Annex 1 - Detailed Specification Urban Habitat Mapping Technical amendments and revisions

Background to Natural England.

Our remit

Natural England is the government’s advisor on the natural environment. We provide practical advice, grounded in science, on how best to safeguard England’s natural wealth for the benefit of everyone.

Our remit is to ensure sustainable stewardship of the land and sea so that people and nature can thrive. It is our responsibility to see that England’s rich natural environment can adapt and survive intact for future generations to enjoy.

NERC Act

Natural England was formally established on 01 October 2006 following the successful passage of the [Natural Environment and Rural Communities (NERC) Act 2006](http://www.opsi.gov.uk/acts/acts2006/ukpga_20060016_en_1) through Parliament. We are an independent statutory Non-Departmental Public Body.

The NERC Act sets out Natural England's purpose: to ensure that the natural environment is conserved, enhanced and managed for the benefit of present and future generations, thereby contributing to sustainable development.

The Act states that this purpose includes:  
​​​​​​

* promoting nature conservation and protecting biodiversity
* conserving and enhancing the landscape
* securing the provision and improvement of facilities for the study, understanding and enjoyment of the natural environment
* promoting access to the countryside, open spaces and encouraging open air recreation
* contributing in other ways to social and economic wellbeing through management of the natural environment.

You can [read more about what we do](https://www.gov.uk/government/organisations/natural-england/about) on GOV.UK.

England Green Infrastructure Mapping Database - Urban Habitat and Naturalness Mapping – Technical amendments and revisions.

Project reference - UHM TAR.

Background.

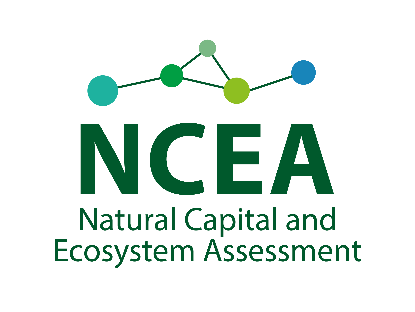
The England Green Infrastructure Mapping database is a part of the England Green Infrastructure Standards Framework and is being delivered as part of the Natural Capital and Ecosystems Assessment Programme

The current version of the England Green Infrastructure Mapping can be viewed via the link below. Please note that this does not include any of the existing (Phase 1) Urban Habitat and Naturalness mapping.

[Home (naturalengland.org.uk)](https://eur03.safelinks.protection.outlook.com/?url=https%3A%2F%2Fclicks.eventbrite.com%2Ff%2Fa%2FB_lhmLe6lSzEykzJa0id7g~~%2FAAQxAQA~%2FRgRjk2ROP0RLaHR0cHM6Ly9kZXNpZ25hdGVkc2l0ZXMubmF0dXJhbGVuZ2xhbmQub3JnLnVrL0dyZWVuSW5mcmFzdHJ1Y3R1cmUvSG9tZS5hc3B4VwNzcGNCCmGyzjCyYSIWXadSIW1hcnRpbi5tb3NzQG5hdHVyYWxlbmdsYW5kLm9yZy51a1gEAAAAAA~~&data=05%7C01%7CMartin.Moss%40naturalengland.org.uk%7C160138e94e8e43b0c07408dad38ce2d7%7C770a245002274c6290c74e38537f1102%7C0%7C0%7C638054899321484718%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=aN0BFX6dI2E03vTyi3So%2Boj9CgIWmLrVQTUphCSn0E4%3D&reserved=0)

Information about the Natural Capital and Ecosystems Assessment Programme can be found via the link below.

[Natural Capital and Ecosystem Assessment Programme - GOV.UK (www.gov.uk)](https://www.gov.uk/government/publications/natural-capital-and-ecosystem-assessment-programme/natural-capital-and-ecosystem-assessment-programme)



The overall purpose of the England Green Infrastructure Mapping Database is to provide England level data to support a range of planning, strategy and resource targeting processes to help and designed to help deliver the England Green Infrastructure Standards framework.

Project scope and overview.

An Earth Observation based approach to developing Urban Habitat and Naturalness Maps was developed during a pilot phase in 2021/22 and further refined during three trial phases between 2022/23 and 2024/25.

During 2024/25, the resulting data and method were technically reviewed by Axion Solutions, and a limited stakeholder engagement exercise was run to gain feedback on the outputs from the pilots and trialling phases.

Because the mapping method was developed and amended with experience, the actual mapping for each area is slightly different and there are also “edge conflicts” where data from different phases are contiguous but not necessarily aligned. This project will resolve these differences and put the data for all existing mapped areas into a consistent framework.

A simplified image file of the Broad Urban Habitat data is included in the [Green Infrastructure Map](https://designatedsites.naturalengland.org.uk/GreenInfrastructure/Map.aspx). However the data is not open and will only be made available to the successful contractor under PSGA Contractor License at the start of the contract.

As a result of the feedback and review, some final adjustments have been developed to the Urban Habitat Mapping Method (these are set out in annex 5) and Natural England now wish to apply these final adjustments to the existing mapped areas to amend the current data and create a “final” version the existing suite of areas for which Urban Habitat and Naturalness data have been developed.

This contract will be to apply the identified amendments to the existing data, re-run any data processing if required, resolve any edge conflicts that exist where data from contiguous areas was generated in different phases (and thus different iterations of the method) and generate “final” iterations of the Urban Habitat and Naturalness maps and a new version of the Urban Habitat and Naturalness Mapping User Guide bringing together the methodological developments from the pilots, three phases of trialling and the stakeholder review (these are set out in the attached documents – annexes 2, 3, 4 and 5 which in combination set out the method that should be followed).

An overview of Urban Habitat and Naturalness Mapping and the essential process steps is set out in annex 6 - Urban Habitat and Naturalness Mapping – Method summary.

Submitted quotes will need to confirm that they will follow the overall prescribed method (subject to any changes agreed with the project steering group) and that they are able in terms of technical skills and capacity to deliver Urban Habitat and Natural Maps for the listed locations below.

Timetable.

The project is anticipated to begin on the 14th July 2025 and to complete by 30th January 2026.

Requirement

The areas to which the amendment process will be applied are;

* Tyneside.
* Teesside.
* Liverpool City Region and Warrington.
* Greater Manchester.
* West Yorkshire.
* Sheffield and Rotherham.
* Stoke on Trent and Newcastle under Lyme.
* West Midlands Combined Authority (including Coventry).
* East Midlands Cities (Derby, Nottingham and Leicester).
* City of Cambridge.
* Greater London.
* Dartford and Gravesham.
* City of Plymouth.

Commercial software usage.

Please note that the method requires the use of some commercial software. **Costs/licenses associated with the use of these software should be included in the prices as eligible project costs**. Please see section 2 of the User Guide (Annex 2) for notes on software requirements.

Costs associated with licenses should be included as part of the project costs and identified clearly in the quote.

The two commercial software requirements are;

1. LASTools [commercial]

Download: <https://rapidlasso.com/lastools/>

LASTools is used to merge the EA LiDAR tiles into single files. A free version of the software exists for smaller areas, but artefacts are voluntarily introduced at larger scales when used without a commercial license. Any software that allows LAZ tile merging could be used as an alternative.

2. Trimble eCognition 10.3 [commercial]

Download: <https://geospatial.trimble.com/ecognition-download>

This is the main software used for the urban habitat and Naturalness mapping workflow and we are not aware of any alternative that is currently available. Licenses need to be purchased, although a free trial version is available for initial testing and training. The official UK provider for Trimble eCognition software licenses is Korec: https://www.korecgroup.com/.

There are two types of eCognition license: Developer and Server. Developer licenses allow ruleset modifications and at least one is required for initial threshold setting. The Server licenses allow tiling of larger areas for more efficient parallel batch processing. It is advised to purchase as many Server licenses as can be supported by the user’s computing power and budget.

eCognition licenses can be renewed monthly and offer flexibility. Users should consider preparing their datasets and performing initial tests before purchasing Server license for efficient use of the license during the rental period.

Tasks.

Task 1 – Develop a “final” schema, definitions and rulesets for the amended mapping approach.

The original “User Guide” (Annex 2) is a comprehensive step by step guide for creating Urban Habitat and Naturalness maps using eCognition software that emerged from the piloting and phase 1 trial exercises. The use of eCognition software will be retained in this project. However, some adjustments and new rulesets were made during trial phases 2 and 3 and following a stakeholder review exercise in 2024/5 several amendments to the Urban Habitat schema and definitions have been identified and listed in annexes 3 and 4. The revised habitat schema and descriptions are provided as Annex 5.

Task 1 will bring together these outputs from previous projects and combine into one “final” Urban Habitat Schema, definitions and rulesets to be applied in eCognition.

This final approach will be agreed with the project steering group prior to application to the currently mapped areas. A draft Urban Habitat Mapping User Guide will be required within 4 weeks of the start of contract.

Only Urban Habitat Map method will be required as the Naturalness element of the method is still developmental. No Naturalness or Combined Factor Naturalness maps will be required and this part of the method should be ignored.

Task 2 – Apply agreed amended mapping approach to the listed areas of existing Urban Habitat and Naturalness data.

It is anticipated that the data amendment requirements will differ by the phase the data was created.

Data for the original 3 pilot areas and the phase 1 of the trialling are likely to require wholesale reprocessing as significant changes were applied between the two and they are out of line with data from later phases.

However, data from phases 2 and 3 is likely to need only minor modification and amendment in order to bring it into line with the final schema.

This task is likely to require;

Task 2a - Reprocessing of the data from the original 3 pilot cities and phase 1 trialling areas.

Task 2b - Amendment of the data from phases 2 and 3 trialling to bring into line with the amended schema etc.

The expected reprocessing and amendment requirements for each area are set out in the table below.

Only Urban Habitat Maps will be required as the Naturalness element of the method is still developmental. No Naturalness or Combined Factor Naturalness maps will be required and this part of the method should be ignored.

|  |  |  |
| --- | --- | --- |
| Phase | Location | Requirement |
| Pilot | Cambridge (41 sqkm) | Reprocess existing mapped area and expand with a 1km buffer around administrative area of City of Cambridge. |
|  | Plymouth (80 sqkm) | Reprocess existing mapped area and expand by adding Torpoint and Saltash and add 1km buffer. |
|  | City of Manchester (see requirement) | City of Manchester should be reprocessed as part of reprocessing Greater Manchester and not separately. |
| Phase 1 | Tyneside (Newcastle, Gateshead, North and South Tyneside, Sunderland). (597 sqkm). | Reprocess existing mapped area. |
|  | Greater Manchester (GMCA area – 1418 sqkm) | Reprocess Greater Manchester area (including City of Manchester). |
|  | West Midlands (Birmingham, Wolverhampton, Dudley, Sandwell, Walsall and Solihull). (903 sqkm). | Reprocess existing mapped area. |
| Phase 2 | Greater London (GLA area). (1601 sqkm) | Amend existing data to be in line with amended schema. |
|  | Liverpool City Region (Liverpool, Sefton, Wirral, Knowsley, St Helens, Halton and Warrington). (907 sqkm). | Amend existing data to be in line with amended schema ensuring mapped area covers all of city region area (there are some edge gaps that will require filling). |
|  | West Yorkshire (Leeds, Bradford, Kirklees, Wakefield). (2038 sqkm). | Amend existing data to be in line with the amended schema. |
| Phase 3 | Teesside (Darlington, Stockton, Middlesbrough, Redcar and Cleveland, Hartlepool). (897 sqkm). | Amend existing data to be in line with amended schema. |
|  | Sheffield and Rotherham. (738 sqkm). | Amend existing data to be in line with amended schema. |
|  | Stoke on Trent and Newcastle under Lyne. (360 sqkm). | Amend existing data to be in line with amended schema. |
|  | Coventry. (122 sqkm). | Amend existing data to be in line with amended schema. |
|  | East Midlands Cities (Nottingham, Derby, Leicester). (295 sqkm). | Amend existing data to be in line with amended schema. |
|  | Dartford and Gravesham (NW Kent). (211 sq km) | Amend existing data to be in line with amended schema. |

**Task 3 – Accuracy Assessments and “Data Confidence overlay”.**

Accuracy assessment using Confusion Matrices will be required for the Detailed Urban Habitat data for each APGB date tile and a “Data Confidence” overlay layer should be developed for each output tile using the accuracy assessment data to clearly indicate the data accuracy confidence for each Detailed Urban Habitat type across the tile.

Task 4 – Create a final Urban Habitat Mapping User Guide for the application of the approach in a Trimble eCognition environment.

This task will create an updated detailed step by step user guide setting out the “final” approach to Urban Habitat and Naturalness Mapping in the Trimble eCognition software environment. This guide is intended to be usable by any stakeholder to either update mapping is due course or to create new mapping. The existing User Guide will provide the essential format for the updated version.

**Outputs.**

Deliver the spatial data outputs in GIS format compatible with ArcGIS Pro (see data requirements below) for the following outputs;

1. Draft process guide on how to apply the amended process and schema to be applied in the Trimble eCognition environment (to include changes required to the User Guide set out in Annex 2 and any ruleset changes required to deliver the amended method).

2. Urban Habitat Broad Classification Maps for the listed target areas in tiles aligned with the Ordnance Survey National grid and in 5 x 5 Square kilometres tile sizes.

3. Urban Habitat Detailed Classification Maps for the listed target areas in tiles aligned with the Ordnance Survey National Grid and of 5 x 5 square kilometres (same tile area as for Broad Classification).

4. Accuracy assessments (Confusion matrices) for each APGB date tile for both the Broad and Detailed Urban Habitat Maps and “Data Confidence overlay” showing Accuracy Assessment informed accuracy percentage by Detailed Habitat Type for each APGB date tile.

5. A final Urban Habitat Mapping Step by Step User guide for developing Urban Habitat Maps using Trimble eCognition.

Data requirements.

Required data inputs are listed in Section 3 of Annex 2. Please note that the existing Urban Habitat data is not Open Government License will be provided to the successful contractor under PSGA Contractor License terms and conditions once the contract is live. A generalised Broad Habitat map is available to inspect on the GI Mapping pages of the GI Framework website.

Required data outputs.All data outputs need to conform with the requirements of the digitising standards set out in Annex 7.

Sustainability

Natural England protects and improves the environment and is committed to reducing the sustainability impacts of its activities directly and through its supply chains. We expect the Contractor to share this commitment and adopt a sound, proactive sustainable approach in keeping with the 25 yr environmental plan/our commitments compliant with all applicable legislation. This includes understanding and reducing direct and indirect sustainability impacts and realising opportunities, including but not restricted to; resilience to climate change, reducing greenhouse gas emissions, water use and quality, biosecurity, resource efficiency and waste, reducing the risk of pollution, biodiversity, modern slavery and equality, diversity & inclusion, negative community impacts.

As a delivery partner, the successful contractor is expected to pursue sustainability in their operations, thereby ensuring the Contracting Authority is not contracting with a supplier whose operational outputs run contrary to the Contracting Authority’s objectives. The successful contractor will need to approach the project with a focus on the entire life cycle of the project.

Outputs and Contract Management

Martin Moss will be the Natural England Contract Manager for this project.

A Project Steering Group of Natural England and successful contractor representatives will be established at start of contract to oversee project delivery. It is anticipated project progress meetings will be held monthly (by Teams) from the initial project inception meeting.

All meetings will be online via Teams.