A photograph of a dirt path winding through a dense forest. The path is made of brown earth and is surrounded by numerous trees with vibrant green foliage. Sunlight filters through the leaves, creating dappled shadows on the ground. The path leads into the distance, where a fallen log is visible. The overall scene is peaceful and natural.

**Newcastle under Lyme Green
Infrastructure Strategy**

Cover picture: Woodland path at Arnold Grove.

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Summary

Green Infrastructure is the network of multifunctional green open space, in urban and rural areas that delivers a wide range of ‘environmental’ and ‘quality of life’ benefits to the borough of Newcastle under Lyme. The Green Infrastructure Strategy is the guide to planning and implementation of Green Infrastructure across the Borough.

Four challenges have been identified to be addressed through the Green Infrastructure Strategy. These are: working with growth; meeting public demand; making Green Infrastructure central to the future economy and improving the Green Infrastructure network and its connectivity.

To address these challenges four strategic objectives have been identified: securing quality of place and positive development; enabling healthier lives and stronger communities; capturing the benefits of Green Infrastructure for all and making the Borough more resilient and biodiverse.

Research has shown that in Newcastle under Lyme the services provided by the environment such as the provision of clean air and water are vulnerable to external factors such as climate change; that the opportunities to use natural solutions to environmental problems over civil ‘built’ infrastructure is currently low; that nature habitats are fragmented and this makes the Boroughs’ wildlife vulnerable and that public access is limited in some areas meaning that the potential of the natural environment to contribute to the health and wellbeing of people is also limited. For the Strategy to make a difference, specific objectives have been set to address these findings. The specific objectives range from addressing the uneven distribution of Green Infrastructure through to planning Green Infrastructure at all scales from the very local to the whole Borough scale. In particular, there is an emphasis on focusing on the basics first.

The Strategy is in two parts; a spatial strategy and a thematic strategy. The core elements of the Spatial Strategy are twofold; the nodal areas – *these are existing areas where Green Infrastructure is concentrated and/ of notable value* and green corridors - *which provide various forms of connectivity, the most notable being ecological connectivity; recreational/ access connectivity or landscape connectivity*. Seven nodal areas have been identified and six green corridors. Interventions have been identified for these areas; those requiring conservation/preservation and those requiring new Green Infrastructure.

With respect to the thematic strategy, out of a potentially very long list, 12 themes have been identified which can help deliver the specific objectives of the Strategy. The themes include, among others; urban design, food security, biodiversity and landscape.

Green Infrastructure crosses multiple land uses and ownerships and no one organisation has sole responsibility for Green Infrastructure across the Borough. The core approach to delivery of Green Infrastructure in the Borough is through ‘partnership’. The Borough Council has a key role as coordinator.



Image 1: (above) Silverdale Country Park is centrally located in a Green Infrastructure node - the ‘Newcastle West Green Gateway’. The landscape at Silverdale Country Park is immature but already exhibits many features strongly beneficial to Green Infrastructure. These functions will grow as the landscape matures.

Section 1: Context setting

Green Infrastructure Vision

Our vision is that by working in partnerships we can manage and enhance the quality, connectivity and multifunctionality of the Borough's Green Infrastructure. This will enable our Green Infrastructure to support the needs of both people and wildlife. We wish to contribute to halting the long-term decline in the natural environment nationally and internationally not only in recognition of our collective responsibility, but also in recognition of the value of the natural environment on maintaining and improving quality of life.

Justification and purpose

The evidence base for the new Joint Local Plan for Newcastle under Lyme (with the City of Stoke-on-Trent) requires an assessment to be made of existing and potential Green Infrastructure in the Borough in line with National Planning Practice Guidance, within a framework set by the National Planning Policy Framework (NPPF). This will be delivered through the production of a Green Infrastructure Strategy which considers the distribution, quality, quantity of this resource in order to address deficiencies, surpluses and resilience.

The Green Infrastructure Strategy helps the local planning authority to understand where the Borough is now in terms of Green Infrastructure and where it should aim to be at the end of the Joint Local Plan period. It is also a guide to how this can happen through planning and delivery processes. Examples of this include the shaping of new developments and how existing open space can be managed for multiple benefits. The environment, is under pressure as never before and human induced global change is acting out at the local level, through for example, flooding. The Green Infrastructure Strategy can help make Newcastle under Lyme more resilient as society gets closer to its environmental limits.

Understanding what Green Infrastructure (GI) is and how it is distinguished from traditional open space planning.

1.1 Green Infrastructure is the network of multifunctional green space, in urban and rural areas, that delivers a wide range of 'environmental' and 'quality of life' benefits to the community of Newcastle under Lyme. Green Infrastructure is not an alternative description for conventional 'green' or 'open' space in the Borough but it does include it. It describes the Borough's entire network of 'green' spaces. This includes parks, open spaces, playing fields, woodlands, street trees, allotments and private gardens. It also includes the Borough's 'blue features' such as streams, canals and other water bodies as well as any 'green' architectural features such as green roofs and green walls. It includes land in public, private and other ownerships.

1.2 Green Infrastructure planning is supported by Government. The Department for Communities and Local Government (DCLG) believes that Green Infrastructure is important for the delivery of high quality sustainable development, alongside other forms of infrastructure such as transport, energy, waste and water. They believe that it provides multiple benefits, notably ecosystem services, at a range of scales, derived from natural systems and processes, for the individual, for society, the economy and the environment. To ensure that these benefits are delivered, Green Infrastructure must be well planned, designed and maintained. Hence

Government believes that Green Infrastructure should be a key consideration in both local plans and planning decisions where relevant (see table 1).

1	Building a strong, competitive economy
2	Delivering a wide choice of high quality homes
3	Requiring good design
4	Promoting healthy communities
5	Meeting the challenge of climate change, flooding and coastal change
6	Conserving and enhancing the natural environment

Table 1: DCLG has issued Planning Practice Guidance, 2016 to show how Green Infrastructure can help deliver planning policies. The six key issues in this table are the areas of planning where Green Infrastructure can make a significant impact in Newcastle under Lyme.

1.3 Green Infrastructure is also considered as a cost-effective alternative to, or complementary with, 'grey' (human-made engineered) infrastructure as it is the basis for developing and delivering *Nature Based Solutions* (NBS). These are solutions which tackle urban and environmental management challenges ranging from drainage, air quality through to public health.

1.4 The Newcastle under Lyme Green Infrastructure Strategy is a guide to planning and delivery processes. Examples include the shaping of new developments and how existing open space is managed for multiple benefits. Given that the environment is under pressure as never before and that human induced global change is acting out at the local level, through for example, flooding; the Newcastle under Lyme Green Infrastructure Strategy is not only necessary but also timely.



Image 2: (above) Keele University, a historic landscape with significant biodiversity and amenity values. The University campus is an important Green Infrastructure asset for the Borough.

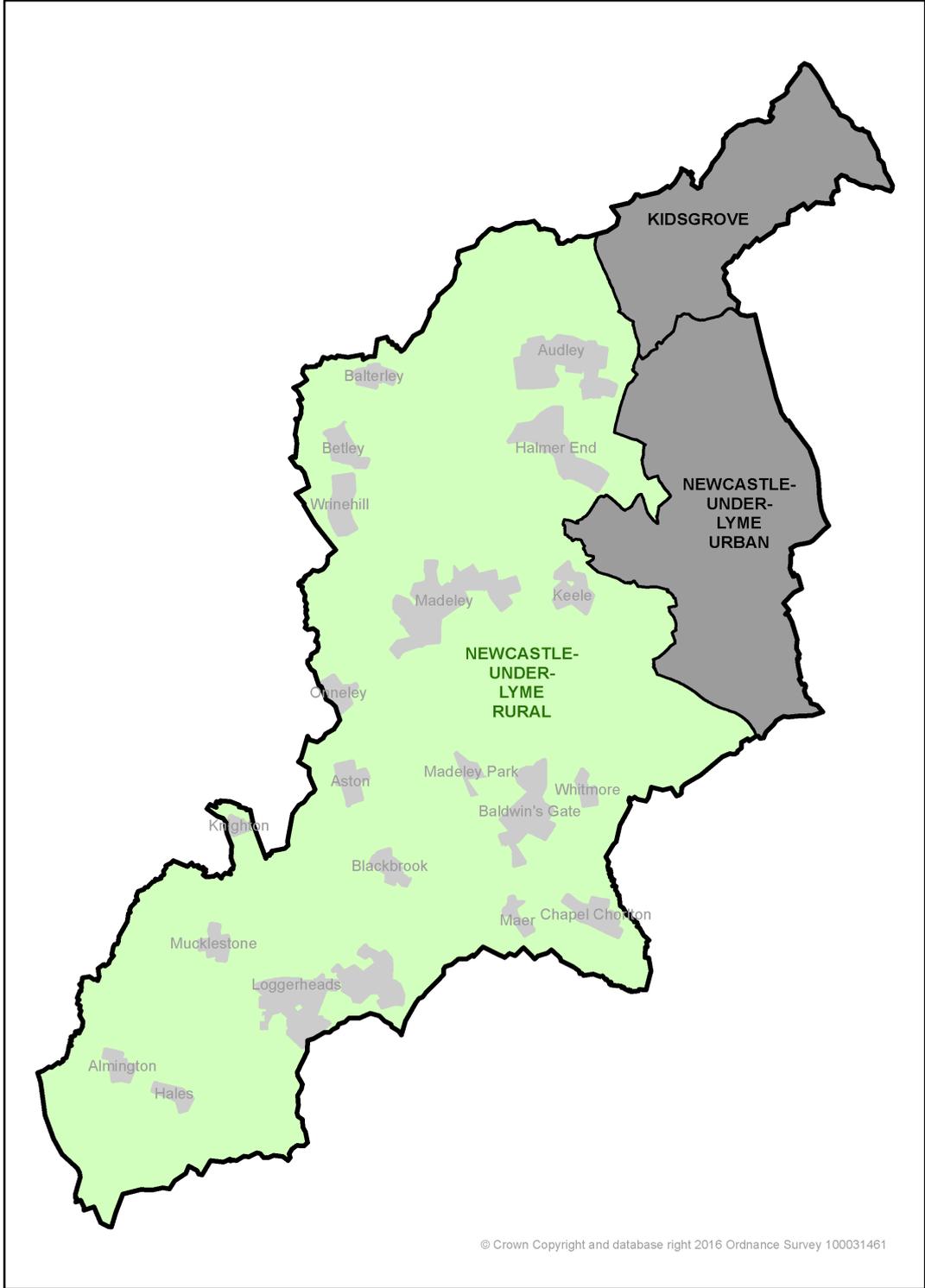
The Geographical Scope of the Green Infrastructure Strategy

1.5 The geographical scope of the Green Infrastructure Strategy includes the whole of the Borough of Newcastle under Lyme. It also identifies key linkages with adjoining local authority areas, which is also important in respect of the duty to cooperate, as set out in the NPPF. The reason for highlighting these

linkages is that Green Infrastructure assets (for examples rivers or woodlands) do not end at municipal boundaries. To fully understand and plan for Green Infrastructure the Borough has been subdivided into three 'framework' areas covering:

- Newcastle Urban
- Kidsgrove Urban
- Borough-wide Rural

The geographical coverage of the three framework plans ties in with the Newcastle under Lyme Open Space Strategy (see Plan 1).



Plan 1: (left) the Green Infrastructure plan area, which shows both the geographical extent of the Borough (also the Strategy area) is broken down into three 'framework' areas. The framework boundaries are aligned to Borough Council ward boundaries.

An evidence based approach

1.6 Preparation of this Strategy required the undertaking of an evidenced based study by specialists from MD2 Consulting Ltd. who designed an approach to support the Council's requirements including preparation of the new Joint Local Plan.

1.7 Three complementary approaches to evidence gathering, analysis and priorities setting were employed. These are shown in Figure 1. Work on each of these three approaches was conducted between 2015 and 2016.

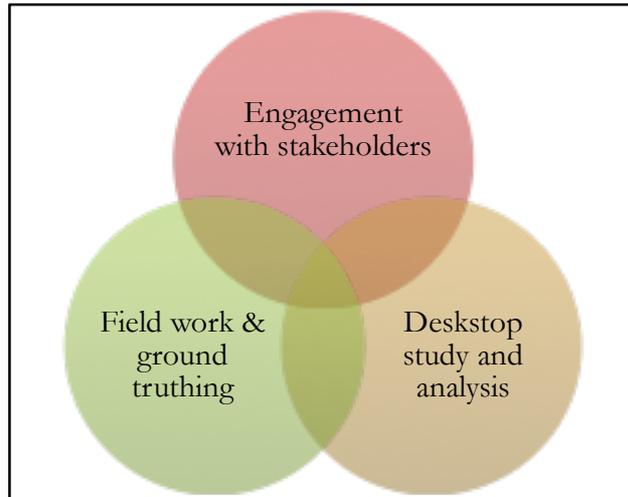


Figure 1: Infographic showing the three complementary approaches to evidence gathering.

1.8 The evidence base includes nine elements:

- a. Newcastle under Lyme Open Space Audit and Open Space Strategy review undertaken concurrently with the Green Infrastructure Strategy.
- b. Newcastle under Lyme Great Outdoors Survey (Adult).
- c. Newcastle under Lyme Great Outdoors Survey (Young People).
- d. Stakeholder workshop.
- e. Local Authority workshop.
- f. Community/user group workshop.
- g. GIS¹ and desktop² analysis.
- h. Benchmarking exercise with other local authority areas with similar characteristics derived from ONS datasets.
- i. Meetings with and comments received from adjacent local authorities.

1.9 In addition to this Green Infrastructure Strategy report, a series of outputs supporting the Green Infrastructure Strategy have been produced and these include:

- a. Framework Plans which are shared with the Newcastle under Lyme Open Space Strategy.
- b. Appendices.
- c. GIS mapping held by Newcastle under Lyme Borough Council.
- d. Executive summary.



Image 3: (left) Green Infrastructure operates at the local, as well as at the landscape scale. Informal access in urban fringe areas is important for active recreation such as jogging and dog-walking. Even small areas can provide communities with experience of nature and these small habitats are foraging grounds for birds and small mammals and also protect urban soils.

¹ Geographical Information System (GIS)

² A study of peer-reviewed publications, case studies, internet articles, strategies and actions plans.

Section 2: Newcastle under Lyme's Green Infrastructure

2.1 This section describes the distribution of the Borough's Green Infrastructure and identifies the areas of greatest need. The distribution of Green Infrastructure forms the basis for the Green Infrastructure Strategy.

Types of Green Infrastructure found in Newcastle under Lyme

2.2 The existing network of Green Infrastructure in Newcastle under Lyme has been mapped. To ensure that user needs can be identified broad types (called the typology) of 'green spaces' has been prepared which includes all vegetation and surface water areas, in public and private ownership. The typology map (Plan 2) illustrates the distribution of the Borough's Green Infrastructure.

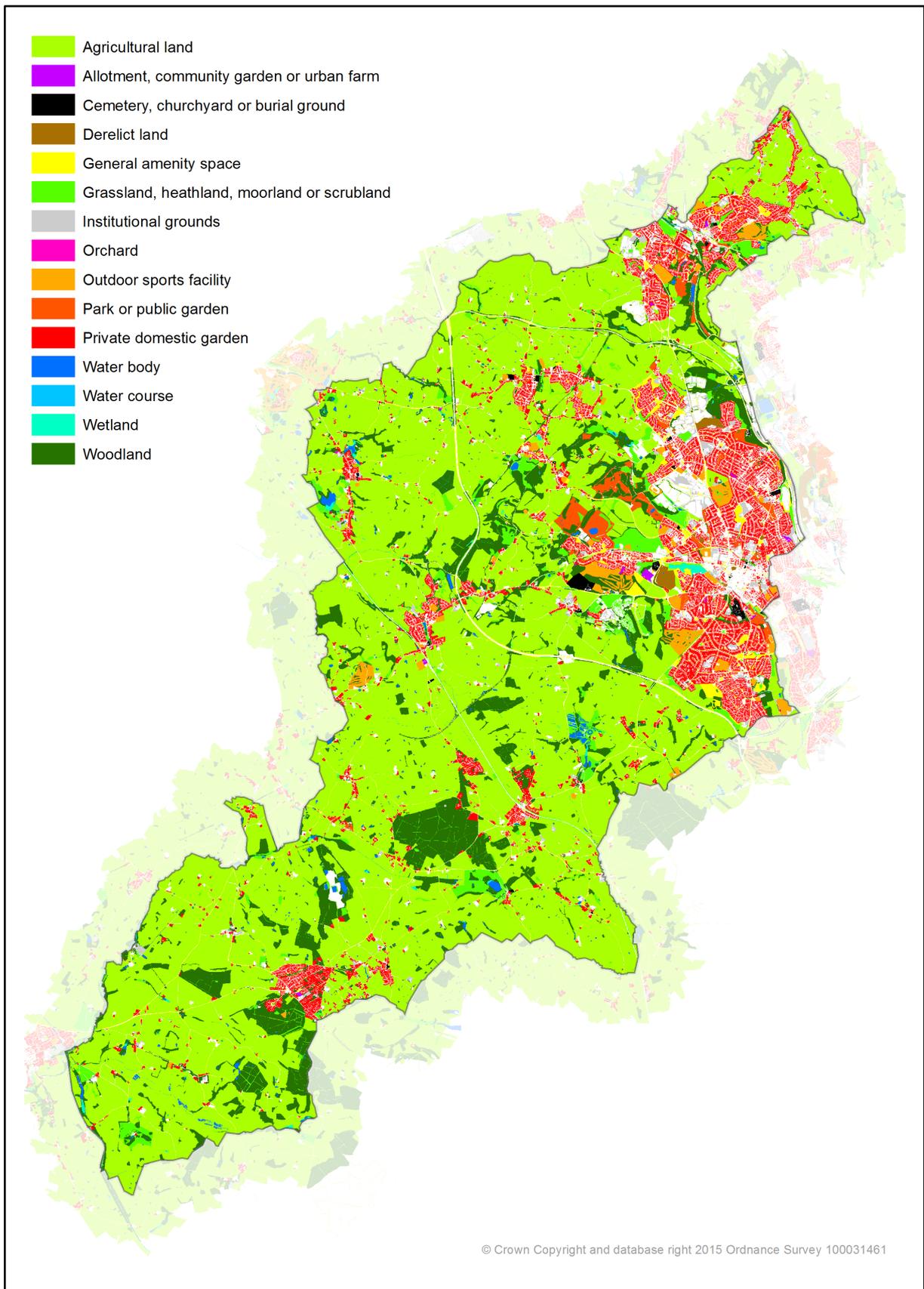
What we know about the Borough's Green Infrastructure typology:

- Green Infrastructure is not evenly distributed across the Borough.
- Agriculture, built-urban and woodlands dominate the Borough's Green Infrastructure typology.
- The area of water bodies and wetlands in the Borough is low.
- In the urban areas, private gardens contribute significantly to the total area of urban Green Infrastructure.
- Key designated nature sites are fragmented, however at the landscape scale there are some areas which have a nodal character and are hence important landscape and ecological resources.
- National Grey/Built Infrastructure³ greatly impacts on the Borough and disrupts local Green Infrastructure connectivity.
- There are clusters of important post-industrial Green Infrastructure sites in the urban fringe.
- Disused railway lines are important for connectivity between urban settlements and nearby nature.



Image 4: (above) The Village Pond, Madeley - as a Green Infrastructure type open water is low in the Borough, except in the area of Betley and Balterley.

³ M6 corridor, West Coast Mainline and the proposed route of HS2.



Plan 2: Existing Green Infrastructure Plan for the Borough of Newcastle under Lyme and a 1km buffer zone. The typology map is subdivided into 15 types. The map should be looked at this scale as its purpose is to provide a 'landscape scale overview'. Details on how this and other maps were prepared can be found in the technical appendix.

Landscape character

2.3 The Borough has a distinct and varied geography, with a mix of countryside, towns and villages. The main urban areas lie to the north and east of the Borough. Road and rail corridors are notably intrusions into the Borough's landscape. The Borough is split between two National Landscape Character Areas (LCA); the built up area including the whole of Newcastle under Lyme and Kidsgrove falls within the Potteries and Churnet Valley LCA No. 64 which coincides with the coal measures. The rural and larger part of the Borough falls within the Shropshire and Staffordshire Plain; LCA No. 61. This plain is an expanse of flat or gently undulating, lush, farmland. It's landscape character is a reflection of its glacial origins, which contains isolated lowland open water and peatland sites.

What we know about the Borough's landscape character:

- The Borough has two distinct Landscape Character Areas and a good degree of landscape diversity.
- The landscape has a predominately lowland character, rolling hills are important in the landscape and at vantage points provide good views.
- Within the Borough, the Potteries and Churnet Valley LCA, is dominated by urban and urban fringe landscapes.
- Some urban fringe areas may look unkempt but brownfield sites within them can be valuable for nature, recreation and play.
- The Shropshire and Staffordshire Plain LCA is dominated by agriculture, woodlands and small settlements, this landscape is attractive, especially when farmland and woodland coincide. Access to this landscape is principally through Rights of Way.
- Parklands and well-structured field boundaries can be found in the Shropshire and Staffordshire Plain and hedge boundaries are important for connectivity and foraging.
- Both of the Boroughs LCA's contain important ecological sites but this is more so in the Shropshire and Staffordshire Plain, notably ancient sites of glacial origin.
- There are large woodland blocks in the Borough, these are important landscape features.
- The urban landscape between the City of Stoke on Trent and Newcastle under Lyme is indistinct.
- Staffordshire County Council lead on landscape character and maintain information relating to landscape.

Ecology

2.4 With respect to biodiversity, the Borough includes important national and international designated sites⁴ spanning the urban and rural areas. The rural south-west and western parts of the Borough are characterised by many small ancient woodlands and remnant heathland, grassland and meres and mosses sites (part of the Borough covers the Meres and Mosses Nature Improvement Area) which act as ecological stepping-stones. The highest priority is given to Natura 2000 sites and Ramsar sites. Betley Mere and Black Firs and Cranberry Bog Sites of Special Scientific Interest (SSSI) are Ramsar sites and are part of the internationally important 'West Midlands Meres and Mosses' Phase 1 Ramsar designation. There are other SSSIs including Burnt Wood, Metallic Tileries and Maer Pool as well as Local Wildlife Sites, which are sites of biological importance selected by the Staffordshire Wildlife Sites Partnership. Equivalent to these for geodiversity are Local Geological Sites (LoGS) also known as Regionally Important Geological Sites (RIGS).

What we know about the Borough's ecology:

- There are internationally and nationally important wildlife sites in the Borough.
- Coordination and management of the Borough's important ecology is already based on established partnerships.
- The voluntary sector, such as Staffordshire Wildlife Trust, play a key role in ecological management.
- Ecological connectivity is strongly influenced by the Borough's grey infrastructure of which road and rail corridors are the most significant.

⁴ The Convention on Wetlands (Ramsar), Europe-wide network of sites tasked with the preservation of natural heritage (Natura 2000), Sites of Special Scientific Interest (SSSI), Regionally Important Geological/geomorphological Sites (RIGS), Local Geological Sites, (LoGS).

- Urban fringe sites generally and the country parks, in particular, are important destinations where the local community can get close to nature.
- HS2 is likely to further affect the Borough's ecological network. Amelioration measures such as green bridges are an appropriate response.

Public Rights of Way

2.5 Public Rights of Way are critical to allowing the public to access and enjoy the Borough's Green Infrastructure. The statutory duty to assert and protect the rights of the public belongs to Staffordshire County Council. To take account of budget reductions, the Council has been steadily increasing its work with volunteers to assist with maintaining the path network. In the Borough, there is a single major long distance trail, The Newcastle Way, which is also part of the Staffordshire Way. It runs through the Borough at its northern end.

What we know about the Borough's Rights of Way

- Rights of Way are the principle means by which people can access the Borough's Green Infrastructure especially, but not exclusively, in rural areas. Public rights of way cross both private and public land.
- Managing the 'Rights of Way' network is a challenge especially at a time when budgets have been cut.
- The Newcastle under Lyme Great Outdoors Survey has shown that there is a demand for more linear access especially over longer distances.
- The proposed route of HS2 will have an impact on public rights of way.
- The Borough's rights of way are more than access routes as they often follow ecological corridors and some have heritage significance.
- The Borough's rights of way, when they are close to where people live, are important to the health and well-being of the community as they are a venue for active recreation and stress reduction.

Public and Private Land

2.6 In Newcastle under Lyme Green Infrastructure exists on both public and private land. No single organisation or individual controls it. Whilst it is a shared resource which benefits everyone, equally there is a shared responsibility to protect and conserve it. To maximise the benefits of Green Infrastructure, a partnership approach must be the basis for delivery.

What we know: Public and Private Land

- The majority of the Borough's Green Infrastructure is on private land. How private landowners manage their land is crucial to the maintenance of the entire Green Infrastructure network. This is especially so in respect of agriculture which is the largest land use but also in respect of private gardens which when considered as a whole, contribute significantly to the Borough's open space.
- The role of the Borough Council in influencing the management of private land is limited; nevertheless, when determining planning applications, it can influence the quantum of open space, connectivity and typology.
- The Borough Council has a key role in managing Green Infrastructure within its own ownership. There are significant areas of municipal land especially in the urban and urban fringe areas of the Borough.
- Unsealed surfaces are under pressure from development. Unsealed surfaces help to protect urban soils, nutrient cycling and have a beneficial impact in respect of flood management.
- Brownfield land has ecological and recreational importance especially in the urban fringe.

Standards

2.7 Both the Newcastle under Lyme Green Infrastructure Strategy and the Open Space Strategy are based on common standards (see Table 2). It should be stressed that the standards are not targets but a planning tool to assist in decision-making. Whilst the standards are common to both strategies they are applied in fundamentally different ways. For the Green Infrastructure Strategy, the application is based on ecosystem

services⁵ and ecological networks⁶. In the Open Space Strategy, the standards are primarily used to determine public recreation needs, especially in respect of accessibility, quality and quantity. Supplementary Planning Documents (SPDs) using the standards may be prepared as part of the new Joint Local Plan to support the planning, design and management components of the Green Infrastructure and/or the Open Space Strategy.

OPEN SPACE TYPES	COUNT	AREA (HA.)	CURRENT PROVISION (Hectares per 1,000 population based on 124,381 pop)	PREVIOUS STANDARD (Hectares per 1,000 population)	PROPOSED QUANTITY STANDARD (Hectares per 1,000 population)	PROPOSED ACCESS STANDARD (measured in straight line)		
						URBAN	RURAL*	
Parks and gardens	35	436.29	3.51	2.35	3.10	Local 400m	Neigh 800m	District 1600m
Amenity green space	112	128.31	1.03	No standard	0.90	220m [open green] & 700m [MUGA]		
Natural and semi-natural green space	181	1746.22	14.0	3.60	3.60	600m		
Designated play spaces for children and young people	81	51.35	0.41	0.76	0.41	LAP 100m	LEAP 400m	NEAP 1,000m
Allotments	12	13.60	0.11	No standard in last audit	0.15	400m (5-10 min walk)		15 min drive
Green Corridors	16	46.03	0.37	No standard	No standard	No standard		
Outdoor Sport Facilities	NO STANDARD							

Table 2: The Open Space Standards are shared between the Green Infrastructure Strategy and the Open Space Strategy but are applied in different ways. For the Green Infrastructure Strategy, the application is based on ecosystem services and ecological networks. The Borough Council has the option to produce supplementary planning documents (SPD) using the standards in support of the planning, design and management components of the Green Infrastructure Strategy.

What we know about the Boroughs standards:

- The Borough’s open space standards are generally on or above average when compared to other similar local authorities.
- The Borough is well provided for in respect of natural and semi-natural green space.
- There is growing interest in urban agriculture and cultivation and hence a demand for allotments that presently exceeds supply; the Borough Council is already addressing this finding.
- Research has shown that quality matters to the community as well as quantity.
- The standards should not be equated to ecosystem values since ecosystem valuation is a separate research based activity.
- Outdoor sport facilities are now considered through playing pitch strategies (PPSs) using a methodology developed by Sport England.

Multifunctionality

2.8 Multifunctionality describes how Green Infrastructure can provide benefits concurrently on a given site. Hence, planning for multifunctionality is the pursuit of added value through the provision of many different functions on the same site e.g. biodiversity, recreation and amenity. However, conflicts can and do occur between different uses and user groups so there are practical limits to achieving multifunctionality. Nevertheless, the pursuit of multifunctionality is a desirable policy goal but within limits.

⁵ Ecosystem services are the benefits provided by ecosystems that contribute to making human life both possible and worth living.

⁶ Ecological networks are intended to maintain environmental processes and to help to conserve biodiversity where remnants of semi-natural habitat have become fragmented and isolated.

What we know about the Borough's Green Infrastructure multifunctionality:

- In Newcastle under Lyme, most municipal owned and run open spaces are already managed for multifunctionality. For example, urban parks provide for public recreation whilst concurrently nature is also encouraged.
- There are perceived or actual conflicts between different users of Green Infrastructure and these require management, sometimes this is achieved by setting aside different areas for different interest or time sharing areas. Realistically not all conflicts can be resolved so sometimes land managers must favour one user over another.
- In the Borough, like elsewhere in lowland England, agricultural land is generally managed for a single purpose i.e. food production or industrial crop production; however, appropriate management of field boundaries can make the agricultural landscape multifunctional. Considered as a whole, the Borough has good field boundaries hence maintaining these in good condition is important to the landscape and rural biodiversity.
- There are areas where multifunctionality is not a desirable goal; however, these occasions are very limited. An example is designated sites such as SSSI's, although even in these, opportunities may exist for multiple uses such as conservation grazing.

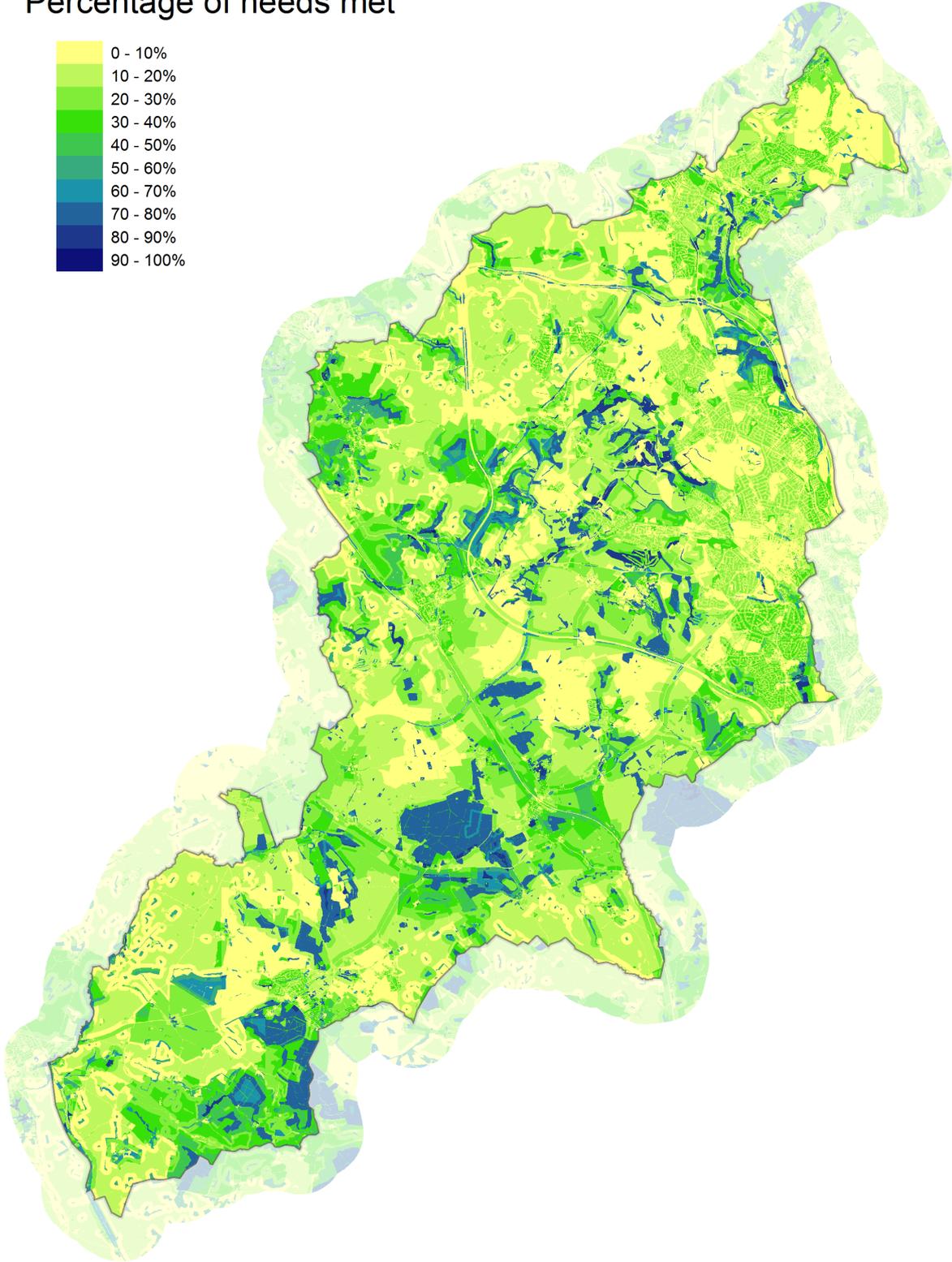
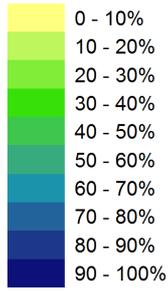
Analysis of Needs

2.9 A geographical analysis was conducted to prepare the strategy. It considered all of the different functions that Green Infrastructure can perform. The demand for each function was mapped to help identify areas where needs are/or are not met. Plan 3 shows the percentage of functions for which need exists and is currently met/not met in the Borough.

What we know about the Borough's analysis of needs

- Plan 3 shows the areas of the Borough where Green Infrastructure needs are and are not being met. The mapping shows an unequal distribution.
- The areas where needs are most met are clustered together often coinciding with ease of access to important landscapes and features such as country parks and woodland.
- Generally, the least needs met can be correlated to inaccessible agricultural land; this is not unique to the Borough and can be found in most lowland parts of England.
- There is no discernible differences between rural and urban fringe areas, however, urban areas generally have fewer needs met.
- The linear verges of transport infrastructure can be positively correlated to the meeting of needs but the relationship is not strong, however it is sufficient to indicate that verge management is important.

Percentage of needs met



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Plan 3: Green Infrastructure percentage of needs met map. This shows the percentage of functions for which need exists that is met in each location in the Borough.

Section 3: Challenges and opportunities

3.1 Green Infrastructure can help to address challenges and exploit new opportunities during the life of the new Joint Local Plan. An analysis of issues papers, historical documents, meetings and consultation on Green Infrastructure identified four particular areas of challenge and opportunity that Green Infrastructure can help address.

Working with growth

Challenge	Opportunity
<p>Newcastle under Lyme is required by Government to accommodate substantial new physical growth and the new Joint Local Plan will provide the template for that growth. A substantial number of new homes and other growth will need to be developed. Newcastle under Lyme Borough Council and the City of Stoke-on-Trent have undertaken a Strategic Housing Market Assessment (SHMA) and an Employment Land Review as part of the Joint Local Plan Supporting Evidence. The SHMA has identified an objectively assessed housing need for between 1,177 and 1,504 new dwellings to be delivered across both Newcastle-under-Lyme and Stoke-on-Trent over the period 2013 to 2039, whilst the Employment Land Review has identified a need for between 190 and 334 hectares of employment land to be developed across both areas over the same period.</p>	<p>Green Infrastructure sensitive design should be used to minimise the built footprint of development.</p> <p>The Green Infrastructure palette includes green roofs and green walls, sustainable urban drainage systems, preference of non-sealed surfaces over sealed surfaces, new tree planting, creation of species rich grasslands and provision of recreational open space facilities in accordance with the Newcastle under Lyme Open Space Strategy standards.</p> <p>Brownfield land can contribute towards the supply of new housing land. However, care must be taken to avoid over-development on sites of ecological and landscape importance some of which are on former brownfield land.</p> <p>Preserving the character and appearance of the rural landscape and the resulting opportunities for the visitor economy.</p>

Meeting public demand

Challenge	Opportunity
<p>There is public demand for Green Infrastructure as seen through the results of the Newcastle under Lyme Great Outdoors Survey.</p> <p>For example, there is a demand for more green corridor and more tree planting in the right places. People also value the Green Infrastructure they already have.</p> <p>There is a cost to the management of Green Infrastructure and the money for management is getting tighter.</p>	<p>Public interest in Green Infrastructure should be harnessed by encouraging more voluntary effort in Green Infrastructure management and maintaining activities already in place. Voluntary involvement is not for free and requires coordination – a role for both the local authority and environmental NGOs.</p> <p>Creating new and managing existing Green Infrastructure can help the Borough manage climate change impacts by seeking Nature Based Solutions over grey infrastructure solutions. Three key areas to focus on are (i) urban drainage, (ii) air pollution and (iii) sustainable transport routes e.g. greenways. Whilst the payback is not always obvious, avoidance of a single flood event can for example, save many £ millions.</p>

Making Green Infrastructure central to the future economy

Challenge	Opportunity
<p>Newcastle under Lyme Borough Council recognises that there are barriers to investment (such as a poor environment or lack of infrastructure) and that there is a need to identify areas for regeneration, infrastructure provision and environmental enhancement. There is also a need to increase the attraction of the area as a tourist destination based on its industrial heritage, existing and future magnets of tourism and leisure interest and the high quality environment in the Borough's rural area, as well as transforming the local image and perceptions.</p> <p>A challenge is to have in place policies that can turn the benefits that Green Infrastructure can provide into reality. Natural England has summarised these as (i) making a local area more attractive to business investors so attracting inward investment, (ii) increasing visitor spend which makes a local area more attractive to service industries, (iii) saving environmental costs, which improves air quality, reduces the urban heat island effect, filters diffuse pollution and helps to manage flood risk, (iv) providing health benefits through improved air quality and surroundings which encourages activity and improves mental health and well-being, (v) generating employment by attracting new businesses and residents to the area, increasing office occupancy rates and increasing the number of jobs in the area and (vi) promoting food production by enabling increased productivity in urban areas.</p>	<p>Green Infrastructure as an 'urban brand' is now rapidly developing both in the UK and internationally and there is no reason why this cannot happen in the Borough too.</p> <p>The Borough already has some outstanding assets such as its urban and country parks, although there is always a challenge to meet maintenance costs and link these sites to wider networks.</p> <p>There are also opportunities to improve access to Green Infrastructure which improves quality of life, health and wellbeing which has a positive spin in terms of reduced sickness and stress. This can be achieved, in part, by working with developers to design in local Green Infrastructure to new developments and including it with urban regeneration schemes.</p> <p>In respect of employment sites, those with little prospect of early development can be temporarily greened whilst those with realisable development potential can benefit from advanced structural landscaping.</p> <p>The timing of this Strategy which coincides with the production of a new Joint Local Plan enables the local authority to incorporate supportive policies.</p>

Improving the Green Infrastructure network and its connectivity

Challenge	Opportunity
<p>A well-functioning Green Infrastructure network should have a high degree of connectivity between ecological nodes and a good spatial distribution of nodes and inter-connections. Whilst in practice this rarely occurs, in policy terms this is the desirable end result of planning and implementation processes.</p> <p>The Green Infrastructure network in Newcastle under Lyme is a significant resource but has weaknesses meaning that habitats are fragmented and the ecosystem services that Green Infrastructure already provides is vulnerable to externalities. The challenge is to improve ecosystem connectivity between nodal areas and to ensure that the ecosystem values of nodal areas is maintained and when possible improved.</p>	<p>By using a geographical information system, it has been possible to identify the areas of Newcastle under Lyme that are performing well in terms of their ecosystem performance. This is mapped in terms of needs met/not met (see Plan 2). Once core nodal areas have been identified, it is possible to determine a thematic and spatial strategy that will improve the connectivity, distribution and health of the Green Infrastructure network.</p> <p>Hence through a combination of a partnership approach, seeking funding, planning and policy making it is possible to identify which Green Infrastructure resource should be protected or conserved and where new Green Infrastructure creation is required.</p>

Table 3: The challenges and opportunities that Green Infrastructure can help to address challenges and exploit new opportunities during the life of the new Joint Local Plan.

Examples of how Green Infrastructure acts as a Nature Based Solution.

Air Pollution

Air pollution can cause or intensify a range of health conditions notably respiratory and cardiovascular illness. Of notable concern are very fine particles called PM_{2.5}. These particles result from a variety of industrial processes, transportation and burning of fossil fuels. They are especially concerning because unlike larger particles they can pass straight into the blood-system. Scientific research has shown a positive correlation between the lowering of PM_{2.5} and the density and distribution of Green Infrastructure.

Green Infrastructure is being proposed as a Nature Based Solution for localities with air pollution problems. Of particular value are large trees and woodlands which intercept PM_{2.5} and remove them from the atmosphere by dry and wet deposition. The benefits are seasonal and are at their highest in spring, summer and autumn. To maximise the air filtration benefits trees and urban woodlands, should have the most 'edge-effect' (e.g. long and thin woodlands are to be preferred over large blocks), include coniferous as well as broadleaved species and be as local to known pollution sources as possible (e.g. close to major transport routes). Woodlands should not be too dense either as for wet deposition a degree of openness is required. The selection of trees should avoid those known to emit significant quantities of VOC's (Volatile Organic Compounds) as this can counter the benefits.

Other Examples

- A pilot study in Manchester has shown that trees, green space and vegetation can attenuate urban heat stress and reduce temperatures by up to 13°C compared to full sunlight.
- In Germany, restoring 10% of drained peat-lands has been shown to avoid damages worth €22m/year from CO₂ emissions.
- In Amsterdam, it has been calculated that 10% more green space can reduce health care and sick leave costs by €400m/year per 10m inhabitants.
- In North-West England, recovering peat-lands is estimated to have achieved ~€3m/year of saved water supply and purification costs.
- In Malmo, the city has invested in sustainable urban regeneration, and installed green roofs and an open storm water system; the result: -50% run-off; +50% biodiversity and -20% environmental impact.



Image 5: Green Bridge across a new high speed rail line near Brussels; this was constructed to allow movement of mammals and ecological connectivity across the railway between two nature hubs (woodland blocks) hence avoiding animal collisions, damage to rolling stock and line disruption. Such an approach should be advanced for HS2.

Section 4: Objectives and mechanisms

The Objectives

4.1 Based on the National Planning Policy Framework, the Government’s Planning Practice Guidance, examples from elsewhere in the UK and the latest international research, four strategic objectives⁷ have been identified which are considered as especially relevant to the Borough of Newcastle under Lyme, these shown in Figure 2.

4.2 The strategic objectives, shown bulleted below, cover relevant social, environmental and economic considerations and can be cross referenced with the challenges and opportunities set out in the preceding chapter (Chapter 3). The strategic objectives are overarching and are the basis for the research undertaken to determine how the Borough is performing against each (see 4.3 below):

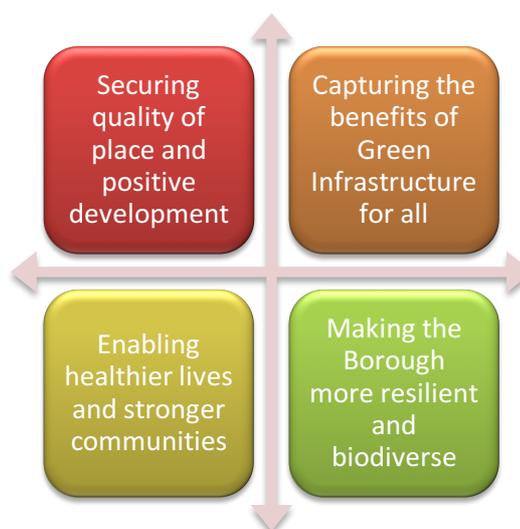


Figure 2: Infographic showing in abbreviated form the four strategic objectives have been identified which are considered as especially relevant to Newcastle under Lyme.

- Securing quality of place and positive development can help the Council and stakeholders to work with urban growth and contribute towards improving the Green Infrastructure network and its connectivity.
- Enabling healthier lives and stronger communities can help the Council and stakeholders meet public demand.
- Capturing the benefits of Green Infrastructure for all can help the Council and stakeholders meet public demand, improve the Green Infrastructure network and its connectivity and contribute to making Green Infrastructure central to the future economy.
- Making the Borough more resilient and biodiverse can help the Council and stakeholders improve the Green Infrastructure network and its connectivity.

4.3 The consultants research has shown that the Borough of Newcastle under Lyme has some geographical and functional deficiencies in terms of Green Infrastructure. The main implication of this is that:

Ecosystems services are sub-optimal.	The baseline for NBS is currently low.	Fragmentation leads to vulnerability.	There are hidden costs.
The Borough’s Ecosystem services are sub-optimal and vulnerable to externalities, most notably in respect of a given ecosystems ability to cope and mitigate climate change impacts. In ecosystem terms the Borough has a lack of ‘ecosystem resilience’.	The baseline for nature based solutions (NBS) is currently low and building this capacity requires determination and long term change. If it does not change the Borough will have to rely to a greater extent on ‘built’ grey infrastructure solutions than would otherwise be the case.	Some habitats and landscapes are fragmented and in these biodiversity and the landscape is vulnerable.	Public access to GI is limited in some areas hence the potential of the natural environment to contribute to public health and wellbeing is limited where this occurs. This places hidden costs on the NHS, social services and private healthcare providers.

Table 4: Research conducted by the Consultants team and based on the four strategic objectives has shown that there are functional deficiencies that require to be addressed through the Green Infrastructure Strategy. This has led to the setting of eight specific objectives.

⁷ The strategic objectives provide the over-arching framework to convert the vision statement (see section 1) into a Strategy.

4.3 Eight specific objectives⁸ have been identified for the Borough to address the implications of the deficiencies in terms of Green Infrastructure.

Ref No.	Specific Green Infrastructure objective
1	Increase the robustness of ecosystems through long-term management planning, starting with those areas most at risk of further decline.
2	Address spatial deficiencies in Green Infrastructure as shown on the mapping.
3	Build the ‘capacity’, which can support Green Infrastructure notably by partnership building, increasing the input of volunteers and reducing the reliance on the local authority. However as a democratic organisation it remains necessary for the local authority to still be seen as the competent body for Green Infrastructure and offer leadership.
4	Ensure a suitably worded policy on Green Infrastructure is included in the Local Plan and that clear guidance is available to those in development control on how to maximise Green Infrastructure through the development process.
5	Seek nature-based solutions on all major developments and infrastructure projects such as H2S, road improvements, housing and commercial development sites.
6	Plan Green Infrastructure at all scales from the neighbourhood to the landscape scale.
7	Place Green Infrastructure as central to resilience planning (notably in connection with climate change) and health and wellbeing planning (notably in connection with the cardio-vascular, obesity, mental health and children’s development agendas).
8	Focus on the basics first. Namely focusing on nodes and improving connectivity & designing in multifunctionality.

Table 5: Specific Green Infrastructure Objectives for the Newcastle under Lyme Green Infrastructure Strategy



Image 6: Formal bedding and open space is as much part of Borough’s Green Infrastructure as natural areas. In the urban parts of the Borough public open space provide porous surfaces, trees, ‘breathing’ spaces and maintain urban soils in good order.

⁸ The specific objectives describe the intended results from delivery of the Green Infrastructure Strategy.

Mechanisms

4.5 The Green Infrastructure Strategy is a high-level plan to achieve the specific objectives. The necessary strategic mechanisms to be put in place are listed below. These can be considered as a toolkit for use by the Borough Council and stakeholders.

Strategic mechanism	Fulfils specific objective	Why	How
<u>Improve</u> the interconnection of green spaces	1, 2, 4, 6, 8	Biodiversity benefits. Extend recreational opportunities Enhance the regulating services provided by ecosystems.	Opportunities created/taken through planning agreements. Embed in local plan policy. Develop & deliver projects that join key green assets together through corridors Enhance existing green corridors.
<u>Enhance</u> the multi-functionality of green spaces	2, 4, 5, 6, 7, 8	Improve the environmental performance of open space Opportunity to reduce management costs. Biodiversity benefits. Improved aesthetics e.g. flower meadow creation Enhance the regulating services provided by ecosystems. Enhance the provisioning services provided by ecosystems.	Review and then change land management regimes when appropriate Seek professional land management inputs and advice from multiple stakeholders Challenge landowners/land managers in a positive way and incentivise where possible.
<u>Integrate</u> green space with other infrastructure and the built environment	1, 4, 5, 6, 7, 8	Resource efficiency. Improved design. Green Infrastructure improvements associated with new development. Enhance the cultural services provided by ecosystems.	Promote co-design and co-delivery. Embed green urban infrastructure in design guidelines. Upskill development planning professionals in Green Infrastructure. Empower/educate high level politicians and corporate management to understand how Green Infrastructure can be brought into major infrastructure projects through application of the principle of 'nature based solution' Engage with professional advisors operating in the area and promote Green Infrastructure through continuing professional development (CPD).
<u>Plan</u> Green Infrastructure at different scales	4, 6	Green Infrastructure exists at different scales, local action can bring Borough wide benefits Enhance the supporting services provided by ecosystems.	Work across boundaries and between tiers of local government. Work with landholder sectors through representative bodies such as the CLA and NFU. Work with environmental regulators and key non-departmental public bodies including; Environment Agency, Natural England and Forestry Commission.
<u>Pursue</u> a strategic and holistic approach to Green Infrastructure	1, 2, 3, 4, 6	Cost effectiveness through sharing resources. Added value over a fragmented approach. Provides clear direction, milestones and destinations Provides clarity to funders that individual Green Infrastructure	Ensure that Green Infrastructure is a 'golden thread' at the centre of local planning. Seek nature based solutions first before adopting 'grey' engineered approaches.

		projects fit within a 'bigger picture'.	
Deliver through partnership	3	No one organisation can plan or deliver on its own. Realistic in a resource limited economic environment. Green Infrastructure requires the engagement of multiple stakeholders not least due to land ownership/management responsibilities.	Embed the Green Infrastructure strategy within existing partnership forums. Encourage existing organisations to see their role in terms of ecosystem services e.g. nature organisations, utility companies etc. Work with Parish Councils, community groups conservation organisations and the LEP, who are often key green space managers as well as green space users.
Provide equal access to the services Green Infrastructure provides	1, 2, 3, 4, 7	Social equity. Supports biocultural diversity e.g. legacy landscapes that speak to sections of the community. Health and wellbeing benefits and local pride.	Link Green Infrastructure strategy to NHS and health providers. Link Green Infrastructure strategy to sports providers e.g. in how they maintain, manage and promote their green spaces. Encourage intervention programmes to build confidence in communities not yet using Green Infrastructure to do so. Better 'signposting' and materials.

Table 6: Strategic mechanisms for the Newcastle under Lyme Green Infrastructure Strategy



Image 7: Lyme Valley Parkway - an important Green Corridor. See Spatial Strategy G5.

Section 5: Strategy

5.1 The Green Infrastructure Strategy is in two part. The first of these is the ‘spatial strategy’ and the second the ‘thematic strategy’. The spatial strategy is based on identified localities within the Borough. The thematic strategy covers the whole Borough.

Spatial Strategy

The core elements of the Spatial Strategy are:

- **Nodal areas** – these are existing areas where Green Infrastructure is concentrated and/of notable value. These areas function at the ‘landscape scale’ rather than at the ‘local scale’, hence isolated Green Infrastructure assets are not included. Nodal areas can be likened to when jigsaw pieces of green spaces and their functions are joined together.
- **Green corridors**– these may be corridors that provide various forms of connectivity, the most notable being (i) ecological connectivity, (ii) recreational/access connectivity or (iii) landscape connectivity.

and Interventions:

- Areas requiring **conservation/preservation**.
- Areas requiring **new Green Infrastructure**.

The balance of the two interventions based on the consultant’s research is shown in the pie charts.

Conservation/preservation is shown green and **new Green Infrastructure** is shown brown. It should be noted that Conservation/preservation does not imply that development within these areas is inappropriate.

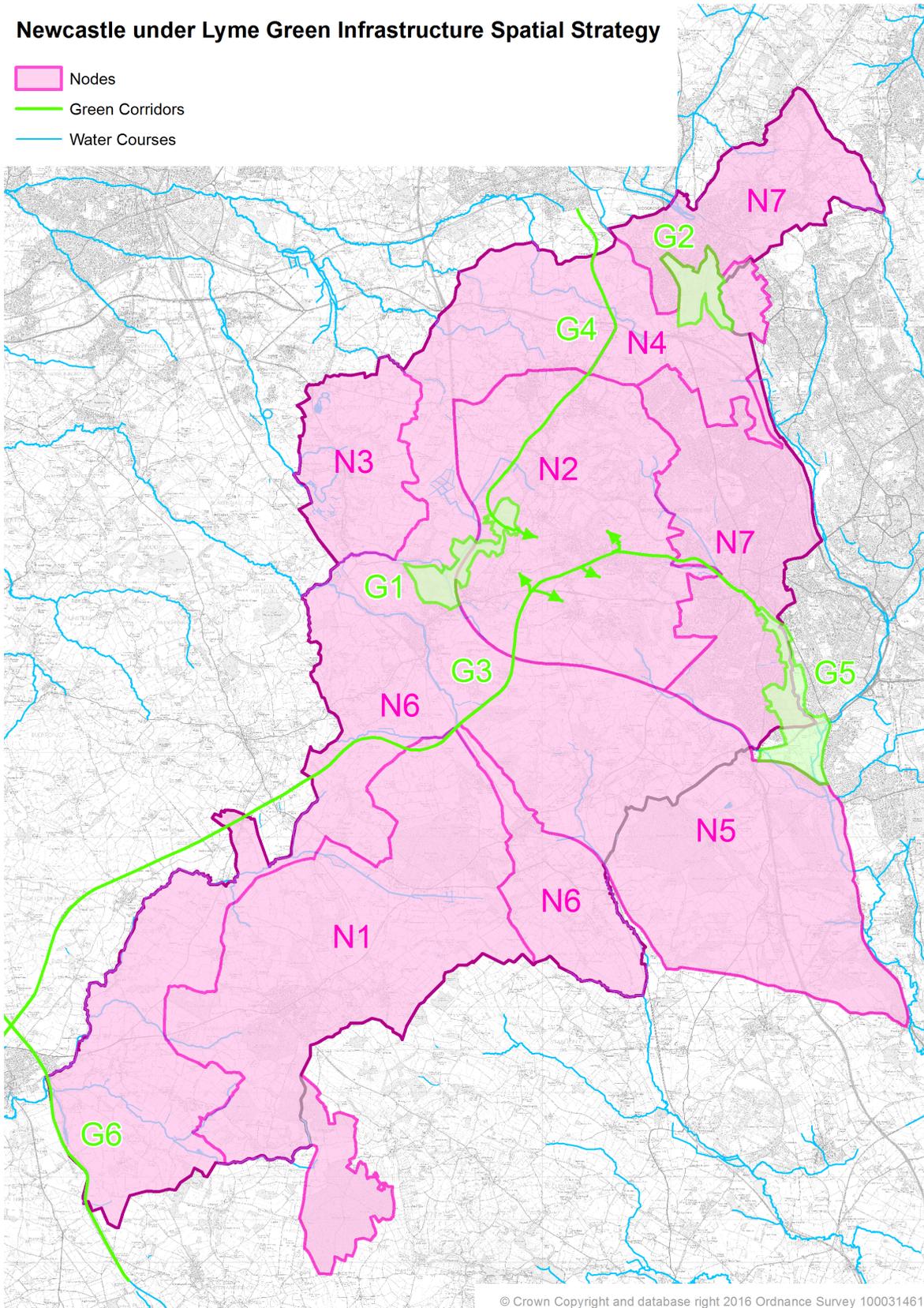
The Spatial Strategy is shown on Plan 4.



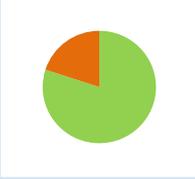
Image 8: Black Firs and Cranberry Bog SSSI, a Staffordshire Wildlife Trust Nature Reserve is located in nodal area N3. This nodal area is especially important for its high value conservation sites.

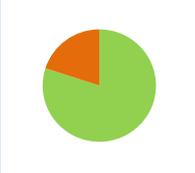
Newcastle under Lyme Green Infrastructure Spatial Strategy

-  Nodes
-  Green Corridors
-  Water Courses

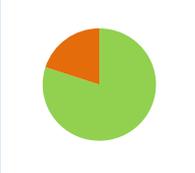


Plan 4: The Newcastle under Lyme Green Infrastructure Spatial Strategy mapped. Note that the water courses refer to thematic strategy T3.

Ref No.	Name	Description	Strategy	Interventions balance
Nodal Areas				
N1	Bishops Wood to River Lea.	This is a predominantly landscape driven node with both urban and rural elements, including a strong woodland cover within a rural rolling landform covering several landscape types. Woodland cover and agriculture predominantly define the character of this area. The node commences outside of the Borough at Bishops Wood and follows a matrix of woodland past Loggerheads (the only major settlement in the node) to the Maer Hills which has an active Landscape Protection Group, before finishing at the minor water course the River Lea. The West Coast Main line presently provides an abrupt end to this node.	<ul style="list-style-type: none"> a. This is node principally requiring conservation and protection but there are also with opportunities for new Green Infrastructure. b. Protection of the wooded landscape is necessary and opportunities to create new woodland in this area should be sought. c. A special focus on proposals that would join existing woodlands physically together (such as shelterbelts and new broadleaved woodland) would benefit the overall Green Infrastructure network. d. Access to this area is likely to remain via 'rights of way' however new permissive access and improvements to existing rights of way should be sought. e. A key opportunity is to link this node with the former railway line that runs from the River Lea to Silverdale, to facilitate non-motorised access from the urban areas of the Borough (N2). f. Over development of this node should be resisted although 'key hole' and 'minor development' could release resources for interventions listed above. New development should be screened wherever possible by trees. 	
N2	Newcastle West Green Gateway	This is an area with urban influence and includes former mining communities. It is more urban in the east and rural in the west and south. Included is Keele University Campus, Bateswood Nature Reserve and the Country Parks at Apedale and Silverdale. It is crossed by a number of transport corridors and these define the boundaries to the node; namely the A53, M6,	<ul style="list-style-type: none"> a. This is node principally requiring conservation and protection but there also ample opportunities for new Green Infrastructure, especially to improve linkages between existing key sites. The proximity of this area to the urban centre of Newcastle under Lyme is a major asset to the Borough especially in 	

		<p>B5500. The area is used for a variety of recreational purposes including golf and other sports. The landscape can be described as urban fringe, interspersed with settlements.</p>	<p>given people access to nature.</p> <ul style="list-style-type: none"> b. Existing 'key' sites, such as Silverdale Country Park, are immature in term of landscape and need both time and management input to help them mature. A 'long-term' perspective is needed in respect of management planning. c. Keele University is major 'green' asset but not one fully used by the wider community, this is an opportunity for the Borough Council and the University to work together. d. The landscape of the former Keele Golf course is good and should be incorporated in any proposed redevelopment through a master planning approach. Any redevelopment of this site is also an opportunity to create new off road access to the University Campus. e. The M6 is an abrupt boundary to the west and the separation of The Glading's from Walton's Wood is a notable break in ecological connectivity. This would be an ideal location for a green bridge which would extend the node Westwood towards Betley, Balterley and Wrinehill (N3) and towards Old Madeley Manor. 	
N3	Betley, Balterley and Wrinehill	<p>This area features a number of high value conservation sites situated amongst a rolling landscape. Betley Mere is of considerable natural and heritage importance. The node is well served with 'rights of way' and the route from Cracow Moss to Bateswood Nature Reserve is of notable importance. The presence of surface water in this area is greater than elsewhere in the Borough, giving it a unique character. the Meres and Mosses Nature Improvement</p>	<ul style="list-style-type: none"> a. This is node principally requiring conservation and protection, especially but not exclusively focused on water environments and associated woodland. Whilst the focus of this is Betley Mere the wide landscape includes numerous smaller water bodies of importance. b. This is a sensitive landscape and development needs to be handled with care for example in respect of 	

		<p>Area includes part of the Borough see http://www.themeresandmosses.co.uk/.</p>	<p>avoiding any diffuse pollution.</p> <ul style="list-style-type: none"> c. The footpath between Cracow Moss to Bateswood includes an on-road section at Adderley Green, off road access should be created if possible. d. A Neighbourhood Development Plan (NDP) is currently awaiting a decision on designation. As an NDP proceeds it should reflect the importance of the designed area to the Borough's overall Green Infrastructure. 	
N4	Newcastle and Kidsgrove Green Gateway	<p>This is an urban fringe gateway giving access to both Newcastle under Lyme, Talke, Kidsgrove and north Stoke-on-Trent. It is traversed by the A500 and is a major Gateway to the 'Potteries'. The landform is undulating and has an urban fringe character and includes former extractive industry sites as well as notable areas of woodland and Bathpool Park. There are a number of commercial business centres and forward logistics in the area.</p>	<ul style="list-style-type: none"> a. Landscape improvements can help reinforce this area as a welcoming approach to the Potteries. b. Key elements of Green Infrastructure are already in place especially on former industrial land and these should be preserved wherever practicably possible. c. In this area, Urban Forestry is a valuable technique to achieve landscape improvements with new structural plantings enabling the joining of existing woodland together and tree belts parallel to road corridors providing air filtration, noise attenuation and screening bland industrial structures. d. New development is unlikely to damage the Green Infrastructure of this node if offsetting actions are delivered. e. The area crosses into Stoke on Trent, hence its Green Infrastructure should be considered in parallel with the City Council. 	

N5	Hanchurch Hills, Swynnerton Old Park and Trentham Gardens	These are long established recreational areas with walks in a strong landscape setting with interesting heritage features, parkland and established woodland. The majority of the area falls with the City of Stoke-on-Trent but extends into the Borough. It is used by Borough residents and exhibits ecological connectivity. There is a notable link to the Lyme Valley Greenway. There is considerable potential for enhancing ecological connectivity in this area by woodland planting connecting existing fragmented ancient woodlands.	<ul style="list-style-type: none"> a. This is node principally requiring conservation and protection. b. Extensive areas of woodland require ongoing woodland management, such as selective felling, new planting and habitat enhancements. c. Ongoing countryside management to address recreational pressures are needed at key locations. d. HS2 will have a significant effect on Swynnerton woodlands and landscape which will require mitigation but it also brings opportunities for enhancement of connectivity and for woodland restoration. e. Rights of way are important for linking larger sites together. 	
N6	West and Central	The West and Central rural area of Newcastle under Lyme is predominantly an agricultural landscape with a gently rolling land form. The landscape features hedgerows and hedgerow trees although the condition of these varies significantly. For the most part importance is attached to maintaining landscape diversity. Access is principally via the right-of-way network.	<ul style="list-style-type: none"> a. This is node principally requiring conservation of existing landscape features such as hedgerows, hedgerow trees and field trees. b. The importance of the rights-of-way network to access is recognised and the condition of rights-of-way will be important to continuing public enjoyment. c. Ongoing countryside management can address recreational pressures and are needed at key locations. d. Opportunities for ecologically sensitive farming should be taken whenever opportunities present themselves. 	
N7	Urban and urban fringe	As the title suggests, this is an urban and urban fringe node. The two principal characteristics are extensive 'sealed surfaces' and 'peri-urban land' some of which is used for agricultural type activities e.g. horse grazing. There are several high-quality green spaces such as parks and gardens which allow extensive public access and in some	<ul style="list-style-type: none"> a. Connectivity improvements are key to enhancing the green infrastructure node. The priorities connecting larger green areas together through for example street scene improvements, tree planting and tree maintenance. b. The ecological value of long established brownfield 	

		<p>areas connected domestic gardens, which are important for wildlife. Tree stands and individual trees are important in the urban landscape.</p>	<p>sites should be recognised when planning redevelopment. Whenever practicably possible established the vegetation should be retained.</p> <p>c. The urban fringe is important for foraging in respect of public use and for wildlife. Hedgerows, lines of trees and rough vegetation have notable values in this regard. These features should be maintained whenever possible</p> <p>d. This node has opportunities for habitat creation through ‘change management’ of some existing areas. An example is the potential to change the management of amenity grassland to meadowland.</p> <p>e. Public engagement, volunteer activities and citizen science can raise awareness of the importance of the Borough’s green infrastructure.</p> <p>f. Whenever practicably possible, surfaces should be unsealed and care taken of urban soils. These are important in respect of climate change adaptation, the food chain for nature and nutrient flows. When sites are developed, efforts should be made to avoid unnecessary levels of ground compaction.</p> <p>g. Initiatives that seek to increase urban food production and the management of private gardens for wildlife should be encouraged.</p>	
Green corridors				
GI	<p>Old Madeley Manor – The Glading’s – Walton’s Wood - Newcastle West</p>	<p>Old Madeley Manor is an important heritage building and parkland landscape with nearby water bodies. It is set amongst well connected woodland – connectivity to the east is compromised by the M6 corridor. The Glading’s and Walton’s Woodlands are</p>	<p>a. New Green Infrastructure in the form of a Green Bridge is advocated, such a major undertaking should appear as a long term objective and could likely be developed at the time of a major re-engineering</p>	

	Green Gateway	separated by the M6 motorway with the two sides otherwise well-connected into wider wooded landscapes. This is an ideal area for a Green Bridge project hence making connectivity between node N2 and areas to the west of the M6.	project on the M6 as an adjunct project.	
G2	Bathpool Park and adjacent open spaces – woodland and open spaces.	Bathpool Park is an urban influenced open space and natural area with water features and an extensive network of adjacent urban woodland. These are important for ecological connectivity and recreation.	a. Maintain key open space resources and seek to improve connectivity, enhance biodiversity and maintain recreational potential.	
G3	Newcastle to Shropshire Union Canal Greenway	Based on a dismantled railway line which runs with gaps from the centre of Newcastle to the River Lea and beyond in a less complete form to the Shropshire Union canal, with crossings of the M6 and the West Coast Main line, this is a major opportunity for Green Infrastructure connectivity and links to Silverdale and Apedale Country parks. To some extent connectivity already exists but there are opportunities for enhancement. The greenway should be considered as a braided route (landscape corridor with access whenever possible) rather than solely linked to the former track bed. Beyond the River Lea towards Market Drayton the route is more conceptual but could be developed in partnership with Shropshire County Council.	<ul style="list-style-type: none"> a. New Green Infrastructure can be used to to enhance the route and provide side branches. b. Wooded vegetation to be maintained and managed for biodiversity c. As far as possible surface to be suitable for cycling and walking. d. Opportunities for interpretation and signage to be taken and clear links make to rights of way. e. Create off road green route (cycle/pedestrian) through Former Keele Golf Course to Keele University as a project within G3(a). 	
G4	Bateswood to Alsager Greenway	Based on a dismantled railway which runs from Alsager to Bateswood, this is a major opportunity for Green Infrastructure connectivity. The route is already in place. The greenway should be considered as a braided route (landscape corridor with access) rather than solely linked to the former track bed. A key opportunity is to link the Greenway with G3 hence creating wider network connectivity.	<ul style="list-style-type: none"> a. New Green Infrastructure can be used to to enhance the route and provide side branches. b. Linkage through Parrot’s Drumble to Kidsgrove and seek further connectivity to G2. c. As far as possible surface to be suitable for cycling and walking. d. Opportunities for interpretation and signage to be taken and clear links make to rights of way. 	

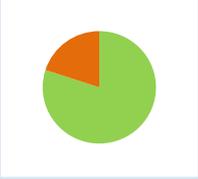
			<ul style="list-style-type: none"> e. Create Bateswood Circular route as a project within G4(a) above f. Use existing PROW to link with G3, cost, agree land issues and seek funding for improvements. 	
G5	Lyme Valley Parkway	Existing Green Infrastructure following the Lyme Brook links to River Trent and to G3 and N2. Strongly urban influenced, with some wooded areas, water features, open grassland and sports facilities.	<ul style="list-style-type: none"> a. Existing Green Infrastructure to be maintained. b. Avoid further urban encroachment. c. Use landscape planting to screen urban features. d. Enhance biodiversity through small scale interventions. e. Enhance path surfaces, signage and increase interpretation. 	
G6	Shropshire Union Canal	Existing green corridor following the Shropshire Union Canal.	<ul style="list-style-type: none"> a. Protect existing Green Infrastructure. b. Work in partnership with other stakeholders. c. Link to G3. 	

Table 7: The Newcastle under Lyme Green Infrastructure Spatial Strategy

Thematic Strategy

Ref No.	Description	The Strategy
T1	Quality vs. quantity	<p>Where a decision needs to be taken between ‘quality’ and ‘quantity’, for instance in respect of public open space management, then quality will be preferred.</p> <p>MORE: <i>Quality is not only a measure of public amenity since of equal value in Green Infrastructure are the ecosystem services the open space provides. Hence the decision will reflect the public benefit <u>and</u> the wider ecosystem benefit.</i></p>
T2	Urban design	<p>Development planning should require that developers include green design to the satisfaction of the local planning authority, in line with Council guidance.</p> <p>MORE: <i>‘Green design’ no longer or very rarely entails significant additional costs that can affect the viability of new urban development. Green design principles, ranging from SUDS, green roofs through to incorporation of niche habitats on buildings are well understood by architects and landscape architects and other urban professions. Commercial/business locations should feature robust landscaping with preference given to indigenous planting and naturalistic landscapes. Whenever possible linkages should be made between new landscaping and neighbouring ‘green areas’.</i></p>
T3	Green corridors and Rights of Way	<p>Recognition is given that connectivity is an essential part of the Borough’s Green Infrastructure approach. Hence wherever practicably possible green spaces will be linked together, although</p>

		<p>this can only be determined on a case-by-case basis. Cross reference should be made with spatial strategy and synergies looked for.</p> <p>MORE: In urban areas street trees can provide ‘bridges’ between green spaces, hence the street scene is seen as a connectivity management issue. Accessible green corridors also act as travel routes for pedestrians and cyclists, albeit this requires planning and design to be factored in.</p> <p>Green corridors are not just linear routes, bounded corridors featuring verges, ditches and hedgerows are habitats too. Such corridors support foraging both by people and wildlife.</p> <p>The Borough’s water courses are of importance as green corridors, especially so as the quantity of surface water is low in comparison with other areas (except in the area around Betley and Balterley). Water courses offer movement for wildlife and are often associated with public access especially across agricultural areas. For this reason, water courses are shown on the Spatial Strategy Plan.</p> <p>Staffordshire County Council has recently published the 4th Review of the Definitive Map and Statement for the Borough. Proposals that enhance the existing path network will be welcomed. Where development is happening, applicants should be encouraged to enhance the existing path network where possible in line with Staffordshire County Council’s Rights of Way Improvement Plan. This could include:</p> <ul style="list-style-type: none"> • The creation of public bridleways or the upgrading of public footpaths to bridleways to improve provision for horse riders and cyclists where there is currently a shortfall in available access routes. A long-term aspiration is to upgrade footpaths within Bathpool Park to formalise the usage by horse riders and cyclists. • The creation and promotion of short circular walks to promote the health benefits of walking. • The replacement of stiles with gaps (where there are no stock) or gates (where there are) in line with Staffordshire County Council’s Least Restrictive Principle for path furniture.
T4	Off-setting	<p>Losses in Green Infrastructure should normally be offset by commensurate increases in provision elsewhere in terms of overall environmental performance. Where financial contributions are involved these can be pooled to maximise the benefits.</p> <p>MORE: It is unrealistic to expect that all area of Green Infrastructure can be preserved; indeed, in some situations the loss of green spaces which are either poorly performing, surplus to requirements or in the wrong place can actually lead to gains in terms of environmental performance through the process of off-setting. For example, through the creation of a new habitat rich area with good public access. Ecosystem values could require the application of an ecosystem valuation tool as part of determining the viability of off-setting a given development, this will normally be the responsibility of the applicant to the satisfaction of the local planning authority. There are numerous tools available and guidance is available at the Government’s Joint Nature Conservation Committee (JNCC) website. It should be noted that DEFRA/Natural England have pilot projects which can be used as case studies.</p>
T5	Transportation and movement	<p>Civil engineering operations commissioned by the Borough Council and other public agencies working in the Borough; should normally utilise the regulatory services provided by Green Infrastructure to offset their environmental impact in preference over grey infrastructure solutions.</p> <p>MORE: Nature based solutions should be pursued in preference to hard ‘grey’ infrastructure. Where grey infrastructure is used then links to adjacent Green Infrastructure should be made. Civils’ operations should seek to make access improvements for pedestrians and cyclists whilst respecting existing nature.</p>

T6	Food security	<p>Encouragement should be given to local food production, local food marketing, foraging, composting and waste recycling.</p> <p>MORE: Community food production (such as allotment gardening) is generally environmentally friendly and maintains urban soils. It is also contributing to health and well-being through physical activity and is known to improve mental health. The Council need to coordinate the provision of allotments and other food spaces in keeping with the Open Space Strategy. Temporary sites can be used for urban growing that can then be moved when a site is developed. Community food production is allied to recycling activities and can be co-promoted.</p>
T7	Economy and jobs	<p>Public Policy should encourage employment and training in land based industries and facilitate volunteer involvement in Green Infrastructure project delivery.</p> <p>MORE: Green Infrastructure makes a large impact in respect of employment. Land management is a relatively easy point of entry to the employment market especially for people with a low skills base and this can lead to progress in vocational training. Green Infrastructure is also a major reason why people visit an area and hence assists in the tourist and visitor economy. Volunteering is also a major contributor to Green Infrastructure management and the act of volunteering builds social cohesion.</p>
T8	Health and wellbeing, education & social cohesion	<p>Encouragement and when possible funding should be deployed to facilitate green exercise and other activities that strengthen well-being and social cohesion in open spaces; for example, through activity and event programmes that target those who currently do not use open space or are socially excluded from it.</p> <p>MORE: Peer reviewed research has shown that access to and use of Green Infrastructure is strongly beneficial to human health and well-being and can help bridge numerous areas of social exclusion and support lifelong learning. Especially strong results are found in terms of cardio-vascular condition and mental health such as stress reduction. Activity started in outdoor spaces is more likely to have been continued one-year hence than if exercise was taken in a Gym. Green Infrastructure is a venue for formal teaching, training and informal lifelong learning.</p>
T9	Biodiversity & Geodiversity	<p>Areas of high ecological value including designated sites should be protected from development and enhanced wherever possible. Advice should be sought from competent authorities where there is a question of potential development impacts. There is a need maintain the quality of sites to prevent or reduce the risk of habitat losses across all key sites.</p> <p>MORE: Biodiversity and geodiversity is a barometer of the overall health of the the local environment. The most important sites are designated and should always be protected from development. There is planning practice guidance issued by government. Competent authorities include Natural England, Environment Agency, Forestry Commission, Staffordshire County Council and Staffordshire Wildlife Trust. Areas of high ecological value also contribute to the quality of the landscape of the Borough. The Borough supports significant populations of protected species including great crested newts and dormouse - creating and connecting habitat for this species should be a priority as it is for the State of Staffordshire report. Biodiversity Opportunity Mapping has been carried out for the Borough. There are a range of practical measures that the Borough Council can support these include; (i) the enhancement of existing ecological corridors for nature and access to allow for the movement and distribution of wildlife and public enjoyment of the natural environment, (ii) increasing the ecological diversity of amenity Open Space – e.g. by reseeding and management as meadows rather than amenity grassland, (iii) Working in partnership with other bodies to encourage whole farm planning for nature improvements, (iv) look to hedgerow management and biomass planting and harvesting for small scale local energy production.</p>

T10	Trees	<p>Trees should normally be protected from the adverse impacts of development and veteran trees should only be removed in extremis (for example when they are a risk to human well-being). Whenever possible existing trees should be incorporated into new developments and protected during the building phase. Tree planting should normally be required on all development sites to the satisfaction of the local planning authority, in line with Council guidance. The Borough Council should seek manage trees using the principles of urban forestry. In Newcastle under Lyme, Kidsgrove and urbanised villages the Borough Council should seek opportunities to plant trees within the street scene to encourage ecosystem connectivity.</p> <p>MORE: <i>The Trees of the Borough are more than just landscape features as they regulate air quality, provide evaporate cooling and particulate filtering. Trees grouped into woodland as well as field and hedgerow trees are vital to the landscape of the Borough. It is highly desirable to create new urban and peri-urban woodland and manage trees in the urban areas as an ‘urban green canopy’ (urban forest) – this will enhance connectivity in urban areas. Trees are importance providers of ecosystem services and there are several tools sets available to measure these benefits.</i></p>
T11	National and regional infrastructure	<p>National and regional infrastructure in the Borough should be audited with a view to agreeing with operator’s/agencies long term objectives for enhanced Green Infrastructure performance and improved connectivity.</p> <p>MORE: <i>The Borough is greatly influenced by national and regional infrastructure most noticeably the M6, West Coast mainline, A500 and the proposed HS2. These all impact on the Borough’s Green Infrastructure. They divide the landscape and impact on ecological connectivity. It is recognised that the Borough Council has limited responsibilities and resources to affect change, however the Council could audit the corridors and identify Green Infrastructure improvements as part of future infrastructure works. The priority is to seek opportunities for green bridges and wildlife underpasses and niche habitats with respect to HS2 and to use partnerships such as the LEP to advocate such measures.</i></p>
T12	Landscape	<p>The landscape of the Borough should be protected from degradation and enhanced whenever possible.</p> <p>MORE: <i>The Borough is fortunate in having a well structure landscape albeit one greatly influenced by national and regional infrastructure. However, the landscape is vulnerable to decline and can be negatively impacted by poorly sited developments. Landscape advice should be sought from the County Council where there is concern about the detrimental impact of a given development. Landscape enhancements should be sought through the Borough’s involvement in partnership projects.</i></p>
T13	Neighbourhoods Development Plans (NDPs)	<p>Designated bodies should be invited to include Green Infrastructure in their NDPs and cross reference to this Strategy.</p> <p>MORE: <i>NDP’s are part of the statutory planning process and inclusion in them of supportive Green Infrastructure polices will benefit the delivery of this Strategy. NDPs are underway in Loggerheads; Chapel and Hill Chorlton, Maer and Aston and Whitmore. A neighbourhood area is also proposed covering the parish of Keele and another for Betley, Balterley and Wrinehill.</i></p>

Table 8: The Newcastle under Lyme Green Infrastructure Thematic Strategy.

Section 6: Delivery and the role of the Borough Council

The delivery framework

6.1 Green Infrastructure crosses multiple land uses and ownerships so no one organisation has sole responsibility for Green Infrastructure across the Borough. The core approach to delivery of Green Infrastructure in the Borough is through ‘partnership’. There are existing partnerships in place that can add Green Infrastructure to their remit. There is no need to establish another forum. Having the appropriate ‘tools’ available to achieve the spatial and functional strategies is important.

Partnership roles

6.2 Partnership roles:

Staffordshire County Council	The County Council has a key role as an advisor on a range of issues e.g. ecology and landscape. It also has a key role in respective rights-of-way which are essential to access the Borough’s Green Infrastructure.
Adjacent local authorities	Green infrastructure does not stop at municipal boundaries. Local authorities should continue to work together to plan cross-border Green infrastructure. Notable examples are in respect of watercourses.
Utility companies	These companies can seek to use nature based solutions when dealing with infrastructure investments. These are strongly beneficial to green infrastructure.
Developers	When planning new development advice should be taken to ensure that green infrastructure is incorporated in the development. An example of this is the use of sustainable urban drainage. Trees and other landscape features that are to be retained should be carefully protected during development. Whenever practicably possible connectivity should feature in developments.
Landowners, farmers and tenant farmers	The management of agricultural land and woodland is crucial to the performance of the Borough’s green infrastructure. Whenever possible habitat sensitive farming should be pursued. Hedgerows and trees should be preserved and replaced when required.
Nature conservation organisations and NGO’s	These bodies have a key role as land managers and in the engagement of wider society in green infrastructure. They have a key role in citizen science, conservation volunteering, nature management and environmental education.
Community	All citizens can assist in the creation and management of green infrastructure. The ways of achieving this are very diverse but include for example; preparedness to volunteer and nature sensitive management of private gardens.

Table 9: Table showing partnership roles. Partnership is the key to the successful delivery and sustenance of green infrastructure at the local level.

The role of the Borough Council

6.2 The role of the Borough Council in delivery is:



Figure 3: Infographic showing the role of the Borough Council in the delivery of the Green Infrastructure Strategy.

Funding

6.3 Funding for the Green Infrastructure will come from a number of sources both monetary and in-kind. It is not the responsibility of the Borough Council to provide the resources for Green Infrastructure delivery beyond its own land and securing funding through planning agreements; however, the Borough Council can facilitate access to external funds for delivery by supporting or leading external funding applications, for example to the National Lottery or Government Grants. Securing funding normally requires a partnership approach since funders require the involvement of many stakeholders and evidence of community support. The Borough Council should give full consideration to mounting a landscape partnership application to the Heritage Lottery Fund for a project based on the Strategy's nodal areas and green corridors.

Section 7: Abbreviations used in this report, acknowledgements, photographic credits.

Abbreviations, definitions and commentary related to this Strategy or referenced in allied literature.

CO ₂	Carbon Dioxide – the most common greenhouse gas.
GI	Green Infrastructure.
Green Corridor	Landscape corridors that provide various forms of connectivity, the most notable being (i) ecological connectivity, (ii) recreational/access connectivity or (iii) landscape connectivity.
HS2	High Speed 2 (HS2) is the planned high-speed railway linking London, Birmingham, the East Midlands, Leeds, Sheffield and Manchester.
Joint Local Plan	The Joint Local Plan for Newcastle-under-Lyme and the City of Stoke-on-Trent. A framework that guides the long-term future growth of an area over a period of 15 to 20 years, including how much development there should be, where it should go, and how land should be used.
LEP	Local Enterprise Partnership.
Natural and Semi-Natural Greenspace	This category includes a wide range of green spaces which have significant ecological value. Newcastle under Lyme is well provided for compared with many other lowland local authorities. Physical access to natural and semi-natural green space varies; in the accompanying Open Space Strategy, this is subdivided into 'limited accessible green space', 'green space accessible via routes and paths' and 'open access'. Limited access green space does not necessarily have physical access, but will have other access e.g. visual. Green space accessible via routes and paths provides the larger part of natural and semi-natural green space and is physically accessible either via a right-of-way or a permissive route. Open access green space is where a site is wholly open; examples include some woodlands. For the most part open access is limited in the lowlands and is more typically characteristic of upland landscapes such as moorlands and heaths.
NHS	National Health Service.
Node (Nodal) Area	Existing areas where Green Infrastructure is concentrated and/of notable value. These areas function at the 'landscape scale' rather than at the 'local scale'.
NPPF	National Planning Policy Framework.
Open Space Strategy	Accompanying Strategy to the Green Infrastructure Strategy with shared evidence base
PM ^{2.5}	Microscopic particulates which can cause respiratory and other diseases. They can pass straight into the blood stream.
Population Growth and New Open Space	The population of Newcastle under Lyme is predicted to grow during the Joint Local Plan period. Provision is based on an agreed Open Space quantity standard. As the population grows in the Borough, new open space may be required if the overall quantity standard is exceeded.
PPG	Planning Practice Guidance.
SHMA	Strategic Housing Market Assessment.
SPD	Supplementary Planning Document
SSSI	Site of Special Scientific Interest
UGI	Urban Green Infrastructure.

Acknowledgments

All contributors to the Newcastle under Lyme Great Outdoors Survey.

All attendees at consultation events.

The consultants team: Clive Davies (Project Manager), Glenn McGill (Planning), Paul Davies (Data), Tom Butlin (GIS), Jane McGill (Survey), Marinella Spano (Consultation).

Council Officers; Becky Allen, Stewart Donohue, Roger Tait, Helen Beech.

Officers of adjacent authorities consulted in the course of the study.

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