

Swanage Green Infrastructure Strategy

Supplementary Planning Document

June 2018



Thriving communities in balance
with the natural environment

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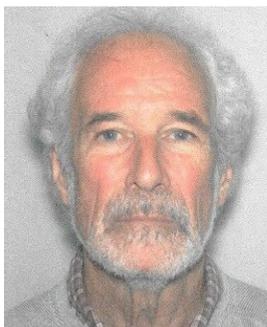
Foreword

We hope that Swanage and everyone who lives, works and visits will soon start to benefit from the improvements to the GI network that will result from the implementation of this Strategy. The town will become a greener, and even more pleasant place whilst also benefitting from increased resilience in the face of climate change.



A handwritten signature in black ink, appearing to read 'Peter Webb'.

Councillor Peter Webb
Environment Portfolio Holder, Purbeck District Council



A handwritten signature in black ink, appearing to read 'Richard Smith'.

Richard Smith
Chairman of the Swanage Local Plan GI working group

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Executive summary

- In the early stages of the Swanage Local Plan (SLP) process protecting and enhancing the natural environment, climate change, and flood risk were identified as being amongst the key issues and challenges faced by the town.
- At the SLP natural environment issues and options workshops in 2013 the potential for enhancement and expansion of the existing green infrastructure (GI) network to provide solutions to these issues and challenges, and the requirement for a GI strategy to guide this was put forwards.
- The Swanage Local Plan includes policy SGI (Swanage Green Infrastructure), which formalises the requirement for a GI strategy, requires all development proposals to take account of the strategy when completed, and includes a statement setting out how the proposals will avoid loss to the existing GI network and maximise opportunities to improve and enhance it.
- This resulting strategy was produced by Purbeck District Council, and includes a GI audit containing information produced at a GI workshop attended by community and voluntary groups and organisations with an interest in GI, and the results of a field survey undertaken by volunteers from the local community. It was presented for public consultation at the Swanage Local Plan Inquiry along with the Pre-submission Document, and is a supplementary planning document (SPD).
- A schedule of costed projects and initiatives and a list of possible sources of funding is included in the strategy, along with recommendations on the mechanism for implementation by Swanage and Purbeck Development Trust and Swanage 2027. Priority projects include GI improvements to Main Beach and North Beach car parks, a tree planting and wildflower meadow project for low GI areas in Herston, an Ulwell Stream flood management project, street and parkland tree planting, and extension of the Dorset County Council 'Living Verges' initiative to include Swanage.
- Guidance is also provided for developers to assist with the design of GI and to help ensure compliance with policy SGI.
- Implementation of this strategy will result in the provision of a 'green infrastructure network of interlinked multipurpose open spaces with good connections to the open countryside', which is the vision for Swanage identified at the GI workshop. This robust GI network will increase the resilience of and enhance the natural environment, provide targeted flood alleviation, and support Swanage's response to climate change.

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Introduction

1. Green infrastructure (GI) is 'a network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities'.¹
2. There is an increase in the political interest in and consequent policy on GI. The Government's National Planning Policy Framework, the Natural Environment White Paper and Local Plan policies are encouraging action to increase the understanding of and improve GI. This increasing importance is developing in response to a growing understanding of the quantifiable benefits of GI across a wide range of topic areas.
3. The most common drivers include aesthetics, improving the look and feel of a location for visitors, workers and residents, and attracting investment. Other drivers include resilience to climate change, reduction of flood risk, improving air quality, increasing biodiversity, health and wellbeing and the protection and stewardship of existing assets.



¹ National Planning Policy Framework [Department for Communities and Local Government 2012](http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf)
<http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf>

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Why does Swanage need a green infrastructure strategy?

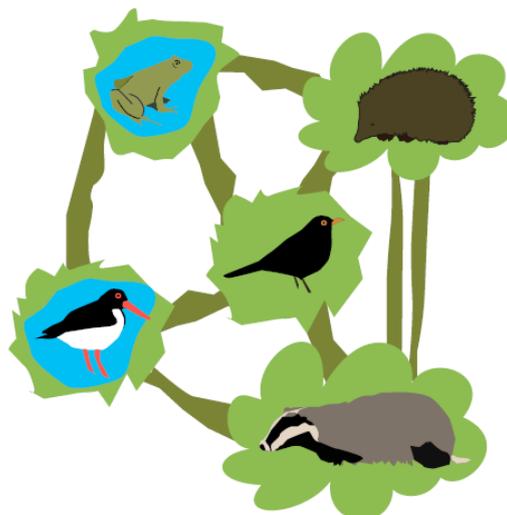
4. During the early stages of putting together the Swanage Local Plan, community, voluntary and business groups attended workshops to discuss current issues in the town, and various options to address these issues. The natural environment issues and options workshop group identified that the town's green spaces, watercourses and other areas of water are important because they:
 - contribute to the character of the town;
 - provide 'breathing space' in built up areas;
 - support wildlife;
 - have the potential to help Swanage be resilient in the face of climate change.
5. The group felt that more green assets could be provided, and that more should be done to maintain and connect the existing assets. The group concluded that to achieve this, the existing assets need to be better understood, and a strategy for change and improvement based on this better understanding developed.

What do we hope the strategy will achieve?

6. There is plenty of evidence from around the country that producing a GI strategy will benefit Swanage in obvious, and some not so obvious ways. For example Thetford in Norfolk has enhanced its reputation by undertaking a GI audit, and producing proposals for improvements. This is because the process has demonstrated action on green issues locally, and positive relationships have been developed, demonstrating that communities can lead the way in GI initiatives, bringing partners with them.
7. Research also shows that GI can create an attractive setting, which encourages inward investment. Employers in Cumbria have even reported that an improved environment and the involvement of staff in activities to increase the diversity of habitats for wildlife have boosted morale, which has in turn led to higher staff retention and productivity.
8. We hope that this GI strategy for Swanage will help achieve the following vision:

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‘To provide a green infrastructure network of interlinked multipurpose open spaces with good connections to the open countryside’



9. To achieve this the strategy will:

- respond to and inform GI policies in the Swanage Local Plan, the Purbeck Local Plan, the Dorset Area of Outstanding Natural Beauty (AONB) Management Plan and the National Planning Policy Framework;
- raise the profile of GI issues locally;
- place Swanage on the map for being forward thinking on green/climate change issues;
- propose projects to enhance the function of existing and provide new GI assets, and to create/reinforce connections between them;
- provide a project programme which will initially focus investment where most impact will be made;
- identify potential funding partners for projects;
- provide a marketing package targeted towards potential funders, which will identify and inspire the implementation of ‘quick-win’ projects alongside longer-term regeneration and improvement projects;
- provide guidance for developers to make sure that new development provides GI which has a range of functions that benefit both the development site and the wider GI network in Swanage.

10. Implementing the strategy will:

- improve the appearance of the town and its approaches;
- make it a greener, healthier place to live;
- make green spaces more accessible and inclusive;
- encourage economic growth;
- improve connections between the town and the open countryside;
- reduce pressure on sensitive landscapes like heathland;

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- make the town more resilient to the effects of climate change;
- involve the community in initiatives to 'green' the town;
- develop relationships with funding and delivery partners;
- benefit wildlife.

Who should use the strategy?

11. This strategy is designed to be used by:
 - landowners and land managers including Dorset County Council, Purbeck District Council and Swanage Town Council;
 - developers;
 - Swanage and Purbeck Development Trust and Swanage 2027;
 - funding and delivery partners.

How did we put the strategy together?

12. Once it was agreed that a GI strategy was needed, Purbeck District Council (PDC) facilitated a workshop to inform and get feedback from local community groups, the Town Council, and infrastructure and environmental agencies.
13. The workshop groups identified and categorised existing GI assets, and listed functions and benefits for each. The groups then mapped where the existing GI is poor, and proposed ways to improve it. They also looked at how new GI could help to integrate new housing proposed in the Purbeck District Local Plan into Swanage successfully, and how on the back of this, the existing edges of the town could be 'softened' and the landscape and visual impact of Swanage on the AONB reduced. The participants at the workshops also generated the vision for the strategy.
14. The information provided by the workshop groups was then collated, refined and audited by PDC using Geographical Information Systems (GIS) and aerial photography. A physical survey of the main GI assets was then undertaken by local volunteers to confirm the accuracy of the mapped data, and gather more detailed information on the quality and quantity of GI. Potential opportunities to enhance the existing GI were worked up into individual projects and initiatives with an action plan. This GI audit and analysis is included as APPENDIX 1.
15. The GI audit and analysis provides the basis for the GI Strategy which was drafted by PDC and presented for public consultation along with the draft Swanage Local Plan between 24 September and 6 November 2015. Comments from the public consultation were incorporated and the Strategy which was then supplied as a supporting document at the Swanage Local Plan Inspection in July 2016.

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What is green infrastructure?

16. GI includes:

- natural and semi-natural rural and urban green spaces – including woodland and scrub, grassland (for example downland and meadow), heath and moor, wetlands, open and running water, brownfield sites, bare rock habitats (for example cliffs and quarries), coasts, beaches, and community forests;
- parks and gardens – urban parks, country and regional parks, formal and private gardens, and institutional grounds (for example at schools and hospitals);
- amenity green space – informal recreation spaces, play areas, outdoor sports facilities, housing green spaces, domestic gardens, community gardens, roof gardens, village greens, commons, living roofs and walls, hedges, civic spaces, and highway trees and verges;
- allotments, city farms, orchards, and suburban and rural farmland.
- cemeteries and churchyards;
- green corridors – rivers and canals (including their banks), road verges and rail embankments, cycling routes, and rights of way;
- sites selected for their nature conservation value – Sites of Special Scientific Interest and local sites (local wildlife sites and local geological sites);
- Nature Reserves (statutory and non-statutory);
- green space designations (selected for historic significance, beauty, recreation, wildlife, or tranquillity);
- green archaeological and historic sites;
- functional green space such as sustainable drainage schemes (SuDs) and flood storage areas.

17. The individual elements are called GI assets.

18. The definition used by Natural England, the public body responsible for protecting and improving England's natural environment is:

'A strategically planned and delivered network comprising the broadest range of high quality green spaces and other environmental features. It should be designed and managed as a multifunctional resource capable of delivering those ecological services and quality of life benefits required by the communities it serves and needed to underpin sustainability. Its design and management should also respect and enhance the character and distinctiveness of an area with regard to habitats and landscape types'.

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19. Green Infrastructure includes established green spaces and new sites and should thread through and surround the built environment and connect the urban area to its wider rural hinterland. Consequently it needs to be delivered at all spatial scales from sub-regional to local neighbourhood levels, accommodating both accessible natural green spaces within local communities and often much larger sites in the urban fringe and wider countryside'.²
20. The Natural England definition refers to GI as being multi-functional. This is because each asset may have an obvious primary function, but there are other functions and services that provide significant contributions to social, environmental and economic agendas.

² *Green infrastructure guidance* Natural England 2009

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Benefits of green infrastructure: why invest?

21. The benefits that GI delivers fall into categories contributing to aesthetic, environmental, social and economic objectives.

Economic benefits

22. There is an increasing number of studies that identify economic benefits as a result of GI. Well planned improvements to public spaces encompassing green infrastructure in town centres can boost commercial trading by up to 40%.³ An example of the economic benefits is provided by the soft landscaping and security improvements undertaken at Langthwaite Grange Industrial Estate, Wakefield. Since starting in 2005, 16 new businesses have moved in bringing over £12m investment and creating 200 new jobs. Crime has also fallen by 70% in 12 months.⁴
23. Research from the US shows that in retail areas, trees positively affect judgments of visual quality and also appear to influence consumer responses and behaviours. People report a willingness to travel further, stay longer and spend more in business districts with trees as compared to those without.⁵
24. The increase in footfall that this generates is a compelling driver for improving the existing GI in Swanage.

Amenity value and access to nature

25. The appearance of an area is important. GI can help to create an attractive setting using a sustainable approach, which enhances local identity and helps to create a sense of place. It can transform the outward appearance of workplaces and have a significant effect on increasing the 'dwell time' of visitors. It can also increase the area's attractiveness to potential investors.
26. Employers in Cumbria have reported that an improved environment and the involvement of staff in activities to benefit biodiversity has boosted morale. This has led to better staff retention with the knock-on benefits of lower recruitment costs, retaining experienced staff and reducing the disruption of staff changes – leading to higher productivity.⁶
27. Trees are associated with a higher perception rating of amenity and visual quality and people are likely to spend more time, visit more frequently and travel further

³ *The Economic Benefits of Green Infrastructure: The Public and Business Case for Investing in Green Infrastructure and a Review of the Underpinning Evidence* Natural Economy North West 2008

⁴ *Benefits of green infrastructure: Report to Defra and CLG* Forest research 2010

⁵ *The Environmental Psychology of Shopping: Assessing the Value of Trees* Kathleen L. Wolf 2007

⁶ *Natural Benefits for Business – Case Studies* Natural Economy North West 2009

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distances to places with trees compared to places with no trees.⁷ Property values are also greater where there are trees and open space nearby.

28. The provision of good quality green open spaces also creates healthier urban environments. These green open spaces are the 'green lungs' of towns and cities where people can spend time relaxing and getting exercise. These activities are vital to health and wellbeing. Contact with nature has also been shown to be an important factor in reducing stress.

Improved air quality

29. 'Estimates indicate that air pollution reduces life expectancy in the UK by seven to eight months.'⁸ 'Poor air quality combined with high temperatures also increases the risks of cardiovascular and respiratory disease, especially in the elderly and vulnerable.'⁹ Urban vegetation influences air quality – in particular, trees can absorb significant quantities of gaseous pollutants such as sulphur dioxide, ozone, nitrogen dioxide, and can also absorb particulates like dust and soot from the air. Particulates are the deadliest form of pollution, as they can penetrate deep into the lungs and bloodstream undiluted, causing lung diseases, heart attacks and ultimately death.

Flood attenuation and water resource management

30. As experienced in Swanage historically, flooding can have a large impact on an area, with rapid flash flooding in particular causing damage to business property. Measures to reduce flood risk have been implemented, but there are still locations in the town where localised flooding occurs. Further measures to reduce flood risk are required.
31. The provision GI which includes of sustainable drainage systems (SuDs) can reduce peak water flows (which tend to be increased in urban environments), improve water quality by removing pollutants and replicate natural drainage patterns so that base groundwater flows are maintained.¹⁰ This can improve business resilience and potentially reduce insurance premiums.
32. There are various types of SuDs, but the majority follow the principle of allowing surface/flood water to drain naturally back into the ground. The water may be stored temporarily if the volume is too great for the ground to absorb straight away. The process of percolation through vegetation and the soil removes harmful contaminants such as oil, petrol and diesel, and micro-organisms in the soil convert bacteria from for example dog waste, into harmless substances.

⁷ *The Environmental Psychology of Shopping: Assessing the Value of Trees* Kathleen L. Wolf 2007.

⁸ *Urban Air Quality* Woodland Trust 2012.

⁹ *Trees in Our Towns: The Role of Trees and Woodland in Managing Urban Water Quality and Quantity* Woodland Trust 2012

¹⁰ *Interim Code of Practice for Sustainable Drainage Systems* National SuDs Working Group 2004

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33. Using this method to deal with surface/flood water is sustainable because it This clean water ultimately recharges the water table and therefore follows the same cycle that it would take if it fell on natural ground

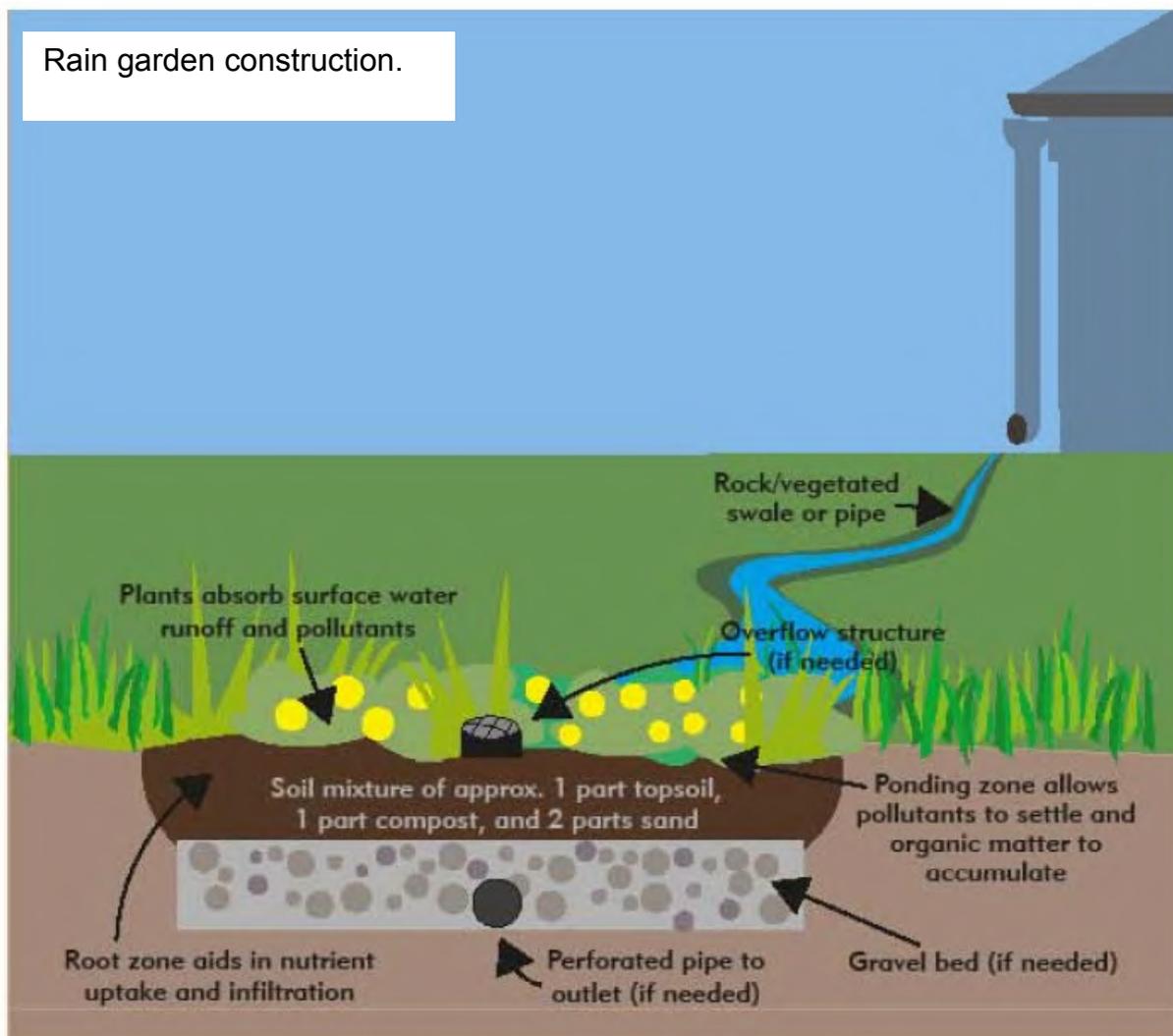
Biodiversity

34. As well as working with, and making use of natural processes and systems, it is important therefore that we replace habitat where it is lost as a result of development, and support biodiversity where this is possible.
35. It is this biodiversity that underpins most if not all ecosystem services, which are crucial to human survival. The resilience of these ecosystems is can depend on the presence or survival of a single species. It is therefore in our interest to ensure that vulnerable species are supported and biodiversity conserved.
36. The ecological benefits that urban GI can provide are largely related to the provision of habitat, which in turn increases resources for wildlife. Well-designed GI can create targeted habitat and contribute to habitats of importance (for example, those published in England as a list under section 41 of the Natural Environment and Rural Communities (NERC) Act), as well as local habitat objectives, thereby conserving biodiversity.

Resilience to climate change

37. Climate change predictions indicate that the UK will be affected by hotter, drier summers and warmer, wetter winters along with more extreme weather events such as flash flooding, droughts, heatwaves and storms. The effects of climate change could result in a negative impact on businesses, for example due to increased flooding due to the wetter winters, or the requirement to install air conditioning to cope with increased summer temperatures.
38. Resilience to the increased risk of flooding can be provided through the implementation of GI based SuDs as identified above. Where practicable SuDs can be designed to collect and store the surface water, which can then be used supply planted areas with water during periods of hot weather and or drought. The diagram on the next page illustrates a 'rain garden' which operates on these principles.

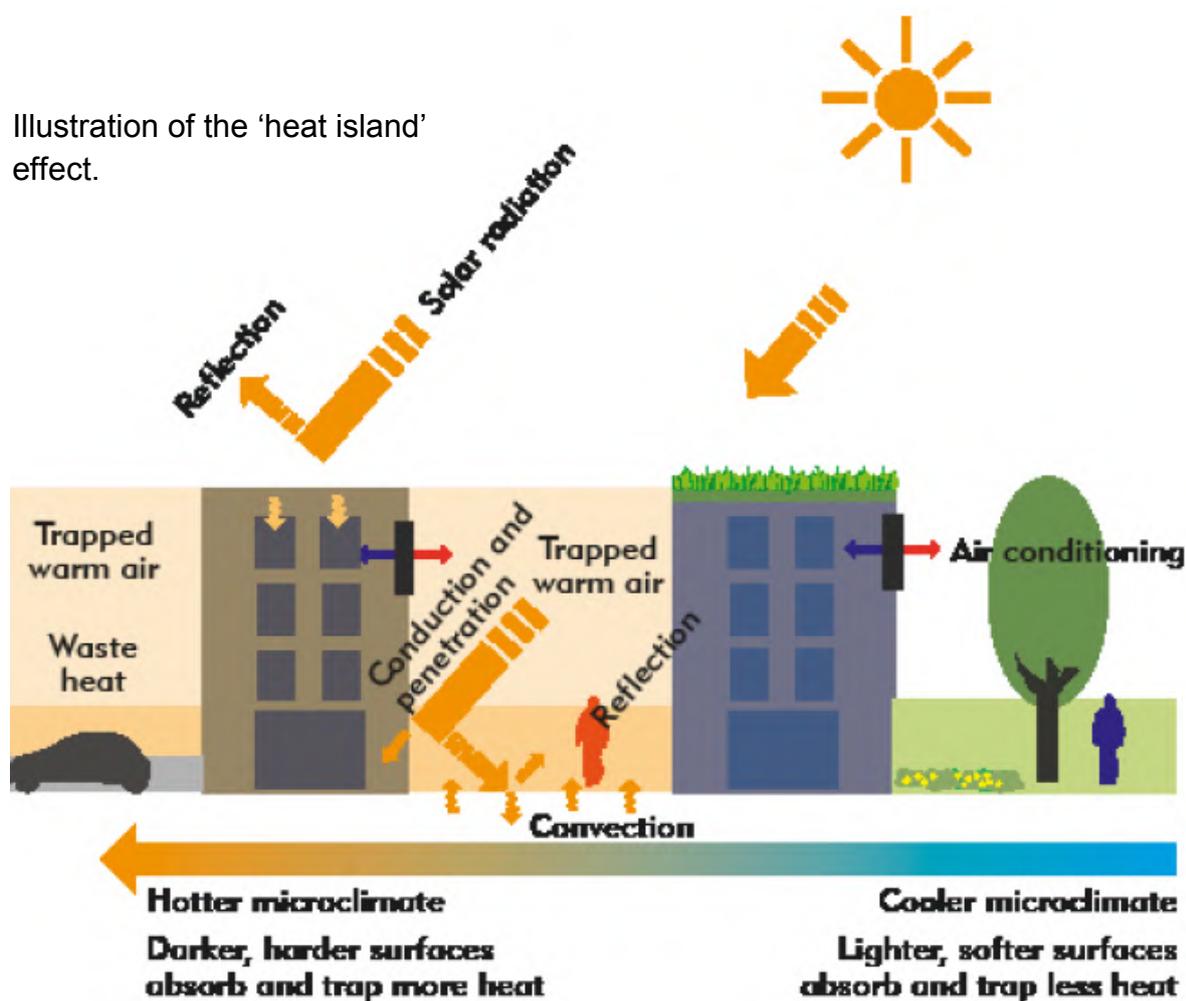
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39. GI can also provide cooling effects, which will increase thermal comfort especially in urban areas, which are susceptible to the heat island effect. This in turn contributes to global warming. The heat island effect is created when the cumulative effect of pollution, the production of waste heat from for example air conditioning and vehicle engines, and changes in the chemical and physical properties of the atmosphere resulting from human activities result in an increase in temperature. The urban area becomes markedly warmer than the surrounding countryside. Heat islands can also develop in 'pockets' around single buildings, with temperature differences of 4°C have been reported along a single street.

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Illustration of the 'heat island' effect.



40. Careful selection and strategic placement of vegetation can reduce the urban heat island effect and cool the air by between 2°C and 8°C.¹¹ It achieves these results through evaporative cooling and vapotranspiration, reflectance of radiation and shading to reduce the direct gain of energy.¹² (vapotranspiration is the process by which plants release water vapour into the air when they convert carbon dioxide and water into food in the presence of sunlight).

Carbon sequestration

41. Carbon dioxide is a major greenhouse gas. It is formed in many ways, both natural and through man-made processes. The amount of carbon dioxide in the atmosphere has increased dramatically since the industrial revolution, because the burning of fossil fuels releases it. Too high a level of carbon dioxide in the atmosphere is also dangerous for human and animal life, because it displaces the amount of oxygen in the atmosphere and can therefore cause suffocation.

¹¹ *Air Temperature Regulation by Urban Trees and Green Infrastructure* Forestry Commission research note 2013

¹² *Air Temperature Regulation by Urban Trees and Green Infrastructure* Forestry Commission research note 2013

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42. Plants, remove carbon dioxide from the atmosphere and break it down into carbon and oxygen. The oxygen is released back into the air, and the carbon is locked away in the structure of the plant. When the plant dies, the carbon is released into the soil, where it enriches the soil and makes it more fertile.
43. Removal of carbon from the atmosphere in this way is called carbon sequestration, which has the potential to significantly reduce the amount of carbon that exists in the atmosphere as carbon dioxide.
44. A recent study undertaken by Torbay Borough Council and Treeconomics found that the trees in Torbay store 98,000 tonnes of carbon, as well as playing a significant role in removing airborne pollution. The financial value of the carbon storage is calculated as being £1.5 million, and the value of air pollution removal as £1.3 million. The cost of replacing all of the trees in Torbay is estimated at £280 million.
45. The information provided by this study has been used to justify an investment of £25,000.00 in Torbay's tree maintenance budget, which will help to stop the decline in health of the town's trees that has been seen in recent years.

Reduced energy consumption

46. Trees can reduce the energy consumption of buildings by sheltering them from cooling winds in the winter and shading them from direct sunlight in the summer. "This will prove increasingly beneficial with the anticipated effects of climate change"¹³ and deciduous trees will also allow sunlight through in winter. Appropriately designed green roofs and walls can provide an insulating effect that reduces the transfer of heat between the external and internal environment or vice versa. As a result, building temperatures can be 4.5°C warmer in the winter and nearly 15°C cooler in the summer; this reduces the internal heating and cooling costs.¹⁴ Green roofs can also therefore help to reduce the urban heat island effect, as less warm air escapes into the surrounding environment.

Multi-functionality

47. GI assets not only provide local benefits *in situ*, but should contribute a wider function as part of other infrastructure planning, for example, to segregate cycle and traffic lanes or providing barriers to vehicular access. Integrated GI that is intelligently designed and managed provides multi-functional benefits across streets, neighbourhoods, towns and beyond.

¹³ *Trees in the Townscape: A Guide for Decision Makers* Trees and Design Action Group 2012

¹⁴ *Building Greener: Guidance on the use of green roofs, green walls and complementary features on buildings* (c644) CIRIA 2007

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48. For example, a single tree or green roof will provide some localised benefits at and around its physical location, such as temperature reduction and the increase in biodiversity. A cluster of trees and green roofs will however provide greater cumulative net benefit to the wider area (including water retention and improved air quality).
49. Well connected GI assets help to create places that are adaptive and resilient to changes in climate, and the more extreme weather events that we can expect as a result, and are especially important in urban areas due to the limited amount of available space.¹⁵

¹⁵ *Green Infrastructure: An integrated approach to land use* Landscape Institute 2013.

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Green infrastructure in Swanage

Existing assets

50. The GI audit results show that the existing GI network consists of a range of assets which can be divided into 14 categories, or typologies. Each is capable of delivering a number of the functions and benefits described in the previous chapter. The following table shows the number of GI assets present in each typology, followed by the functions and benefits provided:

GI asset type	Number of GI assets	Functions	Benefits
Amenity green space	26	Visual amenity	Greener built environment
Farmland	18	Food production	Contribution to local economy, biodiversity (hedges and copses), mitigation of soil sealing, maintain open character, creation of jobs, aesthetic
Notable private gardens and roads	17	Informal recreation, potential for domestic food production, connectivity	Human wellbeing, more attractive built environment, mitigation of heat island effect, strengthening resilience to climate change, higher property values and local distinctiveness, permeability, ecological corridors
Public Rights of Way	11	Walking, riding	Human wellbeing, informal recreation, connections to open countryside, enhanced, tourism and recreation, landscape/ permeability
Civic spaces/public realm	7	Pedestrian links, events, seating, public art including performances	Higher property values and local distinctiveness, permeability, enhanced tourism and recreation, more attractive built environment, maintain open character, informal recreation, socialisation
Sports and recreation	7	Formal recreation	Better health and human wellbeing, mitigation of land take and soil sealing, maintain open character
Waterbodies and watercourses	7	Drainage, flood prevention	Strengthen ecosystem resilience, biodiversity, more attractive built environment, mitigation of heat island effect, strengthening resilience to climate change,

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GI asset type	Number of GI assets	Functions	Benefits
			ecological corridors, mitigation of heat island effect, aesthetic, informal recreation
Natural and semi-natural green spaces	6	Nature conservation, Informal recreation, education	Mitigation of soil sealing, biodiversity, strengthen ecosystem resilience, strengthen resilience to climate change, maintain open character, mitigation of land take, carbon storage and sequestration, improved habitats for wildlife, landscape permeability, ecological corridors, aesthetic
Formal parks and gardens	4	Gatherings, informal recreation, aesthetic enjoyment	Higher property values and local distinctiveness, mitigation of soil sealing, more attractive built environment, better health and wellbeing, maintain open character, benefit wildlife, mitigation of land take, landscape permeability, mitigation of heat island effect
Caravan parks	4	Holiday/ temporary accommodation	Mitigation of soil sealing, enhanced tourism, creation of jobs
Cemeteries and churchyards	3	Burials	Mitigation of soil sealing, local distinctiveness, quiet contemplation, strengthen ecosystem resilience, maintain open character, mitigation of land take
School grounds	3	Formal and informal recreation, education	Mitigation of soil sealing, strengthen ecosystem resilience, maintain open character, mitigation of land take
Allotments	1	Food and flower production	Mitigation of soil sealing, strengthen ecosystem resilience, mitigation of heat island effect, strengthening resilience to climate change, maintain open character, better health and wellbeing, mitigation of land take
Derelict land	1	-	Biodiversity

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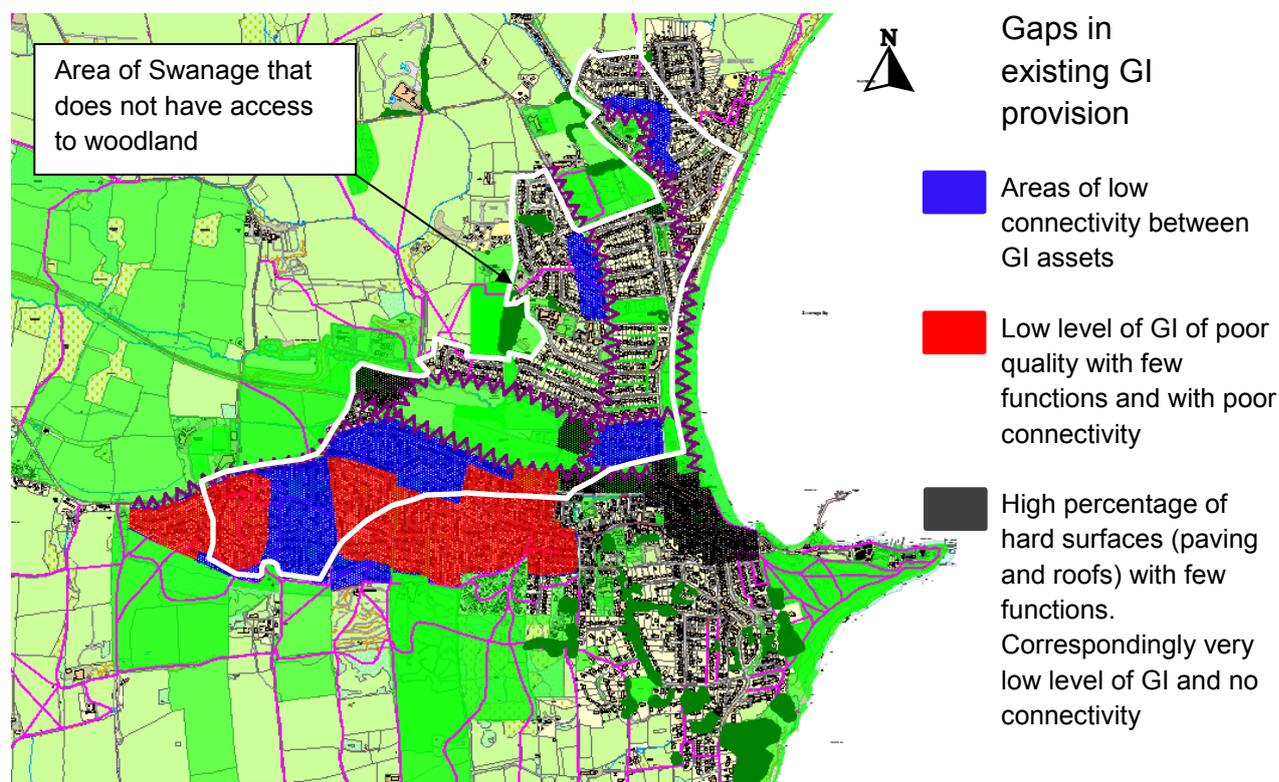
Condition

51. The condition of the GI assets in Swanage varies across the town, with those that are owned by the individual local authorities and housing associations being average, or in some cases poor.
52. Condition does not just relate to the quality of maintenance, it also relates to structure of the asset. For example the Swan Brook as it flows past the Mowlem might appear to be in good condition, but as a GI resource it has little structure and therefore limited benefits. It is confined to a hard sided engineered channel, which contains few footholds or cover for wildlife, and is therefore comparatively sterile compared to further upstream. In GI terms it would have a better structure if there was vegetation lining the banks. Not only would this attract wildlife, it would be more attractive and contribute more to the setting, provide more by way of cooling in hot conditions, do more to link habitats, and provide a framework for the natural systems which are fundamental to ecosystems. The more stratification there is and elements there are in the structure of the asset, the more interactions and benefits it supports.
53. Likewise the condition of a grassed verge would be much improved if it contained trees and shrubs to give it structure. This would create cover and food for wildlife, enhance visual interest, increase carbon sequestration, and to absorb more air pollution. Unchanged, grass verges are single function open space, which would not normally even be classed as GI.
54. Many of the amenity green spaces, especially in more recent development and in the housing association estates, consist of areas of what can be referred to as space left over after planning, or SLOAP. These are the awkward shaped pieces of land in car parking areas, or verges where there are underground services, and represent the pieces of land that are left over after as much development has been provided in as possible. They are not planned, so they have no real function. They are often just short mown grass or low maintenance shrubs that are of little aesthetic or wildlife value. Because these areas have been poorly planned, and are often in poor condition, the benefits that they provide as GI assets are very limited.

Gaps in the network

55. Detailed analysis of the baseline information and the GI audit indicates that there are specific zones where the provision of GI is low when assessed against national standards such as The Woodland Trust's Woodland Access Standards, and Natural England's Accessible Natural Green Space Standards.

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Not to scale

56. The audit also highlights that the lack of connections to the open countryside via the Rights of Way network is an issue, along with the lack of adequate maintenance of that network. There is an aspiration from previous studies that the possibility of creating 'Greenways' be looked at as part of a Rights of Way project too. This would be highly beneficial for the ongoing health and vitality of the GI network of Swanage, as the more layers of connectivity into the countryside, the greater the level of function and health of the GI network will be.
57. Connectivity between GI assets in the town is poor in certain locations. It is likely that connectivity has decreased over recent years due to increases in infill and density of new development. New development has also not contributed enough good quality new GI, and that provided is often not designed to create new connections. Also, fewer properties now have large gardens, and the number of street trees has declined as Victorian plantings have been removed as they become over-mature, diseased, or due to the requirements of new development.
58. There is unfortunately no up to date sports and recreation strategy for the district so it is not possible to say whether the sports and recreational facility provision in Swanage is sufficient. There is however some indication that the facilities that are provided are not necessarily targeted towards the right demographic as the number

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of retired people in the town increases, and the number of younger people decreases.

Other issues

59. There are additional needs that should be considered at the same time as addressing the physical gaps in the network, a lack of connections between assets, and low numbers of benefits for individual assets.
60. A range of needs are identified in the Swanage Community Strategic Plan (SCSP)¹⁶, the Swanage Local Plan (SLP)¹⁷, and the UK Biodiversity Strategy – 2020¹⁸. These needs are assessed in detail in the appraisal section of appendix 1, and it is clear that a number of these can be addressed through improvements to the existing GI network. The following table summarises these needs, and contains suggestions as to how they might be address by GI interventions:

Need	Potential GI interventions
<p>Economic</p> <ul style="list-style-type: none"> ▪ encourage a diverse, thriving and prosperous local economy 	<p>Improve inward investment through creating a more attractive environment for people to live and work in, and for people to visit:</p> <ul style="list-style-type: none"> ▪ introduce GI to enhance the main approaches, arrival points and business areas - for example the A351, main beach car park, the station and the top end of the main retail area; ▪ ensure all new large scale development includes a high proportion of well designed and visually attractive GI
<p>Social</p> <ul style="list-style-type: none"> ▪ encourage informal leisure pursuits; ▪ improve the quality of and access to public amenities and open spaces within the town and its environs 	<ul style="list-style-type: none"> ▪ promote the provision of a sports and recreation strategy; ▪ promote a rights of way project which will improve connectivity to the wider countryside and include walking routes and cycle paths which can be combined into 'greenways'; ▪ provide natural and attractive green open spaces including woodland. Provide GI

¹⁶ Swanage Community Strategic Plan – Swanage: Looking to the future 2007-2027 Swanage Market and Coastal Towns Initiative Working Group 2007

¹⁷ Swanage Local Plan Pre-Submission Document - prepared in partnership by PDC, Swanage Town Council and Swanage Town and Community Partnership Sept 2016

¹⁸ Biodiversity 2020: A strategy for England's wildlife and ecosystem services Defra 2011

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	<p>enhancements on and adjacent to the seafront, and in Herston where there is the greatest social deprivation. Research potential for the creation of new green open spaces including woodland to provide more opportunities for informal recreation in a natural environment thereby improve physical and mental wellbeing</p>
<p>Environmental</p> <ul style="list-style-type: none"> ▪ a more sustainable town, with improved resilience to climate change and flooding; ▪ protect and enhance the natural environment; ▪ enhance and create open green spaces; ▪ provide links to the countryside; ▪ restore and improve ecological and landscape value by connecting fragmented habitats; ▪ minimise all forms of pollution to the local environment 	<p>Improve the existing GI and create a more robust network and respond to climate change, improve the natural environment, and help reduce pollution:</p> <ul style="list-style-type: none"> ▪ introduce SuDs on open land to reduce localised flooding, and design these to support ecological systems, remove pollutants, and contribute to re-charging the water supply; ▪ create green corridors and stepping stones to improve physical and ecological links in the town and to the countryside; ▪ introduce greater variety of management techniques in green open spaces, and vary range of planting and replace bedding plants with flowering shrubs, which require less water, and are longer lived, and introduce more tree planting; ▪ plant trees along main routes and around the station and the town centre to reduce air pollution ▪ provide adequate and well designed open space/GI with new development, and create new green open spaces where possible

Conclusions

61. Analysis of the GI resource reveals that although there are a good number of GI assets in and surrounding Swanage, there are potential benefits that are poorly represented. These are resilience to climate change, biodiversity, flood alleviation connections to the open countryside, sustainable surface water drainage, and in certain locations visual amenity. This is not the case across the board, but these issues have arisen as areas of concern that require further attention.

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62. These benefits are poorly represented partly because of the poor condition of a number of the GI assets, but also because of gaps in provision and low levels of connectivity.
63. There are also a range of economic, social and environmental needs that present in the town that can be partly addressed through to provision of an improved GI network.

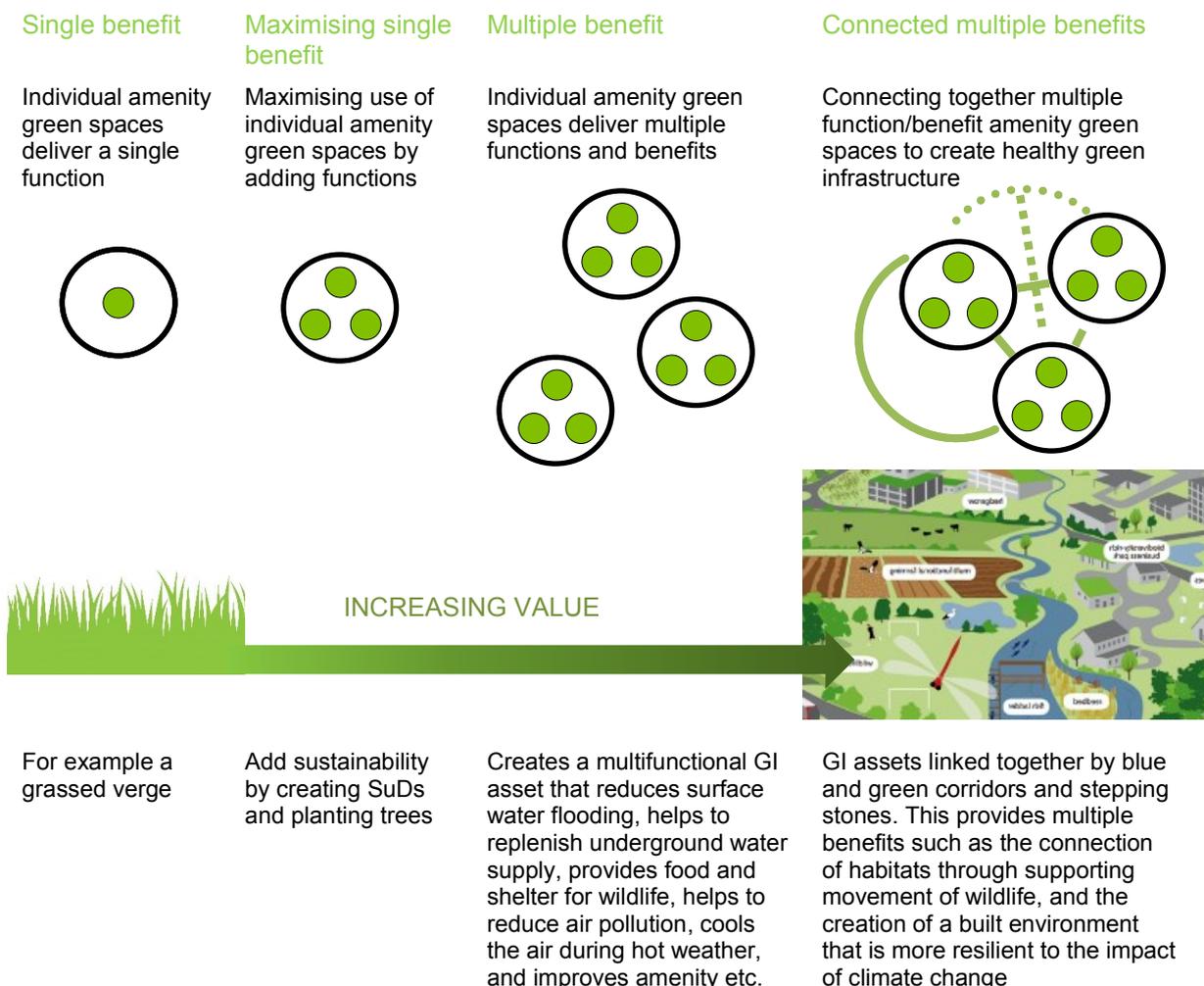
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Recommended improvements

- 64. The GI audit and analysis shows that the condition of the GI network needs to be improved if a full range of benefits is to be provided and identified needs addressed. The physical gaps in provision therefore need to be addressed, new connections made, and the range of function of many of the GI assets increased.
- 65. The analysis identifies a range of improvements that can be made to existing GI assets, and suggestions are made for new assets and connections. These suggested improvements must be reviewed in the context of the GI network as a whole if the improvements made are to provide the greatest benefit to Swanage.

Add functions and strengthen connections

66. The diagram below shows how the number of benefits provided and therefore the condition of the GI network can be improved by adding functions to GI assets and connecting them together:



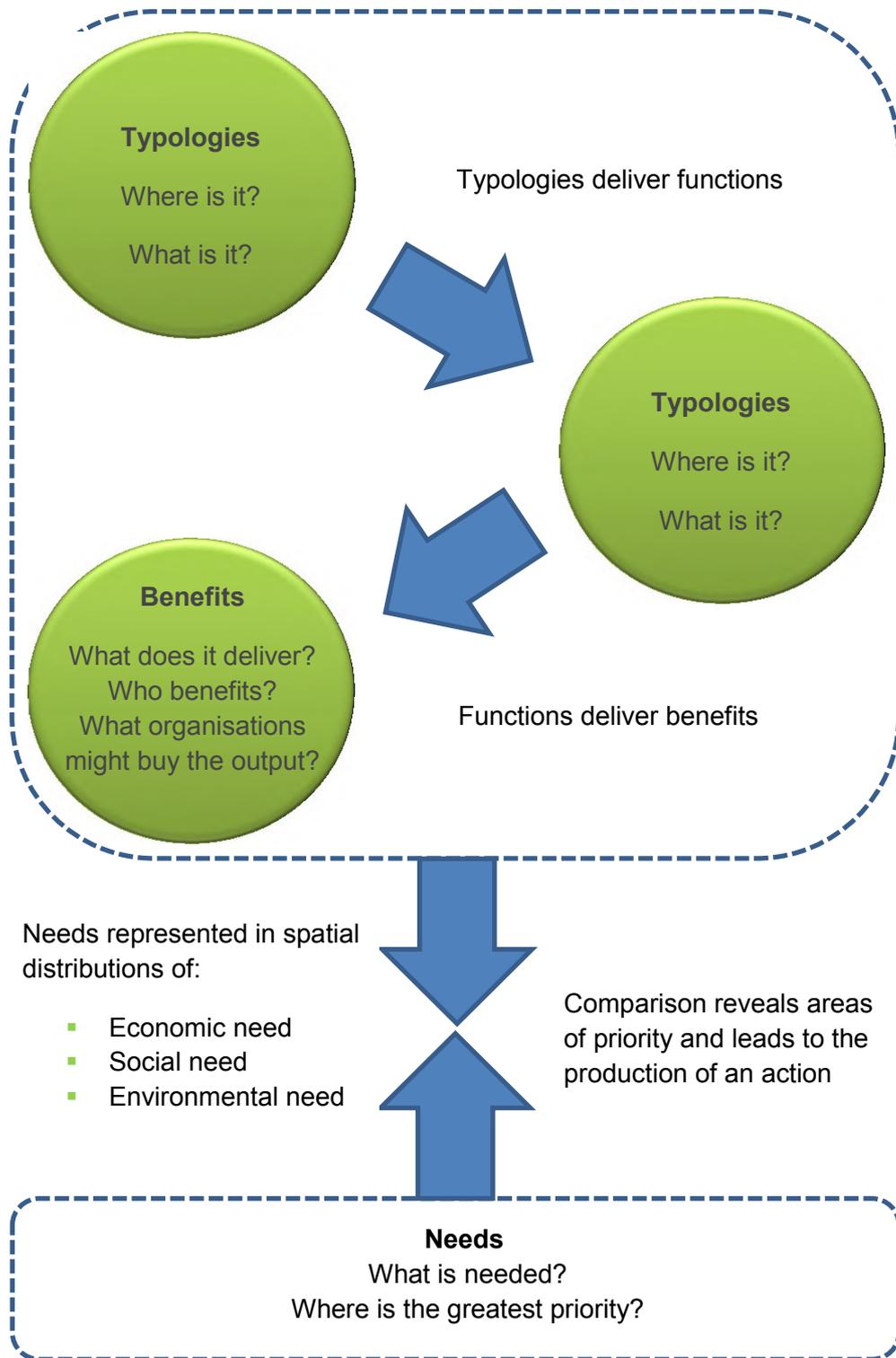
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67. If the condition of the GI network is improved in this way, it will be more robust and capable of providing a sustained response both to climate change, and to the other identified economic, social and environmental needs - the overall value of the network will increase.
68. The table on pages 2-22 of appendix 1 contains a column identifying additional functions that could be provided by each of the audited GI assets. These are then translated into potential projects and initiatives. These projects and initiatives are wide ranging, varying from simple changes to management practices, to major tree planting schemes and SuDs schemes.
69. In order to rationalise the potential projects and initiatives and produce a more targeted list, they are correlated against the results of the functional and spatial analyses. By doing this the potential of the proposals to address strategic issues is tested, and gaps in strategic function revealed. The table on pages 77-80 of appendix 1 shows the results of this assessment.
70. This process, along with mapping the results of the audit is what indicates where new connections and additional GI functions and assets should be located in order to achieve the best outcome.

Targeted actions

71. The final step in refining the projects and initiatives targets those which are most important in terms of the benefits provided, and 'best fit' responses to the economic, social and environmental needs identified in the previous chapter.
72. The diagram below illustrates how this process produces the list of prioritised actions, which are included in the final proposals list on page 28:

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Proposals

73. The highest priority proposals are those which respond to the areas of greatest need and deficiency in the existing GI network, and that will make the biggest overall contribution.
74. Not all proposals identified in the audit are covered as the contribution that some would make to improvement of the overall condition of the GI network and their relevance to social or environmental needs is limited.

Proposals in priority order		Estimate of cost	Mechanism for implementation
1.	Main Beach car park GI improvements – resurfacing, tree planting in tree pits designed as rain gardens to aid surface water drainage	£100,000.00	Engage with Swanage Town Council. Engage consultant to design scheme. Funding application. Planning application may be required
2.	Herston tree planting and wildflower meadow project	£10,100.00	Consult landowners, check for over/underground services. Consult specialist for design advice. Seek funding from landowners/make funding application. Involve volunteers in planting where possible. Public Liability Insurance may be required. Secure arrangements for future maintenance. Engage with the community (especially young people) to encourage a sense of ownership
3.	Street tree planting projects <ul style="list-style-type: none"> ▪ Raised verges on western approach to Swanage ▪ Victoria Avenue tree avenue reinstatement ▪ Park Road replanting ▪ Northbrook Road ▪ Main shopping streets 	£60,000.00	Engage with DCC tree specialists to discuss feasibility and for design advice. Check for underground/over ground services. Seek funding. Ensure arrangements for future maintenance agreed
4.	Park/garden/recreation ground/The Downs –	£39,500.00	Engage with Swanage Town Council. Engage consultant to design planting

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	Proposals in priority order	Estimate of cost	Mechanism for implementation
	management and planting proposals		proposals and produce a management plan for each site based on the recommendations of this strategy. Work with Swanage Town Council to seek external funding
5.	North Beach car park improvements – resurfacing, tree planting in tree pits designed as rain gardens to aid surface water drainage	£30,000.00	Engage with Swanage Town Council. Engage consultant to design scheme. Funding application. Planning application may be required
6.	Ulwell stream flood management scheme	£30,000.00	Engage with landowner (DCC) and Environment Agency. Engage consultant to design scheme. Funding application. Planning application may be required. Flood Defence Consent may be required from the Environment Agency.
7.	GI brief for town centre improvement scheme/promoted housing sites/seafront improvement scheme	-	Engage with PDC. Ensure that tree planting is included where possible, especially in the brief for the town centre improvements.
8.	Greyseeds Wood – creation of 2ha of accessible woodland on open land to the south of the ‘Greyseeds Estate’	£5,000.00	Engage with landowner – Dorset County Council. Engage consultant to design scheme. Funding application. Planning application may be required – consult Forestry Commission
9.	Cauldron Barn Wood – creation of 2ha of accessible woodland on open land to the west of Cauldron Barn caravan park	£5,000.00	Engage with landowner – Cauldron Barn caravan park. Engage consultant to design scheme. Funding application. Planning application may be required - consult Forestry Commission
10.	Whitecliff Wood – creation of 2ha accessible woodland on open land to the west of Whitecliff Road	£5,000.00	Engage with landowner – National Trust. Engage consultant to design scheme. Funding application. Planning application may be required - consult Forestry Commission
11.	Developers GI Guide	-	Included as appendix 2 of this Strategy. Linked to Policy GI in the Swanage Local Plan. To be used for all major development, but principles can be applied to any size of

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	Proposals in priority order	Estimate of cost	Mechanism for implementation
			development where siting and layout is a consideration
12.	Pocket parks project <ul style="list-style-type: none"> ▪ Land between Rabling Road and Prospect Crescent ▪ Site of Crabtree Cottage, off Locarno Road 	£10 – 25,000.00	Engage with landowner. Engage consultant to design scheme if necessary. Planning application may be required. Apply for funding
13.	Living churchyards project <ul style="list-style-type: none"> ▪ Queens Road non-conformist burial ground ▪ St. Mary's churchyard and upper churchyard ▪ Northbrook cemetery ▪ Godlingston cemetery 	£4,000.00	Engage with landowner. Engage with consultant to design proposals. Apply for funding. Volunteers may be able to help with planting. Public Liability Insurance may be required
14.	Swanage Railway green corridor and green bridge project	Unknown	Engage with Swanage Railway Company, and DCC as landowner. Discuss feasibility. DCC bridge design service may be able to help with green bridge design. Investigate possibility of green walls (climbers) for existing bridge where railway passes under Victoria Ave
15.	Living verges initiative	Unknown	Engage with DCC
16.	Caravan parks biodiversity and tree planting project	Unknown	Engage with caravan site owners
17.	Green roof initiative	-	Survey of existing flat roofs to see if suitable replacement with green roofs. Refer to guidance from Victoria BID GI Audit for guidance. Investigate feasibility
18.	Farmland hedge gapping up and wildflower meadow project	Unknown	Seek guidance from DCC countryside rangers/Durlston Country Park/Dorset AONB team
19.	Schools biodiversity project (all schools)	£2,100.00	Engage with schools. Could the project form part of curriculum

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	Proposals in priority order	Estimate of cost	Mechanism for implementation
			activity? Students could help with planting. External funding may be available
20.	Community orchard/tree nursery project (allotment site)	Unknown	Engage with Swanage Town Council and allotment tenants to discuss feasibility
21.	Stream clearance volunteering project	-	Obtain consent and guidance from Environment Agency. Volunteers may need Public Liability Insurance
22.	Private/housing association garden biodiversity initiative	-	Publicity material required. Liaise with Dorset Wildlife Trust to see if have similar initiative that could be relevant. Include a 'Hedges for Hedgehogs' campaign. Work with local housing associations to increase biodiversity on their land especially by replacing evergreen hedges with deciduous species
23.	Local Nature Reserve application <ul style="list-style-type: none"> ▪ King George's recreation ground/Forres Field to flood alleviation scheme ▪ The Downs 	-	Additional survey work may be required. Application to DCC
24.	Green alley project	-	Approach land owners to discuss feasibility
25.	Support the provision of a Dorset sport and recreation strategy	-	Liaise with DCC and PDC
25.	New Rights of Way, greenway and cycle links	-	Set up a Rights of Way, greenway and cycle links task group to take this work forwards in conjunction with Dorset County Council Rights of Way Team
26.	Pick up after your dog campaign	£2,000.00	Seek guidance from PDC Public Health and Housing. Produce leaflets and posters

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Potential sources of funding

UK funding

75. Some of the sources of funding are included in the South East Dorset Green Infrastructure Strategy and may be useful although it should be noted that some may no longer be available. These and other potential funding sources are listed below.

European funding

76. The European Commission has produced a series of guides to assist authorities and stakeholders to invest in GI under the new European Regional Development Fund and the Cohesion Fund for 2014-2020. The first is a guide to 'multi-benefit cohesion policy investments in nature and green infrastructure'. It looks at the values of nature and how they are important for cohesion policy objectives, and offers a useful toolkit and information source for the development and implementation of GI investments under the cohesion policy for 2014–2020.
77. The second guide 'connecting smart and sustainable growth through smart specialisation' aims to assist ERDF managing authorities across the EU to integrate sustainable growth objectives linked to eco-innovation, ecosystem services and sustainable energy into their research and innovation strategies (RIS3).
http://ec.europa.eu/regional_policy/information/brochures/index_en.cfm#.
<http://ec.europa.eu/environment/nature/ecosystems/>
78. This funding will not however be available once the UK finally exits the European Union.

Potential UK funding for GI projects and initiatives

Public agencies

Land management and improvement funding from national public agencies such as:

- Natural England – Countryside Stewardship Mid or High Tier schemes: Hedgerows and Boundaries Grant; Woodland Creation Grant
<https://www.gov.uk/government/collections/countryside-stewardship-get-paid-for-environmental-land-management#mid-tier>
- Forestry Commission - English Woodland Grant scheme, Farm Woodland Premium scheme, Farm Woodland scheme, Woodland Grant scheme
<http://www.forestry.gov.uk/england-grants>

Infrastructure funding from national public agencies eg.

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- Environment Agency - investment programme for managing flood risk
<https://www.gov.uk/guidance/flood-and-coastal-defence-funding-submit-a-project>

Lottery funds:

- Big Lottery – Awards for All, Community Spaces, BIG Local Trust
<https://www.biglotteryfund.org.uk/Home/Funding/Funding%20Finder>
- Heritage Lottery – Parks Matter, Landscapes Partnerships programme, Parks for People programme
<https://www.hlf.org.uk/looking-funding/what-we-fund/land-and-natural-heritage>

Dorset County Council/Dorset AONB grant schemes eg. countryside and conservation projects.

General revenue budget of a local authority in relation to publicly owned land, leisure services, highways, rights of way, countryside and regeneration

Land management budgets of large institutional land owners

Third sector

- RSPB – Woodland Biodiversity Project
<http://www.rspb.org.uk/whatwedo/projects/details/344293-woodland-biodiversity-project#funding>
- Woodland Trust – Trees in Hedgerows scheme, MOREwoods project, First World War Centenary Wood scheme, PUR Project for farmland trees
<http://www.woodlandtrust.org.uk/plant-trees/trees-on-land/grants-and-funding/from-us/>
- Esmée Fairbairn Foundation – Environment fund
<http://esmeefairbairn.org.uk/what-we-fund/environment>
- Grow Wild England
<https://www.growwilduk.com/content/about-community-projects>

Private sector

Local businesses, organisation sponsorship

Market led schemes and income generation

Business Improvement Districts (BIDs)

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The next steps

80. A coordinated approach to delivering the proposals and initiatives is needed, and it is suggested that Swanage 2027 and the Swanage and Purbeck Development Trust are ideally placed to be able to provide this. The following paragraphs provide recommendations on next steps.

Consultation

81. Consultation with landowners, local groups and community representatives will be essential to effective delivery and long term maintenance of the proposals. A period of consultation with potential partners should take place which will:
- allow interested parties to comment on proposals on their property, or related to sites and infrastructure in which they have an interest;
 - ensure that an opportunity is provided to raise any concerns about the proposals, identify constraints, and comment on potential design;
 - enable Swanage 2027/Swanage and Purbeck Development Trust to refine the priorities and deliver GI enhancements with the support of the partners and the wider business and resident communities.
82. Consultation with the local councils should be undertaken as a priority, as many of the proposals are in the public realm and public open spaces, which DCC, PDC and STC manage.

Additional surveys

83. Further survey work will be required for some proposals to ensure that the site or building is suitable for the proposed feature. For example for the green roof project all buildings will require a structural survey to ensure they can bear the additional weight that the installation of a green roof generates.
84. For the street tree planting proposals, surveys will be needed to identify the presence of soil or substrate or buried services. It may not be possible to deliver all of these projects if underground infrastructure is present, and the planted trees will not thrive if there is not enough suitable substrate to support healthy root growth.

Design

85. Many of the smaller projects can be delivered without the need for design input from specialists. For the larger projects however, design advice should be sought. Appropriate types of design guidance include:

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- planting advice at existing parks and gardens, including species which are beneficial to wildlife. The Council may be able to provide this expertise in-house;
- horticultural expertise will be important for most features, in order to ensure that an appropriate species list is identified for the conditions (e.g. flood resistant and pollution tolerant in rain gardens, plants suitable for seaside locations for sites close to the seafront);
- the expertise of a landscape architect may be required for the design of larger projects, especially where structures, ground modelling, street furniture, hard surfaces, SuDs and detailed planting proposals are required.

Consents

86. Various statutory consents or notice may be required before the work can proceed. Some of these are identified in the proposals table. Consents take time to acquire and this varies on the type of consent. Early contact with the consenting body is always recommended. The following table gives further detail about the consents that may be needed:

Description of work	What to check	What to do next
Cutting back, pruning or felling trees	Are the trees protected by a Tree Preservation Order (TPO)? If they are, apply to PDC for consent to do the work	Follow the instructions given on the PDC trees and hedgerows page of the Dorset for you website:
	Are the trees in a Conservation Area? If they are, give PDC 6 weeks notice	https://www.dorsetforyou.gov.uk/treesandhedgerows/purbeck
	If more than one large tree is to be felled a felling licence may be required	Follow the instructions given on the Forestry Commission website: http://www.forestry.gov.uk/forestry/infd-6dfkxf

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Description of work	What to check	What to do next
Removing a section of hedgerow	Does the hedge grow in or adjacent to any common land, National Nature Reserve, Site of Special Scientific Interest, or land used for agriculture, forestry or for the breeding or keeping of horses, ponies and donkeys AND has a continuous length of at least 20 metres, or if less than 20 metres meets another hedgerow at each end? If it does PDC require a hedgerow removal notice	<p>Follow the instructions given on the PDC trees and hedgerows page of the Dorset for you website:</p> <p>https://www.dorsetforyou.gov.uk/treesandhedgerows/purbeck</p>
Removing scrub, saplings or shrubs	Is the site in a Conservation Area? If it is, are any branches 75mm or more in diameter at 1.5 metres above ground level? If there are, these trees and shrubs are protected from felling, lopping and pruning. Give PDC six weeks notice	<p>Follow the instructions given on the PDC trees and hedgerows page of the Dorset for you website:</p> <p>https://www.dorsetforyou.gov.uk/treesandhedgerows/purbeck</p>
Digging trenches or other excavations or earth moving	Does the work involve the use of machinery? If it does planning permission may be required	<p>Follow the instructions given on the PDC Development Management page of the Dorset for you website:</p> <p>https://www.dorsetforyou.gov.uk/article/418400/Development-Management-in-Purbeck</p>

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Description of work	What to check	What to do next
Placement of planters, or other street furniture	<p>Will the work be done by DCC/PDC/STC? If it is, it may be Permitted Development. If not, it will probably need planning permission.</p> <p>Is the site is in a Conservation Area? If it is refer to the Conservation Area appraisal for guidance on design:</p> <p>https://www.dorsetforyou.gov.uk/purbeck/adopted_conservation_area_appraisals</p>	<p>Follow the instructions given on the PDC Development Management page of the Dorset for you website:</p> <p>https://www.dorsetforyou.gov.uk/article/418400/Development-Management-in-Purbeck</p>

Delivery

87. Delivery of the green infrastructure features should be coordinated by the Swanage and District Development Trust or Swanage 2027, but may be implemented by partner organisations. There may also be external funding initiatives relating to the various functions that the GI opportunities will deliver.
88. Where enhancements will deliver direct benefits to specific companies, it may be appropriate for the Trust/Swanage 2027 to negotiate for the enhancement to be partly or wholly funded by with these business partners. This will maximise the enhancements that can be delivered with other funding.

Maintenance

89. Maintenance of the new GI features will be essential to maintain provision of functions such as alleviation of surface water flooding, and their appearance. The options for maintenance need to be considered at the outset, as this is likely to influence prioritisation of the projects. There should be a maintenance plan in place prior to delivery, including which partners will be responsible for maintaining the features. As many of the projects are within the public realm, the local councils will have a key role to play in agreeing where responsibility for management and

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maintenance will lie. There may be a need for the Swanage and District Development Trust/Swanage 2027 to oversee GI maintenance in some instances.

Monitoring

90. A monitoring approach should be agreed for the delivery of projects. This should monitor:
 - the delivery of the GI features and the extent of green features across the town;
 - the quality of the GI features, and maintenance.
91. Monitoring will provide quantified information to enable the success and outputs of the investment to be measured.

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Glossary

Amenity area

Most commonly found in residential areas and function as informal recreation areas, green space in and around housing estates and village greens. Amenity areas are usually publicly accessible.

Area of Outstanding Natural Beauty (AONB)

A rural area designated by the Countryside Commission under Section 87 of the National Parks and Access to the Countryside Act 1949, with the primary aim of conserving and enhancing the natural beauty of the landscape.

Balancing pond

Ponds designed to control flow rates by storing floodwater and releasing it slowly once the risk of flooding has passed.

Biodiversity

The variety of life on earth. It includes plants, animals and micro-organisms which interact in complex ways with the environment to create living ecosystems.

Bioretention

Surface water is collected into the treatment area which consists of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants. The vegetation and layers within the structure of the bioretention system remove contaminants and sedimentation from surface water runoff.

Bug hotel

A man-made structure which provides invertebrates such as bumblebees, beetles and spiders a place to shelter and hibernate over the winter period.

Business improvement district (BID)

A business-led and funded body formed to improve a defined commercial area. A BID is funded through the BID levy, which is a small percentage of a businesses' rateable value.

Canopy cover

The branches and leaves of an individual tree or group of trees that form an overhead umbrella or canopy.

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Carbon management

Minimising energy use, raw material consumption, and waste generation in order to maximise efficiencies in the consumption of resources that contribute to climate change.

Community infrastructure levy (CIL)

A planning charge, introduced by the Planning Act 2008 as a tool for local authorities in England and Wales to help deliver infrastructure to support the development of their area.

Climate change adaptation

Adjustments to natural or human systems in response to actual or expected climatic factors or their effects, including from changes in rainfall and rising temperatures.

Culvert

A structure that allows water to flow under a road, railway, path, or similar obstruction from one side to the other side. Typically encased in soil, a culvert may be made from a pipe, reinforced concrete or other material.

Deciduous

Plants that are deciduous lose their leaves in the winter. The leaves appear again in the spring after that plant has gone through a period of dormancy where it saves its energy and builds up resources for the growing season.

Detention basin

A storage basin or facility that provides flow control by collecting surface water runoff. Detention basins are normally dry and in certain situations the land may also function as a recreational facility.

Ecology

The relationship between living things and their environment.

Ecosystem

A collection of organisms (plant, animal and other living things) living together in a certain space, and their environment. Together, these components and their interactions with and relationships to each other form a dynamic and complex new whole, functioning as an ecological unit, with additional characteristics that can't be found in the individual components. The individual components cannot survive on their own without involving other species in the ecosystem.

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Ecosystem services

The benefits people obtain from ecosystems, such as food, water, flood and disease control and recreation.

Ecosystem approach

A strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use equally and which recognises that humans are an integral component of many ecosystems.

Eco-town

A town consisting of houses that are built in a way that is designed to cause less damage than usual to the environment, for example, by using power from the sun or wind, not using much electricity, and not producing much carbon dioxide.

Evergreen

Plants that are evergreen retain their leaves throughout the year. Their appearance generally not changing from season to season as a result.

Filter strip

Gently sloping, vegetated strips of land that provide opportunities for slow conveyance and infiltration of surface water, and remove sediment and contamination in the same way as a bioretention system.

Geocellular system

Used to control and manage rainwater surface water runoff either as a soakaway or as a storage tank. The modular/honeycomb nature of geocellular systems means that they can be tailored to suit the specific requirements of any site.

Geographic information system (GIS)

A spatially referenced database, or a system to collect, store, manipulate, analyse and present spatially referenced data.

Green infrastructure (GI)

A strategically planned and delivered network of high quality green spaces and other environmental features. It is designed and managed as a multifunctional resource capable of delivering a wide range of environmental and quality of life benefits. GI includes parks, open spaces, playing fields and private gardens.

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Green corridor

Strip of habitat connecting wildlife populations that wildlife can use to travel between those populations.

Green fingers

Areas of habitat penetrating into the urban area from wildlife populations, that allow for the migration of the wildlife into the urban area.

Green infrastructure assets

Open spaces such as parks and gardens, allotments, woodlands, fields, hedges, lakes, ponds, playing fields, coastal habitats, as well as footpaths, cycleways or rivers. They also include urban interventions such as green roofs and street trees. GI assets can be specific sites at the local level or broader environmental features at the landscape scale within and between rural and urban areas such as wetlands, moors and mountain ranges.

Green infrastructure function

The roles that GI assets can play especially if planned, designed and managed in a way that is sensitive to, and includes provision for, natural features and ecosystem services. They may have obvious primary functions, but each asset can perform different functions simultaneously. For example, street trees add aesthetic quality to an urban area, but also reduce airborne pollution, provide shade, reduce urban heat island effects, mitigate wind chill and turbulence, and increase biodiversity.

Green roof

A system of roofing where a layer or soil or mineral substitute is laid onto a suitable liner and seeded or planted up with flowers, grasses, mosses and drought tolerant succulents such as sedums. The vegetated surface provides a degree of retention, retention and treatment of rainwater, and promotes evaporation. If designed accordingly green roofs can also contribute to local biodiversity.

Green wall

A wall with plants growing on its surface without the need to root in ground level soil. A green facade is an alternative approach where climbing plants are rooted in the ground and trained to grow on a support system attached to the wall.

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Greenway

Traffic-free routes which are attractive, generally well separated from traffic and continuous over obstacles and through road junctions. Although Greenways are often rural, many of the most popular and important ones thread their way through urban areas. They may connect urban and rural areas, and where they continue along roads through towns are referred to as 'green streets'. Traffic-free urban routes of high quality are referred to as 'promenades'.

Guerrilla gardening

The covert unauthorised act of cultivation and planting in a public location.

Habitat

The area or natural environment in which an organism or population normally lives. A *habitat* is made up of physical factors such as soil, moisture, range of temperature, and availability of light as well as factors such as the availability of food and the presence of predators.

Hard engineering

Controlled disruption of natural processes by using man-made structures.

Herbaceous

Plants without woody stems and which generally die back at the end of each growing season.

Infiltration basin

The same as a detention basin, but also removes sediment and contamination from the surface water runoff.

Local enterprise Partnership (LEP)

A partnership between local authorities and businesses to decide what the priorities should be for investment in infrastructure, buildings and facilities in the area.

Multi-functionality

Refers to the potential for green infrastructure to have a range of functions, to deliver a broad range of ecosystem services. Multi-functionality can apply to individual sites and routes, but it is when the sites and links are taken together that a fully multi-functional GI network is achieved.

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Native plants

Plants including trees and shrubs that occur naturally in the countryside, and have not been introduced from another country.

Natural systems

The physical and biological materials and their intertwined processes that exists in nature, independent of any human involvement.

Open water

Ponds, ditches and swales covered by water for more than 6 months of the year.

Ornamental plants

These are plants that have been introduced to the UK from other countries. They have often been introduced because of their particular more showy appearance or impact in garden situations. There was a strong movement in Victorian times to bring unusual or exotic plant species back to the UK, and evidence of this can be seen in many of the plantings of the time that took place in Swanage.

Permeable paving

Paving that has joints or pores in it so that surface water can drain through it

Rain garden

In its simplest form, a rain garden is a shallow depression, with absorbent, but free draining soil, planted with vegetation that can withstand occasional temporary flooding. Rain gardens help to deal more effectively with heavy rain, but they also filter and clean surface water runoff.

Rainwater harvesting

The collection of rain water from surfaces and subsequently storing this water for later use. Normally water is collected from the roofs of buildings and stored in rainwater tanks.

Rights of way

A route over which the public have a right to pass and re-pass, for example a public footpath or a bridleway. The route may be used on foot, on a horse, on a pedal cycle or with a motor vehicle, depending on its status.

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Soft engineering

The use of ecological principles and practices to reduce erosion and achieve the stabilisation and safety of shorelines and the area surrounding rivers, while enhancing habitat and improving aesthetics.

Species

A group of living organisms consisting of similar individuals that actually or potentially interbreed in nature.

Stepping stones

Pockets of habitat that while not necessarily connected, facilitate the movement of species across otherwise inhospitable landscapes.

Street trees

A tree planted at the side of a street or in another hard surfaced public place.

Sustainable drainage systems (SuDs)

An approach to surface water management that combines a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques. SuDs work by slowing and holding back the water that runs off from a site, allowing natural processes to break down pollutants. They can provide additional habitats for wildlife as well as improved visual amenity. SuDs can comprise streetscape assets such as permeable paving or rain gardens, as well as soft landscape assets such as swales.

Site of Nature Conservation Interest (SNCI)

Sites of considerable nature conservation interest at a local level. Some may include habitats of comparable quality to SSSIs but are of smaller area or of a more fragmented nature.

Site of Special Scientific Interest (SSSI)

Areas that are protected by law to conserve their wildlife or geology. They are designated by Natural England under the Wildlife and Countryside Act 1981.

Swale

A shallow, broad, vegetated channel designed to store surface water runoff. Swales may be used as conveyance structures to pass the runoff to other systems, and can be designed to promote infiltration where soil and groundwater conditions allow. A

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swale that has vegetation and filtration layers within the structure to remove contaminants and sedimentation is called a bio-swale.

Transpiration

This is the movement of water through a plant and its evaporation from aerial parts, such as from leaves but also from stems and flowers.

Urban heat island

The increased temperature of urban air compared to its rural surroundings. The term 'heat island' is used because warmer urban air lies in a 'sea' of cooler rural air.

Vision

The ability to imagine how a place could be in the future.

Wetland

Areas that are frequently inundated or saturated by surface or ground water, which remains for a long enough time to support vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wildflower meadow

Areas of grass that are filled with wild flowers, are actively managed, and are not improved by fertilisers. They may be cut for hay in late June to early July after summer flowering. The flowering plants set seed before the hay is cut and true meadows are grazed in autumn.

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References and recommended further reading

EU strategy and information

European Commission green infrastructure web page.

<http://ec.europa.eu/environment/nature/ecosystems/>

Green infrastructure, 2010, European Commission four-page factsheet on green infrastructure.

<http://ec.europa.eu/environment/nature/info/pubs/docs/greeninfrastructure.pdf>

Green infrastructure (GI) – enhancing Europe’s natural capital, COM, 2013 249 final communication from the European Commission.

http://eur-lex.europa.eu/resource.html?uri=cellar:d41348f2-01d5-4abe-b817-4c73e6f1b2df.0014.03/DOC_1&format=PDF

European Commission video on green infrastructure (2013).

<http://www.tvlink.org/mediadetails.php?key=dccba5fad56721ede710&title=Green+infrastructure+%E2%80%93+Building+blocks+of+modern+life&titleleft=Environment>

Connecting smart and sustainable growth through smart specialisation: A practical guide for ERDF managing authorities, 2012, European Commission a practical document with concrete recommendations and examples of good practice that show potential ways forward and to facilitate discussion between public authorities and stakeholders

http://ec.europa.eu/regional_policy/sources/docgener/presenta/green_growth/greengrowth.pdf

The guide to multi-benefit cohesion policy instruments in nature and green infrastructure, 2013, European Commission directed at helping with on-going implementation of Cohesion Policy 2007-2013, as well as form a useful toolkit and information source for the development and implementation of Cohesion Policy 2014-2020.

http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/guide_multi_benefit_nature.pdf

Review of LIFE projects supporting GI: LIFE building up Europe’s Green Infrastructure, 2010, European Commission introduces the concept of a green infrastructure strategy for Europe with the aim of finding ways to reduce landscape fragmentation, improve ecosystem resilience, protect biodiversity, adapt to climate change, and promote integrated spatial planning.

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http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/green_infra.pdf

GI Guidance

[Green infrastructure guidance \(NE176\), Natural England, 2011](#) articulates natural England's position in relation to green infrastructure planning and delivery, which is increasingly recognised as an essential part of sustainable spatial planning. This is due in no small part to the role of green infrastructure as a 'life support system', able to deliver multiple environmental functions and to play a key part in climate change mitigation and adaptation.

<http://publications.naturalengland.org.uk/publication/35033?-category=49002>

[Green infrastructure position statement, 2013, Landscape Institute](#) gives fresh insights into the benefits GI can bring by creating multifunctional landscapes and show how people can collaborate to deliver it. It is also a chance to take stock of significant planning reform across the UK and shows how the landscape profession can lead in this area by the integrated use of GI in a way that will provide effective solutions.

www.landscapeinstitute.org/policy/GreenInfrastructure.php

[Green benefits in Victoria business improvement district, 2012, Victoria BID](#) presents a baseline quantitative assessment of the air pollution, amenity, carbon storage and sequestration benefits of trees as well as the storm water and surface temperature benefits of existing green infrastructure in the Victoria BID.

www.victoriabid.co.uk/downloads/

[Delivering biodiversity benefits through green infrastructure \(C711\), 2011, CIRIA](#) aims to give clear messages about the goals and objectives of GI for the construction industry. It also seeks to serve as a tool to enable construction professionals to work together with other disciplines to maximise the opportunities presented by civil engineering and building projects, to enhance biodiversity and ecosystem services through GI, while minimising any negative effects on the environment.

<http://www.ciria.org/ItemDetail?iProductcode=C711&Category=BOOK>

Regional GI strategy

[Investing in green places: South east Dorset green infrastructure strategy, 2011](#) is about making the best use of the assets we already have in a cost effective way, the need for and outlines standards for strategic green space and other aspects of green infrastructure, which are intended to guide new provision of green

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infrastructure and be reflected in improving and managing existing assets.

www.dorsetforyou.com/greeninfrastructure

Sustainable urban drainage

Model agreements for sustainable drainage systems (C626), 2004, CIRIA provides basic advice on the use and development of model operation and maintenance agreements for rainwater and grey water use systems together with simple guidance on their incorporation into developments. The guide identifies maintenance considerations and provides an outline of ways in which the long-term responsibilities for the maintenance of the rainwater and grey water use systems can be allocated.

www.ciria.org/serVlce/Home/core/orders/product.aspx?-catid=2&prodid=115

Retrofitting to manage surface water (C713), 2012, CIRIA sets out a process to achieve the retrofitting of surface water management measures. It integrates the principles of urban design with surface water management.

<http://www.ciria.org/ItemDetail?iProductCode=C713&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91>

The SuDS Manual, 2015, CIRIA covers the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and water quality. There is also supporting information covering topics such as materials, landscape design, maintenance, community engagement and costs and benefits.

<http://www.ciria.org/ItemDetail?iProductCode=C753&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91>

Trees

The benefits of large species trees in urban landscapes: A costing, design and management guide (C712), 2012, CIRIA encourages the use of large species trees within the urban landscape, dispelling assumptions and myths regarding the whole life costs of planting and maintenance. It highlights social and environmental aspects and offers technical guidance covering planning, design, management and maintenance.

<http://www.ciria.org/ItemDetail?iProductcode=C712&Category=BOOK>

Air temperature regulation by urban trees and green infrastructure, 2013, Forestry Commission examines how the type of tree, its planting location,

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together with the mix of vegetation and paved surfaces in green space all contribute to countering the effects of urban heat islands.

www.forestry.gov.uk/fr/lnFD-95ren7

Trees in the townscape: A guide for decision makers, 2012, Trees and Design Action Group as well as playing a role in climate proofing our neighbourhoods and supporting human health and environmental well-being, trees can also help to create conditions for economic success. This guide takes a 21st century approach to urban trees, providing decision makers with the principles and references they need to fully realise this potential.

www.tdag.org.uk/trees-in-the-townscape.html

Trees in our towns: The role of trees and woodland in managing urban water quality and quantity, 2013, Woodland Trust looks at how planting trees in urban areas can help address surface water flooding and improve river health.

www.woodlandtrust.org.uk/en/planting-woodland/making-the-most-of-land/trees-and-water/pages/default.aspx