Appendix A

POLICY CONTEXT

1.1 NATIONAL STRATEGIC CONTEXT

1.1.1. This section presents the existing policy documents that are relevant to this LCWIP on a national level.

GEAR CHANGE: A BOLD VISION FOR CYCLING AND WALKING (DEPARTMENT OF TRANSPORT, 2020)

1.1.2. Gear Change is the Government's vision to see a step-change in levels of walking and cycling in England. The strategy details how the Government intends to invest £2 billion on increasing the numbers of people walking and cycling.

1.1.3. A core focus of the strategy is on improving safety for all by building high quality cycle infrastructure, the lack of which is a significant barrier to more people choosing to walk or cycle for the everyday journeys. The strategy highlights the need to dramatically improve the quality of cycling infrastructure on England's roads to achieve the substantial increases in cycling required.

1.1.4. The document sets out the actions required at all levels of government, grouped under four themes:

1.1.5. **Theme 1 – 'Better streets for cycling and people'** outlines how the Government will help to fund safe, continuous, direct routes for cycling that help people reach the places they need to get to. The key design principles highlight how routes must be physically separated from pedestrians and from high volumes of motor traffic on links and at junctions. The creation of low traffic neighbourhoods and school streets is also featured due to their role in facilitating local walking and cycling trips and creating better places for people to live in.

1.1.6. **Theme 2 - 'Putting cycling and walking at the heart of transport, place-making and health policy'** focuses on how cycling and walking should complement and help expand the range of other modes of transport such as bus and rail travel. The strategy mentions how new local and strategic A road schemes should include appropriate provision for cycling and that the tools used to assess transport schemes' value for money will give fair weight to the broader benefits of active travel schemes.

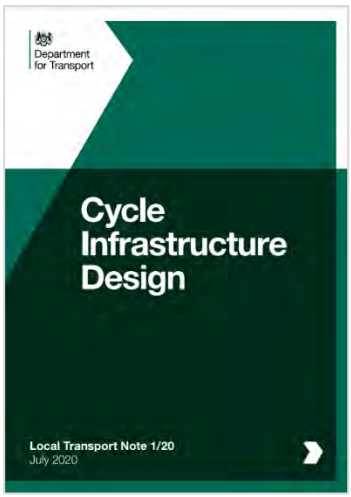
1.1.7. **Theme 3 – 'Empowering and encouraging local authorities'** outlines the new powers and improved assistance for local authorities, such as improving enforcement of traffic violations

that impact on pedestrian and bicycle user safety. An important statement under this theme is how funding available for local authorities will only be applied to schemes that meet the new standards and principles described within the first theme.

1.1.8. **Theme 4 – 'Enabling people to cycle and protecting them when they do'** focuses on encouraging more people to cycle by providing people with the confidence and skills to cycle where the appropriate infrastructure facilities cycle journeys. The Government also stipulate their aim to make legal changes to protect vulnerable road users, strengthen the Highway Code to improve safety and mandate higher safety standards on lorries.

LOCAL TRANSPORT NOTE 1/20: CYCLE INFRASTRUCTURE DESIGN (DEPARTMENT FOR TRANSPORT, 2020)

1.1.9. Alongside Gear Change, the DfT also published updated cycle infrastructure design guidance in 2020. LTN1/20 provides guidance and good practice for the design of cycling infrastructure in support of the DfT Cycling and Walking Investment Strategy. LTN 1/20 replaces LTN 2/08: Cycle Infrastructure Design and LTN1/12: Shared Use Routes for Pedestrians and Cyclists have been withdrawn.



1.1.10. The Government expects local authorities to demonstrate they have given due consideration to the guidance when designing new cycle schemes and when applying for Government funding that includes cycle infrastructure.

1.1.11. LTN 1/20 is based around five overarching design principles (that cycle routes and networks must be coherent, direct, safe, comfortable and attractive) and 22 further principles that represent the essential requirements to achieve more people travelling by foot or cycle for more of their trips.

1.1.12. The LTN 1/20 explains these principles and gives context to the need to improve the quality of cycle infrastructure as part of wider strategies, such as increasing physical activity, reducing carbon emissions and stimulating economic growth. The LTN also focuses on specific types of cycling infrastructure and the highway network, such as facilities within the highway corridor, motor traffic free routes, quiet mixed traffic streets and junctions and crossings.

1.1.13. LTN 1/20 also covers cycle parking, signage and markings and construction and maintenance which all together provides guidance through the whole process of planning designing and implementing high quality cycle infrastructure.

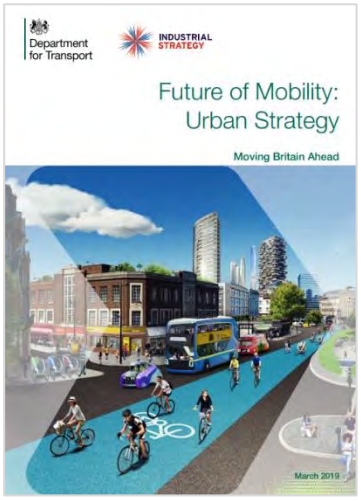
CYCLING AND WALKING INVESTMENT STRATEGY (DEPARTMENT FOR TRANSPORT, 2017)

1.1.14. The Government published its first Cycling and Walking Investment Strategy (CWIS) in 2017, setting out an ambition to make walking and cycling the natural choice for shorter journeys or as part of a longer journey. The CWIS states that the benefits to doing this would be substantial, potentially leading to cheaper travel and better health, increased productivity for business and increased footfall in shops. Benefits will also include lower congestion, better air quality, and vibrant, attractive places and communities.

1.1.15. The CWIS outlines ambitious targets for the period to 2025. This includes a doubling of cycling trip stages each year (from 0.8 billion in 2013 to 1.6 billion by 2025), whilst also reversing the current year-over-year decline in walking trip stages. The CWIS also identifies a need to decrease the number of cycle user fatalities and serious injuries each year.

1.1.16. Following the publication of the CWIS (and in line with its strategic objectives), the Government also published its LCWIPs Technical Guide for Local Authorities. As explained in Section 1.2, this document sets out a flexible six-stage methodology for producing an LCWIP. The methodology developed by HCC and WSP for this LCWIP follows this guidance.

FUTURE OF MOBILITY: URBAN STRATEGY (DEPARTMENT FOR TRANSPORT, 2019)



1.1.17. The 'Future of Mobility: Urban Strategy' recognises the challenges associated with the rise in motor transport including safety, pollution and space. As the number of people living in urban areas in England is forecast to rise by 4.7 million between 2016 and 2041, towns and cities will become increasingly crowded. This provides us with an opportunity to transform the way we travel and the infrastructure within our towns and cities.

1.1.18. The document sets out principles to guide Government decision making, industry and local authorities, and has recognised active travel as a key area to help shape the future of urban mobility. The principle 'Walking, cycling and active travel must remain the best option for short urban journeys' states, in England, 45% of all journeys taken by urban residents are under 2 miles. Many such journeys could be undertaken by sustainable, active modes of transport leading to better air quality, health outcomes and lower congestion. This can be supported by new technologies including intelligent use of real-time data and connectivity making public transport more convenient and responsive. With these improvements active travel can become a more desirable option for multi-stage journeys.

1.1.19. An additional principle identified; 'Mobility as a Service', suggests introducing well-managed bike-sharing schemes and e-bikes which would encourage people who wouldn't normally chose cycling as a travel option to switch. This may be especially important given the trend towards an aging population, 62% of e-bikes in the UK are sold to people over the age of 55.

CLEAN AIR STRATEGY (DEPARTMENT FOR ENVIRONMENT, FOOD & RURAL AFFAIRS, 2019)

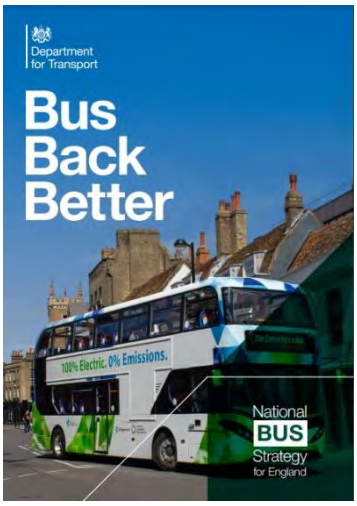
1.1.20. The Clean Air Strategy sets out a comprehensive action required to tackle all sources of air pollution.

1.1.21. A key action in achieving this is reducing emissions from transport by facilitating modal shift towards low and zero emission options. The report suggests encouraging an increase in cycling and walking for short journeys delivers a reduction in congestion and emissions in addition to the associated health benefits from a more active lifestyle.

1.1.22. Drivers and passengers inside vehicles are often exposed to significantly higher levels of air pollution in comparison to those walking and cycling on the same route. People can be persuaded to walk or cycle in Welwyn Hatfield, as even when there is a build-up of traffic within the town centres, the strategy suggested that those travelling actively, experience lower exposure. Pedestrians and cyclists can be encouraged to use quieter routes away from vehicle traffic to reduce exposure even further.

1.1.23. This method of travel also creates less pollution, with associated health benefits such as improved fitness, mental health and lower risk of obesity and heart diseases. In addition to the funding identified through the Cycling and Walking Investment Strategy, local authorities and mayors have been allocated an additional £700 million to safe infrastructure and other Active Travel projects since the CWIS was published. There has also been £34 million spent to improve cycle facilities at stations, making it easier and more accessible to get to and from station by bike, including 22,000 new cycle parking spaces which as a result increased cycle trips to stations by 40%.

BUS BACK BETTER, NATIONAL BUS STRATEGY (DEPARTMENT FOR TRANSPORT, 2021)



1.1.24. Bus Back Better is a long-term strategy for buses in England, outside of London. This new national bus strategy sets out the vision and opportunity to deliver better bus services for passengers across England, through ambitious and far-reaching reform of how services are planned and delivered. The strategy includes various ambitions, such as to "make buses more frequent, more reliable, easier to understand and use, better co-ordinated", and with "simple, cheap flat fares … with daily and weekly price capping across operators.".

1.1.25. The new strategy challenges councils to give buses greater priority at traffic lights, reallocate road-space for bus lanes, create bus gates, and manage their roads with bus reliability in mind. It recommends looking carefully at street design and locations of bus stops, parking and loading bays and developing 'Bus Service Improvement Plans' (BSIPs). Hertfordshire's BSIP was published in October 2021 and is discussed in Section 3.

THE INCLUSIVE TRANSPORT STRATEGY (DEPARTMENT FOR TRANSPORT, 2018)

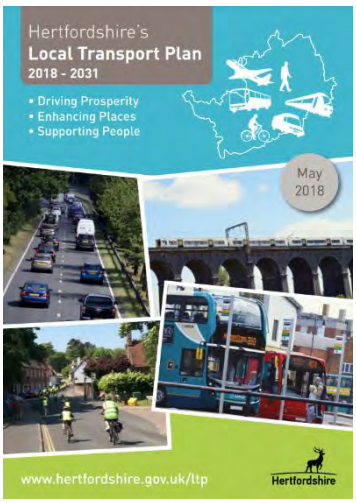
1.1.26. The Inclusive Transport Strategy plans to create more inclusive transport system for everyone. The report itself focusses on transport inclusivity, explaining how vehicles, stations and streetscapes can be designed to be inclusive to people with different forms of disability.

1.1.27. The LCWIP process aims to create a network to support this ambition and allow for users of all abilities to travel safely and comfortably via active travel in and around Welwyn Hatfield Borough. As part of this LCWIP the council has identified improvements to support a transport system fit for all users, identifying infrastructure interventions to make key cycling and walking routes more accessible and inclusive.

1.2 COUNTY STRATEGIES, POLICIES AND PLANS

1.2.1. This section will present the existing policy documents that are relevant to this LCWIP on a county level. All of these have been produced by Hertfordshire County Council.

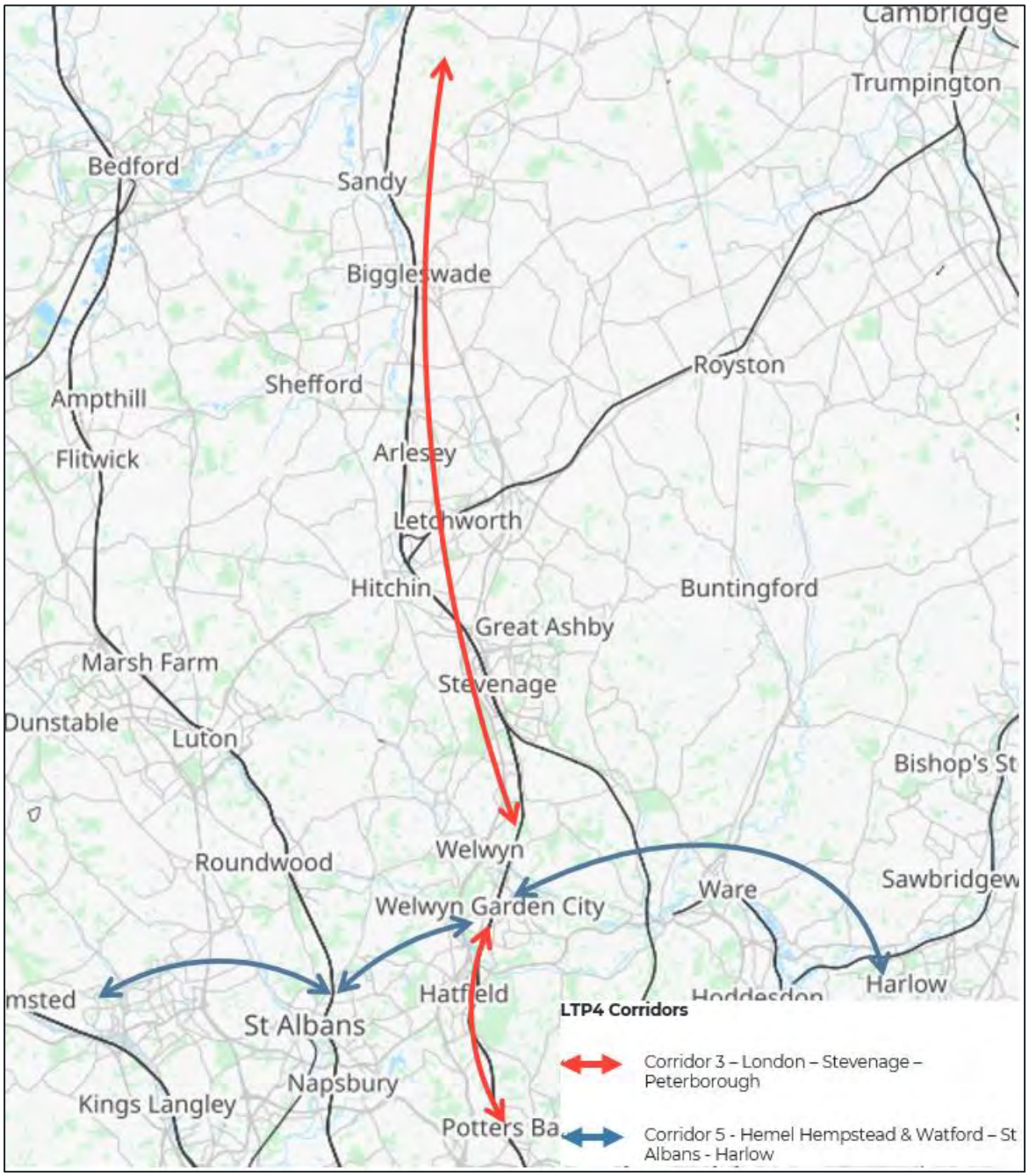
LOCAL TRANSPORT PLAN 4 (2018-2031)



1.2.2. The Hertfordshire Local Transport Plan 4 (LTP4) sets out a transport vision for Hertfordshire. The plan accelerates the transition from the previous transport strategy (LTP3) towards a less car-centric, more balanced approach which caters for all forms of transport and seeks to encourage a switch from the private car to sustainable transport (e.g. walking, cycling and passenger transport) wherever possible. LTP4 recognises the potential public health benefits associated with increased levels of active travel, further emphasising active travel improvements as an essential feature of the future transport systems within Hertfordshire.

1.2.3. LTP4 highlights strategic corridors in which sustainable transport is a priority. Both corridor 3 (London-Stevenage-Peterborough) and corridor 5 (Hemel Hempstead & Watford – St Albans - Harlow) pass through the Welwyn Hatfield borough and LTP4 names Welwyn Garden City and Hatfield as Cycle Infrastructure Improvement Towns. These corridors are highlighted in Figure 1-1 on the next page, along with a summary of opportunities and challenges relating to active travel arising from LTP4.

Figure 1-1 - Priority Sustainable Transport Corridors Highlighted in LTP4



1.2.4. The LTP4 also sets out various objectives to help encourage walking and cycling, which are detailed below.

Walking

1.2.5. LTP4 recognises that there is a high walking mode share for trips of up to 1 mile across the county, with 76.5% of such trips being undertaken on foot (County Travel Survey, 2015).

Policy 7 – Active Travel (Walking) sets out the objectives to further encourage walking, many of which are captured in this LCWIP:

- Implementing measures to increase the priority of pedestrians relative to motor vehicles, especially in town centres, and creating walking friendly towns and centres;
- Delivering infrastructure to provide safer access to key services, and pedestrian facilities to enable and encourage walking.
- Identifying and promoting networks of pedestrian priority routes.
- Promoting walking as a mode of travel and for recreational enjoyment.
- Supporting the implementation of the Rights of Way Improvement Plan.

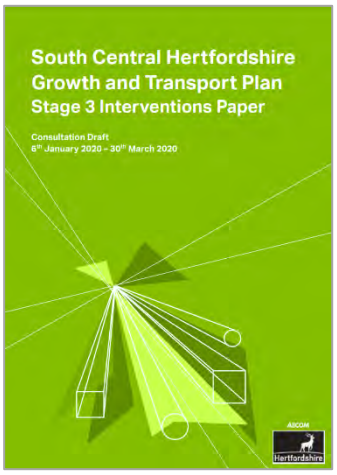
Cycling

1.2.6. LTP4 recognises that compared with walking, cycling has a much lower more share across Hertfordshire, only making up 1.7% of trips under 1 mile, 4.8% of trips between 1-3 miles and 3.1% of trips between 3-5 miles. LTP4 highlights that there is significant potential in the county to increase cycling activity. Policy 7 – Active Travel (cycling) sets out the objectives to further encourage cycling, many of which will be captured within this LCWIP:

- Infrastructure improvements, especially within major urban areas to enable and encourage more cycling.
- Implementing measures to increase the priority of cyclists relative to motor vehicles.
- Improved safety including delivery of formal/informal cycle training schemes.
- Supporting promotion campaigns to inform, educate, reassure and encourage cycling provision and education, such as Bikeability.
- Facilitating provision of secure cycle parking.

1.2.7. Given the Government CWIS targets and the significant potential to increase cycling activity in Hertfordshire, the LTP4 shows that the council is seeking to achieve a large increase in cycling and walking over the next 10 years. This will require an increase in investment in active travel to create routes and networks which can attract a broader demographic to walk and cycle. This is exactly what an LCWIP helps to plan and so the LCWIP is very well-aligned with the LTP4.

SOUTH CENTRAL GROWTH AND TRANSPORT PLAN (2020)



1.2.8. The South Central Growth and Transport Plan (SCGTP) was drafted in 2019 and consulted on in 2020, follows on from the LTP4 to provide more detail on specific measures associated with growth and transport within Welwyn Hatfield borough. Each GTP focuses on a different sub-area within Hertfordshire.

1.2.9. The SCGTP incorporates the city of St Albans, the larger towns including Borehamwood, Potters Bar, Hatfield and Welwyn Garden City, smaller settlements such as London Colney and Radlett, as well as connections to outside of the study area.

1.2.10. This area is undertaking a large amount of development which will increase demand on an already constrained highway network unless a significant shift towards walking, cycling and public transport is achieved. It is therefore appropriate and necessary to look beyond the provision of extra highway capacity alone and instead invest significantly in modes of transport which support efficient mobility while reducing environmental impacts.

1.2.11. The consultation on the Eastern Area GTP closed in March 2021. Relevant interventions on the eastern border of the borough will need to be considered.

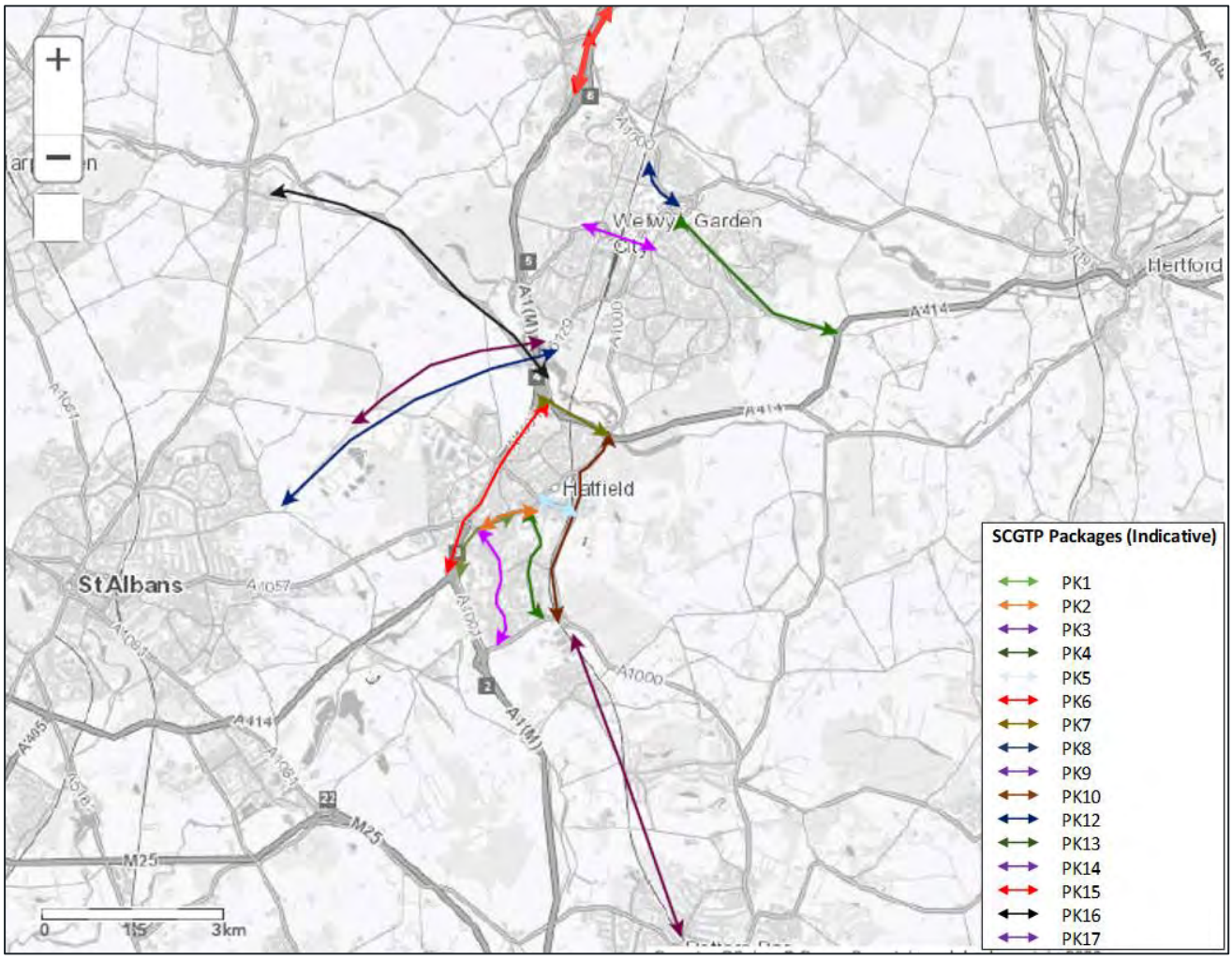
1.2.12. The proposals in the SCGTP are defined as interventions, which are grouped into packages. The following packages relevant to the LCWIP study area are shown in Table 1-1 below and, where corridors are mentioned, these are shown indicatively in Figure 1-2 on the next page. There are opportunities to support these objectives through proposals for routes and infrastructure in this LCWIP. A challenge may be accommodating both public transport and cycle infrastructure on certain corridors, although this is a challenge that should be easy to overcome through careful design.

Table 1-1 – SCGTP Intervention Packages Relevant to Welwyn Hatfield

Area	Package	Name	Objective
Hatfield	PK1	Hatfield – College Lane/Cavendish Way Corridor	To reduce severance and improve conditions for pedestrians and cyclists along the College Lane/Cavendish Way corridor, enhancing connectivity between the university campuses and Hatfield town centre.
	PK2	Hatfield – Cavendish Way/Queensway Corridor	To reprioritise the main transport corridor through Hatfield town centre to reduce the dominance of motorised vehicles, improve connectivity to the surrounding area and make a more attractive entrance to the town centre.
	PK3	Bishop's Rise Corridor	To improve active travel connections and urban realm between the Hatfield Business Park, university, and the residential areas along Bishops Rise.
	PK4	Woods Avenue/Travellers Lane Corridor	To enhance connectivity between south Hatfield and the town centre along Travellers Lane/Woods Avenue by improving facilities for pedestrians and cyclists and reducing traffic speeds.
	PK5	Hatfield - French Horn Lane Corridor	To increase active travel provision between Hatfield town centre and the train station by improving facilities for pedestrians and cyclists.
	PK6	Hatfield – Comet Way/Wellfield Road Corridors	To implement sustainable transport improvements along the Wellfield Road corridor, providing greater mode choice for trips between the Hatfield Business Park and the town centre.
	PK7	Hatfield - St Albans Road East/Hertford Road Corridor	To reduce severance in northeast Hatfield and enhance connectivity between this residential area, the town centre and railway station.
Welwyn Garden City – key connections to other towns	PK8	Northwest Hatfield and Lemsford Connectivity	To ensure sustainable development at northwest Hatfield (Stanboroughbury) through improved transport connections and junctions that facilitate active travel,
	PK9	St Albans – Welwyn Garden City Connectivity	To form a sustainable transport corridor between St Albans and Welwyn Garden City, facilitating attractive and convenient journeys on foot and by bike between the towns with links to the northwest Hatfield development, as well as Hatfield Business Park.

	PK10	Hatfield – Welwyn Garden City Connectivity	To strengthen connections between Hatfield and Welwyn Garden City by modes of active travel, encouraging modal shift and improving recreational facilities within the green spine running between the towns.
Welwyn Garden City	PK12	Mundells Area Non-Car Accessibility and Travel Planning	To alleviate peak congestion issues at the Business Park in the Mundells Area.
	PK13	Welwyn Garden City Active Travel Improvements	To transform Welwyn Garden City into a town that facilitates safe, attractive, and convenient journeys by active and sustainable transport modes.
Welwyn Garden City – key connections to larger towns	PK14	Bridge Road Transformation – Welwyn Garden City Town Centre	To transform Bridge Road into a sustainable spine that enhances connections on foot, by bike and by bus between the Welwyn Garden City town centre and the employment zone east of the rail line and reduce the dominance of motorised traffic.
	PK15	Welwyn Garden City – Stevenage and Hitchin Corridor	To improve connections between towns and facilitate development on the Welwyn Garden City to Stevenage and Hitchin corridor through formation of a sustainable transport corridor along the B197 (via Oaklands), B656 (via Codicote) and Digswell Road which aims to discourage longer distance trips from using the corridor in preference over the A1(M).
	PK16	Luton – Wheathampstead – Hatfield and Welwyn Garden City Corridor	To facilitate new and existing public transport connections between Luton, Hatfield and Welwyn Garden City, alongside improvements to inter-urban cycling infrastructure and selective highway upgrades in order to improve reliability on the corridor.
Potters Bar	PK17	Hatfield – Potters Bar Cycle Corridor Enhancements	To develop an active travel corridor between Hatfield, Welham Green, Brookmans Park and Potters Bar.

Figure 1-2 - Corridors from SCGTP relevant to the Welwyn Hatfield LCWIP



INTALINK HERTFORDSHIRE BUS STRATEGY (FEBRUARY 2020)

1.2.70. The Intalink Hertfordshire Bus Strategy sets out in greater detail the plans to grow the local bus network to support the shift towards more sustainable transport within Hertfordshire (as shown in LTP4).

1.2.71. The strategy states that there is clear potential for growth in bus travel in Hertfordshire, noting that only 3% of journeys to work in Hertfordshire are made by bus, which is less than half the national average. It also notes the large numbers of residents who make multi-modal trips to London on the train and the LTP4 declaration that “with 175,000 additional residents by 2031, it will not be acceptable in environmental, economic or social terms to continue to depend on cars.”

1.2.72. The strategy's plans include giving greater priority to bus services in traffic, making sure bus information is easy to access and raising standards of operation across the county.

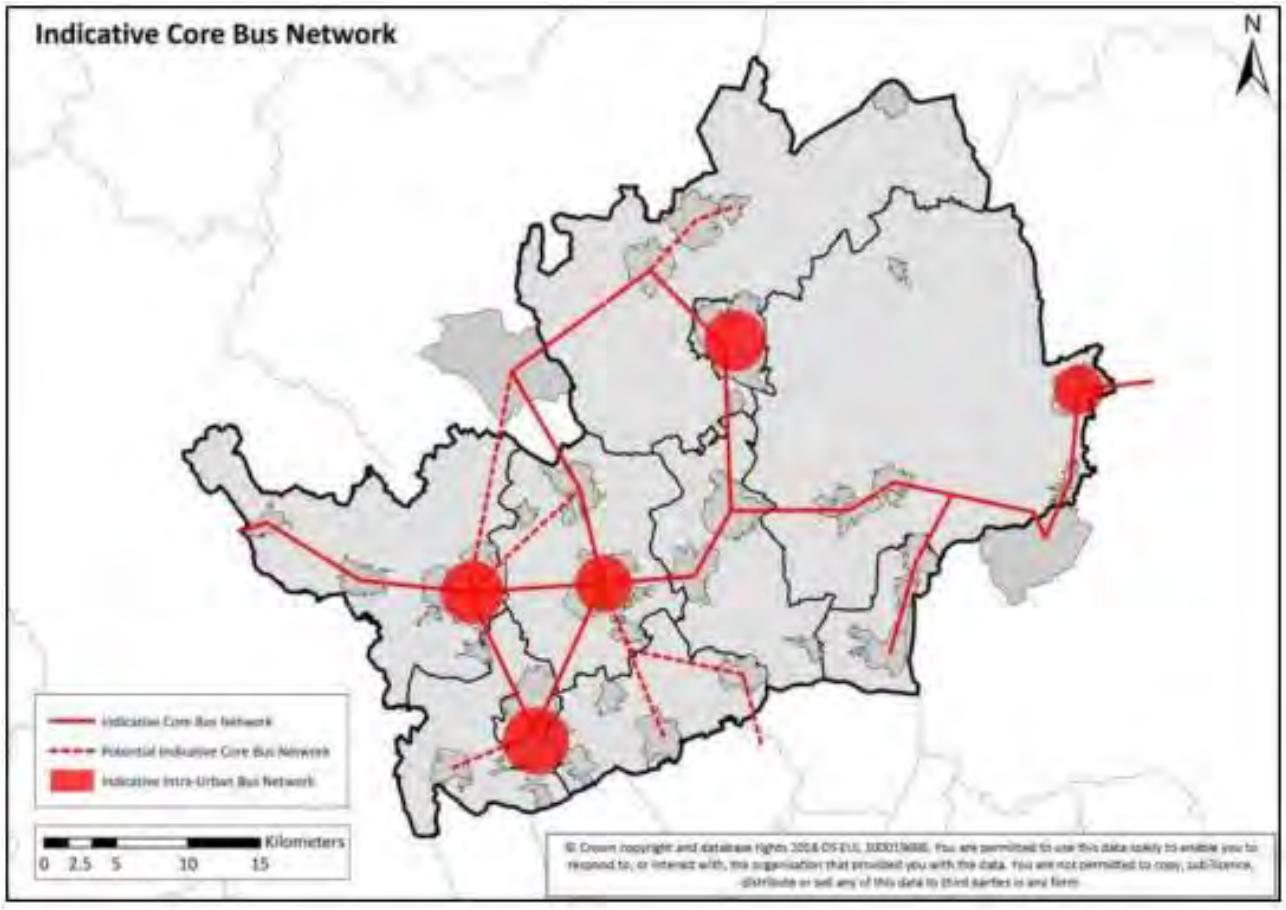
Walking & Cycling

1.2.73. The Intalink Bus Strategy recognises that infrastructure improvements should also be targeted to enhance access to the bus network by walking and cycling. The location, nature and design of interchanges is evolving, and these should consider current and future growth requirements and capacity.

1.2.74. The Strategy focuses on the prioritised improvements presented within LTP4, stating that the prioritised corridors and towns should be well-served in terms of frequency and investment will support patronage growth on routes serving them.

1.2.75. Figure 1-3 shows the indicative core infrastructure corridors identified in LTP4. Routes relevant to this LCWIP including an indicative core bus network connecting Stevenage with St Albans via Welwyn Garden City and Hatfield. Another route connects Bishops Stortford to St Albans via Welwyn Garden City and Hatfield.

Figure 1-3 - Indicative Core Infrastructure Corridors from the Strategy



1.2.76. Short and long-term packages for improving bus services and facilities across Hertfordshire have been identified as part of the Bus Service Improvement Plan. The interventions proposed as part of this LCWIP aim to improve pedestrian and cyclist accessibility in Welwyn Garden City and Hatfield, which provide an opportunity to enable more walking and cycling as the first or last stages in multi-modal journeys.

BUS SERVICE IMPROVEMENT PLAN (OCTOBER 2021)

1.2.77. The Hertfordshire Bus Service Improvement Plan (BSIP) acts as the vision for how bus services will be developed and enhanced across Hertfordshire County in the coming years.

1.2.78. Work on Hertfordshire's BSIP began after the LCWIP was underway and was published in October 2021. It should be noted that this document was not available when the key routes contained in this LCWIP were developed. However, future iterations of this LCWIP should compare and align the plans to complement one another. Co-ordination between the development of walking and cycling networks and the bus network provides a great

opportunity to maximise the potential for multi-modal travel in Welwyn and Hatfield and ensure new developments are well-connected. It should also be noted that new DfT funding for bus priority improvement schemes may even be able to fund certain LCWIP improvements if well-coordinated.

1.2.79. Key corridors where there are gaps in the bus network across Hertfordshire have been identified within the BSIP. These are key corridors that would benefit from increased frequencies and enhanced connectivity particularly during the weekday peak and interpeak periods. Those relevant to this LCWIP include Harpenden to Welwyn Garden City and Hertford to Welwyn Garden City.

1.2.80. A challenge could be if bus priority infrastructure is planned on the same corridor as cycle infrastructure and there is limited space available. However, where there is sufficient space, infrastructure (such as bus stop bypasses and bus stop boarders) is available to enable pedestrians, cyclists and buses all to use the same corridors.

PLACE AND MOVEMENT DESIGN GUIDE – INCOMPLETE DRAFT (MARCH 2021)

1.2.81. The Place and Movement approach is a technical approach intended to recognise the needs of different road users in Hertfordshire and manage the interfaces between them. It intends to provide a way of looking at the appropriate function of any section of highway and therefore a basis for deciding which activities should be prioritised. In doing so, it aims to provide a means to translate LTP4 policies into practice.

1.2.82. As part of this work, each street on Hertfordshire's highway network has been categorised into 9 different street types based on each street's place and vehicle movement function as designed by the guide. The nine street types take the form of a 3x3 matrix and are based on the Healthy Streets approach developed by Transport for London. The LCWIP project team has been given a GIS layer which maps the Welwyn Hatfield highway network onto these street types. Wherever possible, we have sought to match the proposals in this LCWIP with the functionality of the street type. However, due to physical constraints on some streets, it is only possible to provide the infrastructure needed to enable mode shift to walking and cycling by reallocating roadspace away from motor vehicles or adding crossings which may slow down traffic. Where this is the case, further work and consultation may be needed to decide the best way forward as schemes are progressed.

1.2.83. This design guide supports a mode shift towards walking and cycling and is therefore aligned with this LCWIP. The document emphasises that routes should be carefully positioned and easily accessed by all, with particular consideration given to those routes connecting communities to local centres, healthcare facilities and schools.

SUSTAINABLE HERTFORDSHIRE STRATEGY (2020)

1.2.84. Following its Climate Emergency Declaration in July 2019, Hertfordshire County Council started developing a Sustainable Hertfordshire Strategy to set out initial policies and strategies needed to embed sustainability across all its council operations and services throughout the county. The strategy has the aim of enabling environmental action across the county; from delivering net zero carbon to preparing for extreme weather.

1.2.85. The strategy identifies that increasing mode-shift away from car towards walking and cycling will help achieve the county's plans for fighting climate change. The document sets out targets, and what is required in order to achieve these. Enabling more walking and cycling across Welwyn Hatfield will reduce greenhouse gases and air pollution for those in the Borough, including any HCC staff that live, travel or work there.

SPEED MANAGEMENT STRATEGY (2020)

1.2.86. The Speed Management Strategy (SMS) is a supporting document to the fourth Local Transport Plan, LTP4. Its purpose is to establish a consistent approach to the setting of speed limits based on the function and nature of the route as set out in DfT Circular 01/2013 Setting Local Speed Limits. The document is an update of the previous strategy adopted in 2014 and reflects changes in regulation, guidance and policy. A key change is the adoption of LTP4, which places much greater emphasis on the consideration of the needs of vulnerable road users such as pedestrians and cyclists.

1.2.87. In order to support this the council has also adopted a place and movement approach which takes account of the varying functions and uses of its roads and categorises them based on

whether they are places people want to visit or whether they are primarily focussed on vehicle movement. This helps identify locations which may be suitable for the application of lower speed limits.

1.2.88. To enable the SMS to both deliver LTP4 policies and to provide a consistent approach to setting speed limits across the county, the following core principles have been developed:

- To encourage speed limit changes that support active travel;
- Lower speed limits, where appropriate;
- To change the design of roads in order to change behaviour, where appropriate; and
- Where it has been established that speed limits are too low for the environment, speed limits may be raised.

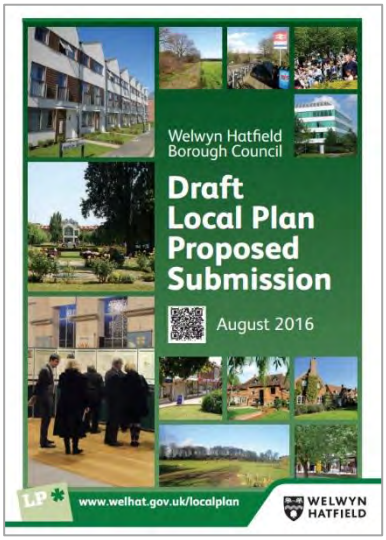
1.2.89. Given the first and third core principles, it is assumed that the proposals in the LCWIP will be supported by the SMS. This is especially important when considering inter-urban cycling trips. Speed limits on roads between settlements (for example between Welwyn Garden City and Hatfield) often increase to over 30mph. On many of these roads there is limited road space for fully kerbed cycle tracks (the only LTN 1/20 compliant infrastructure solution) and there are few or no alternative routes available for cyclists. As such, speed limits (and design speeds) on these roads would need lowering in order to enable on road cycling in a safe manner in accordance with LTN 1/20 guidelines. The LCWIP has proposed this in places, despite the fact that this may be at odds with other strategic transport priorities around the speed and flow of motor traffic and would need to be assessed in line with the SMS guidelines.

1.2.90. Furthermore, there is an opportunity to create more suitable environments for active modes where speeds are lowered, such as in 20mph zones.

1.3 BOROUGH STRATEGIES, POLICIES AND PLANS

1.3.1. This section will present the existing policy documents that are relevant to this LCWIP on a Borough level.

LOCAL PLAN (WELWYN HATFIELD BOROUGH COUNCIL, 2016-2036)



1.3.2. The submitted Welwyn Hatfield Local Plan sets a target to build 15,200 new homes and 116,000 sqm of new employment floorspace over the next 15 years. It contains policies to control the sustainability of development, including higher densities around transport hubs, priority for pedestrians and cyclists, space for nature, protect and enhance environmental assets and sustainable construction principles for materials, waste, water and energy. It was submitted for examination on 15 May 2017 and an inspector has been appointed to carry out an independent examination of the Local Plan (2013-2032).

1.3.3. The plan as currently drafted allocates land for around 12,000 new homes, although it is likely this number will increase to 16,000 until 2033, and the borough are taking steps to find additional sites. WHBC are planning to use brownfield land wherever possible, but there is not enough to meet future demands for development. Only around 6,500 homes can be delivered on brownfield land, which means land from the Green Belt will have to be released. 79% of the borough is currently Green Belt and this would reduce by about 4%.

1.3.4. The document highlights that there are a number of challenges facing Welwyn Hatfield over the plan period which the Local Plan will need to address in terms of national policy and at the borough and local level. It also highlights that there are also a number of opportunities associated with development which the Council should seek to utilise for the benefit of the borough as a whole.

Walking & Cycling

1.3.5. Policy SP 4, supported by SADM 2 and SADM 3, will seek to ensure the safety of highway users is preserved, the borough's highway network functions well, and alternative sustainable forms of transport are promoted and secured. Development proposals should make provision where appropriate for:

- Cyclists, through safe design and layout of routes integrated into new development and the wider cycle network and provision of secure cycle parking and where appropriate changing facilities.

1.3.6. Pedestrians (including disabled persons and those with impaired mobility), through safe, accessible, direct and convenient design and layout of routes within the new development and wider pedestrian network

1.3.7. Safeguarding existing Public Rights of Way and promoting enhancements to the network, where appropriate, to offer walking and cycling opportunities.

1.3.8. Public transport, through measures that will improve and support public transport and provide new public transport routes.

1.3.9. Community transport, through the implementation of Travel Plans where appropriate (for example including measures that will promote car pools, car sharing and voluntary community buses, community services and cycle schemes).

1.3.10. New developments will be expected to encourage cycling through the inclusion of safe cycle routes and parking for cycles. New routes should link with existing or proposed cycle paths. Contributions may be required for off-site facilities. Appropriate secure waterproof storage and changing/shower facilities should be provided within developments.

1.3.11. The Local Plan and its growth strategy therefore promotes the use of rail and bus services where appropriate, as well as providing for new or improved cycling and walking routes, for leisure purposes and for journeys to work, school, shopping and community facilities.

Opportunities for this LCWIP

1.3.12. Welwyn Hatfield is served by major north-south road and rail links, and by the principal east-west road route through central Hertfordshire, the A414. These links offer advantages in terms of accessibility for living and working which have scope to incorporate further active travel modal share.

1.3.13. The quality of the borough's natural and historic garden city environment, open spaces and countryside are highly valued by its residents and present a more welcoming environment for active travel modes.

1.3.14. Welwyn Hatfield is served by four main cycle networks: the Alban Way, Ayot Green Way, Cole Green Way, and Great North Way, which link the borough with the wider countywide cycle network and form three National Cycle Route Networks (12, 57, 61). A number of other cycle routes are also provided, mainly in the urban areas of Hatfield and Welwyn Garden City.

The borough is also served by a variety of public footpaths and green links, which provide connectivity in addition to leisure opportunities.

1.3.15. Welwyn Garden City, Hatfield and surrounding villages lie very close to each other and have strong relationships linking them in terms of housing markets and job movements with high potential for active travel.

Challenges for this LCWIP

1.3.16. The list of development sites is subject to the adoption of the local plan, as there has been a delay to the adoption of the Local Plan. There is a risk that some sites may be altered or removed following the inspectors report, but the LCWIP has proceeded and used the draft list in its early stages and analysis. Therefore, any changes to the list of development sites will need to be accounted for during the development of the LCWIP and highlighted and caveated in the final report.

1.3.17. The A1(M) and A414 suffer from congestion issues and peak stress on the A414 and seek opportunities for transport improvements to increase the ease of east-west movement across the borough and in the county generally. The achievement of the level of housing growth proposed in the Local Plan will need to address additional peak stresses on these routes with a series of measures to improve traffic flow as well as investment in sustainable transport measures.

DRAFT INFRASTRUCTURE DELIVERY PLAN (WELWYN HATFIELD BOROUGH COUNCIL, 2016)

1.3.18. The Draft Infrastructure Delivery Plan (IDP) supports the Welwyn Hatfield borough Council (WHBC) Local Plan covering the period 2013-2032. The purpose of the IDP is to identify the infrastructure requirements arising out of an authority's Local Plan over the entire plan period, also considering the cost, timing, potential funding mechanisms and responsibilities for delivery. Those requirements will tend to be focused on the needs associated with housing growth, but also need to take into account the implications of other site allocations (particularly employment site requirements) and other local plan policies.

1.3.19. Improvements to the borough's existing green infrastructure network and the provision of new green infrastructure, will be crucial in supporting the levels of development identified in the Local Plan, and particularly the delivery of the broad locations. This will assist the authority in

promoting access to green space and the countryside, improving connectivity between places through the use of 'green' networks and promoting healthy lifestyles.

1.3.20. The LCWIP will support the Infrastructure Delivery Plan by providing an evidence base to support s106 applications and help to link green infrastructure along routes where there is demand.

1.3.21. While the Draft Infrastructure Delivery Plan does not detail specific improvements for walking and cycling, the most relevant infrastructure items are detailed in Table 1-2 below.

Table 1 Error! No text of specified style in document.**-2 – WHBC Draft Infrastructure Delivery Plan Items**

Infrastructure Category	Infrastructure Item	Delivery Partners	Timescale for delivery
Transport	Broadwater Road and Bridge Road signalised crossroads - Road widening and pedestrian crossing improvements	HCC	2023 - 27
Green Infrastructure	Green Corridor Scheme – new footbridges/underpasses to secure connectivity of corridor	WHBC, HCC, LNP, others	50% in 2023 – 27, 50% 2028 - 32

HATFIELD 2030+ TRANSPORT STRATEGY (WBDC 2017)

1.3.36. This Transport Strategy forms part of the Hatfield 2030+ regeneration framework that aims to provide guidance and direction for the development and growth of Hatfield over the next twenty years or so. The Transport Strategy sits beneath the Renewal Framework, where it provides objectives and direction to be followed for the identification and delivery of transport schemes. The Strategy identifies some high-level topics to be used in developing objectives and policies. The Strategy then explains how the objectives will help to provide a transport network capable of supporting the future vision for Hatfield.

1.3.37. The goals for the towns transport network are:

Improve the experience of walking and cycling, providing safe, attractive and convenient routes for residents and visitors.

Connect diverse areas of the town with an ambitious, affordable and innovative public transport strategy.

Break down the east-west town division to improve connections across Hatfield.

Create a well-connected green infrastructure strategy to encourage the use of green spaces and support healthy and active lifestyles

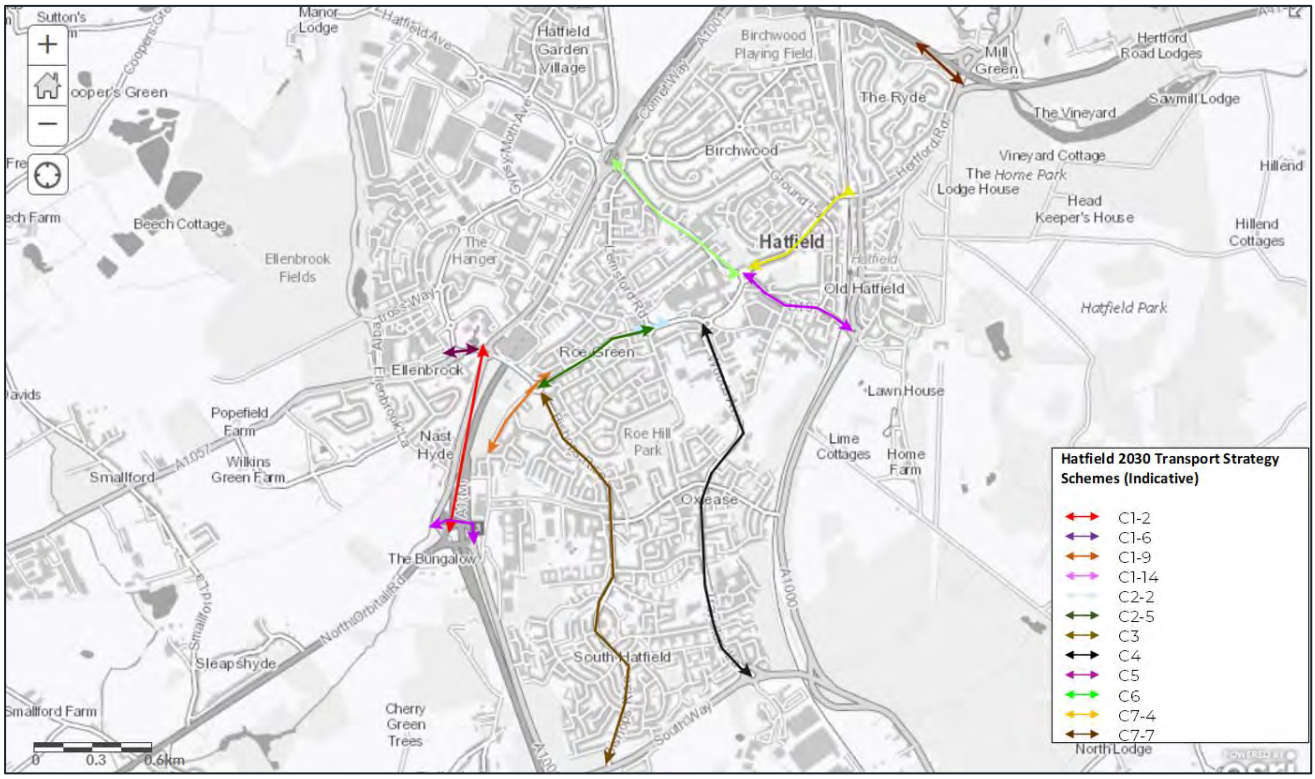
1.3.38. The strategy proposes potential recommended schemes to improve conditions for walking and cycling in Hatfield, as shown in Table 1-3 and mapped in Figure 1-4 the next page.

Table 1-3 – Schemes presented in the Hatfield 2030 Transport Strategy

Code	Description
C1-1	Improve the cycling environment by connecting the various cycle routes.
C1-2	Replace the existing roundabouts with signalised junctions
C1-6	Re-programme the signal phasing at these crossing locations to prioritise pedestrian movements.
C1-9	Increase the width of the pavement to allow for formal marking of a cycle lane.
C1-14	Install marked cycling routes to connect Comet Way with Roehyde Way.
C2-2	Install a dual purpose crossing for use by pedestrians and cyclists
C2-5	Improve the marking of the cycle lanes and ensure consistency along the route
C3-4	Widen the footpath on the eastern side of Bishops Rise and mark dedicated cycle lane
C3-6	Widened the existing footway to allow for pedestrian and cyclist shared space on the footway
C4-6	Remove the existing subway and bring pavements to grade level
C4-7	Improve the cycle connections to various routes around the roundabout
C4-8	Traffic calming measures along the length of the corridor
C5-6	Install cycle lane along French Horn Lane
C5-8	Continue the Improvements to wayfinding and signage and guidance about routes

C6-4	Implementation of a cycle lane to connect existing provisions on either side of the roundabout
C6-7	Redesign the existing connections from Wellfield Road to the Alban Way cycle route
C6-8	Improve pedestrian and cycling crossing of Comet way
C7-4	Introduce a cycle lane along St Albans Road East
C7-7	Install footpath and cycle infrastructure

Figure 1-4 - Hatfield 2030+ Transport Strategy Scheme Corridors



WELWYN HATFIELD BOROUGH PLAN (WHBC, 2005)

1.3.79. Until adoption of the Local Plan, this remains the adopted development plan for the borough, though the strategies set out in the Local Plan have been accepted by the Inspector. The Borough Plan is supportive of sustainable development and modal shift and supports delivery of Hertfordshire County Council's transport strategies. Policies M5 and M6 seek improvements in the walking and cycling network respectively, including requiring developer contributions if necessary. Policy TCR12 requires developments in Welwyn Garden City town

centre to contribute to improving the infrastructure for pedestrians, cyclists and passenger transport access, and Policy TCR21 places the same requirement on development in Hatfield Town Centre.

WELWYN GARDEN CITY TOWN CENTRE NORTH SUPPLEMENTARY PLANNING DOCUMENT (WHBC, 2015)

1.3.80. The SPD supplements Policy TCR4 of the Borough Plan which allocates this site for development and requires detailed guidance on the type of design, layout of development and mix of uses (for example, retail, accommodation) for the site. The Welwyn Garden City Town Centre North Supplementary Planning Document (SPD) provide this guidance and sets out key design and layout constraints as well as other issues relevant to the site.

NORTHAW AND CUFFLEY PARISH PLAN (NORTHAW AND CUFFLEY PARISH COUNCIL, 2022)

1.3.81. The draft Northaw and Cuffley Neighbourhood Plan was consulted on between 20 September and 01 November 2021 and is expected to proceed to examination and possible referendum for adoption in 2022. Chapter 6 of the Plan, “Transport and Getting Around” sets out transport related issues. It recognises the high level of car use in the Parish and in Welwyn Hatfield more generally. Policy T1 covers the Station Road area in the village centre, including suggested changes to public realm to improve pedestrian accessibility and improved crossing points. Policy T2 sets out an aspiration to improve the connectivity of a number of walking routes, mostly rural or linking Cuffley with Northaw and Potters Bar. The policy also supports the aim of creating new cycle links and improve existing routes, though none are specified, but does set out a wish to see improved cycle parking at Cuffley library.

WELWYN HATFIELD CLIMATE CHANGE STRATEGY (WHBC, 2019)

1.3.82. The possible local implications for Welwyn Hatfield include heat, drought, flooding, impact on ecosystems and biodiversity, water supply, river quality, soil quality, agriculture, air pollution, pests, diseases and invasive species.

1.3.83. The Council declared a climate change emergency in June 2019 and set itself the ambitious target to be zero net carbon by 2030, or a justification for a later date if the review finds this unachievable.

1.3.84. The Climate Change Action Plan is the source of Welwyn Hatfield’s contribution to the LCWIP.

1.3.85. The action plan sets out existing actions that the Council is already undertaking and new actions that the Council and its partners will take to tackle climate change. It will be updated on a regular basis by the Climate Change Officer Group and reported to the Climate Change Member Group and Cabinet as appropriate.

1.4 RELEVANT PLANS IN NEIGHBOURING AUTHORITIES

1.4.1. St Albans District Council and North Herts District Council are also developing LCWIPs with HCC and WSP. The key inter-urban routes from these areas that tie in with this LCWIP are discussed below.

1.4.2. The Alban Way and A1057 link St Albans to Hatfield to the west near the Galleria. The Alban Way is the main active travel route between the two, with the A1057 being the main traffic route linking the two areas.

1.4.3. The B197 links Stevenage to Welwyn, routing via Knebworth and Woolmer Green and is one of the main inter-urban routes between the two except for the A1(M).

1.5 COVID-19 AND THE ACTIVE TRAVEL FUND

1.5.1. As with the rest of the country, travel patterns in North Hertfordshire in 2020 were massively disrupted by the covid-19 pandemic. Many workers started working from home rather than commuting and schools were closed, impacting these trips as well. People were advised by the government to avoid non-essential trips, to not use public transport, and to prioritise walking or cycling rather than driving to help avoid streets becoming gridlocked. Cycle sales in the UK were much higher than usual in 2020 and the DfT reported increases of around 200% in cycling trips made between March 16th and June 1st compared to the year before.

1.5.2. To support this desired shift to walking and cycling, and to make social distancing easier, on 11 May 2020 the government announced a £250m Emergency Active Travel Fund (EATF). This fund was distributed to local authorities across England in two tranches. The council used funding from the first tranche to improve active travel infrastructure across Hertfordshire.

1.5.3. The fund was then renamed the Active Travel Fund and the second tranche of funding was awarded based on plans submitted to the DfT by the council. WSP helped the council prepare these plans.

1.5.4. Hertfordshire received funding through the Emergency Active Travel Fund in Summer 2020 and selected locations in Welwyn Hatfield for the reallocation of road space to improve cycle and pedestrian provision, with further details provided below.

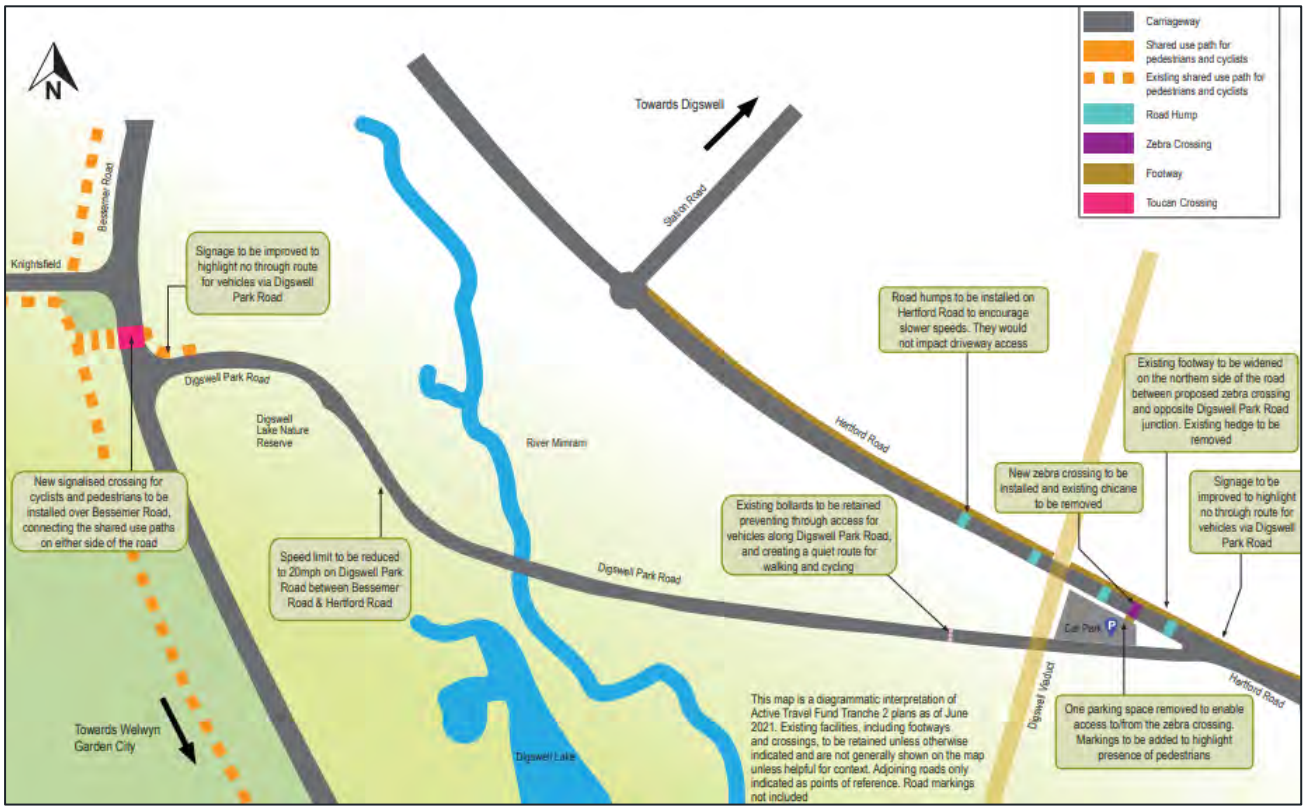
Digswell Park Road (Bessemer Road to Hertford Road)

1.5.5. HCC introduced temporary walking and cycling improvements in the area last year as part of the Emergency Active Travel Fund (EATF) measures, including:

- Closing the road to through traffic by the Digswell Viaduct, to prevent it being used as a 'rat-run'
- A quieter route for pedestrians and cyclists, and a crossing point at Bessemer Road.

1.5.6. Majority support was received from the consultation and a further bid has been submitted to the DfT to enable implementation of a permanent scheme (see Figure 1-5).

Figure 1-5 - Digswell Park Road, WGC Proposals



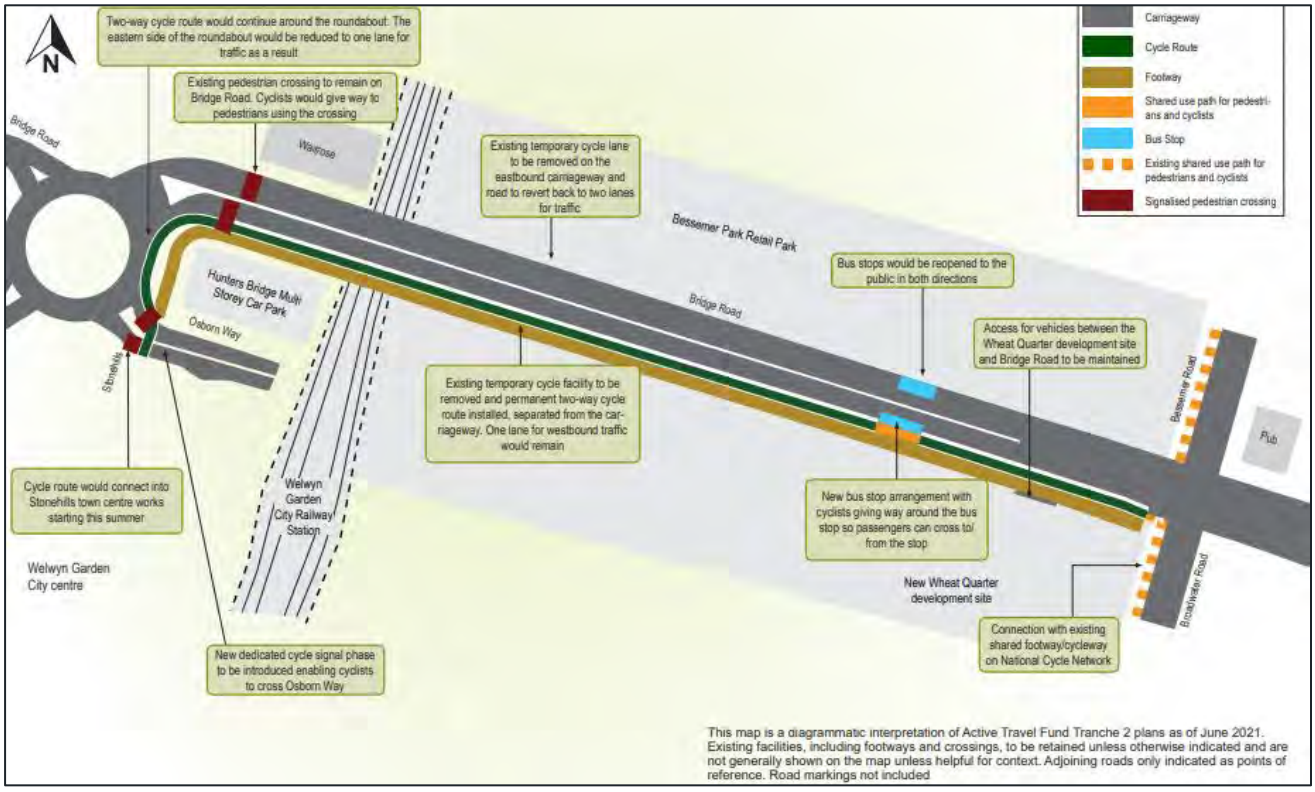
Bridge Road - EATF (Hunters Bridge, Welwyn Garden City)

1.5.7. Following public engagement in early 2021, proposals for a more permanent scheme with a two-way cycle track on the southern side of Bridge Road connecting into Stonehills have been developed (shown bottom right). These received majority support during consultation in Summer 2021 and a bid has been submitted to the DfT for implementation of this scheme (which is in line with the GTP proposals to change Bridge Road into a sustainable boulevard (SCGTP PK14 – Scheme 93)

1.5.8. Proposals are detailed below and illustrated in Figure 1-6**Error! Reference source not found.**:

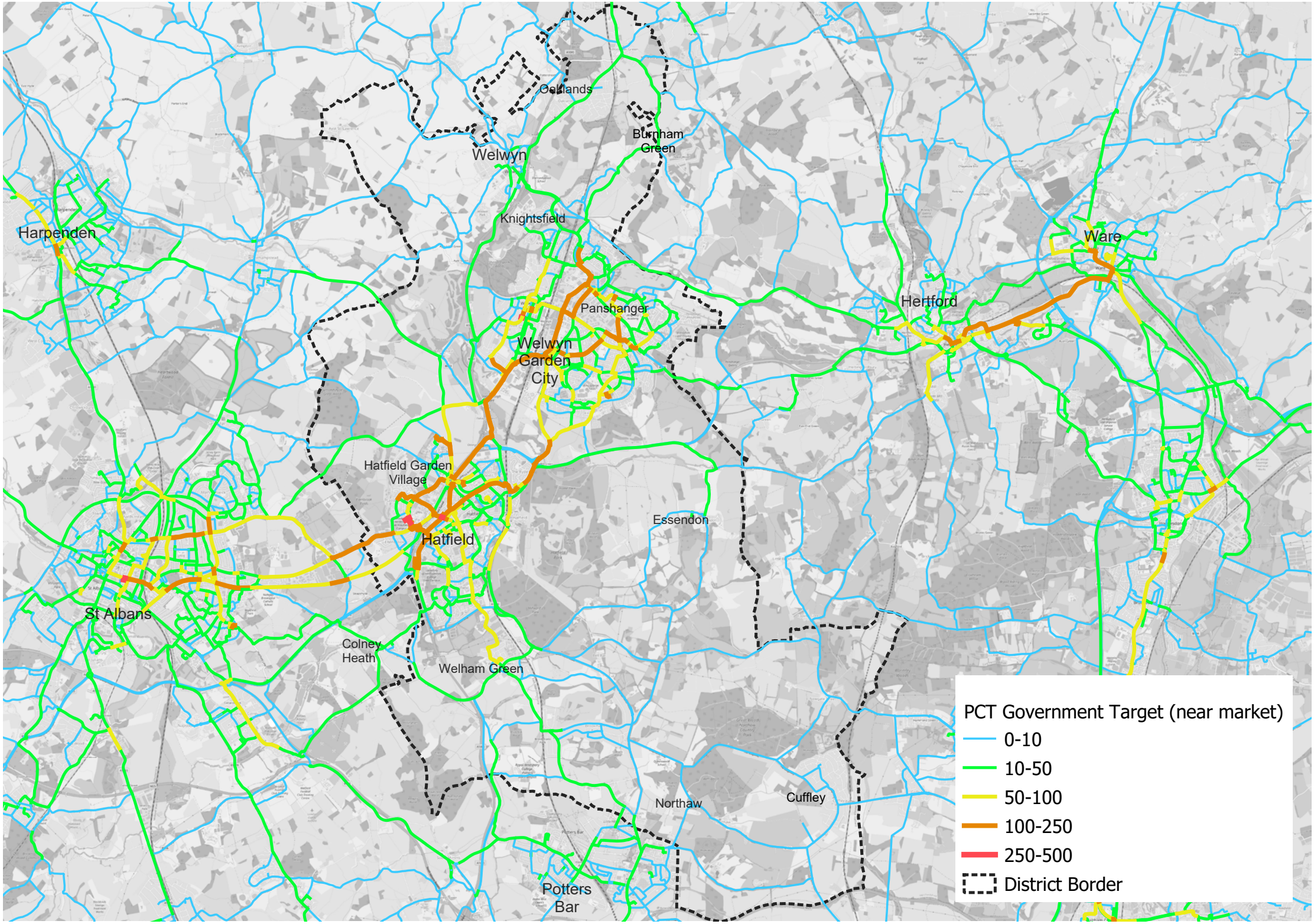
- Dedicated, safe road space for cycle users, separated from the main carriageway and footway with low-level kerbs.
- Junction improvements to give priority to pedestrians and cyclists
- Bus stop improvements.

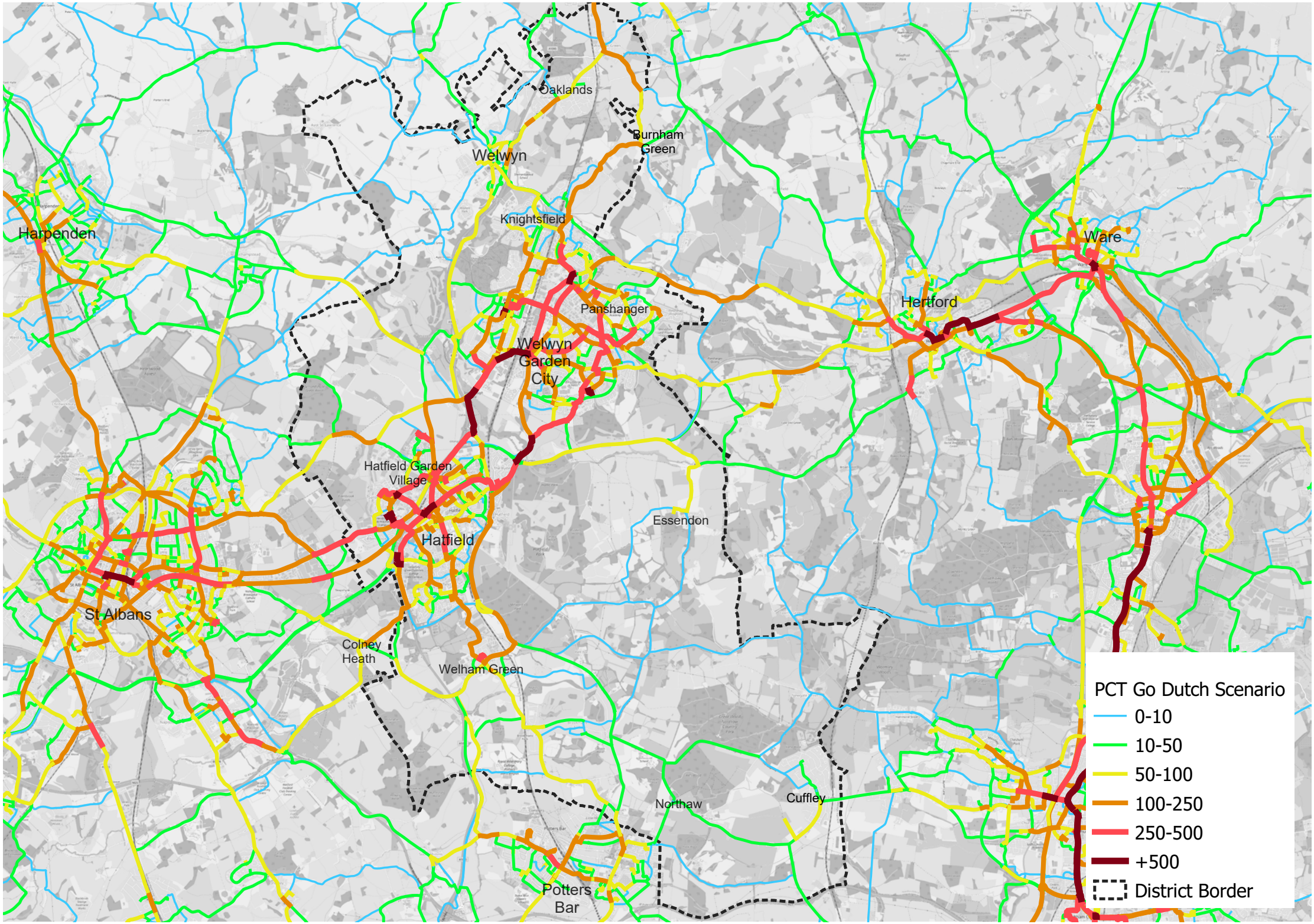
Figure 1-6 - Bridge Road, WGC Proposals



Appendix B

PCT OUTPUTS


Oaklands
Burnham Green
Welwyn
Knightsfield
Harpenden
Ware
Hertford
Panshanger
Welwyn Garden City
Hatfield Garden Village
Hatfield
Essendon
St Albans
Colney Heath
Welham Green
Northaw
Cuffley
Potters Bar
PCT Government Target (near market)
0-10
10-50
50-100
100-250
250-500
District Border


Oaklands
Burnham Green
Welwyn
Knightsfield
Harpenden
Ware
Hertford
Panshanger
Welwyn Garden City
Hatfield Garden Village
Hatfield
Essendon
St Albans
Colney Heath
Welham Green
Northaw
Cuffley
Potters Bar
PCT Go Dutch Scenario
0-10
10-50
50-100
100-250
250-500
+500
District Border

Appendix C

GIS MODEL TECHNICAL NOTE

GIS Model Overview

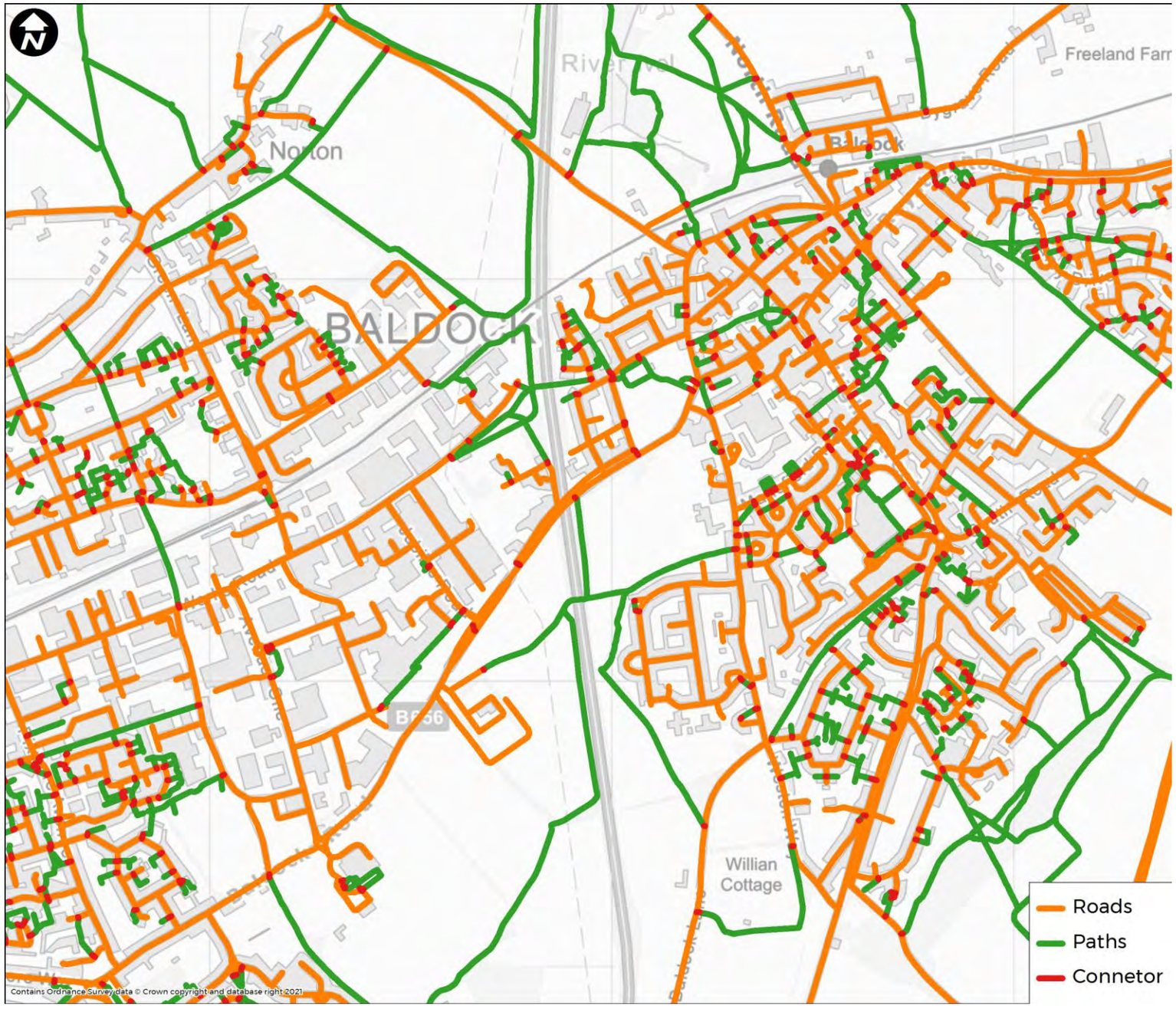
Introduction

- A suite of models has been developed to automate the creation of desire lines for walking and cycling.
- The models require the following inputs: a walk/cycle network, origins, destinations and associated parameters.
- The models create two types of output:
  1. ‘As crow fly’ lines with the number of trips calculate between respective origins and destinations
  2. Walk/cycle network based lines that aggregate the number of trips to the actual network

Inputs

Input 1: Walk/Cycle Network

- A walk/cycle network has been built for the whole of Hertfordshire plus an 8km buffer.
- The datasets were downloaded from the vendor (Emapsite) on 4th May 2021.
- The data consist of two Ordnance Survey MasterMap datasets, one is the most detailed road network available and the second is the associated paths dataset. These two datasets have been merged together correctly before building the network.
- The walk/cycle network can be used for any of Hertfordshire County Council's LCWIPs projects.
- One-way streets have not been modelled.



Input 2: Origin Points

- The origin points dataset has been created from three sources:
    1. Experian Mosaic postcodes with 2019/20 population estimates
    2. North Herts COMET R6 Housing Completions L3
    3. North Herts COMET R6 Perm Sites L3
- The COMET datasets were supplied by Hertfordshire County Council. It is understood that the council has its own Acorn data and in future runs this can be used instead of the Experian Mosaic dataset.
- There are a total of 19,628 origin points across North Hertfordshire plus an 8km buffer
- Each origin point has a weight score, representative of the population at each point.

Input 3: Destination Points

- The destination points dataset has been created from 25 individual datasets supplied by Hertfordshire County Council.
- The extent of destinations was North Hertfordshire plus an 8km buffer
- The combined walk destinations dataset includes all 25 individual datasets, which includes bus stops, and contains 9,157 points
- The combined cycle destinations dataset does not include bus stops, and contains 6,839 points
- Each destination dataset is referred to as a "Destination Type". The Key Employment Areas destination type is made up of three individual destination datasets combined together (Key Employment Areas, Employment Completions, Employment Perm Sites)
- Every destination point within each destination type is given a weighting, however, in the majority of cases, the weighting is a value of one, meaning that all destinations within that destination type, have the same attractiveness as one another. Some destination types have a specific weighting that represents the varying attractiveness of each point, such as number of jobs.
- Each destination type is assigned two pieces of information:
    1. Model Run Category – one of four options (All2All, Nearest1, ClosestX, ClosestY)
    2. Assignment Proportion – each destination type is given a value that represents the proportion of trips being generated by an origin that go to the corresponding destination type. E.g. 10% of all trips from an origin will go to a secondary school.
    - The run category will determine how this proportion of trips generated at an origin point is distributed between the respective destinations within the destination type.

Destination Parameters: Run Category Types & Values

Run Category	Description	Example Destination Type
All2All	This run category will generate data between each origin and every one of the destination points within the corresponding destination type. Serious consideration should be given to using this run category as it can generate millions of data rows which will cause the models to fail (run out of memory).	Town centres
Nearest1	This run category will generate data between each origin and the single nearest destination point within the corresponding destination type.	Train stations, secondary schools
ClosestX	When running the models, the user assigns a value for X, and this run category will generate data between each origin and the X closest destination point within the corresponding destination type.	Primary schools, bus stops
ClosestY	When running the models, the user assigns a value for Y, and this run category will generate data between each origin and the Y closest destination point within the corresponding destination type.	Business parks, retail centres

Run Category	Value for North Herfordshire Model Runs
ClosestX	3
ClosestY	5

Walk Destination Parameters

Destination Type	Run Category	Proportion (Total = 100%)
Bus Stops	ClosestY	6%
Coach Stations	Nearest1	1%
Colleges/Universities	Nearest1	5%
Community Centres	Nearest1	1%
Dentist	Nearest1	1%
Event Spaces	ClosestX	1%
GPs/Walk-in Centres	Nearest1	1%
Hospitals	All2All	5%
Key Employment Areas / Acorn Data /Future Employment	All2All	10%
Libraries	Nearest1	1%
Local/Neighbourhood Centres	Nearest1	20%
Market Areas / Marketplaces	ClosestX	1%
Nurserys	ClosestX	1%
Parks/Open Spaces	Nearest1	1%
Post Office	Nearest1	1%
Primary Schools	ClosestX	9%
Railway Stations	Nearest1	5%
Retail Parks	All2All	1%
Secondary Schools	ClosestX	10%
Sport and Leisure Centres	Nearest1	1%
Supermarkets	Nearest1	5%
Tourist Attractions / Points of Interest	Nearest1	3%
Town Centre Area	All2All	10%

Cycle Destination Parameters

Destination Type	Run Category	Proportion (Total = 100%)
Coach Stations	ClosestY	1%
Colleges/Universities	Nearest1	5%
Community Centres	Nearest1	1%
Dentist	Nearest1	1%
Event Spaces	ClosestX	1%
GPs/Walk-in Centres	Nearest1	1%
Hospitals	All2All	5%
Key Employment Areas	All2All	30%
Libraries	Nearest1	1%
Local/Neighbourhood Centres	Nearest1	5%
Market Areas / Marketplaces	ClosestX	1%
Nurserys	ClosestX	2%
Parks/Open Spaces	All2All	1%
Post Office	Nearest1	1%
Primary Schools	ClosestX	6%
Railway Stations	Nearest1	6%
Retail Parks	All2All	5%
Secondary Schools	Nearest1	6%
Sport and Leisure Centres	Nearest1	1%
Supermarkets	Nearest1	5%
Tourist Attractions / Points of Interest	All2All	5%
Town Centre Area	All2All	10%

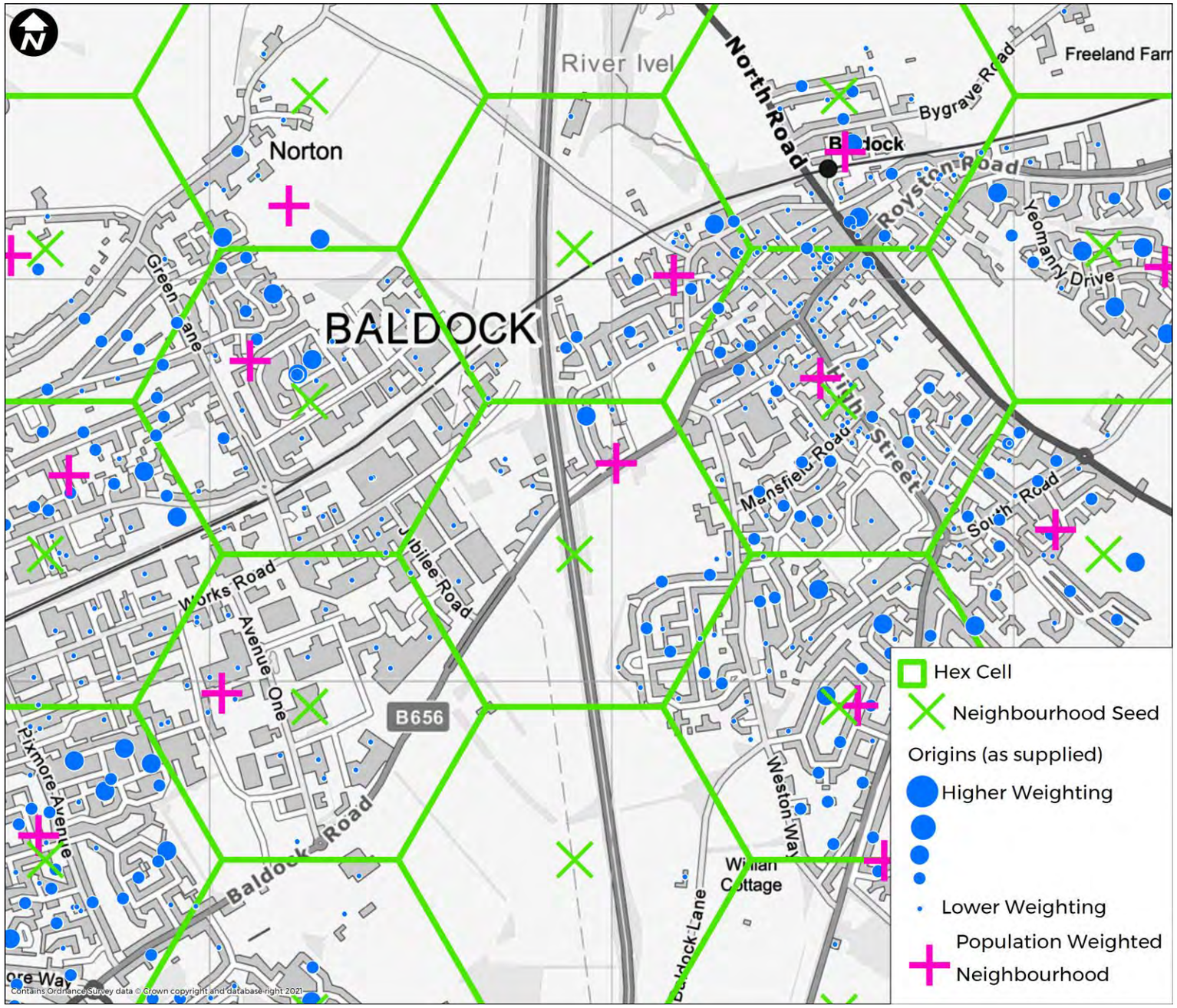
Methodology

Workflow

- A suite of models have been created that run though Esri ArcGIS Desktop.
- Running the models requires an ArcGIS Desktop Advanced license and Network Analyst license.
- The workflow for the models is as follows:
    1. The user manually pre-processes the origin and destination points to ensure both datasets have the required fields and attribute values.
    2. The user selects the required model inputs: walk/cycle network, origin points, destination points and hex cells
    3. The user manually inputs the values of X and Y for ClosestX and ClosestY run categories
    4. The origin and destination points are automatically aggregated to neighbourhood points so that less data is used by the model, however there is no loss to the weighting values associated with origins/destinations. This is essential as with 19,000 origins and 9,000 destinations, up to 171,000,000 trip lines could be generated and a normal computer would not be able to process this.
    5. The model creates an Origin-Destination Matrix (OD Matrix) from all origins to the appropriate destinations destinations, respecting the Run Category parameters for the respective destination type. For example, trips are made from each origin to all hospitals (All2All) and trips are made from each origin to the closest three nurseries (ClosestX). The OD Matrix distances are based on network distances not straight line distances.
    6. The OD Matrix is used to generate the 'as crow flies' lines between origins and destinations. A series of table joins add the origin weight value and destination proportion value to the respective OD lines. A gravity model calculates the number of trips being assigned to each line. The gravity calculation assigns trips based on a formula that balances the distance between origin and destinations and the attractiveness of the destinations. The output dataset is then run through a python script (outside of ArcGIS) to create the clustered desire lines
    7. The OD Matrix is used to generate the walk/cycle network based lines between origins and destinations. A series of table joins add the origin weight value and destination proportion value to the respective OD lines. A gravity model calculates the number of trips being assigned to each line. The gravity calculation assigns trips based on a formula that balances the distance between origin and destinations and the attractiveness of the destinations. Additional processes then aggregate the network based lines to the underlying road network, summing the total number of trips along concomitant sections of road.

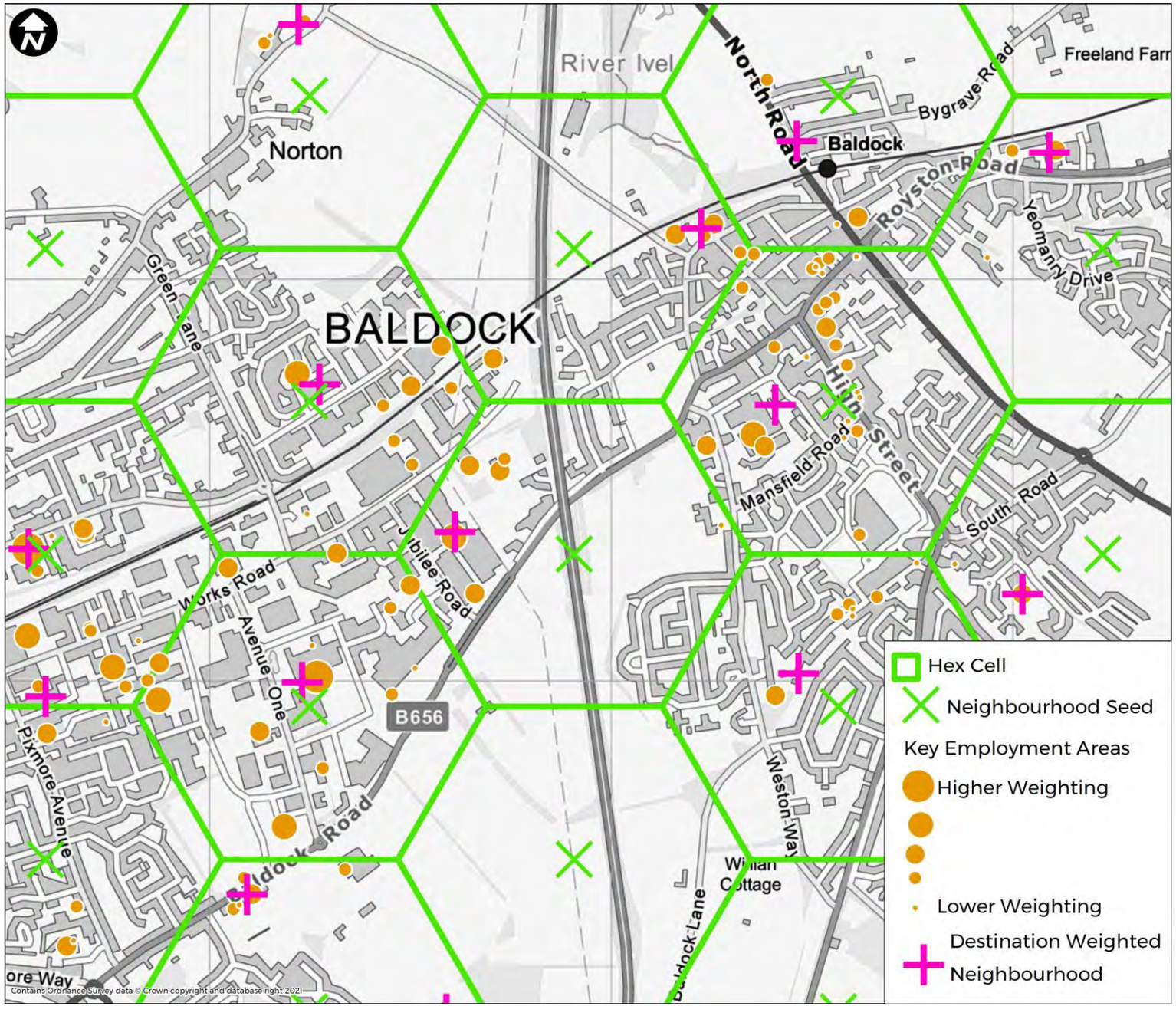
Aggregating Origins

- A grid of hex cells is used as a proxy for neighbourhoods and the centroid of each hex cell used as a ‘first step’ neighbourhood seed.
- The supplied origins are assigned to the nearest neighbourhood seed using the road network and the total origin weight for each neighbourhood seed calculated (sum of all origin weights)
- A new location to best represent the respective origins is calculated creating a population weighted neighbourhood point
- The population weighted neighbourhood point is now a proxy for all origins deemed to be within a neighbourhood.
- Note that an origin can be physically located in one hex cell, but the closest neighbourhood seed when using the road network is actually in another hex cell. The origin is assigned to the other neighbourhood seed instead.

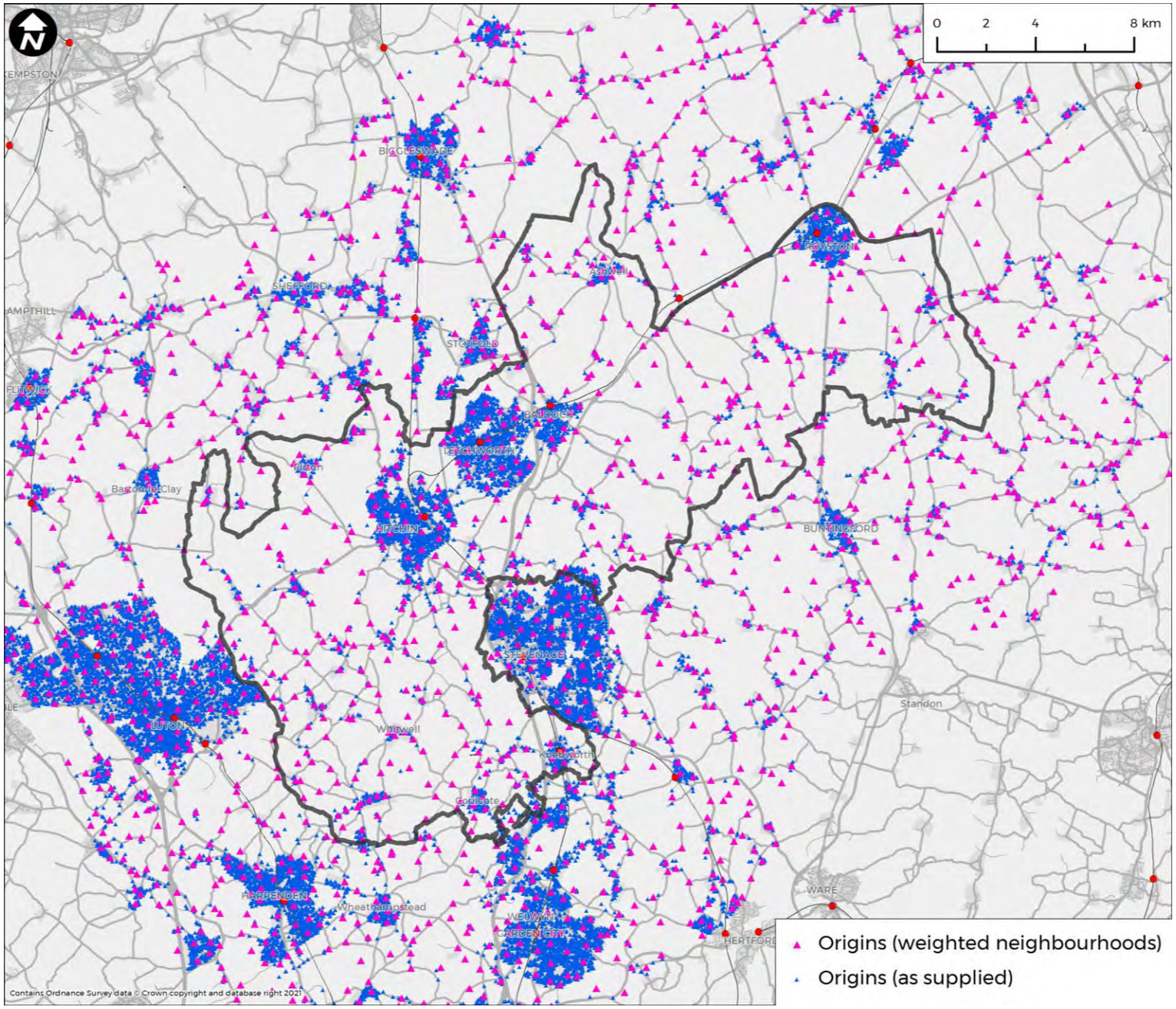


Aggregating Destinations

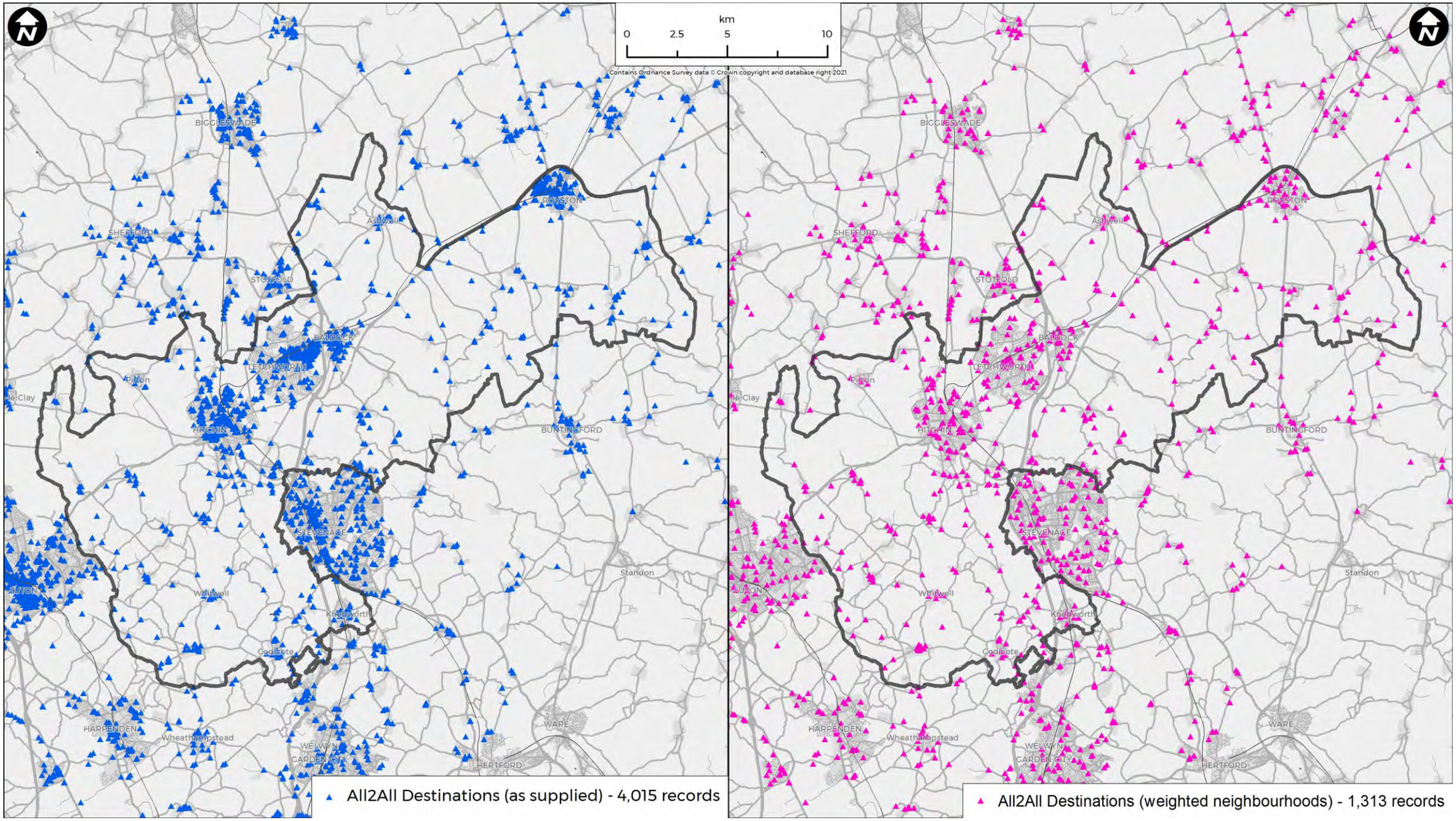
- The same methodology was used as for aggregating origins to weighted neighbourhood points
- A specific set of destination weighted neighbourhood point was created for each of the destination types – the image illustrated the destination type of Key Employment Areas only.
- All sets of destination specific weighted neighbourhood points were merged into one final dataset used by the model.



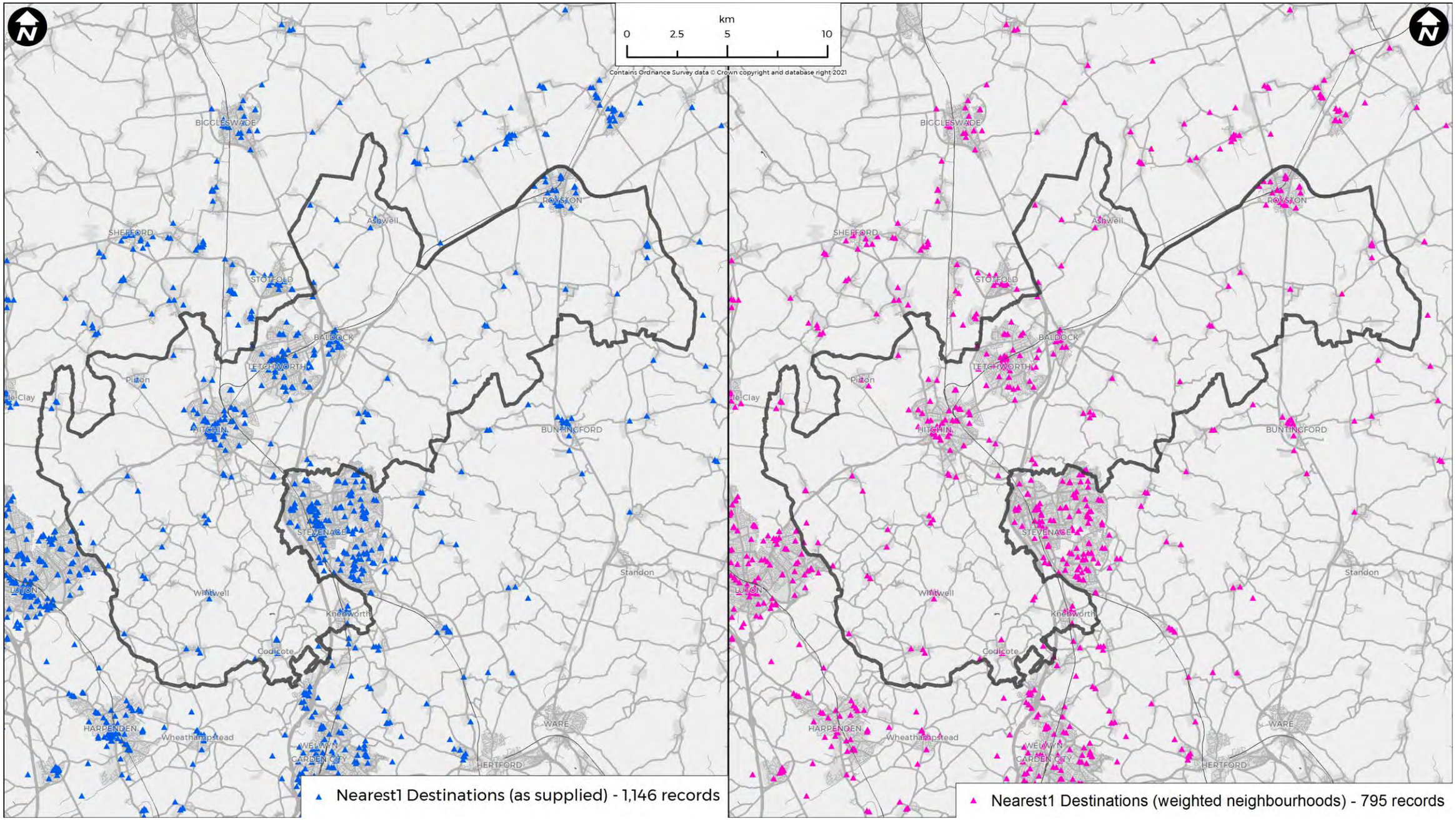
Origins: As supplied & Aggregated to Neighbourhoods



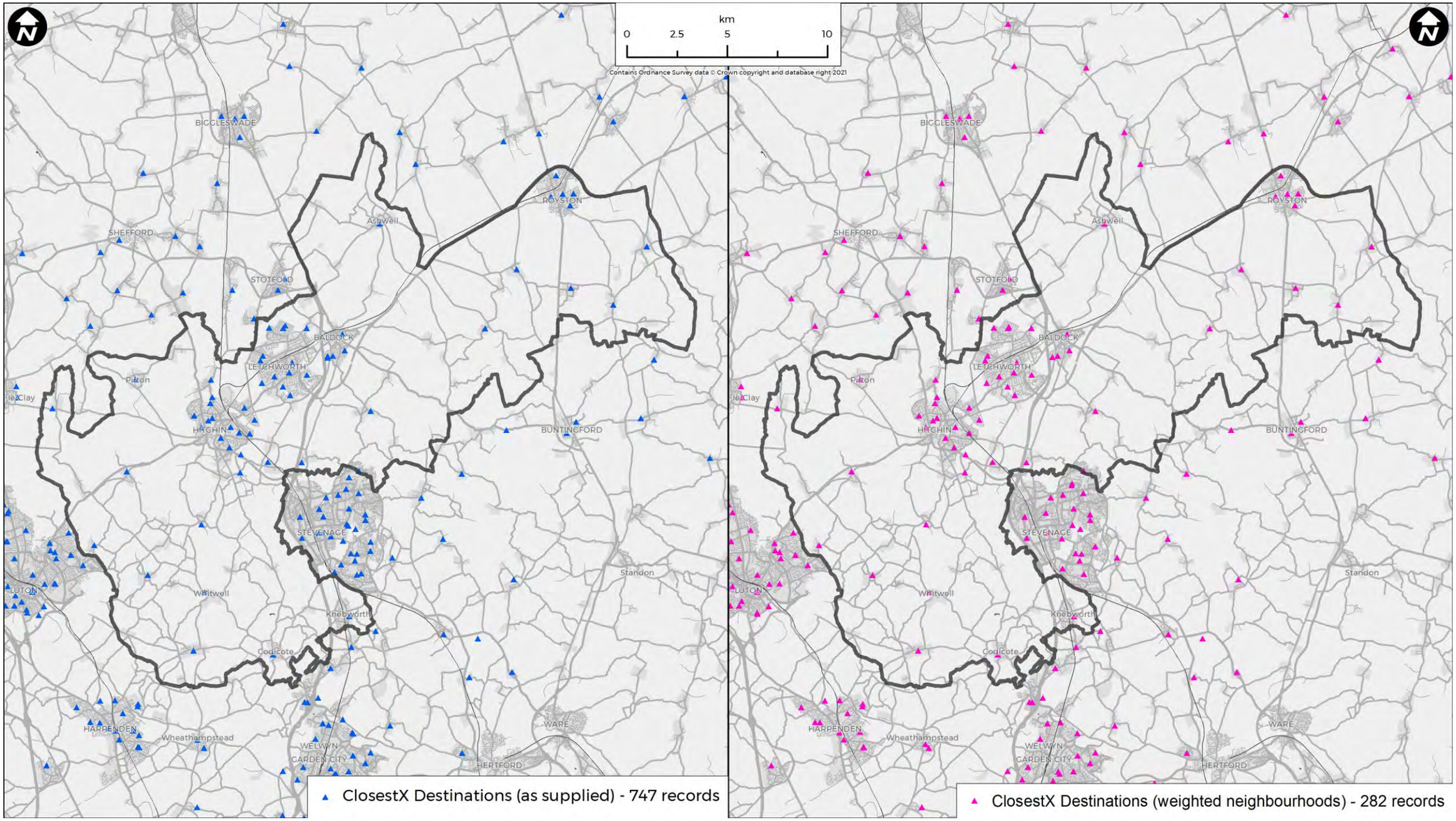
Aggregating All2All Destination Types



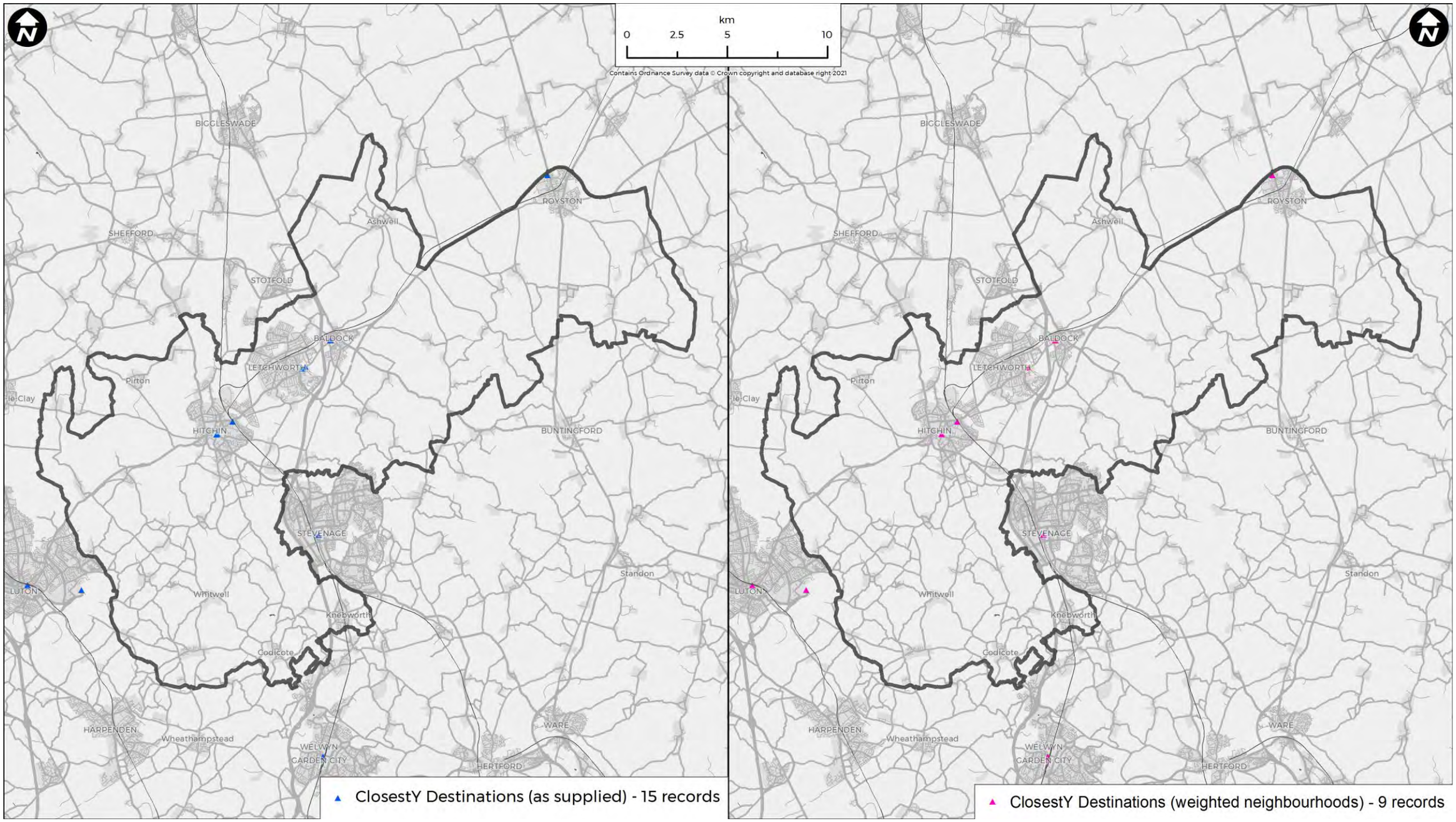
Aggregating Nearest1 Destination Types



Aggregating ClosestX Destination Types

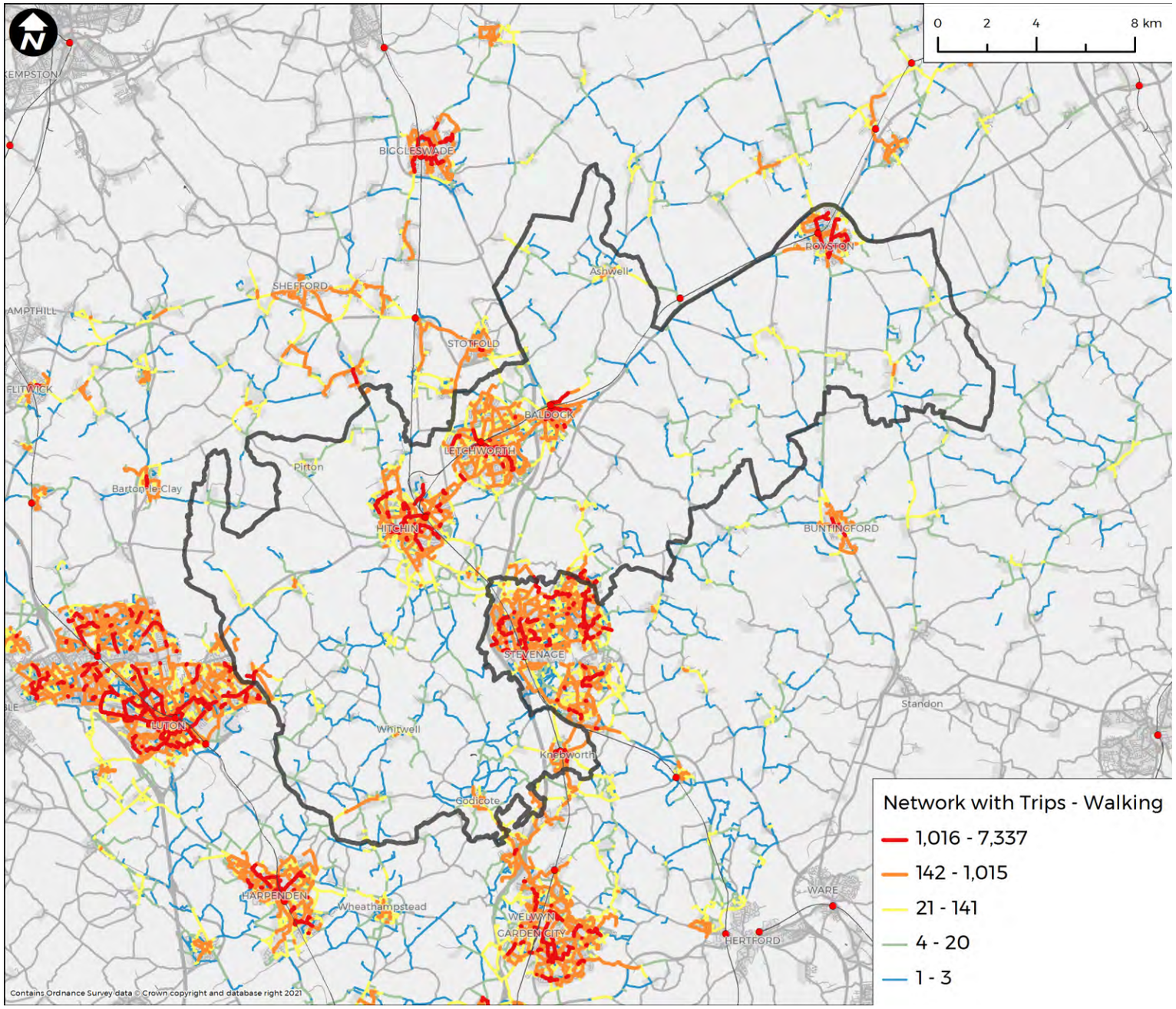


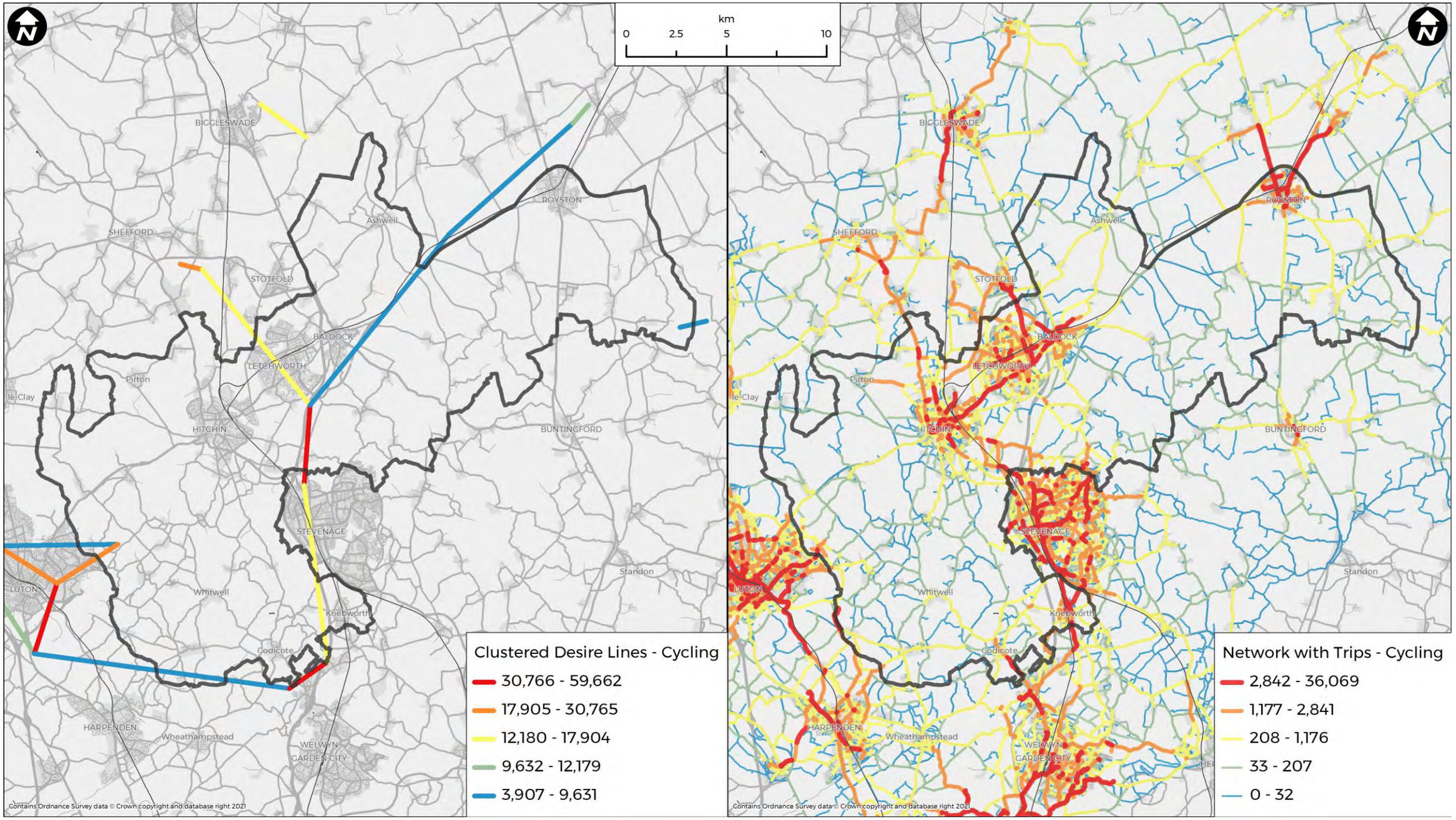
Aggregating ClosestY Destination Types



Outputs

Aggregating Destinations




km
0
2.5
5
10
BIGGLESWADE
SHEFFORD
Ashwell
ROYSTON
STOTFOLD
BALDOCK
LETCHWORTH
Pirton
HITCHIN
BUNTINGFORD
STEVENAGE
Standon
LUTON
Whitwell
Knebworth
Codicote
HARPENDEN
Wheathampstead
WELWYN
GARDEN CITY
Contains Ordnance Survey data © Crown copyright and database right 2021
Clustered Desire Lines - Cycling
30,766 - 59,662
17,905 - 30,765
12,180 - 17,904
9,632 - 12,179
3,907 - 9,631
Network with Trips - Cycling
2,842 - 36,069
1,177 - 2,841
208 - 1,176
33 - 207
0 - 32

WSP House

70 Chancery Lane

London

WC2A 1AF

TECHNICAL NOTE

Software Requirements

- ArcGIS Desktop Advanced license
- Network Analyst extension

LCWIPS Model (Summary)

- This suite of models has been developed to help complete and add value to stages 2, 3 and 4 of the DfT LCWIP six-stage process. The models allow the user to input origin data, destination data, and a network. These are then manipulated by the models to identify potential trips across the study area. The key output is a plan of the network with flows assigned to it, allowing the user to see where future demand for trips may be concentrated.
- This suite of models has several advantages over the widely-used 'Propensity to Cycle Tool' (PCT), which was also developed for LCWIPs. The PCT is based on Census 2011 data, only considers trips to school and workplaces, and does not account for developments built since 2011, or planned for the future. This suite of models allows users to input more recent population data, any type of destination data they like and a more up-to-date network layer too.
- The current version of the model suite is v4.3, and the toolbox is called *LCWIPS_Model_Suite_v4_3*. It is located within the geodatabase called *LCWIPS_Model.gdb*. The toolbox has been created inside a geodatabase to facilitate its portability across servers and local drives.
- The toolbox contains nine models (see Figure 1, below) however only the four models prefixed with "Step … " are to be run by the user. The five models prefixed with "SubModel_... " are called by the other models, where applicable, and should not be interacted with by the user at all.
- The four interactive models are run through ArcCatalog by either double-clicking the model, or right-clicking the model and selecting "Open". Both ways require the user to input the appropriate required parameters.

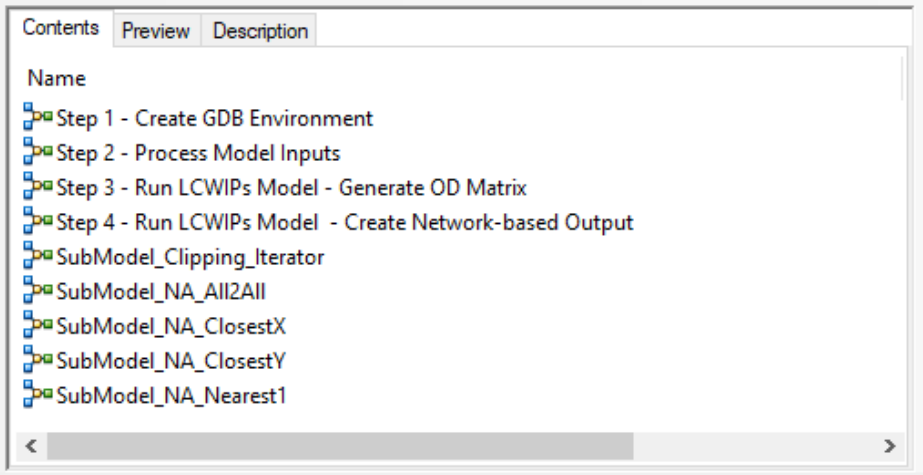


Figure 1: Contents of toolbox

Compatibility

- This suite of models has been created using *Esri ArcGIS Destop 10.5* ("Desktop"), which will allow them to be compatible with *ArcGIS Pro* ("Pro") in the future. The key incompatibility between Desktop and Pro is the *Calculate Field* tool. In Desktop, the tool is defaulted to Visual Basic (VB), however, Pro does not support VB. Python has been used for all instances of the Calculate Field tool, however a reasonable amount of reworking will still be required to remedy unforeseen incompatability issues with other tools, as and when Esri update them, and change the underlying code.

Workflow Overview

- Process the input feature classes.
- Run model: *Step 1 - Create GDB Environment* to create the geodatabases in the appropriate model run folder.
- Run model: *Step 2 - Process Model Inputs* to import the model input feature classes.
- Manually populate *In_Destination_Type_Proportions* (this is created by the second model run) with the appropriate values for Dest_Proportion and Run_Category fields (see Table 4, above).
- Run model: *Step 3 - Run LCWIPs Model - Generate OD Matrix.*
- Run model: *Step 4 - Run LCWIPs Model - Create Network-based Output.*
- QA and map the output feature class called *Out_Network_with_Utilisation_Data* that will be located within *LCWIPs_Model_Run_GDB.gdb.*

Network Dataset

- The network dataset used for the model has been pre-built and covers Hertfordshire plus 8km buffer.
- The network dataset is derived from OS MasterMap data sourced from Emapsite on 4th May 2021. The network contains the full OS MasterMap Highways Network RAMI and OS MasterMap Highways Network Paths, which have been correctly merged with networking junctions. As the analysis concerns walking and cycling, one-way restrictions have not been included (in the case of cycling, the outputs of the model may build a case for introducing a contraflow facility on an existing one-way street, for example).
- Both the network dataset and network feature class are located within a feature dataset called *Network__RAMI_Paths* and are located in the geodatabase called *Hertfordshire_Network__OS_Roads_Paths.gdb.*
- The network impedance field used to build the network dataset is simply the default length value (where the units are metres), and the models are hardcoded to use this.
- The model will require the user to input two aspects of the road network:
    i. The network dataset, called *Network__RAMI_Paths_ND*. This is used by the Network Analyst tools within the models to calculate least-cost paths from all origins to the required destinations (as specified in Table 5).
    ii. The network feature class, called *Network__RAMI_Paths*. This is the line feature class associated with the network dataset.

PROCESSING THE INPUT FEATURE CLASSES

- The inputs of the models, which are manually pre-processed by the user prior to being consumed by the model, require specific fields to be present. Additional fields will not affect the model. The prescribed data structure of the data inputs is detailed in the following sections.
- Emphasis should be placed on meticulous data preparation.

Origin Points

- Origins must be a point feature class, projected to British National Grid.
- The prescribed data structure is shown within Table 1, below.

Table 1: Data structure for origins

FIELD NAME	TYPE	DESCRIPTION
O_ID	Text, 50	A unique ID, containing alpha-numeric characters as well as underscores (“_”) or dashes (“-“).Spaces should not be used.
Weight	Double	A numeric value representing the population at the origin. This can be the population at a postcode or total number of people forecast on a new development. The value must not be blank, null or zero.

Destination Points

- Destinations must be a point feature class, projected to British National Grid.
- The prescribed data structure is shown within Table 2, below.

Table 2: Data structure for destinations

FIELD NAME	TYPE	DESCRIPTION
Dest_ID	Text, 100	A unique ID, containing alpha-numeric characters as well as underscores ("_") or dashes ("-"). Ideally, this will acknowledge what type of destination it is, e.g. "PrimSchool_1". Spaces should not be used.
Dest_Type	Text, 50	A value that describes succinctly the type of destination. Examples include: GP, Hospital, SchoolPrimary, SchoolSecondary, BusStop, RailStation. The string must only contain alpha-numeric characters as well as underscores ("_") or dashes ("-"). Spaces should not be used.
Weight	Double	A numeric value representing the attractiveness of the destination, in comparison to the other destinations of the same destination type. This can be a factual value - such as number of jobs, number of buses/trains per hour, or floor area, or subjective value - such as a score between 1-10, where 10 is the most attractive. A value of one is assigned to all destinations within a destination type, where an attractiveness factor is not relevant. The value must not be blank, null or zero. For example, in the North Herts LCWIP, the attractiveness of an employment site was calculated from its floor area. It was assumed that 50% of the floor area was usable and that there was one job per $30m^2$.

Hex Cells

- A polygon feature class called *HexCells__Herts_plus_8km* has been supplied and is located in the geodatabase called *Hertfordshire_Datasets.gdb*.
- The hex cell feature class is projected to British National Grid and covers Hertfordshire plus 8km buffer. The size of each hex cell is 500,000m^2 and a diameter (east to west vectors) of 877m.
- The purpose of the hex cell feature class is to create pseudo neighbourhoods to aggregate the origin and destination datasets and reduce the number results being generated, which would otherwise cause the model to fail due to the processing computer running out of memory.
- Each origin and destination point is assigned to a hex cell ("neighbourhood") using Network Analyst which calculates the least cost path between the origin and the closest hex cell centroid across the walk/road network. This means that because of the layout of the relevant local road network, an origin point can be assigned to a different hex cell to the one that it is contained within.
- A subset of the *HexCells__Herts_plus_8km* feature class should be created that covers the extent of the required project area. This subset, and not the full dataset, should be the input to the model.

Clipping Cells

- A polygon feature class called *ClippingCells__Herts_plus_8km* has been supplied and is located in the geodatabase called *Hertfordshire_Datasets.gdb*.
- The clipping cell feature class is projected to British National Grid, and covers Hertfordshire plus 8km buffer. The size of each square clipping cell is 100,000,000m^2 with a width of 10,000m.
- The purpose of the clipping cell feature class is to physically split and then batch process certain elements of the analysis in order to reduce the size of datasets being processed, which would otherwise cause the model to fail due to the processing computer running out of memory.
- A subset of the *HexCells__Herts_plus_8km* feature class should be created that covers the extent of the required project area. This subset, and not the full dataset, should be the input to the model.

RUN MODEL: STEP 1 - CREATE GDB ENVIRONMENT

- This model creates two creates two file geodatabases in the folder that the user specifies (the only parameter).
- These two geodatabases are used by the subsequent models and are called *LCWIPs_Model_Run_GDB.gdb* and *Scratch_GDB.gdb*. Once all the models have been run, all the important feature classes and tables will be within the former.
- The user selected folder should be unique to this scenario test.
- The folder name must only contain alpha-numeric characters and underscores ("_"). Spaces and dashes ("-") should not be used.

RUN MODEL: STEP 2 - PROCESS MODEL INPUTS

- This model has six parameters, as detailed in Table 3, below. The abbreviation "FC" refers to the parameter being a feature class.

Table 3: Model Parameters

PARAMETER	DESCRIPTION
Select Project Folder	The user specifies the correct folder for this scenario test (the same as the previous model).
Select Network Dataset	The user specifies the *Network__RAMI_Paths_ND* network dataset.
Select Origin Points (FC)	The user specifies the correctly processed origin points feature class.
Select Destination Points (FC)	The user specifies the correctly processed destination points feature class.
Select HexCells (FC)	The user specifies the correct subset of the supplied Hex Cells feature class.
Select Clipping Cells (FC)	The user specifies the correct subset of the supplied Clipping Cells feature class.

- This model will create copies of all the input feature classes and apply numerous geoprocessing steps to prepare them for subsequent models. They are saved within *LCWIPs_Model_Run_GDB.gdb* and can be useful for auditing purposes in the future.
- This model creates a new table called *In_Destination_Type_Proportions* within *LCWIPs_Model_Run_GDB.gdb*, that requires the user to manually input certain additional values before the next model is run. The table lists each unique Destination Type (as per the Dest_Type field of the input Destination points feature class), and the user must manually populate the two fields, as detailed in Table 4, below, with specific values determined by subject matter experts for each Destination Type.

Table 4: Destination type additional data

Required Information	Description
Destination Type Proportion	Each destination type is assigned a numeric value, where the sum of this value for all destination types is 1. This numeric value therefore represents the proportion of trips produced by an origin that go to the respective destination type.
Run Category	Each destination type is assigned with one of four types of run category. These are: - All2All - Nearest1 - ClosestX - ClosestY N.B. These four string values must match exactly the text shown above. Additional details of these are given in Table 5.

Table 5: Run categories

Run Category	Description	Example Destination Type
All2All	This run category will generate data between each origin and every one of the destination points within the corresponding destination type. Serious consideration should be given before using this run category as it can generate millions of data rows which will cause the models to fail (run out of memory).	Town centres
Nearest1	This run category will generate data between each origin and the single nearest destination point within the corresponding destination type.	Train stations, secondary schools
ClosestX	When running the model called *Step 3 - Run LCWIPs Model - Generate OD Matrix*, the user assigns a value for X, and this run category will generate data between each origin and the X closest destination points within the corresponding destination type.	Primary schools, bus stops

Run Category	Description	Example Destination Type
ClosestY	When running the model called *Step 3 - Run LCWIPs Model - Generate OD Matrix*, the user assigns a value for Y, and this run category will generate data between each origin and the Y closest destination points within the corresponding destination type.	Business parks, retail centres

RUN MODEL: STEP 3 - RUN LCWIPS MODEL - GENERATE OD MATRIX

- This model has five parameters, as detailed in Table 6, below.
- Although the model says some parameters are options, please assume that they are not optional. Insert a value of 0 (zero) if ClosetX or ClosestY are not required. A value must be inserted for *Trip Cut off Distance (m)* – failure to do so will generate enormous amounts of data that will cause the preceding model to fail (run out of memory).

Table 6: Model Parameters

Parameter	Description
Select Project Folder	The user specifies the correct folder for this scenario test (the same as the previous model).
Select Network Dataset	The user specifies the *Network__RAMI_Paths_ND* network dataset.
Number of Destination for ClosestX	The user specifies the value of X (see Table 5) for this Run Category.
Number of Destination for ClosestY	The user specifies the value of Y (see Table 5) for this Run Category.
Trip Cut off Distance (m)	The user specifies the maximum network distance (as opposed to straight line 'as crow flies' distance) that is allowed for trips between an origin and destination. The units are in metres. For example, in the North Herts LCWIP, the *Trip Cut off Distance* was 8000 for cycling and 2000 for walking.

- This model uses Network Analyst to generate an Origin-Destination Matrix (OD Matrix) table that is consumed by the preceding model. The OD Matrix comprises network trips between all origins and all destinations, conforming to the specification of Destination Types and the associated Run Category (see Table 2, Table 4 and Table 6).
- This model uses iterators to iterate between the individual Destination Types within each Run Category and merges all the individual OD Matrices together.
- The processing within this model principally utilises Network Analyst, is stable and should run until completion.

RUN MODEL: STEP 4 - RUN LCWIPS MODEL - CREATE NETWORK-BASED OUTPUT

- This model has two parameters, as detailed in Table 7 below.

Table 7: Model Parameters

PARAMETER	DESCRIPTION
Select Project Folder	The user specifies the correct folder for this scenario test (the same as the previous models).
Select Network Dataset	The user specifies the *Network__RAMI_Paths_ND* network dataset.

- This model uses Network Analyst to post-process the OD Matrix table (generated in the preceding model) and generate a line feature class that follows the underlying network dataset. A series of computationally and memory intensive geoprocessing tools are then used to aggregate the line feature class version of the OD Matrix.
- As detailed in Table 5, unnecessary use of the *All2All* Run Category, or unrealistic (large) values for *ClosestX* and *ClosestY* will generate enormous amounts of data that will cause the model to fail.
- Within the model, an iterator is used to split and batch-process the line feature class using the *Clipping Cells* feature class that was processed by the *Step 2 - Process Model Inputs* model. This process aims to mitigate the amount of data being processed at any one time; however, as this increases the number of processes being run, there is a commensurate impact on the overall model run time.

Output Feature Class

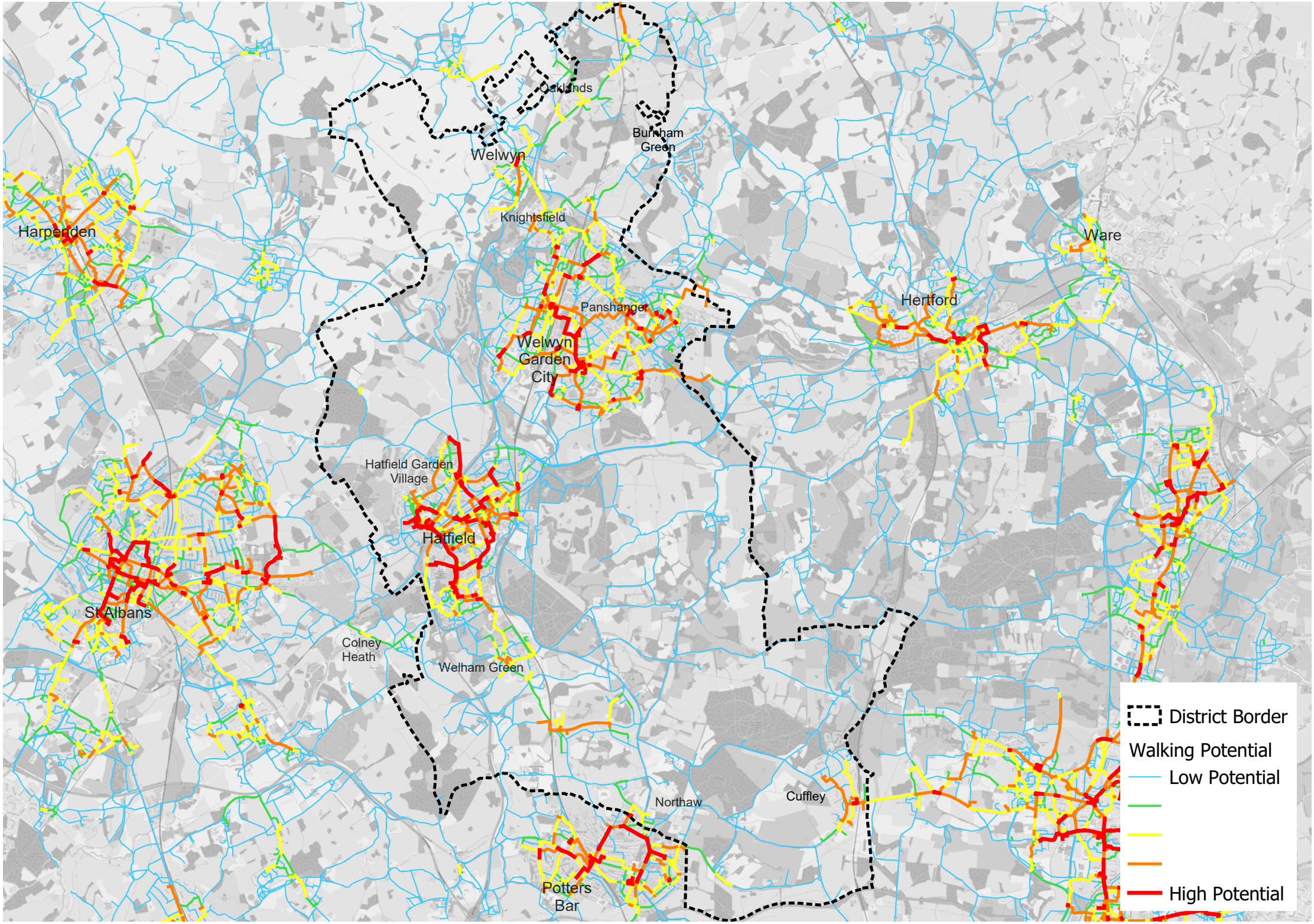
- The output line feature class generated by the *Step 4 - Run LCWIPs Model - Create Network-based Output* model is called *Out_Network_with_Utilisation_Data* and is located in the geodatabase called *LCWIPs_Model_Run_GDB.gdb.*
- The output feature class is projected to British National Grid.
- This feature class has three fields that can be mapped, which are detailed in Table 8, below.

Table 8: Mappable fields

FIELD NAME	DESCRIPTION
Trips	The total number of trips calculated and aggregated to the unique segment of road or footpath.
Trips_Reclassed	The total number of trips normalised so that the value is between 0 and 1, where 0 = the lowest value in the data range and 1 = the highest value in the data range.
Trips_Ranked	Each unique segment is ranked in order of the number of trips the segments has. The segment with a rank of 1 has the most trips using it.

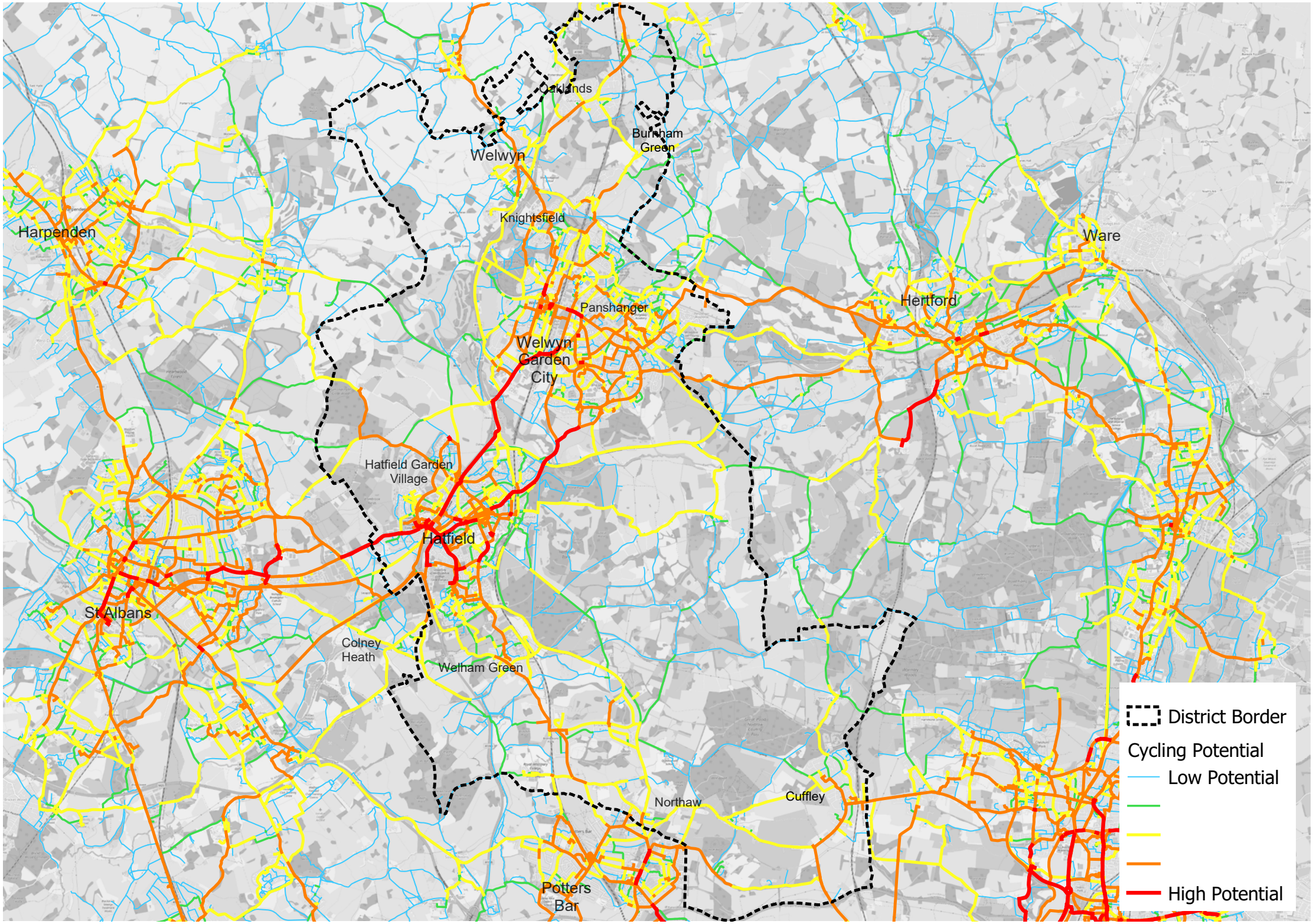
Appendix D

LCWIP GIS MODEL: CYCLING OUTPUTS


Oaklands
Burnham Green
Welwyn
Knightsfield
Harpenden
Ware
Panshanger
Hertford
Welwyn Garden City
Hatfield Garden Village
Hatfield
St Albans
Colney Heath
Welham Green
Northaw
Cuffley
Potters Bar
District Border
Walking Potential
Low Potential
High Potential

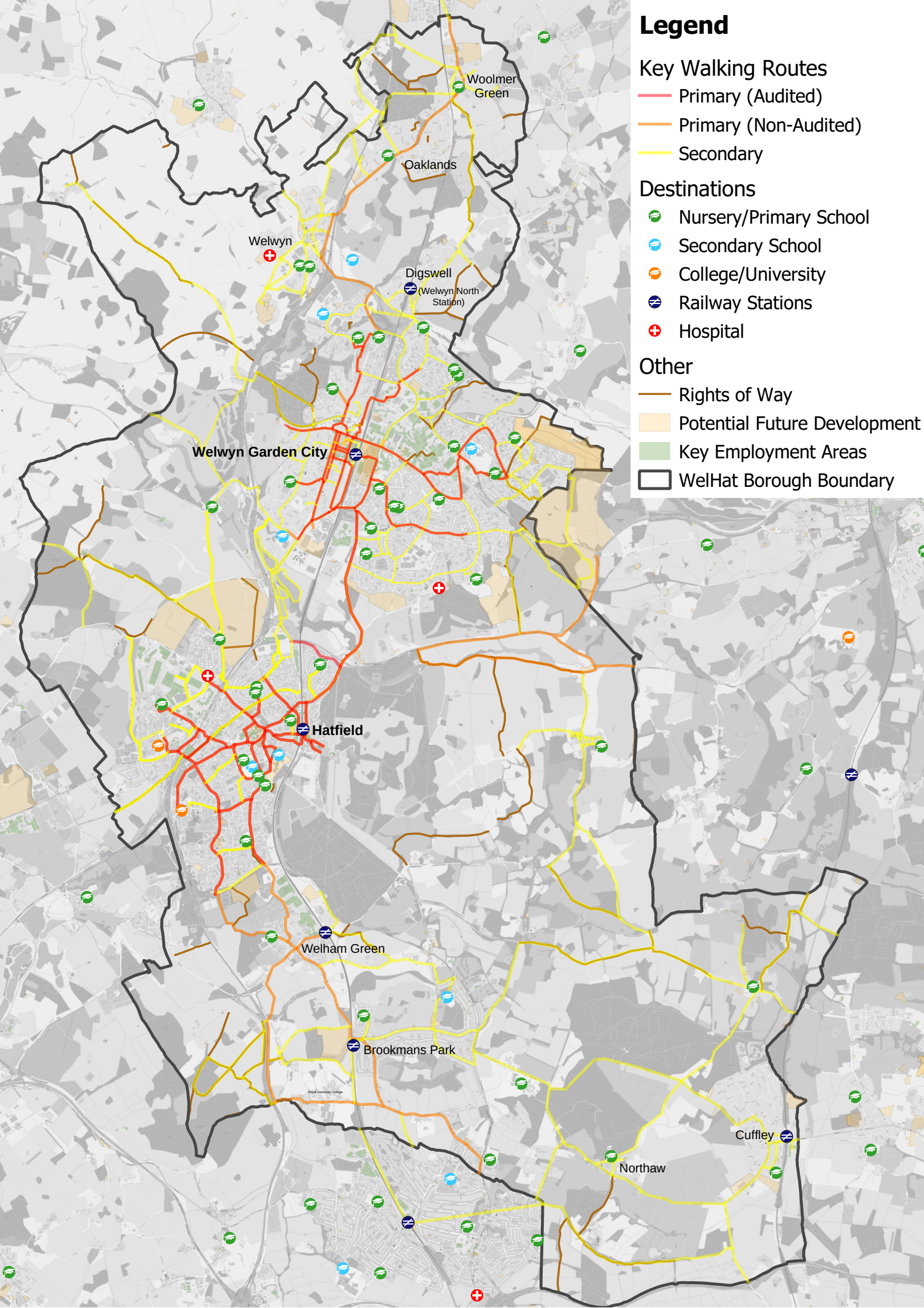
Appendix E

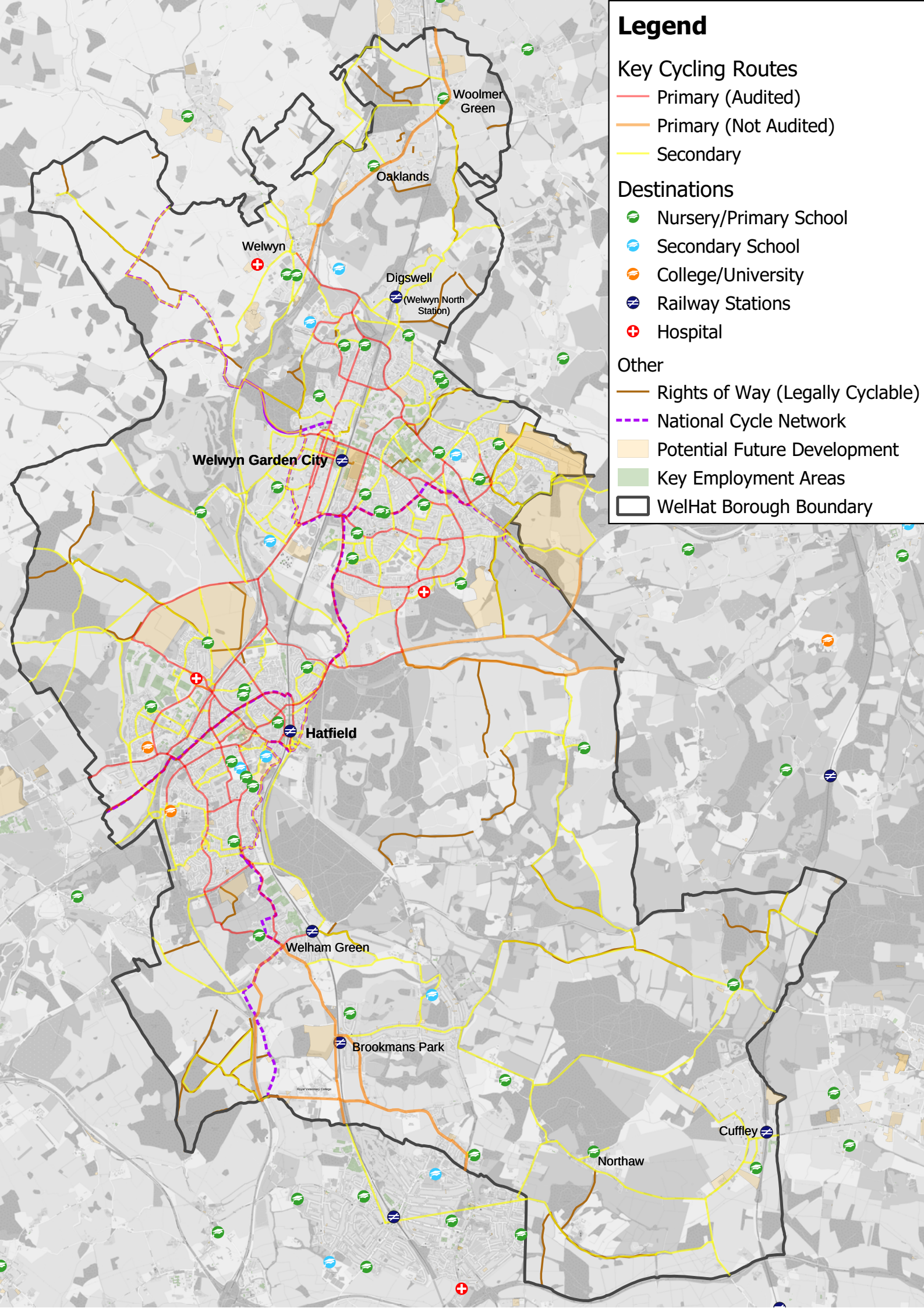
LCWIP GIS MODEL: WALKING OUTPUTS


Oaklands
Burnham Green
Welwyn
Knightsfield
Harpenden
Ware
Panshanger
Hertford
Welwyn Garden City
Hatfield Garden Village
Hatfield
St Albans
Colney Heath
Welham Green
Northaw
Cuffley
Potters Bar
District Border
Cycling Potential
Low Potential
High Potential

Appendix F

NETWORK PLANS FOR WALKING AND CYCLING

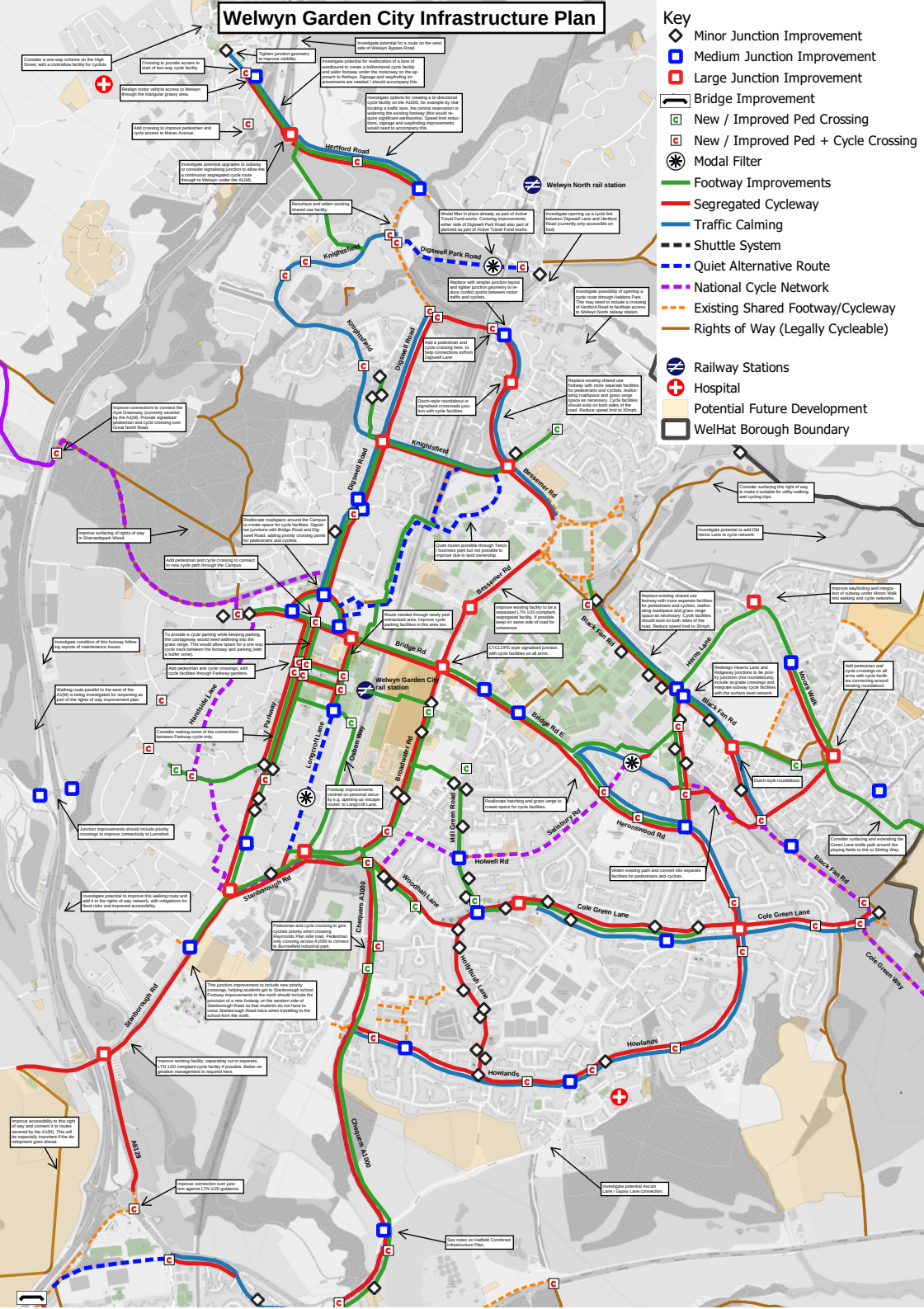

Legend
Key Walking Routes
Primary (Audited)
Primary (Non-Audited)
Secondary
Destinations
Nursery/Primary School
Secondary School
College/University
Railway Stations
Hospital
Other
Rights of Way
Potential Future Development
Key Employment Areas
WelHat Borough Boundary
Woolmer Green
Oaklands
Welwyn
Digswell
(Welwyn North Station)
Welwyn Garden City
Hatfield
Welham Green
Brookmans Park
Cuffley
Northaw

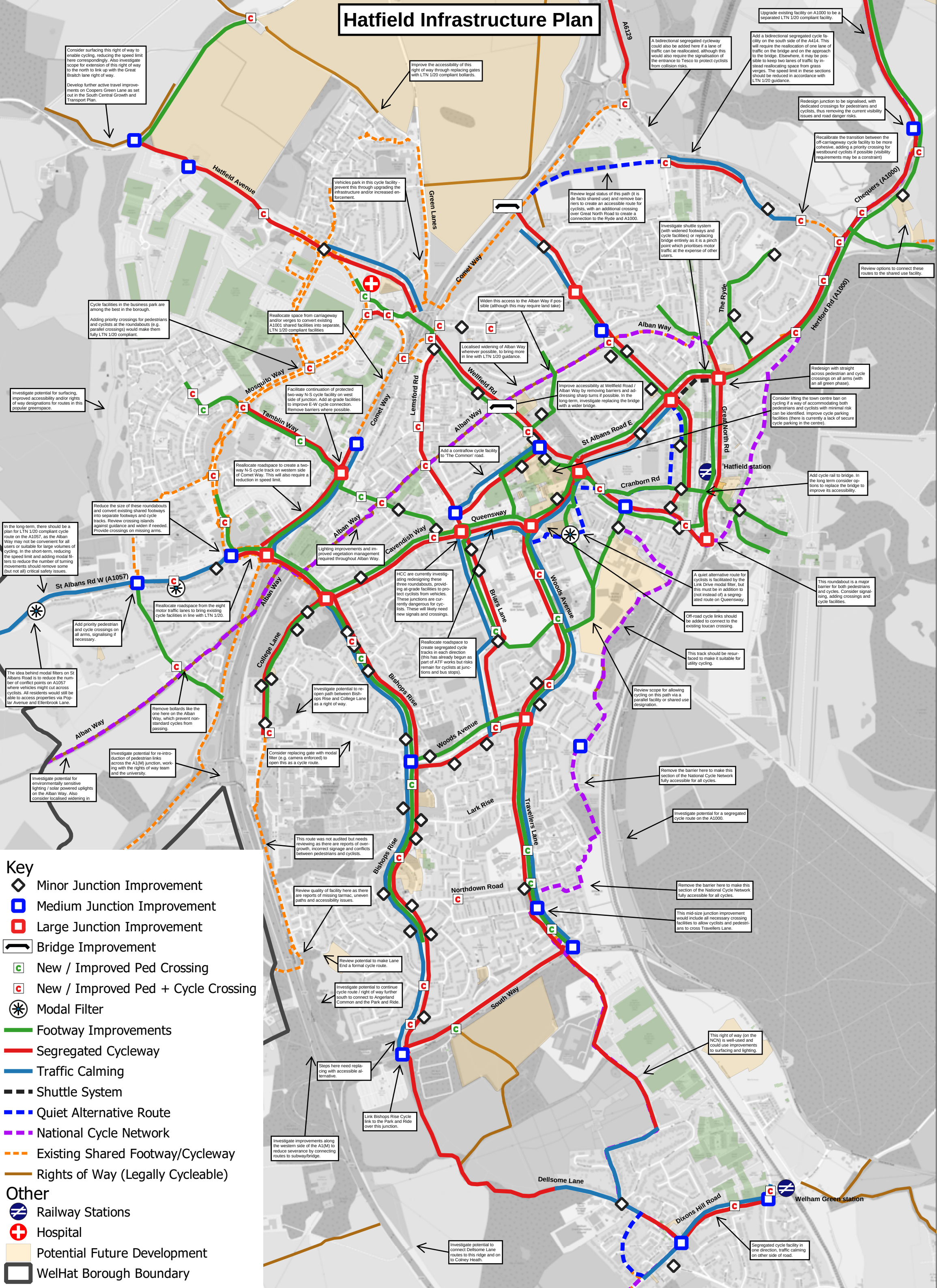

Legend
Key Cycling Routes
Primary (Audited)
Primary (Not Audited)
Secondary
Destinations
Nursery/Primary School
Secondary School
College/University
Railway Stations
Hospital
Other
Rights of Way (Legally Cyclable)
National Cycle Network
Potential Future Development
Key Employment Areas
WelHat Borough Boundary
Woolmer Green
Oaklands
Welwyn
Digswell
(Welwyn North Station)
Welwyn Garden City
Hatfield
Welham Green
Brookmans Park
Cuffley
Northaw

Appendix G

INFRASTRUCTURE PLANS FOR WELWYN GARDEN CITY AND HATFIELD

PUBLIC


Welwyn Garden City Infrastructure Plan
Key
Minor Junction Improvement
Medium Junction Improvement
Large Junction Improvement
Bridge Improvement
New / Improved Ped Crossing
New / Improved Ped + Cycle Crossing
Modal Filter
Footway Improvements
Segregated Cycleway
Traffic Calming
Shuttle System
Quiet Alternative Route
National Cycle Network
Existing Shared Footway/Cycleway
Rights of Way (Legally Cycleable)
Railway Stations
Hospital
Potential Future Development
WelHat Borough Boundary
Welwyn North rail station
Welwyn Garden City rail station
Hertford Road
Digswell Park Road
Knightsfield
Digswell Road
Bessemer Rd
Bridge Rd
Bridge Rd E
Black Fan Rd
Herns Lane
Monks Walk
Broadwater Rd
Mill Green Road
Salisbury Rd
Heronswood Rd
Holwell Rd
Woodhall Lane
Cole Green Lane
Cole Green Way
Howlands
Hollybush Lane
Chequers A1000
Stanborough Rd
Longcroft Lane
Oaklands Way
Parkwell
Handside Lane
A6129
Consider a one-way scheme on the High Street, with a contraflow facility for cyclists.
Crossing to provide access to start of two-way cycle facility.
Realign motor vehicle access to Welwyn through the triangular grassy area.
Tighten junction geometry to improve visibility.
Investigate potential for a route on the west side of Welwyn Bypass Road.
Investigate potential for reallocation of a lane of westbound to create a bidirectional cycle facility and wider footway under the motorway on the approach to Welwyn. Signage and wayfinding improvements are needed / should accompany this.
Investigate options for crossing a bi-directional cycle facility on the A1000, for example by realocating a traffic lane, the central reservation or widening the existing footway (this would require significant earthworks). Speed limit reductions, signage and wayfinding improvements would need to accompany this.
Add crossing to improve pedestrian and cycle access to Mimram Avenue.
Investigate potential upgrades to subway or consider signalising junction to allow the a continuous segregated cycle route through to Welwyn under the A1(M).
Resurface and widen existing shared use facility.
Modal filter in place already as part of Active Travel Fund works. Crossing improvements either side of Digswell Park Road also part of planned as part of Active Travel Fund works.
Investigate opening up a cycle link between Digswell Lane and Hertford Road (currently only accessible on foot).
Replace with simpler junction layout and tighter junction geometry to reduce conflict points between motor traffic and cyclists.
Investigate possibility of opening a cycle route through Haldens Park. This may need to include a crossing of Hertford Road to facilitate access to Welwyn North railway station.
Add a pedestrian and cycle crossing here, to help connections to/from Digswell Lane
Dutch-style roundabout or signalised crossroads junction with cycle facilities.
Replace existing shared use footway with more separate facilities for pedestrians and cyclists, realignising roadspace and grass verge space as necessary. Cycle facilities should exist on both sides of the road. Reduce speed limit to 30mph.
Improve connections to connect the Kyot Greenway (currently severed by the A1(M). Provide signalised pedestrian and cycle crossing over Great North Road.
Improve surfacing of rights of way in Sherrardspark Wood.
Add pedestrian and cycle crossing to connect to new cycle path through the Campus
Roadspace roadspace around the Campus to create space for cycle facilities. Signalise junctions with Bridge Road and Digswell Road, adding priority crossing points for pedestrians and cyclists.
Quiet routes possible through Tesco / business park but not possible to improve due to land ownership.
Improve existing facility to be a segregated LTN 1/20 compliant cycle facility. If possible, this should keep on same side of road for coherence.
Route needed through newly pedestrianised area. Improve cycle parking facilities in this area too.
To provide a cycle parking while keeping parking the carriageway would need widening into the grass verge. This would allow space for a one way cycle track between the footway and parking (with a buffer zone).
Add pedestrian and cycle crossings, with cycle facilities through Parkway gardens.
DYCLOPS style signalised junction with cycle facilities on all arms.
Investigate condition of this footway following reports of maintenance issues.
Walking route parallel to the west of the A1(M) is being investigated for reopening as part of the rights of way improvement plan.
Consider making some of the connections between Parkway cycle-only.
Footway improvements centred on personal security e.g. opening up 'escape routes' to Longcroft Lane.
Reallocate hatching and grass verge to create space for cycle facilities.
Junction improvements should include priority crossings to improve connectivity to Lemsford.
Investigate potential to improve this walking route and add it to the rights of way network, with mitigations for road risks and improved accessibility.
Pedestrian and cycle crossing to give cyclists priority when crossing Raymonds Plain side road. Pedestrian only crossing across A1000 to connect to Burrowfield industrial park.
This junction improvement to include new priority crossings, helping students get to Stanborough school. Footway improvements to the north should include the provision of a new footway on the western side of Stanborough Road so that students do not have to cross Stanborough Road twice when travelling to the school from the north.
Improve existing facility, separating out to separate, LTN 1/20 compliant cycle facility if possible. Better vegetation management is required here.
Improve accessibility to this right of way and connect to routes severed by the A1(M). This will be especially important if the de-whipsnade gains ahead.
Improve connection over junction against LTN 1/20 guidance.
See notes on Hatfield Combined Infrastructure Plan.
Investigate potential Ascots Lane / Gypsy Lane connection.
Consider surfacing this right of way to make it suitable for utility walking and cycling trips.
Investigate potential to add Old Herns Lane to cycle network.
Improve wayfinding and integration of subway under Moors Walk into walking and cycle networks.
Replace existing shared use footway with more segregated facilities for pedestrians and cyclists, realignising roadspace and grass verge space as necessary. Cycle facilities should exist on both sides of the road. Reduce speed limit to 30mph.
Redesign Herns Lane and Ridgeway junctions to be priority junctions (not roundabouts), include at-grade crossings and integrate subway cycle facilities with the surface level network.
Add pedestrian and cycle crossings on all arms of junction, with links connecting around existing roundabout.
Dutch-style roundabout
Consider surfacing and extending the Green Lane bridle path around the playing fields to link to Stirling Way.
Widen existing path and convert into separate facilities for pedestrians and cyclists.


Hatfield Infrastructure Plan
Consider surfacing this right of way to enable cycling, reducing the speed limit here correspondingly. Also investigate scope for extension of this right of way to the north to link up with the Great Braitch lane right of way.
Develop further active travel improvements on Coopers Green Lane as set out in the South Central Growth and Transport Plan.
Improve the accessibility of this right of way through replacing gates with LTN 1/20 compliant bollards.
A bidirectional segregated cycleway could also be added here if a lane of traffic can be reallocated, although this would also require the signalisation of the entrance to Tesco to protect cyclists from collision risks.
Upgrade existing facility on A1000 to be a separated LTN 1/20 compliant facility.
Add a bidirectional segregated cycle facility on the south side of the A414. This will require the reallocation of one lane of traffic on the bridge and on the approach to the bridge. Elsewhere, it may be possible to keep two lanes of traffic by instead reallocating space from grass verges. The speed limit in these sections should be reduced in accordance with LTN 1/20 guidance.
Redesign junction to be signalised, with dedicated crossings for pedestrians and cyclists, thus removing the current visibility issues and road danger risks.
Recalibrate the transition between the off-carriageway cycle facility to be more cohesive, adding a priority crossing for westbound cyclists if possible (visibility requirements may be a constraint)
Vehicles park in this cycle facility - prevent this through upgrading the infrastructure and/or increased enforcement.
Review legal status of this path (it is de facto shared use) and remove barriers to create an accessible route for cyclists, with an additional crossing over Great North Road to create a connection to the Ryde and A1000.
Investigate shuttle system (with widened footways and cycle facilities) or replacing bridge entirely as it is a pinch point which prioritises motor traffic at the expense of other users.
Review options to connect these routes to the shared use facility.
Cycle facilities in the business park are among the best in the borough.
Adding priority crossings for pedestrians and cyclists at the roundabouts (e.g. parallel crossings) would make them fully LTN 1/20 compliant.
Reallocate space from carriageway and/or verges to convert existing A1001 shared facilities into separate, LTN 1/20 compliant facilities
Widen this access to the Alban Way if possible (although this may require land take)
Localised widening of Alban Way wherever possible, to bring more in line with LTN 1/20 guidance.
Improve accessibility at Wellfield Road / Alban Way by removing barriers and addressing sharp turns if possible. In the long-term, investigate replacing the bridge with a wider bridge.
Redesign with straight across pedestrian and cycle crossings on all arms (with an all green phase).
Consider lifting the town centre ban on cycling if a way of accommodating both pedestrians and cyclists with minimal risk can be identified. Improve cycle parking facilities (there is currently a lack of secure cycle parking in the centre).
Investigate potential for surfacing, improved accessibility and/or rights of way designations for routes in this popular greenspace.
Facilitate continuation of protected two-way N-S cycle facility on west side of junction. Add at-grade facilities to improve E-W cycle connection. Remove barriers where possible.
Add a contraflow cycle facility to 'The Common' road.
Reallocate roadspace to create a two-way N-S cycle track on western side of Comet Way. This will also require a reduction in speed limit.
Add cycle rail to bridge. In the long term consider options to replace the bridge to improve its accessibility.
Reduce the size of these roundabouts and convert existing shared footways into separate footways and cycle tracks. Review crossing islands against guidance and widen if needed. Provide crossings on missing arms.
In the long-term, there should be a plan for LTN 1/20 compliant cycle route on the A1057, as the Alban Way may not be convenient for all users or suitable for large volumes of cycling. In the short-term, reducing the speed limit and the number of turning movements should remove some (but not all) critical safety issues.
Lighting improvements and improved vegetation management required throughout Alban Way.
HCC are currently investigating redesigning these three roundabouts, providing at-grade facilities to protect cyclists from vehicles. These junctions are currently dangerous for cyclists. There will likely need new signals and crossings.
A quiet alternative route for cyclists is facilitated by the Link Drive modal filter, but this must be in addition to (not instead of) a segregated route on Queensway.
This roundabout is a major barrier for both pedestrians and cycles. Consider signalising, adding crossings and cycle facilities.
Reallocate roadspace from the eight motor traffic lanes to bring existing cycle facilities in line with LTN 1/20.
Add pedestrian and cycle crossings on all arms, signalising if necessary.
Off-road cycle links should be added to connect to the existing toucan crossing.
Reallocate roadspace to create segregated cycle tracks in each direction (this has already begun as part of ATF works but risks remain for cyclists at junctions and bus stops).
This track should be resurfaced to make it suitable for utility cycling.
The idea behind modal filters on St Albans Road is to reduce the number of conflict points on A1057 where vehicles might cut across cyclists. All residents would still be able to access properties via Popular Avenue and Ellenbrook Lane.
Investigate potential to re-open path between Bishops Rise and College Lane as a right of way.
Review scope for allowing cycling on this path via a parallel facility or shared use designation.
Remove bollards like the one here on the Alban Way, which prevent non-standard cycles from passing.
Investigate potential for re-introduction of pedestrian links across the A1(M) junction, working with the rights of way team and the university.
Consider replacing gate with modal filter (e.g. camera enforced) to open this as a cycle route.
Investigate potential for environmentally sensitive lighting / solar powered uplights on the Alban Way. Also consider localised widening in
Remove the barrier here to make this section of the National Cycle Network fully accessible for all cycles.
Investigate potential for a segregated cycle route on the A1000.
This route was not audited but needs reviewing as there are reports of overgrowth, incorrect signage and conflicts between pedestrians and cyclists.
Review quality of facility here as there are reports of missing tarmac, uneven paths and accessibility issues.
Remove the barrier here to make this section of the National Cycle Network fully accessible for all cycles.
This mid-size junction improvement would include all necessary crossing facilities to allow cyclists and pedestrians to cross Travellers Lane.
Review potential to make Lane End a formal cycle route.
Investigate potential to continue cycle route / right of way further south to connect to Angerland Common and the Park and Ride.
This right of way (on the NCN) is well-used and could use improvements to surfacing and lighting.
Steps here need replacing with accessible alternative.
Link Bishops Rise Cycle link to the Park and Ride over this junction.
Investigate improvements along the western side of the A1(M) to reduce severance by connecting routes to subway/bridge.
Investigate potential to connect Dellsome Lane routes to this ridge and on to Colney Heath.
Segregated cycle facility in one direction, traffic calming on other side of road.
A6129
Hatfield Avenue
Green Lanes
Comet Way
Mosquito Way
Tamblin Way
Lemsford Rd
Wellfield Rd
Alban Way
The Ryde
Chequers (A1000)
Hertford Rd (A1000)
St Albans Road E
Great North Rd
Hatfield station
Cranborn Rd
Queensway
Cavendish Way
St Albans Rd W (A1057)
College Lane
Bishops Rise
Briars Lane
Woods Avenue
Lark Rise
Travellers Lane
Northdown Road
South Way
Dellsome Lane
Dixons Hill Road
Welham Green station
Key
Minor Junction Improvement
Medium Junction Improvement
Large Junction Improvement
Bridge Improvement
New / Improved Ped Crossing
New / Improved Ped + Cycle Crossing
Modal Filter
Footway Improvements
Segregated Cycleway
Traffic Calming
Shuttle System
Quiet Alternative Route
National Cycle Network
Existing Shared Footway/Cycleway
Rights of Way (Legally Cycleable)
Other
Railway Stations
Hospital
Potential Future Development
WelHat Borough Boundary

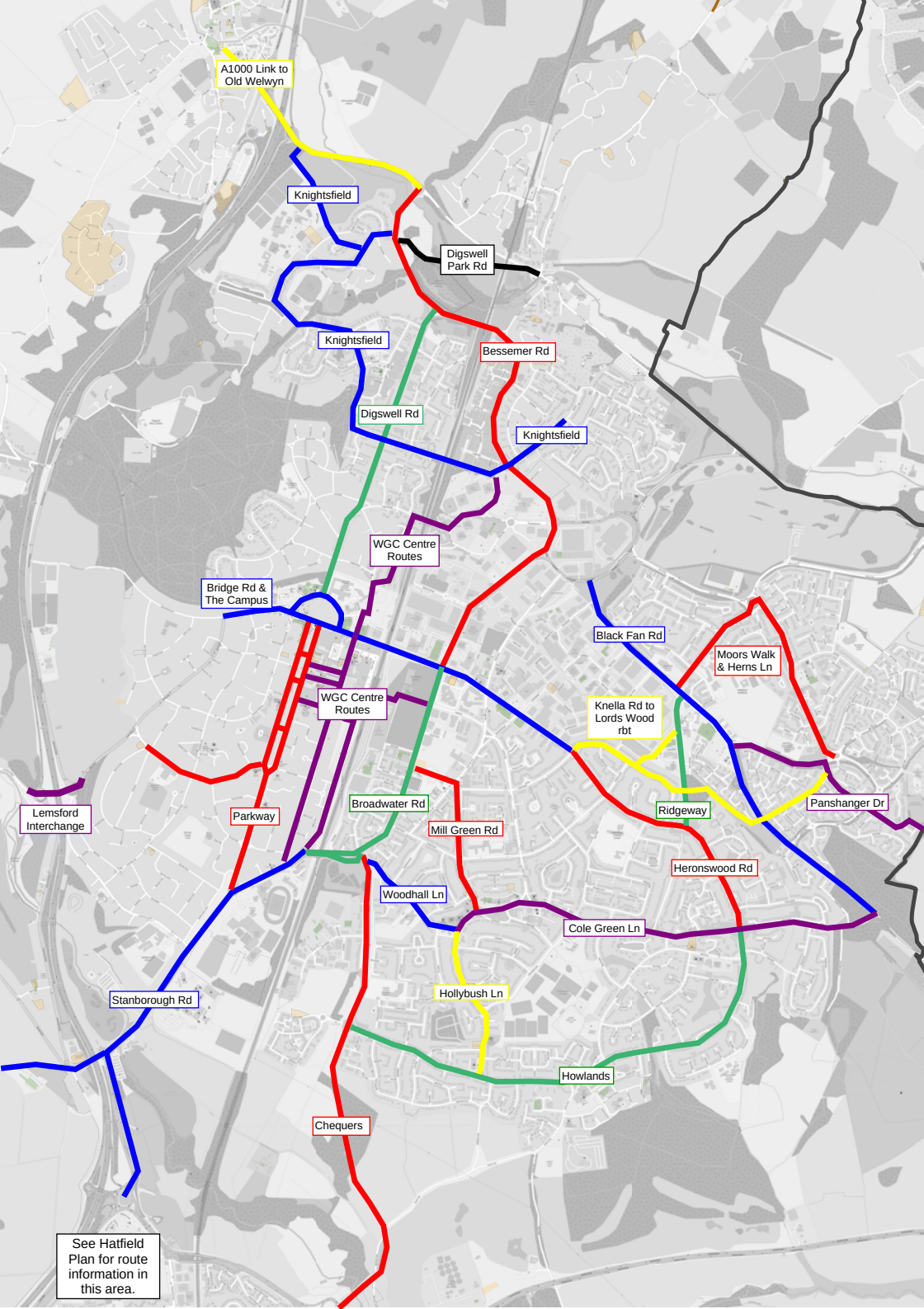
Appendix H

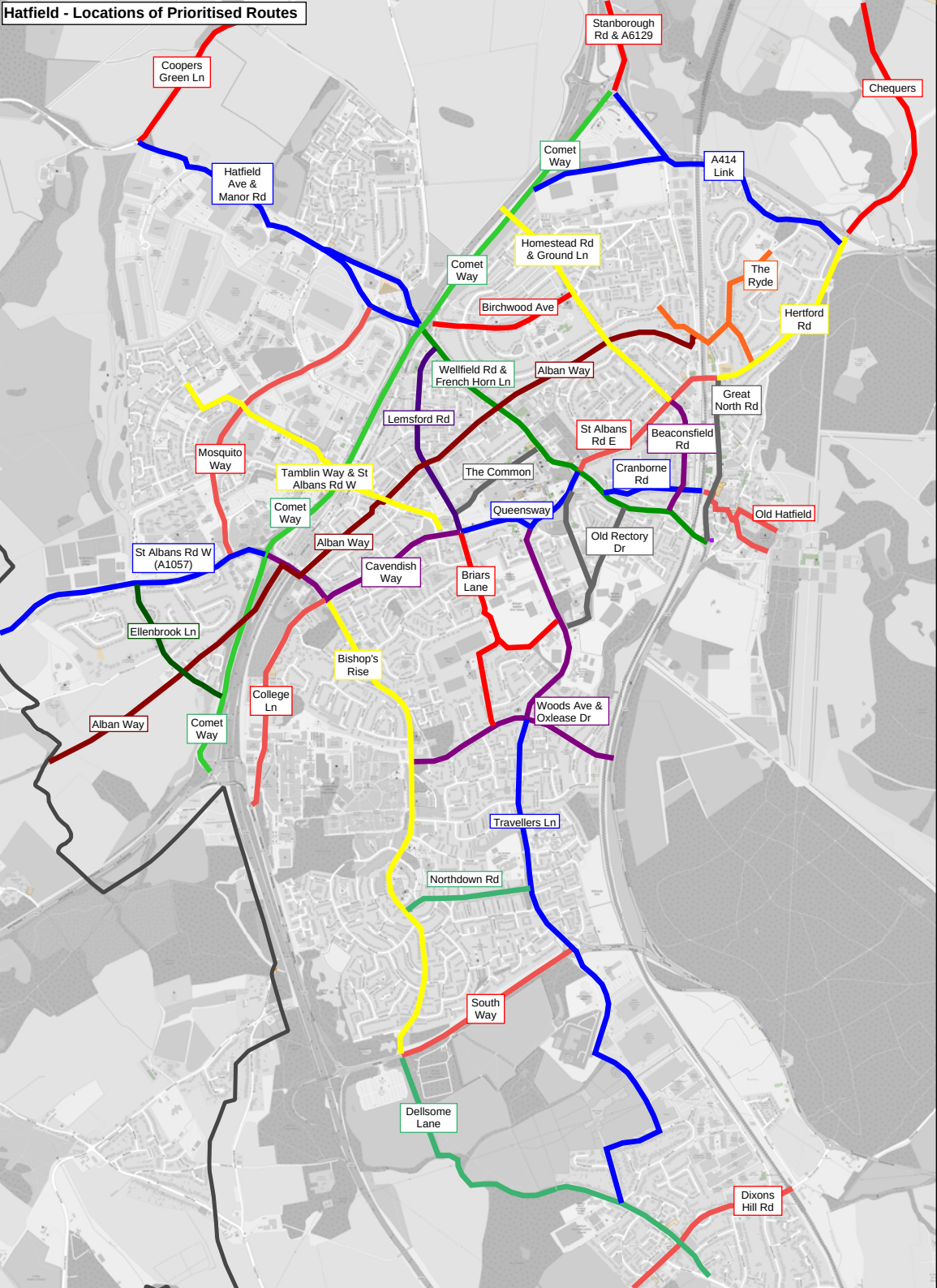
PRIORITISED COSTED LIST OF INFRASTRUCTURE IMPROVEMENTS

				Desired Outcomes					Technical Deliverability			Total	Ranked Order	
			Minimum Possible Score	0	-1	-1	0	0	-1	-2	-1	-6		
			Maximum Possible Score	2	3	1	2	2	3	1	1	15		
Route / Area	**Location**	**Audited Route?**	**Total Cost**	**Increase in walking & cycling trips based on GIS model**	**Infrastructure impact on active travel**	**Strategic Fit**	**Support for new housing**	**Access to jobs**	**LTN 1/20 compliance**	**Technical feasibility**	**Dependency**	**Total Score**	**Audited Routes Only**	**All Routes**
Coopers Green Lane	Hatfield	No	£715,000	2	2	1	2	2	2	0	0	**11**	-	1
Cranborne Road	Hatfield	Yes	£185,000	2	1	1	2	2	1	1	1	**11**	**1**	2
Knella Road to Lords Wood rbt	Welwyn Garden City	Yes	£2,955,350	2	2	1	1	2	2	0	1	**10**	**2**	3
Chequers	Welwyn Garden City and Hatfield	Yes	£3,870,000	2	2	1	2	1	2	0	0	**10**	**3**	4
Stanborough Road	Welwyn Garden City	Yes	£7,521,800	2	2	1	2	2	2	-1	0	**10**	**4**	5
Wellfield Road & French Horn Lane	Hatfield	Yes	£8,586,000	2	2	1	2	2	2	0	0	**10**	**5**	6
The Common	Hatfield	Yes	£1,727,500	2	2	0	2	2	2	0	0	**10**	**6**	7
Old Rectory Drive	Hatfield	Yes	£680,000	2	2	1	2	2	1	1	1	**10**	**7**	8
Hatfield Avenue & Manor Road	Hatfield	Yes	£3,416,000	2	2	0	2	2	2	0	0	**10**	**8**	9
Queensway	Hatfield	Yes	£5,836,000	2	2	1	2	2	2	0	0	**10**	**9**	10
Heronswood Road	Welwyn Garden City	Yes	£3,989,500	2	2	0	1	2	3	0	0	**10**	**10**	11
Bessemer Road	Welwyn Garden City	Yes	£9,274,300	2	2	1	1	2	3	0	0	**10**	**11**	12
Mosquito Way	Hatfield	Yes	£1,390,000	2	3	0	1	2	3	0	0	**10**	**12**	13
Parkway	Welwyn Garden City	Yes	£3,220,000	2	2	1	1	2	2	0	0	**10**	**13**	14
Great North Road	Hatfield	Yes	£4,124,000	2	2	1	2	1	2	0	0	**10**	**14**	15
Moors Walk & Herns Lane	Welwyn Garden City	Partially	£5,130,000	2	2	0	2	2	3	0	0	**10**	**15**	16
Hertford Road (Hatfield)	Hatfield	Yes	£2,795,000	2	3	1	1	1	3	0	0	**10**	**16**	17
Bridge Road & The Campus	Welwyn Garden City	Yes	£9,015,400	2	2	1	1	2	2	0	0	**9**	**17**	18
St Albans Road East	Hatfield	Yes	£5,018,500	2	2	1	1	2	2	-1	0	**9**	**18**	19
Lemsford Road	Hatfield	Yes	£2,975,000	2	2	0	2	2	2	-1	0	**9**	**19**	20
Black Fan Road	Welwyn Garden City	Yes	£6,276,000	2	2	1	1	2	2	0	0	**9**	**20**	21
Ridgeway	Welwyn Garden City	Partially	£2,224,200	2	2	0	1	2	2	0	0	**9**	**21**	22
Broadwater Road	Welwyn Garden City	Yes	£1,868,000	2	1	0	2	2	1	0	0	**9**	**22**	23
Panshanger Drive	Welwyn Garden City	No	£196,000	1	2	0	2	2	1	1	1	**9**	-	24
Birchwood Avenue	Hatfield	No	£1,740,000	2	2	0	1	2	2	0	0	**9**	-	25
South Way	Hatfield	Yes	£3,265,000	2	2	1	2	0	2	0	0	**9**	**23**	26
Woods Avenue & Oxlease Drive	Hatfield	Partially	£5,966,500	2	2	1	1	1	2	0	0	**9**	**24**	27
Travellers Lane	Hatfield	Yes	£5,398,000	2	2	1	1	1	2	0	0	**9**	**25**	28
Bishops Rise	Hatfield	Yes	£6,745,000	2	2	1	2	1	2	0	0	**9**	**26**	29
WGC Centre Routes	Welwyn Garden City	Yes	£1,896,000	1	1	0	2	2	2	0	1	**9**	**27**	30
A414 Link	Hatfield	Yes	£1,654,600	1	2	1	2	1	2	0	0	**9**	**28**	31
Comet Way	Hatfield	Yes	£6,690,000	2	2	1	0	1	2	0	0	**9**	**29**	32
Howlands	Welwyn Garden City	Yes	£6,299,500	2	2	0	2	1	2	0	0	**9**	**30**	33
Northdown Road	Hatfield	No	£660,000	2	2	1	1	1	2	0	0	**9**	-	34
Mill Green Road	Welwyn Garden City	No	£918,800	2	1	0	2	2	1	0	0	**8**	-	35
Beaconsfield Road	Hatfield	Yes	£2,170,000	2	2	0	1	2	1	0	0	**8**	**31**	36
Old Hatfield	Hatfield	Yes	£130,000	1	1	0	2	2	1	1	1	**8**	**32**	37
Cavendish Way	Hatfield	Yes	£4,385,000	2	2	1	0	1	2	-1	0	**8**	**33**	38
Digswell Road	Welwyn Garden City	Yes	£5,622,000	2	2	0	1	1	2	0	0	**8**	**34**	39
College Lane	Hatfield	Yes	£1,795,000	2	1	1	0	2	2	0	0	**8**	**35**	40
Woodhall Lane	Welwyn Garden City	Yes	£763,400	2	1	0	1	1	1	0	0	**8**	**36**	41
Alban Way	Hatfield	Yes	£2,260,000	1	3	1	1	1	2	-1	0	**8**	**37**	42
Cole Green Lane	Welwyn Garden City	Partially	£7,053,300	2	2	0	2	0	2	0	0	**7**	**38**	43
Homestead Road & Ground Lane	Hatfield	Yes	£5,164,000	1	2	0	1	2	1	0	0	**7**	**39**	44
A1000 Link to Old Welwyn	Welwyn Garden City	Yes	£4,471,900	2	2	0	1	1	2	0	0	**7**	**40**	45
Other Infrastructure in WGC	Welwyn Garden City	Partially	£1,398,600	2	2	0	0	1	2	0	0	**7**	**41**	46
Tamblin Way	Hatfield	Yes	£2,815,000	1	2	0	0	2	2	0	0	**7**	**42**	47
Hollybush Lane	Welwyn Garden City	No	£978,000	2	1	-1	2	1	1	0	0	**7**	-	48
Briars Lane	Hatfield	Yes	£3,044,050	1	2	0	1	1	1	0	0	**7**	**43**	49
Knightsfield	Welwyn Garden City	Yes	£5,583,200	2	2	0	0	1	2	0	0	**6**	**44**	50
St Albans Road West	Hatfield	Yes	£2,242,500	2	2	0	0	0	2	0	0	**6**	**45**	51
Dixons Hill Road	Hatfield	Yes	£1,762,500	1	2	1	0	2	2	0	0	**6**	**46**	52
Dellsome Lane	Hatfield	Yes	£3,184,500	1	2	0	0	2	1	-1	0	**6**	**47**	53
Lemsford Interchange	Welwyn Garden City	No	£1,000,000	1	2	1	1	0	1	-1	0	**5**	-	54
Ellenbrook Lane	Hatfield	No	£193,000	1	2	0	0	0	2	0	1	**5**	-	55
The Ryde	Hatfield	No	£235,600	1	1	0	0	0	1	0	0	**4**	-	56

Appendix I

KEY FOR PRIORITISED ROUTES


A1000 Link to Old Welwyn
Knightsfield
Digswell Park Rd
Knightsfield
Bessemer Rd
Digswell Rd
Knightsfield
WGC Centre Routes
Bridge Rd & The Campus
Black Fan Rd
Moors Walk & Herns Ln
WGC Centre Routes
Knella Rd to Lords Wood rbt
Lemsford Interchange
Parkway
Broadwater Rd
Mill Green Rd
Ridgeway
Panshanger Dr
Heronswood Rd
Woodhall Ln
Cole Green Ln
Stanborough Rd
Hollybush Ln
Howlands
Chequers
See Hatfield Plan for route information in this area.


Hatfield - Locations of Prioritised Routes
Stanborough Rd & A6129
Coopers Green Ln
Chequers
Comet Way
A414 Link
Hatfield Ave & Manor Rd
Homestead Rd & Ground Ln
Comet Way
The Ryde
Birchwood Ave
Hertford Rd
Wellfield Rd & French Horn Ln
Alban Way
Great North Rd
Lemsford Rd
St Albans Rd E
Beaconsfield Rd
Mosquito Way
Tamblin Way & St Albans Rd W
The Common
Cranborne Rd
Comet Way
Queensway
Old Hatfield
Alban Way
Old Rectory Dr
St Albans Rd W (A1057)
Cavendish Way
Briars Lane
Ellenbrook Ln
Bishop's Rise
College Ln
Alban Way
Comet Way
Woods Ave & Oxlease Dr
Travellers Ln
Northdown Rd
South Way
Dellsome Lane
Dixons Hill Rd

Appendix J

LIST OF ACRONYMS USED IN REPORT

Acronyms Used in this Report

(listed in alphabetical order)

CWZ	Core Walking Zone
DfT	Department for Transport
GIS	Geographic Information System
HCC	Hertfordshire County Council
IDP	(Draft) Infrastructure Delivery Plan (published by WHBC)
LCWIP	Local Cycling and Walking Infrastructure Plan
LTN 1/20	Local Transport Note 1/20 (Cycle Infrastructure Design)
LTP4	Local Transport Plan 4 (published by HCC)
NCN	National Cycle Network
PCT	Propensity to Cycle Tool
ROW	Rights of Way
RST	Route Selection Tool (a DfT tool developed for LCWIP audits)
RVC	Royal Veterinary College
SCGTP	South Central Growth and Transport Plan (published by HCC)
WHBC	Welwyn Hatfield Borough Council
WRAT	Walking Route Audit Tool (a DfT tool developed for LCWIP audits)
WSP	WSP UK (the engineering consultancy firm)

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