

Tresham Garden Village: Natural Capital Account and Assessment

A natural capital account and impact assessment have been produced for a proposed major housing and community development in East Northamptonshire.

Approach

The natural capital approach is becoming embedded in national environmental and planning policies. In addition, biodiversity net gain is being made mandatory for all new developments with the ambition of extending this to encompass environmental net gain. But what does this mean in practise for the planning and development sector?

This is a summary of two reports that demonstrate how a natural capital and ecosystem services approach can be applied to a major development. It is the first in the UK to employ natural capital accounting to highlight the importance of the natural environment in new developments, and to use an assessment of impact on natural capital and ecosystem services to enhance the design of the masterplan. The assessment was undertaken in four steps:

Step 1. Mapping the baseline and post-development (masterplan) natural capital assets (habitats).

Step 2. Mapping ecosystem service provision and demand before and after development.

Step 3. Assessing environmental net gain.

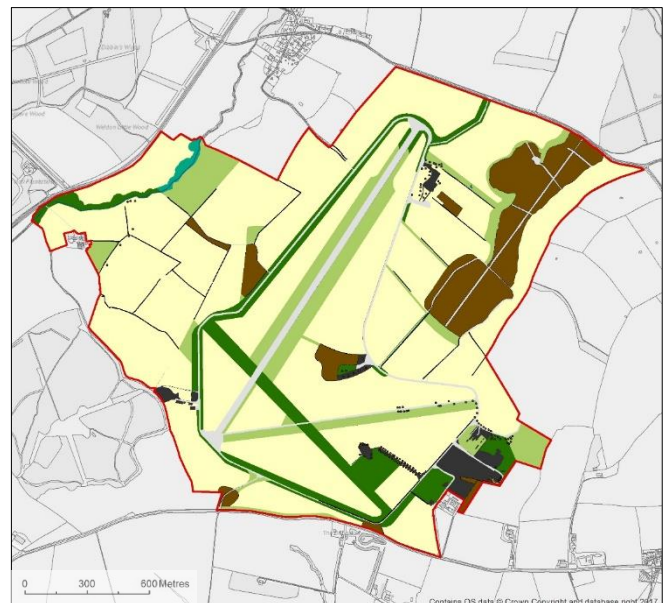
Step 4. Natural capital accounting.

Step 1: Mapping natural capital assets

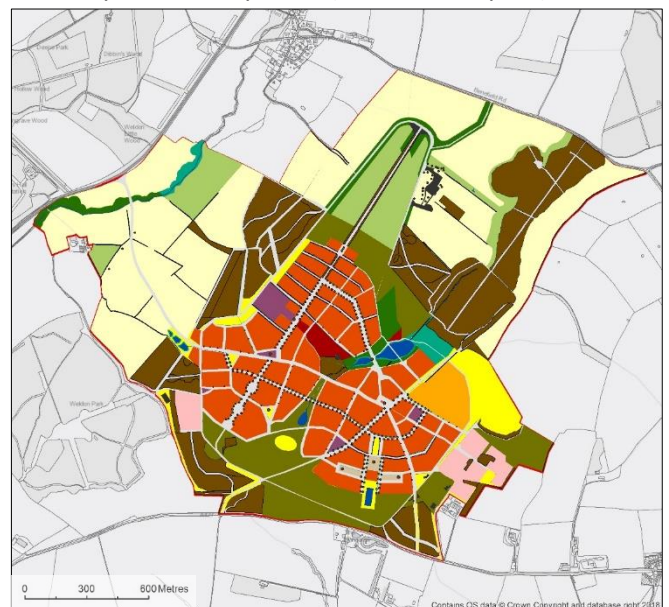
The proposed development at Tresham Garden Village includes 1500 houses, a primary and secondary school, employment zones and associated infrastructure. It also incorporates a significant amount of interconnected green space and is to be partly buffered by large areas of new woodland.

The natural capital asset register revealed that the site (370 ha) is currently dominated by arable land, with smaller patches of improved grassland, semi-natural grassland and broadleaved woodland (see maps to right). Under the proposed masterplan, the area of arable land will fall considerably with large increase in woodland and parkland, along with built-up areas, gardens and infrastructure.

Habitat baseline



Habitat post-development (2018 masterplan)



Step 2: Mapping ecosystem service provision

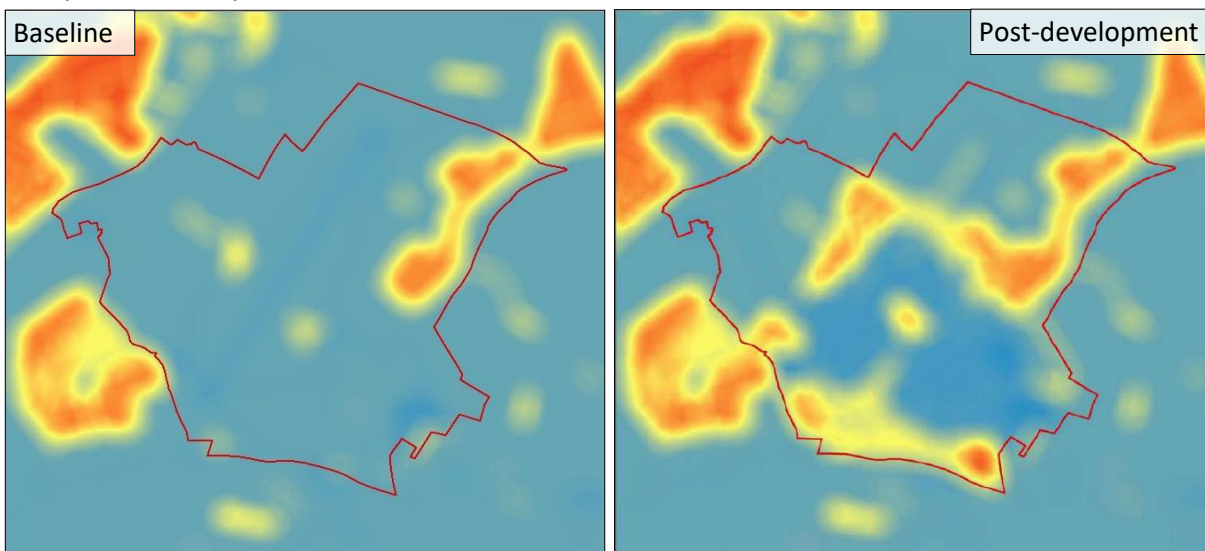
Each ecosystem service was mapped individually (illustrated for one ecosystem service below) showing the capacity of the habitats from Step 1 to provide ecosystem services before the development (baseline) and for the masterplan design. Biodiversity was also mapped and presented on the same scale as the services. The provision and (in some cases) demand of the following ecosystem services were mapped:

- Food production
- Timber production
- Carbon sequestration
- Air pollution regulation (and demand)
- Noise regulation (and demand)
- Water flow regulation
- Water quality regulation
- Pollination
- Access to nature (and demand)

The maps were successfully used at a stakeholder workshop to alter the design of the masterplan, with the aim of enhancing the delivery of ecosystem services, and further recommendations were provided based on the outcomes of this assessment to inform the masterplan design. The importance of the new woodland planting surrounding the core built zone, fully integrating street trees and Sustainable Drainage Systems (SuDS) into the detailed design, and increasing public access to greenspace were highlighted as particularly beneficial.

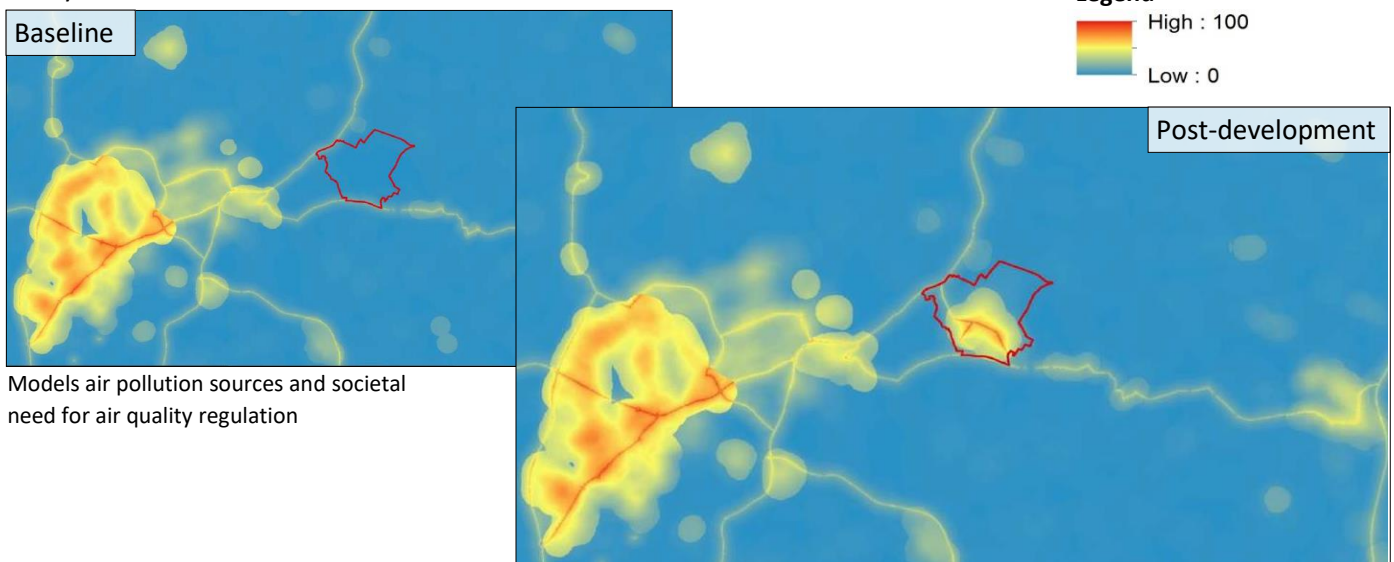
Air pollution regulation

Ecosystem service provision



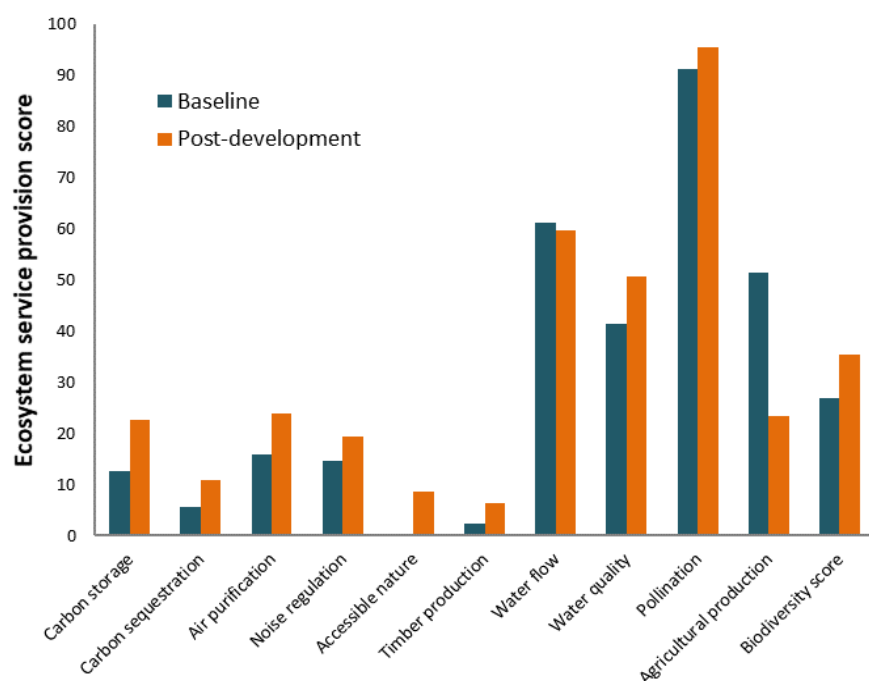
Models the air pollution absorption capacity for each habitat and the effect on the surrounding area

Ecosystem service demand



Models air pollution sources and societal need for air quality regulation

Step 3: Assessing environmental net gain



Graphs of the level of provision of all ecosystem services for baseline and post development scenarios, make it clear whether or not net gain has been achieved. Biodiversity has been integrated into the natural capital assessment so environmental net gain can be assessed as a whole.

Environmental net gain is achieved when the biodiversity score at the site is higher post-development, and the majority of ecosystem services also increase compared to the baseline (as illustrated by the graph on the left).

This has been achieved at Tresham, as under the proposed masterplan, the delivery of almost all ecosystem services is predicted to increase. The proposed development will also significantly increase demand.

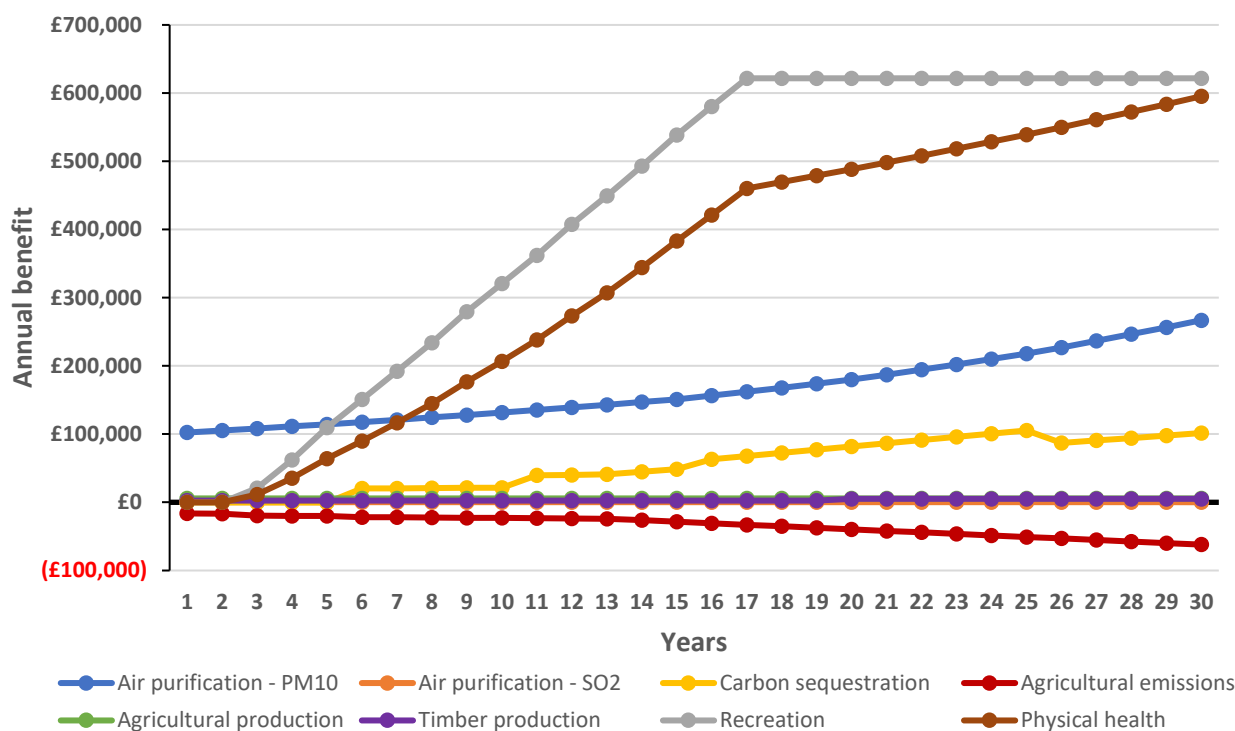
Step 4: Natural capital accounting

Natural capital accounting produces 'a series of interconnected accounts that provide a structured set of information relating to the stocks of natural capital and flows of services supplied by them' (ONS (2017)). This involves identifying and assessing the natural capital assets (asset register, Step 1 above) with and without the development, calculating the flow of services from them (physical flow account), and then the monetary value of the resultant benefits (monetary flow account). Crucially it balances these benefits with the costs of creating and maintaining the natural capital assets (capital and maintenance costs account), thereby providing a net natural capital value for the development (natural capital balance sheet). The baseline and post-development accounts for a site can then be compared.

A summary of the natural capital balance sheet for Tresham Garden Village is shown here, based on the Present Value of assets and liabilities over 30 years.

Natural Capital Balance Sheet £ ₂₀₁₈ PV over 30 years	Baseline £'000	Masterplan £'000	Change £'000
Assets			
Air purification - PM10	1,061	2,896	1,835
- SO2	0.9	1.1	0.2
Carbon sequestration	299	833	534
Agricultural emissions	(809)	(577)	233
Agricultural production	497	109	(389)
Timber production	49	61	13
Recreation	0	6,966	6,966
Physical health	0	5,294	5,294
Natural capital benefits	1,097	15,583	14,486
Rental & grant income	983	764	(219)
Gross asset value (benefits)	2,080	16,348	14,267
Liabilities			
Capital costs	0	(841)	(841)
Maintenance costs	(132)	(1,479)	(1,347)
Total liabilities (costs)	(132)	(2,320)	(2,188)
Net Natural Capital Value	1,948	14,027	12,079

The table shows the value of each natural capital benefit and the overall net natural capital value both for the baseline and post-development. It also highlights the change in value between these scenarios. Red text in brackets shows losses or costs.



The value of natural capital benefits and disbenefits each year for the next 30 years for the masterplan for Tresham.

Overall, the **Net Present Value of the natural capital assets under the masterplan is projected to be £14.03M, an increase of £12.08M compared to the baseline.** Recreation, physical health and air quality regulation provide the greatest benefits, although all natural capital benefits increase, with the exception of agricultural production. However, the vast majority of the benefits delivered by the site would be in the form of public benefits.

The benefits and costs were calculated for each individual year over 30 years. Under the baseline (no development), values will not change greatly, whereas the value of benefits delivered as the masterplan is implemented change considerably over this period (see figure above). In particular, recreation and physical health benefits will increase as homes are gradually completed and the village population increases. Air quality regulation and carbon sequestration benefits will increase as the trees and woodlands grow. On the other hand, costs are much higher towards the start of the project period, due to the capital costs of establishing habitats. This means that there will be a net cost at the start of the project, but by Year 4 the green elements of the project will be providing net benefits, which then increase rapidly as the development progresses.

A sensitivity analysis and RAG assessment were performed and showed that the range of potential values was high, but that the vast majority of this uncertainty arose from the calculation of physical health. In all versions of the sensitivity analysis, creating new green infrastructure at Tresham resulted in a substantial positive return on investment.

This project has demonstrated how a natural capital and ecosystem services approach can be applied to a major development and used to enhance design. It has also shown that it is possible to produce natural capital accounts for a proposed development. With national policy moving towards the assessment of environmental net gain and integrating a natural capital approach, this project can be used to demonstrate best practice to roll out the approach more widely and to communicate and showcase the importance of the natural environment in new developments. Green infrastructure is an essential part of all new developments and this approach is useful at highlighting its value, which may otherwise remain hidden. **Quality green spaces deliver a range of benefits that have real value to society, create community well-being, and enhance liveability and sense of place.**

Much more information and analyses are included in the full reports, which can be downloaded from [here](#).