80	76	49		34	80	76	49	FALSE	140	FALSE
138	16/00192/SHLAA	North Road, land at	Private	Coalfield	Greenfield	TRUE	FALSE	18.70	75% net de	Outline application (live	11/02362/OU	Suitable	Available	Achievable	653	E00044421	E02001825	66%	300	MLH	3%	0.232	0.553	0.532	0.330	45	10	25	24	15	125	39	94	90	56	100	63	149	144	89	30	69	166	160	99	FALSE	300	FALSE
142	16/00198/SHLAA	Former Chilton Moor Cricket Club, Black Boy Road	Private	Coalfield	Mixed (G90 E	FALSE	FALSE	1.29	90% net de	Outline application (live	15/00691/FUI	Suitable	Available	Achievable	881	E00044445	E02001823	62%	45	HLL	6%	0.211	0.512	0.497	0.301	45	10	23	22	14		10	23	22	14		10	23	22	14		10	23	22	14	FALSE	45	FALSE
146	16/00201/SHLAA	Easington Lane Primary School Playing Fields, School View	Council	Coalfield	PDL	FALSE	FALSE	1.68	90% net de	No planning status		Suitable	Available	Achievable	818	E00044420	E02001826	65%	75	LLM	1%	0.233	0.558	0.538	0.332		0	0	0	0	75	17	42	40	25		17	42	40	25		17	42	40	25	FALSE	75	FALSE
147	16/00011/SHLAA	Site of Greenway House, Nookside	Council	Sunderland South	PDL	FALSE	FALSE	1.86	90% net de	Full application (live)	16/01050/FU4	Suitable	Available	Achievable	903	E00044740	E02001804	65%	77	LMM	2%	0.230	0.553	0.533	0.328	30	7	17	16	10	47	18	43	41	25		18	43	41	25		18	43	41	25	FALSE	77	FALSE
149	16/00202/SHLAA	Aster Terrace, land at back of	Council/ Chur	Coalfield	Greenfield	FALSE	FALSE	1.58	90% net de	No planning status	15/00249/MN	Suitable	Available	Achievable	878	E00044677	E02001822	79%	80	LLM	1%	0.282	0.648	0.607	0.000		0	0	0	0	80	23	52	49	0		23	52	49	0		23	52	49	0	FALSE	80	TRUE
150	16/00203/SHLAA	Land adjacent Newbottle Primary School, Houghton Road	Council	Coalfield	Mixed (G50 E	FALSE	FALSE	0.53	90% net de	Permitted - not started	16/01097/FU4	Suitable	Available	Achievable	877	E00044458	E02001823	64%	17	MLL	3%	0.225	0.541	0.522	0.320	17	4	9	9	5		4	9	9	5		4	9	9	5		4	9	9	5	FALSE	17	FALSE
159	16/00012/SHLAA	Land adjacent to The Scullery Restaurant	Private/Counc	Sunderland South	Greenfield	FALSE	FALSE	0.29	100% net d	No planning status		Suitable	Available	Achievable	833	E00044733	E02001816	68%	9	HMH	8%	0.226	0.537	0.514	0.322		0	0	0	0	9	2	5	5	3		2	5	5	3		2	5	5	3	FALSE	9	FALSE
160	16/0013/SHLAA	East of Silksworth Lane, High Newport	Council	Sunderland South	Greenfield	FALSE	FALSE	0.69	90% net de	Permitted – under cons	15/01072/FU4	Suitable	Available	Achievable	893	E00044699	E02001816	32%	77	HMH	8%	0.138	0.362	0.395	0.000	77	11	28	30	0		11	28	30	0		11	28	30	0		11	28	30	0	FALSE	77	TRUE
175	16/00155/SHLAA	Fulwell Quarry East, land at Bell House Road	Council	Sunderland North	Greenfield	FALSE	FALSE	4.10	75% net de	No planning status		Suitable	Available	Achievable	732	E00044237	E02001794	41%	90	HMM	7%	0.159	0.406	0.425	0.229		0	0	0	0		0	0	0	0	45	7	18	19	10		7	18	19	10	FALSE	45	FALSE
177	16/00106/SHLAA	Former Usworth Comprehensive School	Council	Washington	Mixed (50/5(	FALSE	FALSE	11.39	75% net de	No planning status		Suitable	Available	Achievable	250	E00044949	E02001797	67%	256	LMM	2%	0.237	0.565	0.542	0.338		0	0	0	0	150	36	85	81	51	106	61	145	139	87		61	145	139	87	FALSE	256	FALSE
187	16/00156/SHLAA	Bonnersfield, land at - Palmers Hill Road	University of S	Sunderland Central	PDL	FALSE	FALSE	1.81	75 % net developable area = 1.36ha			Suitable	Available	Achievable	710	E00170218	E02001796	42%	80	HHH	10%	0.156	0.398	0.414	0.224		0	0	0	0		0	0	0	0	40	6	16	17	9		6	16	17	9	FALSE	40	FALSE
193	16/00304/SHLAA	SIG Combibloc Limited, Blackthorn Way	Private / Store	Coalfield	PDL	FALSE	FALSE	4.83	75% net de	Permitted – under cons	12/02556/REI	Suitable	Available	Achievable	876	E00044455	E02001823	64%	158	MLL	3%	0.225	0.541	0.522	0.320	53	12	29	28	17		12	29	28	17		12	29	28	17		12	29	28	17	FALSE	53	FALSE
194	16/00206/SHLAA	Lambton Lane, land at	Private / Coun	Coalfield	Mixed (G60 E	FALSE	FALSE	9.28	75% net de	No planning status		Suitable	Available	Achievable	818	E00044454	E02001823	61%	139	LLL	0%	0.221	0.538	0.524	0.316		0	0	0	0	139	31	75	73	44		31	75	73	44		31	75	73	44	FALSE	139	FALSE
197	16/00207/SHLAA	Land to the east of former Broomhill estate	Private / Coun	Coalfield	Greenfield	TRUE	FALSE	3.79	75% net de	Permitted – not started	14/00090/FUI	Suitable	Available	Achievable	652	E00170241	E02001825	62%	102	HLH	6%	0.211	0.512	0.497	0.301	50	11	26	25	15	52	22	52	51	31		22	52	51	31		22	52	51	31	FALSE	102	FALSE
230	16/00208/SHLAA	Rutland Street, Hetton, land rear of	Private	Coalfield	Greenfield	FALSE	FALSE	0.42	90% net de	No planning status		Suitable	Available	Achievable	453	E00044387	E02001825	53%	10	LLH	1%	0.197	0.490	0.488	0.282		0	0	0	0	10	2	5	5	3		2	5	5	3		2	5	5	3	FALSE	10	FALSE
248	16/00295/SHLAA	Emerson House, Emerson Road	Private	Washington	PDL	FALSE	FALSE	3.88	75% net de	Permitted – under cons	12/01651/REI	Suitable	Available	Achievable	616	E00044999	E02001810	81%	112	LLH	1%	0.306	0.693	0.642	0.433	12	4	8	8	5		4	8	8	5		4	8	8	5		4	8	8	5	FALSE	12	FALSE
252	16/00109/SHLAA	Former Hastings Court, Sulgrave	Gentoo	Washington	Greenfield	FALSE	FALSE	0.80	90 % net d	No planning status		Suitable	Available	Achievable	607	E00044970	E02001799	40%	22	MMM	4%	0.162	0.415	0.435	0.233		0	0	0	0		0	0	0	0		0	0	0	0	22	4	9	10	5	FALSE	22	FALSE
258	16/00110/SHLAA	Washington Football Club, Spout Lane	Private	Washington	Mixed (G85 E	FALSE	FALSE	2.05	75% net de	No planning status		Suitable	Available	Achievable	261	E00044979	E02001799	55%	46	LMM	2%	0.199	0.494	0.490	0.285		0	0	0	0	46	9	23	23	13		9	23	23	13		9	23	23	13	FALSE	46	FALSE
280	16/00305/SHLAA	Former Shiney Row Centre, Success Road	Sunderland C	Coalfield	Mixed (G20 E	FALSE	FALSE	4.20	75% net de	Permitted – not started	15/01226/REI	Suitable	Available	Achievable	878	E00044651	E02001822	76%	128	LLL	0%	0.274	0.635	0.598	0.389	110	30	70	66	43	18	35	81	77	50		35	81	77	50		35	81	77	50	FALSE	128	FALSE
288	16/00296/SHLAA	Teal Farm South	Private	Washington	Greenfield	FALSE	FALSE	2.13	75% net de	Permitted – under cons	12/00333/FUI	Suitable	Available	Achievable	615	E00170198	E02001807	73%	566	LMH	2%	0.258	0.603	0.572	0.367	202	52	122	115	74		52	122	115	74		52	122	115	74		52	122	115	74	FALSE	202	FALSE
292	16/00279/SHLAA	Lisburn Terrace , land at	Private	Sunderland South	PDL	FALSE	FALSE	6.79	75% net de	Permitted – under cons	11/00982/REI	Suitable	Available	Achievable	672	E00044184	E02001803	42%	212	MHH	5%	0.165	0.420	0.437	0.237	17	3	7	7	4		3	7	7	4		3	7	7	4		3	7	7	4	FALSE	17	FALSE
299		Peareth Hall Farm, Peareth Hall Road, Springwell Village, NE9 7NT		Washington				2.83							247	E00045074	E02001797	59%		MLM	3%	0.208	0.509	0.498	0.297		0	0	0	0	0	0	0	0	0	35	7	18	17	10	0	7	18	17	10	FALSE	35	
312	16/00117/SHLAA	Former Junglerama, Victoria Road	Private	Washington	PDL	FALSE	FALSE	0.28	100% net d	Permitted - not started	16/00115/FU4	Suitable	Available	Achievable	617	E00044980	E02001799	46%	14	MMM	4%	0.175	0.443	0.453	0.252	14	2	6	6	4		2	6	6	4		2	6	6	4		2	6	6	4	FALSE	14	FALSE
324	16/00018/SHLAA	Land to the East of Durham Road and Tudor Grove	Private	Sunderland South	Greenfield	FALSE	FALSE	2.40	75% net de	Permitted - not started	14/01638/FUI	Suitable	Available	Achievable	899	E00044609	E02001812	70%	8	MMH	4%	0.243	0.572	0.546	0.345	8	2	5	4	3		2	5	4	3		2	5	4	3		2	5	4	3	FALSE	8	FALSE
328	16/00216/SHLAA	Hetton Downs Phase 2	Unknown	Coalfield	PDL	FALSE	FALSE	3.97	75% net de	No planning status		Suitable	Available	Achievable	652	E00170245	E02001825	69%	125	MLH	3%	0.242	0.572	0.547	0.344		0	0	0	0	125	30	72	68	43		30	72	68	43		30	72	68	43	FALSE	125	FALSE
333	16/00218/SHLAA	Fletcher Terrace, land at (Lumley Crescent)	Private	Coalfield	Greenfield	FALSE	FALSE	0.36	100% net d	Permitted – not started	14/00194/OU	Suitable	Available	Achievable	630	E00044271	E02001822	70%	6	HLL	6%	0.238	0.560	0.534	0.338	6	1	3	3	2		1	3	3	2		1	3	3	2		1	3	3	2	FALSE	6	FALSE
339	16/00306/SHLAA	Land at Gillas Lane (rear of Lingfield)	Private (Persir	Coalfield	Greenfield	FALSE	FALSE	3.35	75% net de	Permitted – under cons	13/01617/FUI	Suitable	Available	Achievable	652	E00044268	E02001824	75%	63	LLH	1%	0.268	0.622	0.587	0.380	9	2	6	5	3		2	6	5	3		2	6	5	3		2	6	5	3	FALSE	9	FALSE
341	16/00220/SHLAA	Redburn Row, Land to the north of	Private	Coalfield	Greenfield	TRUE	FALSE	1.67	90% net de	Permitted – not started	14/01647/FUI	Suitable	Available	Achievable	627	E00044449	E02001823	73%	70	LLL	0%	0.263	0.616	0.583	0.374	70	18	43	41	26		18	43	41	26		18	43	41	26		18	43	41	26	FALSE	70	FALSE
342	16/00020/SHLAA	Land at Mill Hill, Silksworth Road	Private	Sunderland South	Greenfield	FALSE	FALSE	11.22	75% net de	No planning status		Suitable	Available	Achievable	838	E00044724	E02001819	63%	250	MMH	4%	0.219	0.529	0.512	0.312		0	0	0	0	150	33	79	77	47	100	55	132	128	78		55	132	128	78	FALSE	250	FALSE
344	16/00222/SHLAA	Chilton Moor Gardens site 2 (Durham Street)	Private	Coalfield	Greenfield	FALSE	FALSE	1.39	90% net de	No planning status		Suitable	Available	Achievable	818	E00044446	E02001823	72%	27	MLL	3%	0.252	0.591	0.561	0.358		0	0	0	0	27	7	16	15	10		7	16	15	10		7	16	15	10	FALSE	27	FALSE
355	16/00072/SHLAA	Rushford Phase 2, Ryhope	Private	Sunderland South	Greenfield	FALSE	FALSE	4.80	75% net de	Permitted – not started	15/10789/SUI	Suitable	Available	Achievable	895	E00170212	E02001818	81%	150	MMH	4%	0.297	0.672	0.622	0.420	120	36	81	75	50	30	45	101	93	63		45	101	93	63		45	101	93	63	FALSE	150	FALSE
356	16/00073/SHLAA	Burdon Road/Hall Farm Road, land at	Private	Sunderland South	Greenfield	FALSE	FALSE	9.74	75% net de	Full application (live)		Suitable	Available	Achievable	904	E00044539	E02001821	78%	114	MLH	3%	0.273	0.629	0.590	0.387		0	0	0	0	114	31	72	67	44		31	72	67	44		31	72	67	44	FALSE	114	FALSE
364		Pattinson Road, land south of (Teal Farm village Phase 1+2)	Private	Washington	PDL	FALSE	FALSE	6.30	75% net de	Permitted – under cons	12/00333/FUI	Suitable	Available	Achievable	615	E00170198	E02001807	73%	566	LMH	2%	0.258	0.603	0.572	0.367	202	52	122	115	74		52	122	115	74		52	122	115	74		52	122	115	74	FALSE	202	FALSE
367	16/00224/SHLAA	Coaley Lane, Land south of	Lambton Esta	Coalfield	Greenfield	TRUE	FALSE	5.19	75% net de	No planning status		Suitable	Available	Achievable	880	E00170240	E02001823	63%	90	LLL	0%	0.228	0.551	0.534	0.325		0	0	0	0	90	21	50	48	29		21	50	48	29		21	50	48	29	FALSE	90	FALSE
376	16/00227/SHLAA	Chilton Gardens, Chilton Moor	Lambton Esta	Coalfield	Greenfield	FALSE	FALSE	1.31	90% net de	No planning status		Suitable	Available	Achievable	818	E00044446	E02001823	72%	18	LLL	0%	0.260	0.609	0.578	0.369		0	0	0	0	18	5	11	10	7		5	11	10	7		5	11	10	7	FALSE	18	FALSE
380	16/00075/SHLAA	Grangetown Autos and land to the South. East side of Ryhope R	Private	Sunderland South	PDL	TRUE	FALSE	0.54	90% net de	Permitted – not started	15/01629/OU	Suitable	Available	Achievable	901	E00044519	E02001818	66%	22	LLH	1%	0.236	0.565	0.543	0.337	22	5	12	12	7		5	12	12	7		5	12	12	7		5	12	12	7	FALSE	22	FALSE
382	16/00230/SHLAA	Dairy Lane, Site 1, Land at	Lambton Esta	Coalfield	Greenfield	FALSE	FALSE	0.79	90% net de	No planning status		Suitable	Available	Achievable	426	E00170221	E02001823	76%	15	LLL	0%	0.274	0.635	0.598	0.389		0	0	0	0	15	4	10	9	6		4	10	9	6		4	10	9	6	FALSE	15	FALSE
388	16/00235/SHLAA	Ennerdale Street, Low Moorsley, Land at	Private	Coalfield	Greenfield	FALSE	FALSE	0.98	90% net de	Permitted - not started	12/01125/OU	Suitable	Available	Achievable	652	E00044409	E02001826	51%	40	LLH	1%	0.192	0.480	0.482	0.275	30	6	14	14	8	10	8	19	19	11		8	19	19	11		8	19	19	11	FALSE	40	FALSE
410	16/00236/SHLAA	Blind Lane, Grasswell, land to North of	Private	Coalfield	Greenfield	FALSE	FALSE	0.71	90% net de	No planning status		Suitable	Available	Achievable	818	E00044451	E02001823	69%	21	LLL	0%	0.249	0.590	0.563	0.355		0	0	0	0	21	5	12	12	7		5	12	12	7		5	12	12	7	FALSE	21	FALSE
413	16/00167/SHLAA	Seaburn Amusements, Whitburn Road	Private	Sunderland North	Mixed (50/5(	FALSE	FALSE	5.65	75% net de	No planning status		Suitable	Available	Achievable	768	E00044286	E02001792	70%	181	MMH	4%	0.243	0.572	0.546	0.345		0	0	0	0	30	7	17	16	10	151	44	104	99	62		44	104	99	62	FALSE	181	FALSE
416		Land north and west of Ferryboat Lane, North Hylton, Sunderland		Sunderland North				7.79							752	E00044156	E02001798	55%		LLH	1%	0.202	0.499	0.495	0.288		0	0	0	0	100	20	50	49	29	35	27	67	67	39	0	27	67	67	39	FALSE	135	
417	16/00238/SHLAA	Heritage Green - Rear of Bee Hive Pub, Coaley Lane	Private Durha	Coalfield	Greenfield	TRUE	FALSE	10.73	75% net de	Permitted – under cons	15/00815/HYI	Suitable	Available	Achievable	879	E00044680	E02001820	72%	277	MLL	3%	0.252	0.591	0.561	0.358	95	24	56	53	34	100	49	115	109	70	82	70	164	155	99		70	164	155	99	FALSE	277	FALSE
421	16/00239/SHLAA	Quarry House Lane, East Rainton	Private	Coalfield	Greenfield	TRUE	FALSE	1.55	90% net de	No planning status		Suitable	Available	Achievable	443	E00044391	E02001825	68%	42	MLH	3%	0.238	0.566	0.542	0.339		0	0	0	0	42	10	24	23	14		10	24	23	14		10	24	23	14	FALSE	42	FALSE
422	16/00240/SHLAA	Markle Grove, land to East, East Rainton	Private	Coalfield	Greenfield	TRUE	FALSE	4.35	75% net de	Permitted – not started	16/00216/REI	Suitable	Available	Achievable	659	E00044422	E02001825	69%	93	MLM	3%	0.242	0.572	0.547	0.344	93	22	53	51	32		22	53	51	32		22	53	51	32		22	53	51	32	FALSE	93	FALSE
424		Land south of Stoney Lane, Springwell Village, Washington		Washington				3.99							252	E00045048	E02001800	68%		MLL	3%	0.238	0.566	0.542	0.339		0	0	0	0	0	0	0	0	0	0	0	0	0	0	54	13	31	29	18	FALSE	54	
448	16/00246/SHLAA	Penshaw House	Council	Coalfield	Mixed (50/5(	FALSE	FALSE	1.52	90% net de	Pre-App		Suitable	Available	Achievable	404	E00044656	E02001820	74%	15	LLM	1%	0.264	0.616	0.582	0.375		0	0	0	0	15	4	9	9	6		4	9	9	6		4	9	9	6	FALSE	15	FALSE
451	16/00082/SHLAA	Former Stannington Centre, Hillview, Stannington Grove	Council	Sunderland South	PDL	FALSE	FALSE	0.81	90% net de	No planning status		Suitable	Available	Achievable	869	E00044581	E02001812	63%	22	MMH	4%	0.219	0.529	0.512	0.312		0	0	0	0		0	0	0	0	22	5	12	11	7		5	12	11	7	FALSE	22	FALSE
453	16/00133/SHLAA	Silverstone Way, land west of,	HCA	Washington	Greenfield	FALSE	FALSE	0.45	90 % net d	No planning status		Suitable	Available	Achievable	256	E00044976	E02001799	44%	12	MMM	4%	0.171	0.433	0.447	0.245		0	0	0	0		0	0	0	0		0	0	0	0	12	2	5	5	3	FALSE	12	FALSE
454		Teal Farm North	Private	Washington	PDL	FALSE	FALSE	12.46	75% net de	Permitted – under cons	12/00333/FUI	Suitable	Available	Achievable	615	E00170198	E02001807	73%	566	MMH	4%	0.253	0.591	0.560	0.359	202	51	119	113	73		51	119	113	73		51	119	113	73		51	119	113	73	FALSE	202	FALSE
462	16/00307/SHLAA	Hetton Downs Phase 1	Unknown	Coalfield	PDL	FALSE	FALSE	2.27	75% net de	Permitted – under cons	14/00136/FUI	Suitable	Available	Achievable	651	E00044278	E02001825	58%	69	MLH	3%	0.204	0.503	0.493	0.292	32	7	16	16	9		7	16	16	9		7	16	16	9		7	16	16	9	FALSE	32	FALSE
465		Land adjacent to Herrington Country Park, Penshaw, Houghton-le-Spring		Coalfield				23.95							407	E00044658	E02001820	79%		MLL	3%	0.276	0.635	0.595	0.391		0	0	0	0	160	44	102	95	63	240	110	254	238	157	0	110	254	238	157	FALSE	400	
468	16/00253/SHLAA	Land north of Blackthorn Way, Sedgeletch Industrial Estate	HCA	Coalfield	Mixed (G85 E	FALSE	FALSE	6.40	62.5% net (	Outline application (live	16/01687/OU	Suitable	Available	Achievable	876	E00044455	E02001823	64%	138	LLL	0%	0.232	0.557	0.539	0.330	20	5	11	11	7	118	32	77	74	46		32	77	74	46		32	77	74	46	FALSE	138	FALSE
469	16/00254/SHLAA	Site of former Kentmere House	Council	Coalfield	PDL	FALSE	FALSE	0.64	90% net de	No planning status	13/01367/P7	Suitable	Available	Achievable	818	E00044451	E02001823	69%	20	LLL	0%	0.249	0.590	0.563	0.355		0	0	0	0	20	5	12	11	7		5	12	11	7		5	12	11	7	FALSE	20	FALSE
470	16/00255/SHLAA	Site of former Gilpin House	Council	Coalfield	PDL	FALSE	FALSE	0.34	100% net d	No planning status		Suitable	Available	Achievable	818	E00044451	E02001823	69%	12	LLL	0%	0.249	0.590	0.563	0.355		0	0	0	0	12	3	7	7	4		3	7	7	4		3	7	7	4	FALSE	12	FALSE
472	16/00256/SHLAA	Former Hetton Community Centre	Council	Coalfield	PDL	FALSE	FALSE	0.19	100% net d	Permitted - under const	14/00768/LP4	Suitable	Available	Achievable	445	E00044397	E02001825	63%	1	HLH	6%	0.214	0.518	0.502	0.306	1	0	1	1	0		0	1	1	0		0	1	1	0		0	1	1	0	FALSE	1	FALSE
477	16/00083/SHLAA	Land north of Burdon Lane	Private	Sunderland South	Greenfield	TRUE	FALSE	84.50	75% net de	No planning status		Suitable	Available	Achievable	875	E00044540	E02001821	73%	955	HLH	6%	0.248	0.579	0.548	0.352		0	0	0	0	440	109	255	241	155	515	236	553	524	336		236	553	524	336	FALSE	955	FALSE
494	16/00258/SHLAA	Land at Chapel Street/Edward Street	Private	Coalfield	Greenfield	FALSE	FALSE	0.08	100% net d	Lapsed permission	12/00290/SUI	Suitable	Available	Achievable	429	E00044275	E02001825	54%	6	HLH	6%	0.189	0.469	0.467	0.271		0	0	0	0	6	1	3	3	2		1	3	3	2		1	3	3	2	FALSE	6	FALSE
504	16/00087/SHLAA	Doxford Park Phase 6	Gentoo	Sunderland South	PDL	FALSE	FALSE	3.99	75% net de	No planning status		Suitable	Available	Achievable	851	E00170248	E02001817	47%	90	HLH	6%	0.174	0.438	0.447	0.249		0	0	0	0	90	16	39	40	22		16	39	40	22		16	39	40	22	FALSE	90	FALSE
505	16/00280/SHLAA	Doxford park Phase 5	Gentoo	Sunderland South	PDL	FALSE	FALSE	8.54	75% net de	Permitted – not started	13/01337/FUI	Suitable	Available	Achievable	896	E00170249	E02001817	58%	155	HLH	6%	0.198	0.487	0.478	0.283	110	22	54	53	31	45	31	76	74	44		31	76	74	44		31	76	74	44	FALSE	155	FALSE
511	16/00281/SHLAA	Land at Burdon Lane, west of Bevan Avenue	Private	Sunderland South	Greenfield	FALSE	FALSE	2.49	75% net de	Permitted – under cons	11/03345/SUI	Suitable	Available	Achievable	886	E00170214	E02001818	76%	77	LLH	1%	0.271	0.629	0.592	0.385	7	2	4	4	3		2	4	4	3		2	4	4	3		2	4	4	3	FALSE	7	FALSE
517		Former Castletown Workmens Club, Castle View	Private	Sunderland North	PDL	FALSE	FALSE	0.07	100% net d	Permitted – under cons	12/00135/FUI	Suitable	Available	Achievable	662	E00044145	E02001798	54%	12	LMH	2%	0.197	0.489	0.487	0.282	12	2	6	6	3		2	6	6	3		2	6	6	3		2	6	6	3	FALSE	12	FALSE
520	16/00172/SHLAA	Southwick Social Club, Church Bank	Private	Sunderland North	PDL	FALSE	FALSE	0.22	100% net d	No planning status					731	E00044773	E02001795	41%	14	HHH	10%	0.154	0.393	0.411	0.221		0	0	0	0	14	2	6	6	3		2	6	6	3		2	6	6	3	FALSE	14	FALSE
530	16/00027/SHLAA	Hillside Lodge, Tunstall Road	Private	Sunderland South	PDL	FALSE	FALSE	0.44	90% net de	Permitted – not started	11/01856/EXT	Suitable	Available	Achievable	900	E00044582	E02001812	66%	2	LMH	2%	0.234	0.559	0.538	0.333	2	0	1	1	1		0	1	1	1		0	1	1	1		0	1	1	1	FALSE	2	FALSE
531	16/00282/SHLAA	Council Yard, North St, Silksworth	Private	Sunderland South	PDL	FALSE	FALSE	0.14	100% net d	Permitted – under cons	11/01908/FUI	Suitable	Available	Achievable	891	E00044707	E02001817	61%	6	LMH	2%	0.217	0.527	0.513	0.309	4	1	2	2	1		1	2	2	1		1	2	2	1		1	2	2	1	FALSE	4	FALSE
537	16/00173/SHLAA	Land at Redcar Road/Rawdon Rd	Council	Sunderland North	PDL	FALSE	FALSE	0.28	100% net d	No planning status		Suitable	Available	Achievable	732	E00044216	E02001794	32%	8	LMH	2%	0.147	0.386	0.421	0.000		0	0	0	0	8	1	3	3	0		1	3	3	0		1	3	3	0	FALSE	8	TRUE
538	16/00136/SHLAA	Havannah Rd/Moorway, Albany	Unknown	Washington	Greenfield	FALSE	FALSE	2.80	75% net de	No planning status		Suitable	Available	Achievable	257	E00045062	E02001800	71%	63	LLM	1%	0.254	0.597	0.568	0.361		0	0	0	0		0	0	0	0	63	16	38	36	23		16	38	36	23	FALSE	63	FALSE
539	16/00261/SHLAA	Land to the west of Mulberry Way	Private	Coalfield	Greenfield	TRUE	FALSE	1.58	90% net de	No planning status		Suitable	Available	Achievable	426	E00170221	E02001823	76%	35	LLL	0%	0.274	0.635	0.598	0.389		0	0	0	0	35	10	22	21	14		10	22	21	14		10	22	21	14	FALSE	35	FALSE
540	16/00262/SHLAA	Hetton Downs Phase 3	Unknown	Coalfield	Mixed (G85 E	FALSE	FALSE	2.03	75% net de	No planning status		Suitable	Available	Achievable	652	E00170241	E02001825	62%	60	MLH	3%	0.218	0.528	0.513	0.311		0	0	0	0	60	13	32	31	19		13	32	31	19		13	32	31	19	FALSE	60	FALSE
562	16/00028/SHLAA	Land to the east of Silksworth Lane, by Elstob	Unknown	Sunderland South	Greenfield	FALSE	FALSE	4.10	75% net de	No planning status		Suitable	Available	Achievable	893	E00044699	E02001816	32%	93	MMH	4%	0.144	0.378	0.412	0.208		0	0	0	0	93	13	35	38	19		13	35	38	19		13	35	38	19	FALSE	93	FALSE
565	16/00176/SHLAA	Phoneix Tower Business Park, Castletown Way	Private	Sunderland North	PDL	FALSE	FALSE	3.98	75% net de	Outline application (live	14/00292/OU	Suitable	Available	Achievable	665	E00044786	E02001795	51%	140	MMH	4%	0.187	0.466	0.468	0.267	55	10	26	26	15	85	26	65	65	37		26	65	65	37		26	65	65	37	FALSE	140	FALSE
567		George Washington County Hotel Golf Course (pitch & putt course), Stone Cel		Washington				3.60							749	E00045041	E02001797	64%		MLM	3%	0.225	0.541	0.522	0.320		0	0	0	0	40	9	22	21	13	0	9	22	21	13	0	9	22	21	13	FALSE	40	
595	16/00139/SHLAA	Fell House, Albion Terrace, Springwell	Private	Washington	PDL	FALSE	FALSE	0.21	100% net d	Permitted – not started	13/02569/FUI	Suitable	Available	Achievable	626	E00045043	E02001797	59%	28	MLM	3%	0.208	0.509	0.498	0.297		0	0	0	0	28	6	14	14	8		6	14	14	8		6	14	14	8	FALSE	28	FALSE
628	16/00299/SHLAA	Former London Inn, Spout Lane	Unknown	Washington	PDL	FALSE	FALSE	0.55	90 % net d	Permitted – under cons	14/01589/FUI	Suitable	Available	Achievable	617	E00044980	E02001799	46%	79	MLM	3%	0.177	0.447	0.458	0.254	79	14	35	36	20		14	35	36	20		14	35	36	20		14	35	36	20	FALSE	79	FALSE
629	16/00029/SHLAA	Site of former Ford and Hylton Social Club, Poole Road	Private	Sunderland South	PDL	FALSE	FALSE	0.29	100% net d	Permitted – not started	15/01944/S12	Suitable	Available	Achievable	780	E00044752	E02001802	37%	14	MMM	4%	0.156	0.401	0.427	0.000	14	2	6	6	0		2	6	6	0		2	6	6	0		2	6	6	0	FALSE	14	TRUE
630	16/00284/SHLAA	Land Adjac Saint Lukes Road	Gentoo	Sunderland South	PDL	FALSE	FALSE	3.79	75% net de	Permitted - under const	13/02903/FUI	Suitable	Available	Achievable	889	E00170243	E02001802	56%	123	HHM	9%	0.187	0.463	0.457	0.000	123	23	57	56	0		23	57	56	0		23	57	56	0		23	57	56	0	FALSE	123	TRUE
631	16/00030/SHLAA	West of Silksworth Way, Doxford Park	Unknown	Sunderland South	Greenfield	FALSE	FALSE	4.10	75% net de	No planning status		Suitable	Available	Achievable	847	E00044725	E02001819	66%	92	MMH	4%	0.229	0.548	0.527	0.326		0	0	0	0		0	0	0	0	92	21	50	48	30		21	50	48	30	FALSE	92	FALSE
632	16/00140/SHLAA	Rear of Don Gardens	Unknown	Washington	Greenfield	FALSE	FALSE	2.76	75% net de	No planning status		Suitable	Available	Achievable	250	E00044962	E02001799	42%	62	MMM	4%	0.167	0.424	0.441	0.239		0	0	0	0		0	0	0	0	62	10	26	27	15		10	26	27	15	FALSE	62	FALSE
633	16/00141/SHLAA	Bonemill Lane, Rickleton	Unknown	Washington	Greenfield	FALSE	FALSE	0.75	90 % net d	No planning status		Suitable	Available	Achievable	274	E00045035	E02001815	72%	20	MMH	4%	0.249	0.585	0.555	0.354		0	0	0	0		0	0	0	0		0	0	0	0	20	5	12	11	7	FALSE	20	FALSE
636	16/00031/SHLAA	Open space at Fordfield Road, Pennywell/Ford	Unknown	Sunderland South	Greenfield	FALSE	FALSE	0.80	90% net de	No planning status		Suitable	Available	Achievable	780	E00044751	E02001802	40%	22	MMM	4%	0.162	0.415	0.435	0.233		0	0	0	0		0	0	0	0	22	4	9	10	5		4	9	10	5	FALSE	22	FALSE
637	16/00269/SHLAA	Hetton Downs Square / East of Thomas St	Gentoo	Coalfield	Greenfield	FALSE	FALSE	1.36	90% net de	No planning status		Suitable	Available	Achievable	429	E00044275	E02001825	54%	39	MLH	3%	0.195	0.484	0.482	0.279		0	0	0	0		0	0	0	0	39	8	19	19	11		8	19	19	11	FALSE	39	FALSE
646		Land at Glebe House Farm, Staithes Road, Washington, NE38 8NW		Washington				2.20							615	E00170198	E02001807	73%		LLH	1%	0.261	0.609	0.578	0.370		0	0	0	0	41	11	25	24	15	0	11	25	24	15	0	11	25	24	15	FALSE	41	
650	16/00145/SHLAA	Dame Margaret Field, Washington	Council	Washington	Greenfield	FALSE	FALSE	1.98	90 % net d	No planning status		Suitable	Available	Achievable	270	E00044900	E02001809	53%	53	MHH	5%	0.189	0.470	0.469	0.000		0	0	0	0	53	10	25	25	0		10	25	25	0		10	25	25	0	FALSE	53	TRUE
654	16/00274/SHLAA	West of Redburn Road	Private	Coalfield	Greenfield	FALSE	FALSE	1.44	90% net de	Permitted – not started	14/01804/OU	Suitable	Available	Achievable	627	E00044449	E02001823	73%	27	HLL	6%	0.248	0.579	0.548	0.352	27	7	16	15	9		7	16	15	9		7	16	15	9		7	16	15	9	FALSE	27	FALSE
655	16/00289/SHLAA	Galen Building	Unknown	Sunderland Central	PDL	FALSE	FALSE	0.21	100% net d	Permitted – under cons	14/02729/FUI	Suitable	Available	Achievable	883	E00044195	E02001803	25%	128	HHH	10%	0.000	0.000	0.000	0.000	128	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0	TRUE	128	FALSE
656	16/00290/SHLAA	Cassaton House, Fawcett Street		Sunderland Central	PDL	FALSE	FALSE	0.19	100% net d	Permitted – under cons	16/01640/VAI	Suitable	Available	Achievable	661	E00170234	E02001803	31%	105	HHH	10%	0.000	0.000	0.000	0.192	105	0	0	0	20		0	0	0	20		0	0	0	20		0	0	0	20	TRUE	105	FALSE
657	16/00291/SHLAA	15-17 John Street	Unknown	Sunderland Central	PDL	FALSE	FALSE	0.10	100% net d	Permitted – under cons	15/01265/FU4	Suitable	Available	Achievable	661	E00170234	E02001803	31%	61	HHH	10%	0.000	0.000	0.000	0.192	61	0	0	0	12		0	0	0	12		0	0	0	12		0	0	0	12	TRUE	61	FALSE
658	16/00292/SHLAA	Phoenix House, Union Street	Unknown	Sunderland Central	PDL	FALSE	FALSE	0.07	100% net d	Permitted – under cons	15/00357/FUI	Suitable	Available	Achievable	661	E00170234	E02001803	31%	38	HHH	10%	0.133	0.350	0.384	0.192	38	5	13	15	7	0	5	13	15	7	0	5	13	15	7	0	5	13	15	7	FALSE	38	FALSE
659	16/00093/SHLAA	Sunniside Central Area, Villiers Street	Council/HCA	Sunderland Central	PDL	FALSE	FALSE	1.21	90 % net d	No planning status		Suitable	Available	Achievable	701	E00170202	E02001803	31%	33	HHH	10%	0.133	0.350	0.384	0.192		0	0	0	0		0	0	0	0	33	4	12	13	6		4	12	13	6	FALSE	33	FALSE
660	16/00094/SHLAA	63 Fawcett Street	Unknown	Sunderland Central	PDL	FALSE	FALSE	0.02	100% net d	Permitted – not started	14/02357/FUI	Suitable	Available	Achievable	661	E00170234	E02001803	31%	7	HHH	10%	0.133	0.350	0.384	0.192	7	1	2	3	1		1	2	3	1		1	2	3	1		1	2	3	1	FALSE	7	FALSE
661	16/00095/SHLAA	12 Fawcett Street	Unknown	Sunderland Central	PDL	FALSE	FALSE	0.02	100% net d	Permitted – not started	16/00357/FUI	Suitable	Available	Achievable	661	E00170234	E02001803	31%	5	HHH	10%	0.133	0.350	0.384	0.192	5	1	2	2	1		1	2	2	1		1	2	2	1		1	2	2	1	FALSE	5	FALSE
662	16/00096/SHLAA	18 John Street	Unknown	Sunderland Central	PDL	FALSE	FALSE	0.02	100% net d	Permitted – under cons	15/00041/FUI	Suitable	Available	Achievable	661	E00170234	E02001803	31%	10	HHH	10%	0.133	0.350	0.384	0.192	10	1	4	4	2		1	4	4	2		1	4	4	2		1	4	4	2	FALSE	10	FALSE
663	16/00035/SHLAA	Former East Herrington Library, Farringdon	Unknown	Sunderland South	PDL	FALSE	FALSE	0.11	100% net d	Permitted – under cons	15/02298/FU4	Suitable	Available	Achievable	890	E00044572	E02001819	63%	5	MMH	4%	0.219	0.529	0.512	0.312	5	1	3	3	2		1	3	3	2		1	3	3	2		1	3	3	2	FALSE	5	FALSE
664	16/00285/SHLAA	North Moor Farm Cottages, Farringdon	Unknown	Sunderland South	PDL	FALSE	FALSE	0.14	100% net d	Permitted – under cons		Suitable	Available	Achievable	894	E00044559	E02001816	60%	6	HHH	10%	0.196	0.478	0.467	0.280	6	1	3	3	2		1	3	3	2		1	3	3	2		1	3	3	2	FALSE	6	FALSE
665	16/00098/SHLAA	255 High Street West	Unknown	Sunderland Central	PDL	FALSE	FALSE	0.04	100% net d	Permitted – not started	15/00344/FUI	Suitable	Available	Achievable	884	E00044180	E02001803	30%	9	HHH	10%	0.131	0.346	0.381	0.189	9	1	3	3	2		1	3	3	2		1	3	3	2		1	3	3	2	FALSE	9	FALSE
671		Southern Area Playing Fields, Washington		Washington				18.67							276	E00045038	E02001815	74%		LLH	1%	0.264	0.616	0.582	0.375		0	0	0	0	170	45	105	99	64	32	53	124	118	76	0	53	124	118	76	FALSE	202	
673		James Steel Park		Washington				5.24							275	E00045026	E02001815	64%		LLH	1%	0.229	0.552	0.533	0.327		0	0	0	0	0	0	0	0	0	32	7	18	17	10	0	7	18	17	10	FALSE	32	
675		Land at Newcastle Road, Fulwell		Sunderland North				4.75							773	E00044236	E02001791	65%		HLM	6%	0.221	0.530	0.511	0.315		0	0	0	0	82	18	43	42	26	0	18	43	42	26	0	18	43	42	26	FALSE	82	
676		land at East Herrington		Sunderland South				7.06							840	E00044544	E02001819	72%		HLH	6%	0.244	0.573	0.544	0.347		0	0	0	0	0	0	0	0	0	70	17	40	38	24	0	17	40	38	24	FALSE	70	
677		Land at Birchwood, Ford Oval	Council/Gento	Sunderland South	Greenfield	FALSE	FALSE	1.89	75% net de	No planning status		Suitable	Available	Achievable	799	E00044746	E02001804	60%	60	MMH	4%	0.209	0.510	0.498	0.298		0	0	0	0	60	13	31	30	18		13	31	30	18		13	31	30	18	FALSE	60	FALSE
154A	16/00154/SHLAA	Seaburn Camp, Whitburn Road (North)	University of S	Sunderland North	Greenfield	FALSE	FALSE	4.00	75% net de	No planning status		Suitable	Available	Achievable	769	E00044301	E02001792	68%	140	MMH	4%	0.236	0.560	0.536	0.336		0	0	0	0	140	33	78	75	47		33	78	75	47		33	78	75	47	FALSE	140	FALSE
154B	16/00154/SHLAA	Seaburn Camp, Whitburn Road (South)	Council	Sunderland North	Greenfield	FALSE	FALSE	5.18	75% net de	No planning status		Suitable	Available	Achievable	768	E00044286	E02001792	70%	78	MMH	4%	0.243	0.572	0.546	0.345		0	0	0	0		0	0	0	0	78	19	45	43	27		19	45	43	27	FALSE	78	FALSE
293A	16/00213/SHLAA	Low Moorsley, land at (Ennerdale Street)	Private	Coalfield	Mixed (G90 E	FALSE	FALSE	4.33	75% net de	Outline application (live	14/01371/OU	Suitable	Available	Achievable	628	E00044408	E02001826	52%	82	MLH	3%	0.191	0.475	0.476	0.273	30	6	14	14	8	52	16	39	39	22		16	39	39	22		16	39	39	22	FALSE	82	FALSE
330A	16/00217/SHLAA	Philadelphia Complex	Private and Pa	Coalfield	Mixed (50/5(	FALSE	FALSE	27.36	75% net de	Permitted - not started	14/00538/HYI	Suitable	Available	Achievable	629	E00044377	E02001806	42%	500	LLM	1%	0.172	0.437	0.455	0.247	60	10	26	27	15	150	36	92	96	52	150	62	157	164	89	60	72	184	191	104	FALSE	420	FALSE
330B		Land at Philadelphia Complex / Philadelphia Lane, Houghton-le-Spring		Coalfield			WAS	8.32							629	E00044377	E02001806	42%		MLL	3%	0.168	0.429	0.446	0.242		0	0	0	0	20	3	9	9	5	150	29	73	76	41	0	29	73	76	41	FALSE	170	
407C		Land to the north of Mount Lane, Springwell Village		Washington			WAS	3.21							252	E00045048	E02001800	68%		LLM	1%	0.243	0.577	0.553	0.346		0	0	0	0	48	12	28	27	17	0	12	28	27	17	0	12	28	27	17	FALSE	48	
426A	16/00077/SHLAA	Willow Farm land to south, Ryhope (North)	Private/Churc	Sunderland South	Greenfield	FALSE	FALSE	18.51	75% net de	No planning status		Suitable	Available	Achievable	859	E00170235	E02001818	71%	500	LLH	1%	0.254	0.597	0.568	0.361		0	0	0	0	150	38	89	85	54	150	76	179	170	108	60	91	215	204	130	FALSE	360	FALSE
463A		Land west of Waterloo Road, Usworth, Washington		Washington			WAS	10.93							608	E00044950	E02001797	66%		HLM	6%	0.224	0.536	0.516	0.320		0	0	0	0	125	28	67	64	40	80	46	110	106	66	0	46	110	106	66	FALSE	205	
464B		Land to the North of the Graneries, Offerton, Sunderland		Coalfield			WAS	0.85							398	E00165667	E02001797	58%		LLM	1%	0.208	0.513	0.504	0.298		0	0	0	0	10	2	5	5	3	0	2	5	5	3	0	2	5	5	3	FALSE	10	
467A	16/00170/SHLAA	Thornbeck College,land to the North East	Council	Sunderland North	Greenfield	FALSE	FALSE	3.80	90% net de	No planning status		Suitable	Available	Achievable	398	E00165667	E02001797	58%	60	LMH	2%	0.206	0.508	0.499	0.295		0	0	0	0		0	0	0	0	30	6	15	15	9		6	15	15	9	FALSE	30	FALSE
467B	16/00170/SHLAA	Thornbeck College,land to the South	Private (Austi	Sunderland North	PDL	FALSE	FALSE	0.51	90% net de	No planning status		Suitable	Available	Achievable	771	E00044214	E02001791	68%	14	HMH	8%	0.226	0.537	0.514	0.322		0	0	0	0	14	3	8	7	5		3	8	7	5		3	8	7	5	FALSE	14	FALSE
80C		Stadium Village Site C	Council	Sunderland Central	PDL	FALSE	FALSE	0.98		No planning status		Suitable	Available	Achievable	710	E00170218	E02001796	42%	100	HHH	10%	0.156	0.398	0.414	0.224		0	0	0	0	100	16	40	41	22		16	40	41	22		16	40	41	22	FALSE	100	FALSE

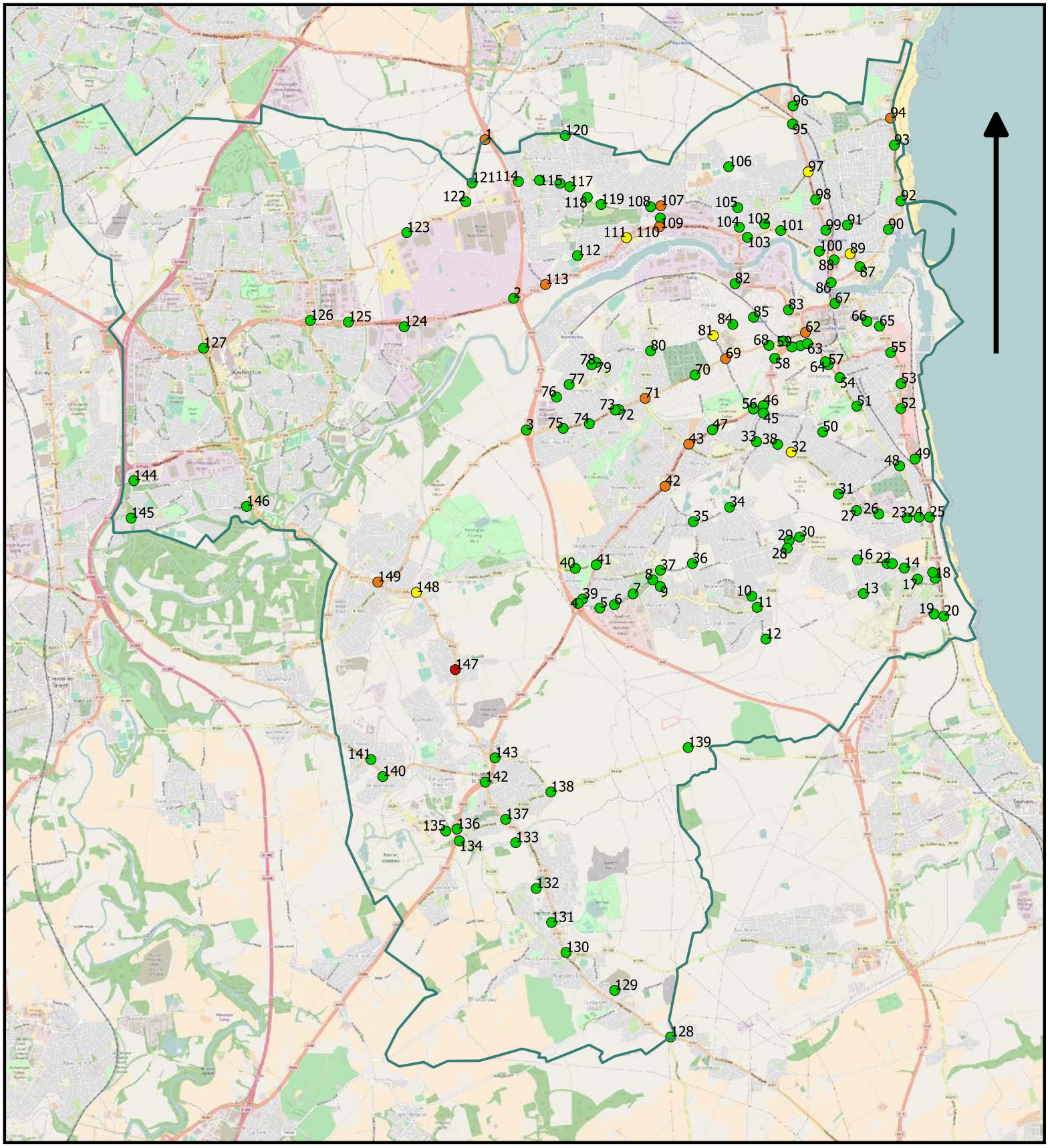
													office	industrial	warehouse	3558	3000	2992	WITHOUT DOUBLE COUNTING											
																			within 5				within 6-10				within 11-15				16&17			
ELR Ref	ELR Sub Ref		Site Name	Sub Area	Industrial Estate Name	Site Area [ha]	Site area [m2]	OA	MSOA	Saturn Zone	Car % from area	Workplace Population	B1 %	B2 %	B8 %	B1 [m2]	B2 [m2]	B8 [m2]	AM		PM		AM		PM		AM		PM		AM		PM	
																			IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT	IN	OUT
0		0	Sunderland Enterprise Park East	Sunderland North	Sunderland Enterprise Park	0.54	5417.80	E00044786	E02001795	913	53%	3947	80%	10%	10%	4334	542	542	2	0	0	1	4	1	1	2	5	1	1	3	6	1	1	4
0		0	IAMP			69.60	695973.44	E00044950	E02001797	938	68%	9662	37%	31%	31%	259296	218630	218047	113	23	20	70	287	60	52	178	405	84	73	251	426	89	77	264
0		0	Biffa landfill site	Coalfield	Houghton - Quarry	5.91	59070.50	E00044253	E02001824	912	62%	20	10%	40%	50%	5907	23628	29535	5	1	1	3	12	3	2	8	17	4	3	11	18	4	3	11
2	a	2a	Barrack Street (3)	Sunderland South	Port	0.62	6232.25	E00044178	E02001806	917	43%	82	0%	10%	90%	0	623	5609	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	b	2b	Prospect Road (2)	Sunderland South	Port	4.96	49553.13	E00044199	E02001806	917	33%	243	0%	10%	90%	0	4955	44598	1	0	0	1	2	0	0	1	3	1	1	2	3	1	1	2
2	c	2c	Disused Hendon railway sidings, Moor Terrace	Sunderland South	Port	5.84	58435.21	E00044377	E02001806	917	42%	276	0%	10%	90%	0	5844	52592	1	0	0	1	3	1	0	2	4	1	1	2	4	1	1	2
4	b	4b	North of Woodbine Terrace (1)	Sunderland South	Pallion Riverside	1.76	17571.72	E00044184	E02001803	918	44%	278	0%	25%	25%	0	4393	4393	1	0	0	0	1	0	0	1	2	0	0	1	2	0	0	1
4	a	4a	East of Woodbine Terrace (3)	Sunderland South	Pallion Riverside	0.77	7704.08	E00044184	E02001803	918	44%	278	0%	25%	25%	0	1926	1926	0	0	0	0	1	0	0	0	1	0	0	1	1	0	0	1
15		15	Former Corning warehouse, Deptford Ter	Sunderland South	Deptford	2.41	24135.29	E00044184	E02001803	919	44%	278	0%	25%	25%	0	6034	6034	1	0	0	0	2	0	0	1	3	1	0	2	3	1	0	2
16	d	16d	I J Dewhirst (6)	Sunderland South	Hendon	1.53	15325.31	E00044377	E02001806	920	42%	276	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	b	16b	Gasometers (3)	Sunderland South	Hendon	2.39	23880.15	E00044354	E02001814	920	55%	476	0%	100%	0%	0	23880	0	3	1	0	2	7	1	1	4	10	2	2	6	10	2	2	6
16	a	16a	East of gasometers depot, Spelter Works Road (2)	Sunderland South	Hendon	2.19	21942.89	E00044354	E02001814	920	55%	476	0%	100%	0%	0	21943	0	2	1	0	2	6	1	1	4	9	2	2	5	9	2	2	6
17	c	17c	Former Purdy Hose, Wellmere Road	Sunderland South	Leechmere	3.76	37557.27	E00044596	E02001814	921	77%	513	10%	40%	50%	3756	15023	18779	3	1	1	2	8	2	1	5	11	2	2	7	12	2	2	7
17	b	17b	South-west of Carrmere Road	Sunderland South	Leechmere	0.12	1165.64	E00044594	E02001814	921	57%	541	10%	40%	50%	117	466	583	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	a	17a	North of Plumb Centre, Sandmere Road	Sunderland South	Leechmere	0.61	6101.50	E00044594	E02001814	921	57%	541	10%	40%	50%	610	2441	3051	0	0	0	0	1	0	0	1	2	0	0	1	2	0	0	1
18	a	18a	South East corner of Pennywell Industrial Estate	Sunderland South	Pennywell	1.66	16598.26	E00170244	E02001811	922	47%	23	10%	40%	50%	1660	6639	8299	1	0	0	1	3	1	1	2	5	1	1	3	5	1	1	3
18	b	18b	Rear of nursery units (2)	Sunderland South	Pennywell	0.14	1366.11	E00044331	E02001811	922	47%	798	10%	40%	50%	137	546	683	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	b	19b	Former Vishay factory, Pallion Way (8)	Sunderland South	Pallion	0.72	7247.54	E00044465	E02001802	923	43%	1219	10%	40%	50%	725	2899	3624	1	0	0	0	2	0	0	1	2	0	0	1	2	0	0	1
19	a	19a	West of Eastern Way (9)	Sunderland South	Pallion	0.31	3106.32	E00044465	E02001802	923	43%	1219	10%	40%	50%	311	1243	1553	0	0	0	0	1	0	0	0	1	0	0	1	1	0	0	1
19	c	19c	West of Luxembourg Road (1)	Sunderland South	Pallion West	0.59	5913.33	E00044741	E02001804	923	72%	250	10%	40%	50%	591	2365	2957	0	0	0	0	1	0	0	1	2	0	0	1	2	0	0	1
25		25	West of Azure Court, Camberwell Way (2)	Sunderland South	Doxford	1.13	11317.16	E00044557	E02001819	924	73%	2024	90%	0%	10%	10185	0	1132	3	1	1	2	9	2	2	5	12	3	2	8	13	3	2	8
47		47	North Hylton Enterprise Park (5)	Sunderland North	North Hylton	0.33	3329.81	E00044786	E02001795	914	53%	3947	0%	50%	50%	0	1665	1665	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0
48	a	48a	Wear Street/Camden Street (1)	Sunderland North	Low Southwick	0.09	949.04	E00044786	E02001795	915	53%	3947	5%	75%	20%	47	712	190	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	c	48c	Crown Road (West of Quay West) (4)	Sunderland North	Low Southwick	0.14	1378.74	E00044786	E02001795	915	53%	3947	5%	75%	20%	69	1034	276	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
48	b	48b	Crown Road (East of Quay West) (5)	Sunderland North	Low Southwick	0.40	4021.45	E00044786	E02001795	915	53%	3947	5%	75%	20%	201	3016	804	0	0	0	0	1	0	0	1	1	0	0	1	2	0	0	1
48	d	48d	Wear Street (land beside Q A Bridge) (3)	Sunderland North	Low Southwick	0.15	1509.21	E00044786	E02001795	915	53%	3947	5%	75%	20%	75	1132	302	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
55		55	Trafford Road (8)	Sunderland North	Low Southwick	0.30	3044.88	E00044773	E02001795	916	42%	877	5%	75%	20%	152	2284	609	0	0	0	0	1	0	0	0	1	0	0	1	1	0	0	1
59	b	59b	North of Crowther Road (3)	Washington	Crowther	0.30	2994.09	E00045000	E02001810	925	77%	917	10%	40%	50%	299	1198	1497	0	0	0	0	1	0	0	0	1	0	0	1	1	0	0	1
59	a	59a	East of Crowther Road (1)	Washington	Crowther	0.41	4138.90	E00045000	E02001810	925	77%	917	10%	40%	50%	414	1656	2069	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	1
60		60	Tower Road (2)	Washington	Glover West	0.19	1898.35	E00044948	E02001799	926	50%	1382	10%	40%	50%	190	759	949	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
61		61	Northern entrance to Industrial Road	Washington	Hertburn	0.21	2056.63	E00044680	E02001820	927	73%	63	10%	40%	50%	206	823	1028	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
62		62	Hillthorn Farm (6)	Washington	Nissan	27.01	270083.45	E00170229	E02001818	928	71%	697	0%	50%	50%	0	135042	135042	16	3	3	10	41	8	7	25	57	12	10	36	60	13	11	37
63		63	Hillthorn Farm (7)	Washington	Nissan	3.29	32881.01	E00044181	E02001803	928	33%	465	10%	40%	50%	3288	13152	16441	3	1	0	2	7	1	1	4	10	2	2	6	10	2	2	6
64		64	Turbine Business Park (3) - east of pub	Washington	Nissan	1.21	12129.18	E00044950	E02001797	933	68%	9662	10%	40%	50%	1213	4852	6065	1	0	0	1	3	1	0	2	4	1	1	2	4	1	1	2
64	d	64d	North of Low Barmston Farmhouse (10)	Washington	Pattinson North	2.58	25788.75	E00170198	E02001807	931	75%	5171	0%	0%	100%	0	0	25789	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
64	c	64c	Screen Print, North of Alston Rd/Walton Rd (11)	Washington	Pattinson North	1.69	16923.53	E00170231	E02001807	931	81%	1359	10%	40%	50%	1692	6769	8462	1	0	0	1	4	1	1	2	5	1	1	3	5	1	1	3
64	a	64a	West of Walton Road (5)	Washington	Pattinson North	0.94	9371.06	E00170231	E02001807	930	81%	1359	10%	40%	50%	937	3748	4686	1	0	0	0	2	0	0	1	3	1	1	2	3	1	1	2
64	b	64b	South of Faraday Close (6)	Washington	Pattinson North	1.09	10938.51	E00170231	E02001807	930	81%	1359	10%	40%	50%	1094	4375	5469	1	0	0	1	2	0	0	1	3	1	1	2	3	1	1	2
64	e	64e	James Steel, Site 1 (7)	Washington	Pattinson North	0.89	8907.63	E00170198	E02001807	930	75%	5171	10%	40%	50%	891	3563	4454	1	0	0	0	2	0	0	1	3	1	1	2	3	1	0	2
64	f	64f	Front of James Steel (8)	Washington	Pattinson North	1.01	10086.34	E00170198	E02001807	930	75%	5171	10%	40%	50%	1009	4035	5043	1	0	0	1	2	0	0	1	3	1	1	2	3	1	1	2
65		65	Turbine Business Park (3) - east of Spine Road	Washington	Nissan	0.21	2095.36	E00044950	E02001797	933	68%	9662	10%	40%	50%	210	838	1048	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
65	c	65c	North of Sterling Close (1)	Washington	Pattinson South	0.47	4692.73	E00170198	E02001807	937	75%	5171	10%	40%	50%	469	1877	2346	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	1
65	b	65b	West of Sterling Close (3)	Washington	Pattinson South	0.19	1871.26	E00170198	E02001807	937	75%	5171	10%	40%	50%	187	749	936	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
65	a	65a	Holystone Waste, adjoining Railway	Washington	Pattinson South	1.00	9996.97	E00170198	E02001807	937	75%	5171	10%	40%	50%	1000	3999	4998	1	0	0	1	2	0	0	1	3	1	1	2	3	1	1	2
66		66	Turbine Business Park (3) - south of WBC	Washington	Nissan	0.84	8371.19	E00044950	E02001797	933	68%	9662	10%	40%	50%	837	3348	4186	1	0	0	0	2	0	0	1	2	1	0	2	3	1	0	2
67	c	67c	Former Northumbria Centre (1)	Washington	Stephenson	0.66	6555.97	E00044944	E02001797	932	79%	76	10%	40%	50%	656	2622	3278	1	0	0	0	1	0	0	1	2	0	0	1	2	0	0	1
67	b	67b	East of Stephenson Road (3)	Washington	Stephenson	0.35	3522.65	E00044944	E02001797	932	79%	76	10%	40%	50%	352	1409	1761	0	0	0	0	1	0	0	0	1	0	0	1	1	0	0	1
67	a	67a	East of Stephenson Road (2)	Washington	Stephenson	1.04	10364.76	E00044950	E02001797	932	68%	9662	10%	40%	50%	1036	4146	5182	1	0	0	1	2	0	0	1	3	1	1	2	3	1	1	2
67		67	Turbine Business Park (3) - south-east of FTC	Washington	Nissan	0.66	6562.20	E00044950	E02001797	933	68%	9662	10%	40%	50%	656	2625	3281	1	0	0	0	1	0	0	1	2	0	0	1	2	0	0	1
68		68	Turbine Business Park (3) - west of Vantec	Washington	Nissan	1.76	17626.37	E00044950	E02001797	933	68%	9662	10%	40%	50%	1763	7051	8813	1	0	0	1	4	1	1	2	5	1	1	3	5	1	1	3
69		69	Turbine Business Park (3) - south of test track	Washington	Nissan	2.59	25942.95	E00044950	E02001797	933	68%	9662	10%	40%	50%	2594	10377	12971	2	0	0	1	5	1	1	3	8	2	1	5	8	2	1	5
70		70	Turbine Business Park (1)	Washington	Nissan	6.09	60866.56	E00044177	E02001801	934	51%	75	10%	40%	50%	6087	24347	30433	5	1	1	3	13	3	2	8	18	4	3	11	19	4	3	12
71	a	71a	North of Hankyu (6)	Washington	Wear	0.82	8219.52	E00045013	E02001815	935	61%	790	5%	50%	45%	411	4110	3699	1	0	0	0	2	0	0	1	2	0	0	1	2	0	0	1
71	b	71b	South of Sedling Road (2)	Washington	Wear	0.57	5736.23	E00045023	E02001815	935	57%	141	5%	50%	45%	287	2868	2581	0	0	0	0	1	0	0	1	2	0	0	1	2	0	0	1
72		72	North of Campanile Hotel	Washington	Emerson	0.42	4225.65	E00044999	E02001810	936	83%	134	0%	0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	a	78a	West of Cherry Way (4)	Coalfield	Dubmire	0.79	7923.16	E00044455	E02001823	907	65%	134	10%	40%	50%	792	3169	3962	1	0	0	0	2	0	0	1	2	0	0	1	2	1	0	2
78	b	78b	South of Techniks	Coalfield	Dubmire	0.11	1092.70	E00044455	E02001823	907	65%	134	10%	40%	50%	109	437	546	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	c	78c	East of Cherry Way (1)	Coalfield	Dubmire	2.49	24887.82	E00044455	E02001823	907	65%	134	5%	25%	30%	1244	6222	7466	1	0	0	1	3	1	1	2	4	1	1	3	4	1	1	3
80	a	80a	Gilpin Wood (former Glebe Farm Sewage Works) (6)	Coalfield	Rainton Bridge North	2.68	26758.25	E00170218	E02001796	908	43%	787	10%	40%	50%	2676	10703	13379	2	0	0	1	6	1	1	3	8	2	1	5	8	2	1	5
80	b	80b	Land to west of former Sumitomo factory (1)	Coalfield	Rainton Bridge North	3.20	32048.46	E00170218	E02001796	908	43%	787	10%	40%	50%	3205	12819	16024	3	1	0	2	7	1	1	4	9	2	2	6	10	2	2	6
81	b	81b	South of Cygnet Way (5)	Coalfield	Rainton Bridge South	6.32	63200.97	E00044422	E02001825	909	76%	2861	60%	20%	20%	37921	12640	12640	14	3	3	9	36	8	7	22	51	11	9	32	54	11	10	33
81	a	81a	North of Cygnet Way (5)	Coalfield	Rainton Bridge South	1.78	17838.29	E00044422	E02001825	909	76%	2861	60%	20%	20%	10703	3568	3568	4	1	1	2	10	2	2	6	14	3	3	9	15	3	3	9
81	c	81c	North of Gadwall Road (1)	Coalfield	Rainton Bridge South	0.69	6870.13	E00044422	E02001825	909	76%	2861	60%	20%	20%	4122	1374	1374	2	0	0	1	4	1	1	2	6	1	1	3	6	1	1	4
82	a	82a	North of Colliery Lane (4)	Coalfield	Hetton Lyons	0.37	3686.39	E00044397	E02001825	910	72%	622	0%	50%	50%	0	1843	1843	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	1
82	b	82b	Land east of Parkgate (2)	Coalfield	Hetton Lyons	0.18	1765.89	E00044418	E02001826	910	63%	66	0%	50%	50%	0	883	883	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
87	b	87b	Adjoining Readycrete site (4)	Coalfield	Market Place	0.15	1535.29	E00170218	E02001796	911	43%	787	0%	50%	50%	0	768	768	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix D Census Mode Share Devised Vehicular Trip Rates

Car %	Trip Rates			
	AM		PM	
	IB	OB	IB	OB
81%	0.309	0.700	0.648	0.438
80%	0.288	0.661	0.618	0.408
79%	0.285	0.654	0.613	0.403
78%	0.281	0.648	0.608	0.398
77%	0.277	0.641	0.603	0.394
76%	0.274	0.635	0.598	0.389
75%	0.270	0.629	0.593	0.384
74%	0.267	0.622	0.588	0.379
73%	0.263	0.616	0.583	0.374
72%	0.260	0.609	0.578	0.369
71%	0.256	0.603	0.573	0.364
70%	0.253	0.596	0.568	0.359
69%	0.249	0.590	0.563	0.355
68%	0.246	0.583	0.558	0.350
67%	0.242	0.577	0.553	0.345
66%	0.239	0.570	0.549	0.340
65%	0.235	0.564	0.544	0.335
64%	0.232	0.557	0.539	0.330
63%	0.228	0.551	0.534	0.325
62%	0.225	0.544	0.529	0.320
61%	0.221	0.538	0.524	0.316
60%	0.218	0.531	0.519	0.311
59%	0.214	0.525	0.514	0.306
58%	0.210	0.519	0.509	0.301
57%	0.208	0.514	0.506	0.298
56%	0.206	0.509	0.503	0.294
55%	0.204	0.504	0.500	0.291
54%	0.201	0.499	0.496	0.288
53%	0.199	0.495	0.493	0.285
52%	0.197	0.490	0.490	0.281
51%	0.194	0.485	0.487	0.278
50%	0.192	0.480	0.484	0.275
49%	0.190	0.475	0.481	0.272
48%	0.187	0.471	0.478	0.269
47%	0.185	0.466	0.475	0.265
46%	0.183	0.461	0.472	0.262
45%	0.180	0.456	0.469	0.259
44%	0.178	0.451	0.466	0.256
43%	0.176	0.447	0.463	0.252
42%	0.174	0.442	0.460	0.249
41%	0.171	0.437	0.457	0.246

Car %	Trip Rates			
	AM		PM	
	IB	OB	IB	OB
40%	0.169	0.432	0.454	0.243
39%	0.167	0.427	0.451	0.239
38%	0.164	0.423	0.448	0.236
37%	0.162	0.418	0.444	0.233
36%	0.160	0.413	0.441	0.230
35%	0.157	0.408	0.438	0.226
34%	0.155	0.404	0.435	0.223
33%	0.153	0.399	0.432	0.220
32%	0.150	0.394	0.429	0.217
31%	0.148	0.389	0.426	0.213
30%	0.146	0.384	0.423	0.210
29%	0.144	0.380	0.420	0.207
28%	0.141	0.375	0.417	0.204
27%	0.139	0.370	0.414	0.200
26%	0.137	0.365	0.411	0.197
25%	0.134	0.360	0.408	0.194

Appendix E RFC SATURN Modelling Results for all of the Local Plan Delivery Phases



Key

Ratio of flow to capacity

- <0.85
- 0.86 - 0.90
- 0.91 - 1.00
- > 1.00

Base 2015 AM

CAPITA
INFRASTRUCTURE
The Quadrant, The Silverlink North, Cobalt Business Park,
North Tyneside NE27 0BY - 0191 643 4819
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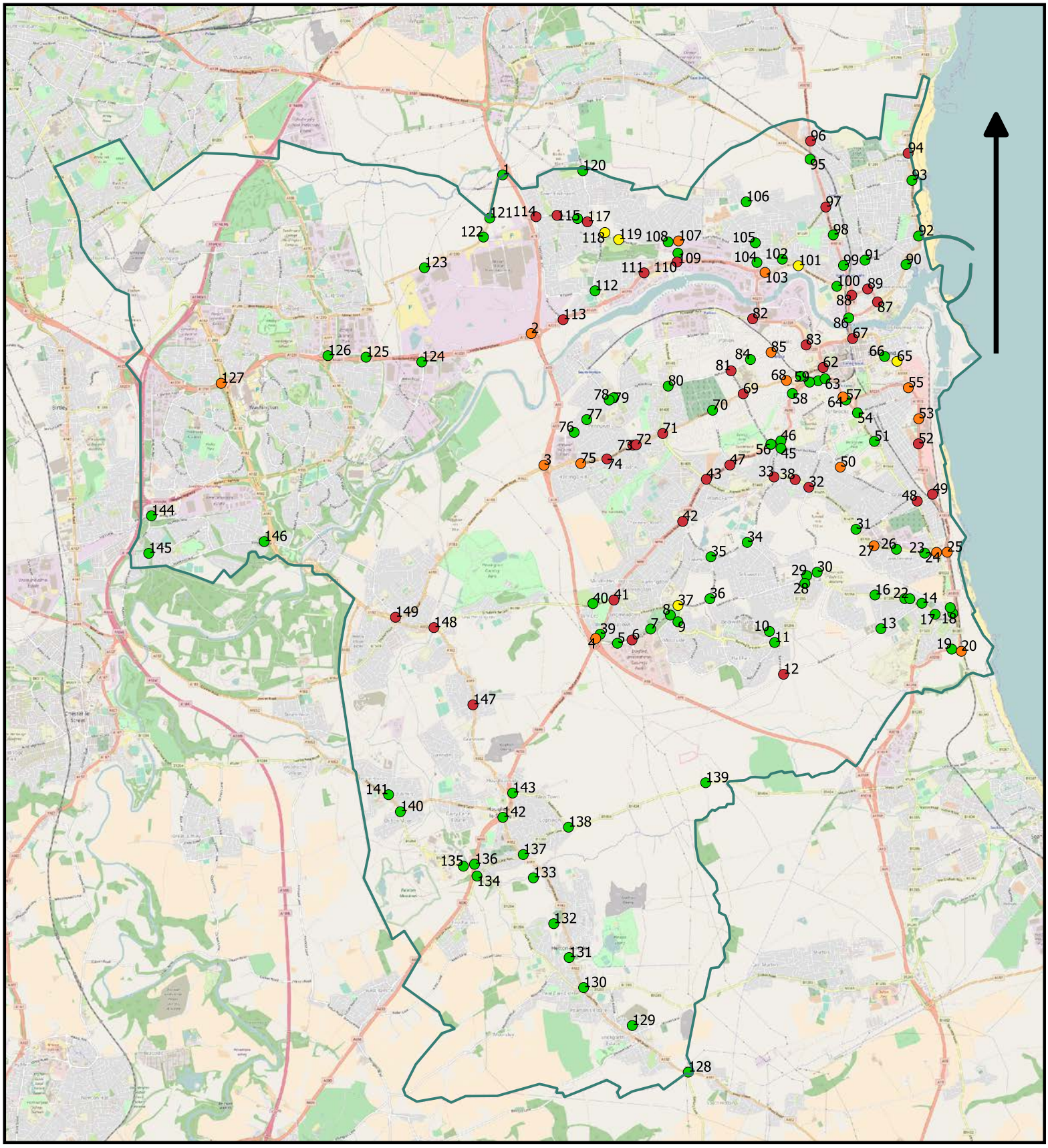
Capita Property and Infrastructure Ltd.



Key

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- 0.91 - 1.00
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Base 2015 PM

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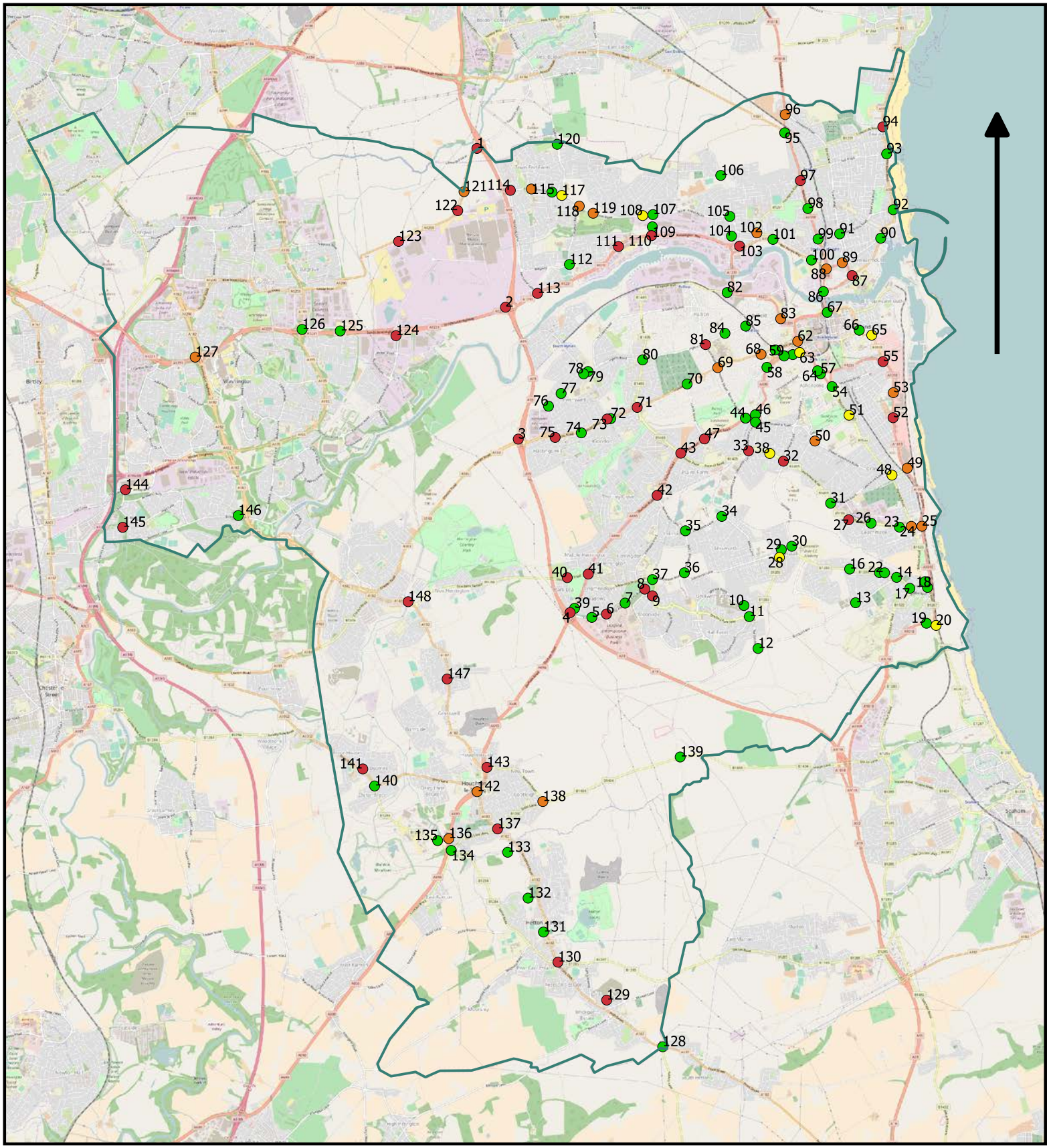

Key

Ratio of flow to capacity

- <0.85
- 0.86 - 0.90
- 0.91 - 1.00
- > 1.00

Phase 0 AM

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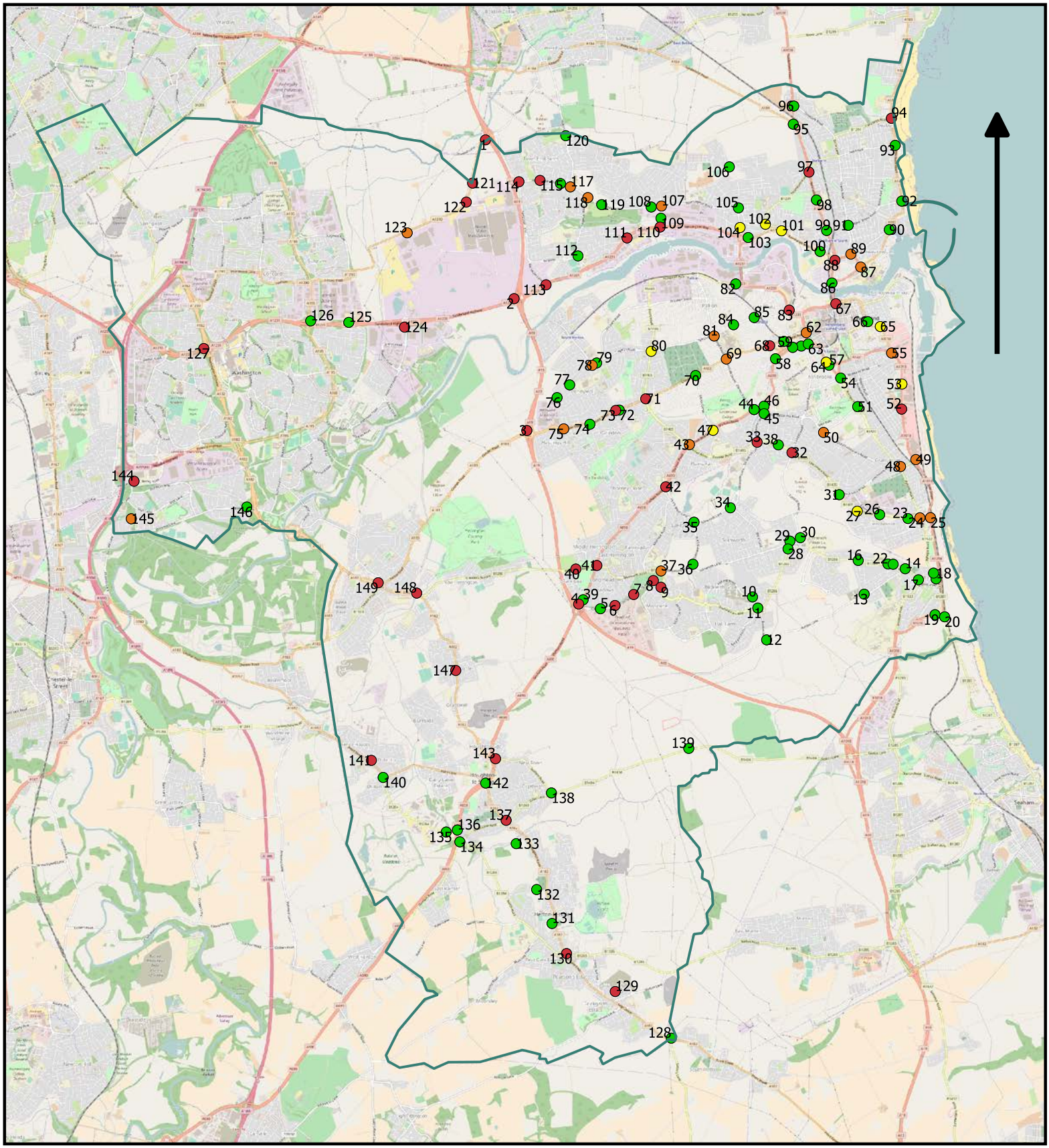

Key

Ratio of flow to capacity

- <0.85
- 0.86 - 0.90
- 0.91 - 1.00
- > 1.00

Phase 0 PM

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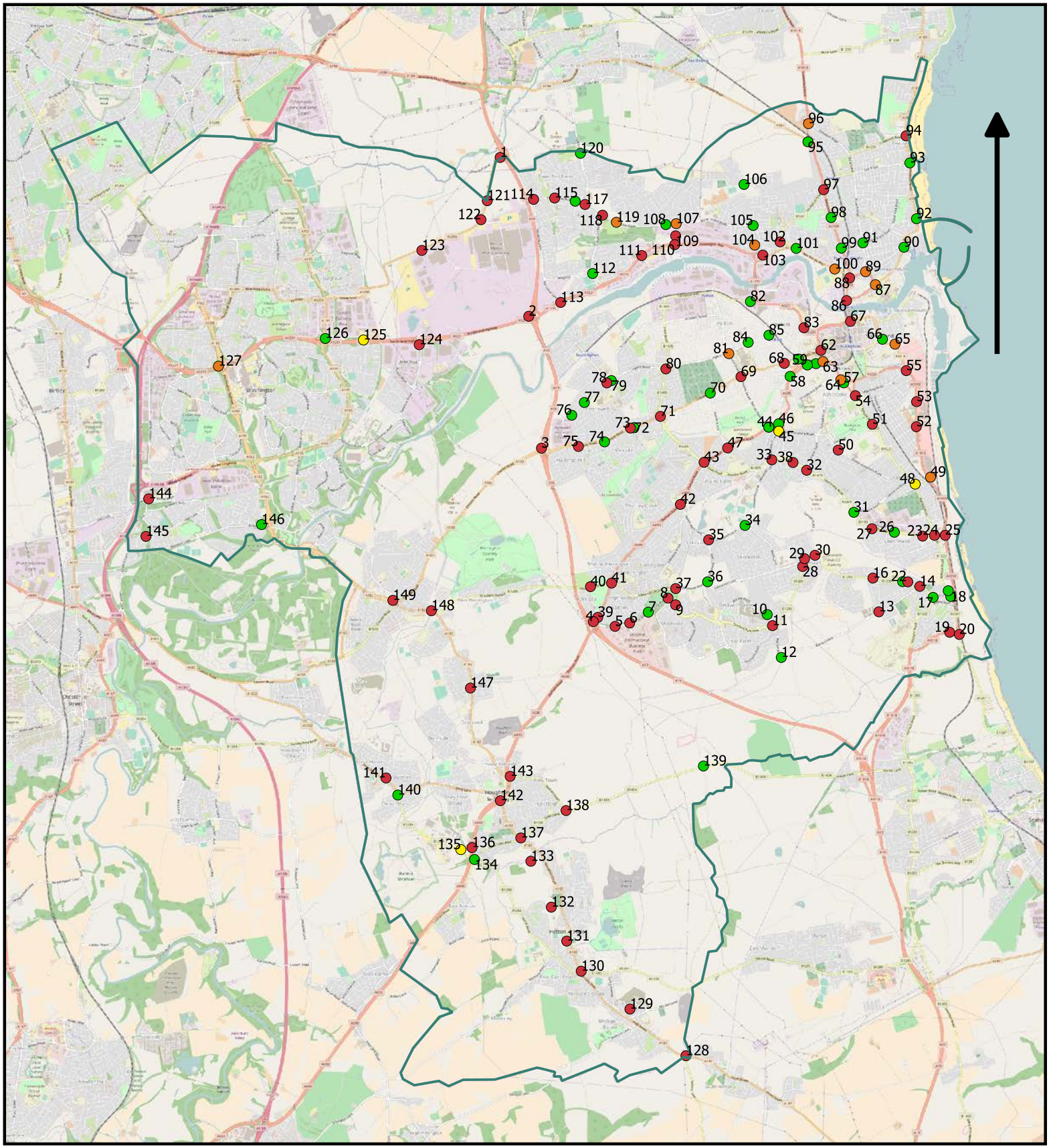

Key

Ratio of flow to capacity

- <0.85
- 0.86 - 0.90
- 0.91 - 1.00
- > 1.00

Phase 1 AM

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INFRASTRUCTURE
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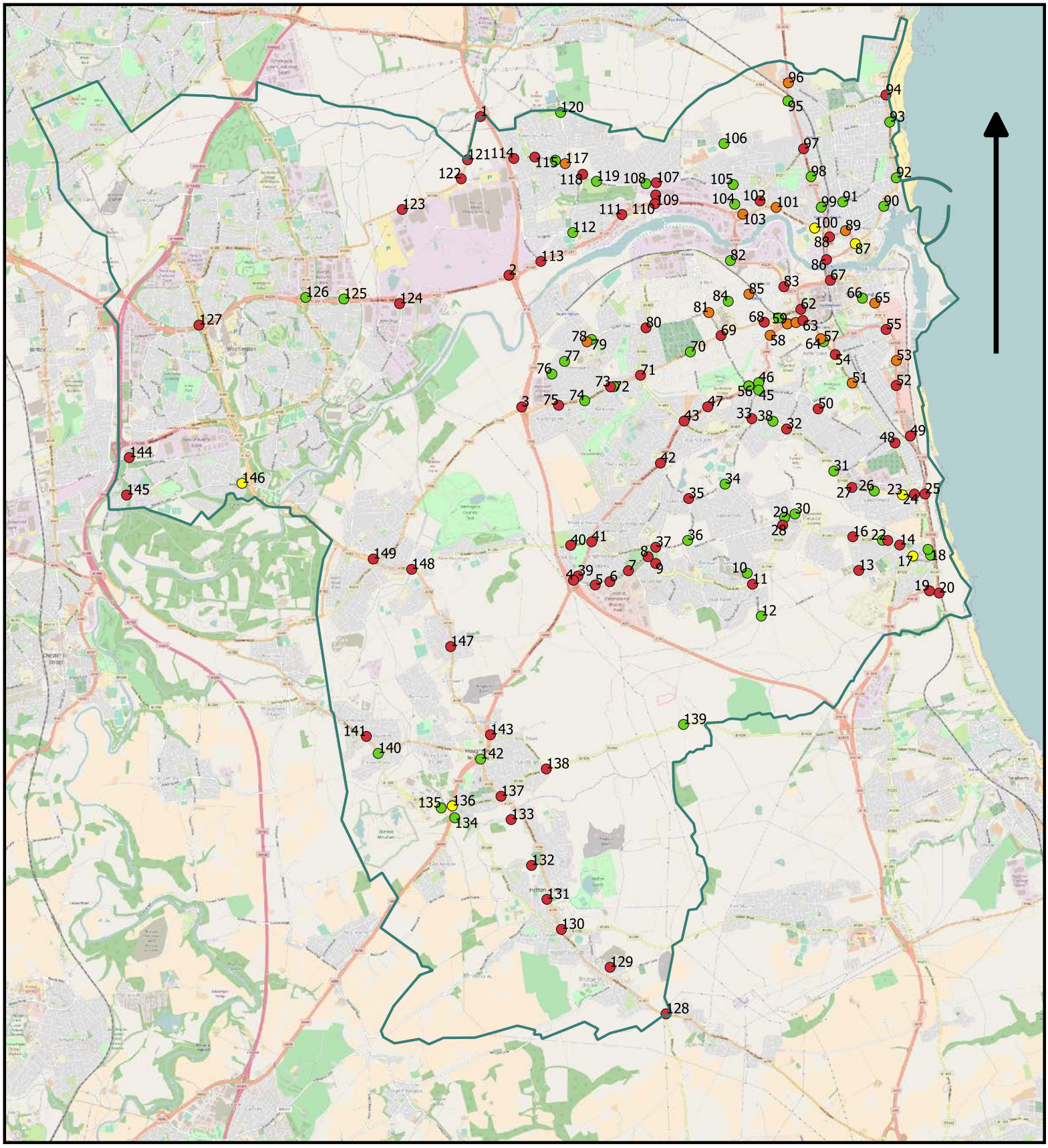

Key

Ratio of flow to capacity

- <0.85
- 0.86 - 0.90
- 0.91 - 1.00
- > 1.00

Phase 1 PM

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INFRASTRUCTURE
The Quadrant, The Silverlink North, Cobalt Business Park,
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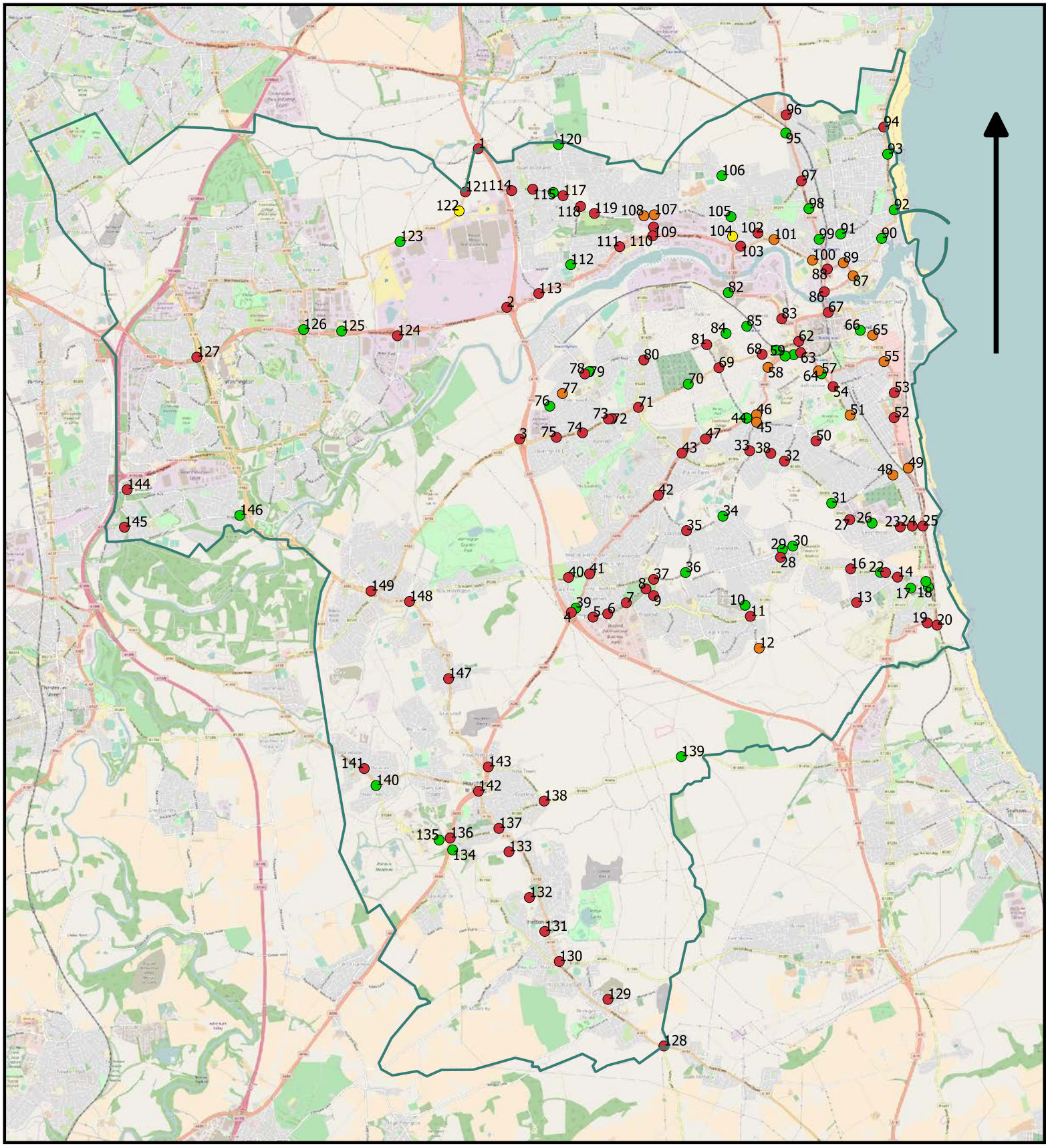

Key

Ratio of flow to capacity

- <0.85
- 0.86 - 0.90
- 0.91 - 1.00
- > 1.00

Phase 2 AM

CAPITA
INFRASTRUCTURE
The Quadrant, The Silverlink North, Cobalt Business Park,
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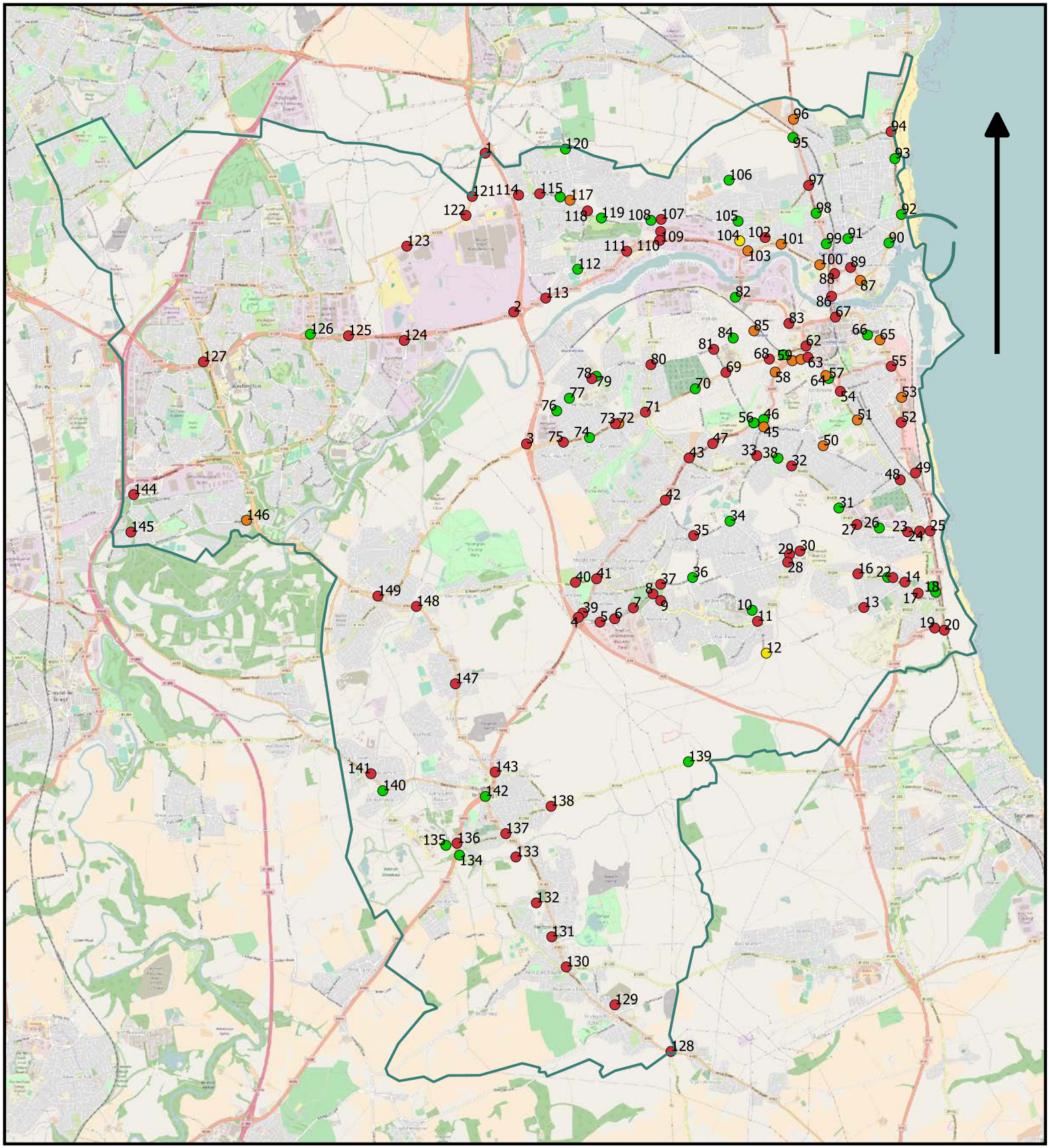

Key

Ratio of flow to capacity

- <0.85
- 0.86 - 0.90
- 0.91 - 1.00
- > 1.00

Phase 2 PM

CAPITA
INFRASTRUCTURE
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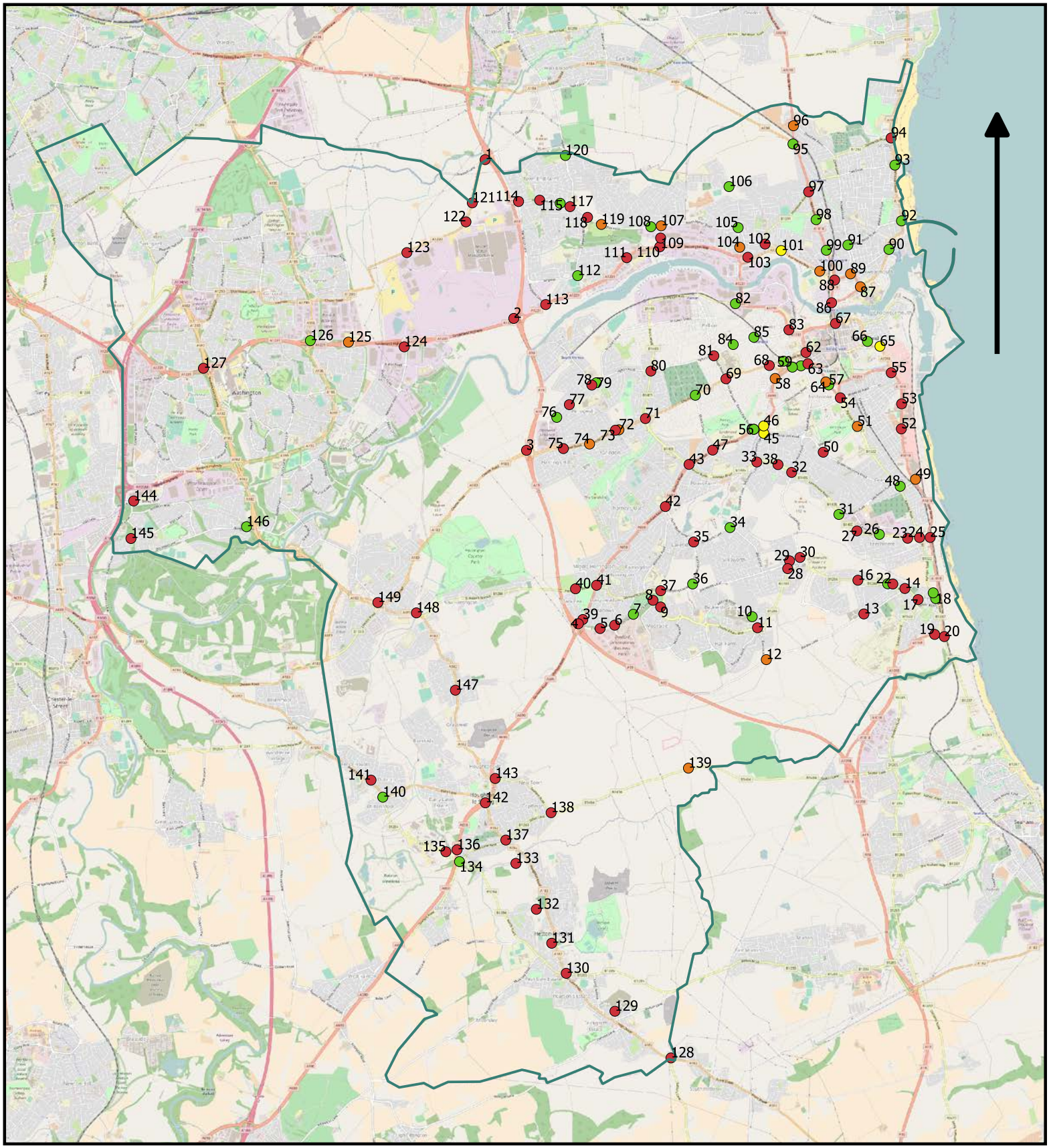

Key

Ratio of flow to capacity

- <0.85
- 0.86 - 0.90
- 0.91 - 1.00
- > 1.00

Phase 3 AM

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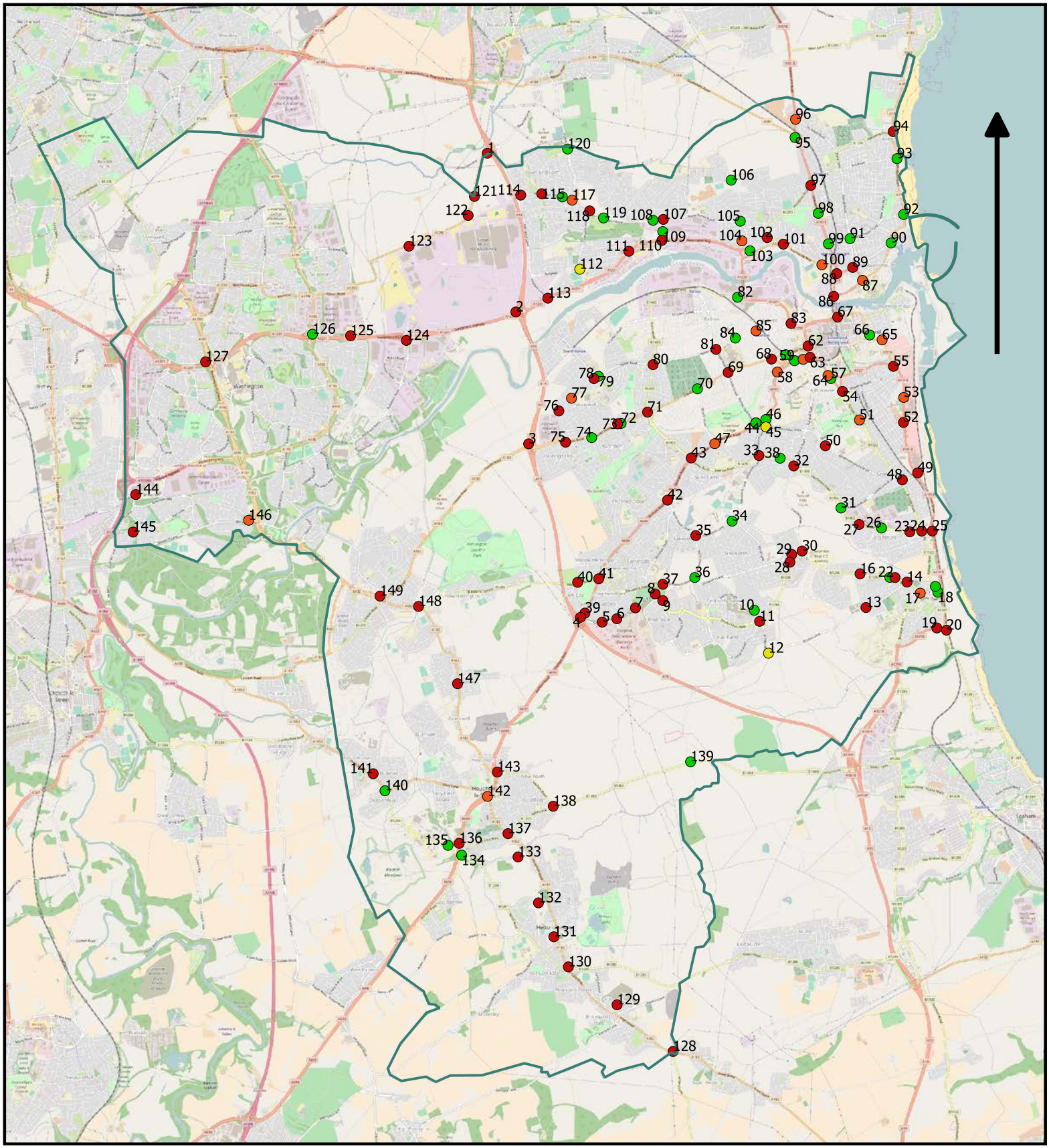

Key

Ratio of flow to capacity

- <0.85
- 0.86 - 0.90
- 0.91 - 1.00
- > 1.00

Phase 3 PM

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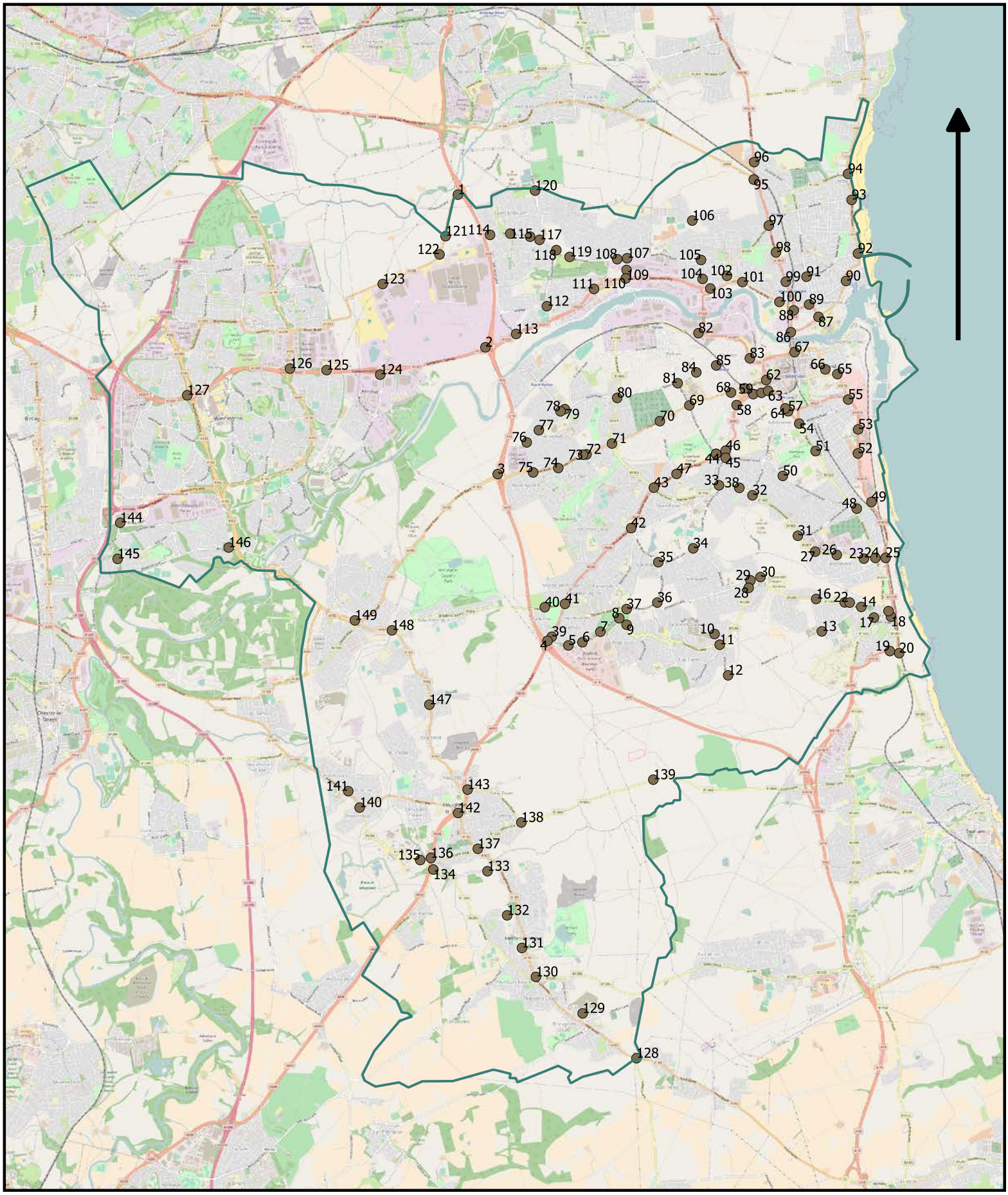
Appendix F Modelled Network Junction Reference Numbers



JUNCTION REFERENCE NUMBERS

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Appendix G NECA Pipeline Highway Schemes

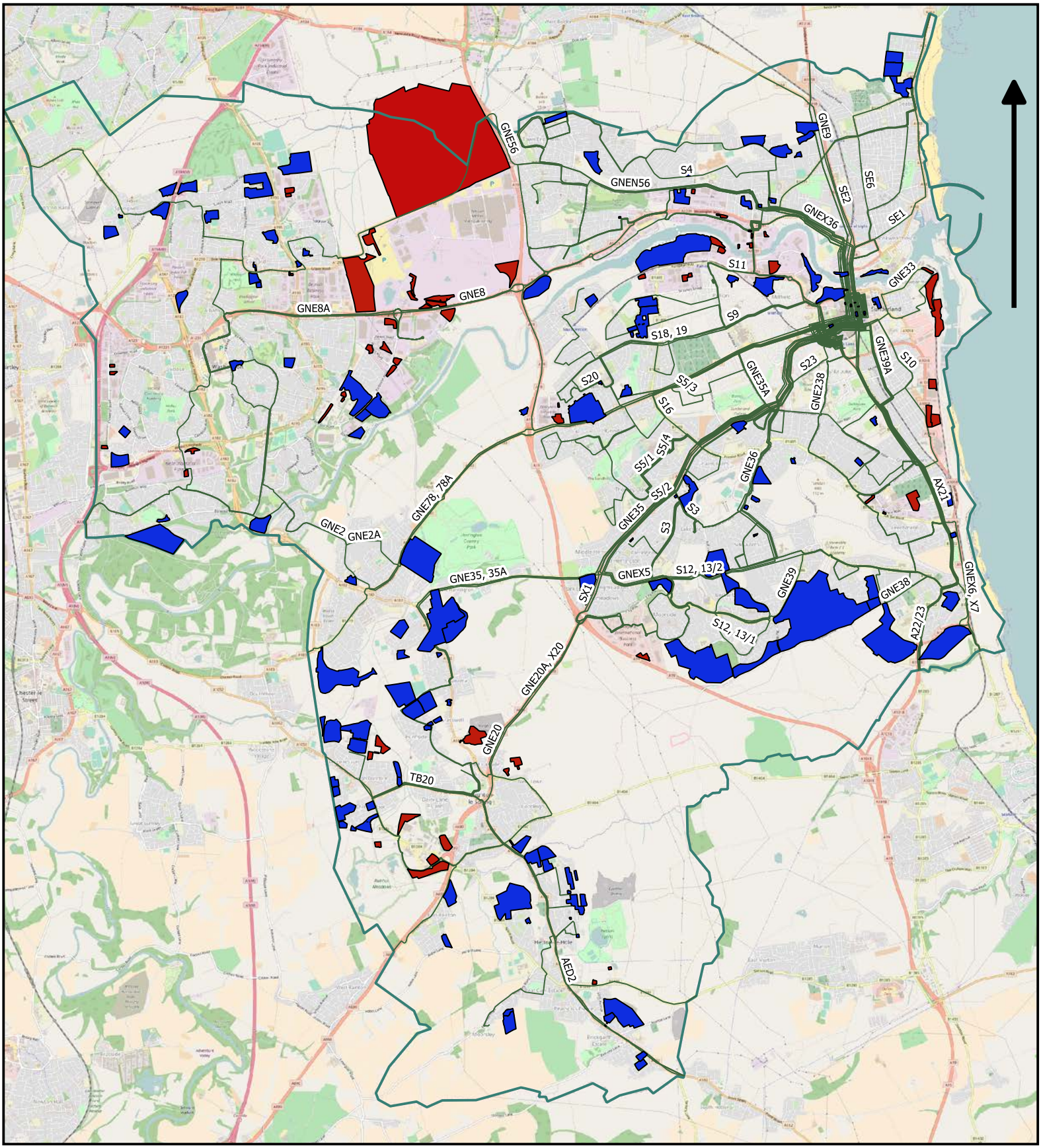
Capital Project Pipeline
Updated: 14 December 2015

No.	Plan Ref.		Project name	Link	Overview & status	Scheme Objectives	Lead body	Project Exec	Project Lead	Start Date	End Date	Actual / estimated total cost	Funding position	Posible Funding sources	Cap. Prog. Ref	Priority for LGF (Y/N)
A			**Top 10 £20m - £60m**													
	1	SSTC3	Sunderland Strategic Transport Corridor (SSTC3)	1A	Improvements to A1231 between junctions with St. Michael's Way and SSTC3. 1A estimated cost £13,000,000				PL			£30,000,000				
				1B	1B estimated cost £17,000,000											
	2	SSTC4	Sunderland Strategic Transport Corridor (SSTC) Phase 4 - Wessington Way (A19 to Proposed New North Bridgehead)		Improvements to A1231 between north bridgehead of proposed new bridge over the River Wear (SSTC Phase 2) and junction with A19. Developing interface improvements with Highway's England network.				PL			£50,000,000				
	3	SSTC 5	SSTC Phase 5 - Bridge Street to Commercial Road Roundabout, Sunderland Strategic Transport Corridor (SSTC)	3A	Improvements to A1018 between Wearmouth Bridge and the roundabout junction of Hendon Road with Commercial Road. Proposed single carriageway road linking SSTC / A1018 Southern Radial Route with the Port of Sunderland.Improvements would provide direct access between the Port and the national road network (i.e. A19 and A1M). This would contribute towards development of the Port, which is currently constrained by poor standard of existing road access. 3A Cost £25,000,000				PL			£60,000,000				
				3B	3B Cost £35,000,000											
	4		Coalfield Area Route - Central Route with Durham County Council		The proposed Central Route extends through the Coalfield Area, connecting the A182 west of Shiney Row with the B1284 at Rainton Bridge. Hetton By Pass and Murton Lane Improvements Link to Hetton Lyons. Complete east Durham link between the B1285 and the A19 via the Hawthorn employment site and bypassing Murton Village.				PL			£60,000,000				
	5	A690 Durham Road	A690 Durham Road Improvements	5A	The A690 Durham Road is a major road corridor providing a key access route serving the city centre and connecting Sunderland to the A19, and to the A1 (M) in County Durham.Aim is to improve journey times and reliability and reduce junction delays, and including safety improvements. 5A £30,000,000				PL			£35,650,000				
			Durham Road (A690) / Barnes Gyratory	5B	Intercity (Durham - Sunderland) Access Improvement 5B £2,500,000	To provide journey time saving (including public transport). To remove uncontrolled side road movements and improve road safety. To improve pedestrian connectivity To increase cycling permeability and promote the use of sustainable modes of transport			KH							
			Durham Road (A690) eastbound approach to A19	5C	Construction of a free flow filter lane between A690 eastbound approach to junction and northbound entry slip to A19 to accommodate high daily demand of northbound traffic. 5C £2,500,000				KH							
			Durham Road (A690) / Grindon Lane	5D	Intercity (Durham - Sunderland) Access Improvement 5D £650,000				KH							
	6		Doxford Park / Ryhope Link Road	5E	Proposal to provide a single carriageway link road, connecting Doxford Park Way with the A1018 Southern Radial Route to south of Ryhope.Facilitates access to new residential development at South Ryhope, former Cherry Knowle Hospital. Phased Delivery with section to be designed in-house.				PL			£10,000,000				
	7		South Sunderland Growth Area Access Route		Improved transport links with south Sunderland and A690				PL			TBC				
	8		A19 - A1018 Improvement remodelling		Remodelling to section of carriageway between A19 and 1018 to create improved transport links				PL			TBC				
	9	Stadium Parking Links	Vaux-Stadium Park Footbridge	9A	Estimates for a bridge at this location will vary widely depending on the required width and quality.	To improve links to and promote the use of public transport. To promote and assist in development of the Bonnersfield development site. To provide improved links to the historic St Peters Church and the Stadium of Light. To improve walking and cycling routes and to promote the use of such modes of transport			KH			For 11.5m wide a 'value for money' option is estimated at £15m, with a 'landmark' structure c. £39m.				
			Stadium Park-St Peters Subway	9B	5.5m wide subway below Wearmouth Bridge North Approach between St Peters Metro Station and Bonnersfield				KH			Based on a study in 2003 the updated estimate in 2015 was c. £2.5m				
	10		IAMP		Proposed dual and single carriageway links, including new bridge crossings to the proposed 100 hectare development to the west of Sunderland city centre that will house new automotive, logistics and offshore manufacturing businesses.				PL			£35,000,000				
			£2m - £20m													

	11		Traffic Signals - Upgrading of existing traffic signals city wide		The signals asset is ageing and around 50% of the 155 signal installations are close to, or beyond, design life. This means that not only is the physical state of the equipment generally poor; but also the technology is aged. The asset is fulfilling its basic requirement of regulating traffic flows, but is doing so in a basic/unintelligent/isolated manner With modern, intelligent, networked equipment and design, there would be substantial gains in efficiency for highway users by reduction of delays/stopping/speed alterations. Additionally, modern LED aspects use substantially less energy, leading to reduced revenue costs as well as measurable carbon savings.				GC			£7,500,000: Circa £1.5m per annum over 5 years				
	12	Chester Road	Chester Road Bus Corridor (A183) A183 / A182 (Shiney Row) Junction	12A	Journey time saving and removal of congestion pinch point. Link 1 £5,000,000	To provide journey time saving (including public transport). To improve junctions at A183 and A690. To improve pedestrian links. To provide a gateway to the University and the City.			KH			£11.300,000				
			Chester Road Bus Corridor (A183) Grindon Mill and Springwell Road Junction	12B	Signalisation of junctions and construction of direct access to land to the north inorder to facilitate regenaration of the Pennywell housing area. Link 2 £3,000,000				KH							
				12C	Signalisation of existing junction and improvement to mainline approaches to reduce congestion and delay. Link 3 £1,300,000											
			Chester Road Bus Corridor (A183) Royalty Junction and Springwell Road Junction	12D	Journey time saving & congestion relief. Link 4 £2,000,000				KH							
	13		North Bridge Street		Creation City Centre Gateway and conversion of North Bridge Street and Dame Dorothy Street to two-way traffic flow.	To create a gateway to the City in order to promote economic development. To provide journey time saving. To reduce congestion. To improve links between the City centre and the coastal areas of Roker, Seaburn and Whitburn. To improve pedestrian connectivity			KH			£4,000,000				
	14		(B1286) Doxford International Technology Park Access		Dualling of route and removal of Congestion Pinch point at entry to City Way (Economic regeneration)				KH			£4,000,000				
	15	City Centre	Investment Corridors Phase 2	15A	Environmental improvements providing strategic link between Sunderland University and City Centre. Link 1 £2,000,000	To provide journey time saving. To improve access to / from the City Centre and promote Economic Development. To provide journey time saving and congestion relief. To improve road safety and reduce delay for pedestrians crossing movements;			KH			£6,500,000				
			Park Lane Interchange entrance from Stockton Road	15B	Improves public transport links through journey time saving and provides congestion relief in City centre (Holmeside). Link 2 £1,500,000				KH							
			St Michael's Way / Durham Road junction	15C	Journey time saving and removal of congestion pinch point. Link 3 1,300,000				KH							
			Link Road through police station onto St Mary's Way St Michael's Way / High Street West junction	15D	Provides link to SSTC from City centre (High Street West). Link 5 £1,000,000				KH							
				15E	Removal of Congestion Pinch point. Link 6 £700,000				KH							
	16		Four Lane Ends Junction		Journey time saving and removal of congestion pinch point.				KH			£2,000,000				
			Up to £1-5m													
	17		Park Lane Interchange entrance from Stockton Road		Improves public transport links through journey time saving and provides congestion relief in City centre (Holmeside).				KH			£1,500,000				
	18		Leechmere Road / Toll Bar Road Junction		Journey time saving.				KH			£1,500,000				
	19		(A1231) Queen Alexandra Bridge / Camden Street Gyratory		Major Event Management Project	To provide journey time saving. To improve access to / from the Stadium. To allow the efficient management of traffic to / from A19 Trunk Road following Major Events or in an Emergency scenario.			KH			£1,000,000				
?	20		Houghton Road (A182) / Coaley Lane Junction		Removal of Congestion Pinch point and Collision Mitigation				KH			£1,000,000				
	21		Hetton Road (A182) / Gillas Lane Junction		Removal of Congestion Pinch point and Collision Mitigation				KH			£800,000				
	22		Hetton Downs Access Road		New Link Road to assist delivery of the Hetton Downs Action Plan. Scheme to be designed in-house				KH/PL			£750,000				
	24		Strategic Cycle Network Development.		Sunderland has a strong transport policy (LTP, DfT) imperative and political support for the continued development of a strategic cycle network across the city. The five Regeneration Area Committees/Place Boards have formally supported and endorsed the initiative. - The project will be embedded in and strongly support the integrated development of transport for Sunderland, and will be linked to a regional cycle network in accordance with LTP3 policy.	The project will support economic regeneration by linking residential and employment areas, broadening the labour market available to employers. The project will support modal shift for short-medium length journeys, thus supporting congestion reduction and improved air quality. The project will support equitable access to work by targeting areas with low car ownership and higher indices of multiple deprivation. The project will run in tandem with health initiatives by targeting areas with a higher imperative for increased physical activity to reduce the health effects of inactivity			GC			TBC				
	25		Camden St Gyratory		Resurfacing of the Camden St Gyratory and signals/cycling works to be carried out	To provide journey time saving. To improve access to / from the Stadium. To allow the efficient management of traffic to / from A19 Trunk Road following Major Events or in an Emergency scenario.			GC			TBC				
	25		IAMP Phase 2 Transport Infrastructure		Proposed dualing of A1290 link to A195, including new bridge crossing over the Leamside Line to the proposed 100 hectare development to the west of the A19 that will house new automotive, logistics and offshore manufacturing businesses.											
	26		Penshaw / Philadelphia / Sedgewick Link Road		Open area to residential development and Improve safety on the A18							TBC				
	27		Central Station		Nexus											
			Strategic Studies													

	28		Durham Coast / Picton Line Rail Study									TBC				
	29		A19 Junction Study									TBC				

Appendix H Existing Bus Services & Connections



Key

- Residential Sites
- Employment Sites
- Bus Routes
- metro
- Sunderland Boundary

Bus Routes in Sunderland

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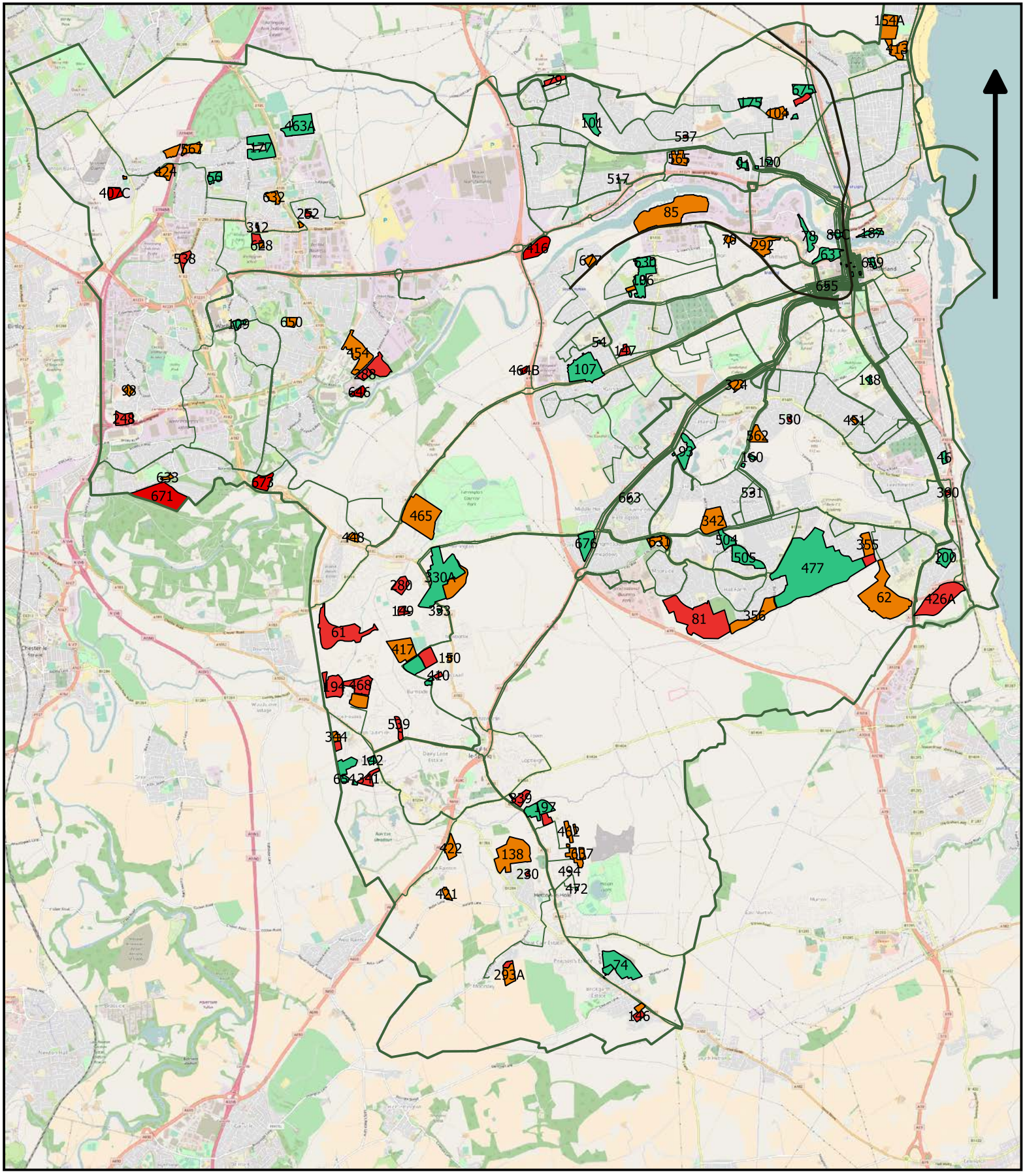
Appendix I Public Transport Accessibility Ranking Results



Key

PT Accessibility

- High
- Medium
- Low
- Bus Routes
- Sunderland Boundary

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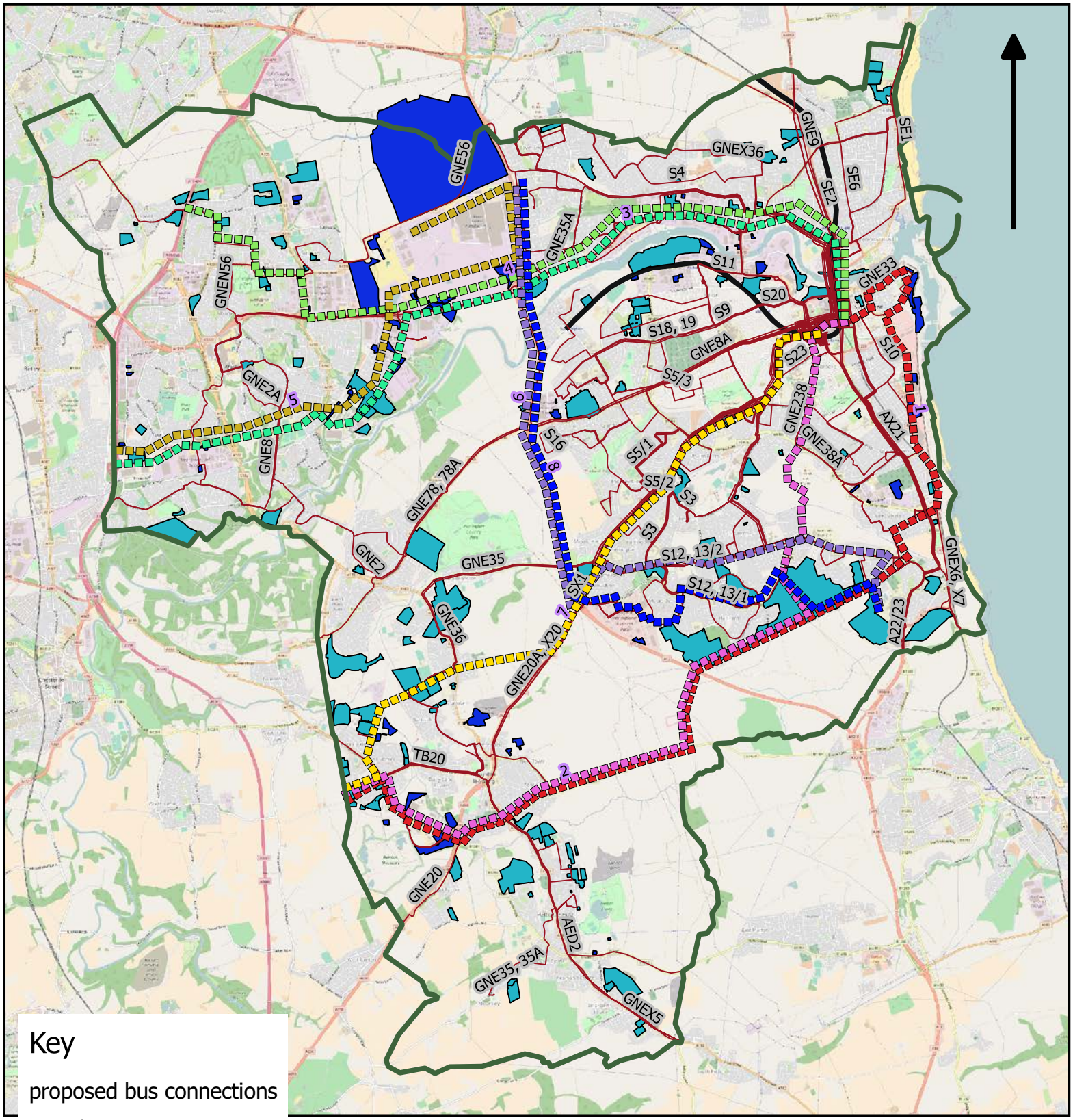
Site	sub area	PT accessibility overall	frequency	accessibility metro	accessibility bus stop	frequency peak [min]	bus provision
46	Sunderland South	H	high	low	high	12	high
54	Sunderland South	H	high	low	high	10	high
56	Washington	H	high	low	high	15	medium
61	Coalfield	L	high	low	low	0	low
62	Sunderland South	M	high	low	low	12	high
63	Sunderland Central	H	high	high	high	12	high
70	Sunderland South	M	low	high	high	20	medium
74	Coalfield	H	high	low	high	12	high
78	Sunderland Central	H	high	medium	high	15	medium
79	Sunderland North	L	low	low	high	30	low
81	Sunderland South	L	low	low	low	20	medium
85	Sunderland South	M	high	high	medium	15	medium
86	Coalfield	M	low	low	high	30	low
91	Sunderland North	H	high	low	high	10	high
93	Sunderland South	H	high	low	high	10	high
98	Washington	M	low	low	high	30	low
100	Sunderland South	H	high	low	high	10	high
101	Sunderland North	H	high	low	high	10	high
104	Sunderland North	M	high	low	medium	10	high
106	Sunderland South	H	high	low	high	15	medium
107	Sunderland South	H	high	low	high	10	high
109	Washington	H	high	low	high	15	medium
111	Coalfield	H	high	low	high	12	high
112	Coalfield	H	high	low	high	12	high
113	Coalfield	M	low	low	high	30	medim
115	Coalfield	H	high	low	high	10	high
118	Sunderland South	H	high	low	high	12	high
120	Sunderland North	H	high	low	high	10	high
128	Coalfield	H	high	low	medium	12	high
138	Coalfield	M	high	low	low	12	high
142	Coalfield	H	high	low	high	12	high
146	Coalfield	L	low	low	medium	30	low
147	Sunderland South	L	high	low	high	10	high
149	Coalfield	L	low	low	medium	60	low
150	Coalfield	M	low	low	high	20	medium
159	Sunderland South	H	high	low	high	15	medium
160	Sunderland South	H	high	low	high	15	medium
175	Sunderland North	H	high	low	high	10	high
177	Washington	H	high	low	high	15	medium
187	Sunderland Central		high	low	high	12	high
193	Coalfield	M	low	low	high	30	low
194	Coalfield	L	low	low	medium	30	low
197	Coalfield	H	high	low	high	12	high
230	Coalfield	L	low	low	medium	60	low
248	Washington	L	high	low	high	0	high
252	Washington	L	high	low	high	0	high
258	Washington	L	high	low	high	0	high

280	Coalfield	L	low	low	high	60	low
288	Washington	L	low	low	high	60	low
292	Sunderland South	M	high	medium	low	15	medium
299	Washington	M	high	low	high	10	low
312	Washington	M	high	medium	low	15	medium
324	Sunderland South	M	high	medium	low	15	medium
328	Coalfield	M	low	low	high	30	low
333	Coalfield	H	high	low	high	12	high
339	Coalfield	L	medium	low	low	(AM), 15 (P	high
341	Coalfield	L	low	low	medium	(AM), 30 (P	medium
342	Sunderland South	M	low	low	high	20	medium
344	Coalfield	M	low	low	high	20	medium
355	Sunderland South	M	low	low	high	60	low
356	Sunderland South	M	low	low	medium	20	medium
364	Washington	L	low	low	high	60	low
367	Coalfield	L	low	low	medium	30	low
376	Coalfield	L	low	low	medium	30	low
380	Sunderland South	L	low	low	medium	30	low
382	Coalfield	L	low	low	medium	30	low
388	Coalfield	L	low	low	medium	30	low
410	Coalfield	L	low	medium	low	60 (PM)	low
413	Sunderland North	M	low	low	high	20	medium
416	Sunderland North	L	low	low	medium	60	medium
417	Coalfield	M	low	low	high	30	low
421	Coalfield	M	low	low	high	30	low
422	Coalfield	M	low	low	high	20	medium
424	Washington	M	high	low	high	10	low
448	Coalfield	M	low	low	high	20	medium
451	Sunderland South	M	low	low	high	20	medium
453	Washington	M	low	low	high	20	medium
454	Washington	M	low	low	high	30	low
462	Coalfield	M	low	low	high	30	low
465	Coalfield	M	low	low	high	30	medim
468	Coalfield	L	low	low	medium	30	low
469	Coalfield	H	high	low	high	12	high
470	Coalfield	H	high	low	high	12	high
472	Coalfield	H	high	low	high	12	high
477	Sunderland South	H	high	low	high	15	medium
494	Coalfield	H	high	low	high	15	medium
504	Sunderland South	H	high	low	high	10	high
505	Sunderland South	H	high	low	high	10	high
511	Sunderland South	L	low	low	high	60	low
517	Sunderland North	L	low	low	high	60	low
520	Sunderland North	H	high	low	high	10	high
530	Sunderland South	L	low	low	high	60	low
531	Sunderland South	L	low	low	high	60	low
537	Sunderland North	L	low	low	high	60	low
538	Washington	L	low	low	medium	30	low
539	Coalfield	L	low	low	medium	30	low
540	Coalfield	L	low	low	medium	30	low
562	Sunderland South	M	high	low	high	15	medium

565	Sunderland North	M	high	high	low	10	high
567	Washington	M	high	low	high	10	low
595	Washington	M	low	high	low	10	high
628	Washington	M	low	low	high	30	low
629	Washington	H	high	low	high	15	medium
630	Sunderland South	H	high	low	high	15	medium
631	Sunderland South	M	low	low	high	20	medium
632	Washington	M	low	low	high	20	medium
633	Washington	M	low	low	high	20	medium
636	Sunderland South	M	low	low	high	20	medium
637	Coalfield	M	low	low	high	20	medium
646	Washington	L	low	low	low	60	low
650	Washington	M	low	low	high	30	low
654	Coalfield	H	high	low	high	10	high
655	Sunderland Central	H	high	high	high	10	high
656	Sunderland Central	H	high	high	high	10	high
657	Sunderland Central	H	high	high	high	10	high
658	Sunderland Central	H	high	high	high	10	high
659	Sunderland Central	H	high	high	high	10	high
660	Sunderland Central	H	high	high	high	10	high
661	Sunderland Central	H	high	high	high	10	high
662	Sunderland Central	H	high	high	high	10	high
663	Sunderland South	M	low	low	high	20	medium
664	Sunderland South	H	high	low	high	10	high
665	Sunderland Central	H	high	high	high	10	high
671	Washington	L	low	low	low	0	low
673	Washington	L	low	low	high	30	medium
675	Sunderland North	H	medium	high	high	20	medium
676	Sunderland South	H	high	low	high	15	high
677	Sunderland South	M	low	high	high	30	low
154A	Sunderland North	M	low	low	high	20	medium
154B	Sunderland North	M	low	low	high	20	medium
293A	Coalfield	M	low	low	medium	30	low
330A	Coalfield	H	high	low	high	12	high
330B	Coalfield	M	low	low	high	30	medim
407C	Washington	L	low	low	high	30	low
426A	Sunderland South	L	low	low	high	60	low
463A	Washington	H	high	low	high	10	high
464B	Coalfield	L	low	low	low	30	medium
467A	Sunderland North	L	low	medium	low	20	medium
467B	Sunderland North	H	high	low	high	10	high
80C	Sunderland Central	H	high	high	high	15	medium

Appendix J Identified Bus Service Improvements



Key

proposed bus connections

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8

bus routes

metro

Residential Sites

Employment Sites

Proposed bus connections

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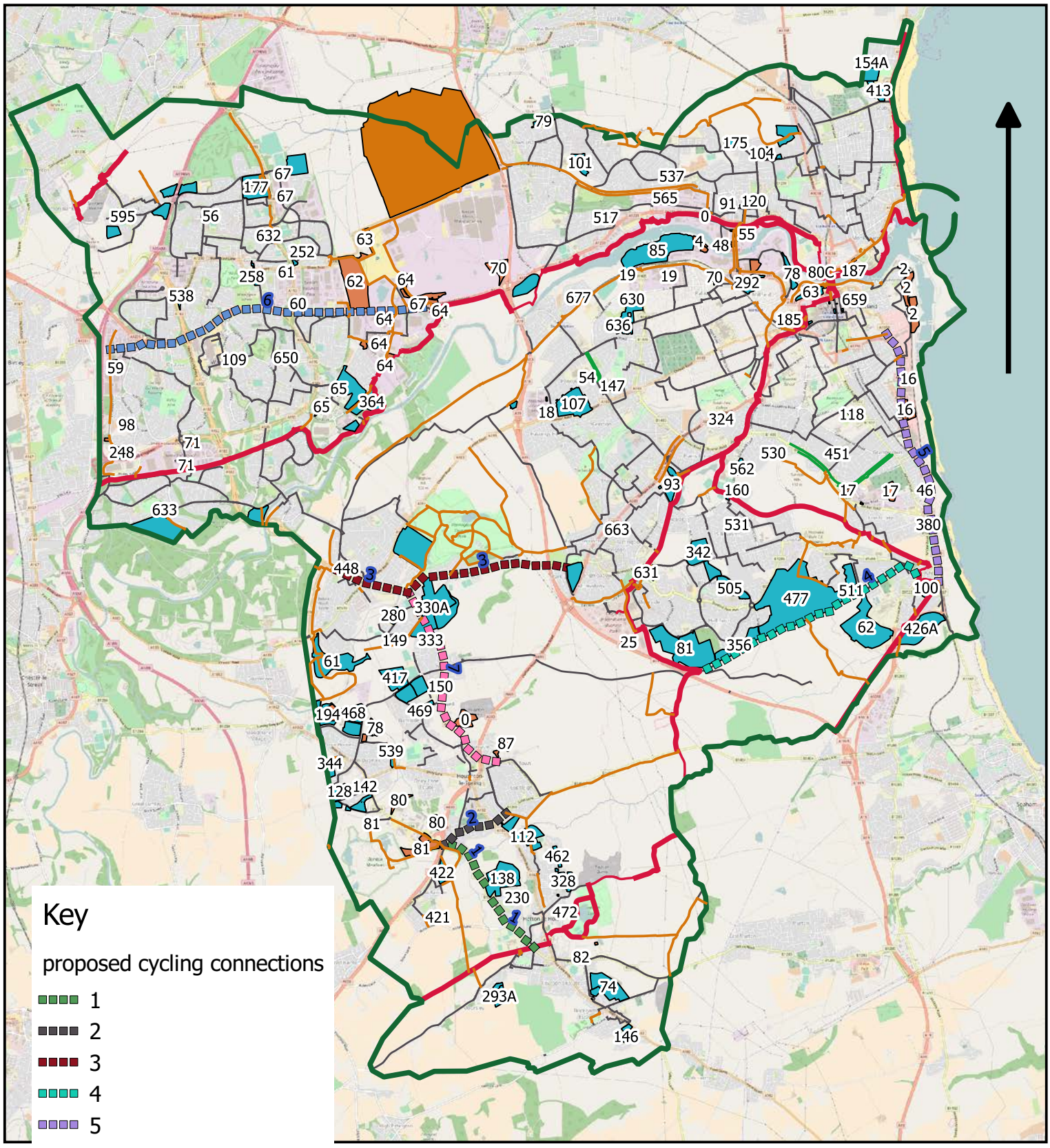
Appendix K Sunderland Cycling Map

Appendix L Cycling & Walking Accessibility Ranking Results

Site	Walking	Cycling	Site	Walking	Cycling	Site	Walking	Cycling
46	L	L	252	M	M	520	H	H
54	L	L	258	M	M	530	M	H
56	L	L	280	L	L	531	M	H
61	M	M	288	M	H	537	M	H
62	M	H	292	H	H	538	L	M
63	H	H	299	L	M	539	L	L
70	H	H	312	M	M	540	L	H
74	L	H	324	M	H	562	M	H
78	M	H	328	L	H	565	M	H
79	L	L	333	L	L	567	L	M
81	M	H	339	L	H	595	L	M
85	H	M	341	L	L	628	L	M
86	L	M	342	M	H	629	M	M
91	H	H	344	L	L	630	H	M
93	H	H	355	M	H	631	M	H
98	L	H	356	L	H	632	M	M
100	M	H	364	M	H	633	M	H
101	M	M	367	L	L	636	M	M
104	M	M	376	L	L	637	L	H
106	M	H	380	L	H	646	L	H
107	M	M	382	L	L	650	H	H
109	H	M	388	L	H	654	L	L
111	L	H	410	L	L	655	H	H
112	H	H	413	M	H	656	H	H
113	L	L	416	L	H	657	H	H
115	L	M	417	L	L	658	H	H
118	H	M	421	L	H	659	H	H
120	H	H	422	L	M	660	H	H
128	M	L	424	L	L	661	H	H
138	L	H	448	L	M	662	H	H
142	L	L	451	M	H	663	M	H
146	L	M	453	M	M	664	H	H
147	M	M	454	M	H	665	H	H
149	L	M	462	L	H	671	L	H
150	L	L	465	L	L	673	L	H
159	M	H	468	L	L	675	L	M
160	M	H	469	L	L	676	L	H
175	M	M	470	L	L	677	M	H
177	M	M	472	L	H	154A	M	H
187	H	H	477	L	H	154B	M	H
193	L	L	494	L	H	293A	L	H
194	L	L	504	L	H	330A	L	M
197	L	H	505	L	H	330B	L	L
230	L	H	511	L	H	407C	L	M
248	L	H	517	M	H	426A	L	H
463A	L	M	467A	M	H	80C	H	H
464B	L	M	467B	M	H			

Appendix M Identified Improvements to the Cycling Network



PROPOSED CYCLING CONNECTIONS

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INFRASTRUCTURE
The Quadrant, The Silverlink North, Cobalt Business Park,
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Appendix N Minor Highway Mitigation Works

Potential Minor Highway Mitigation for Impacted Junctions

Junction Ref	Junction Name	Potential Minor Highway Mitigation	Council Identified Schemes
1	JB - A19 / A1290	Part of IAMP highway mitigation.	IAMP highway infrastructure improvements and A1290 / A19 junction improvements.
2	Sunderland Highway / A19	Traffic signal optimisation.	A1231 / A19 junction improvements.
3	A19N on-slip / A183W	Traffic signal optimisation and coordination with the adjacent junction - the traffic queues from the A19/A1290 junction directly cause queuing at the A19N/A183W junction.	A183 / A19 junction improvements.
5	City Way / Emperor Way	Queue going back from A19 (mitigation for A19/City Way should mitigate this issue).	A19 junction improvements and City Way dualling.
6	City Way / Monarch Way	Queue going back from A19 with City Way (mitigation for A19/City Way should solve this traffic impact).	A19 junction improvements and City Way dualling.
7	City Way / Camberwell Way	The same as above.	A19 junction improvements and City Way dualling.
8	City Way / Doxford Park Way	The same as above.	A19 junction improvements and City Way dualling.
11	Doxford Park Way / Burdon Road	The failing approach (Burdon Road) has just 1 lane with a small flare. Increasing capacity can be achieved by extending the length of the flare.	Doxford Park / Ryhope Link road and localised junction improvements.
20	A1018 / Saint Nazaire Way	Traffic capacity issues at this junction appear to be caused by traffic queuing from the adjacent junction: Salterfen Road/Ivor Street. Mitigation for Salterfen Road/Ivor Street such as traffic signal optimisation should alleviate capacity issues and delay at A1018/Saint Nazaire Way.	Doxford Park / Ryhope Link road and localised junction improvements.
24	Ryhope Road / Salterfen Road	Traffic signal optimisation.	Doxford Park / Ryhope Link road and localised junction improvements.

25	A1018 / Salterfen Road	Traffic capacity issues at this junction appear to be caused by traffic queuing from the adjacent junction: Toll Bar Road/ Ryhope Road. Mitigation such as traffic signal optimisation at the Ryhope Road junction should alleviate capacity issues and delay at A1018/Salterfen Road junction.	Doxford Park / Ryhope Link road and localised junction improvements.
40	West Park / Herrington Road	Queue extending from Herrington Road/Silksworth Road junction impacting on West Park junction. Mitigation for Herrington Road/Silksworth Road should alleviate the congestion impact on West Park / Herrington Road.	A690 / A19 junction improvements and localised junction improvements.
41	A690 / Herrington Road	Increase the length of the flares at this junction.	A690 / A19 junction improvements and localised junction improvements.
43	Durham Road / Premier Road	Traffic signal optimisation.	A690 Durham Road corridor improvements.
49	A1018 / Ocean Road South	Traffic signal optimisation.	Doxford Park / Ryhope Link road and localised junction improvements.
54	Burdon Road / Mowbray Road	Traffic signal optimisation.	Localised junction improvements.
62	Chester Road / St Michael Way	Traffic signal optimisation.	City centre junction improvements.
67	High Street West / West Wear Street	City centre location – complex multi-modal mitigation.	SSTC5 and city centre junction improvements.
68	Chester Road / St Mark's Road	Traffic signal optimisation.	Chester Road / St Mark's Road junction improvement.
69	Kayll Road / Chester Road	Traffic signal optimisation.	A183 Chester Road corridor improvements.
75	Chester Road / Prestbury Road	Traffic signal optimisation of A19 junction with Chester Road.	A183 / A19 junction improvements and A183 Chester Road corridor improvements.
83	Trimdon Street / Silksworth Row	Junction being modified as part of SSTC3.	SSTC3 and city centre junction improvements.
86	A1018 / Sheepfolds North	Traffic signal optimisation.	Northern Gateway Scheme.
88	North Bridge Street / Roker Avenue	Traffic signal optimisation.	Northern Gateway Scheme.

94	Whitburn Road / Dykelands Road	Traffic signal optimisation.	Localised junction improvements.
97	Newcastle Road / Chalton Road	Traffic signal optimisation.	Localised junction improvements.
103	Wessington Way / A1231	Traffic signal optimisation.	SSTC4 and A1231 / A19 junction improvements.
110	Wessington Way / Castletown Way	Traffic signal optimisation.	SSTC4 and A1231 / A19 junction improvements.
113	Washington Road / Ferryboat Lane	Traffic signal optimisation.	SSTC4 and A1231 / A19 junction improvements.
115	Washington Road / Blackwood Road	Traffic signal optimisation.	SSTC4 and A1231 / A19 junction improvements.
118	Washington Road / Craigavon Road	Traffic signal optimisation.	Localised junction improvements.
148	A182 - B1260	Traffic signal optimisation.	Coalfield Regeneration Route (Hetton Bypass) and localised junction improvements.
142	A690 - A1052 – A182	Increase the length of the flare on Hetton Road.	Coalfield Regeneration Route (Hetton Bypass) and localised junction improvements.
144	Vigo Lane / Picktree Lane	Traffic signal optimisation.	Localised junction improvements.
145	Picktree Lane / Bramhall Drive	2 lanes are not intuitive, provision of lane markings on the circulatory.	Localised junction improvements.
147	A182 / Coaley Lane	Traffic signal optimisation.	Coaley Lane / Philadelphia Link Road and localised junction improvements.
155	A182 / B1286	A182 northbound delay, introduce restriction access to the local garage.	New Herrington / Penshaw Link Road.
71	The Broadway / Springwell Road	Northern and western approaches to the roundabout are 1 lane approaches, suggest increasing these to 2 lane approaches.	A183 Chester Road Corridor improvements.
73	Chester Road / Pennywell Road	Northern approach to the junction is 1 lane, and suggest building a flare or additional lane on this junction approach.	A183 Chester Road Corridor improvements.
78	Hylton Road / Grindon Lane	Creation of an additional lane for ahead and right turning movements at the junction.	A183 Chester Road Corridor improvements.

89	Hylton Road / St Luke's Road	Creation of a left turn flare on the Hylton Road approach to the junction.	Localised junction improvements.
102	Southwick Road / B1291	Creation of a left turn flare for Southwick Road.	Localised junction improvements.
111	Wessington Way / Colima Avenue	Creation of additional lanes/flares on Castellian Road and Dene Road junction approaches.	SSTC4.
113	Wessington Way / Ferryboat Lane	Additional lanes on carriageway approaches.	SSTC4.
122	A1290 / Nissan Sight	Part of IAMP highway mitigation.	IAMP highway infrastructure.
123	A1290 / Cherry Blossom Way	Part of IAMP highway mitigation.	IAMP highway infrastructure.
133	A182 / The Bungalows	Create a flare on the minor road approach.	Localised junction improvements.
30	Tunstall Village Green / Burdon Road	To mitigate traffic capacity issues at these junctions, a collection of mitigation proposals will be needed that complement one another within the Burdon Lane area within the immediate vicinity of the proposed residential sites.	Doxford Park / Ryhope Link road and localised junction improvements.
32	Leechmere Road / Tunstall Road		Localised junction improvements.
33	Premier Road / Essen Way		Localised junction improvements.
35	Silksworth Lane / North Moor Lane		Farringdon Bypass.
36	Silksworth Way / Silksworth Road		Localised junction improvements.
138	B1404 / B1260	Create a flare on the B1260 approach.	Localised junction improvements.
139	B1404 / Salters Lane	Provision of flares on B1404 for both directions.	Localised junction improvements.
141	A1052 / Britannia Terrace	Traffic signal optimisation, or create a flare on Britannia Terrace.	Central Route and localised junction improvements.
142	A690 / A1052 Dairy Lane entry	Increase the number of lanes or build flare on A690 off slip road.	Central Route and localised junction improvements.
145	Picktree Lane / Bonemill Lane	Introducing a flare on Bonemill Lane.	Localised junction improvements.
149	A182 / A183	Increase the number of lanes or build flare on Chester Road.	Central Route and localised junction improvements.

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