

Green Infrastructure Statement

22nd April 2024 Rev G

Overview

As part of the development process, the existing Green Infrastructure (GI) asset has been assessed through landscape desktop survey, and the context of the site, in its wider GI network, and within the policy framework in Wales and Merthyr Tydfil. The following statement reports on the iterative GI process and how it has influenced the design approach based on national and local policy, focusing on the appropriate and proportionate GI benefits that development of this site can contribute.

Introduction

The term ‘Green Infrastructure’ first came to prominence in the early 2000’s most notably in the Landscape Institute Position Statement ‘Green Infrastructure An integrated approach to landuse’ (2009). This document defined Green Infrastructure as;

‘The network of natural and semi-natural features, green spaces, rivers and lakes that intersperse and connect villages, towns and cities. It is a natural, service-providing infrastructure that is often more cost effective, more resilient and more capable of meeting social, environmental and economic objectives than ‘grey’ infrastructure.’

GI Functions are described as the:

‘roles that assets can play if planned, designed and managed in a way that is sensitive to, and includes provision for, natural features and ecosystems services. They may have obvious primary functions, but each asset can perform different functions simultaneously – ‘multifunctionality.’

The natural environment between and within towns and cities, including greenspace, vegetation and water. Provision of GI offers a multitude of ecosystem services (i.e. the benefits that people derive from nature) and forms part of a sustainable approach to the management of natural resources. New infrastructure should seek to strengthen and reinforce existing assets within a site and it should be planned and designed to be beneficially multi-functional.

Principal GI Design Aims.

The principal multifunctional targeted benefits of GI are to:

1. Protect and enhance biodiversity and the resilience of ecosystems and their connectivity;
2. Consider Opportunities for habitat protection, restoration, creation and management in the provision of GI;
3. Contribute to improved mental health with more direct contact with nature, the seasons and natural processes;
4. Identify opportunities where existing and potential green infrastructure could be improved and enhanced as part of placemaking;
5. Provide opportunities for improved physical health and wellbeing through recreational access, community permeability and connectivity;
6. Enhance place-making identity and sense of community ownership;
7. Improve townscape and landscape quality and visual amenity;
8. Integrate play and recreation in GI networks;
9. Improve micro-climate (summer cooling/winter shelter);
10. Mitigate and adapt to the impacts of climate changes improving of;
 - Oxygen production.
 - Carbon sequestration (locking carbon in vegetation and soils).
 - Water sequestration (vegetation evapotranspiration and formal attenuations).
 - Improve air and water quality.
 - Reduce flood risk.
 - Provide alternative transportation opportunities (cycling/walking/public transport links).

Green/Blue Infrastructure (GI) is the term adopted in this document to incorporate the now more fully developed drainage requirements for developments under SABs, (Sustainable Drainage Approval Body) in Wales, along with other GI elements including all the features of

Policy & Guidance

Planning Policy Wales 2024 (12th Edition)

6.2 Green Infrastructure

“Green infrastructure plays a fundamental role in shaping places and our sense of well-being, and are intrinsic to the quality of the spaces we live, work and play in. The planning system should protect and enhance green infrastructure assets and networks because of these multi-functional roles. The protection and enhancement of biodiversity must be carefully considered as part of green infrastructure provision alongside the need to meet society’s wider social and economic objectives and the needs of local communities. The multiple benefits that resilient ecosystems and

green infrastructure offer to society, including the economic and social contribution they make to local areas, should be taken into account when balancing and improving these needs.”

“The quality of the built environment should be enhanced by integrating green infrastructure into development through appropriate site selection and use of creative design. With careful planning and design, green infrastructure can embed the benefits of biodiversity and ecosystem services into new development and places, helping to overcome the potential for conflicting objectives, and contributing towards health and well-being outcomes.”

Future Wales: The National Plan 2040

Policy 9 – Resilient Ecological Networks and Green Infrastructure

“To ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure, the Welsh Government will work with key partners to:

- identify areas which should be safeguarded and created as ecological networks for their importance for adaptation to climate change, for habitat protection, restoration or creation, to protect species, or which provide key ecosystems services, to ensure they are not unduly compromised by future development; and
- identify opportunities where existing and potential green infrastructure could be maximised as part of placemaking, requiring the use of nature-based solutions as a key mechanism for securing sustainable growth, ecological connectivity, social equality and well-being.

Planning authorities should include these areas and/or opportunities in their development plan strategies and policies in order to promote and safeguard the functions and opportunities they provide. In all cases, action towards securing the maintenance and enhancement of biodiversity (to provide a net benefit), the resilience of ecosystems and green infrastructure assets must be demonstrated as part of development proposals through innovative, nature-based approaches to site planning and the design of the built environment.”

“As part of a green infrastructure assessment, broad opportunities for habitat protection, restoration or creation and the provision of green infrastructure may be specified as part of identifying areas to be safeguarded or may take the form of more specific allocations. This may be achieved, for example, through the provision of buffer areas around protected sites or stepping stones connecting habitats or through the identification of green infrastructure in and around urban areas.”

Merthyr Tydfil Replacement Local Development Plan (LDP) 2016 - 2031

Policy SW11: Sustainable Design and Placemaking

“Development must contribute to the creation of attractive and sustainable places through high quality, sustainable drainage systems where appropriate, and ensure that the County Borough’s network of green infrastructure is accessible and connected;”

6.4.72 – “Amongst the list of detailed considerations the policy requires the provision and integration of Green Infrastructure in new development proposals which may, for example, include open space and Sustainable Drainage System (SuDS) features. The integration of Green Infrastructure is important as it can realise other positive benefits to health and well-being. This can include for example, the provision of healthy and active environments, flood management, water and air quality improvements, reduced noise pollution, climate moderation, climate change mitigation and food production. Examples of features that can help address these wider objectives can include landscaping, green roofs, grass verges, sustainable urban drainage, open spaces and gardens.”

6.4.74 – “The Council’s Biodiversity Action Plan and future Nature Recovery Action Plan will identify local biodiversity issues and opportunities for green infrastructure enhancement that can inform the planning and design of development proposals. Examples of landscape-scale green infrastructure within the County Borough that can provide enhancement opportunities and which are areas of high biodiversity value include former mineral and coal spoil tips and the Coedcae (Fridd) mosaic habitats that exist on predominantly steep valley sides between the valley floor and upland areas. The Council’s Open Space Strategy and Local Nature Reserve can also be used in the consideration of potentially suitable locations for off-site compensation where there is unavoidable loss of sites important for biodiversity”.

6.6.9 – “The Council’s Biodiversity Action Plan and future Nature Recovery Action Plan will identify local biodiversity issues and opportunities for enhancement and will supplement the information contained in NRW’s Area Statements. As well as identifying opportunities to promote ecosystem resilience, the Council’s Open Space Strategy and Local Nature Reserve can also be used to identify potentially suitable locations for securing off-site compensation. Further information regarding the consideration of Green Infrastructure in new development can be found under Policy SW11: Sustainable Design and Placemaking”.

Merthyr Tydfil Nature Recovery Action Plan 2019 - 2024

Objective 3: Increase the resilience of our natural environment by restoring degraded habitats and habitat creation.

“Landowners will be positively influenced to undertake land management that will restore degraded habitats and/or create new habitats” (pg. 23).

Development GI Process

As part of the development process, the existing Green Infrastructure (GI) assets have been assessed through Landscape desktop survey, and the context of the site, in its wider GI network, considered. These assessments are illustrated and reported in the following document(s):

- 26CB01-SBC-00-XX-DR-L-300 Landscape and GI Constraints and Opportunities Plan
- 26CB01-SBC-00-XX-DR-L-400 Strategic Soft Landscape Plan
- 26CB01-SBC-00-XX-DR-L-401 External Areas Calculation
- 26CB01-SBC-00-XX-DR-L-402 Western Habitat Mitigation
- 26CB01-SBC-00-XX-DR-L-403 Eastern Habitat Mitigation
- 26CB01-SBC-00-XX-DR-L-405 Biodiversity Enhancement Plan
- EclA Ecological Services Limited,

The stepwise approach (PPW 12) has been implemented along with the DECCA Framework¹. A summary of the stepwise approach is as followed-

1. **Avoid**

To avoid damage to biodiversity and ecosystem functioning.

2. **Minimise**

Alternative sites that would result in less harm, no harm or gain are to be fully considered to minimise the any harmful environment effects.

3. **Mitigate/Restore**

‘...ensure that features and elements of biodiversity or green infrastructure value are retained on site and enhanced or created wherever possible.’

4. **Compensate on site**

Onsite compensation must be sought when all other options have been exhausted.

5. **Compensate off site**

Offsite compensation must be sought when all other options have been exhausted.

6. **DECCA Framework**

By assessing resilience attributes of the site, appropriate enhancements can be proposed through the landscape design:

- **Diversity:** Biological diversity and all scales of the environment underpins biodiversity and resilient ecosystems. A more diverse ecosystem is more resilient to external influences.

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- **Extent:** The size of an ecosystem will affect its capacity to adapt, recover or resist disturbance. The smaller the extent of an ecosystem, the less species it can support and the less resilient it is to extreme events.
- **Condition:** This relates to the overall condition of an ecosystem, which could be measured by several factors including presence, abundance, structure, range of habitats and species, and water/air/soil quality. Ecosystems in better condition will be more resilient to change.
- **Connectivity:** “Connectivity refers to the links between and within habitats, which may take the form of corridors, stepping stones or patches of the same or related vegetation types.” “Connectivity is a major driver for spatial variation which affects diversity and the abundance of living organisms.”
- **Adaptability:** Ecosystem resilience is thought to emerge from the four attributes above, and may appear in three distinct aspects: adaptability, resistance, or recovery to/from disturbance.

7. Long Term Management

Long Term Management of retained and new GI assets to secure enhancement.

Development GI Aims

The GI aims have been developed within the context of the Landscape and GI Constraints and Opportunities Plan, & EclA and the design team review of how the development GI could most appropriately enhance Placemaking, Biodiverse, Adapting the site for Climate Change, and how it could contribute to the Health and Wellbeing of the users and deliver a Sustainable approach, all focusing on beneficial Multi-functional GI outcomes.

The site area was also reviewed as part of the design process and the function of the development in contributing to the wider GI network. The site itself is isolated from the local GI network (Ref: 26CB01-SBC-00-XX-DR-L-300 *Landscape and GI Constraints and Opportunities Plan*). Therefore, the proposed development aims to establish GI along the site boundary which will contribute to the wider GI network for any future connections and developments.

The Merthyr Tydfil Borough Council SPG Chapter 10 on Green Infrastructure, summaries below, have been applied to achieve the GI proposals.

1. Protect and Enhance the function of Existing GI

Using contextual appraisal to gain understanding of the assets, functional requirements, and potential benefit of the existing green infrastructure, that can then be used to inform design new developments that protects, enhance the function of existing green infrastructure. The range of measures includes scale

building measure e.g. green roofs, to bigger scale measure, as well as providing new recreational green space.

2. Incorporating Green Spaces Networks

‘Networks of green spaces can be incorporated into developments through wildlife-friendly landscaping, provision of open space, installation of SuDS and features such as green roofs and walls.’ The SPG also emphasise the species chosen should be ‘suited to the microclimate and beneficial to wildlife. Native species are best suited to the local environment, sustaining biodiversity while protecting and enhancing natural features and the character of the area.’

The proposed SuDS including rain gardens and swales which will retain a degree of water run-off and encourage natural drainage in-situ on-site, as well as increasing evaporation and micro-climate benefits. Extensive wildflower meadow seeding (tolerant of occasional flooding) within the rain gardens will provide valuable habitat and ecological resources for the local ecosystem. Furthermore, tree planting within rain gardens will add vertical visual interest, biodiversity value and shading within the landscape. Two raised SuDS planters provide additional bioretention and planting interest.

Summary of Effects, Mitigation & Enhancement

The landscape drawings, listed above, illustrate the impact and proposed new landscape elements as part of the proposed development including offsite mitigation resulting for the GI led approach. The process and results are summarised through each stepwise stage below.

Step 1: **Avoid:**

- Other sites had been considered, however the location of the site best fits the educational, community and development needs.

Step 2: **Minimise:**

- Existing GI within the site boundary is dominated by species rich neutral semi-improved grassland and lacks a complex multi-functional GI. Tree and scrub cover is generally limited within the boundary of the school development. Existing trees within the site have aimed to be preserved as far as possible. The footprint of the development and the associated landscape would require the unavoidable removal of large areas existing grassland, which also includes species-rich marshy grassland.

Steps 3 to 5: **Mitigate/Restore/Compensation (on and off site):**

- Mitigation, Restoration and Compensation proposals onsite include:

The site development proposes to create strengthened east-west and north-south GI corridors with swales (retaining water), native hedgerow, meadow grass and woodland corridor defining the northern and eastern site boundaries and creating a multi-functional GI corridor linking and bounding the school site. Within the school site additional GI features would include individual trees of habitat value, native woodland, native species-rich hedgerows, wildflower meadow, shrubs and rain gardens. Part of the planting will be delivered in SuDS elements adapting for climate change and all GI components will contribute towards an improved micro-climate, which will then support different species and mediate the environment through pollutant and dust capture, evapotranspiration and biological filtration. As well as contributing to ecosystem resilience through additional and improved habitats. Provision of bat boxes, bird boxes, and hedgehog-friendly fences will bolster the ecological value of the proposed landscape.

In addition, a western and a south eastern 'blue line' off-site habitat creation sites have also been proposed to further mitigate grassland and habitat loss and create wider diversified habitat mitigation. The western site would include new habitats to that particular portion of the site: boundary native hedgerow (that will connect to the main development's boundary hedgerow), native woodland copse, native specimen trees, and a new wetland feature. Existing grassland within the western parcel will be enhanced by plug planting. The south eastern off-site habitat creation area would include revised management to grassland to encourage diversification and a new reptile hibernacula feature.

Step 5: **DECCA Framework**

- *Diversity:* The current habitats on the site are dominated by species-rich grassland, with little tree/scrub cover. Supplementary plug planting will be added to off-site retained grassland as an enhancement. Proposed wildflower meadow mixes will add greater diversity to grassland species within the area. Shrub and perennial planting will provide additional ecological resources for local wildlife by increasing the diversity of species within the site. Woodland copse and hedgerow planting is a new habitat for the site which will create additional structure and shelter not currently available. The proposed open swale around the edge of the swale will feature check dams that will create ponds of water; this is an additional habitat to what is currently available.
- *Extent:* Whilst a large proportion of the existing grassland will be removed to accommodate the school, wildflower meadow seeding is proposed over much of the remaining available landscape. Existing grassland offsite will be enhanced to help mitigate for the loss of extent of existing grassland. The extents of other habitats

such as scrub and tree planting will be considerably increased as part of the development proposals.

- *Condition:* Grassland that is being removed will be replaced by new wildflower meadow mixtures that will add diversity to the grassland on site. The use of sustainable drainage solutions across the proposed development will assist with filtering surface run-off water. The additional habitats that will be created as part of the proposed development will help to improve the condition of the ecosystem. Furthermore the proposed long-term management regime of the landscape will seek to maintain the grassland landscape in good condition with
- *Connections:* The diversity of new habitats being proposed as part of the development, particularly new hedgerows and trees, will significantly increase the green connections between habitats. While areas of existing grassland would be lost as part of the site's development, the proposed wildflower meadow mix will provide taller vegetation than existing which will provide additional shelter for wildlife. Furthermore, pockets of large shrub planting within the meadow act as stepping stones for wildlife. The proposed swale running along the northern and eastern boundary provides an additional connection through the site for wildlife.
- *Adaptability:* The greater variety of plant species that will be introduced as part of the proposed development will provide greater adaptability of the ecosystem to outside influence, particularly the effects of climate change which has led to hotter and drier summers.

Step 6: Long Term Management

- An additional benefit which can result from the proposed development would be the opportunity for the long-term management of the retained and new GI assets to secure these enhancements and their value in the long term.

GI Conclusion

The above Stepwise GI process adopted through the design development process, demonstrates that where possible, negative impacts have been avoided, whilst achieving the necessary development outcomes, with beneficial multi-functional GI outcomes which strengthen and diversify the current GI assets and provide the opportunity for a more climate change resilient matrix of beneficial and diverse GI components, whilst providing the opportunity to secure beneficial long-term management and contributing more extensively to community and environmental (multifunctional GI habitat and sustainable drainage) needs.

Retained, Removed and Proposed on-site and off-site Principal Multi-Functional GI

Retained Trees	7 no.
Removed Trees	5 no.

Removed Grassland	39,769 sq m
Proposed General Wildflower Meadow	8,479 sq m
Enhancement of Existing Grassland	6,847 sq m
Proposed Wet Wildflower Meadow	3,949 sq m
Proposed Sports Surface	3,354 sq m
Proposed Amenity Grass	4,128 sq m
Proposed Trees	32 nos. (1:6.4 replacement ratio)
Proposed Woodland Mix	976 sq m (New GI asset)
Proposed Species Rich Hedgerow	570 linear m (New GI assets)
Proposed Shrubs Planting	1,224 sq m (New GI assets)
Proposed Stony Substrate for invertebrates	194 sq m (New GI assets)
In addition to the retention of water in the new swale a new off-site pond is proposed	427 sq m (New GI asset)