Tranquillity Assessment – Final Report

Technical Report

South Oxfordshire and Vale of White Horse District Councils

Final report

Prepared by LUC

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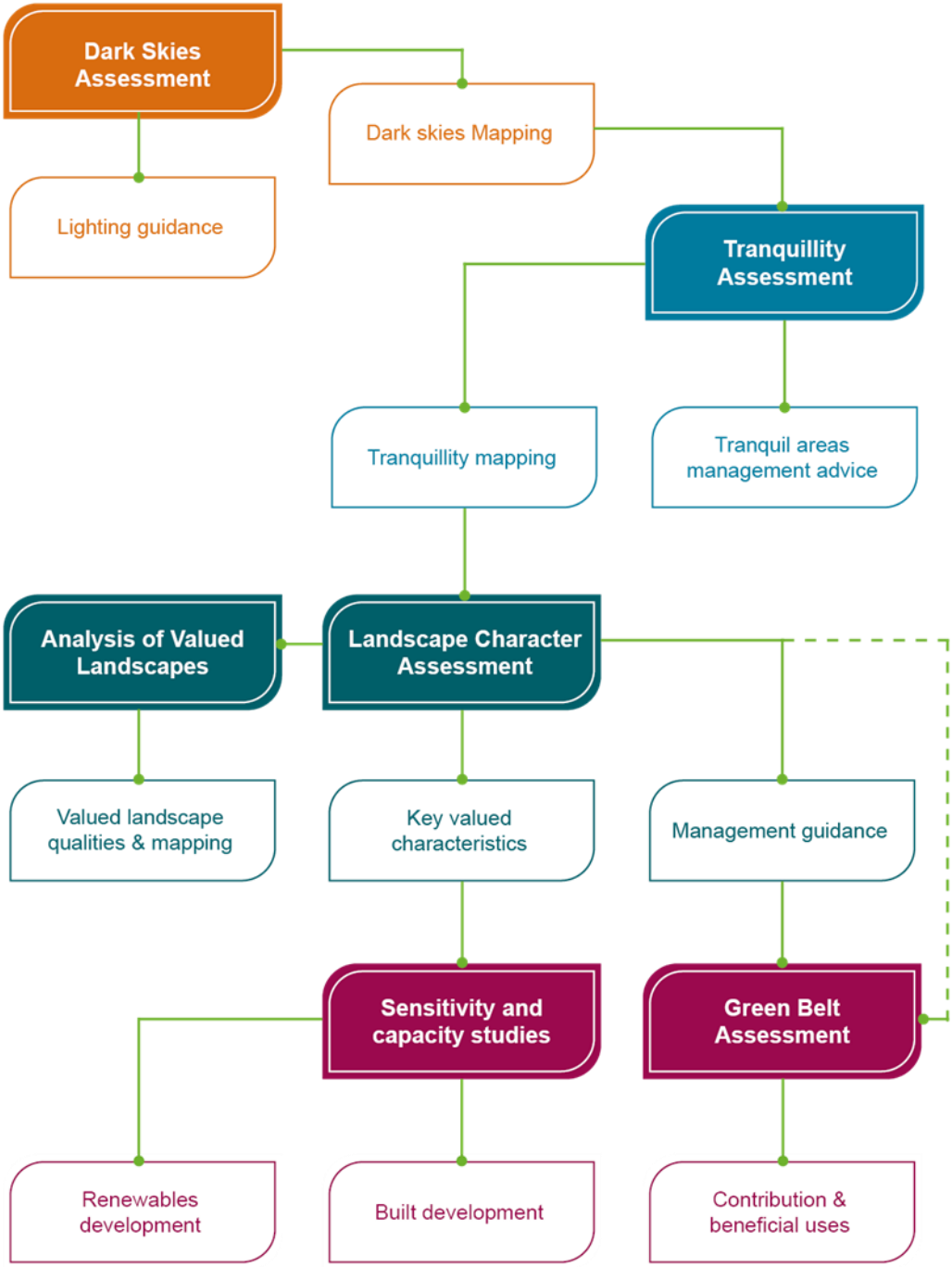
Chapter 1

Introduction

1.1 In January 2023, South Oxfordshire and Vale of White Horse District Councils commissioned LUC to produce landscape evidence contributing to the Joint Local Plan that will guide development in the districts to 2041. An overview of the suite of landscape evidence commissioned is shown in Figure 1.1.

Figure 1.1: Suite of landscape evidence bases



1.2 The second requirement of this landscape evidence is to assess, describe and map relative levels of tranquillity across South Oxfordshire and Vale of White Horse District Councils in a clear, consistent and comprehensive way. Tranquillity is a key factor contributing to landscape character and landscape value. This tranquillity assessment will inform the Landscape Character Assessment.

1.3 Tranquillity means different things to different people. There is a consensus for tranquillity to relate to audible (e.g. birdsong, natural sounds, moving water) and visual (e.g. stars and perceived wildness) peace. Tranquillity can support health and well-being and be a key contributor to quality of life. However, tranquillity can be impacted by changes in noise, visual intrusion and light pollution.

1.4 Tranquillity in South Oxfordshire and Vale of White Horse District Councils has been mapped by combining sets of indicators that fall into 'positive' or 'negative' categories. Positive indicators enhance the feeling of tranquillity and represent the relative abundance, perception or experience of nature. When combined, positive indicators represent places that are visually tranquil and with natural sounds more prominent than non-natural noise. Negative indicators detract from tranquillity. When combined they represent areas which are less tranquil and where visual and noise disturbances are present.

Aims and objectives

1.5 The aims of this study are to:

- Create maps of tranquillity for South Oxfordshire and Vale of White Horse District Councils.
- Produce key findings/statistics for the two local authorities to aid in the interpretation of the results.
- Produce a report which summarises the method and findings of the study.

- Make recommendations on how tranquillity can be protected, enhanced and created in the districts.
- Host the final tranquillity map online to show this information in a visually engaging and easy to understand way.

1.6 The study was supported by one stakeholder workshop that took place during the development phase, ensuring that a diverse range of perspectives inform the development of the tranquillity indicators in the study area.

What does this report cover

1.7 The final tranquillity assessment provides maps at two different scales: the assessment covering all South Oxfordshire and Vale of White Horse District Councils at 50m resolution, and an assessment for the larger settlements only, at 10m resolution.

1.8 This report provides details of the method used to create the final map layers for the tranquillity assessment covering South Oxfordshire and Vale of White Horse District Councils at 50m resolution as well as the larger settlements at 10m resolution. This final mapping phase takes into account the stakeholder feedback received following the pilot mapping.

1.9 This report also includes a user guide giving recommendations on how the tranquillity assessment can be used to protect, enhance and create tranquillity through development.

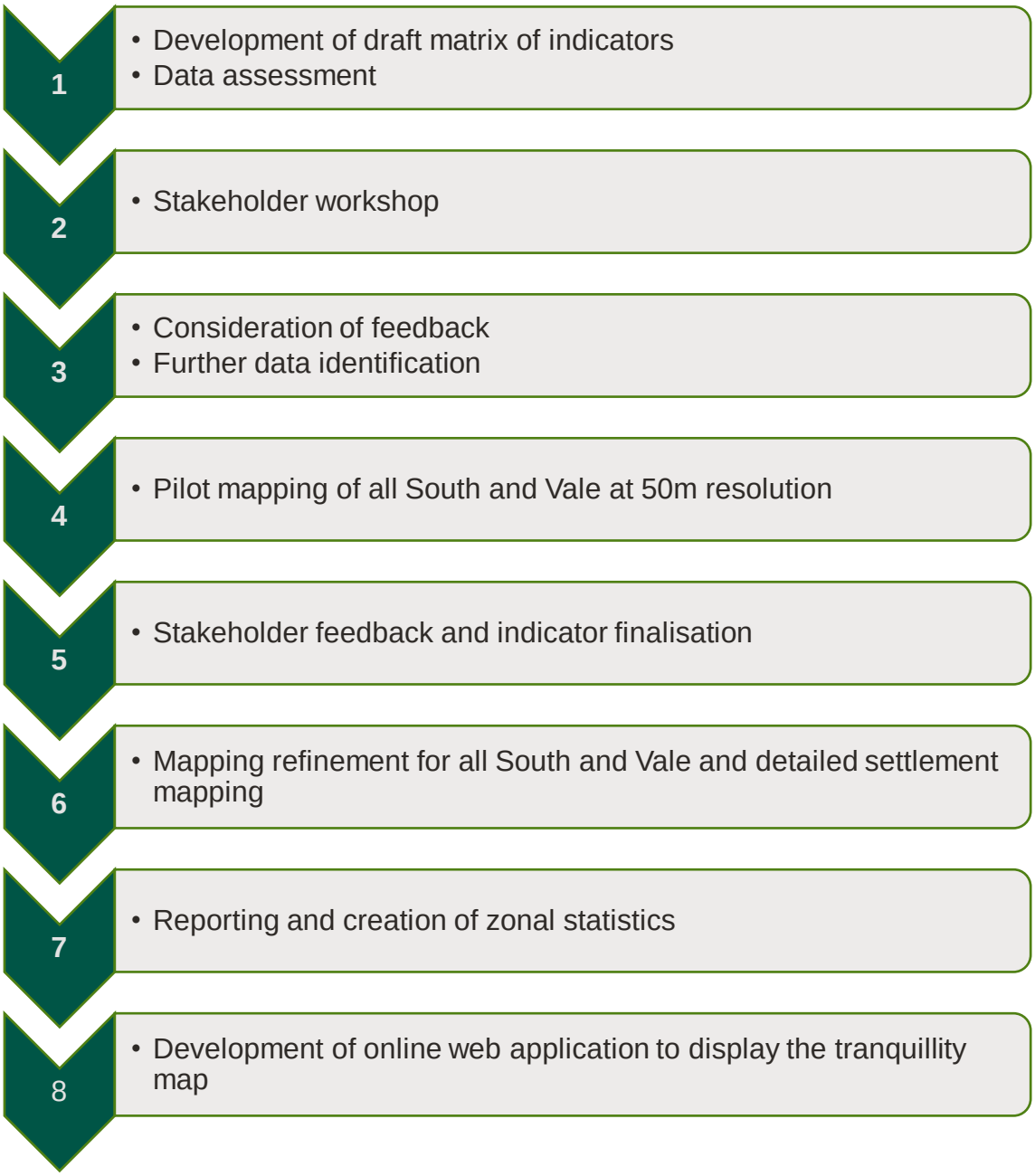
Chapter 2

Methodology

2.1 This section sets out the method followed to identify the relevant indicators and process the data to generate the maps that comprise this study. This method is designed to be easily replicated.

2.2 The approach taken to develop the mapping methodology followed the stages set out in Figure 2.1.

Figure 2.1: Summary of approach



2.3 The methodology for this study is based on the Tranquillity Mapping: Developing a Robust Methodology for Planning Support Technical Report produced by Northumbria University for CPRE in 2008 **[See reference** 1**]**. It also draws on the experience in assessing and mapping tranquillity which LUC

has built up in past projects, such as Tranquillity and Place in Wales **[See reference** 2**]** and Tranquillity Mapping for Central Bedfordshire Council **[See reference** 3**]**.

Mapping scales

2.4 Following the methodology developed by LUC in Wales **[See reference** 2**]** a two level approach has been used to ensure that whilst there is full coverage of all South Oxfordshire and Vale of White Horse District Councils at 50m resolution, more detailed (10m) mapping is available for the larger settlements. This approach aims to differentiate pockets of tranquillity within settlements, recognising that these are important even though they are potentially not as tranquil when compared to rural tranquillity values.

2.5 For ease of reference, the full coverage 50m resolution mapping is referred to as 'All South and Vale' mapping in this report. The higher resolution settlement mapping is referred to as 'Urban' mapping.

2.6 Both levels of analysis consider the same aspects/indicators of tranquillity (for example visibility of major roads), but the data used to represent the indicator and the spatial resolution of the data has been adjusted accordingly.

2.7 The larger settlements used in the detailed 'Urban' analysis shown in Figure 2.2 were selected based on the 'towns' list provided in Appendix 2 of the South Oxfordshire and Vale of White Horse Joint Local Plan 2041 Landscape Evidence Specification. These were buffered by a distance of 6 km to generate the extent for the urban analysis. Service centres were not included in the urban analysis because they were going to change while this study was on-going. Therefore it was agreed to omit them from this mapping.

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 2.2 - Selected urban areas

South Oxfordshire and Vale of White Horse

ONS Built-up areas 2022

*Urban Areas mapped:

Abingdon-on-Thames
Didcot
Faringdon
Henley-on-Thames
Thame
Walingford
Wantage

0 10 20 km

Map scale 1:225,000 @ A3

12315_r2_PilotReportMaps/Fig2_SelectUrbnArea_A3L
25/09/2023EB:Horton_K Source: OS, ONS, LUC

Consultation

2.8 LUC and South Oxfordshire and Vale of White Horse District Councils held a workshop in April 2023 to provide key stakeholders the opportunity to comment on and shape the proposed methodology; including the datasets to be used. The workshop included discussions on:

- What makes the participants feel tranquil and what detracts from tranquillity
- The relative importance of different factors influencing tranquillity
- What datasets could be used to map tranquillity

2.9 Stakeholders included representatives from the following groups:

- Client steering group (landscape and planning officers)
- National Landscape representative
- Environmental Health (noise)
- County council waste and minerals activities
- Green space / Green Infrastructure
- Local CPRE
- Heritage representative

2.10 Notes from the breakout discussion sessions from the workshop are included in Appendix A.

Indicators

2.11 Tranquillity was assessed using 'positive' and 'negative' indicators. These indicators form the building blocks of the positive and negative aspects of tranquillity but are not designed to be viewed in isolation as a measure of tranquillity.

2.12 Early in the study, a list of draft indicators was developed for exploration and discussion with stakeholders. The details of the draft indicators and the feedback received is presented in Appendix A.

2.13 A number of factors influenced the development of the final list of indicators taken forward for the tranquillity assessment including:

- Stakeholder feedback
- Availability of data
- Consistency and robustness of data

2.14 This section sets out the final list of positive and negative indicators which were used to map tranquillity in South Oxfordshire and Vale of White Horse District Councils. A full breakdown of the indicators and the way in which they were processed is included in the Positive Indicators Details (Chapter 3) and Negative Indicators Details (Chapter 4) sections of this report.

2.15 The positive indicators are as follows:

- P01 - Naturalness of the land cover
- P02 - Seeing rivers and canals
- P03 - Seeing lakes
- P04 - Seeing broadleaved woodland over 2.5 ha
- P05 - Seeing plantation/coniferous woodland over 2.5 ha
- P06 - Seeing the stars at night

- P07 - Hearing nature (includes hearing bird songs; wildlife; silence; peace and quiet; no human sounds)
- P08 - Seeing elevated areas
- P09 - Seeing natural designations
- P10 - Seeing time depth

2.16 The negative indicators are as follows:

- N01 - Seeing settlements
- N02 - Seeing light pollution
- N03 - Seeing large non-natural infrastructure
- N04 - Seeing major roads
- N05 - Hearing major roads
- N06 - Seeing minor roads
- N07 - Hearing minor roads
- N08 - Seeing railways
- N09 - Hearing major railways
- N10 - Seeing and/or hearing low flying airplane
- N11 - Hearing non-natural sounds (includes wind turbines; warehouse; advanced conversion technologies ; anaerobic / sewage digestion; battery / biomass / hydro; landfill; solar photovoltaics; 400Kv pylons)

Data sourcing

2.17 A key requirement for this study was to design a repeatable methodology. As such, all datasets used needed to be easily accessible and wherever

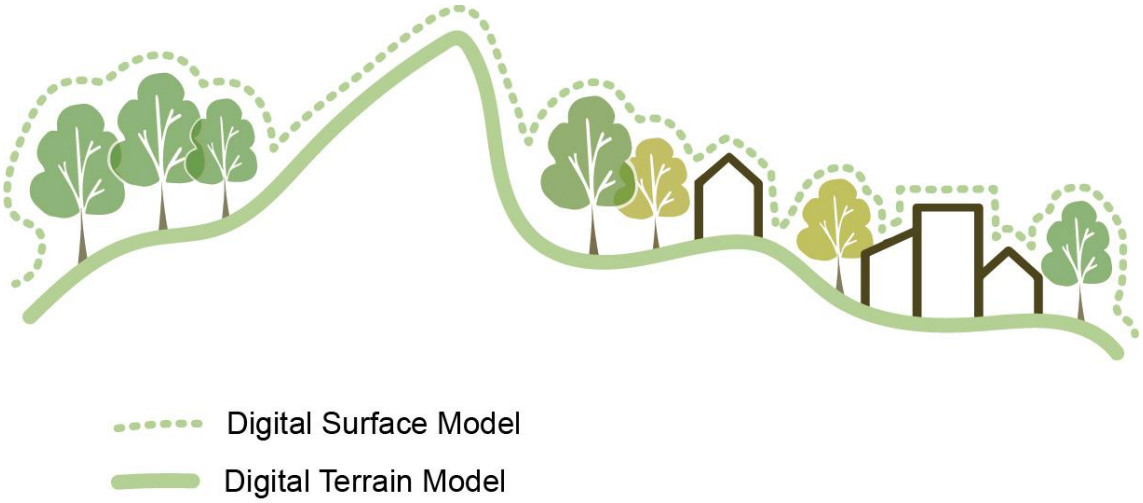
possible, freely available. The data also needed to cover the whole of South Oxfordshire and Vale of White Horse District Councils.

Generation of analysis surfaces

2.18 As this study is assessing the visibility of some of the indicators, the analysis required a Digital Terrain Models (DTM) to simulate the topology of the Earth. Ordnance Survey (OS) Terrain 50 and the National LIDAR Programme were used to develop this surface. They are both DTMs which only take into account the bare surface of the Earth and do not include features such as trees and buildings that rise above the ground.

2.19 Given the importance of buildings and trees in constraining visibility, these DTMs were converted into Digital Surface Models (DSMs) by modelling in the trees and buildings using data from OS MasterMap and the National Forest Inventory data from the Forestry Commission. Figure 2.3 illustrates the difference between a DTM and a DSM.

Figure 2.3: Digital Terrain Models and Digital Surface Models



2.20 As the All South and Vale and Urban components of this study are assessed separately and at different scales, the datasets used to generate the surfaces for each were different.

All South and Vale

2.21 For the All South and Vale surface, OS Terrain 50 (OST50) data was used. This data has a resolution (pixel size) of 50 metres. Given this resolution, it was likely that many pixels would only be partially covered by buildings or trees, and so raising their elevation value to the height of that surface feature would vastly overstate the visibility obstruction. However, only raising the pixel value where the whole pixel was covered in surface features would do the opposite. In order to balance these factors, a pixel value was raised if more than 20% of its area was covered by buildings or trees.

2.22 The building data used was OS MasterMap, and the woodland data was from the National Forest Inventory. Notional values needed to be applied to augment the surface model. The values were presented to stakeholders during

the workshop. The values used to raise the bare ground model are as shown in Table 2-1.

Table 2-1: Height of objects added to the elevation model

Surface feature	Elevation increases (metres)
Building	8
Assumed woodland	10
Broadleaved woodland	10
Conifer woodland	15
Coppice	3
Coppice with standards	3
Low density woodland	8
Mixed mainly broadleaved woodland	12
Mixed mainly conifer woodland	12
Shrub	3
Young trees	5

2.23 Where multiple features met the 20% coverage criteria, the highest value was taken. Pixels that intersected with roads, paths, railways, rivers and waterbodies were removed so as not to overstate their visibility.

Urban

2.24 The process for the generation of the Urban surface was the same as for All South and Vale, except using the National LIDAR Programme DTM 1 metre resolution resampled to 10 metres as the base instead of OST50. The National LIDAR Programme DTM is very high resolution, providing detailed surface information. However processing the visibility analysis with this resolution of

data would be impractical, so the National LIDAR Programme DTM was resampled to 10m pixels. This involved reducing the resolution of the data and taking an average of each original pixel that falls within the 10m cell (or pixel).

2.25 The Urban surface was only generated out to 6km from the selected urban areas (Figure 2.2). The reasons for this are covered under the Data processing heading later in this section.

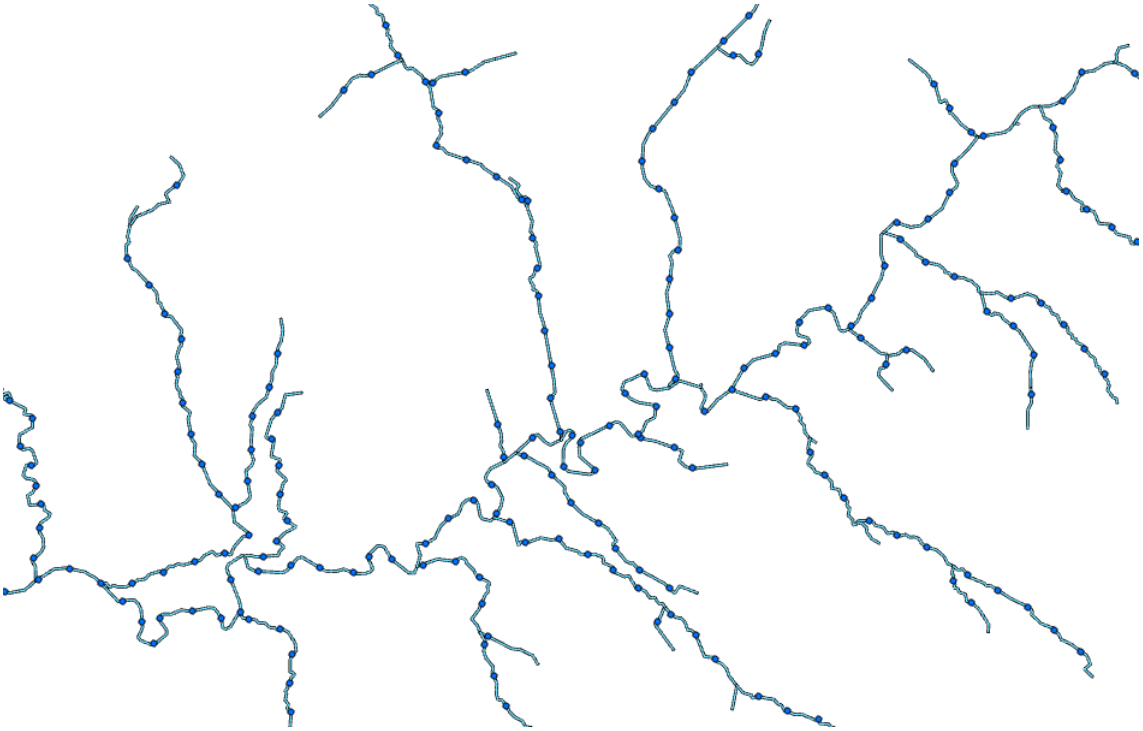
2.26 For consistency in approach, the 20% overlap method was also used for the generation of this surface. In this case, the building data was OS MasterMap, and instead of giving each building an assumed height of 8 metres, each building was given an individual height from the OS MasterMap Building Height Attribute (BHA) data. Woodland data was from the National Forest Inventory, using the same assumed heights as for the All South and Vale surface (Table 2-1). In the urban areas themselves the woodland data was removed to avoid double counting when it came to the visibility analysis.

Data processing

2.27 Visibility analysis is calculated from specific locations to all pixels within the surface dataset. These specific locations are represented in GIS as ‘points’ – discrete pieces of data with x and y coordinates, but no area or length. Because of this, any datasets stored as polygons needed to be converted so that they were represented as points. In all instances, this involved generating a grid of points at equal intervals covering the study area. Those points that intersected the polygons were then used as the basis of the visibility analysis. For smaller features that may be missed by the grid, the outlines of the polygons were converted into points, with points at a set distance around the perimeter.

2.28 Visibility analysis can be run from lines, but for consistency these were converted into points for the analysis as shown in Figure 2.4.

Figure 2.4: Approach to generating point layers from features



2.29 The specific details of the method and grid density for each indicator are detailed in the Positive indicators details (Chapter 3) and Negative indicators details (Chapter 4) sections.

2.30 For all visibility analysis, the maximum processing distance was set to 6 km from the source points. This is in accordance with the CPRE study for England, which itself drew the conclusions from *Benson et al (2002)* **[See reference 4]**. The CPRE methodology utilised a distance of 6 km to model the theoretical limit of visibility. Earth curvature was taken into account in the visibility analysis. Therefore, scores greater than 0 are only assigned where the model indicates that a feature is theoretically visible when both earth curvature and elevation are accounted for, with the elevation including buildings and vegetation as detailed in paragraph 2.20.

2.31 Indicators relating to hearing either natural or detracting sounds have been assessed based on distance from the source of the sound. Decibel (dB) is the measurement unit used for indicating the intensity of a sound as perceived by

the human ear. The more intense a sound is, the higher up it will be on the decibel scale.

2.32 Extensive literature review and stakeholder engagement was carried out by LUC as part of the Tranquillity and Place Sound Environment project **[See reference 2]** in Wales to establish buffers for sound indicators in tranquillity assessments. It was found that sound is expected to drop by 6 dB each time the distance from the source is doubled (*Collman (2015)*) **[See reference 5]**. For example, a sound that is 60 dB at 5 metres from the source would decrease as per Table 2-2. For reference, an increase of 10 dB corresponds to a tenfold (ten times) increase in sound intensity and is perceived as twice as loud.

Table 2-2: Sound decreases when distance increases

Distance (m)	**5**	**10**	**20**	**40**	**80**	**160**	**320**	**640**
Sound (dB)	60	54	48	42	36	30	24	18

2.33 The analysis expects that there would be an ambient background noise level of 30 dB in rural areas (*Mehta et al. (1999)*) **[See reference 6]**. Sounds below that level would just contribute to that background noise rather than being distinct sounds. As such the analysis only measures out to a distance where sounds would be above 30 dB. For instance, in the example above, the analysis would only extend out to 160m away from the source of the sound.

2.34 The same process was applied to the Urban analysis where the ambient sound is expected to be higher than in rural areas and is likely to have variations in background level. *King et al. (2012)* suggest that in urban areas, once a sound is below 40dB it becomes indistinguishable from the general sounds associated with an urban area.

Scoring

2.35 Once all the visibility analysis was complete, buffers were generated around the source datasets representing the features from which the visibility was being calculated. For most indicators in All South and Vale these were at the following distances:

- 500 metres
- 1 kilometre
- 2 kilometres
- 5 kilometres
- 6 kilometres

2.36 To represent features that are closer having more visual impact than features that are further away, these buffers were then combined with the results of the visibility analysis to work out if a pixel is both within a certain distance, **and** visible. The pixels were then scored based on these factors. The scoring varies for each indicator but has a maximum value of 5 (highest contribution to tranquillity for positive indicators, lowest contribution to tranquillity for negative indicators) and a minimum of 0 (no contribution to tranquillity). An example of the scoring can be found in Table 2-3: This illustrates the scoring approach for a feature that contributes to tranquillity using the seeing rivers indicator as an example in Figure 2.5.

Figure 2.5: Contributing buffer distances and scores for visibility analysis

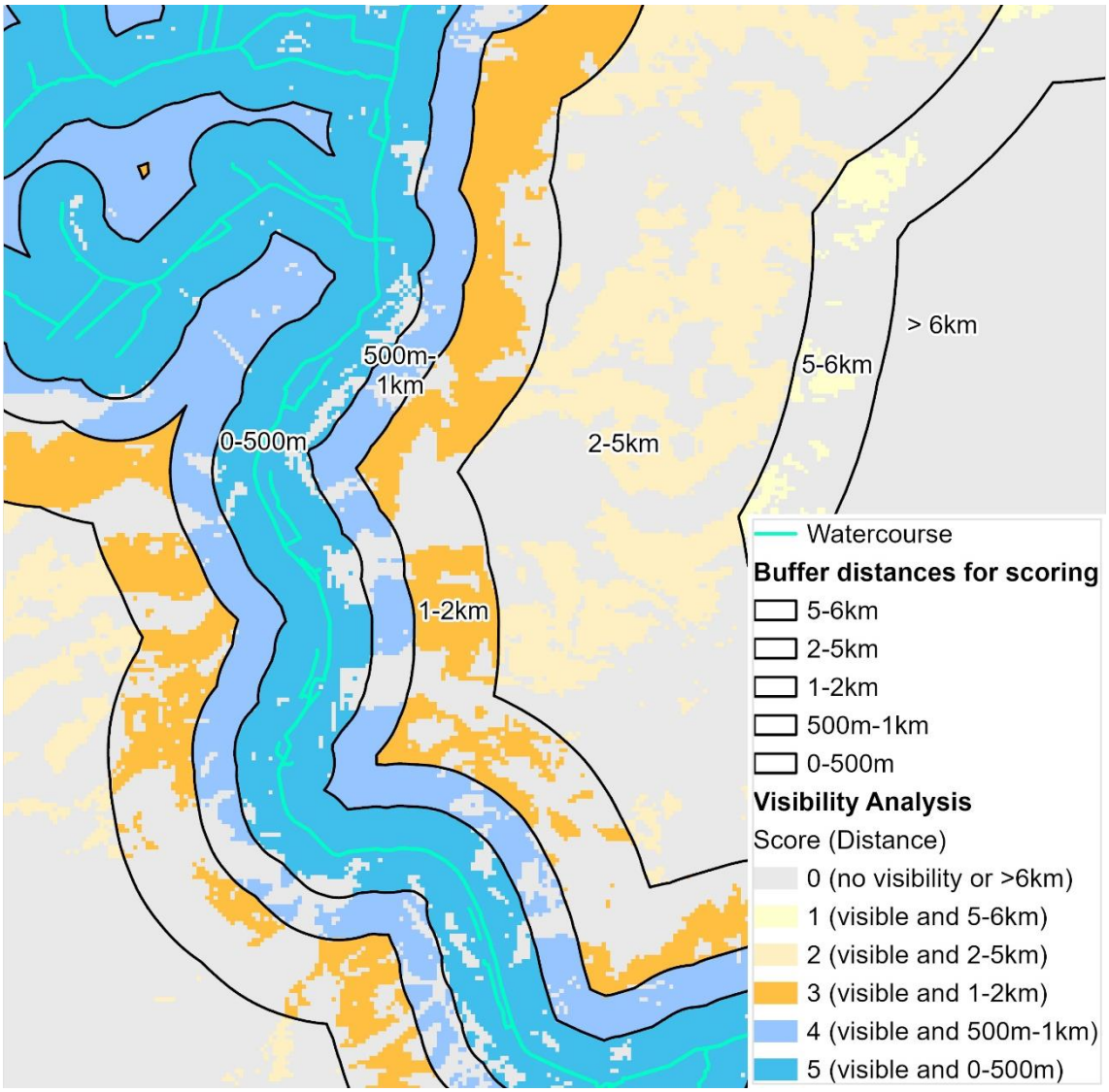


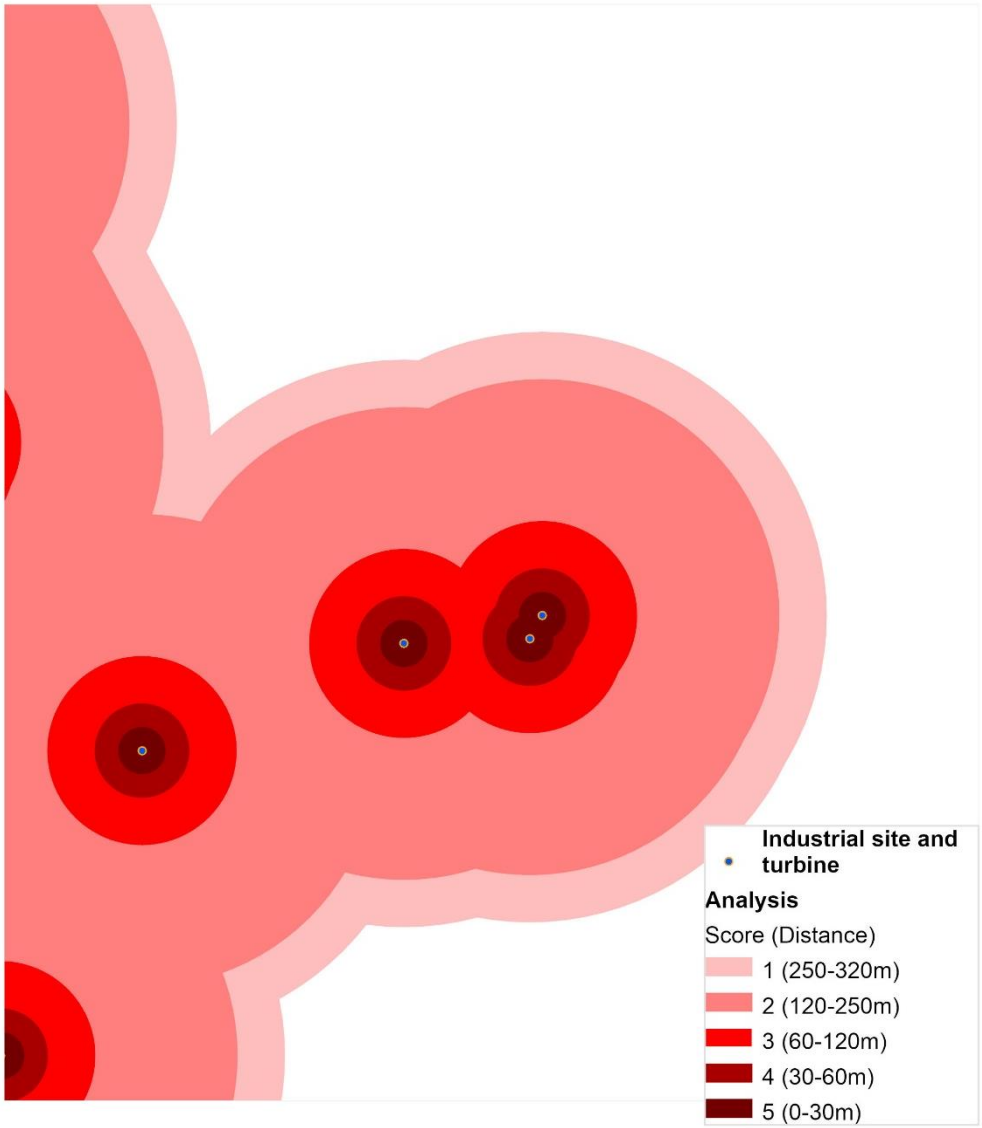
Table 2-3: Example of indicator scoring approach

Distance	500m	1km	2km	5km	6km
Score	5	4	3	2	1

2.37 Sounds that detract from tranquillity were given a higher detracting score closer to the source. When the distance increases from the source, the sound

level decreases, therefore lower scores were given for further distances. This is shown visually for sounds that detract from tranquillity using the hearing non-natural sound indicator as an example in Figure 2.6.

Figure 2.6: Detracting buffer distances and scores



Combination of indicators

2.38 Once all of the positive and negative indicators were scored, they were combined together to give a total positive and negative score for each pixel.

- Overall positive score All South and Vale – a high score means the pixel is more tranquil
- Overall negative score All South and Vale – a high score means the pixel is less tranquil

2.39 The All South and Vale and Urban analyses are processed and combined separately.

Producing the tranquillity map

2.40 The analysis results represent the spatial distribution of relative tranquillity across South Oxfordshire and Vale of White Horse District Councils. The relative tranquillity is calculated as the difference between the overall positive score and the overall negative score.

2.41 The following two sections provide specific details on the data sources, method and results for each of the indicators.

Chapter 3

Positive indicators details

3.1 This section gives the full details of the data used, the process followed and any assumptions made for each positive indicator. The level of detail provided will support repeat analysis in the future.

3.2 Each indicator is presented with the following structure:

- Datasets – setting out the data sources used for both All South and Vale and Urban analysis;
- Method – describes the way in which the indicator has been modelled for both All South and Vale and Urban; and
- Result – maps of the raw input data and resulting processed indicator for both All South and Vale and Urban.

Indicator P01 – Naturalness of the land cover

Datasets

3.3 All South and Vale: Corine Land Cover 2018 (European Environment Agency)

3.4 Urban: OS MasterMap

Method

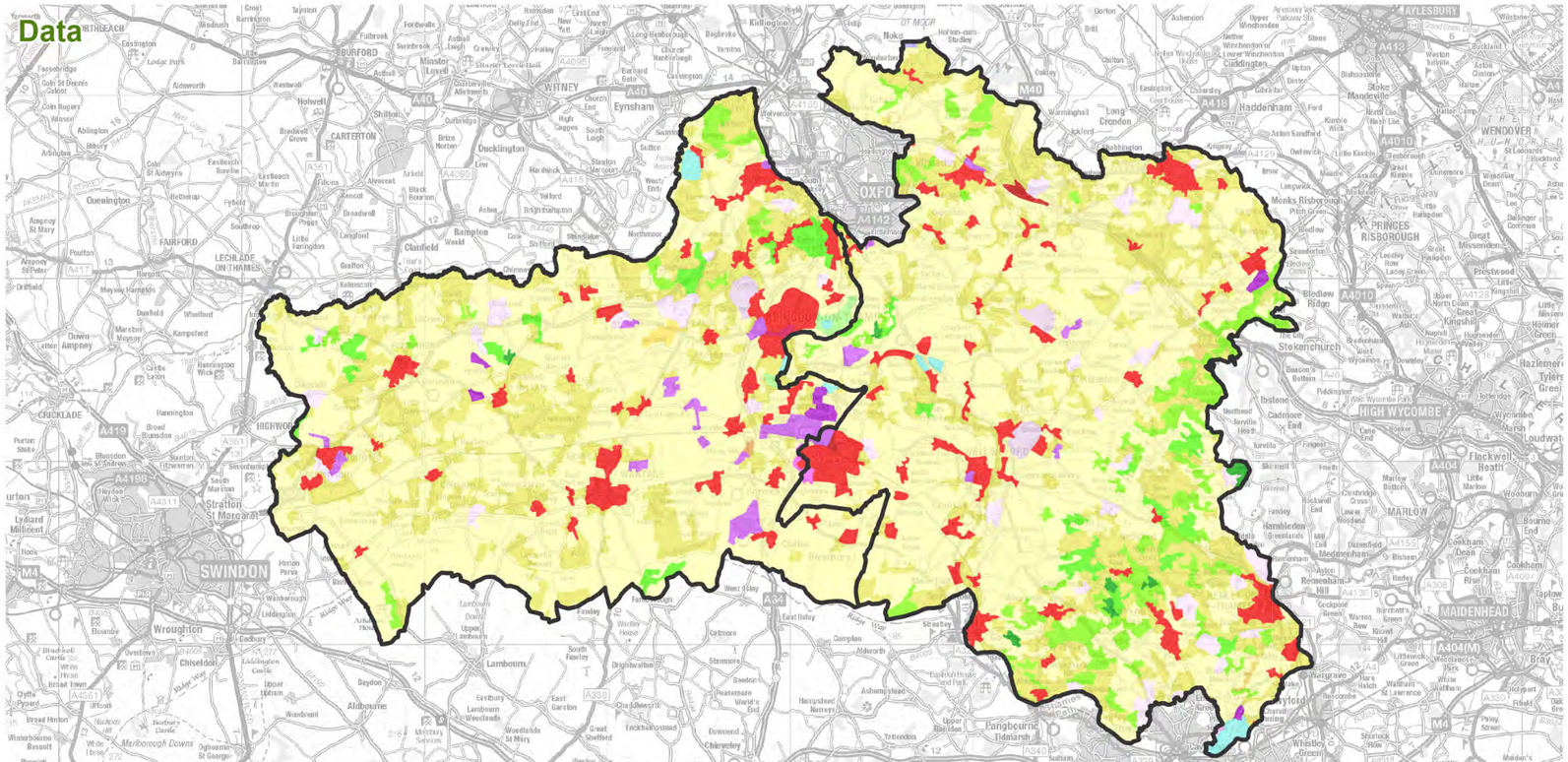
3.5 All South and Vale: Each 50 metre pixel in the study area was split into categories based on the Corine land cover type and given a score based on the most natural type it contains. The scores for each Corine land cover type are broken down in Appendix B, Table B-1.

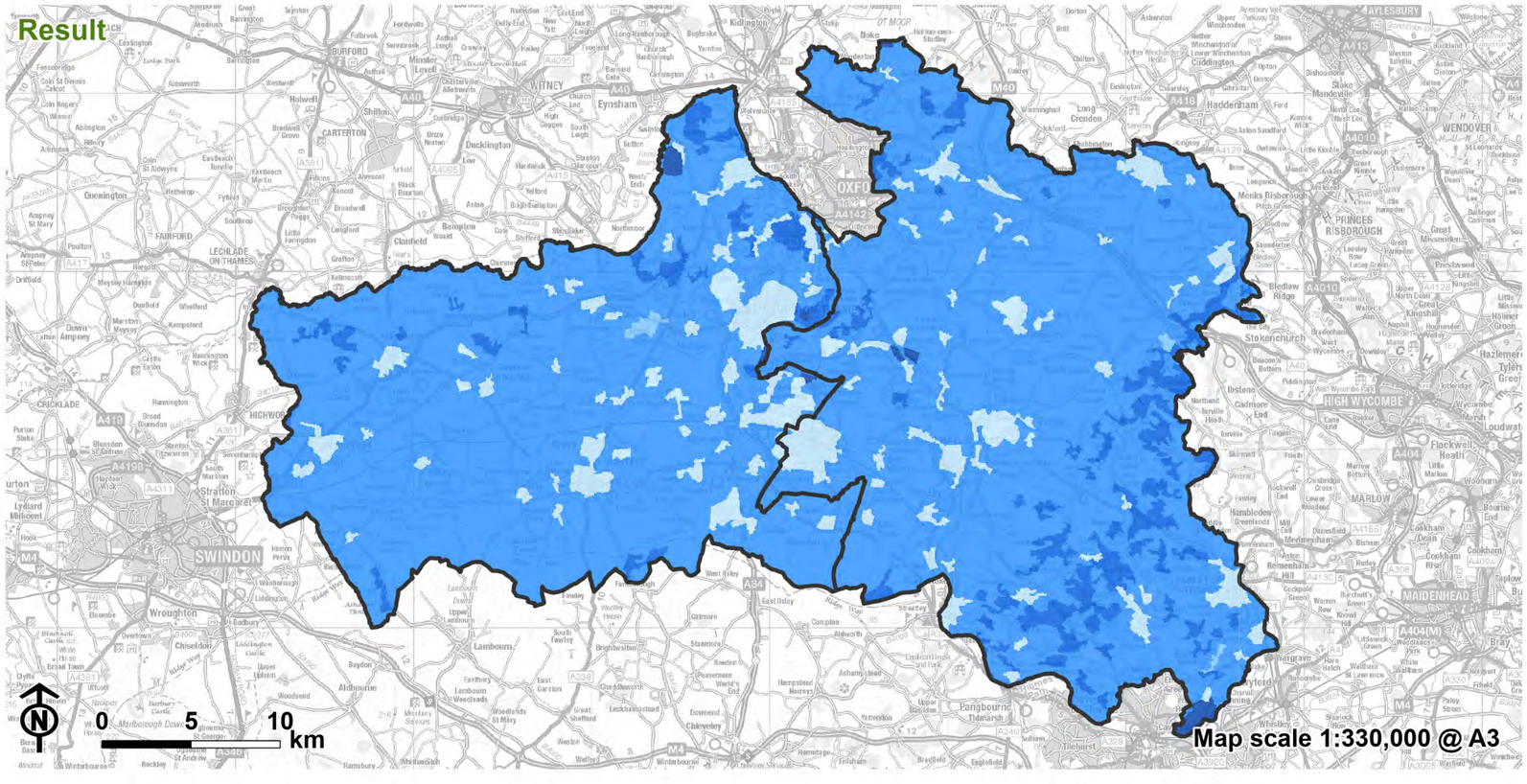
3.6 Urban: Each 10 metre pixel in the urban areas was split into categories based on the OS MasterMap Descriptive Term and given a score based on the most natural type it contains. The scores for each Mastermap Descriptive Term are broken down in Appendix B, Table B-2.

Results

3.7 The results of the analysis for All South and Vale are shown in Figure 3.1 and for Urban in Figure 3.2. Higher scores represent a higher contribution to tranquillity and lower scores contribute less to tranquillity.

Figure 3.1: P01 Naturalness of land cover - all South and Vale data and results





South Oxfordshire and Vale of White Horse

Data

Corine Land Cover 2018

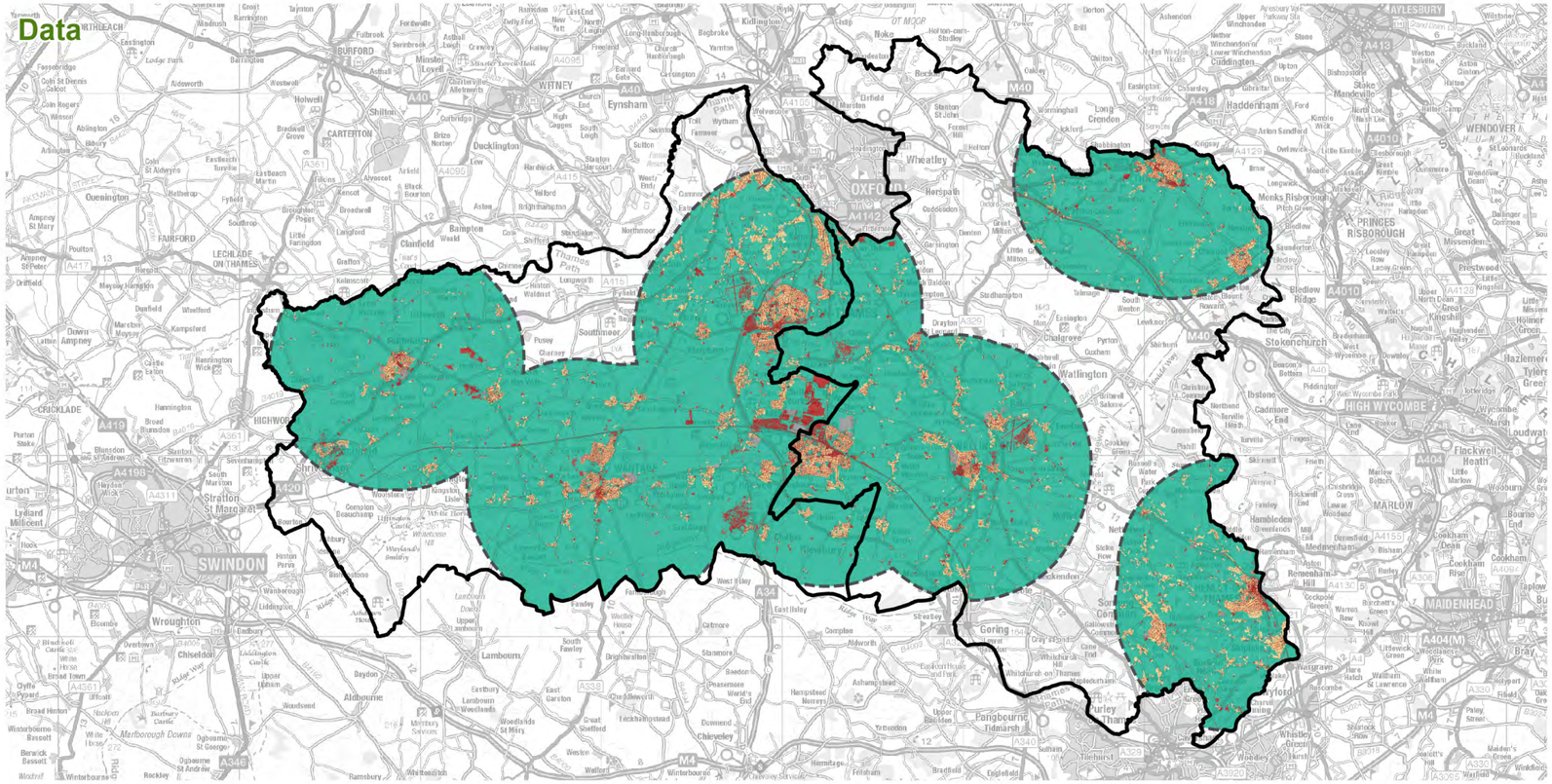
- 111: Continuous urban fabric
- 112: Discontinuous urban fabric
- 121: Industrial or commercial units
- 122: Road and rail networks and associated land
- 124: Airports
- 131: Mineral extraction sites
- 133: Construction sites
- 141: Green urban areas
- 142: Sport and leisure facilities
- 211: Non-irrigated arable land
- 222: Fruit trees and berry plantations
- 231: Pastures
- 242: Complex cultivation patterns
- 243: Land principally occupied by agriculture, with significant areas of natural vegetation
- 311: Broad-leaved forest
- 312: Coniferous forest
- 313: Mixed forest
- 322: Moors and heathland
- 411: Inland marshes
- 512: Water bodies

Result

Score P01

- 0 - Lowest contribution to tranquillity
- 1
- 2
- 3
- 4 - highest contribution to tranquillity

Figure 3.2: P01 Naturalness of land cover - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Ordnance Survey Mastermap level 1 land cover

- Natural
- Multiple
- Manmade
- Unclassified / Unknown

Result

Score P01

- 0 - lowest contribution to tranquillity
- 2
- 3
- 4
- 5 - highest contribution to tranquillity

Indicator P02 – Seeing rivers and canals

Datasets

3.8 All South and Vale: OS OpenRivers (canals and inland rivers)

3.9 Urban: OS OpenRivers (canals and inland rivers)

Method

3.10 All South and Vale: Points were generated every 100m along rivers and canals and visibility was calculated from each pixel of the analysis. The rivers and canals were buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility.

Table 3-1: Scoring P02 All South and Vale

Distance	500m	1km	2km	5km	6km
Score	5	4	3	2	1

3.11 Urban: Points were generated every 100m along rivers and canals and visibility calculated from each pixel of the analysis. The rivers and canals were buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility.

Table 3-2: Scoring P02 Urban

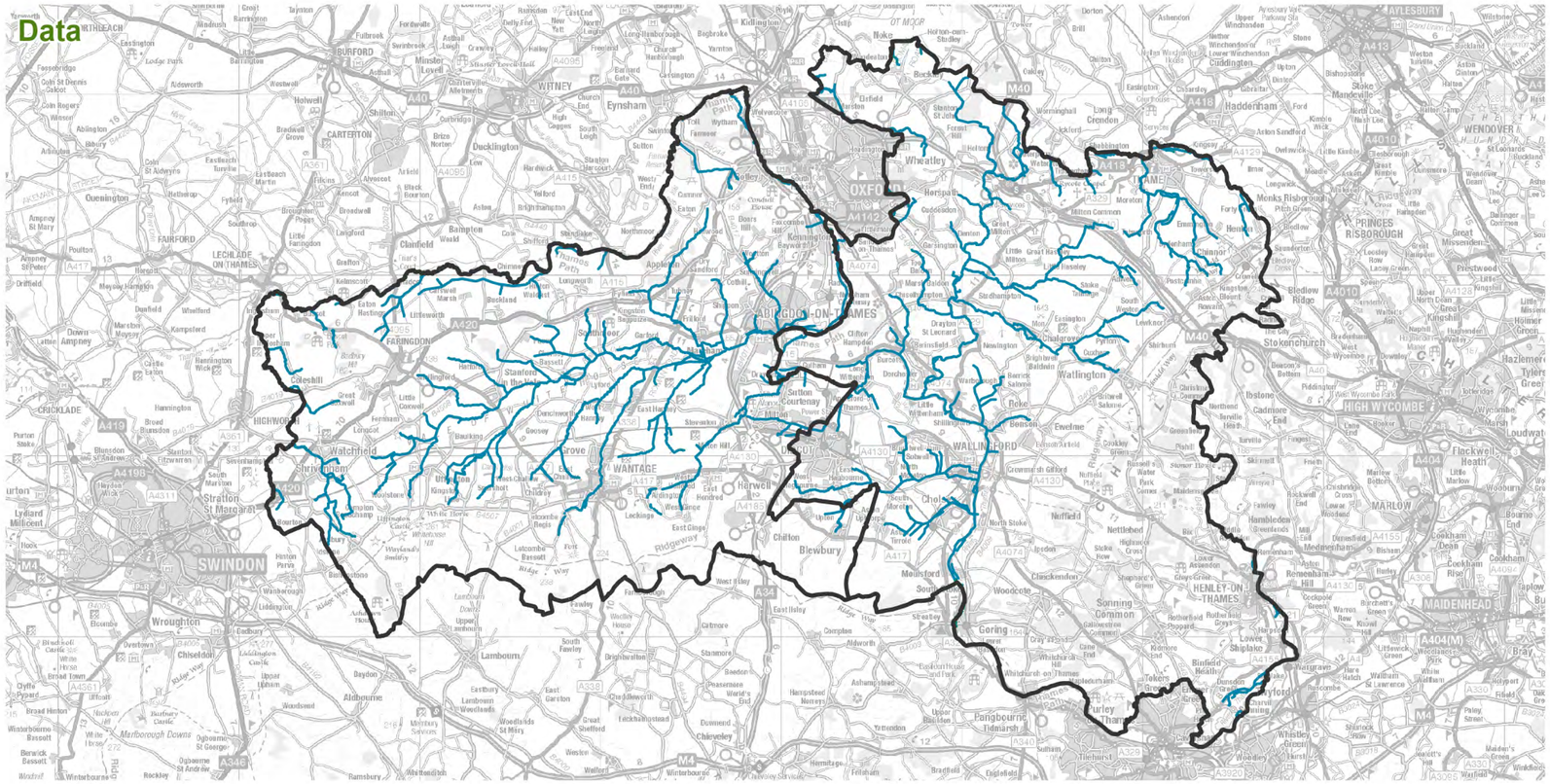
Distance	100m	200m	400m	1km	6km
Score	5	4	3	2	1

Results

3.12 The results of the analysis for All South and Vale are shown in Figure 3.3 and for Urban in Figure 3.4. More visibility increases the contribution towards tranquillity, therefore higher scores represent more contribution to tranquillity and lower scores contribute less to tranquillity.

LUC

Figure 3.3: P02 Seeing rivers and canals - all South and Vale data and results



South Oxfordshire and Vale of White Horse

Data

Watercourse

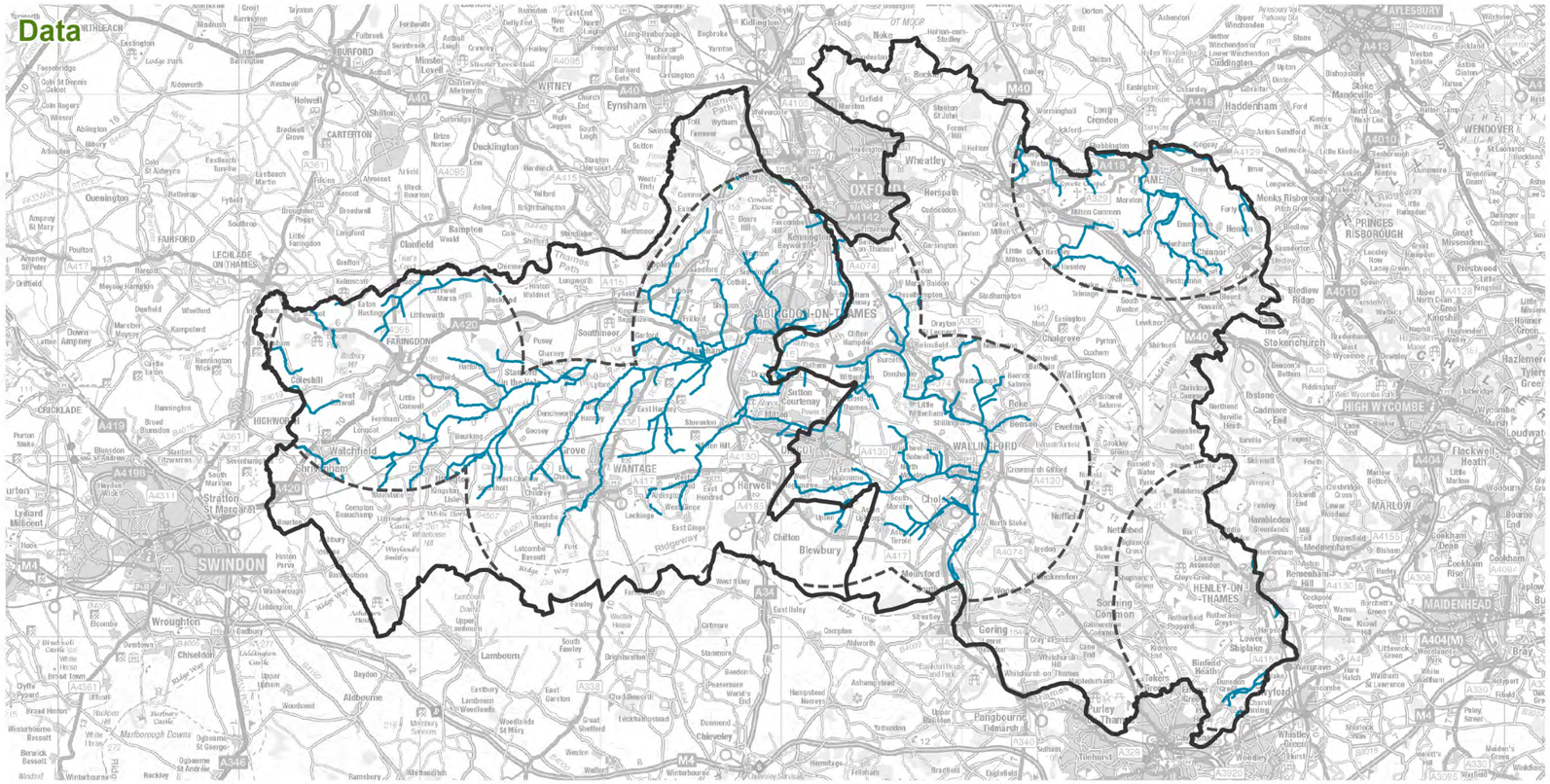
Result

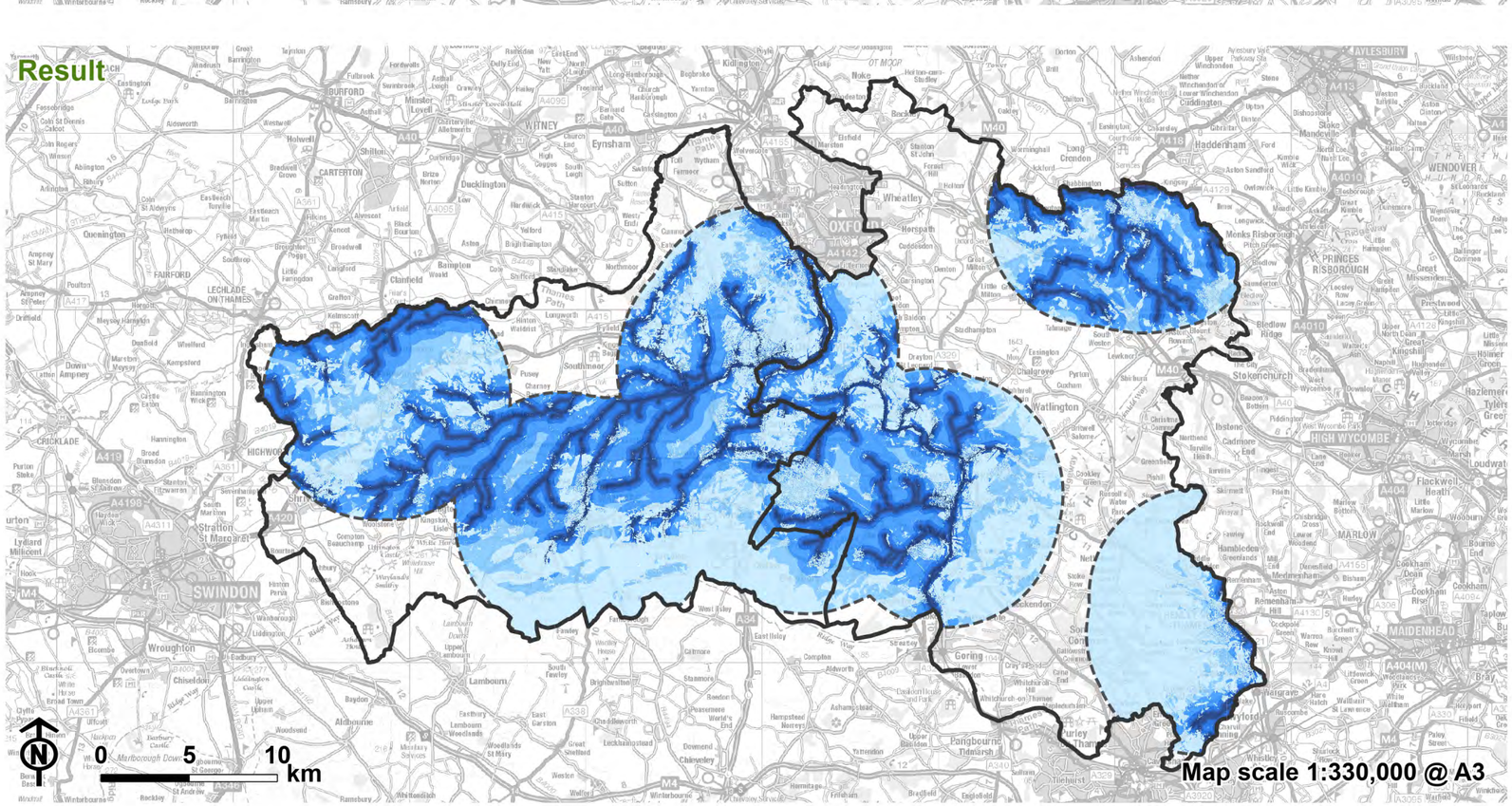
Score P02

- 0 - lowest contribution to tranquillity
- 1
- 2
- 3
- 4
- 5 - highest contribution to tranquillity

LUC

Figure 3.4: P02 Seeing rivers and canals - Urban data and results





South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Watercourse

Result

Score P02

0 - lowest contribution to tranquillity

1

2

3

4

5 - highest contribution to tranquillity

Indicator P03 – Seeing lakes

Datasets

3.13 All South and Vale: OS Open Map Local surface water (streams removed, only features > 2ha)

3.14 Urban: OS Open Map Local surface water (streams removed, only features > 2ha)

Method

3.15 All South and Vale: Points were generated at 100m intervals and intersected with waterbodies larger than 2ha. Another set of points was generated at 100m intervals around the perimeter of the waterbodies. Using these two sets of points, visibility was calculated from each pixel in the analysis area. The waterbodies were buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility.

Table 3-3: Scoring P03 All South and Vale

Distance	500m	1km	2km	5km	6km
Score	5	4	3	2	1

3.16 Urban: The same method as All South and Vale was applied, with 100m interval points. Buffers were generated and pixels scored as per the table below.

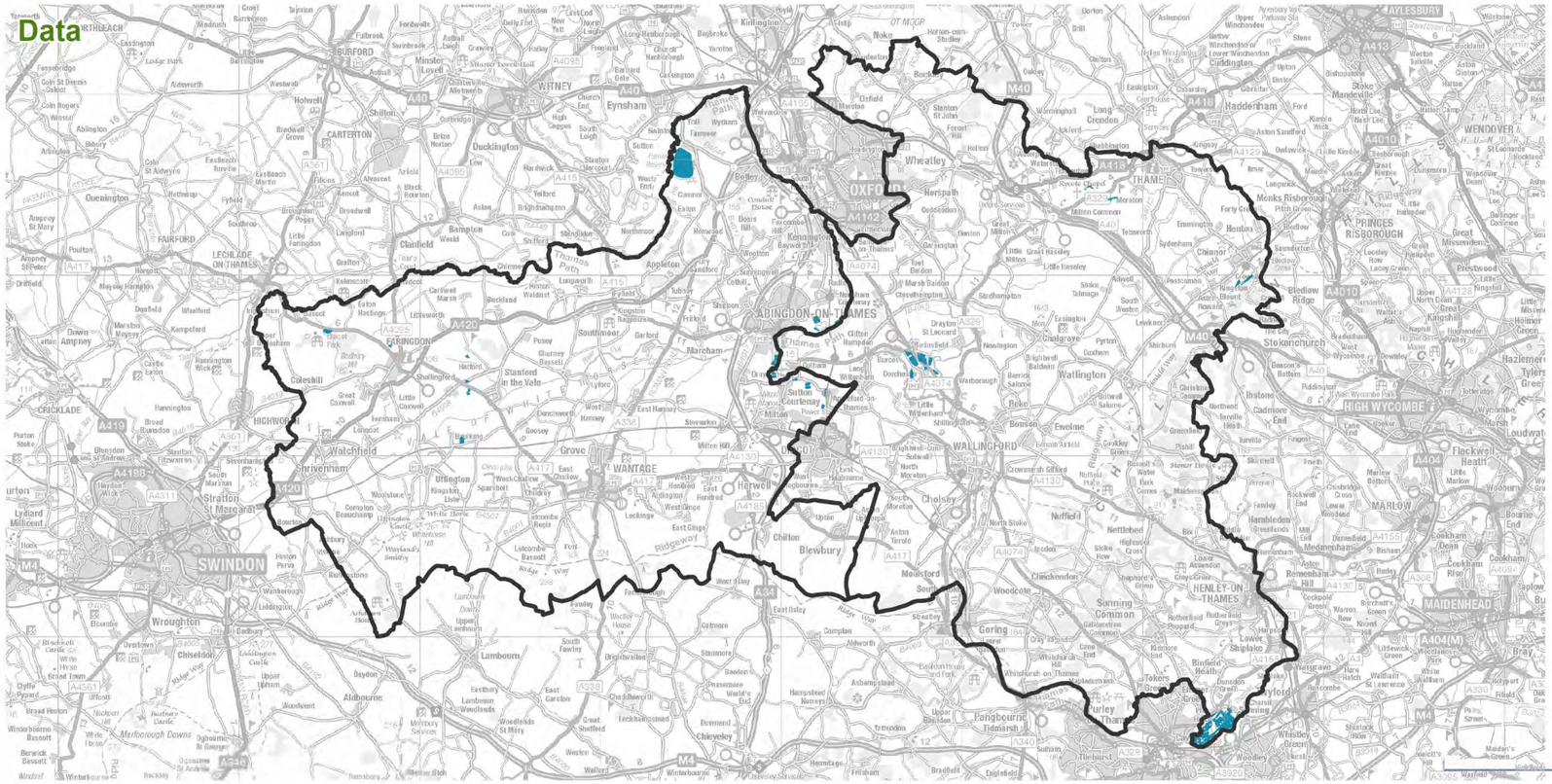
Table 3-4: Scoring P03 Urban

Distance	100m	200m	400m	1km	6km
Score	5	4	3	2	1

Results

3.17 The results of the analysis for All South and Vale are shown in Figure 3.5 and Urban results in Figure 3.6. More visibility increases the contribution to tranquillity, therefore higher scores represent areas with a greater contribution to tranquillity and lower scores represent areas making a lesser contribution to tranquillity.

Figure 3.5: P03 Seeing lakes - all South and Vale data and results



South Oxfordshire and Vale of White Horse

Data

Surface water

Result

Score P03

- 0 - lowest contribution to tranquillity
- 1
- 2
- 3
- 4
- 5 - highest contribution to tranquillity

Tranquillity Assessment
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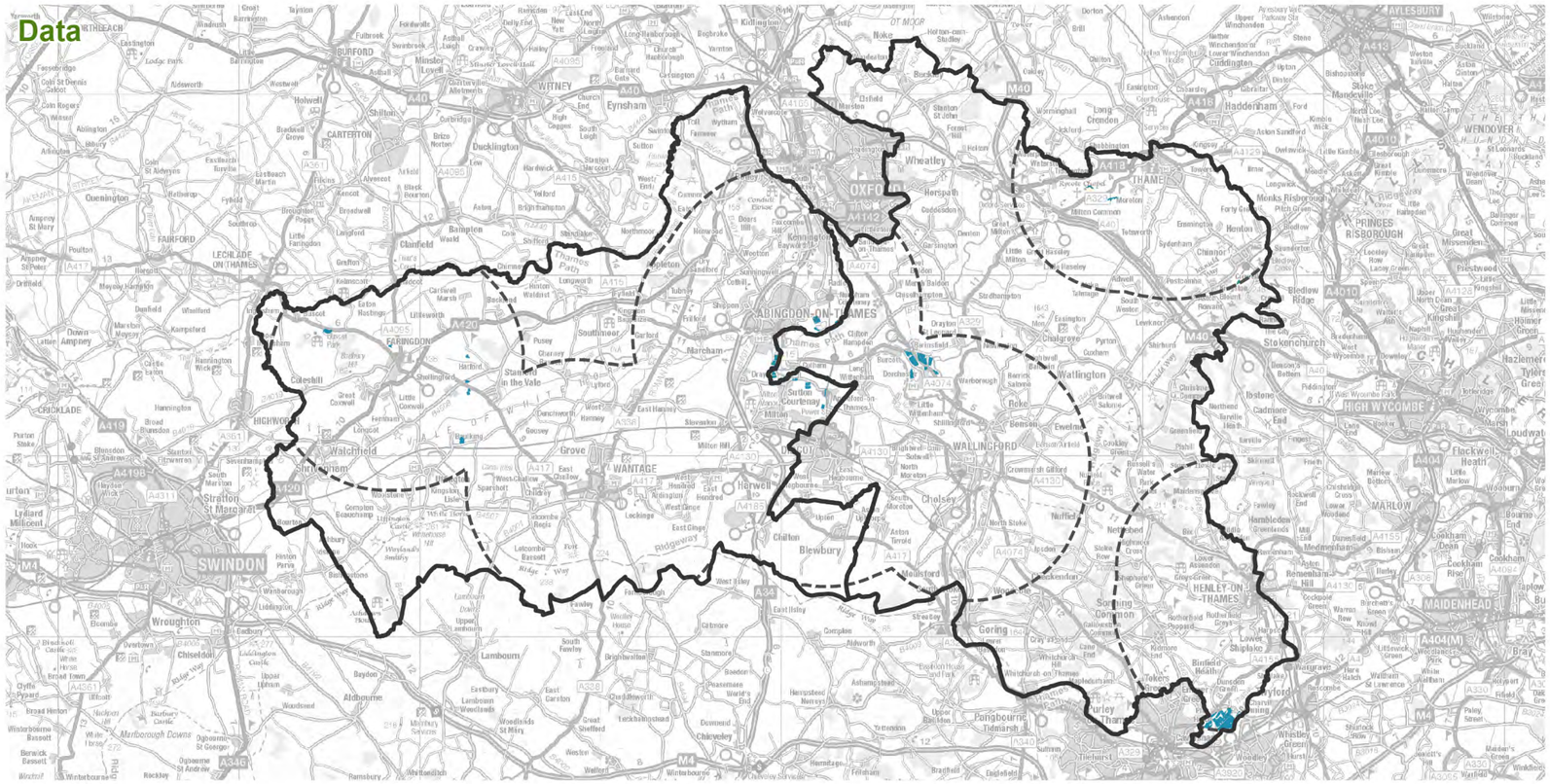
LUC

Figure 3.6: P03 Seeing lakes - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Surface water

Result

Score P03

0 - lowest contribution to tranquillity

1

2

3

4

5 - highest contribution to tranquillity

12315_Tranquility_Urban_Positive/Fig_3.6_P03_Urban 26/09/2023
EB:Horton_K Source: OS, LUC

Indicator P04 – Seeing broadleaved woodland above 2.5 ha

Datasets

3.18 All South and Vale: National Forest Inventory (NFI) 2020 (selected categories: assumed woodland, broadleaved, mixed mainly broadleaved). Woodland >2.5 ha was selected based on the average size of broadleaved woodland 'patches' as per NFI in South Oxfordshire and Vale of White Horse Districts

3.19 Urban: As data on urban trees were not available, the same woodland categories as for the All South and Vale analysis were selected from the NFI dataset but only within the 6km buffer outside of the urban areas to represent woodland visibility from urban into rural areas.

Method

3.20 All South and Vale: Points were generated at 100m intervals and intersected with the selected woodland areas. Another set of points was generated at 100m intervals around the perimeter of the woodland areas. Using these two sets of points, visibility was calculated from each pixel in the analysis area. The woodland areas were buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility.

Table 3-5: Scoring P04 All South and Vale

Distance	500m	1km	2km	5km	6km
Score	5	4	3	2	1

3.21 Urban: The same method as All South and Vale was applied, with 100m intervals points. Buffers were generated and pixels scored as per the table below.

Table 3-6: Scoring P04 Urban

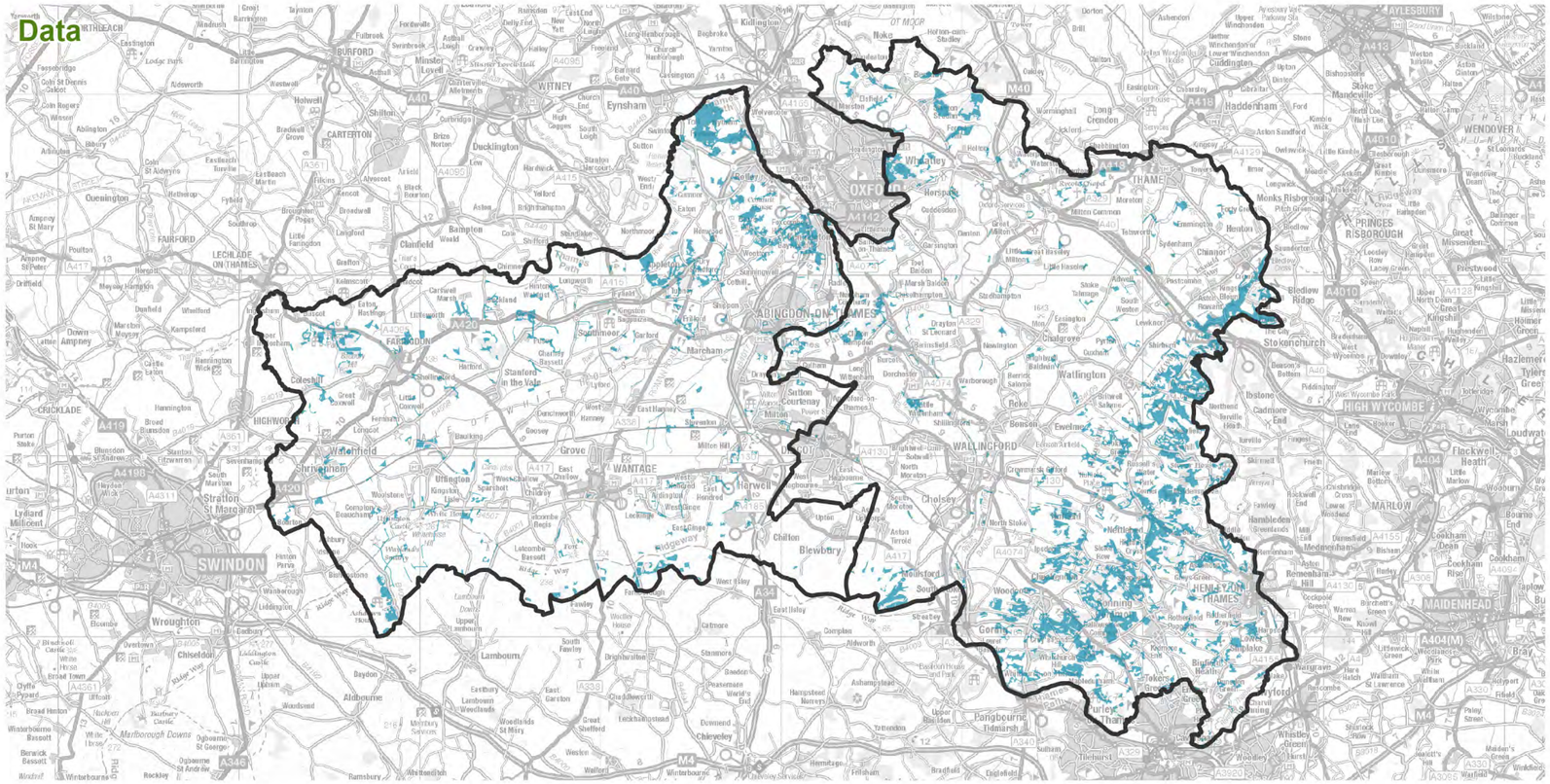
Distance	100m	200m	400m	1km	6km
Score	5	4	3	2	1

Results

3.22 The results of the analysis for All South and Vale are shown in Figure 3.7 and Urban results in Figure 3.8. More visibility increases the potential contribution to tranquillity, therefore higher scores represent more contribution towards tranquillity and lower scores contribute less to tranquillity.

LUC

Figure 3.7: P04 Seeing broadleaved woodland above 2.5 ha - all South and Vale data and results



South Oxfordshire and Vale of White Horse

Data

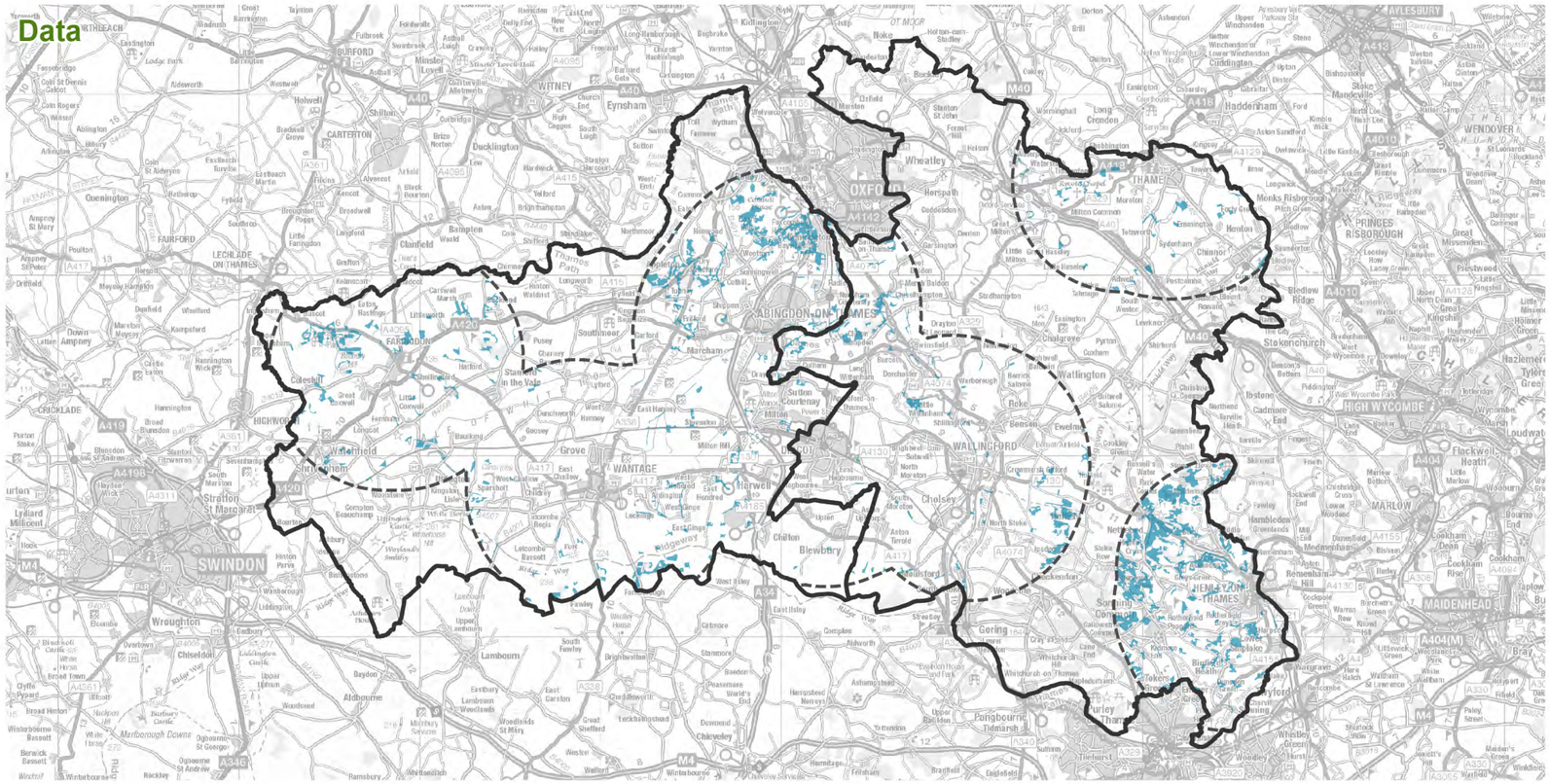
Broadleaved woodland

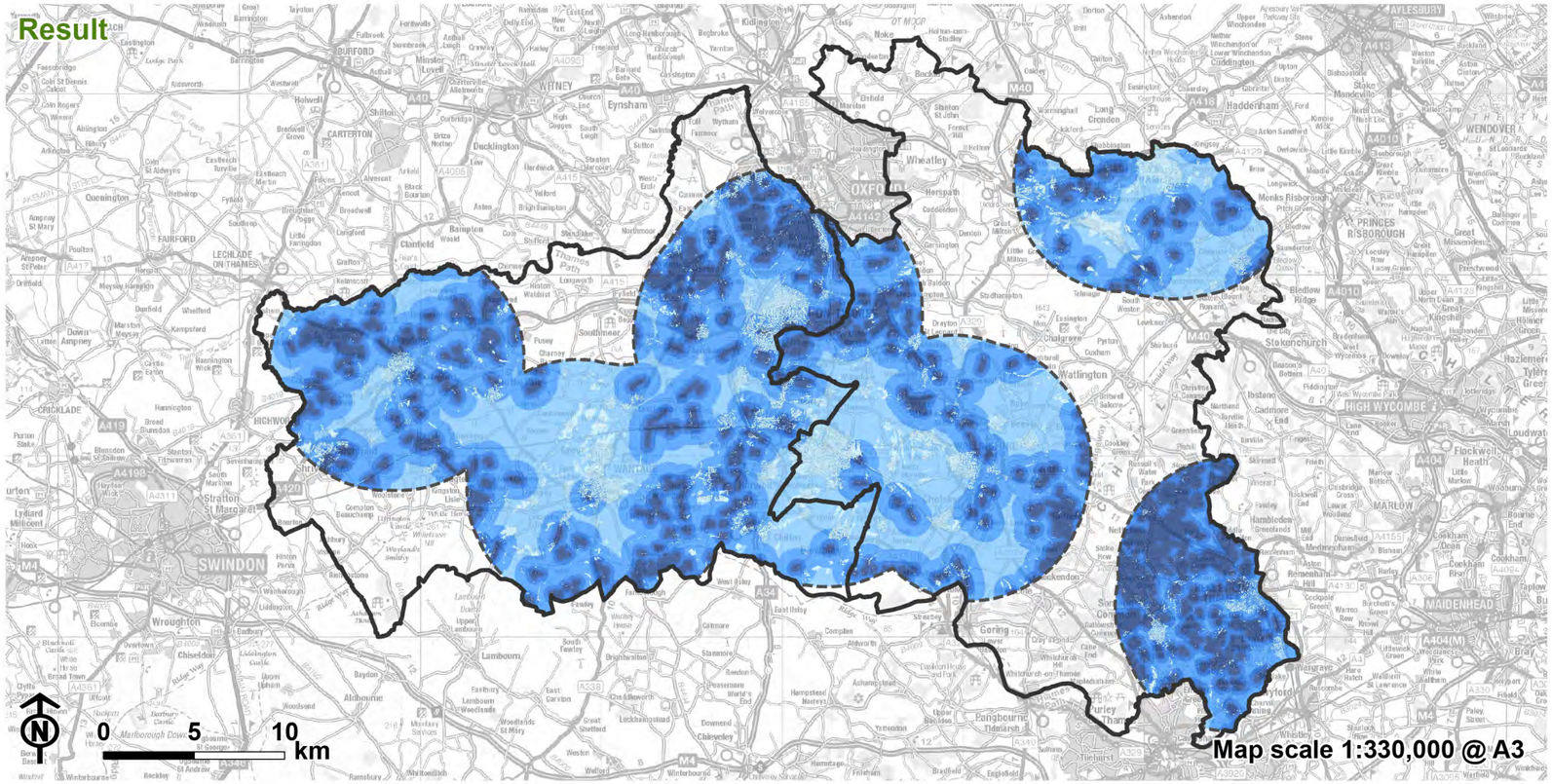
Result

Score P04

- 0 - lowest contribution to tranquillity
- 2
- 3
- 4
- 5 - highest contribution to tranquillity

Figure 3.8: P04 Seeing broadleaved woodland above 2.5 ha - Urban data and results





South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Broadleaved woodland

Result

Score P04

0 - lowest contribution to tranquillity

1

2

3

4

5 - highest contribution to tranquillity

Indicator P05 – Seeing plantation/coniferous woodland above 2.5 ha

Datasets

3.23 All South and Vale: National Forest Inventory (NFI) 2020 (selected categories: conifer, mixed mainly conifer). Woodland >2.5 ha was selected based on the average size of coniferous woodland as per NFI in South Oxfordshire and Vale of White Horse Districts

3.24 Urban: The same categories as for the All South and Vale analysis were selected from the NFI dataset but only within the 6km buffer outside of the urban areas because there were no plantation areas within the urban areas.

Method

3.25 All South and Vale: Points were generated at 100m intervals and intersected with the selected woodland areas. Another set of points was generated at 100m intervals around the perimeter of the woodland areas. Using these two sets of points, visibility was calculated from each pixel of the analysis. The woodland areas were buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility. Based on findings from a previous tranquillity assessment carried out for Central Bedfordshire Council, the range of scores for plantation/coniferous woodland did not go as high as 5 as it did for broadleaved woodland (P04).

Table 3-7: Scoring P05 All South and Vale

Distance	500m	1km	2km	5km	6km
Score	3	2	1	0	0

3.26 Urban: The same method as All South and Vale was applied, with 100m intervals points. Buffers were generated and pixels scored as per the table below.

Table 3-8: Scoring P05 Urban

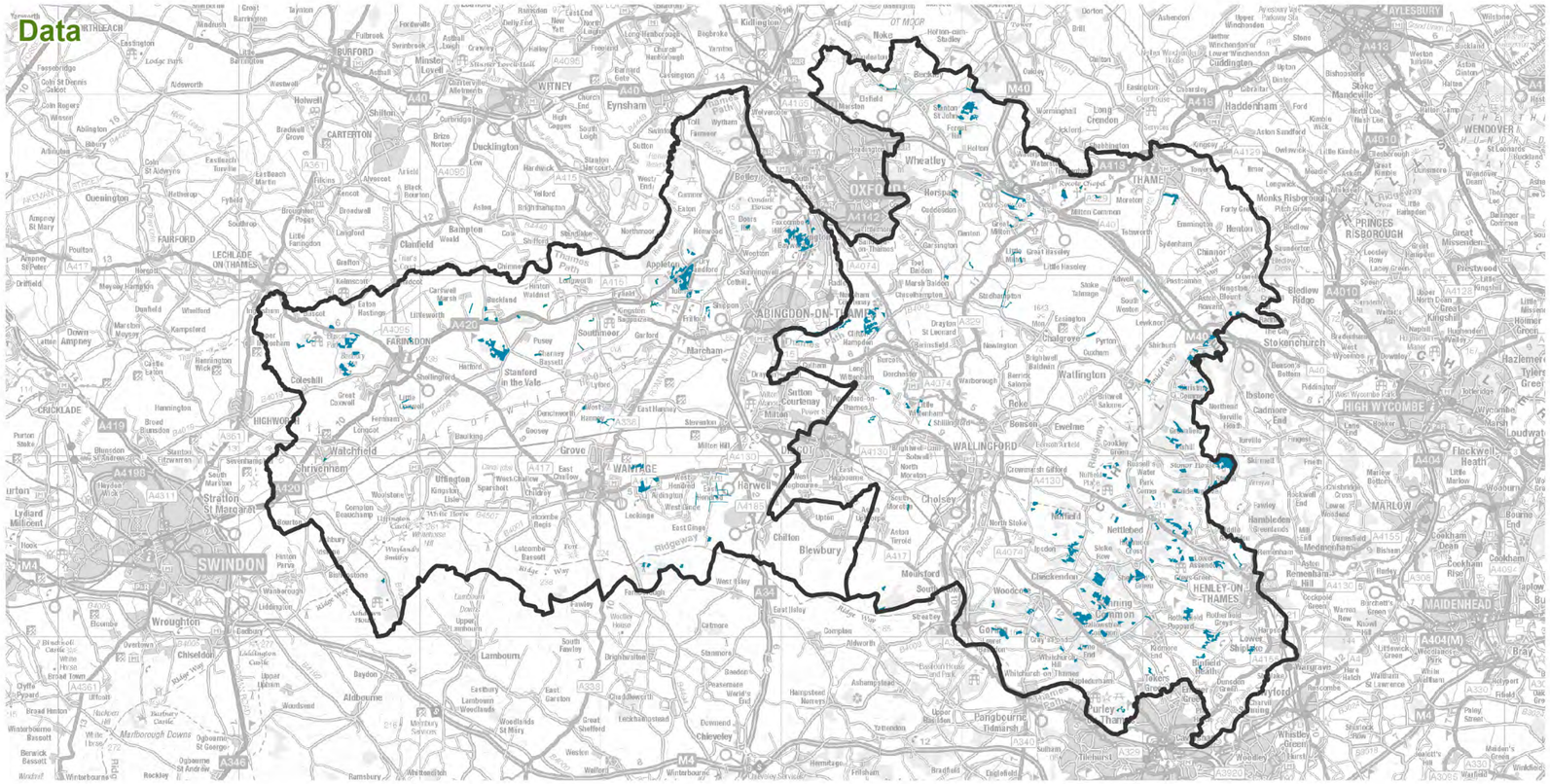
Distance	100m	200m	400m	1km	6km
Score	3	2	1	0	0

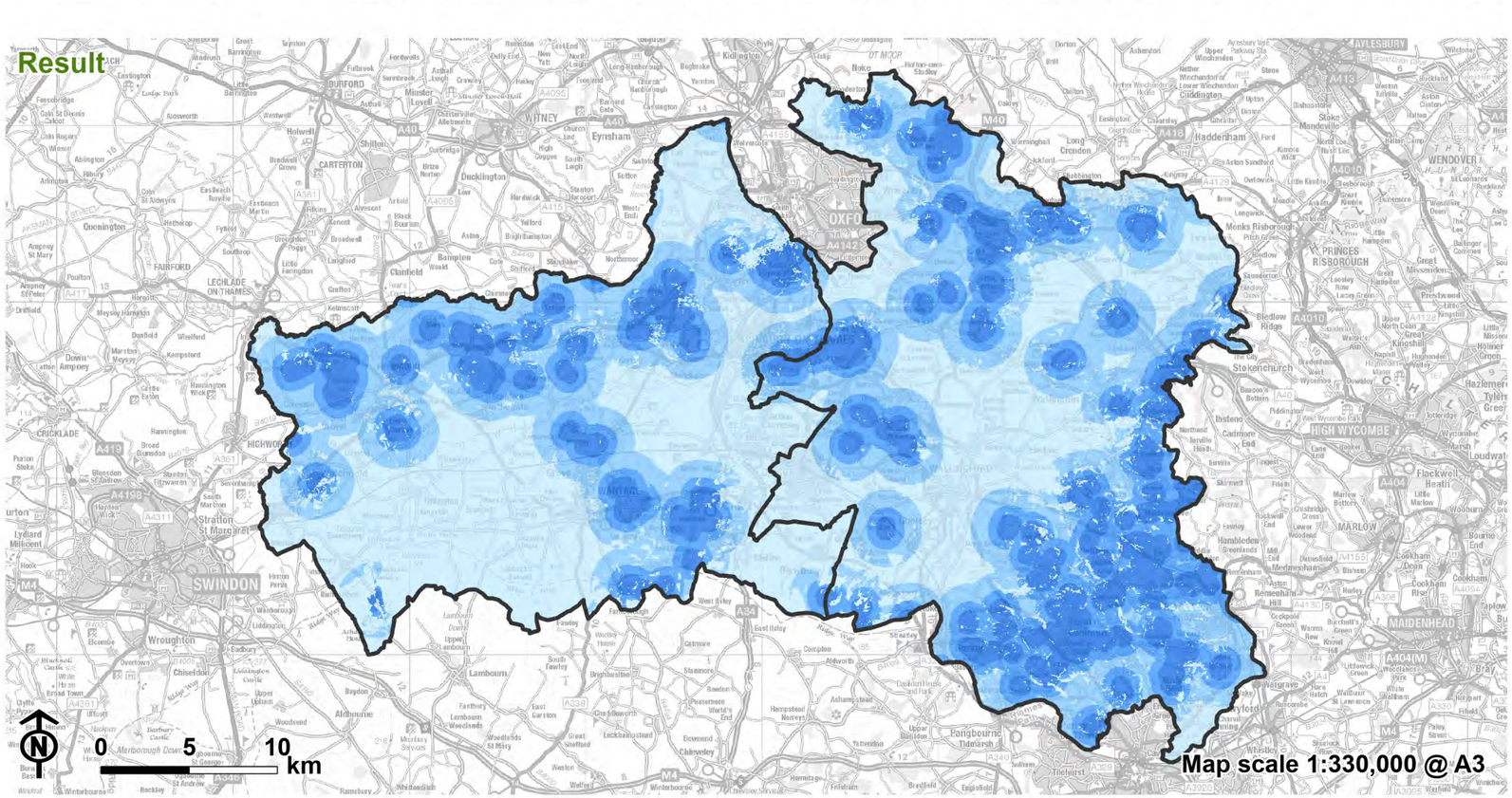
Results

3.27 The results of the analysis for All South and Vale are shown in Figure 3.9 and Urban results in Figure 3.10. More visibility increases the potential contribution to tranquillity, therefore higher scores represent higher contribution towards tranquillity and lower scores less contribution.

LUC

Figure 3.9: P05 Seeing plantation/coniferous woodland above 2.5ha - all South and Vale data and results





South Oxfordshire and Vale of White Horse

Data

Coniferous woodland

Result

Score P05

- 0 - lowest contribution to tranquillity
- 1
- 2
- 3 - highest contribution to tranquillity

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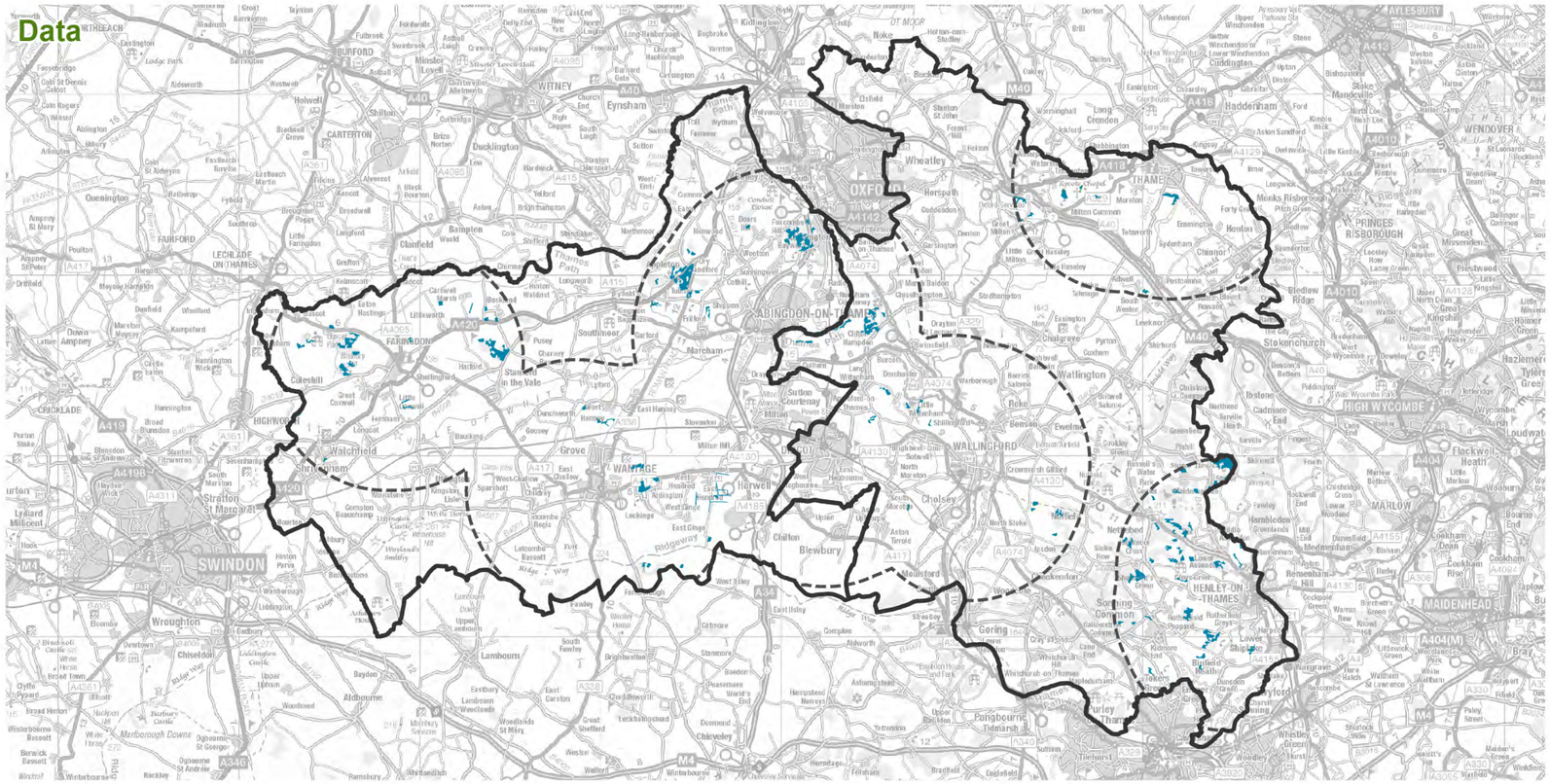
Figure 3.10: P05 Seeing plantation/coniferous woodland above 2.5ha - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Coniferous woodland

Result

Score P05

0 - lowest contribution to tranquillity

1

2

3 - highest contribution to tranquillity

Indicator P06 – Seeing the stars at night

Datasets

3.28 All South and Vale: LUC Dark Skies Map (output of Requirement 1 for this project). The original map is 400m resolution, so it was resampled to 50m pixels to match the scale of analysis at All South and Vale level. It must be noted that this does not increase the precision of the data, it merely aligns the pixel sizes.

3.29 Urban: LUC Dark Skies Map (output of requirement 1 for this project). The original map is 400m resolution, so it was resampled to 10m pixels to match the scale of analysis at the urban areas level. It must be noted that this does not increase the precision of the data, it merely aligns the pixel sizes.

Method

3.30 All South and Vale: The dark skies map was re-classified into four categories as per the table below. The darkest pixels (<0.25 nanoW/cm²/sr) were scored with the highest contribution to tranquillity score. Pixels between 0.25 and 0.5 nanoW/cm²/sr were scored with an intermediate contribution to tranquillity score. Pixels between 0.5 and 1 nanoW/cm²/sr were scored with a lower contribution to tranquillity score as they are still dark enough to allow stars to be seen, but not as dark as the previously mentioned pixels. Finally, all other pixels were scored 0 as they are considered to be too bright to allow for a very high quality view of a starry sky (such that it would contribute to tranquillity).

Table 3-9: Scoring P06 All South and Vale

Brightness (nanoW/cm2/sr)	<0.25	0.25 - 0.5	0.5 - 1	>1
Score	5	3	1	0

3.31 Urban: The dark skies map was re-classified following the same method as for All South and Vale.

Table 3-10: Scoring P06 Urban

Brightness (nanoW/cm2/sr)	<0.25	0.25 - 0.5	0.5 - 1	>1
Score	5	3	1	0

Results

3.32 The results of the analysis for All South and Vale are shown in Figure 3.11 and Urban in Figure 3.12. Darker skies provide the potential for a higher quality view of the stars at night, therefore these areas were given a higher score as seeing a starry sky contributes to tranquillity.

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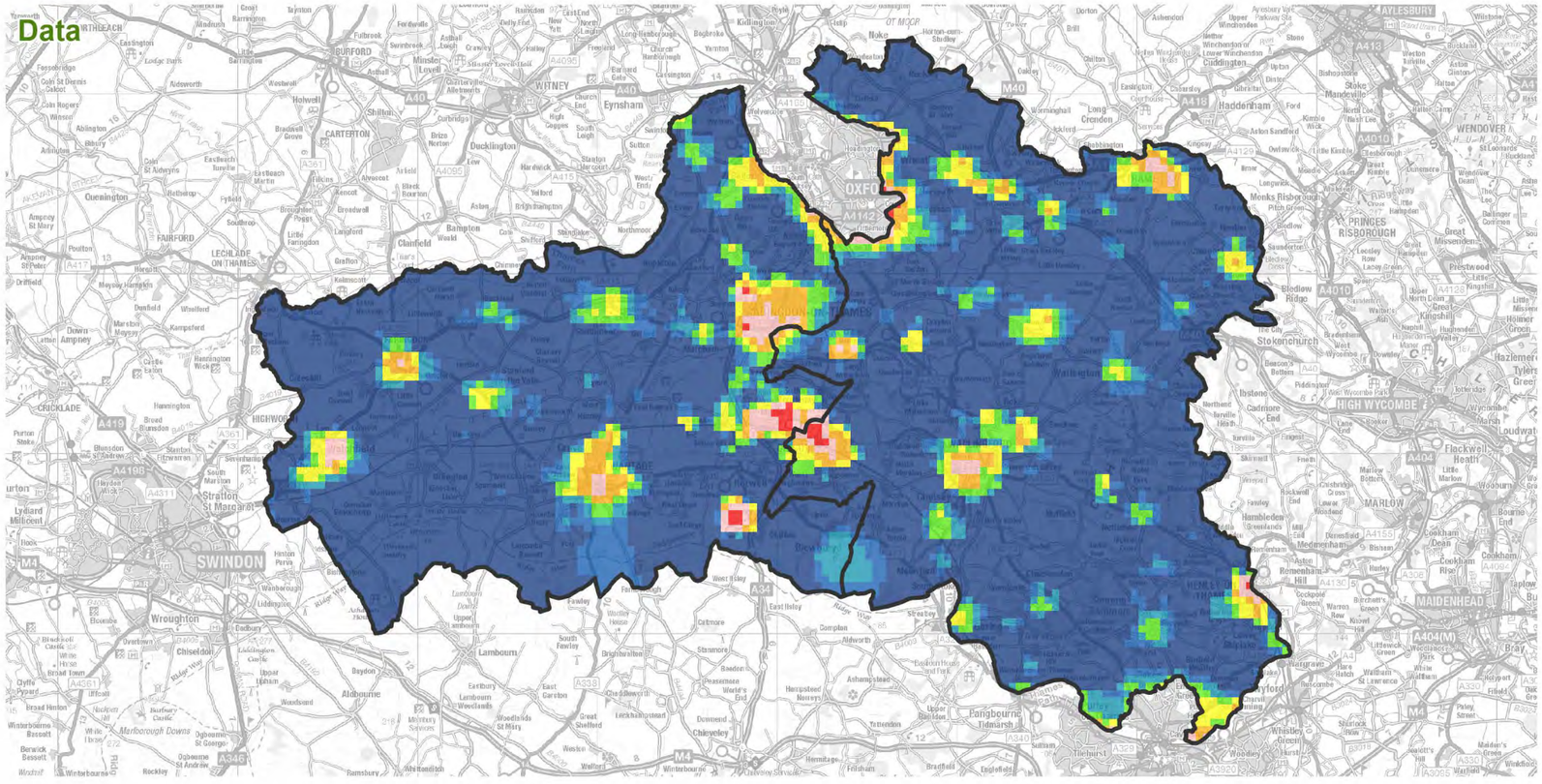
Figure 3.11: P06 Seeing the stars at night - all South and Vale data and results



South Oxfordshire and Vale of White Horse

Data

Dark skies and light pollution (nanoW/cm2/sr)

- <0.25 (Darkest)
- 0.25-0.5
- 0.5-1
- 1-2
- 2-4 (Brighter)
- 4-8
- 8-16
- 16-32
- >32 (Brightest)

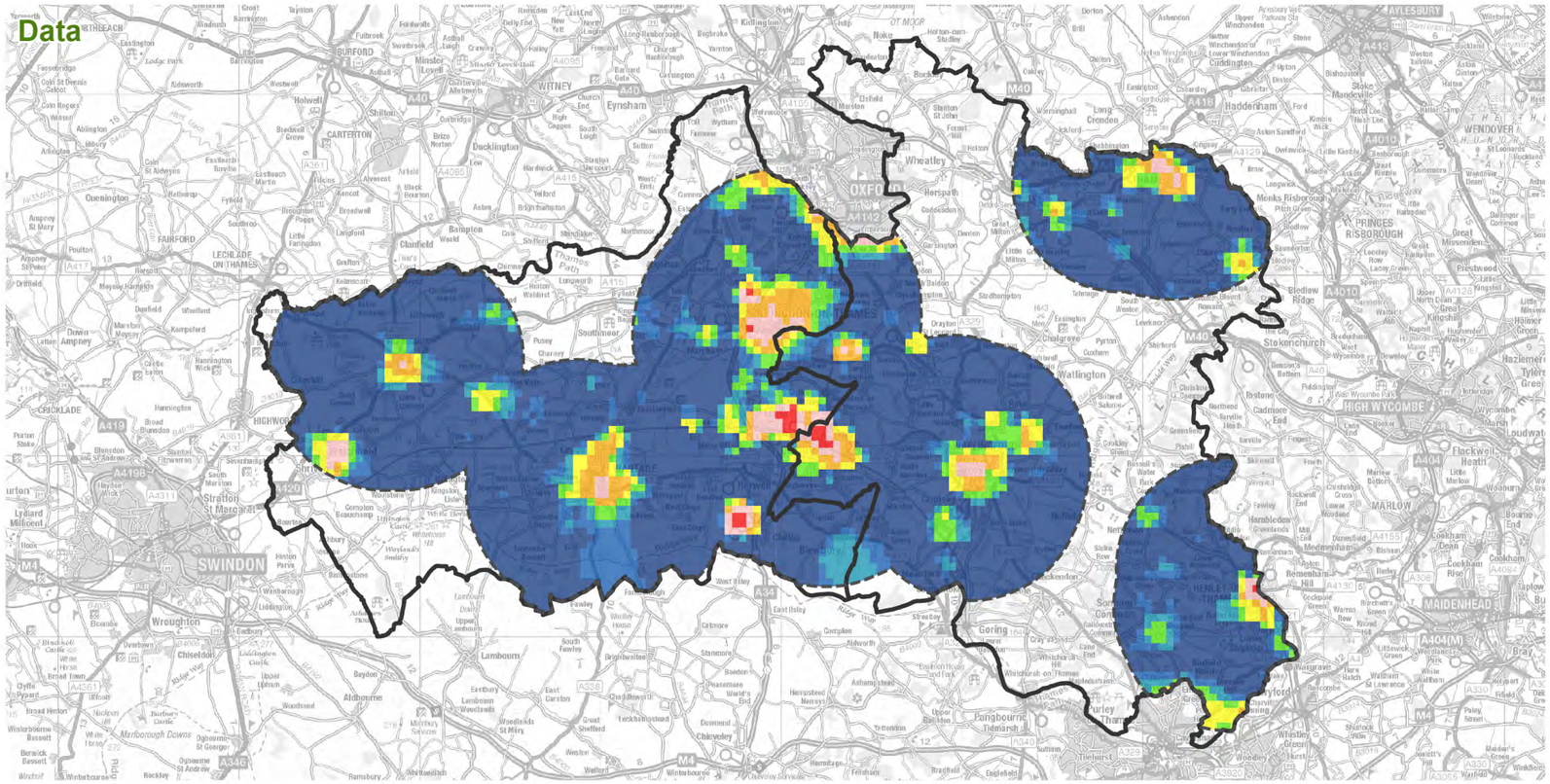
Result

Score P06

- 0 - lowest contribution to tranquillity
- 1
- 3
- 5 - highest contribution to tranquillity

LUC

Figure 3.12: P06 Seeing the stars at night - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Dark skies and light pollution (nanoW/cm2/sr)

- <0.25 (Darkest)
- 0.25-0.5
- 0.5-1
- 1-2
- 2-4 (Brighter)
- 4-8
- 8-16
- 16-32
- >32 (Brightest)

Result

Value

- 0 - lowest contribution to tranquillity
- 1
- 3
- 5 - highest contribution to tranquillity

Indicator P07 – Hearing nature

3.33 This indicator assumes all sounds of nature contribute to tranquillity. It encompasses hearing bird song, wildlife, silence, peace and quiet and no human sounds. The louder the sound, the more it is expected to contribute positively to tranquillity, therefore higher scores are more tranquil and lower scores mean a lower contribution to tranquillity from hearing nature and natural sounds.

3.34 There is no dataset to directly map this indicator. Therefore a proxy indicator is required. For this indicator, scores were applied to locations depending on their likelihood of being able to hear enhanced sounds of nature and natural sounds. For instance, in an urban area it may be more unlikely for nature to be heard than it would be outside of an urban area. Higher scores were therefore given for pixels outside of urban areas, as well as pixels within nature conservation related designations and sites. This is based on the assumption that within these designated areas, management and conservation of nature is prioritised and so the chances of having an opportunity to hear nature and natural sounds are likely to be higher.

Datasets

3.35 All South and Vale: National Forest Inventory (NFI) 2020 (selected categories: assumed woodland, broadleaved, mixed mainly broadleaved, mixed mainly conifer, shrub), Ancient Woodland Inventory (AWI), Special Area Conservation (SAC), Site of Special Scientific Interest (SSSI), Local Nature Reserve (LNR), National Nature Reserve (NNR), Country Parks and Local Wildlife Sites.

3.36 Urban: The same categories as for the All South and Vale analysis were selected from the NFI dataset, AWI, SAC, SSSI, LNR, NNR, Country Parks, Local Wildlife Sites, Natural England Green Infrastructure (selected categories: Access Land, Activity Spaces Provision, Allotments and Community Growing

Spaces, Cemeteries and Religious Grounds, Golf Course, Millenium or Doorstep Green, Other Sports Facilities, Play Space Provision, Playing Fields, Public Park – general)

Method

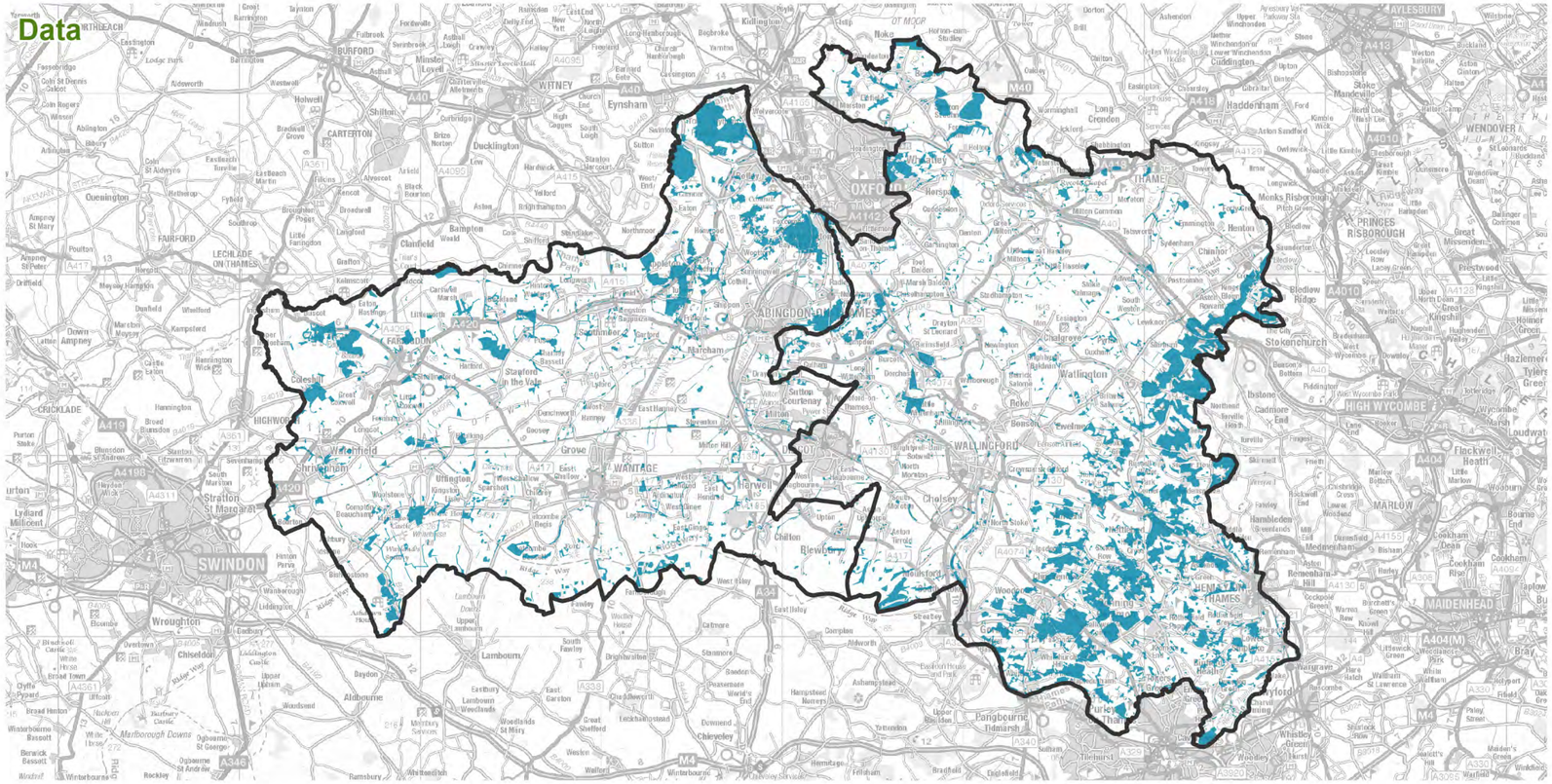
3.37 All South and Vale: All pixels outside of the urban areas were given a score of 4. Any pixels outside of the urban areas and which fall within the datasets listed in the Datasets section above were given the highest score for tranquillity of 5. This means that smaller towns and villages outside of the larger urban areas selected for the tranquillity urban analysis will be given high scores. To exclude those a definition of how large these settlements need to be before they cause a decrease in the likelihood of hearing nature would be needed. Since this information was not available in the literature these smaller settlements were left in.

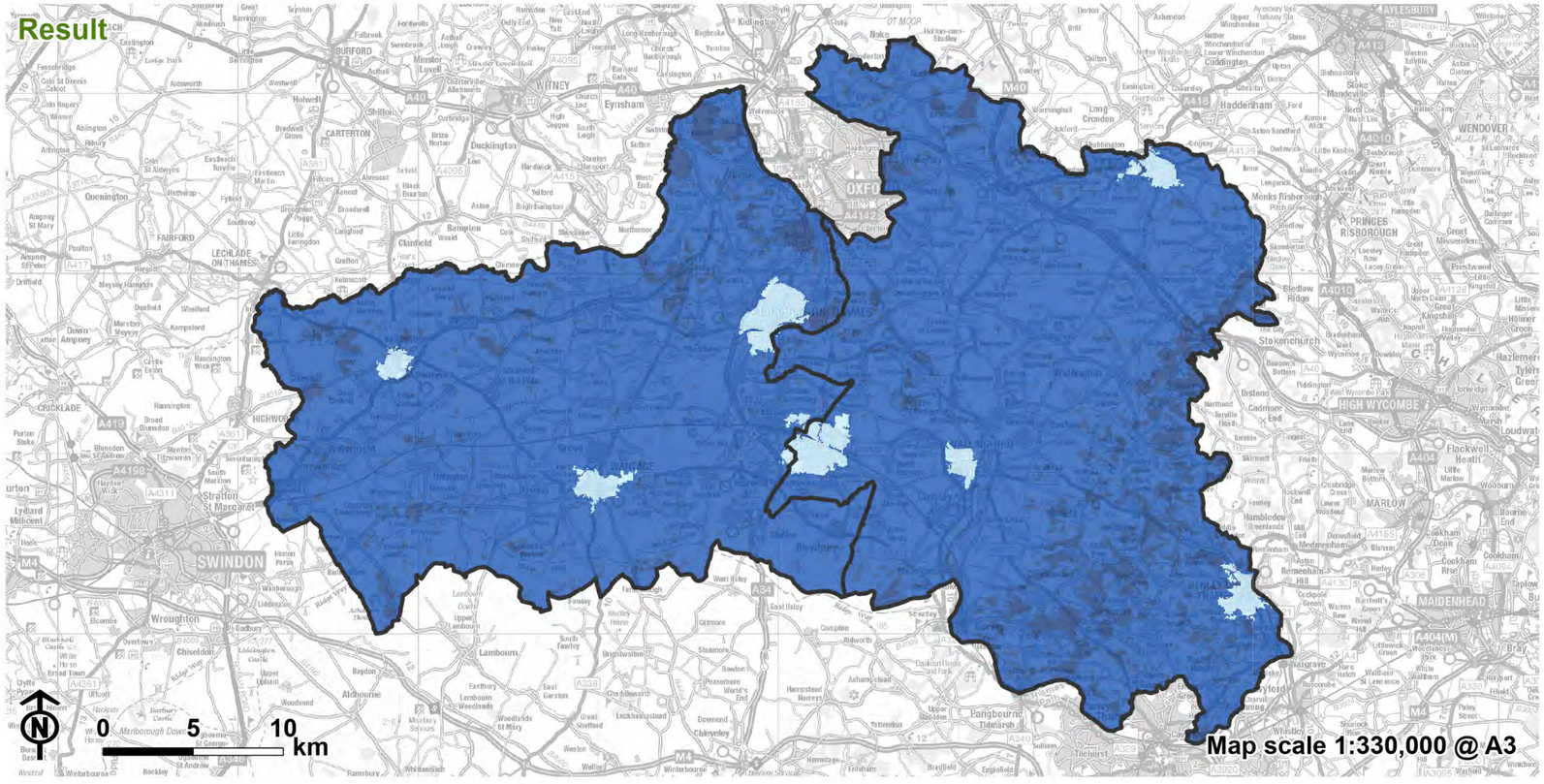
3.38 Urban: The same method as All South and Vale was applied, with pixels outside of the selected urban areas scoring 4 and pixels within the listed datasets scoring 5.

Results

3.39 The results of the analysis for All South and Vale are shown in Figure 3.13 and Urban results in Figure 3.14. Scores are based on the likelihood of being able to hear natural sounds, with higher scores attributed to locations with a higher likelihood of hearing these sounds.

Figure 3.13: P07 Hearing nature - all South and Vale data and results





South Oxfordshire and Vale of White Horse

Data

National Forest Inventory, Ancient Woodland Inventory, Special Area of Conservation, Site of Special Scientific Interest, Local Nature Reserve, National Nature Reserve, Country parks, Local wildlife site

Result

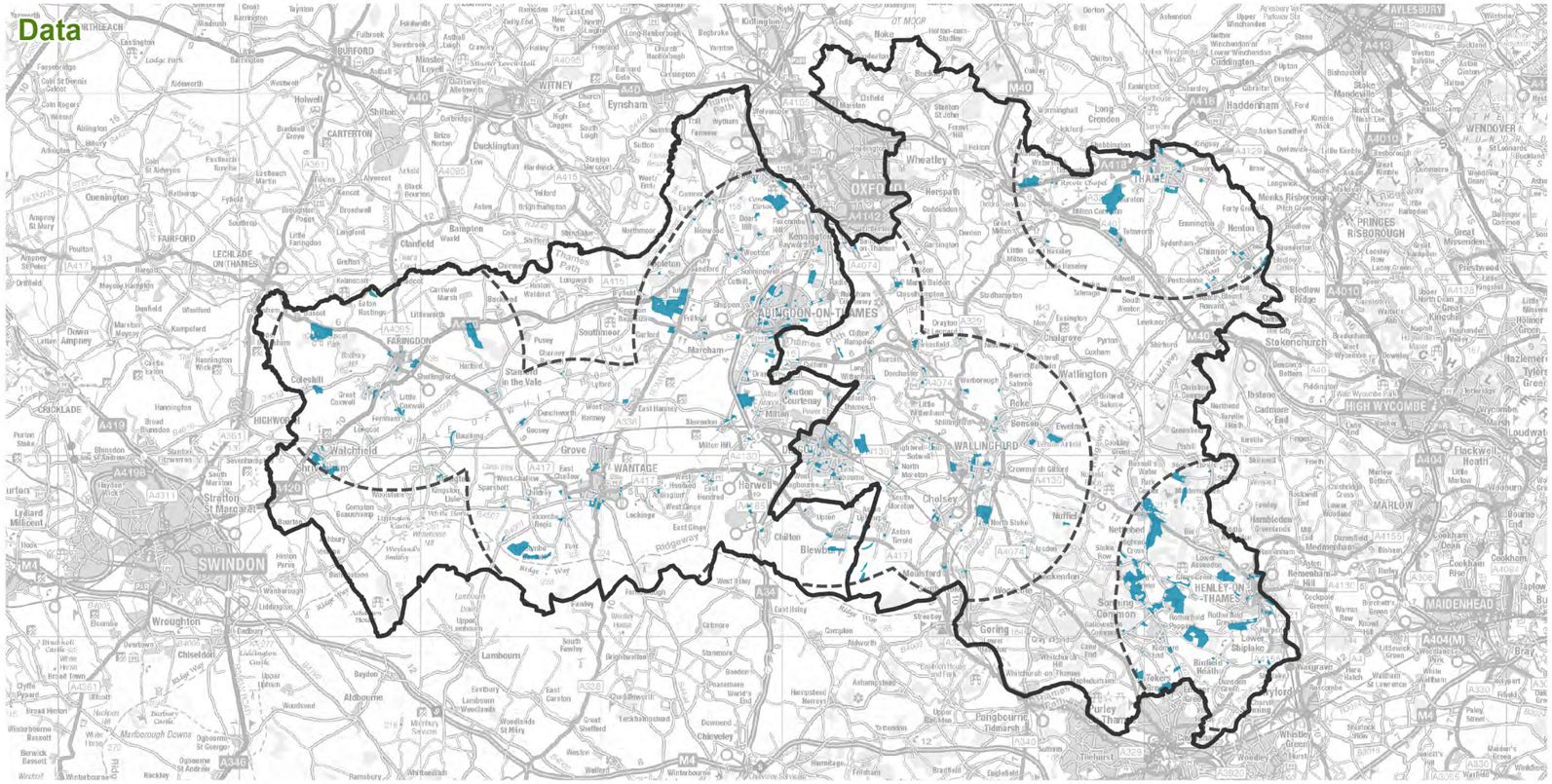
Score P07

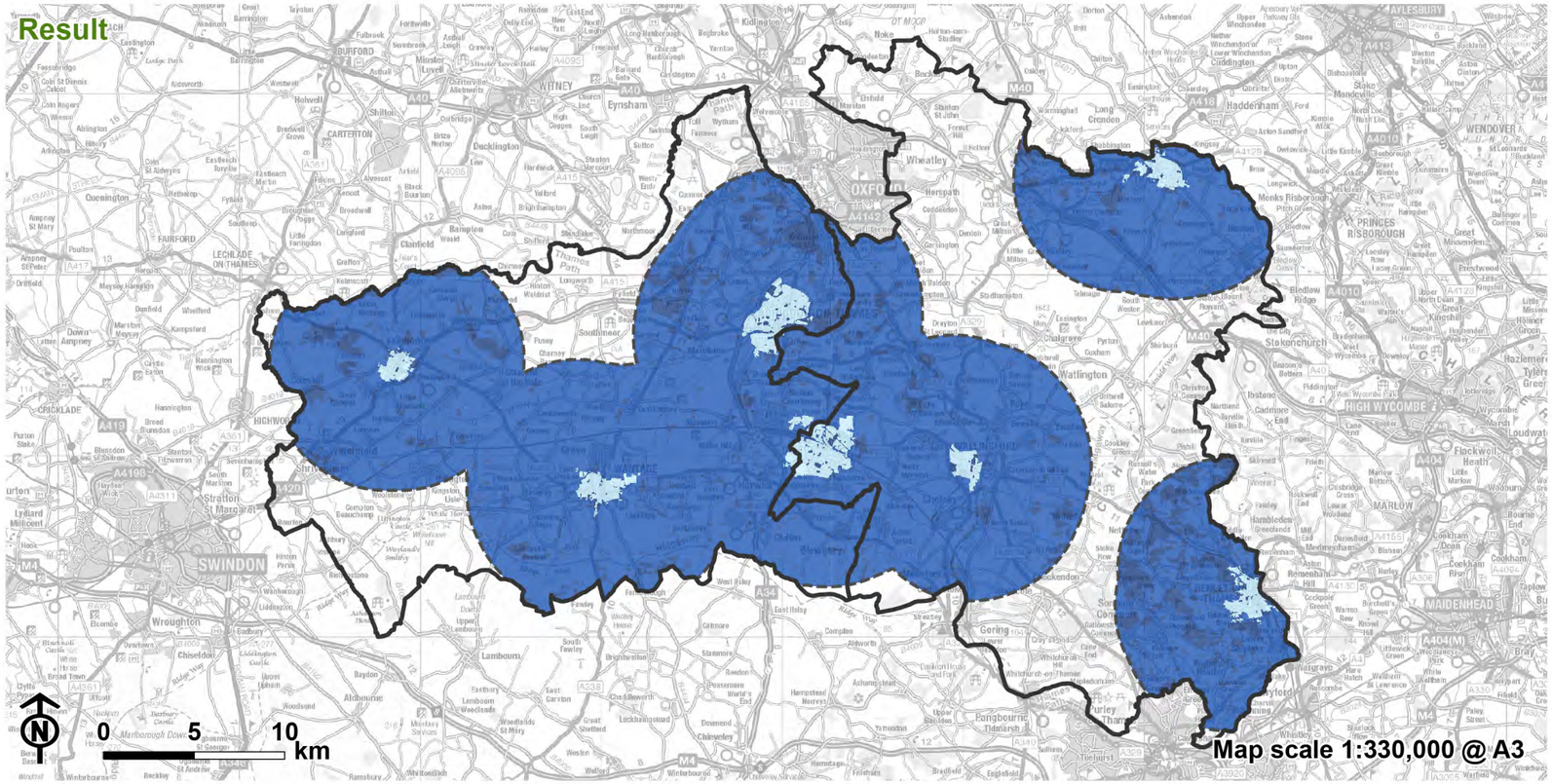
0 - lowest contribution to tranquillity

4

5 - highest contribution to tranquillity

Figure 3.14: P07 Hearing nature - Urban data and results





South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Urban Green Infrastructure, National Forest Inventory, Special Area of Conservation, Site of Special Scientific Interest, Local Nature Reserve, National Nature Reserve

Result

Value

0 - lowest contribution to tranquillity

4

5 - highest contribution to tranquillity

Indicator P08 – Seeing elevated areas

Datasets

3.40 This indicator represents the ability to see elevated areas. Stakeholders gave feedback on this indicator following the pilot mapping, pointing out the initial lack of variation in scoring. For instance, the lower-lying farmland in the Vale of White Horse should score high as it is an area where one can stand and see both the National Landscapes and the Corallian Ridge and feel part of this large scale landscape, which contributes to tranquillity. The pilot mapping for this indicator was revised and the classification method improved in order to pick up these areas where elevated areas are visible from and therefore the contribution to tranquillity is higher.

3.41 All South and Vale: grid of points at 200m intervals over all South and Vale

3.42 Urban: Grid of points at 200m intervals over the 6km buffer outside of the urban areas

Method

3.43 All South and Vale: Points were generated at 200m intervals over the South Oxfordshire and Vale of White Horse districts. Visibility was calculated from each pixel of the analysis using this grid of points. The pixels were then grouped into five categories based on the number of visible points. Scores were given to these five categories, with the highest score given to the top 20% with the most visibility, the second highest score given to the 20% with the next most visibility and so on as per the table below.

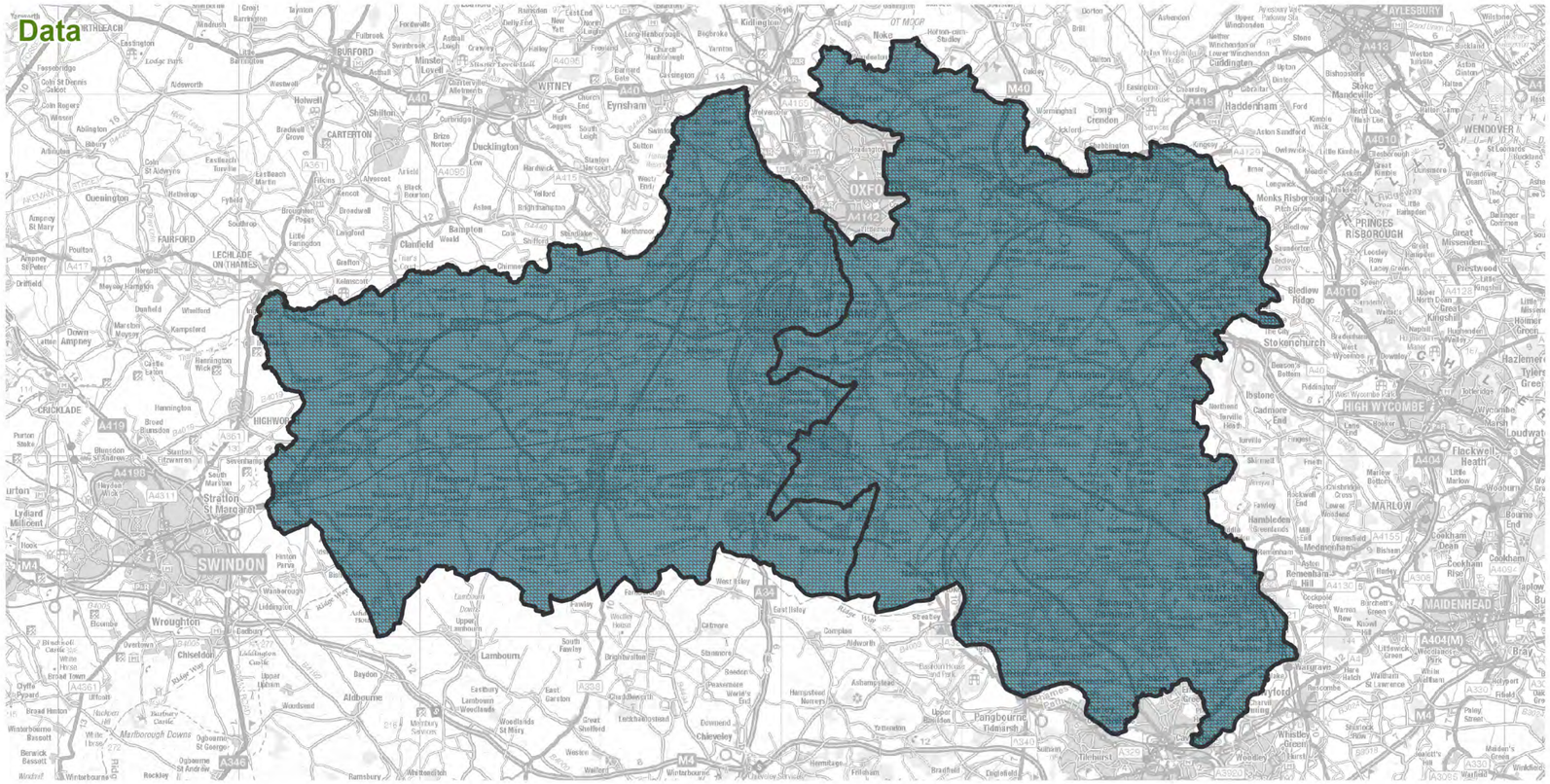
Table 3-11: Scoring P08

Category	1	2	3	4	5
Score	5	4	3	2	1

3.44 Urban: For views out of the urban areas into open countryside (the 6km buffer outside of the urban areas), the same approach as the All South and Vale analysis was used with a 200m grid of points. Visibility was calculated from each pixel of the analysis using this grid of points. Using the same categories as for All South and Vale (table above) the pixels were grouped into five categories and scores were attributed.

Results

3.45 The results of the analysis for All South and Vale are shown in Figure 3.15 and Urban results in Figure 3.16. More visibility increases the potential contribution to tranquillity, therefore higher scores represent more contribution towards tranquillity and lower scores contribute less to tranquillity. The maps clearly show lower areas where higher ground can be seen in the centre of both districts. However some areas scored lower than expected, such as the south western section of the North Wessex Downs National Landscape.



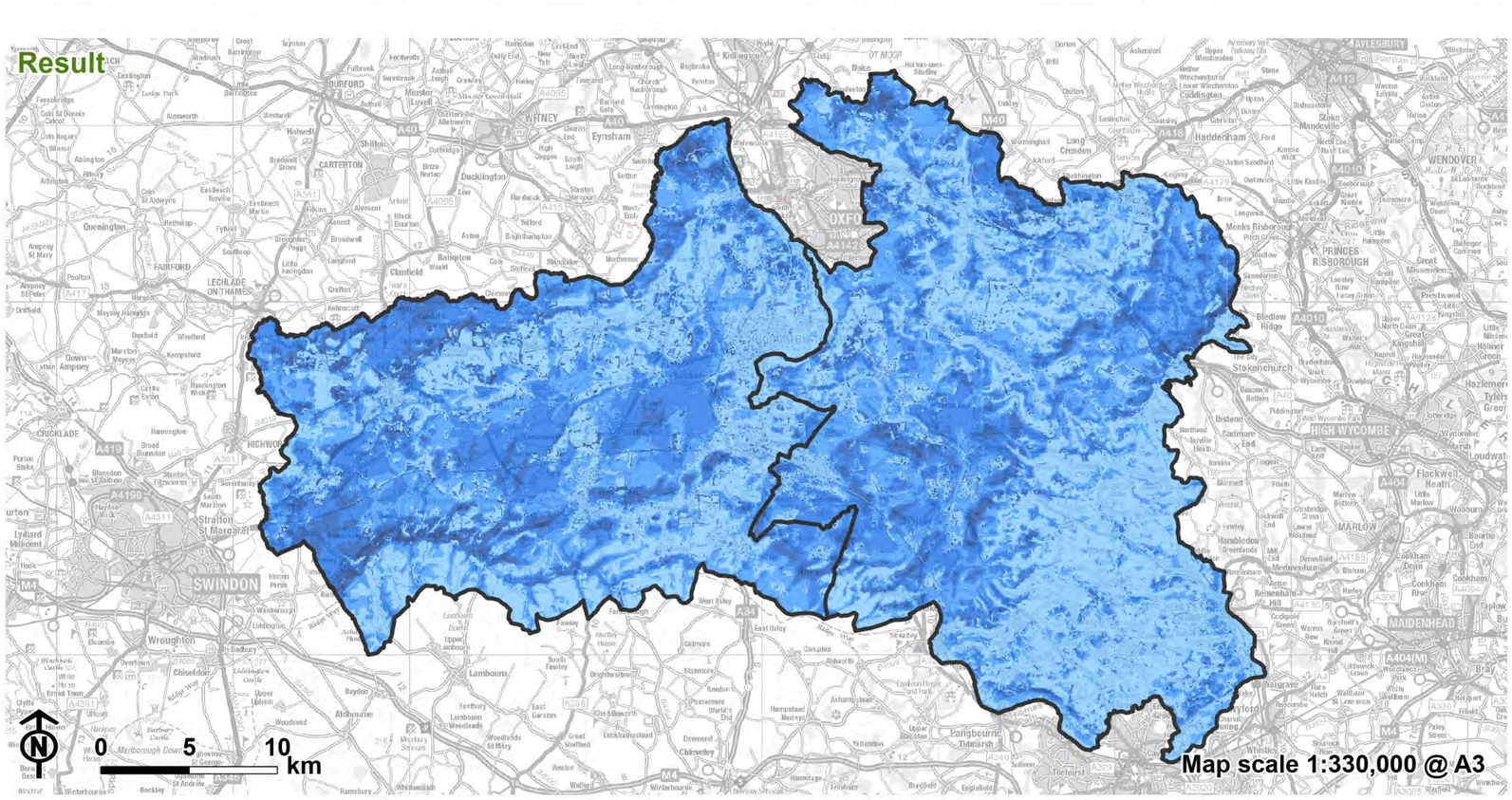


Figure 3.15: P08 Seeing elevated areas - all South and Vale data and results

South Oxfordshire and Vale of White Horse

Data

- Points 200m interval

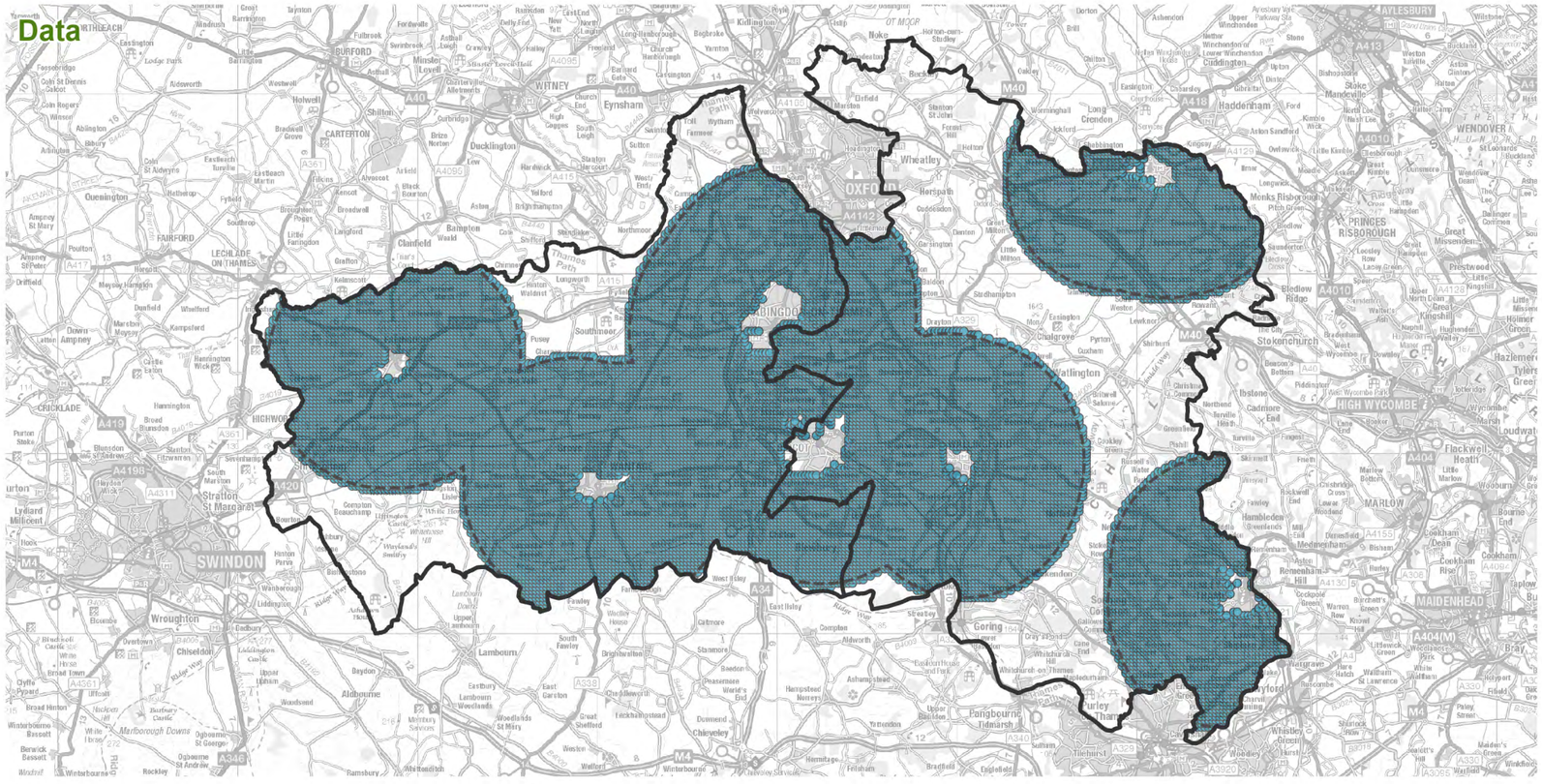
Result

Score P08

- 1 - lowest contribution to tranquillity
- 2
- 3
- 4
- 5 - highest contribution to tranquillity

LUC

Figure 3.16: P08 Seeing elevated areas - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

- Points 200m interval

Result

Score P08

- 0 - lowest contribution to tranquillity
- 1
- 2
- 3
- 4
- 5 - highest contribution to tranquillity

Indicator P09 – Seeing natural designations

Datasets

3.46 All South and Vale: National Landscape, Special Area Conservation (SAC), Site of Special Scientific Interest (SSSI), Local Nature Reserve (LNR), National Nature Reserve (NNR).

3.47 Urban: National Landscape, Special Area Conservation (SAC), Site of Special Scientific Interest (SSSI), Local Nature Reserve (LNR), National Nature Reserve (NNR).

Method

3.48 All South and Vale: Points were generated at 250m intervals and intersected with the nature conservation designation areas from the datasets listed above. Using the intersected points, visibility was calculated from each pixel of the analysis. The areas were buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility.

Table 3-12: Scoring P09 All South and Vale

Distance	500m	1km	2km	5km	6km
Score	5	4	3	2	1

3.49 Urban: The same method as All South and Vale was applied, with 250m intervals points. Buffers were generated and pixels scored as per the table below.

Table 3-13: Scoring P09 Urban

Distance	100m	200m	400m	1km	6km
Score	5	4	3	2	1

Results

3.50 The results of the analysis for All South and Vale are shown in Figure 3.17 and Urban results in Figure 3.18. More visibility increases the potential contribution to tranquillity, therefore higher scores represent more contribution towards tranquillity and lower scores contribute less to tranquillity.

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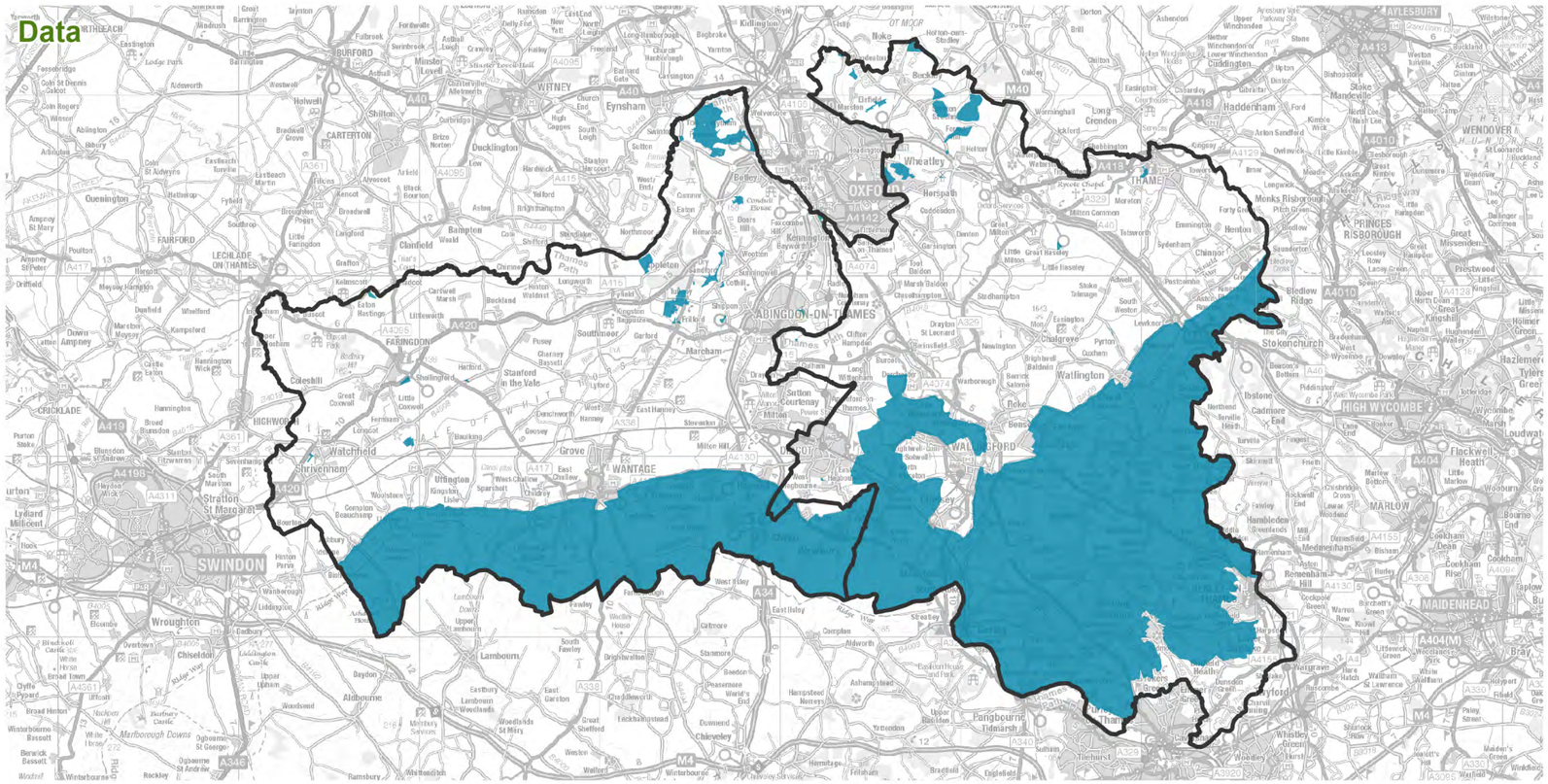
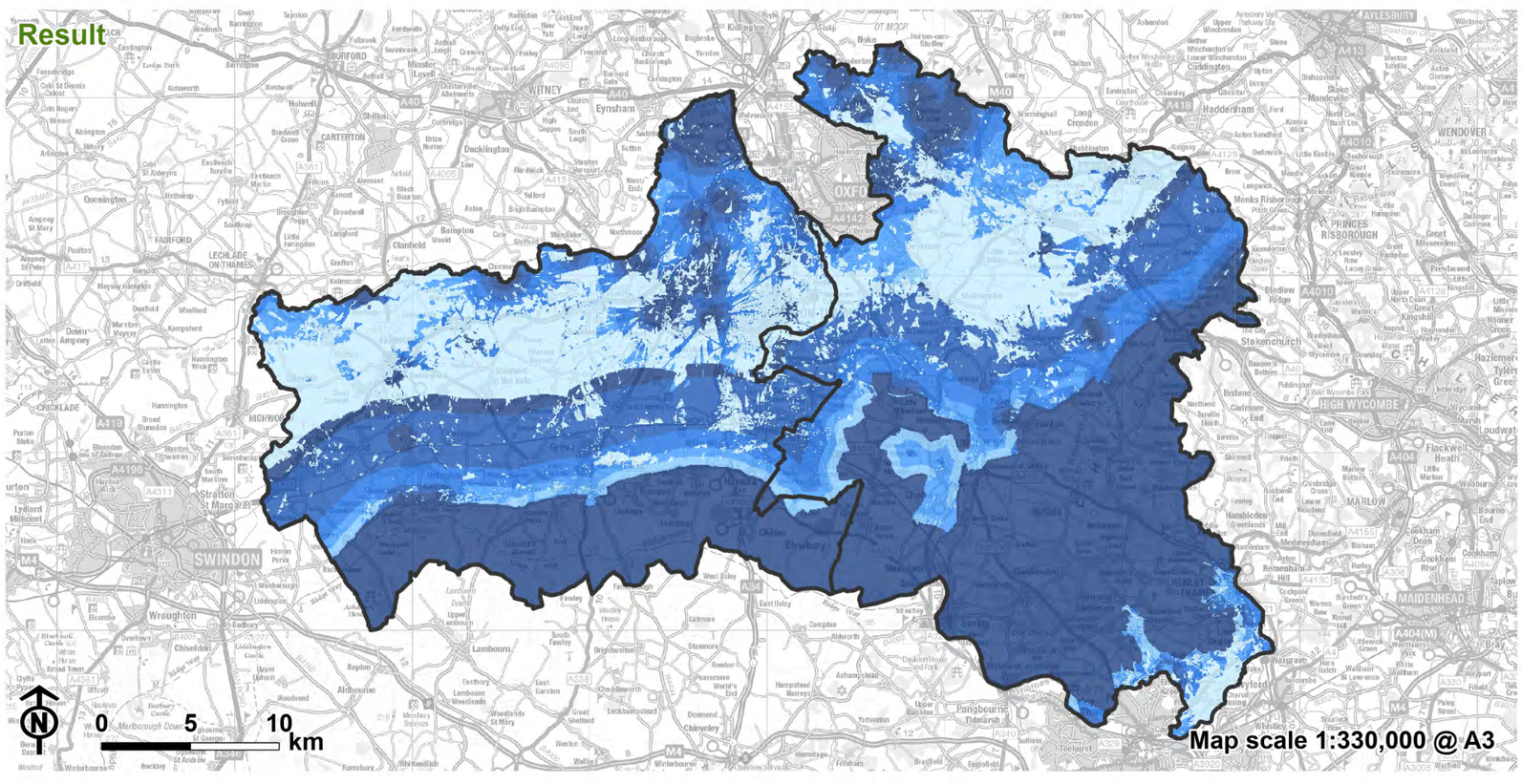
Figure 3.17: P09 Seeing natural designations - all South and Vale data and results





South Oxfordshire and Vale of White Horse

Data

National Landscape, Special Area of Conservation, Site of Special Scientific Interest, Local Nature Reserve, National Nature Reserve

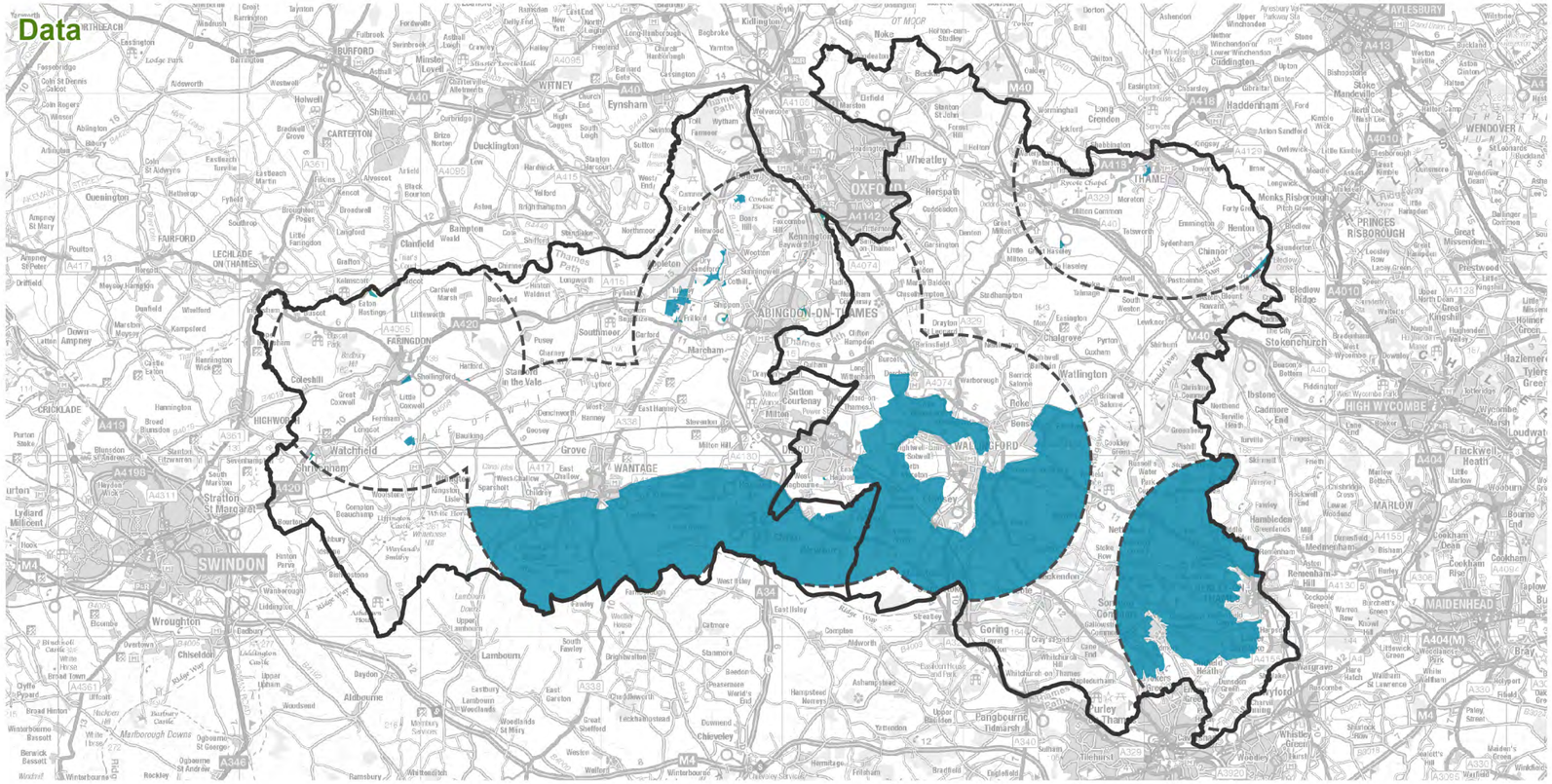
Result

Score P09

- 0 - lowest contribution to tranquillity
- 1
- 2
- 3
- 4
- 5 - highest contribution to tranquillity

12315_Tranquility_Rural_Positive/Fig_3.17_P09_Rural 22/08/2024
EB:bournazel_j Source: OS, NE, LUC

Figure 3.18: P09 Seeing natural designations - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

National Landscape, Special Area of Conservation, Site of Special Scientific Interest, Local Nature Reserve, National Nature Reserve

Result

Score P09

0 - lowest contribution to tranquillity

1

2

3

4

5 - highest contribution to tranquillity

Indicator P10 – Seeing time depth

Datasets

3.51 All South and Vale: Scheduled monuments, historic parks and gardens

3.52 Urban: Scheduled monuments, historic parks and gardens

3.53 The pilot mapping included listed buildings and conservation areas. These were removed from the final mapping based on stakeholder feedback. Feedback suggested that the inclusion of listed buildings and conservation areas was overstating the contribution to tranquillity in settlements (where the density of listed buildings is typically higher).

Method

3.54 All South and Vale: Points were generated at 250m intervals and intersected with the scheduled monuments and historic parks and gardens. These datasets were buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility.

Table 3-14: Scoring P10 All South and Vale

Distance	500m	1km	2km	5km	6km
Score	5	4	3	2	1

3.55 Urban: The same method as All South and Vale was applied, but with a grid of points at 50m intervals. Buffers were generated and pixels scored as per the table below.

Table 3-15: Scoring P10 Urban

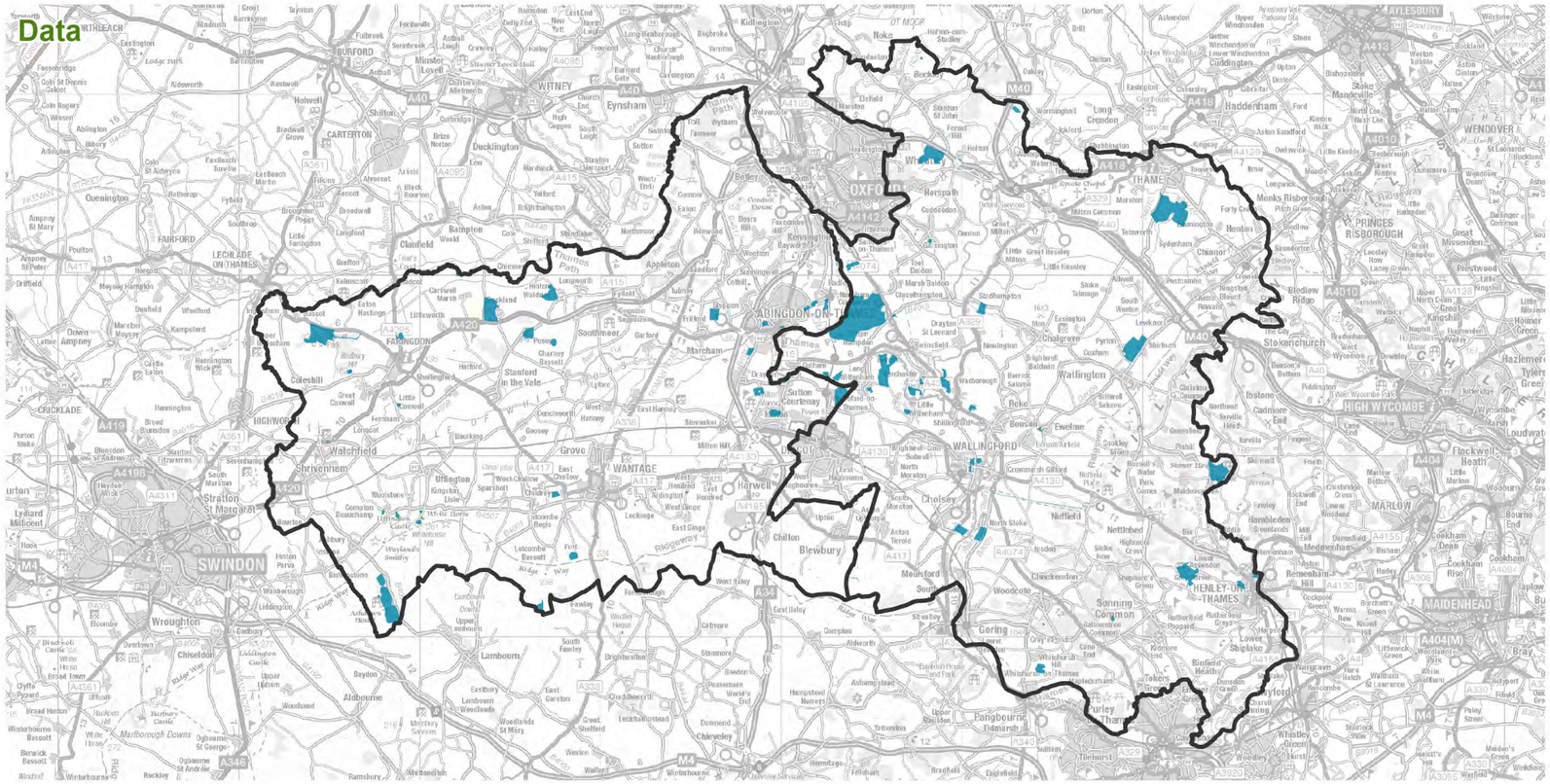
Distance	100m	200m	400m	1km	6km
Score	5	4	3	2	1

Results

3.56 The results of the analysis for All South and Vale are shown in Figure 3.19 and Urban results in Figure 3.20. More visibility increases the potential contribution to tranquillity, therefore higher scores represent a greater contribution to tranquillity and lower represent areas where the contribution to tranquillity is lower.

LUC

Figure 3.19: P10 Seeing time depth - all South and Vale data and results



South Oxfordshire and Vale of White Horse

Data

Scheduled monument, historic park and garden

Result

Score P10

- 0 - lowest contribution to tranquillity
- 1
- 2
- 3
- 4
- 5 - highest contribution to tranquillity

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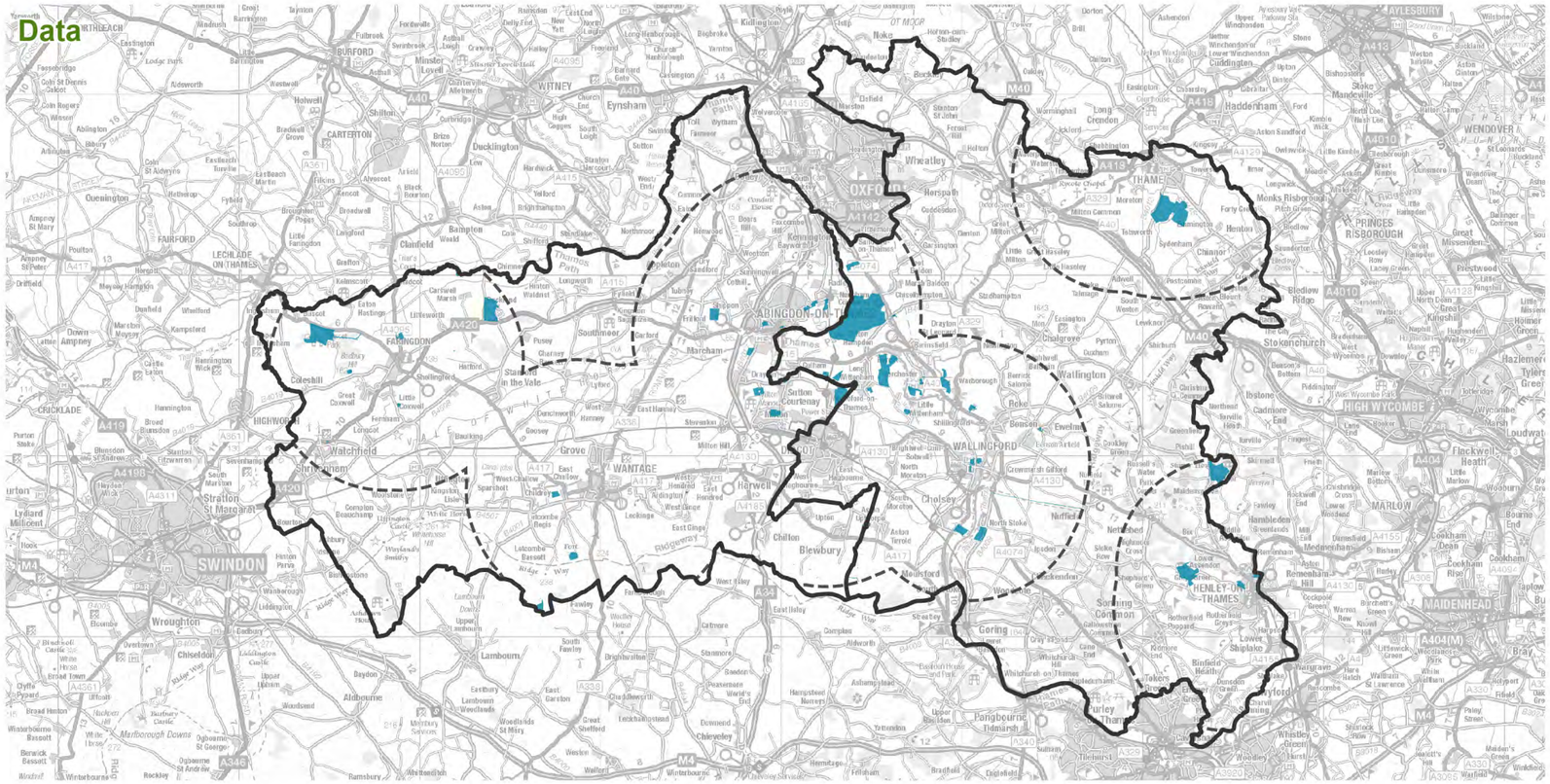
Figure 3.20: P10 Seeing time depth - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Scheduled monument, historic park and garden

Result

Score P10

0 - lowest contribution to tranquillity

1

2

3

4

5 - highest contribution to tranquillity

Chapter 4

Negative indicators details

4.1 This section gives the full details of the data used, the process followed and any assumptions made for each negative indicator. A higher score for negative indicators suggests a greater detraction from tranquillity.

4.2 Each indicator is presented with the following structure:

- Datasets – setting out the data sources used for both All South and Vale and Urban analysis;
- Method – describes the way in which the indicator has been modelled for both All South and Vale and Urban analysis; and
- Result – maps of the raw input data and resulting processed indicator data for both South and Vale and Urban

Indicator N01 – Seeing settlements

4.3 Based on stakeholder feedback, this indicator focuses only on seeing larger settlements. Stakeholders fed back that villages are often beautiful and tranquil, so they should not be included as part of this indicator.

4.4 Stakeholders also fed back that seeing settlements is not always negative; it depends on the viewing distance.

Datasets

4.5 All South and Vale: Selected Office for National Statistics (ONS) built up 2022 areas.

4.6 Urban: Selected ONS built up 2022 areas.

4.7 The settlements selected for this indicator are listed in Appendix C and include the higher tiers from the existing South Oxfordshire and Vale of White Horse settlement hierarchies, as well as settlements over 50 ha located within the 6km buffer outside of the study area.

Method

4.8 All South and Vale: Points were generated at 100m intervals and intersected with the selected settlements. Another set of points was generated at 100m intervals around the perimeter of the settlements. Using these two sets of points, visibility was calculated from each pixel of the analysis. The settlements were buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility.

Table 4-1: Scoring N01 All South and Vale

Distance	500m	1km	2km	5km	6km
Score	5	4	3	2	1

4.9 Urban: The same method as All South and Vale was applied, with 100m interval points. Buffers were generated and pixels scored as per the table below.

Table 4-2: Scoring N01 Urban

Distance	100m	200m	400m	1km	6km
Score	5	4	3	2	1

Results

4.10 The results of the analysis for All South and Vale are shown in Figure 4.1 and for Urban in Figure 4.2. Visibility of more of the features measured by the indicator means that the tranquillity decreases, so higher scores represent less contribution towards tranquillity and lower scores more contribution towards tranquillity.

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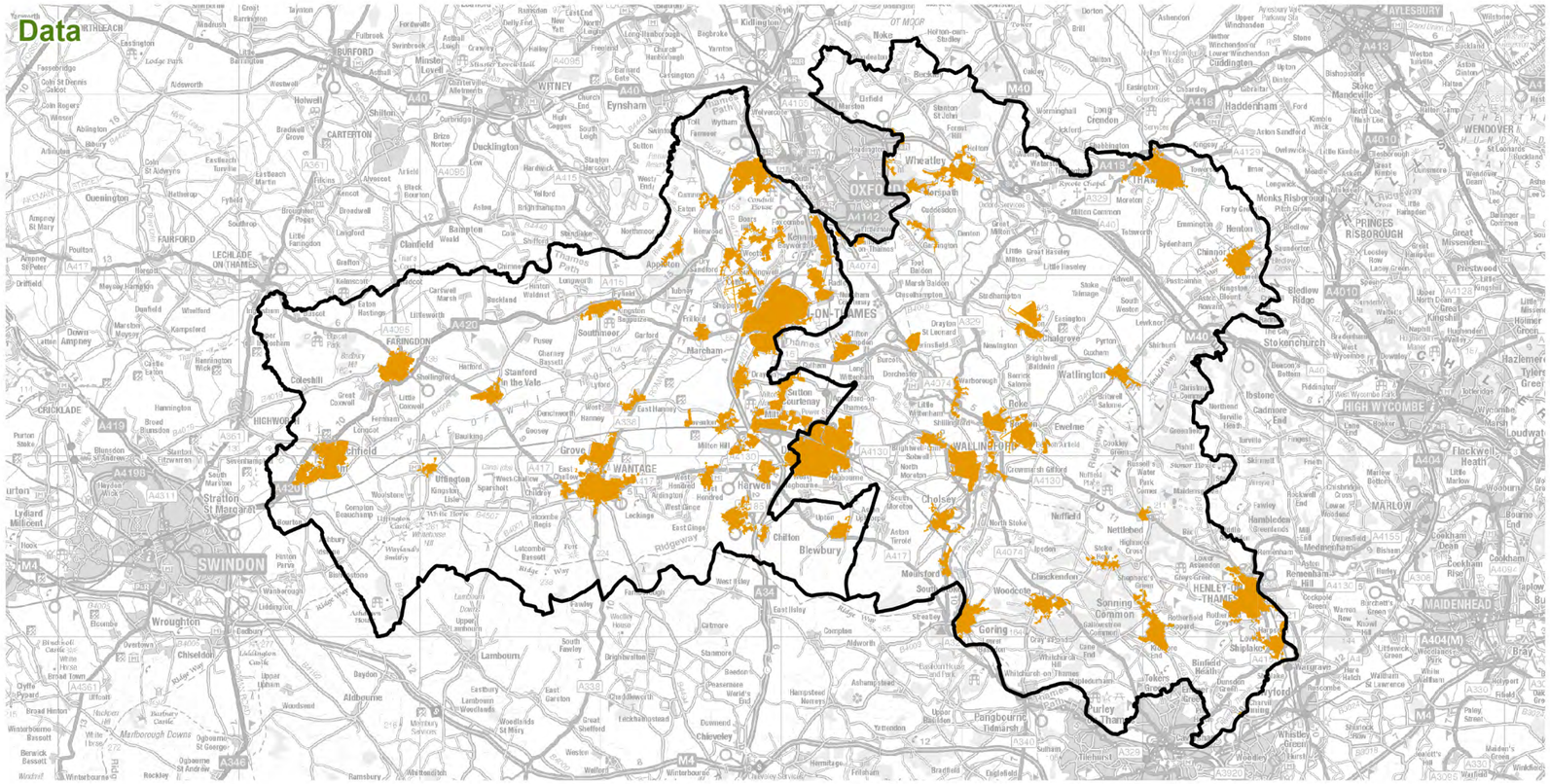
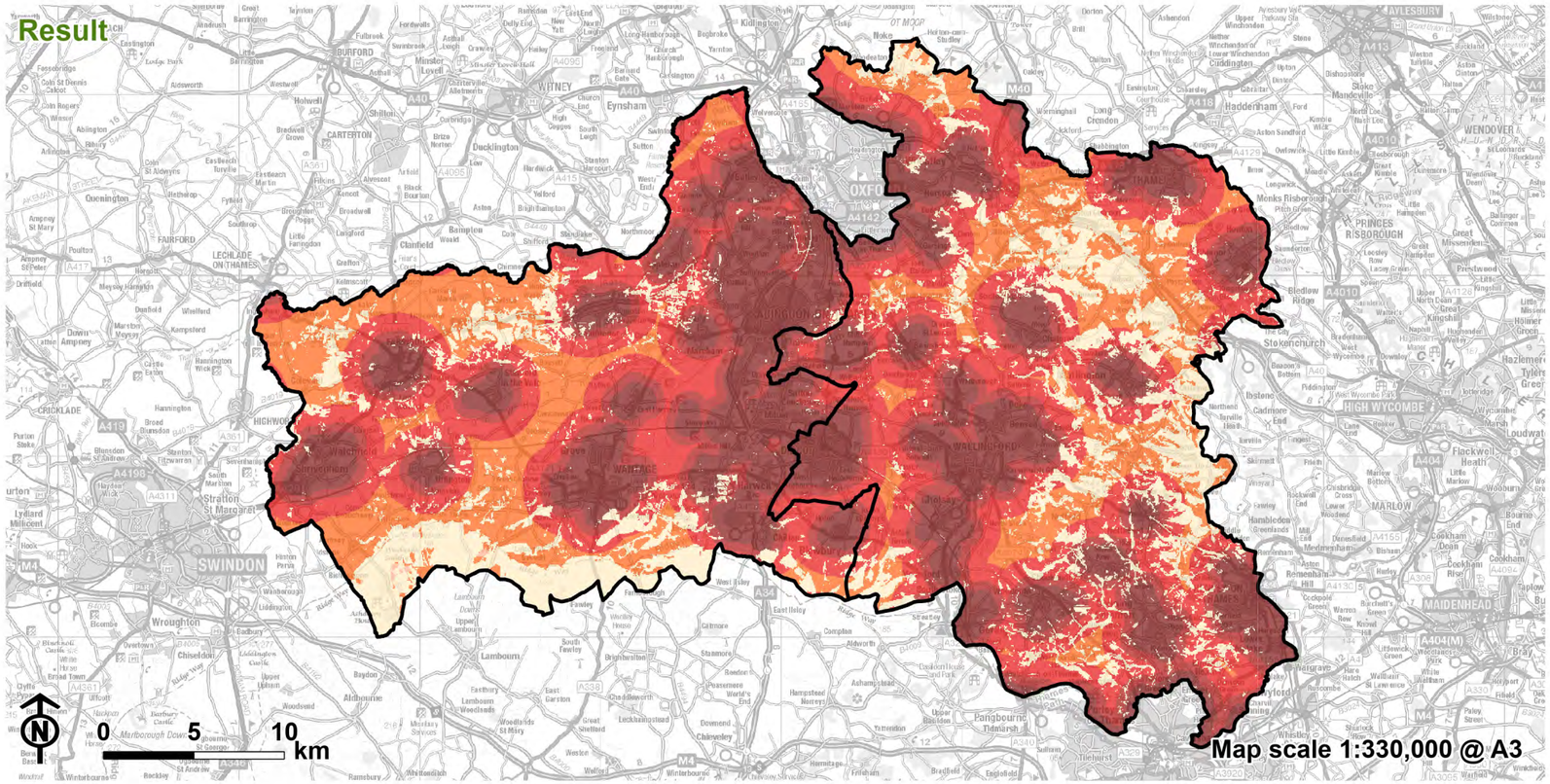
LUC

Figure 4.1: N01 Seeing settlements - all South and Vale data and results





South Oxfordshire and Vale of White Horse

Data

Settlement

Result

Score N01

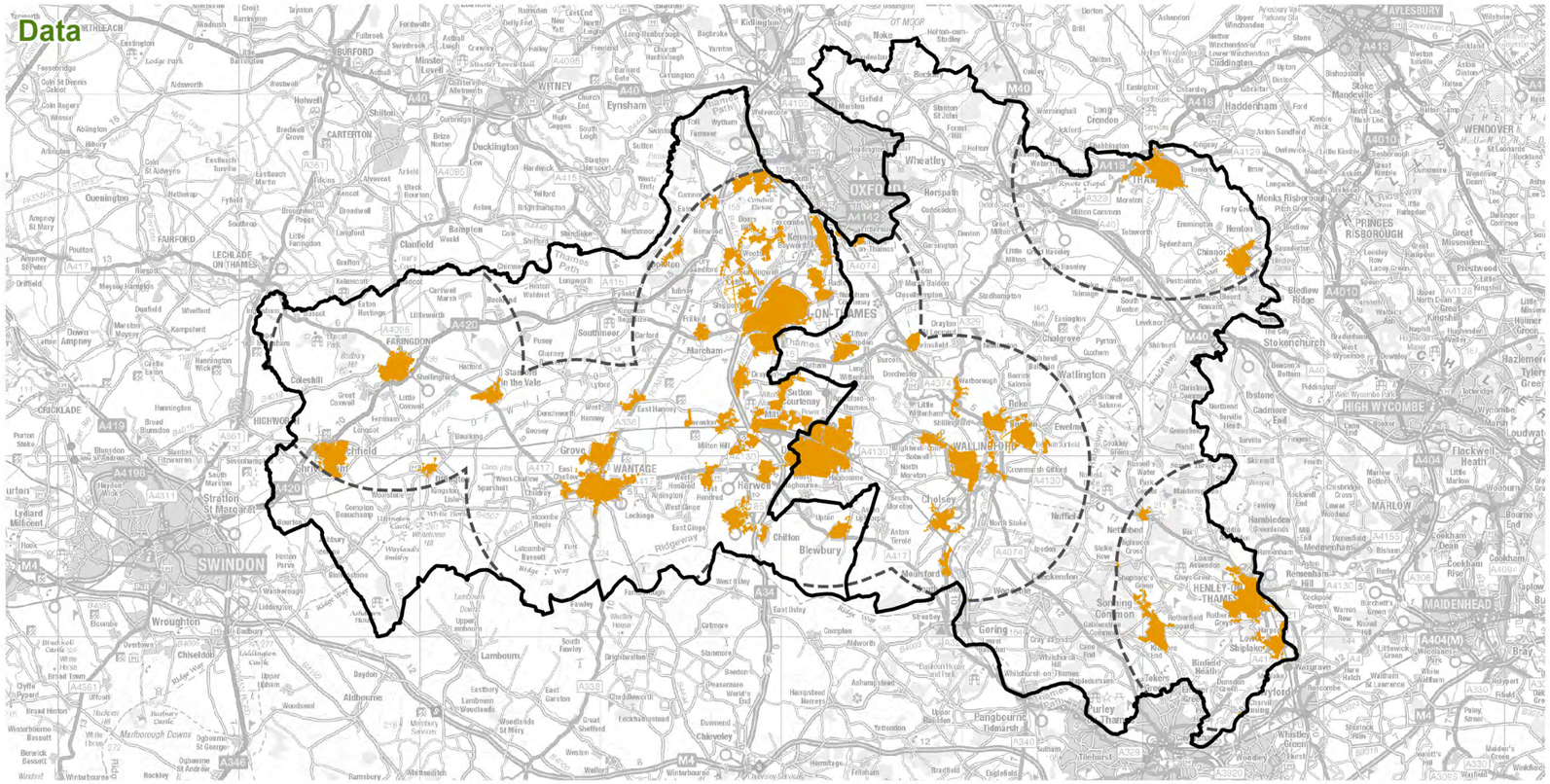
- 0 - highest contribution to tranquillity
- 1
- 2
- 3
- 4
- 5 - lowest contribution to tranquillity

12315_Tranquillity_Rural_Negative_N01toN03/Fig_4_1_N01_Rural 22/09/2023 EB:bournazel_j Source: OS, ONS, LUC

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 4.2: N01 Seeing settlements - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Settlement

Result

Score N01

0 - highest contribution to tranquillity

1

2

3

4

5 - lowest contribution to tranquillity

12315_Tranquillity_Urban_Negative/Fig_4_2_N01_Urban 21/09/2023 EB:bournazel_j Source: OS, ONS, LUC

Indicator N02 – Seeing light pollution

Datasets

4.11 All South and Vale: LUC Dark Skies Map (output of Requirement 1 for this project). As the original map is 400m resolution, it was resampled to 50m pixels to match the scale of analysis at All South and Vale level. It must be noted that this does not increase the precision of the data, it merely aligns the pixel sizes.

4.12 Urban: LUC Dark Skies Map (output of requirement 1 for this project). As the original map is 400m resolution, it was resampled to 10m pixels to match the scale of analysis at the urban areas level. It must be noted that this does not increase the precision of the data, it merely aligns the pixel sizes.

Method

4.13 All South and Vale: The dark skies map was re-classified into four categories as per the table below. The brightest pixels (>32 nanoW/cm²/sr) were scored with the highest score for detraction from tranquillity. These correspond to the Urban high district brightness environmental zone (E4) as defined in the Dark Skies Assessment and Lighting Guidance report (requirement 1 for this project). Pixels between 4 and 32 nanoW/ cm²/sr corresponding to the Suburban medium district brightness zone (E3) were scored with the second highest score for detraction from tranquillity. Pixels between 1 and 4 nanoW/cm²/sr, corresponding to Rural low district brightness zone (E2), were scored with a lower detraction score as they are still bright, but less so. Finally, all other pixels were scored 0 as they are darker and assumed to represent areas with the least light pollution.

Table 4-3: Scoring N02 All South and Vale

Brightness (nanoW/cm2/sr)	>32	4-32	1-4	<1
Score	5	4	3	0

4.14 Urban: The dark skies map was re-classified following the same method as for All South and Vale.

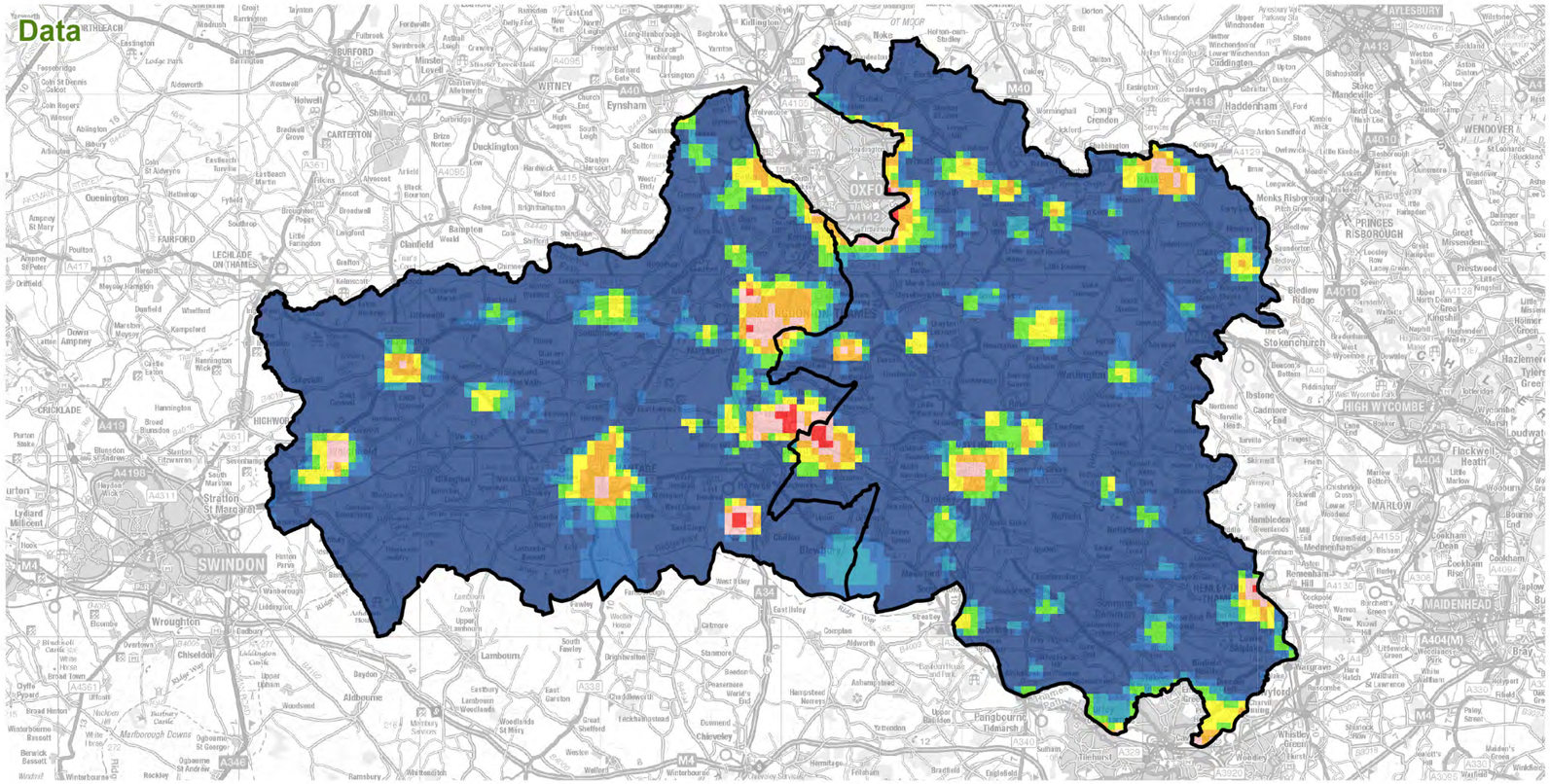
Table 4-4: Scoring N02 Urban

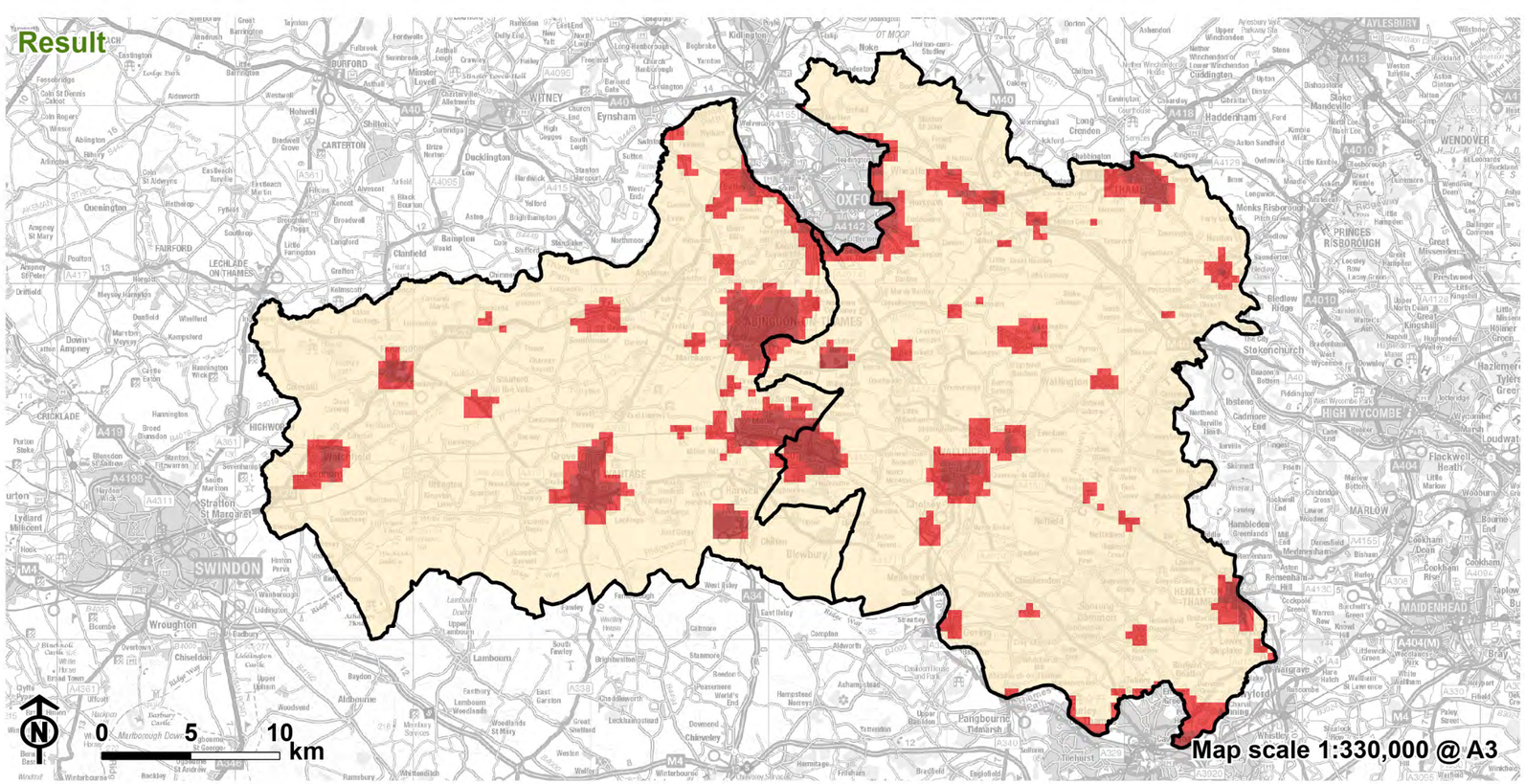
Brightness (nanoW/cm2/sr)	>32	4-32	1-4	<1
Score	5	4	3	0

Results

4.15 The results of the analysis for All South and Vale are shown in Figure 4.3 and Urban results are in Figure 4.4. Brighter skies mean there is light pollution, therefore areas with brighter values were given a higher score for detraction from tranquillity. Higher scores represent less tranquil areas and lower scores are more tranquil.

Figure 4.3: N02 Seeing light pollution - all South and Vale data and results





South Oxfordshire and Vale of White Horse

Data

Dark skies and light pollution (nanoW/cm2/sr)

- <0.25 (Darkest)
- 0.25-0.5
- 0.5-1
- 1-2
- 2-4 (Brighter)
- 4-8
- 8-16
- 16-32
- >32 (Brightest)

Result

Score N02

- 0 - highest contribution to tranquillity
- 3
- 4
- 5 - lowest contribution to tranquillity

Tranquillity Assessment
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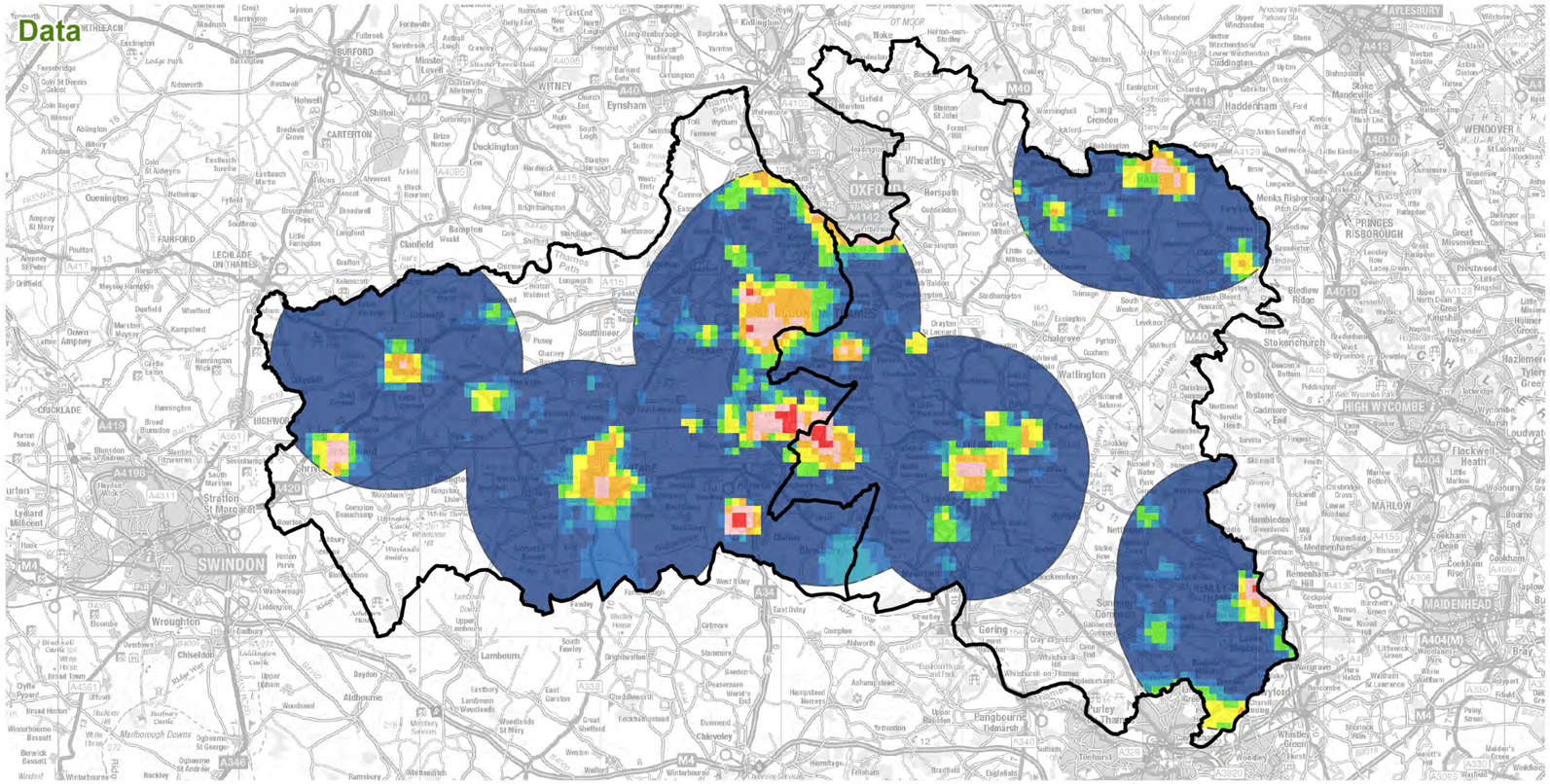
LUC

Figure 4.4: N02 Seeing light pollution - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

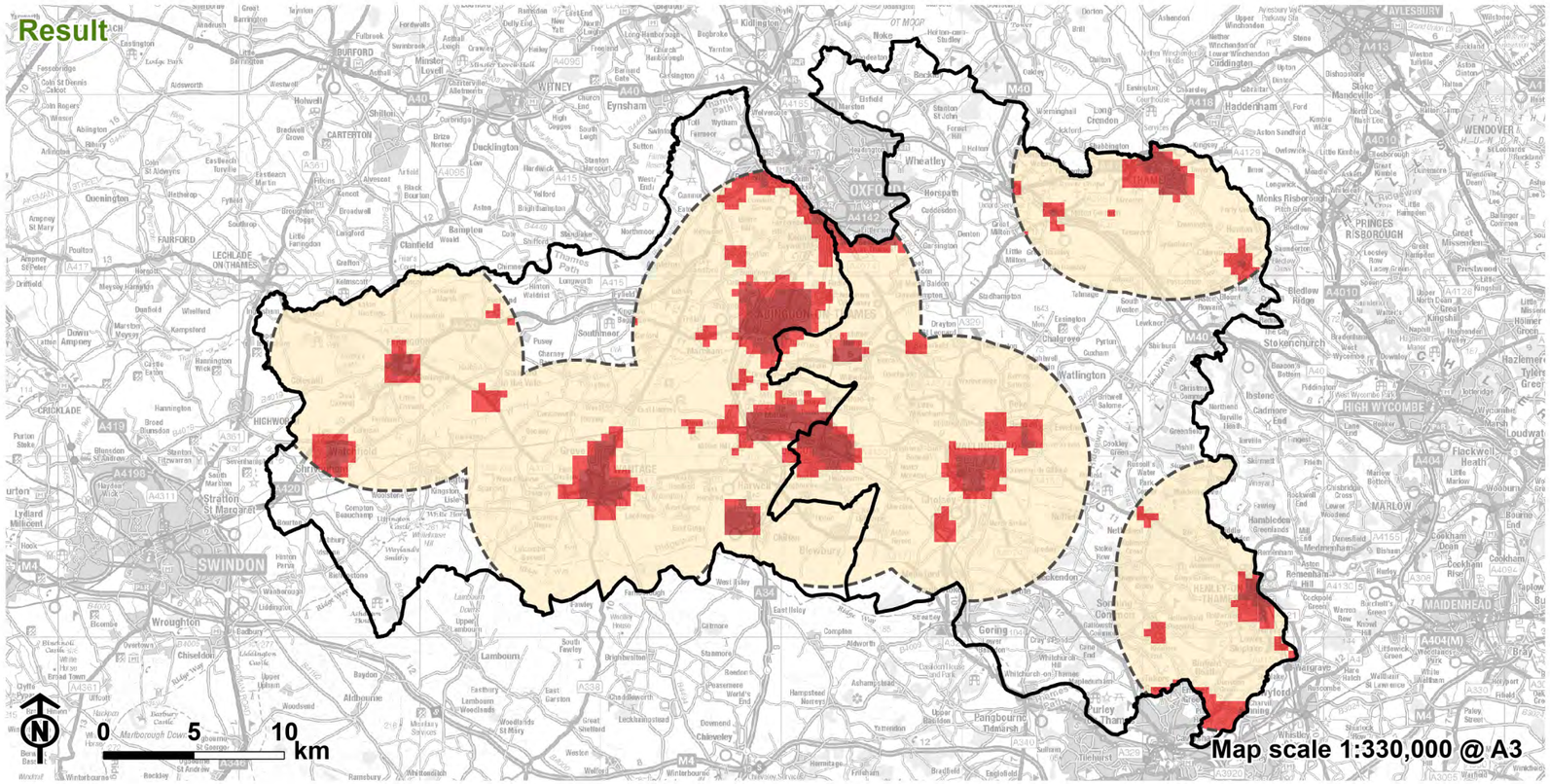
Dark skies and light pollution (nanoW/cm2/sr)

- <0.25 (Darkest)
- 0.25-0.5
- 0.5-1
- 1-2
- 2-4 (Brighter)
- 4-8
- 8-16
- 16-32
- >32 (Brightest)

Result

Score N02

- 0 - highest contribution to tranquillity
- 3
- 4
- 5 - lowest contribution to tranquillity



Indicator N03 – Seeing large non natural infrastructure

Datasets

4.16 All South and Vale: OS MasterMap (industrial buildings and warehouses selected using OS AddressBasePlus as detailed in Appendix D), Department for Business, Energy and Industrial Strategy (BEIS) Renewables Energy Planning Database (database filtered on 'Development' = 'Under construction' or 'operational'), National grid towers (400kV pylons)

4.17 Urban: same as All South and Vale analysis.

Method

4.18 Features that are likely to be large, non-natural infrastructure were extracted from the datasets listed above. Specific buildings in Harwell Campus as well as Culham were added following stakeholder feedback on the pilot mapping as these specific buildings were not included in the initial extract from OS AddressBasePlus, however due to their height they were felt to contribute towards this indicator. A mix of assumed heights as well as heights based on stakeholder feedback were assigned to each type of feature as described in the following table. Note that the 8m building height that was built in the DSM was subtracted from the initial assumed/suggested building heights in the table below to avoid double counting building height in the visibility analysis.

Table 4-5: Heights assigned to features for N03

Feature	Data source	Assumed height (metres)
Industrial buildings / warehouses (OS selected categories*)	OSMM / OS AddressBasePlus	7
Harwell Campus and the old Didcot power site	OSMM / OS AddressBasePlus/Stakeholder feedback	12
Joint European Torus buildings in Culham	OSMM / OS AddressBasePlus/Stakeholder feedback	24
Anaerobic / sewage digestion	BEIS REPD	40
Battery / biomass / hydro	BEIS REPD	3
Landfill gas	BEIS REPD	20
Solar photovoltaics	BEIS REPD	2.7
400kV pylons	National Grid	50
Wind onshore turbine capacity 1-2 MW	BEIS REPD	81

4.19 All South and Vale: The selected OS Mastermap industrial/warehouse buildings were buffered by 300m to ensure that they were all selected in the next step, even though some of them have a small footprint. Points were generated at 100m intervals and intersected with the buffered industrial/warehouses buildings. Using the intersected industrial/warehouse points and the REPD and National Grid tower points, visibility was calculated from each pixel of the analysis, using the height that was assigned for each feature type as per the table above. The industrial/warehouse buildings, REPD and National Grid tower points were buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility.

Table 4-6: Scoring N03 All South and Vale

Distance	500m	1km	2km	5km	6km
Score	5	4	3	2	1

4.20 Urban: The same method as All South and Vale was applied, with 100m intervals points. Buffers were generated and pixels scored as per the table below.

Table 4-7: Scoring N03 Urban

Distance	100m	200m	400m	1km	6km
Score	5	4	3	2	1

Results

4.21 The results of the analysis for All South and Vale are shown in Figure 4.5 and Urban results in Figure 4.6. Visibility of more of the features measured by the indicator means that the tranquillity decreases, so higher scores represent less contribution towards tranquillity and lower scores more contribution towards tranquillity.

Tranquillity Assessment
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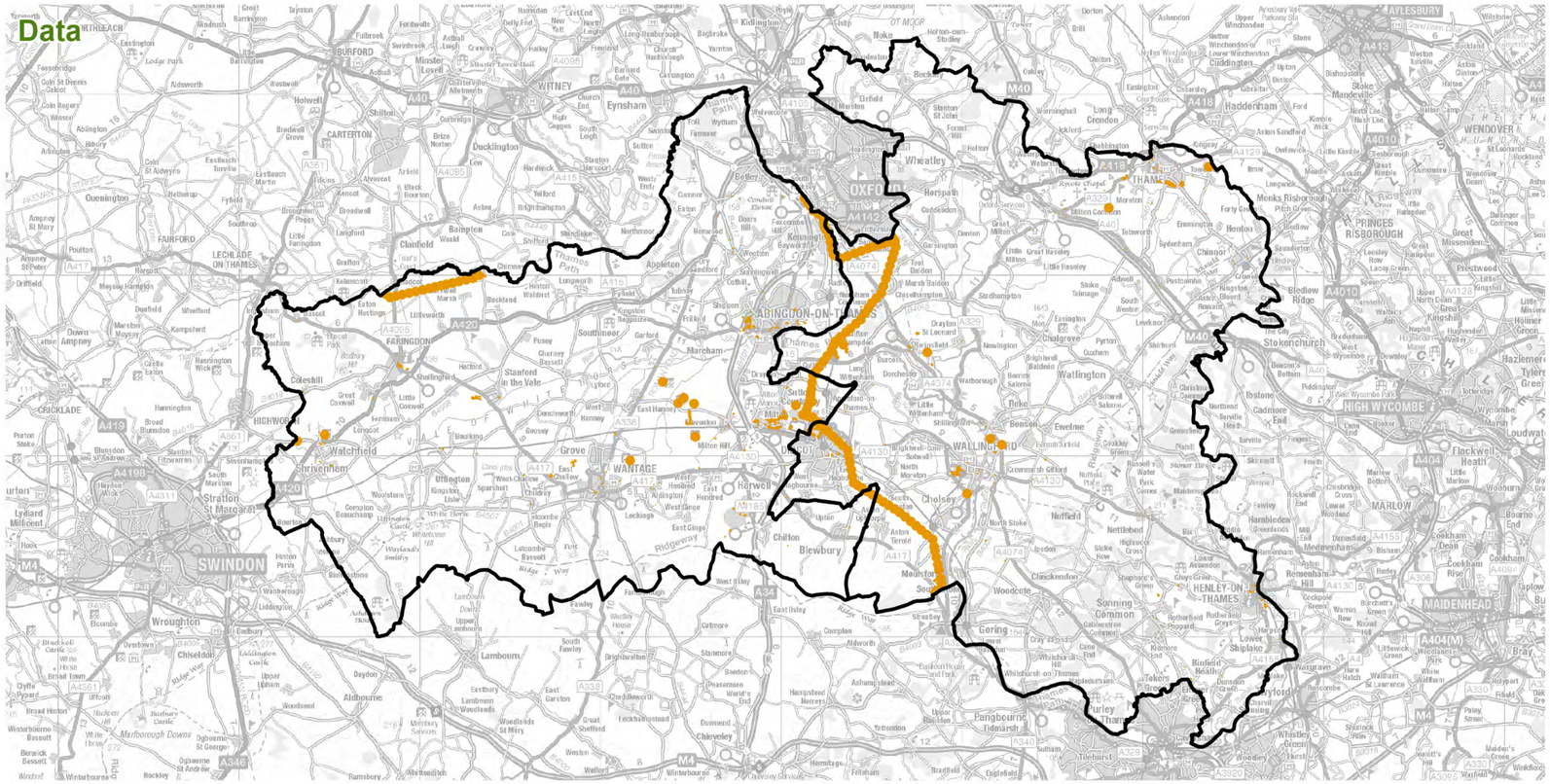
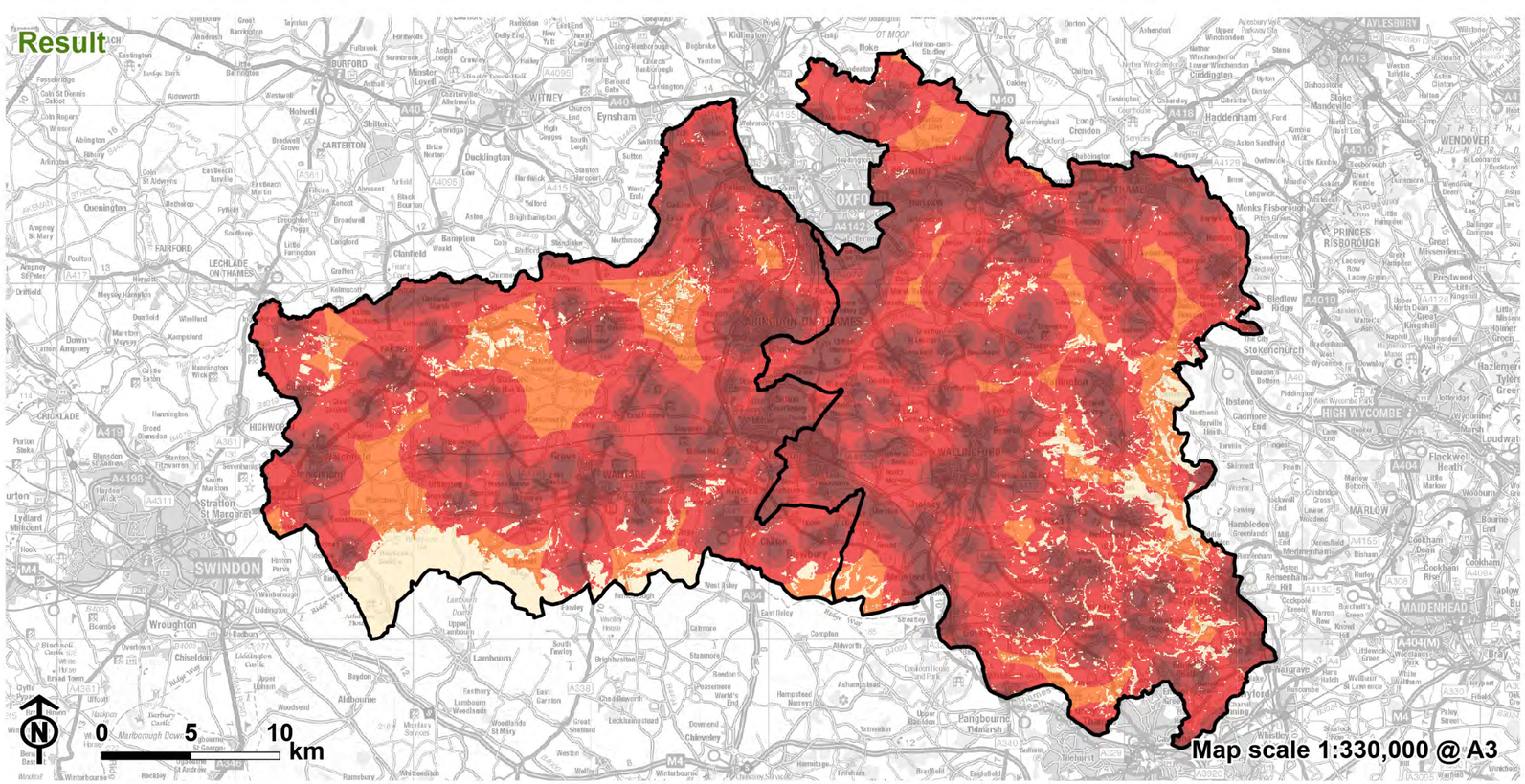
Figure 4.5: N03 Seeing large non-natural infrastructure - all South and Vale data and results





South Oxfordshire and Vale of White Horse

Data

- Anaerobic sewage digestion, battery, biomass, hydro, landfill gas, solar photovoltaics, 400kV pylons, wind turbine
- Industrial building, warehouse

Result

Score N03

- 0 - highest contribution to tranquillity
- 1
- 2
- 3
- 4
- 5 - lowest contribution to tranquillity

12315_Tranquillity_Rural_Negative_N01toN03/Fig_4_5_N03_Rural 22/09/2023
EB:bournazel_j Source: OS, LUC, BEIS, National Grid

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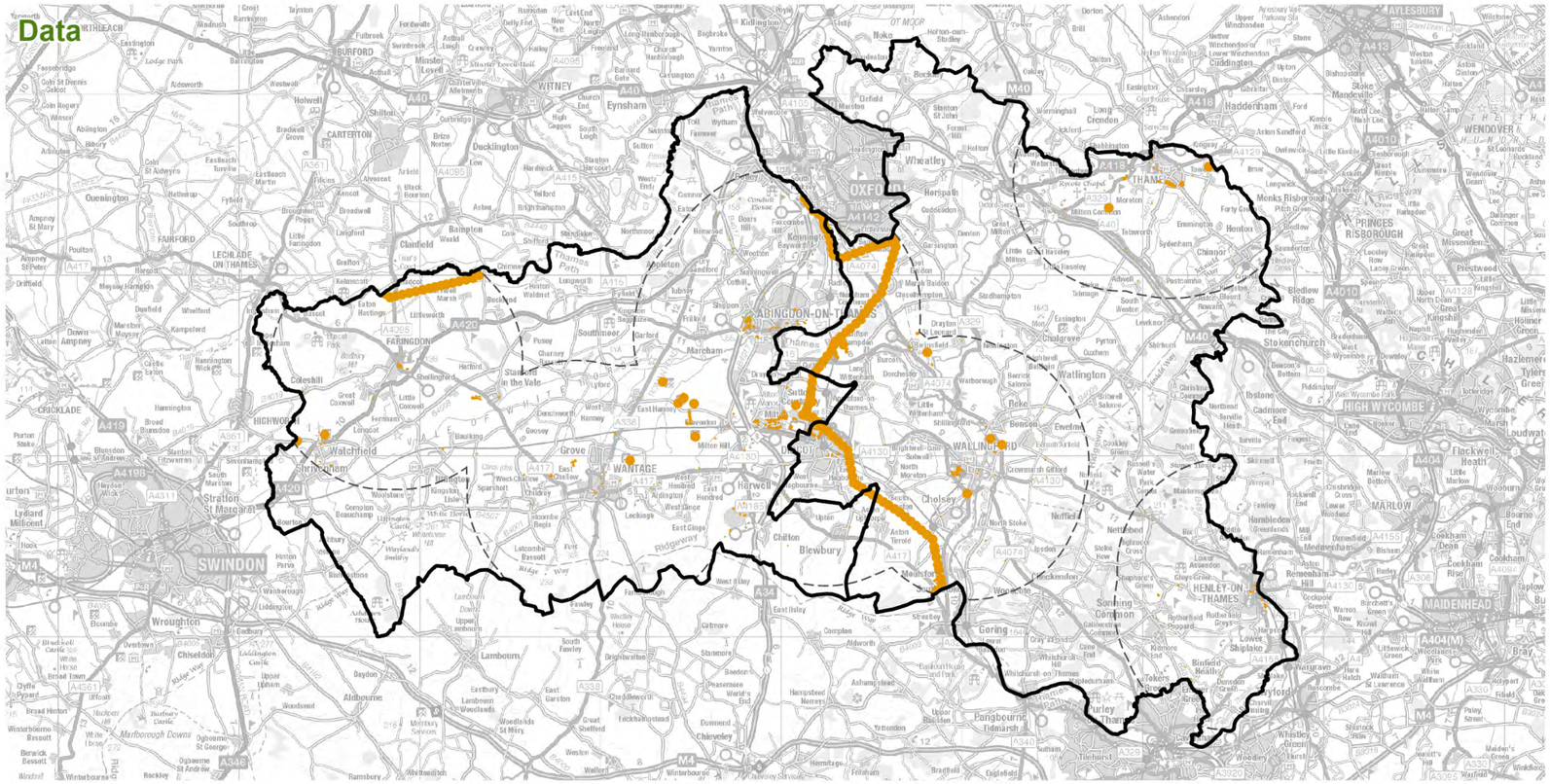
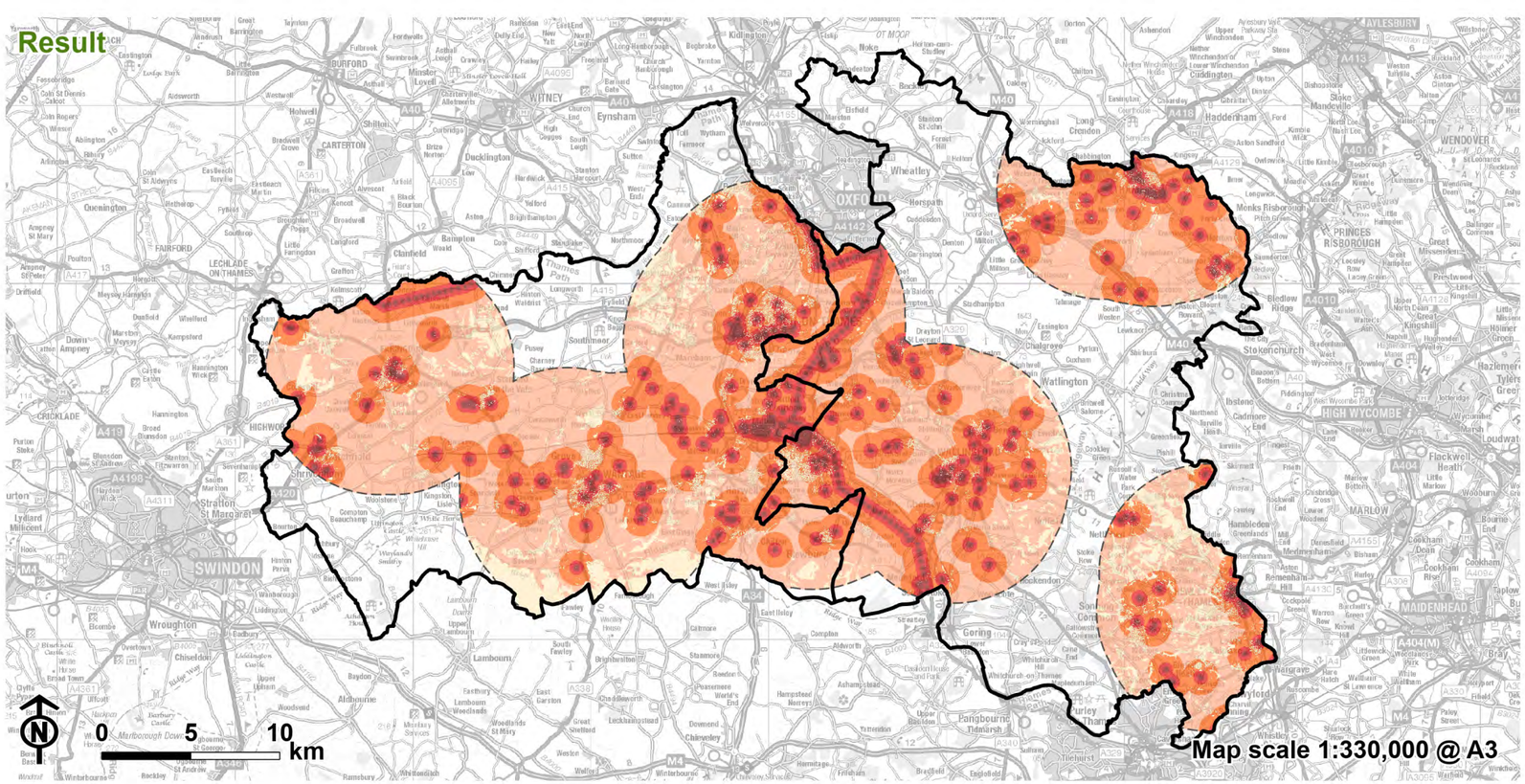
Figure 4.6: N03 Seeing large non-natural infrastructure - Urban data and results





South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Anaerobic sewage digestion, battery, biomass, hydro, landfill gas, solar photovoltaics, 400kV pylons, wind turbine

Industrial building, warehouse

Result

Score N03

0 - highest contribution to tranquillity

1

2

3

4

5 - lowest contribution to tranquillity

12315_Tranquillity_Urban_Negative/Fig_4_6_N03_Urban 21/09/2023
EB:bournazel_j Source: OS, LUC, BEIS, National Grid

Indicator N04 – Seeing major roads

Datasets

4.22 All South and Vale: OS Open Roads (selected categories: single carriageway A-roads and motorway and dual carriageway A-roads).

4.23 Urban: same as All South and Vale analysis.

Method

4.24 All South and Vale: The analysis was performed separately for single carriageway A-roads and dual carriageway/motorways. Points were generated every 100m along the two types of roads. Visibility was calculated from each pixel of the analysis using each set of points. Each road type was buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility. The scored pixels for each road type were combined together to obtain the final 'seeing major roads' results. When pixels overlapped while combining both road types results, the highest score per pixel was kept.

Table 4-8: Scoring N04 All South and Vale

Distance	500m	1km	2km	5km	6km
Motorway and dual carriageway A -roads Score	5	4	3	3	2
Single carriageway A-roads - Score	4	3	2	2	1

4.25 Urban: The same method as All South and Vale was applied, with 100m points along each road type. Buffers were generated and pixels scored as per the table below.

Table 4-9: Scoring N04 Urban

Distance	100m	200m	400m	1km	6km
Motorway and dual carriageway A -roads Score	5	4	3	3	2
Single carriageway A-roads - Score	4	3	2	2	1

Results

4.26 The results of the analysis for All South and Vale are shown in Figure 4.7 and Urban results in Figure 4.8. Visibility of more of the features measured by the indicator means that the tranquillity decreases, so higher scores represent less contribution towards tranquillity and lower scores more contribution towards tranquillity.

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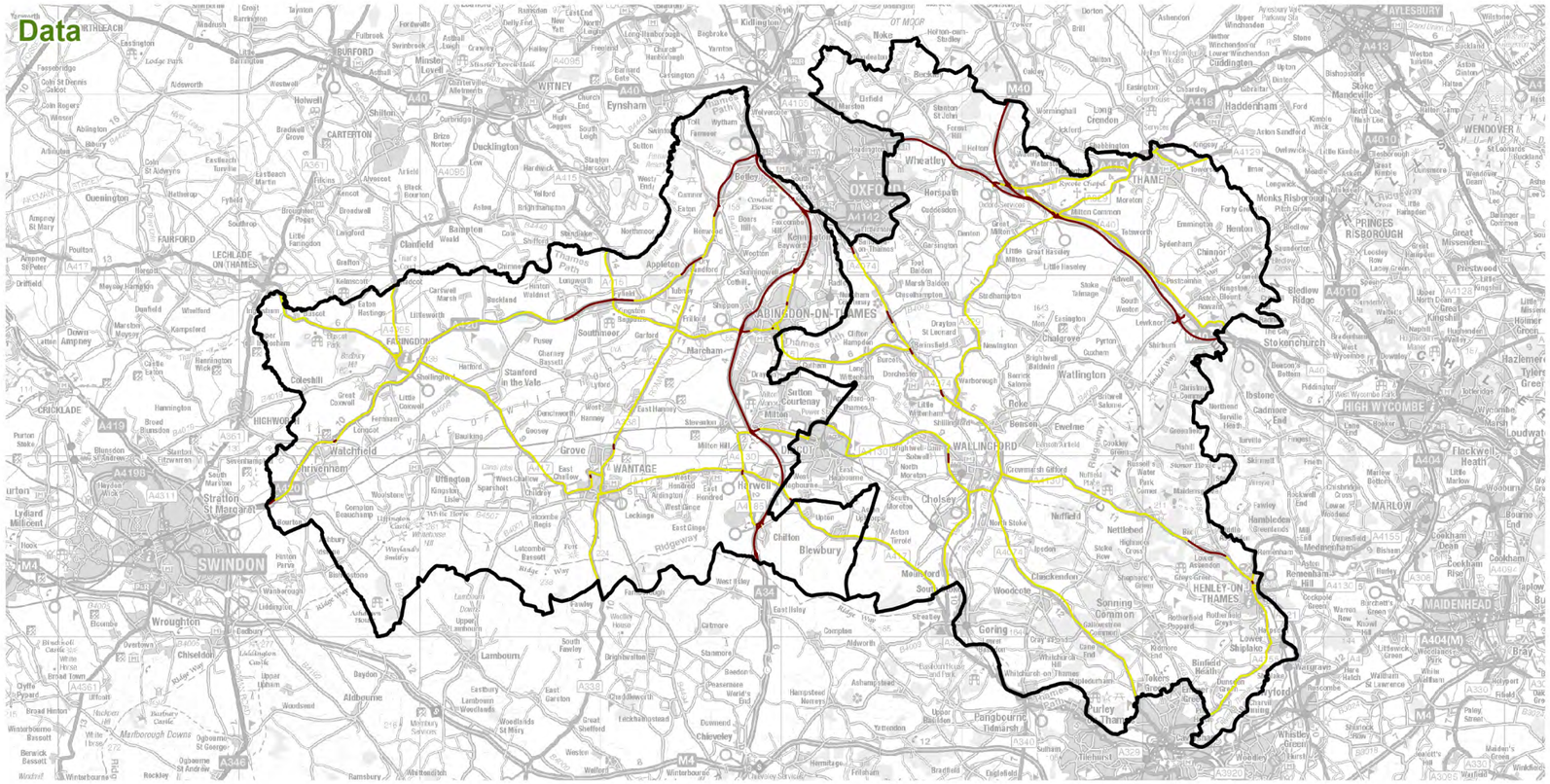
Figure 4.7: N04 Seeing major roads - all South and Vale data and results



South Oxfordshire and Vale of White Horse

Data

- Single carriageway A-road
- Motorway and dual carriageway A-road

Result

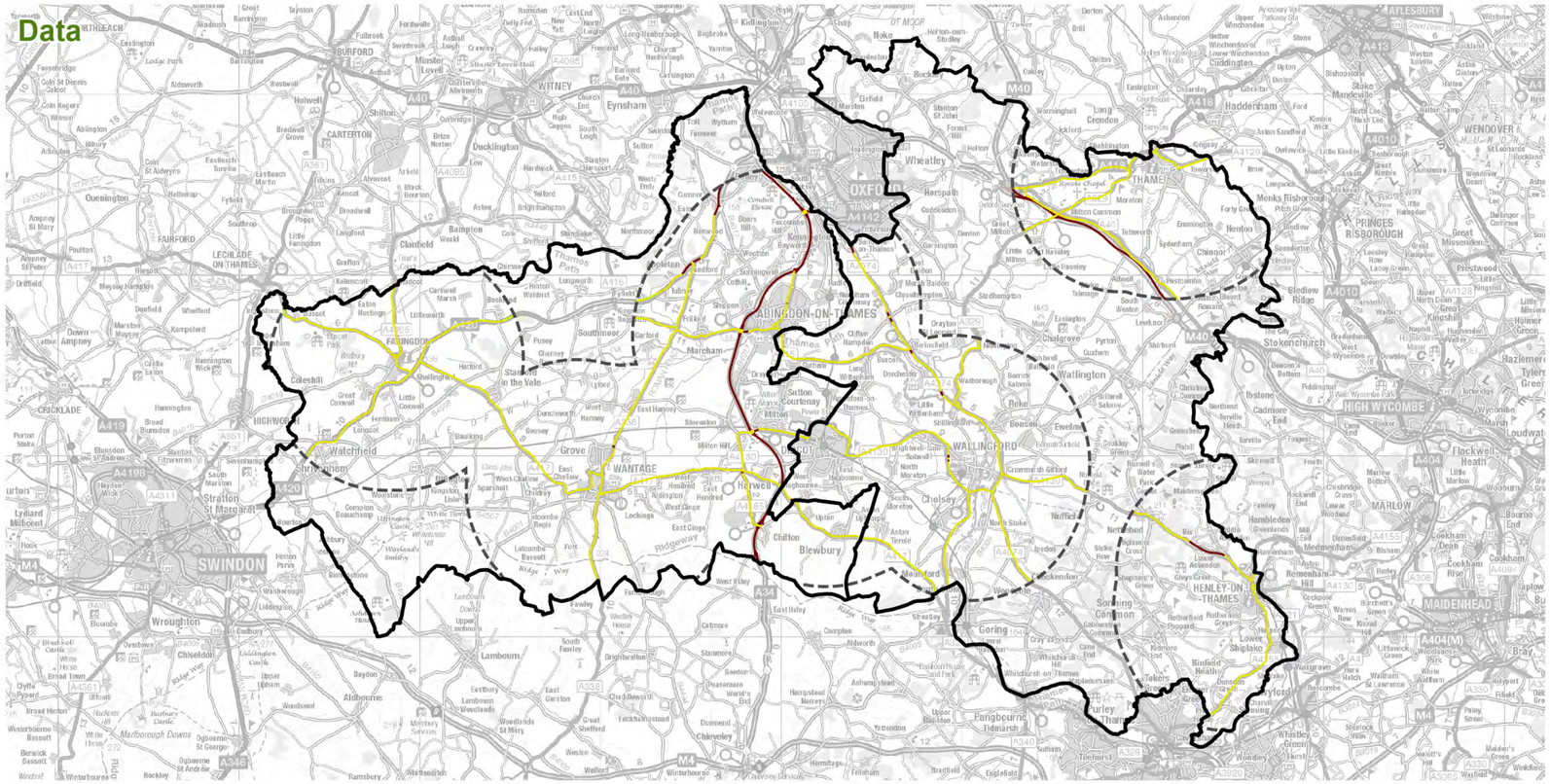
Score N04

- 0 - highest contribution to tranquillity
- 1
- 2
- 3
- 4
- 5 - lowest contribution to tranquillity

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 4.8: N04 Seeing major roads - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Single carriageway A-road

Motorway and dual carriageway A-road

Result

Score N04

0 - highest contribution to tranquillity

1

2

3

4

5 - lowest contribution to tranquillity

Indicator N05 – Hearing major roads

Datasets

4.27 All South and Vale: Defra Strategic Noise Mapping 2017 round 3 (road, day-evening-night noise level, or Lden, that accounts for both day and night average noise).

4.28 Urban: same as All South and Vale analysis.

Method

4.29 All South and Vale: The Defra road noise mapping dataset was re-classified into three categories as per the table below. Highest scores were assigned to the loudest pixels, representing least tranquil areas.

Table 4-10: Scoring N05 All South and Vale

Decibel	>=65	60 – 64.9	55- 59.9	<55
Score	5	4	3	0

4.30 Urban: same as All South and Vale analysis.

4.31 Although the *EEA technical report (2014)* **[See reference 7]** indicates that Lden 50 dB should be the upper limit for relatively quiet areas in urban locations, it was not possible to use this minimum threshold due to the Defra road noise Lden dataset being pre-categorised into noise classes with the lowest one being 55.0-59.9 dB.

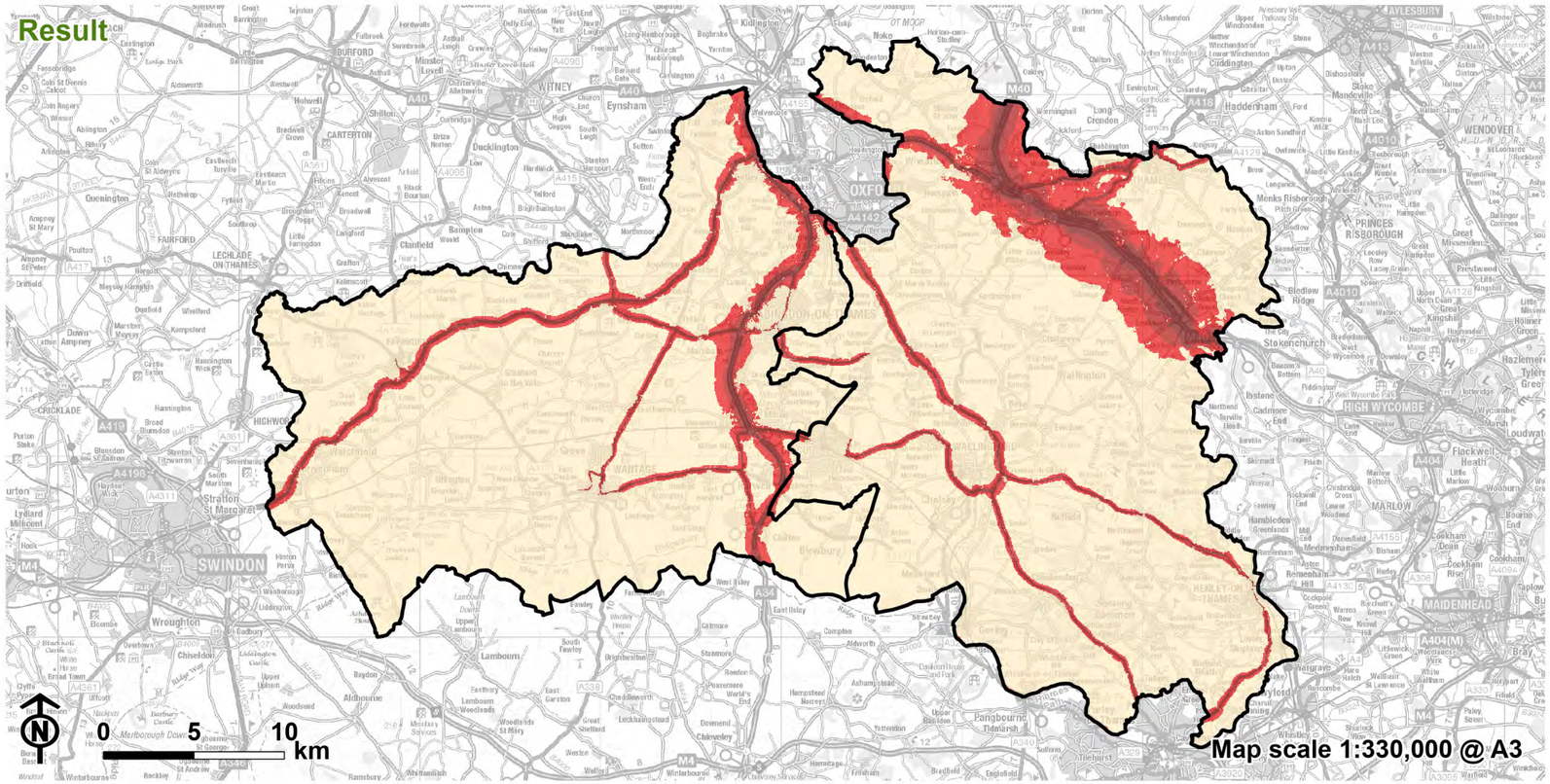
Table 4-11: Scoring N05 Urban

Decibel	>=65	60 – 64.9	55- 59.9	<55
Score	5	4	3	0

Results

4.32 The results of the analysis for All South and Vale are shown in Figure 4.9 and Urban results in Figure 4.10. The higher the decibel value, the more it detracts from tranquillity, so higher scores represent less contribution towards tranquillity and lower scores more contribution towards tranquillity.

Figure 4.9: N05 Hearing major roads -all South and Vale data and results



South Oxfordshire and Vale of White Horse

Data

Defra strategic noise mapping 2017 - road

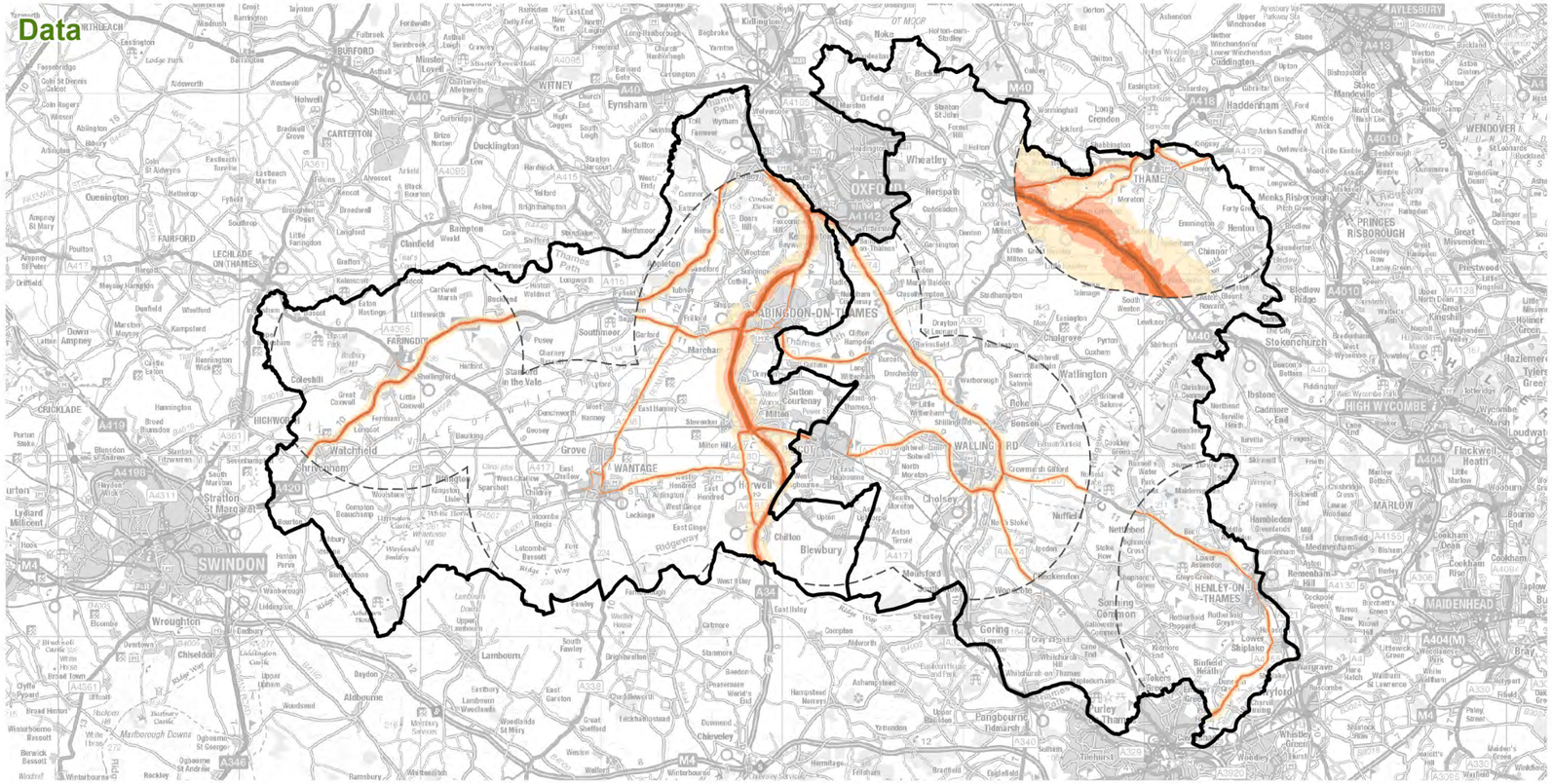
- 55.0-59.9
- 60.0-64.9
- 65.0-69.9
- 70.0-74.9
- >=75.0

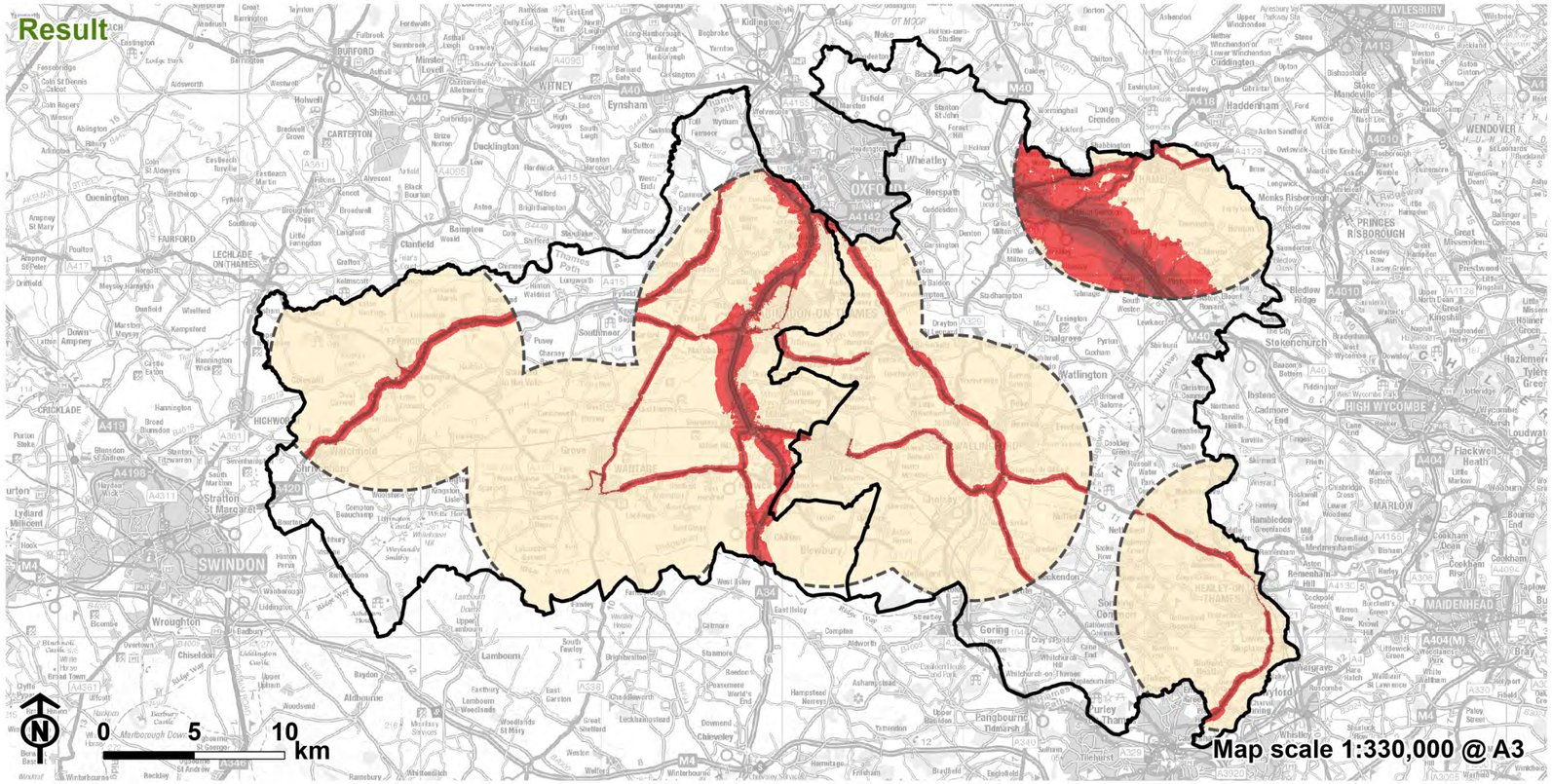
Result

Score N05

- 0 - highest contribution to tranquillity
- 3
- 4
- 5 - lowest contribution to tranquillity

Figure 4.10: N05 Hearing major roads - Urban data and results





South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Defra strategic noise mapping 2017 - road

- 55.0-59.9
- 60.0-64.9
- 65.0-69.9
- 70.0-74.9
- >=75.0

Result

Score N05

- 0 - highest contribution to tranquillity
- 3
- 4
- 5 - lowest contribution to tranquillity

Indicator N06 – Seeing minor roads

4.33 Stakeholder feedback on this indicator following the pilot mapping highlighted that it would potentially account for quiet rural lanes which may not negatively affect tranquillity. Consideration was given to omitting the indicator. After further discussions, this indicator was kept in the analysis and no edits were made to the way it is mapped for the final assessment because the assumption is that regardless of how minor a road is, it would always be preferable not to see a road in terms of tranquillity.

Datasets

4.34 All South and Vale: OS Open Roads (selected categories: B-roads and classified un-numbered).

4.35 Urban: same as All South and Vale analysis.

Method

4.36 All South and Vale: Points were generated every 100m along the selected roads and visibility was calculated from each pixel of the analysis. The minor roads were buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility.

Table 4-12: Scoring N06 All South and Vale

Distance	500m	1km	2km	5km	6km
Score	3	2	1	1	0

4.37 Urban: The same method as All South and Vale was applied, with 100m points along minor roads. Buffers were generated and pixels scored as per the table below.

Table 4-13: Scoring N06 Urban

Distance	100m	200m	400m	1km	6km
Score	3	2	1	1	0

Results

4.38 The results of the analysis for All South and Vale are shown in Figure 4.11 and Urban results in Figure 4.12. Visibility of more of the features measured by the indicator means that the tranquillity decreases, so higher scores represent less contribution towards tranquillity and lower scores more contribution towards tranquillity.

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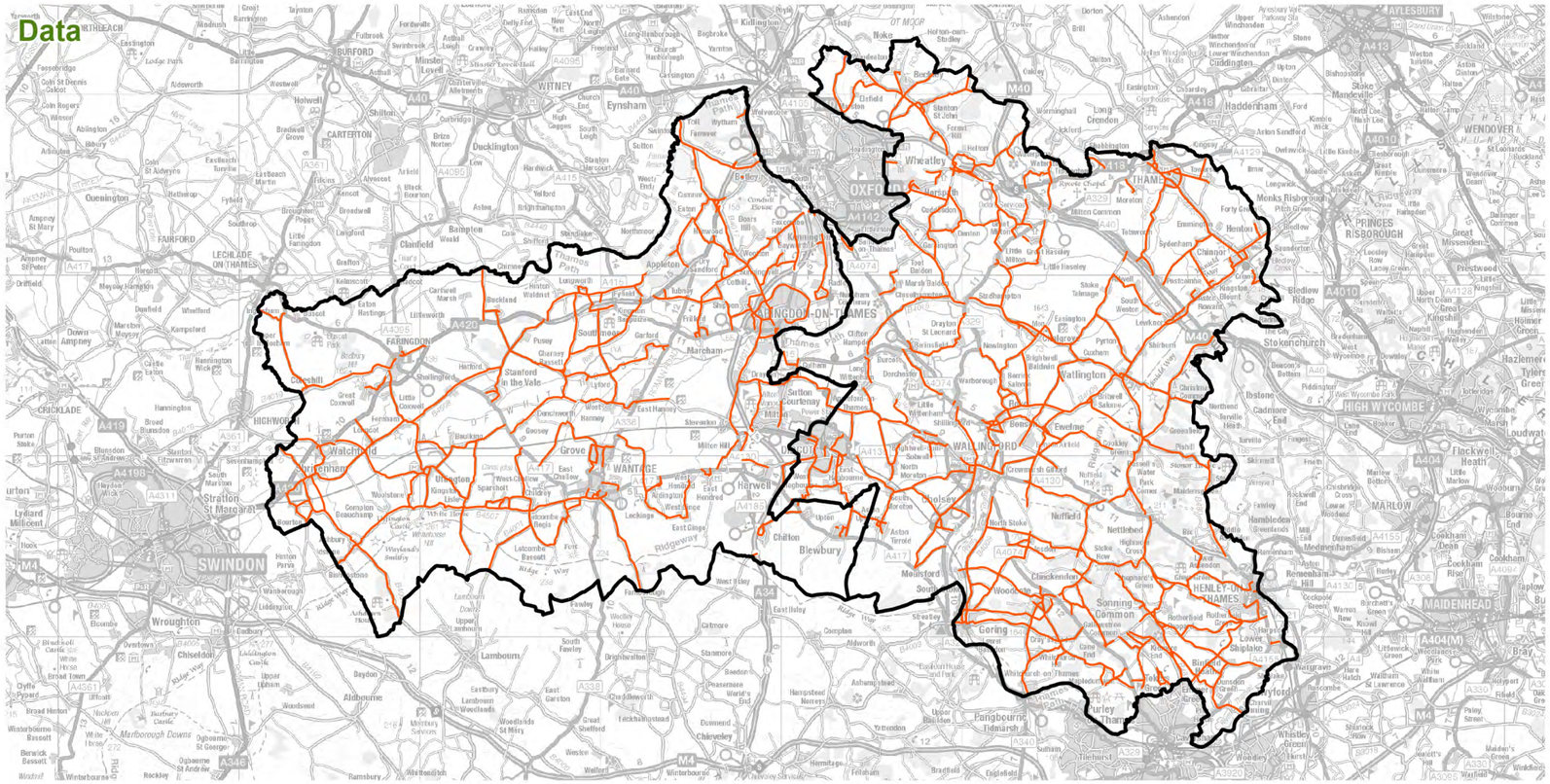
Figure 4.11: N06 Seeing minor roads - all South and Vale data and results



South Oxfordshire and Vale of White Horse

Data

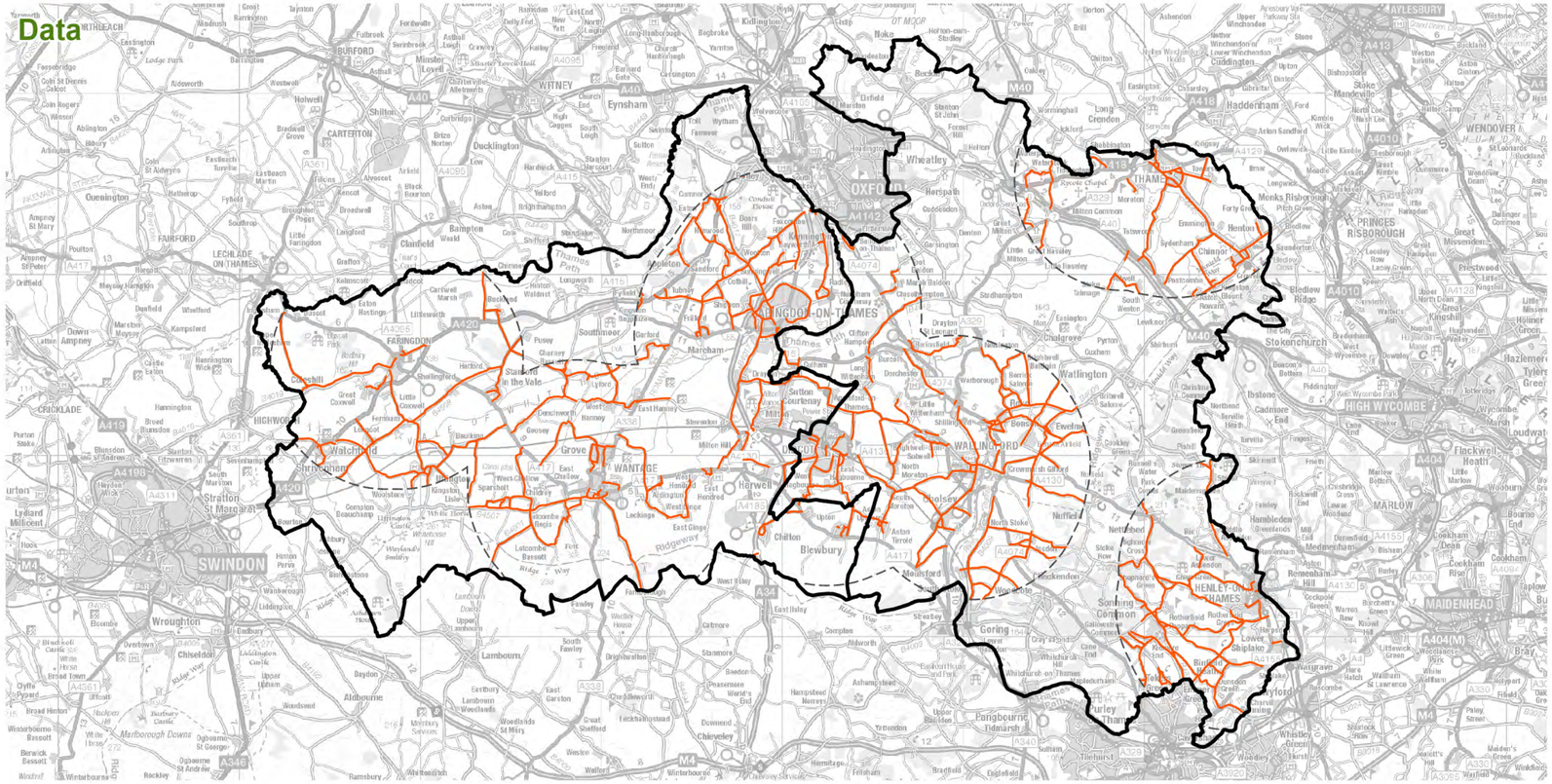
Minor road

Result

Score N06

- 0 - highest contribution to tranquillity
- 1
- 2
- 3 - lowest contribution to tranquillity

Figure 4.12: N06 Seeing minor roads - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Minor road

Result

Score N06

0 - highest contribution to tranquillity

1

2

3 - lowest contribution to tranquillity

Indicator N07 – Hearing minor roads

Datasets

4.39 Minor roads are not mapped as part of the Defra noise mapping therefore a more simplistic approach was required to map this indicator.

4.40 All South and Vale: OS Open Roads (selected categories: B-roads and classified un-numbered).

4.41 Urban: same as All South and Vale analysis.

Method

4.42 All South and Vale: The minor roads were buffered as per the table below, and pixels were scored based on their distance from the feature. The highest scores were assigned to pixels that are very close to minor roads, representing a greater detraction from tranquillity due to the sound being louder.

Table 4-14: Scoring N07 All South and Vale

Distance	50m	100m	150m	6km
Score	3	2	1	0

4.43 Urban: The same method as All South and Vale was applied. Buffers were generated and pixels scored as per the table below.

Table 4-15: Scoring N07 Urban

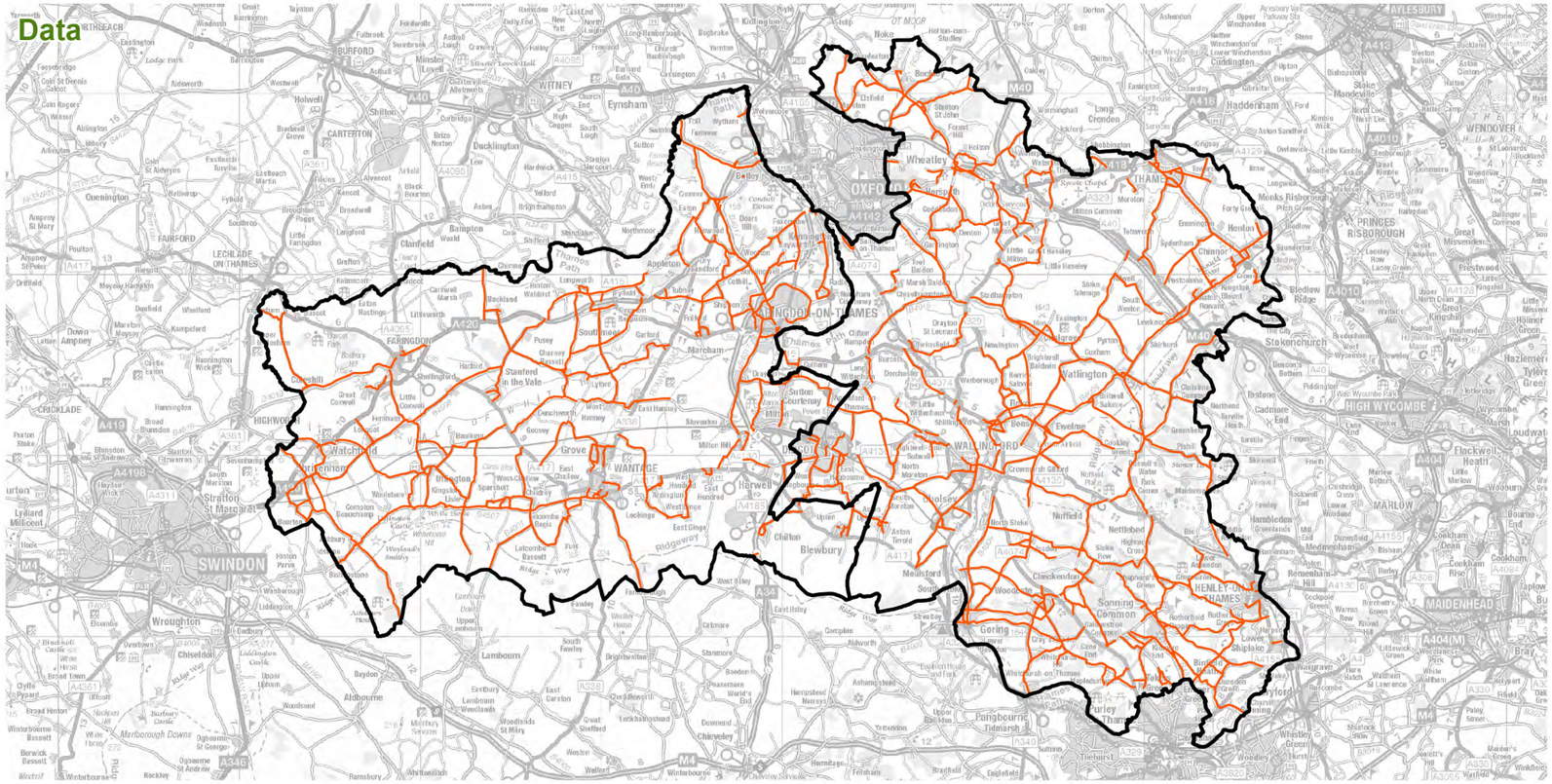
Distance	10m	30m	50m	6km
Score	3	2	1	0

Results

4.44 The results of the analysis for All South and Vale are shown in Figure 4.13 and Urban results in Figure 4.14. The closer to the source, the more it detracts from tranquillity, so higher scores represent less contribution towards tranquillity and lower scores more contribution towards tranquillity.

LUC

Figure 4.13: N07 Hearing minor roads - all South and Vale data and results



South Oxfordshire and Vale of White Horse

Data

Minor road

Result

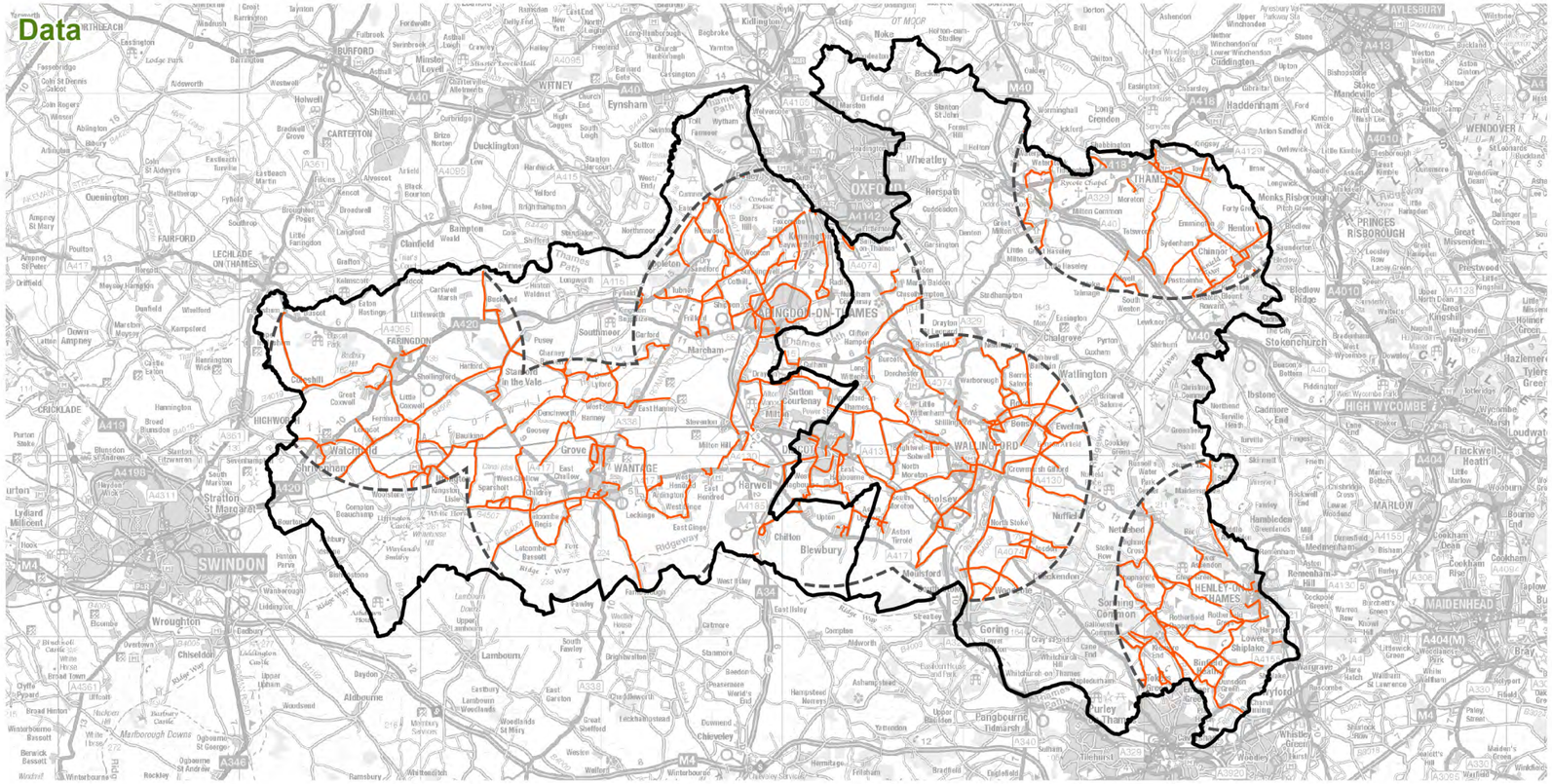
Score N07

- 0 - highest contribution to tranquillity
- 1
- 2
- 3 - lowest contribution to tranquillity

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 4.14: N07 Hearing minor roads - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Minor road

Result

Score N07

0 - highest contribution to tranquillity

1

2

3 - lowest contribution to tranquillity

Indicator N08 – Seeing railways

Datasets

4.45 All South and Vale: Railways extracted from OS Mastermap

4.46 Urban: same as All South and Vale analysis.

Method

4.47 All South and Vale: The analysis was performed separately for the electrified tracks which cross the study area from East to West and the track with no electrification (North-South). Points were generated every 100m along the two different railway tracks and visibility was calculated from each pixel of the analysis using each set of points. Based on stakeholder feedback, the height for electrified tracks was set to 8.25m and the default height of 3m was used for non-electrified tracks as per the CPRE methodology. Each track was buffered as per the table below, and the buffers were then combined with the results of the visibility analysis. Pixels were scored based on their distance from the feature and their visibility. The scored pixels for each track type were combined together to obtain the final 'Seeing railways' results. When pixels overlapped while combining both electrified and non-electrified tracks results, the highest score per pixel was kept.

Table 4-16: Scoring N08 All South and Vale

Distance	500m	1km	2km	5km	6km
Score	5	3	2	2	1

4.48 Urban: The same method as All South and Vale was applied, with 100m points along railway tracks. Buffers were generated and pixels scored as per the table below.

Table 4-17: Scoring N08 Urban

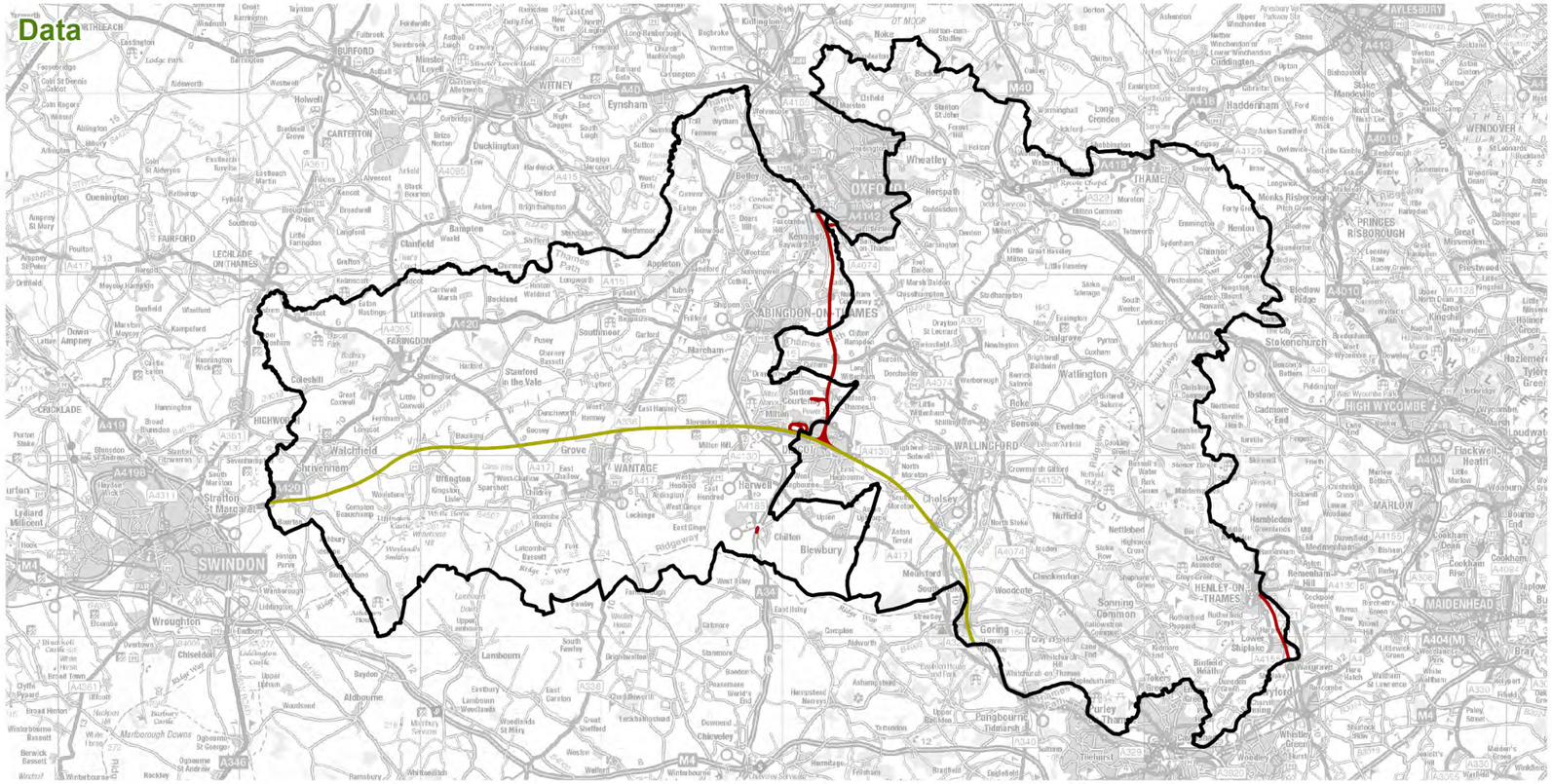
Distance	100m	200m	400m	1km	6km
Score	5	3	2	2	1

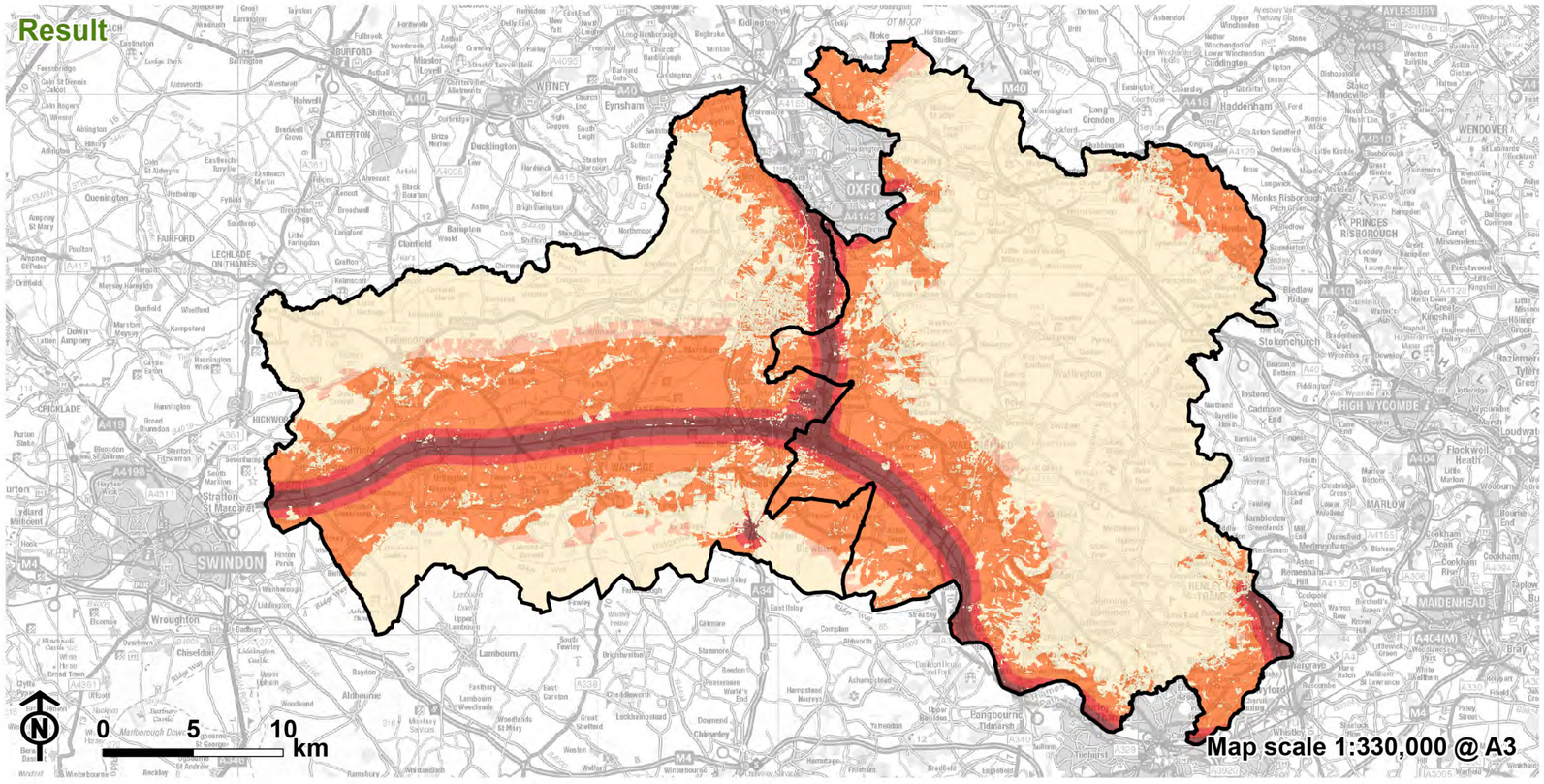
Results

4.49 The results of the analysis for All South and Vale are shown in Figure 4.15 and Urban results in Figure 4.16. Visibility of more of the features measured by the indicator means that the tranquillity decreases, so higher scores represent less contribution towards tranquillity and lower scores more contribution towards tranquillity.

LUC

Figure 4.15: N08 Seeing railways - all South and Vale data and results





South Oxfordshire and Vale of White Horse

Data

Major railway - electrified

Major railway - non electrified

Result

Score N08

0 - highest contribution to tranquillity

1

2

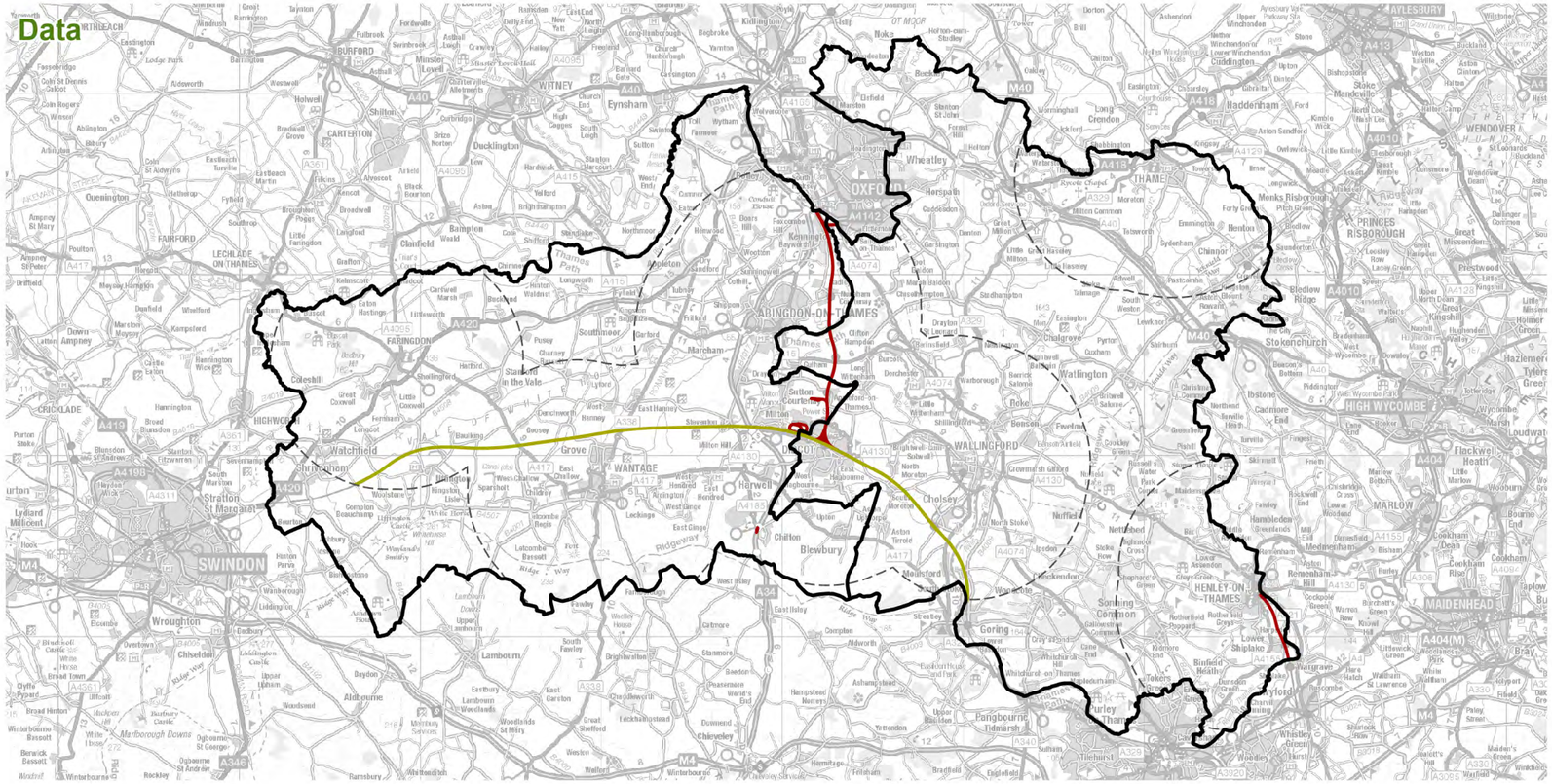
3

5 - lowest contribution to tranquillity

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 4.16: N08 Seeing railways - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Major railway - electrified

Major railway - non electrified

Result

Score N08

0 - highest contribution to tranquillity

1

2

3

4

5 - lowest contribution to tranquillity

Indicator N09 – Hearing major railways

Datasets

4.50 All South and Vale: Defra Strategic Noise Mapping 2017 round 3 (railway, Lden that accounts for both day and night average noise).

4.51 Urban: same as All South and Vale analysis.

Method

4.52 All South and Vale: The Defra railway noise mapping dataset was re-classified into four categories as per the table below. Highest scores were assigned to the loudest pixels, representing least tranquil areas.

Table 4-18: Scoring N09 All South and Vale

Decibel	>=65	60 – 64.9	55- 59.9	<55
Score	5	4	3	0

4.53 Urban: same as All South and Vale analysis. Although the EEA technical report (2014) **[See reference 7]** indicates that Lden 50 dB should be the upper limit for relatively quiet areas in urban locations, it was not possible to use this minimum threshold due to the Defra railway noise Lden dataset being pre-categorised into noise classes with the lowest one being 55.0-59.9 dB.

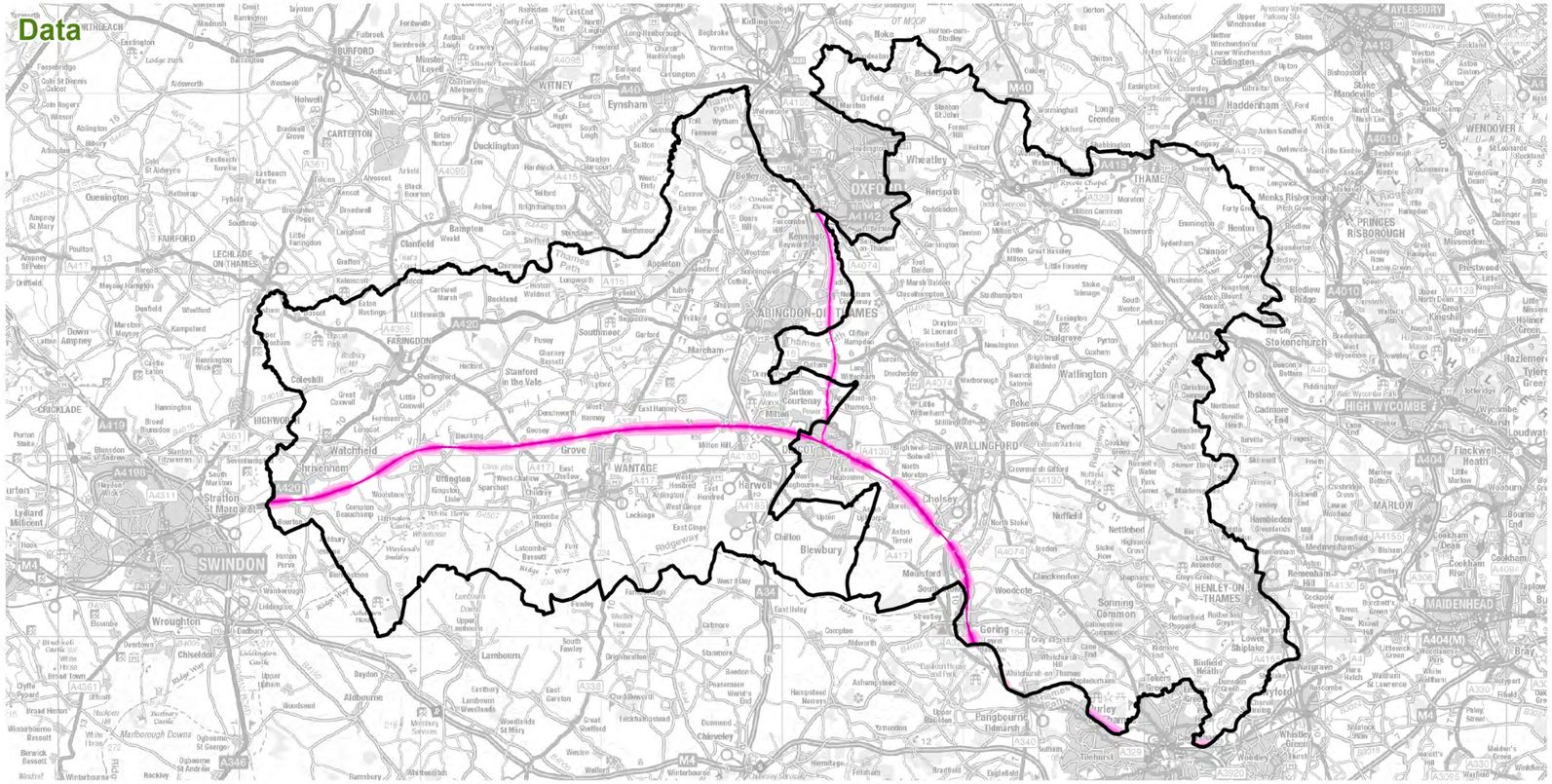
Table 4-19: Scoring N09 Urban

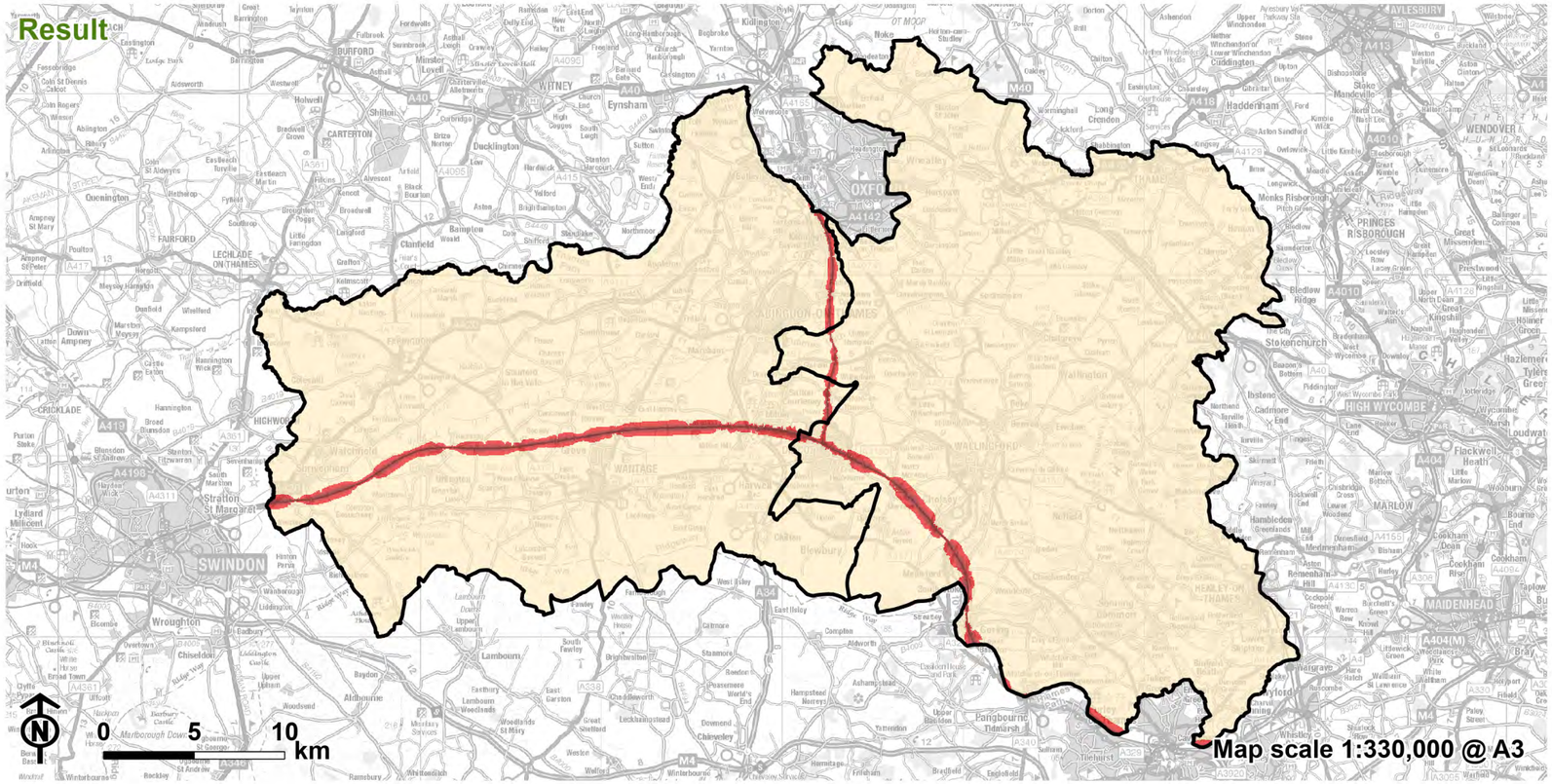
Decibel	>=65	60 – 64.9	55- 59.9	<55
Score	5	4	3	0

Results

4.54 The results of the analysis for All South and Vale are shown in Figure 4.17 and Urban results in Figure 4.18. The higher the decibels, the more it detracts from tranquillity, so higher scores represent less contribution towards tranquillity and lower scores more contribution towards tranquillity.

Figure 4.17: N09 Hearing major railways - all South and Vale data and results





South Oxfordshire and Vale of White Horse

Data

Defra strategic noise mapping 2017 - railway

Noise class (dB)

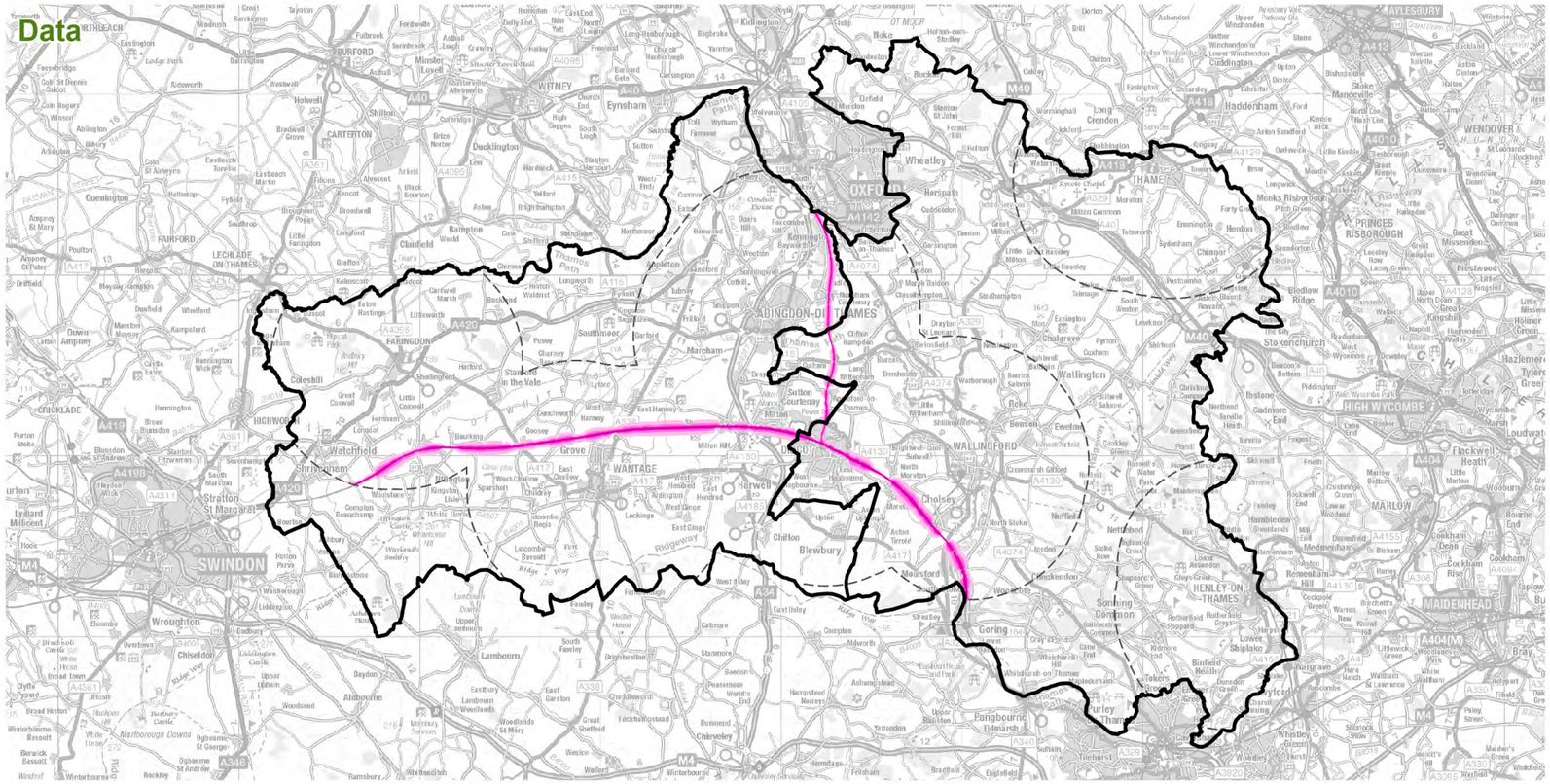
- 55.0-59.9
- 60.0-64.9
- 65.0-69.9
- 70.0-74.9
- >=75.0

Result

Score N09

- 0 - highest contribution to tranquillity
- 3
- 4
- 5 - lowest tranquillity

Figure 4.18: N09 Hearing major railways - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Defra strategic noise mapping 2017 - railway

Noise class (dB)

- 55.0-59.9
- 60.0-64.9
- 65.0-69.9
- 70.0-74.9
- >=75.0

Result

Score N09

- 0 - highest contribution to tranquillity
- 3
- 4
- 5 - lowest tranquillity

Indicator N10 – Seeing and/or hearing low flying airplanes

4.55 This indicator includes both seeing and hearing low flying airplanes as it was considered that airplanes would be seen during arrival/departure when they can also be heard the most.

4.56 Stakeholder feedback indicated that whilst there are no large commercial airports in either district, there are some airfields, specifically RAF Benson which is active. Stakeholders suggested the inclusion of the flight paths of RAF Brize Norton which passes over Vale of White Horse as well as Heathrow flight paths which pass over parts of the Chilterns National Landscape. Stakeholders suggested including data on helicopters because these cause the most disturbance in the area, however this data was not available at the time of the analysis.

4.57 Chalgrove Airfield is used by a company to test ejector seats and Abingdon Airfield is used for occasional training by the RAF, and due to their infrequent use, were removed from the analysis following stakeholder feedback.

Datasets

4.58 All South and Vale: RAF Benson airfield was extracted from the Landscape Character Area (LCA) 2017 datasets, and was then digitised using OS Mastermap and aerial imagery to move the boundaries to only include the airfield.

4.59 No data in GIS format could be found showing Heathrow and RAF Brize Norton flightpaths. A workaround was to digitise the arrival flight paths using the flight paths overview for Heathrow airport. Only arrival flight paths over the

south east of South Oxfordshire were digitised as it appeared that the departure paths did not intersect with the study area. Main flightpath data for RAF Brize Norton was digitised from maps hosted by the RAF.

4.60 Urban: same as All South and Vale analysis.

Method

4.61 All South and Vale: An in depth literature review was carried out as part of the Wales Tranquillity project in order to process hearing low flying aircraft data. This research findings were directly applied to assess 'seeing and/or hearing low flying aircraft' in South Oxfordshire and Vale of White Horse Districts. This previous project found that the average distance of the outermost buffer from the runaway was calculated as 1km. Therefore a 1km buffer was used as the extent of sound impacts of RAF Benson airfield, and Heathrow and RAF Brize Norton flight paths, and highest scores were assigned to the pixels within this 1km buffer, representing the greatest detraction from tranquillity as per the table below.

Table 4-20: Scoring N10

Distance	1km	>1km
Score	5	0

4.62 Urban: For this indicator, the scores were applied in the same way for both rural and urban analysis, as per the table above.

Results

4.63 The results of the analysis for All South and Vale are shown in Figure 4.19 and Urban results in Figure 4.20. The closer the source, the louder the sound is

anticipated to be and the more it is expected to detract from tranquillity. Therefore higher scores represent less contribution towards tranquillity and lower scores more contribution towards tranquillity.

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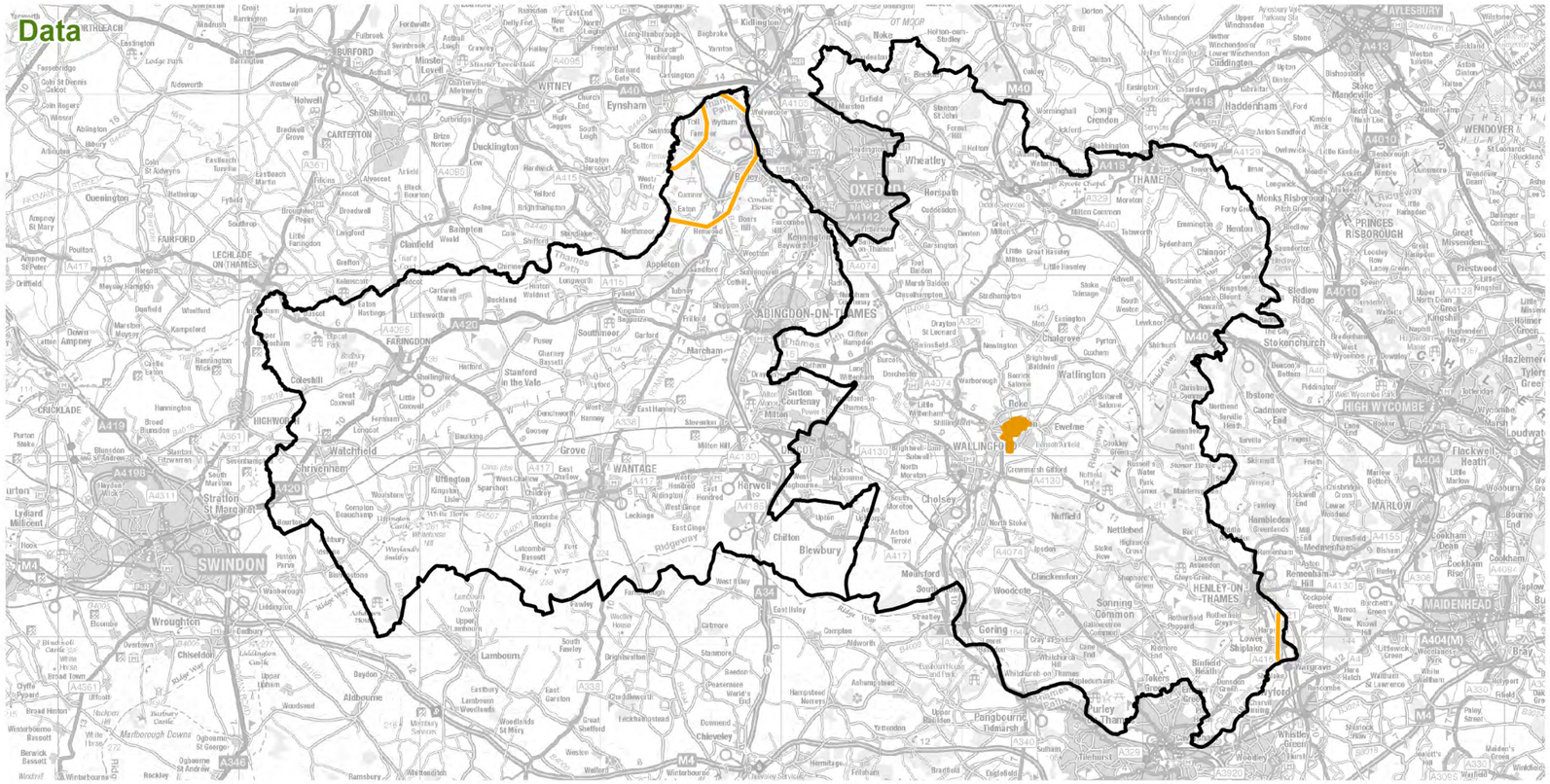
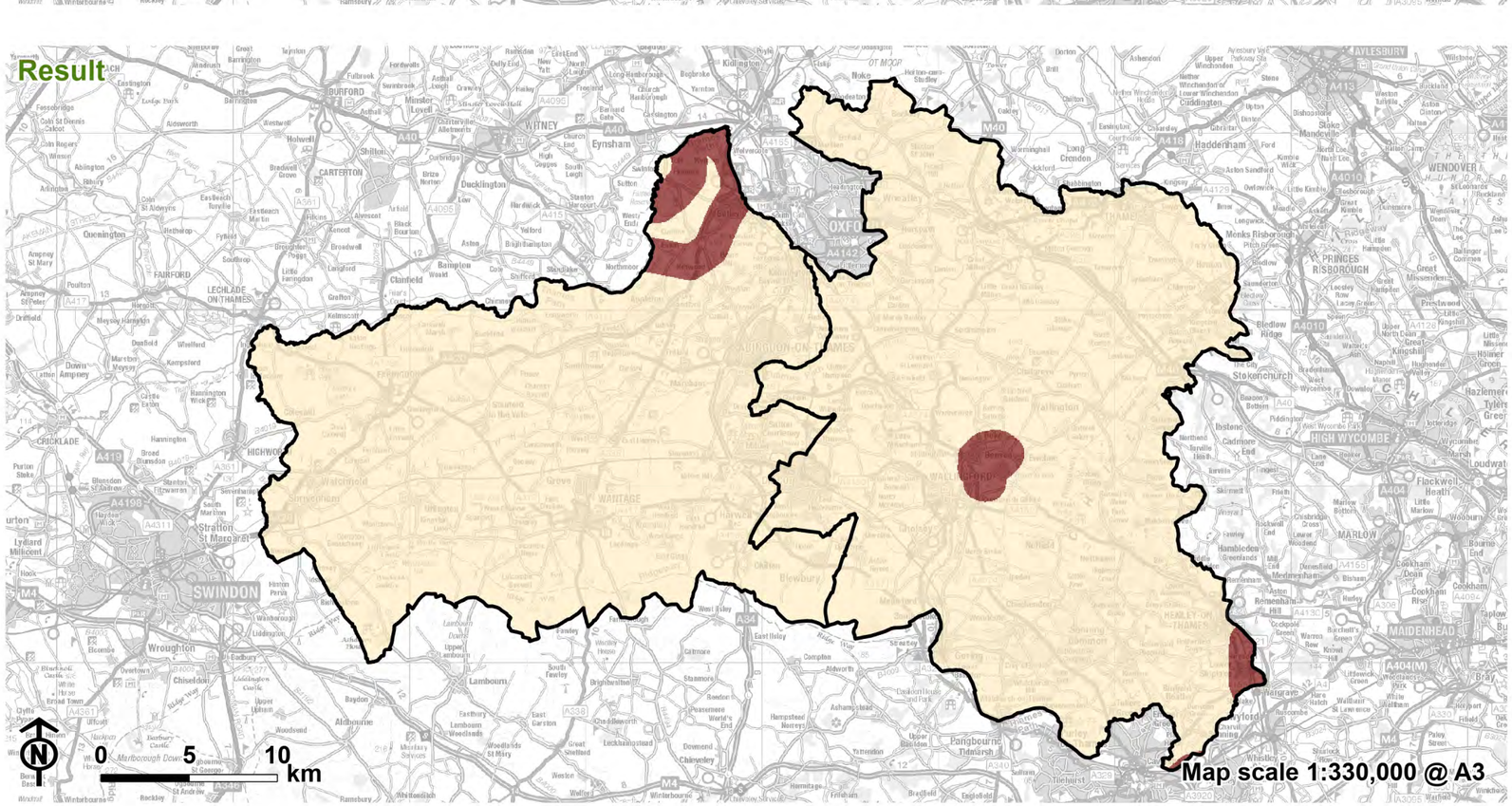
Figure 4.19: N10 Seeing and/or hearing low flying airplanes - all South and Vale data and results





South Oxfordshire and Vale of White Horse

Data

Flight path
Airfield

Result

Score N10

0 - highest contribution to tranquillity
5 - lowest contribution to tranquillity

12315_Tranquillity_Rural_Negative_N10toN11/Fig_4_19_N10_Rural 22/09/2023
EB:bournazel_j Source: OS, LUC, RAF, Heathrow, South and Vale Councils

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

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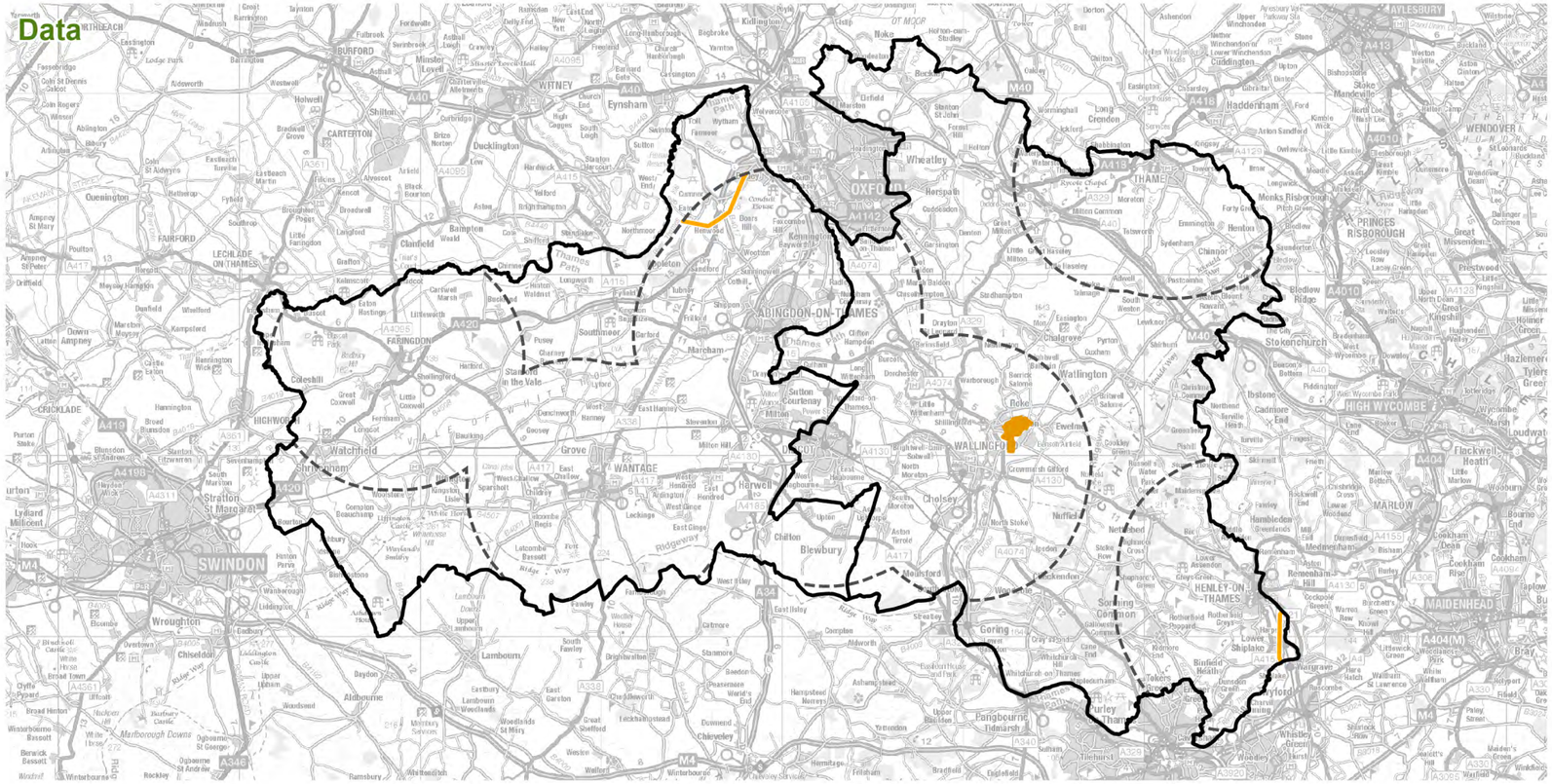
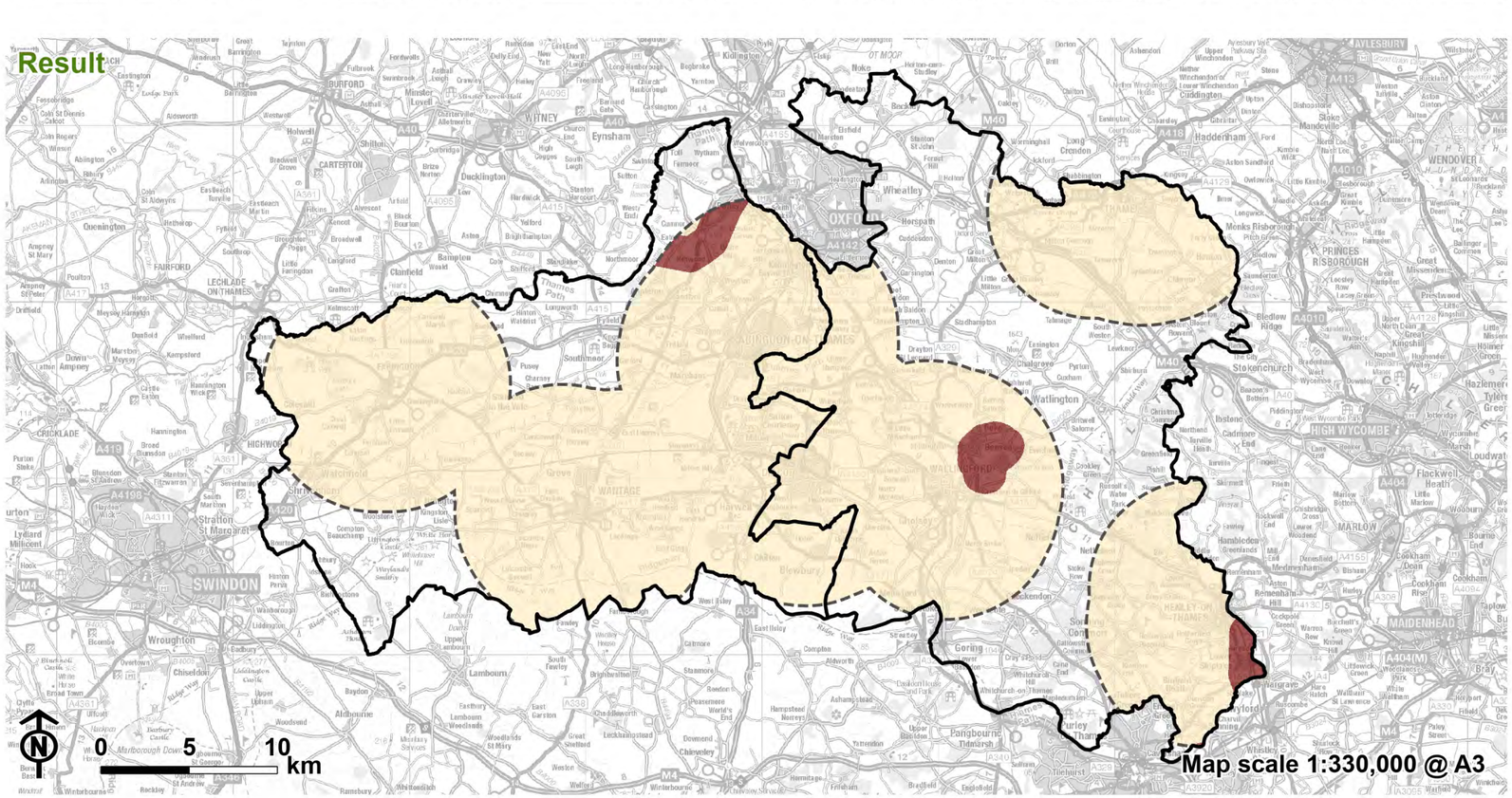
Figure 4.20: N10 Seeing and/or hearing low flying airplanes - Urban data and results





South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Flight path

Airfield

Result

Score N10

0 - highest contribution to tranquillity

5 - lowest contribution to tranquillity

12315_Tranquillity_Urban_Negative_N10toN11/Fig_4_20_N10_Urban 22/09/2023
EB:bournazel_j Source: OS, LUC, RAF, Heathrow, South and Vale Councils

Indicator N11 – Hearing non-natural sounds

4.64 This indicator has used data where it was available, solely focussing on static non-natural sounds.

4.65 Initially MOD land data was considered for this indicator, however following stakeholder feedback it appeared that MOD data would be better suited to indicator N10, so this data was not included in this indicator to avoid double counting.

4.66 Quarries were also explored as part of this indicator, but following stakeholder feedback, quarries were not considered to be a detractor from tranquillity (see Appendix A for full stakeholder feedback).

Datasets

4.67 All South and Vale: BEIS Renewables Energy Planning Database (selected category: wind onshore); extracted 'Strategic employment sites' and 'Employment allocations' from the South Oxfordshire Local Plan 2031 and Vale of White Horse Local Plan 2035

4.68 Urban: same as All South and Vale analysis.

Method

4.69 All South and Vale: Sound measurements for the above datasets were quite different and so the analysis was separated into two parts, then combined as a final step.

4.70 For wind turbines, the scores were applied to each pixel as per the table below, based on a sound measurement of 45dB at 300m. This sound measurement was provided by LUC's renewable energy experts as part of the Tranquillity and Place Sound Environment project **[See reference 2]** as the maximum acceptable level that wind turbines will produce at this distance. All pixels more than 1,700 metres from a turbine were given a score of 0 (no detracting sound from turbines).

Table 4-21: Scoring wind turbines for N11 – All South and Vale

Distance	300m	600m	1200m	1700m	6km
Decibel	>45	45-39	39-33	33-30	<30
Score	5	4	3	2	0

4.71 For the sounds coming from industry sites, the scores were based on sound measurements of 89 dB at source. Scores were applied as below.

Table 4-22: Scoring sounds from industry for N11 – All South and Vale

Distance	30m	60m	120m	250m	320m
Decibel	80-50	50-44	44-38	38-32	32-30
Score	5	4	3	2	1

4.72 Turbines and other sounds scores were combined with the highest score taking precedence when overlaps were present for each pixel of the analysis.

4.73 Urban: The same method as All South and Vale was applied but using the scores and distances as below.

Table 4-23: Scoring wind turbines for N11 - Urban

Distance	300m	530m	6km
Decibel	>45	45-40	<40
Score	4	3	0

Table 4-24: Scoring sounds from industry for N11 - Urban

Distance	15m	30m	60m
Decibel	80-56	56-50	50-44
Score	5	4	3

Results

4.74 The results of the analysis for All South and Vale are shown in Figure 4.21 and Urban results in Figure 4.22. The louder the sound the more it is expected to detract from tranquillity, so higher scores represent less contribution towards tranquillity and lower scores more contribution towards tranquillity.

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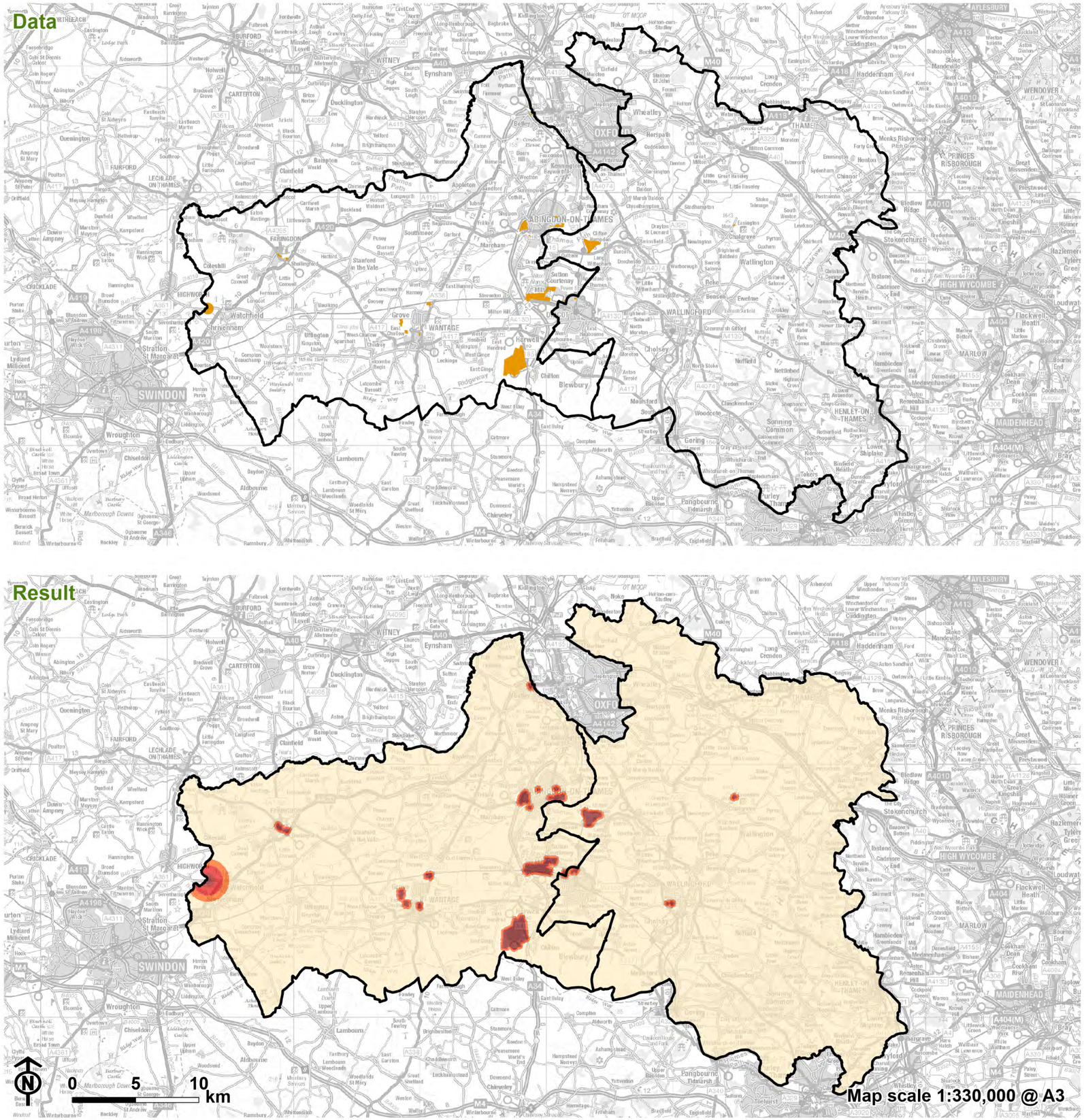
Figure 4.21: N11 Hearing non-natural sounds - all South and Vale data and results



South Oxfordshire and Vale of White Horse

Data

- Turbine
- Employment area and industrial site

Result

Score N11

- 0 - highest contribution to tranquillity
- 2
- 3
- 4
- 5 - lowest contribution to tranquillity

12315_Tranquillity_Rural_Negative_N10toN11/Fig_4_21_N11_Rrual 22/09/2023
EB:bournazel_j Source: OS, LUC, BEIS, South and Vale Councils

Tranquillity Assessment
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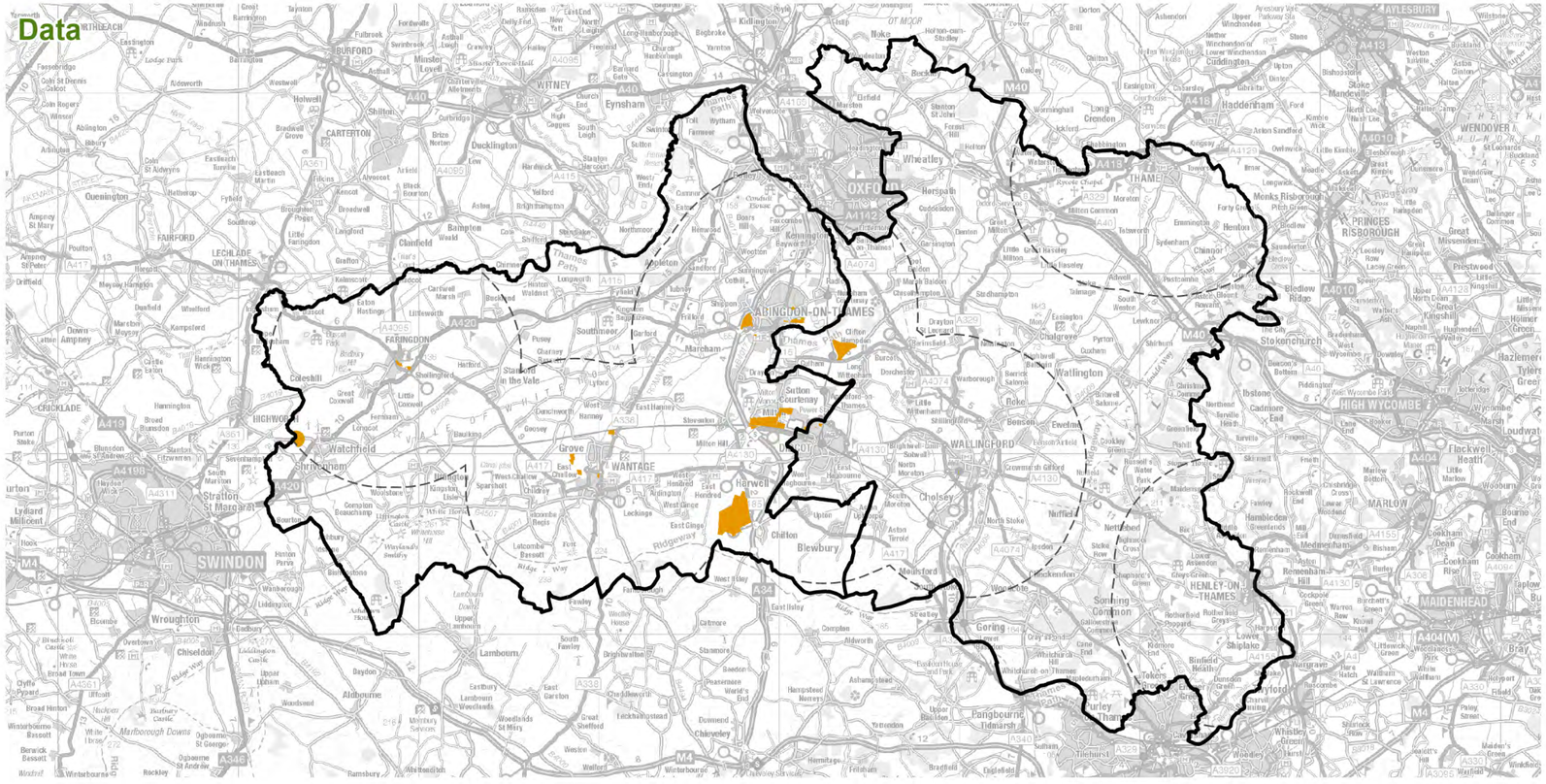
LUC

Figure 4.22: N11 Hearing non-natural sounds - Urban data and results



South Oxfordshire and Vale of White Horse

Urban Footprint

Data

Turbine

Employment area and industrial site

Result

Score N11

0 - highest contribution to tranquillity

2

3

4

5 - lowest contribution to tranquillity

12315_Tranquillity_Urban_Negative_N10toN11/Fig_4_22_N11_Urban 22/09/2023
EB:bournazel_j Source: OS, LUC, BEIS, South and Vale Councils

Chapter 5

Combining the indicators

Combined positive indicators

5.1 Once all the analysis had been run for all the positive indicators for All South and Vale and Urban, the indicators were combined to give an overall positive score as shown in Figure 5.1 and Figure 5.2. A higher score means the pixel is more tranquil.

Combined negative indicators

5.2 Once all the analysis had been run for all the negative indicators for All South and Vale and Urban, the indicators were combined to give an overall negative score as shown in Figure 5.3 and Figure 5.4. A higher score means the pixel is less tranquil.

Tranquillity in South Oxfordshire and Vale of White Horse Districts

5.3 Tranquillity in South and Vale and Urban was calculated as the difference between the total positive score and total negative score, displaying the spatial distribution of relative tranquillity (Figure 5.5 and Figure 5.6).

5.4 Figure 5.7 aims to determine which areas of South Oxfordshire and Vale of White Horse Districts are dominated by negative indicators, as well as areas where positive indicators of tranquillity dominate. It also shows areas of assumed no negative impact, which are areas where the negative indicators

were all scored 0, and therefore the tranquillity score is only driven by the positive indicators.

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

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Figure 5.1: Combined map of all positive indicators - all South Oxfordshire and Vale of White Horse districts

South Oxfordshire and Vale of White Horse

Combined positive indicators

Lowest contribution to tranquillity (lower score)

Highest contribution to tranquillity (higher score)

Oxford
Abingdon
Faringdon
Didcot
Wallingford
Watchfield
Grove
Harwell Campus
Wantage
Thame
Henley-on-Thames

0 10 20 km

Map scale 1:225,000 @ A3

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 5.2: Combined map of all positive indicators - Urban

South Oxfordshire and Vale of White Horse

Urban Footprint

Combined positive indicators

Lowest contribution to tranquillity (lower score)

Highest contribution to tranquillity (higher score)

Oxford
Abingdon
Faringdon
Didcot
Wallingford
Watchfield
Grove
Harwell Campus
Wantage
Thame
Henley-on-Thames

0 10 20 km

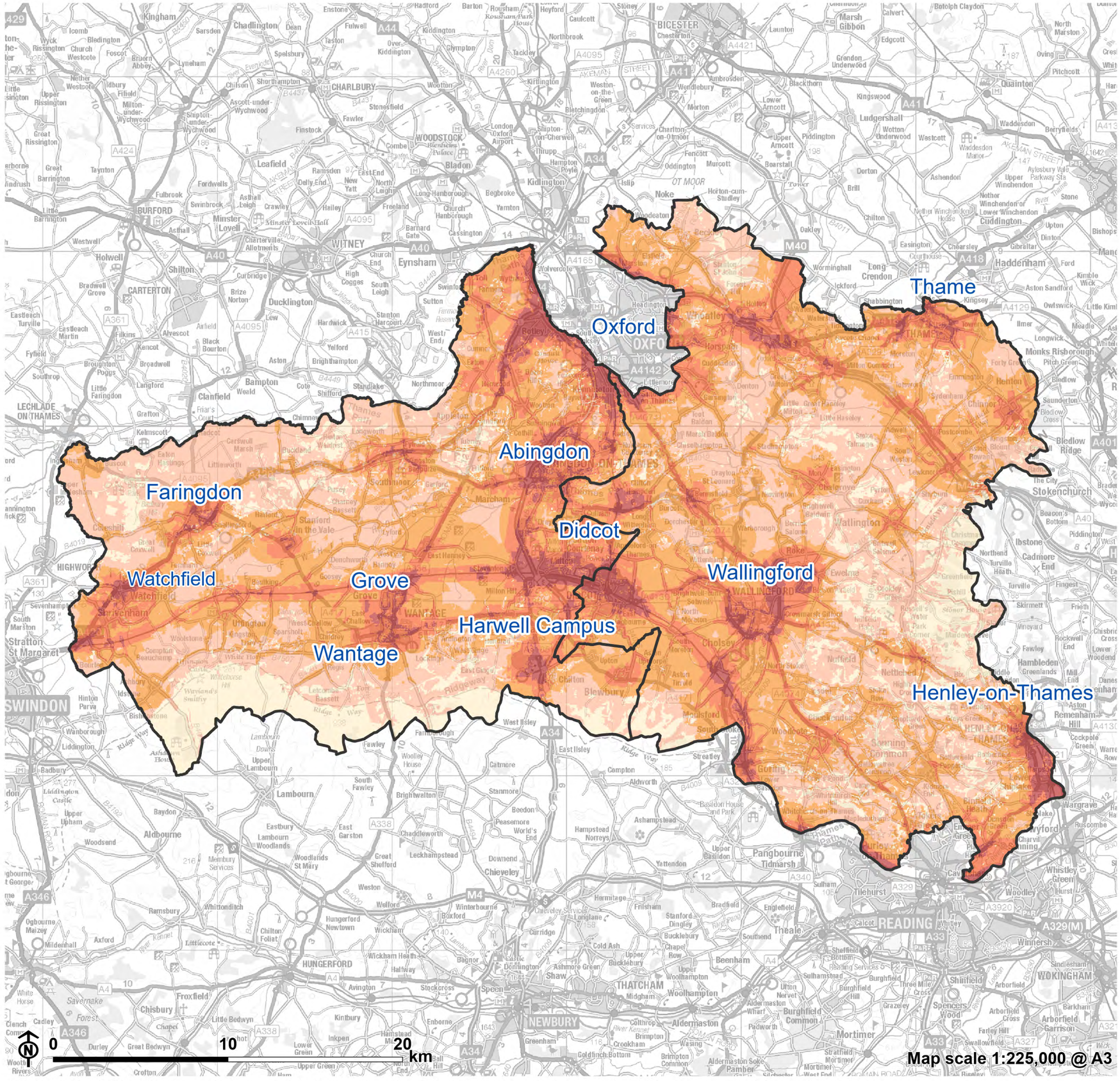
Map scale 1:225,000 @ A3

Fig_5_2_r2_Urban_All_Pos 03/11/2023 EB:bournazel_j
Source: OS, Corine, FC, NE, HE, LUC

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 5.3: Combined map of all negative indicators - all South Oxfordshire and Vale of White Horse districts



South Oxfordshire and Vale of White Horse

Combined negative indicators

Highest contribution to tranquillity (lower score)

Lowest contribution to tranquillity (higher score)

Fig_5_3_r2_Rural_All_Neg 03/11/2023 EB:bournazel_j
Source: OS, LUC, BEIS, ONS, DEFRA, RAF, Heathrow, South and Vale Councils

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 5.4: Combined map of all negative indicators - Urban

South Oxfordshire and Vale of White Horse

Urban Footprint

Combined negative indicators

Highest contribution to tranquillity (lower score)

Lowest contribution to tranquillity (higher score)

Oxford
Abingdon
Faringdon
Didcot
Wallingford
Watchfield
Grove
Harwell Campus
Wantage
Thame
Henley-on-Thames

0 10 20 km

Map scale 1:225,000 @ A3

Fig_5_4_r2_Urban_All_Neg 03/11/2023 EB:bournazel_j
Source: OS, LUC, BEIS, ONS, DEFRA, RAF, Heathrow, South and Vale Councils, NE

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 5.5: Map of tranquil areas - all South Oxfordshire and Vale of White Horse districts

South Oxfordshire and Vale of White Horse

Overall tranquillity

Least tranquil

Most tranquil

Thame
Oxford
Abingdon
Faringdon
Didcot
Wallingford
Watchfield
Grove
Harwell Campus
Wantage
Henley-on-Thames

0 10 20 km

Map scale 1:225,000 @ A3

Fig_5_5_r2_Rural_Tranquillity 03/11/2023 EB:bournazel_j
Source: South and Vale Councils, LUC

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 5.6: Map of tranquil areas - Urban

South Oxfordshire and Vale of White Horse

Urban Footprint

Overall tranquillity

Least tranquil

Most tranquil

Oxford
Abingdon
Faringdon
Didcot
Grove
Watchfield
Wantage
Harwell Campus
Wallingford
Thame
Henley-on-Thames

0 10 20 km

Map scale 1:225,000 @ A3

Fig_5_6_r2_Urban_Tranquillity 03/11/2023 EB:bournazel_j
Source: South and Vale Councils, LUC

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

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Figure 5.7: Relative tranquillity - difference in the total positive and total negative score

South Oxfordshire and Vale of White Horse

Relative tranquillity

- Positive score higher than negative
- Assumed no negative impact
- Negative score higher than positive
- Positive and negative score equal

Oxford
Abingdon
Faringdon
Didcot
Wallingford
Watchfield
Grove
Harwell Campus
Wantage
Thame
Henley-on-Thames

0 10 20 km

Map scale 1:225,000 @ A3

Fig_5_7_r2_Rural_RelativeTranqu 03/11/2023 EB:bournazel_j
Source: South and Vale Councils, LUC

Chapter 6

Findings

Interpreting the Maps

6.1 This section focuses on the tranquillity assessment at both districts level rather than the urban analysis.

6.2 By analysing the spatial distribution of the positive (Figure 5.1) and negative (Figure 5.3) scores it is possible to determine which areas of South Oxfordshire and Vale of White Horse Districts are dominated by negative indicators, as well as areas where positive indicators of tranquillity dominate (Figure 5.7).

6.3 Five zones of relative tranquillity have been identified to help the use and interpretation of the assessment results:

- Zone 1: Areas of high tranquillity. These areas have high tranquillity (positive score >=10), and positive indicators of tranquillity dominate over negative ones. The negative visual and/or noise intrusion is relatively low (negative score <10)
- Zone 2: Areas of some tranquillity. These areas have high tranquillity (positive score >=10), and positive indicators of tranquillity dominate over negative ones. However there is also negative intrusion (negative score >=10)
- Zone 3: Areas of mixed tranquillity. These areas have some level of tranquillity (positive score <20), but there is also some level of negative visual and/or noise intrusion (negative score <20)
- Zone 4: Areas of low tranquillity. These areas have a high level of visual and/or noise intrusion and negative indicators dominate over positive ones (negative score >=20), however there is also high tranquillity (positive score >=10)

- Zone 5: Areas of very low/no tranquillity. These areas have high level of negative visual and/or noise intrusion (negative score >=20), with low level of relative tranquillity (positive score <10).

6.4 Figure 6.1 shows the spatial distribution of the tranquillity zones in South Oxfordshire and Vale of White Horse Districts and a breakdown of the area and coverage of each zone in the districts is available in Table 6-1.

Table 6-1: Total area (ha) of the tranquillity zones in South Oxfordshire and Vale of White Horse Districts

Zone of relative tranquillity	Area (ha)	Percent coverage (%)
Zone 1: Area of high tranquillity	28,636.25	22.8
Zone 2: Area of some tranquillity	83,591.25	66.5
Zone 3: Area of mixed tranquillity	2,653	2.1
Zone 4: Area of low tranquillity	10,149.75	8.1
Zone 5: Area of very low/no tranquillity	686	0.5

Tranquillity Assessment
South Oxfordshire and Vale of White Horse Councils

LUC

Figure 6.1: Zones of relative tranquillity

South Oxfordshire and Vale of White Horse

Zones of relative tranquillity

- Zone 1: Area of high tranquillity
- Zone 2: Area of some tranquillity
- Zone 3: Area of mixed tranquillity
- Zone 4: Area of low tranquillity
- Zone 5: Area of very low/no tranquillity

Thame
Oxford
Abingdon
Faringdon
Didcot
Wallingford
Watchfield
Grove
Harwell Campus
Wantage
Henley-on-Thames

0 10 20 km

Map scale 1:225,000 @ A3

 12315_Combined_Tranquillity_Rural/Fig_6_1_r1_Zones_Tranquillity 03/11/2023 EB:bournazel_j
Source: South and Vale Councils, LUC

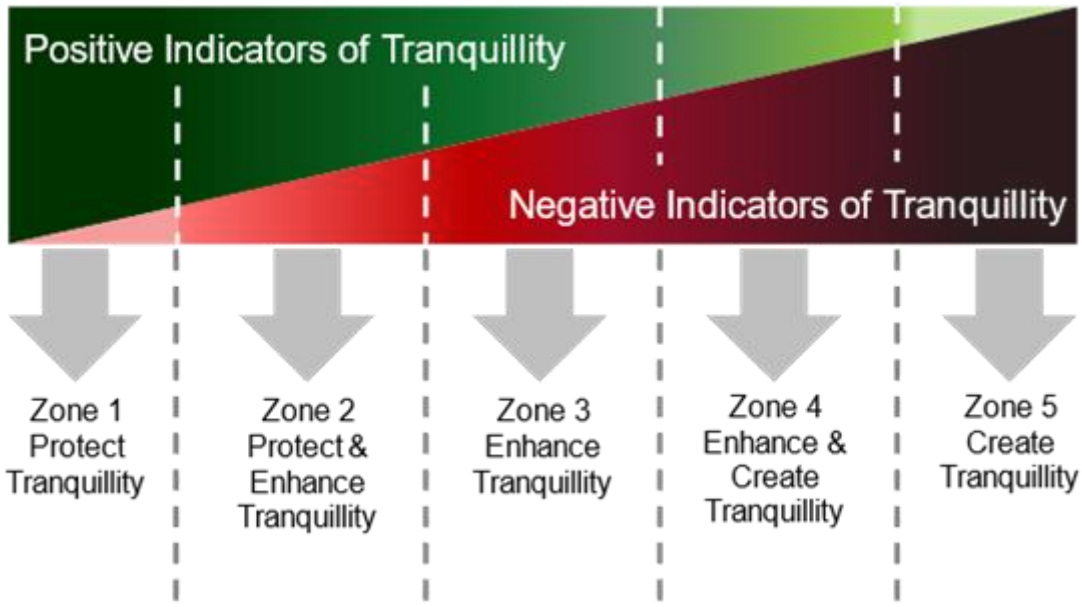
Chapter 7

User Guide

7.1 This chapter provides guidance on the use of the tranquillity assessment in South Oxfordshire and Vale of White Horse Districts. It is targeted at users such as planners, specialist advisers, developers, and local communities. The guide presents how development proposals could be considered in relation to their impacts on tranquillity and identifies general strategies that could be put in place to protect, enhance and create tranquillity.

7.2 The tranquillity indicators, tranquillity zones and recommended strategies are shown in Figure 7.1 below. The strategies move along a spectrum from protecting the existing tranquil resource to enhancing tranquillity, eventually to creating new positive factors of tranquillity. Any development or change may also provide opportunities to reduce/mitigate negative factors of tranquillity both existing and associated with the development itself.

Figure 7.1: Indicators of Tranquillity



Considering Tranquillity in New Developments

Zone 1: Area of High Tranquillity

7.3 These areas have high relative tranquillity, where positive indicators of tranquillity are dominant and where negative visual and/or noise intrusion is low. They cover 22.8% of the South Oxfordshire and Vale of White Horse districts and are mostly associated with areas in the southwestern part of the North Wessex Downs National Landscape, as well as eastern areas falling in the Chilterns National Landsacpe. Areas of high tranquillity are also found in the northern parts of the districts, such as the Corallian Ridge. Smaller pockets of high tranquillity can be found across many parts of the landscape and these are as important to conserve as the wider landscape-scale areas of tranquillity.

7.4 Tranquillity is an important resource in South Oxfordshire and Vale of White Horse districts and the strategy is to protect existing tranquillity. In considering any change/development, the tranquillity mapping can be interrogated to provide the following information:

- Is the proposal in or close to an area of high tranquillity, for instance in views from adjacent highly tranquil areas?
- Which positive indicators are contributing to the high positive score in the area of interest? Area there any positive indicators with a high score (for example 4 or 5) in the area of interest? What effect will the development have on these positive indicators of tranquillity?
- Does the proposed development introduce any new negative indicators of tranquillity?
- How does the proposed change protect existing tranquillity?

7.5 For any development, the aim should be to protect the existing positive attributes of tranquillity and avoid introducing any new negative factors that reduce tranquillity.

Zone 2: Area of Some Tranquillity

7.6 These areas have great tranquillity, with more positive than negative indicators. They cover over half of the South Oxfordshire and Vale of White Horse districts and coincide with the wider rural areas, away from the main settlements. They provide an important experience of tranquillity for people.

7.7 The strategy for these areas is to protect and enhance tranquillity. In considering any change/development, the tranquillity mapping can be interrogated to provide the following information:

- What are the positive indicators of tranquillity present?
- What effect will the development have on the positive indicators of tranquillity present at this location?
- What are the negative indicators of tranquillity present?
- Does the proposal extend or introduce any further negative effects on tranquillity?
- What changes can be made to reduce/mitigate the effect of the development on tranquillity?
- What changes can be made to mitigate existing negative indicators of tranquillity present?
- Can further positive factors influencing tranquillity be created?

7.8 The aim should be to protect the positive factors of tranquillity and avoid introducing negative factors that reduce tranquillity. Consideration should be given to options for enhancing tranquillity by reducing/mitigating impacts of existing negative indicators of tranquillity and/or creating further positive indicators of tranquillity.

Zone 3: Area of Mixed Tranquillity

7.9 These areas contain positive indicators of tranquillity which are balanced with a degree of visual and/or noise intrusion. They only cover 2.1% of South Oxfordshire and Vale of White Horse districts and are mostly found in the outskirts of settlements. These areas do not usually have any special protection and are especially vulnerable to further erosion and weakening of tranquillity. The Zone 3 areas provide an opportunity to provide positive interventions that reverse declines in tranquillity.

7.10 The strategy for these areas is to enhance tranquillity. In considering any change/development, the tranquillity mapping can be interrogated to provide the following information:

- What effect will the development have on the positive indicators of tranquillity present at this location?
- What changes can be made to reduce/mitigate the effect of the development on positive attributes of tranquillity?
- Does the proposal extend or introduce any further negative effects on tranquillity?
- What changes can be made to mitigate existing negative indicators of tranquillity present?
- What opportunities are there to (re) create aspects of tranquillity as part of the proposed development and to help mitigate effects?

7.11 The aim should be to protect any existing positive indicators of tranquillity, mitigate and reduce the negative indicators of tranquillity and where appropriate seek to (re) create further positive indicators of tranquillity. Development should, where possible, seek to avoid introducing further negative factors that reduce tranquillity. There may be opportunities as part of the design to create a sense of tranquillity for future residents and employees.

Zone 4: Area of Low Tranquillity

7.12 These are areas that contain a high level of visual and/or noise intrusion where negative indicators of tranquillity dominate over positive ones. They frequently coincide with areas of countryside on the edge of settlement or along transport corridors routes. Although they cover a relatively small part of South Oxfordshire and Vale of White Horse (8.1%), their location means these areas are experienced by many people as part of their everyday lives. These areas are also likely to be subject to development pressures, for example, development associated with existing transport corridors with further effects on levels on tranquillity due to negative visual effect of large-scale roadside development in addition to the negative effect of road noise.

7.13 The strategy for these areas is to enhance and where possible create tranquillity. In considering any change/development, the tranquillity mapping can be interrogated to provide the following information:

- What are the remaining positive indicators of tranquillity present at this location?
- What effect will the development have on these positive indicators and what changes can be made to reduce the effect of the development on these factors?
- Does the proposal extend or introduce any further negative effects on tranquillity?
- What changes can be made to mitigate existing negative indicators of tranquillity present?
- What opportunities are there to (re) create aspects of tranquillity as part of the proposed development and to help mitigate effects?

7.14 The aim is to enhance any existing attributes of tranquillity perceived at this location and seek to (re) create tranquillity, where appropriate. This should include protecting any of the remaining existing positive indicators of tranquillity. Where possible the proposal should also seek to mitigate and reduce negative

indicators of tranquillity and if possible, (re) create further positive indicators of tranquillity, such as areas of tree planting.

Zone 5: Area of Very Low/No Tranquillity

7.15 These are areas that contain a high level of visual and/or noise intrusion with a low level of relative tranquillity. These areas are not very common in South Oxfordshire and Vale of White Horse districts, covering less than 1% of the districts, mostly found in urban areas. These areas, which are already negatively affected, are also likely to be subject to further development pressures, for example areas with existing negative factors associated with noise may be targeted for further development that have a visual effect on sense of tranquillity.

7.16 The strategy for these locations is to seek to create tranquillity, where appropriate, recognising that in many areas this will not be feasible or desirable. In considering any change/development, the tranquillity mapping can be interrogated to provide the following information:

- Is the proposal in an area of very low/no tranquillity (Zone 5)?
- Can any changes be made to mitigate existing negative indicators of tranquillity?
- Does the proposal extend or introduce any further negative effects on tranquillity?
- Are there opportunities for the development to (re) create positive aspects of tranquillity?

7.17 Where possible, consideration should be given to reducing and mitigating the existing negative indicators of tranquillity, as well as looking into opportunities to create new positive indicators of tranquillity as part of the new development. However, it is recognised that concentration of activities in areas of low tranquillity is often appropriate and creation of tranquillity in these areas would bring few benefits or would likely not be achievable.

Protect, Enhance and Create Tranquillity: Key Considerations

7.18 The following sections set out the key considerations relevant to the protection, enhancement and creation of the positive indicators of tranquillity (P01-P10) that were used to develop the tranquillity assessment in South Oxfordshire and Vale of White Horse Districts.

Positive Indicators of Tranquillity

P01: Naturalness of the land cover/P09: Seeing natural designations

Protect and Enhance

- Avoid any development that disrupts areas of natural landcover (woodland, undeveloped valleys, semi natural grassland or views across areas of natural landcover).
- Retain/avoid blocking views in relation to key natural landscape elements e.g. out from the vales to the higher elevated chalk landscapes of the North Wessex Downs and Chilterns National Landscapes, the Sinodun Hills/Wittenham Clumps and the Corallian Ridge which form important features in views from the flatter vale landscape.
- Consider aspects of design including colour and reflectivity to reduce visual prominence of the development and blend with natural landscape/skyscape backdrop.

Create

- Create areas of natural land cover – meadows and mini woodlands, scrub as part of green infrastructure integral to development.
- Create sense of natural open spaces and connections – avoid hemming in access/rights of way between development such as fences which reduce sense of naturalness.

P02: Seeing rivers and canals/ P03: Seeing lakes

Protect and Enhance

- Avoid any development that disrupts views or experience of areas of water. Ensure development does not block (physically or visually) public access to watercourses/river sides.
- Ensure development conserves water quality and maintains water flows.
- Seek to restore natural water courses.
- Maintain and enhance riverside access to provide continuous experience of water such as along the Thames path.

Create

- Consider opportunities for providing areas of water within development, including as part of SUDS schemes, mini ponds and water features.
- Include calm natural spaces where people can experience and enjoy proximity to water.
- Create new opportunities/rights of ways links to access water.

P04: Seeing broadleaved woodland above 2.5 ha/ P05: Seeing plantation/coniferous woodland above 2.5 ha

Protect and Enhance

- Conserve existing trees, notably mature and older specimens.
- Maintain views and access to natural element such as woodlands.
- Augment existing woodland cover including opportunities for connecting existing woodland habitats.

Create

- Create small areas of broadleaved woodland, hedgerows and scrub as part of green infrastructure within developments.
- Consider opportunities for larger scale woodland and tree planting as part of land use change targets towards net zero carbon. New accessible woodlands around settlements are a key opportunity.
- Encourage change from coniferous plantations to mixed native woodlands to allow cropping to be undertaken with less visual impact to the wider landscape.

P06: Seeing the stars at night

Protect and Enhance

- Conserve dark skies where they exist and avoid new lighting influences within or close to those areas where dark skies are a feature.
- Pay attention to lighting design to maintain dark skies. Please refer to the Dark Skies Assessment and Lighting Guidance Report (requirement 1 for

this project) User guidance chapter for further details on protecting and enhancing dark skies, such as incorporating a lighting control system and implementing an adaptive dimming strategy.

Create

- Seek to recreate areas of dark skies by reducing lighting. The South Oxfordshire and Vale of White Horse Dark Skies Assessment and Lighting Guidance Report (requirement 1 for this project) User guidance chapter provides further details on measures to create dark skies.

P07: Hearing nature

Protect and Enhance

- Maintain scrub, mature trees, hedgerows and meadows that provide habitats for birds.
- Seek to link and connect habitats for example creation of new native woodland and hedgerows around new developments.

Create

- Provide a range of fruit, berry and seed-bearing plants, shrubs and trees to attract birds.
- Use hedges to link and connect to adjacent wooded habitats.
- Specify sustainable grounds maintenance contracts limiting use of herbicides and other chemicals to maintain a healthy biodiversity/food cycle, retain seed heads and berries, etc.

P08: Seeing elevated areas

Protect and Enhance

- Conserve views, particularly views to and across open spaces. This is a key consideration in relation to views from highpoints in South Oxfordshire and Vale of White Horse Districts such as along the elevated scarps of the National Landscapes as experienced from along the Ridgeway National Trail and at key locations such as Watlington Hill, Devils Punchbowl, Uffington Castle and Wayland Smith, as well as outlying chalk hills such at the Sinodun Hills (Wittenham Clumps), and local view points along the Corallian Ridge. While the tranquil high spots themselves may not be threatened, the sense of tranquillity could change by unsympathetic development in the wider setting.
- Consider opportunities for enhancing views for example by removing or screening detracting elements.

Create

- Avoid hard urban style boundaries in rural locations, limit signage and other streetscape ‘clutter’. Create calm, legible environments.
- Create visible open spaces within development in views for example along streets. Ensure that green infrastructure is integrated into development to provide maximum benefit for users and offers opportunities to experience a sense of tranquillity, for instance avoid sources of noise such as roads, or encourage natural sound sources such as bird song.
- Consider opportunities for natural play and use of natural materials/nature in GBI open space, in contrast to areas of more formal play.

P10: Seeing time depth

Protect and Enhance

- Avoid development that disrupts views or experience of parks and gardens, scheduled monuments and non-designated historic landscape features

Create

- Create new opportunities/rights of ways links to access or interpret these designations.

Reduce and Mitigate Effects on Tranquillity: Key Considerations

7.19 The following sections set out the key considerations relevant to the reduction and mitigation of negative indicators of tranquillity (N01-N11) that were used to develop the tranquillity assessment in South Oxfordshire and Vale of White Horse Districts.

Negative Indicators of Tranquillity

N01: Seeing settlements

Reduce and Mitigate

- Ensure development edges are well integrated with the surrounding landscape and avoid harsh interfaces such as roads, fencing/boundaries,

softening of development breaking up the outline of development and also the roofscapes.

- Seek to create ‘natural’ edges in character with surroundings including opportunities for locally characteristic planting.
- Consider size, scale, height, reflectivity, colour and orientation of bulky large-scale development – to reduce visual prominence.
- For large scale developments, consider opportunities to sink down in the landscape and designs to help blend into landscape context.
- Maintain (avoid blocking) views to characteristic skyline backdrops which are characteristic of South Oxfordshire and Vale of White Horse Districts notably the distinctive chalk ridges of the National Landscape scarps.
- In urban areas, consider quieter streets and individual trees, as smaller changes can have a bigger impact towards tranquillity in an urban environment compared to rural areas.

N02: Seeing light pollution

Reduce and Mitigate

- Pay attention to lighting design to limit/reduce light pollution. The South Oxfordshire and Vale of White Horse Dark Skies/Light Impact Assessment (requirement 1 for this project) identifies the darkest areas and supports an understanding of the levels of light pollution across the districts.

N03: Seeing large non-natural infrastructure / N04: Seeing major roads / N06: Seeing minor roads / N08: Seeing railways

Reduce and Mitigate

- While there are limited opportunities for screening, attention to design of ancillary development can help create a more 'tranquil' character such as avoiding harsh urban style fencing and security lighting around solar farms/other development, careful location of additional infrastructure.
- Consider opportunities to orientate public open space, routes and views away from intrusive/detracting visual elements.

N05: Hearing major roads / N07: Hearing minor roads / N09: Hearing major railways / N10: Seeing and/or hearing low flying airplanes / N11: Hearing non-natural sounds

Reduce and Mitigate

- Provide tree screening belts, where appropriate. Design planting to achieve acoustic screening.
- Where possible, residential development and outdoor recreational uses should be located away from sources of noise intrusion. Where proximity to noise intrusion cannot be avoided, consider building location, design, orientation and room layout measures to minimise that intrusion (as per section 3 in the ProPG Planning and Noise Supplementary Document 2 Good Acoustic Design, May 2017) **[See reference 8]**. Use planting patterns and species that align with local character.
- Avoid introduction of further sources of noise as part of the development.

Chapter 8

Future Enhancements

8.1 Following the release of the tranquillity pilot mapping report, stakeholders provided feedback on further datasets that could be included in the tranquillity assessment. With the benefit of more time and access to more complete datasets, the following suggestions would be of interest for future iterations of the assessment:

- Urban trees dataset to include in P04 Seeing broadleaved woodland in the urban analysis.
- Include recreation, especially noise associated with water sports and boat movements as a negative indicator.
- Include helicopter movements in N10 Seeing and/or hearing low flying airplanes.

Chapter 9
Recommendations

9.1 This assessment provides a strategic evidence base that will inform a range of other landscape evidence being developed concurrently. The assessment also provides principles that will guide general strategies to protect, enhance and create tranquillity.

9.2 This evidence base can be used to:

- Raise awareness of the importance of tranquillity for people, nature and landscapes.
- Inform the suite of landscape evidence being developed for the emerging Joint Local Plan as well as neighbourhood plans in South Oxfordshire and Vale of White Horse districts.
- Provide greater access to the mapped data for decision-makers and members of the public.
- Support the development of planning policy to protect and enhance the areas of high tranquillity and reduce and mitigate the impacts of negative indicators of tranquillity.

Policy context

9.3 The NPPF (last updated in December 2023) sets out the environmental, social and economic planning policies for England **[See reference** 9**]**. Chapter 15 of the NPPF (Conserving and enhancing the natural environment), sets out ways in which planning policies and decisions should contribute to and enhance the natural and local environment.

9.4 Paragraph 191 (under Ground conditions and pollution) sets out:

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

9.5 The online National Planning Practice Guidance (PPG) resource, published by the Department for Levelling Up, Housing and Communities (DLUHC) and Ministry of Housing, Communities and Local Government (MHCLG) provides further interpretation of national planning policy for the benefit of local planning authorities and planning practitioners. Tranquilly is mentioned in the section on Noise in paragraph 008 **[See reference** 10**]**:

What factors are relevant if seeking to identify areas of tranquillity?

For an area to justify being protected for its tranquillity, it is likely to be relatively undisturbed by noise from human sources that undermine the intrinsic character of the area. It may, for example, provide a sense of peace and quiet or a positive soundscape where natural sounds such as

birdsong or flowing water are more prominent than background noise, e.g. from transport.

Consideration may be given to how existing areas of tranquillity could be further enhanced through specific improvements in soundscape, landscape design (e.g. through the provision of green infrastructure) and/or access.

Policy options

9.6 The NPPF and related PPG could have varied interpretations. Two options are presented in this section, with consideration given to the relative merits of each approach.

Designating areas of high tranquillity

9.7 One interpretation of the NPPF appears to support the designation of tranquil areas. However, there is no supporting guidance on criteria for designation or approach to defining boundaries. Identification and protection of the areas of highest tranquillity with the aim of affording these areas with additional protections poses some notable challenges. If areas are to be designated and presented on a proposals map, they will likely need to have some physical definition on the ground, and be supported by fieldwork to establish those boundaries.

9.8 This assessment has categorised all of South Oxfordshire and Vale of White Horse into five categories of relative tranquillity; recognising that there are potentially competing positive and negative tranquillity factors acting together in all zones:

- Zone 1: Areas of high tranquillity. These areas have high tranquillity (positive score >=10), and positive indicators of tranquillity dominate over

negative ones. The negative visual and/or noise intrusion is relatively low (negative score <10)

- Zone 2: Areas of some tranquillity. These areas have high tranquillity (positive score >=10), and positive indicators of tranquillity dominate over negative ones. However there is also negative intrusion (negative score >=10)
- Zone 3: Areas of mixed tranquillity. These areas have some level of tranquillity (positive score <20), but there is also some level of negative visual and/or noise intrusion (negative score <20). In this zone positive and negative factors compete and the positive factors do not dominate over negative factors.
- Zone 4: Areas of low tranquillity. These areas have a high level of visual and/or noise intrusion and negative indicators dominate over positive ones (negative score >=20), however there is also high tranquillity (positive score >=10)
- Zone 5: Areas of very low/no tranquillity. These areas have high level of negative visual and/or noise intrusion (negative score >=20), with low level of relative tranquillity (positive score <10).

9.9 If singling out areas of high tranquillity (Zone 1) for designation, it is noticeable that parts of this zone are already protected by other designations (such as National Landscapes), so the interaction needs to be carefully considered. As can be seen in the underlying data, there are variations in levels of relative tranquillity, even within Zone 1. Furthermore, it must be noted that some areas in Zone 2 and beyond can have higher positive scores than Zone 1, but are offset by higher negative scores.

9.10 Without fieldwork to support the definition of boundaries, the boundaries would need to be based on a threshold or numeric criteria. For example, this might be a minimum size or minimum number of contiguous values over a certain threshold. This might leave out some small areas of high tranquillity that may be highly valued. As noted in paragraph 7.3, smaller pockets of high tranquillity are as important to conserve as the wider landscape-scale areas of tranquillity. Evidence developed through this study, as a desk-based

assessment, cannot claim to support an understanding of which of these areas are ‘prized for their recreational and amenity value’ as a result of their tranquillity.

A high-level policy on tranquillity supported by guidance/supporting text

9.11 An alternative to the designation of specific areas of high tranquillity is a high-level policy on tranquillity supported by guidance or supporting text that focuses not only on the protection of these areas (or the prevention of harm), but can be used as a tool to ensure that protection, enhancement and creation of tranquillity is considered in every location within the districts.

9.12 Alongside the protection of areas with existing high tranquillity, it is considered important to use this evidence as a tool to lift up lower scoring areas by ensuring that developers demonstrate how tranquillity has been designed into developments – i.e. not only preventing harm to the most positive aspects contributing to tranquillity, but also designing in aspects that address or mitigate some of the less well-scoring tranquillity factors. The User Guide section in this study has been developed with this in mind.

Policy recommendations

9.13 It is recommended that a high-level policy on tranquillity is developed, supported by reference to this assessment. In particular, referencing the mapping (which is available online for interrogation) and User Guide, provides the strong policy recognition for enhancement and protection of tranquillity in the districts. The policy should require developers to have regard to tranquillity irrespective of the current tranquillity zone the development falls within. This could be through a requirement to consider the user guidance and explore the questions asked when describing their proposal.

9.14 By requiring use of the evidence to assess the impacts of development on tranquillity, and present how the development responds to the local circumstances, this approach aims to help developers design in elements that will enhance or create new positive factors and mitigate those that might negatively affect tranquillity.

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Appendix A

Extracts from April 2023 stakeholder workshop breakout discussions

A.1 Small breakout groups were prompted to discuss the following aspects of tranquillity.

A.2 Firstly, participants were asked to think about:

- What makes you feel tranquil – what are your top 5 positive factors?
- What detracts from tranquillity – what are your top 5 negative factors?
- Do you agree with the indicators we have presented?
- What datasets could we use?
- Are there indicators that are more important than others?
- How does distance factor in (buffer distances)?

Considerations:

- Availability of spatial data
- Data update and frequency

The following list highlights the range of responses to the question “what makes you feel tranquil?”:

- Natural landscape without man made structures
- Seeing artificial things from great distance , lack of movement
- Peace and quiet, absence of man made noise
- Presence of natural sounds
- Sense of space, good views

- Hearing bird song, insects

The following list highlights the range of responses to the question “What detracts from tranquillity?”:

- Loud man made noises, such as motorway, airplanes, construction sites
- External unexpected disturbance to tranquillity, likelihood of seeing and hearing other people
- Seeing major infrastructure
- Military aircraft

A.3 Then participants were asked to think about:

- What factors are different between All South and Vale and Urban?
- Are there any additional factors at play in one or the other?
- Could we use the same data but just change the distances to which they are relevant?
- Different datasets in All South and Vale/Urban?

The following list highlights the range of responses and comments made relating to the points above:

- Air quality/ pollution in urban areas. However this is potentially already included in other detracting indicators such as seeing and hearing roads
- Gardens and leafy parks in urban areas would feel tranquil because of being in the urban environment, whereas the same features in rural area would not really impact tranquillity
- The idea of perception and how people get used to noises, for instance getting used to hearing trains.
- Quieter streets and individual trees can make a difference in urban areas. Smaller changes might make a bigger difference in urban than in rural areas

Appendix A Extracts from April 2023 stakeholder workshop breakout discussions

- Small green corridors provide small sections of tranquillity
- Importance of greenspaces around urban areas

Full list of indicators considered and stakeholder feedback

A.4 Further stakeholder feedback was received after the workshop via emails and online meetings and are detailed in Table A-1 and Table A-2. These helped deciding whether the proposed indicators were relevant in South Oxfordshire and Vale of White Horse District Councils and pointed out specific datasets that could be used to map the indicators. Note that P03 Hearing flowing/lapping water was discussed with stakeholders following the review of the pilot mapping and it was agreed that this indicator is not relevant to South Oxfordshire and Vale of White Horse Districts and should therefore be removed from the final analysis.

Table A-1: List of positive indicators considered and decision to keep or not in tranquillity assessment

Positive factors	Stakeholder feedback	LUC answer	Included in pilot assessment	Included in final assessment
P01 - Naturalness of the land cover	n/a	n/a	Yes	Yes
P02 - Seeing streams, rivers and canals	n/a	n/a	Yes	Yes
P03 - Hearing flowing/lapping water	n/a	n/a	Yes	No

Positive factors	Stakeholder feedback	LUC answer	Included in pilot assessment	Included in final assessment
P04 - Seeing lakes	n/a	n/a	Yes	Yes
P05 - Seeing broadleaved woodland/ individual trees	Would the TPO data help with mapping urban trees?	TPO data won't help mapping urban trees. LUC looked into using the Environment Agency 'vegetation object model' dataset to map urban trees, however there are gaps in the data over various sections of the urban areas so we could not use this data.	Yes	Yes
P06 - Seeing plantation/coniferous woodland	n/a	n/a	Yes	Yes
P07 - Seeing the stars at night	n/a	n/a	Yes	Yes
P08 - Hearing nature	n/a	n/a	Yes	Yes

Positive factors	Stakeholder feedback	LUC answer	Included in pilot assessment	Included in final assessment
P09 – Seeing wide open spaces (pilot mapping indicator name)	n/a	n/a	Yes	Yes – renamed to Seeing elevated areas
P10 - Seeing natural designations	n/a	n/a	Yes	Yes
P11 - Seeing time depth	Some landscapes feel ancient too and like they have not changed for centuries, such as White Horse Hill at Uffington, Wayland Smithy, the Wittenham Clumps (but perhaps these are captured anyway in the heritage mapping). Also we see time depth when we see old veteran trees or walk in ancient woodland perhaps.	White Horse Hill, Wayland Smithy, Witthenham Clumps and Ancient woodland are all included in natural designation datasets (P10).	Yes	Yes

Table A-2: List of negative indicators considered and decision to keep or not in tranquillity assessment

Negative factors	Stakeholder feedback	LUC answer	Included in pilot assessment	Included in final assessment
N01 - Seeing settlements	n/a	n/a	Yes	Yes
N02 - Seeing villages and scattered houses	Villages and scattered houses should be differentiated from settlements as these are often beautiful and tranquil in natural setting.	Based on the feedback this indicator was not included in the assessment.	No	No
N03 - Seeing light pollution	n/a	n/a	Yes	Yes
N04 - Seeing large non-natural infrastructure	n/a	n/a	Yes	Yes
N05 - Seeing major roads	n/a	n/a	Yes	Yes
N06 - Hearing major roads	n/a	n/a	Yes	Yes

Negative factors	Stakeholder feedback	LUC answer	Included in pilot assessment	Included in final assessment
N07 - Seeing minor roads	n/a	n/a	Yes	Yes
N08 - Hearing minor roads	n/a	n/a	Yes	Yes
N09 - Seeing railways	n/a	n/a	Yes	Yes
N10 - Hearing major railways	n/a	n/a	Yes	Yes
N11 - Hearing minor railways	The heritage railways such as the Bunk Line between Cholsey and Wallingford and the Chinnor to Princes Risborough railway can be a positive experience of noise (e.g. the toot of a steam train)	Based on the feedback this indicator was not included in the assessment.	No	No
N12 - Hearing airport noise	This is not that relevant as there are no large commercial airports in either district.	Based on the feedback this indicator was not included in the assessment.	No	No

Negative factors	Stakeholder feedback	LUC answer	Included in pilot assessment	Included in final assessment
N13 - Seeing and/or hearing low flying airplane	This indicator is relevant in South and Vale. The biggest one would be RAF Benson with a lot of low flying helicopters. Also include the flightpaths of RAF Brize Norton and Heathrow airport. Chalgrove airfield is no longer operated by MOD and it is used by a company to test ejector seats, which is noisy when testing. Abingdon airfield is still used for occasional training by the RAF as well as for an air show every year in May.	RAF Benson, Heathrow and RAF Brize Norton flight paths were used in this indicator.	Yes	Yes
N14 - Seeing military training	This indicator is more about aircraft movement, so will be covered in 'seeing and /or hearing low flying airplane'.	n/a	n/a	n/a

Negative factors	Stakeholder feedback	LUC answer	Included in pilot assessment	Included in final assessment
n/a	Dalton Barracks is a live MOD base with regular army vehicles coming out of barracks. However when training takes place it cannot be seen from the road.	This indicator will not be added to the analysis because the points from the stakeholder feedback are covered in N13.	No	No
N15 - Seeing quarries/ mines	There are no mines in either district. In terms of quarries, all of the ones in the study area are with restoration conditions and thus are excluded from 'previously developed land' in the NPPF. The timescale of a working quarry is also short (around 5 years) and then the land has restoration potential. Note that old quarries in South and Vale are some of the most tranquil areas.	Based on the feedback this indicator was not included in the assessment.	No	No

Negative factors	Stakeholder feedback	LUC answer	Included in pilot assessment	Included in final assessment
N16 - Hearing non-natural sounds	There is one wind farm of five wind turbines at West Mill Farm, Watchfield.	n/a	Yes	Yes
N17 – Seeing many people	Popular towns and rural spots for tourism are not over-run with visitors to the extent it impacts on tranquillity.	Based on the feedback this indicator was not included in the assessment.	No	No

Appendix B

P01 Naturalness of land cover scoring approach

Table B-1: All South and Vale land cover classification

Corine category	Score
111 Continuous urban fabric	0
112 Discontinuous urban fabric	0
121 Industrial or commercial units	0
122 Road and rail networks and associated land	0
124 Airports	0
131 Mineral extractions sites	0
132 Dump sites	0
133 Construction sites	0
242 Complex cultivation patterns	1
243 Land principally occupied by agric., with significant areas of natural vegetation	1
141 Green urban areas	2
142 Sport and leisure facilities	2
211 Non-irrigated arable land	2
222 Fruit trees and berry plantations	2
231 Pastures	2
321 Natural grassland	2
324 Transitional woodland/shrub	2

Corine category	Score
311 Broad-leaved forest	3
312 Coniferous forest	3
313 Mixed forest	3
322 Moors and heathland	3
411 Inland marshes	4
512 Water bodies	4

Table B-2: Urban land cover classification

Descriptive Group	Descriptive Term	Make	Score
General Surface	Inland Water	Manmade	5
General Surface	Inland Water	Natural	5
General Surface	Sand	Natural	5
Inland Water	n/a	Natural	5
Inland Water	Spring	Natural	5
Inland Water	Static Water	Manmade	5
Inland Water	Static Water	Natural	5
Inland Water	Watercourse	Natural	5
Inland Water,Natural Environment	Nonconiferous Trees (Scattered),Static Water	Natural	5
Inland Water,Natural Environment	Nonconiferous Trees,Static Water	Natural	5
Inland Water,Natural Environment	Reeds,Static Water	Natural	5
Landform	Cliff	Natural	5
Natural Environment	Marsh	Natural	5
Natural Environment	Marsh,Nonconiferous Trees	Natural	5

Appendix B P01 Naturalness of land cover scoring approach

Descriptive Group	Descriptive Term	Make	Score
Natural Environment	Marsh,Nonconiferous Trees,Scrub	Natural	5
Natural Environment	Marsh,Rough Grassland	Natural	5
Natural Environment	Marsh,Rough Grassland,Scrub	Natural	5
Natural Environment	Marsh,Scrub	Natural	5
Natural Environment	Nonconiferous Trees	Natural	5
Natural Environment	Nonconiferous Trees (Scattered)	Natural	5
Natural Environment	Nonconiferous Trees (Scattered),Rough Grassland	Natural	5
Natural Environment	Rough Grassland	Natural	5
Natural Environment,Roadside	Rough Grassland	Natural	5
General Surface	Reservoir	Manmade	4
General Surface	Reservoir	Natural	4
Inland Water	Canal	Natural	4
Inland Water	Collects	Natural	4
Inland Water	Reservoir	Natural	4
Natural Environment	Boulders (Scattered),Coniferous Trees,Nonconiferous Trees	Natural	4
Natural Environment	Canal,Nonconiferous Trees	Natural	4
Natural Environment	Canal,Scrub	Natural	4
Natural Environment	Coniferous Trees	Natural	4

Descriptive Group	Descriptive Term	Make	Score
Natural Environment	Coniferous Trees (Scattered)	Natural	4
Natural Environment	Coniferous Trees (Scattered),Nonconiferous Trees (Scattered)	Natural	4
Natural Environment	Coniferous Trees (Scattered),Nonconiferous Trees (Scattered),Scrub	Natural	4
Natural Environment	Coniferous Trees (Scattered),Rough Grassland,Scrub	Natural	4
Natural Environment	Coniferous Trees (Scattered),Scrub	Natural	4
Natural Environment	Coniferous Trees,Nonconiferous Trees	Natural	4
Natural Environment	Coniferous Trees,Nonconiferous Trees,Scrub	Natural	4
Natural Environment	Coniferous Trees,Scrub,Nonconiferous Trees	Natural	4
Natural Environment	Nonconiferous Trees (Scattered),Coniferous Trees (Scattered)	Natural	4
Natural Environment	Nonconiferous Trees (Scattered),Rough Grassland,Scrub	Natural	4
Natural Environment	Nonconiferous Trees (Scattered),Scrub	Natural	4
Natural Environment	Nonconiferous Trees,Coniferous Trees	Natural	4
Natural Environment	Nonconiferous Trees,Coniferous Trees,Scrub	Natural	4
Natural Environment	Nonconiferous Trees,Coniferous Trees,Scrub	Natural	4
Natural Environment	Nonconiferous Trees,Rock (Scattered),Scrub	Natural	4
Natural Environment	Nonconiferous Trees,Scrub	Natural	4

Descriptive Group	Descriptive Term	Make	Score
Natural Environment	Nonconiferous Trees,Scrub,Coniferous Trees	Natural	4
Natural Environment,General Surface	Nonconiferous Trees,Coniferous Trees,Scrub	Natural	4
Natural Environment,Path	Nonconiferous Trees,Scrub	Natural	4
Natural Environment,Rail	Coniferous Trees,Nonconiferous Trees,Scrub	Natural	4
Natural Environment,Rail	Nonconiferous Trees	Natural	4
Natural Environment,Rail	Nonconiferous Trees (Scattered),Scrub	Natural	4
Natural Environment,Rail	Nonconiferous Trees,Scrub	Natural	4
Natural Environment,Rail	Rail,Nonconiferous Trees (Scattered)	Natural	4
Natural Environment,Rail	Rough Grassland,Scrub	Natural	4
Natural Environment,Rail,Structure	Nonconiferous Trees,Scrub	Natural	4
Natural Environment,Roadside	Coniferous Trees	Natural	4
Natural Environment,Roadside	Coniferous Trees (Scattered)	Natural	4
Natural Environment,Roadside	Coniferous Trees,Nonconiferous Trees	Natural	4
Natural Environment,Roadside	Coniferous Trees,Nonconiferous Trees,Scrub	Natural	4
Natural Environment,Roadside	Coniferous Trees,Scrub	Natural	4
Natural Environment,Roadside	Nonconiferous Trees	Natural	4
Natural Environment,Roadside	Nonconiferous Trees (Scattered)	Natural	4
Natural Environment,Roadside	Nonconiferous Trees (Scattered)	Natural	4

Descriptive Group	Descriptive Term	Make	Score
Natural Environment,Roadside	Nonconiferous Trees,Scrub	Natural	4
Natural Environment,Structure	Coniferous Trees,Nonconiferous Trees	Natural	4
Natural Environment	Boulders (Scattered),Rough Grassland,Scrub	Natural	3
Natural Environment	Coniferous Trees (Scattered),Nonconiferous Trees (Scattered)	Natural	3
Natural Environment	Coniferous Trees (Scattered),Nonconiferous Trees (Scattered),Rough Grassland,Scrub	Natural	3
Natural Environment	Coniferous Trees (Scattered),Rough Grassland,Scrub	Natural	3
Natural Environment	Coniferous Trees,Coppice Or Osiers,Nonconiferous Trees	Natural	3
Natural Environment	Coniferous Trees,Coppice Or Osiers,Nonconiferous Trees,Scrub	Natural	3
Natural Environment	Coniferous Trees,Scrub	Natural	3
Natural Environment	Coppice Or Osiers	Natural	3
Natural Environment	Coppice Or Osiers,Nonconiferous Trees	Natural	3
Natural Environment	Coppice Or Osiers,Nonconiferous Trees,Scrub	Natural	3
Natural Environment	Coppice Or Osiers,Scrub	Natural	3
Natural Environment	Nonconiferous Trees,Scrub,Spoil Heap (Inactive)	Natural	3
Natural Environment	Orchard	Natural	3

Descriptive Group	Descriptive Term	Make	Score
Natural Environment	Rough Grassland,Rock (Scattered)	Natural	3
Natural Environment	Rough Grassland,Scrub	Natural	3
Natural Environment	Rough Grassland,Scrub,Rock (Scattered)	Natural	3
Natural Environment	Scrub	Natural	3
Natural Environment	Scrub,Coniferous Trees	Natural	3
Natural Environment	Scrub,Coniferous Trees (Scattered)	Natural	3
Natural Environment	Scrub,Coniferous Trees,Nonconiferous Trees	Natural	3
Natural Environment	Scrub,Nonconiferous Trees	Natural	3
Natural Environment	Scrub,Nonconiferous Trees (Scattered)	Natural	3
Natural Environment	Scrub,Nonconiferous Trees,Coniferous Trees	Natural	3
Natural Environment	Scrub,Rough Grassland	Natural	3
Natural Environment,Rail	Scrub	Natural	3
Natural Environment,Rail	Scrub,Nonconiferous Trees	Natural	3
Natural Environment,Rail,Structure	Bridge,Nonconiferous Trees,Scrub	Natural	3
Natural Environment,Road Or Track	Orchard	Natural	3
Natural Environment,Roadside	Rough Grassland,Scrub	Natural	3
Natural Environment,Roadside	Scrub	Natural	3

Descriptive Group	Descriptive Term	Make	Score
Natural Environment,Roadside,Structure	Bridge,Nonconiferous Trees	Natural	3
Natural Environment,Structure	Bridge,Nonconiferous Trees	Natural	3
General Surface	Agricultural Land	Natural	2
General Surface	Mineral Workings (Inactive)	Natural	2
General Surface	Spoil Heap (Inactive)	Natural	2
General Surface	n/a	Natural	2
General Surface,Rail,Structure	Bridge	Natural	2
General Surface,Rail,Structure	n/a	Natural	2
General Surface,Road Or Track	n/a	Natural	2
General Surface,Roadside,Structure	Bridge	Natural	2
General Surface,Roadside,Structure	n/a	Natural	2
General Surface,Structure	Bridge	Natural	2
General Surface,Structure	n/a	Natural	2
Inland Water,Road Or Track	Ford	Natural	2
Inland Water,Structure	Aqueduct, Watercourse	Natural	2
Inland Water,Structure	Reservoir	Manmade	2
Landform,Road Or Track	Cliff	Natural	2

Descriptive Group	Descriptive Term	Make	Score
Natural Environment	Coniferous Trees,Mineral Workings (Inactive),Nonconiferous Trees	Natural	2
Natural Environment	Coniferous Trees,Mineral Workings (Inactive),Nonconiferous Trees,Scrub	Natural	2
Natural Environment	Mineral Workings (Inactive),Nonconiferous Trees	Natural	2
Natural Environment	Mineral Workings (Inactive),Nonconiferous Trees	Natural	2
Natural Environment	Mineral Workings (Inactive),Nonconiferous Trees (Scattered)	Natural	2
Natural Environment	Mineral Workings (Inactive),Rough Grassland	Natural	2
Natural Environment	Mineral Workings (Inactive),Rough Grassland,Scrub	Natural	2
Natural Environment	Mineral Workings (Inactive),Scrub	Natural	2
Rail	n/a	Natural	2
Road Or Track	Track	Natural	2
Road Or Track,Structure	Track	Natural	2
Roadside	n/a	Natural	2
Roadside,Structure	n/a	Manmade	2
Roadside,Structure	n/a	Natural	2
Slope	n/a	Natural	2

Descriptive Group	Descriptive Term	Make	Score
Building	Archway	Manmade	0
Building	Chimney	Manmade	0
Building	Electricity Sub Station	Manmade	0
Building	Gas Governor	Manmade	0
Building	Public Convenience	Manmade	0
Building	Rail	Manmade	0
Building	Road Or Track	Manmade	0
Building	Signal	Manmade	0
Building	Structure	Manmade	0
Building	Structure, Footbridge	Manmade	0
Building	Structure, Tank	Manmade	0
Building	Tank	Manmade	0
Building	Well	Manmade	0
Building	n/a	Manmade	0
General Surface	Electricity Sub Station	Manmade	0
General Surface	Gas Governor	Manmade	0
General Surface	Landfill	Manmade	0
General Surface	Mineral Workings	Manmade	0
General Surface	Multi Surface	Multiple	0
General Surface	Public Convenience	Manmade	0

Descriptive Group	Descriptive Term	Make	Score
General Surface	Slipway	Manmade	0
General Surface	Sloping Masonry	Manmade	0
General Surface	Step	Manmade	0
General Surface	Tank	Manmade	0
General Surface	Tidal Water	Manmade	0
General Surface	n/a	Manmade	0
General Surface,Rail,Structure	Bridge	Manmade	0
General Surface,Structure	Bridge	Manmade	0
General Surface,Structure	Footbridge	Manmade	0
General Surface,Structure	Footbridge,Step	Manmade	0
General Surface,Structure	Step	Manmade	0
General Surface,Structure	n/a	Manmade	0
Glasshouse	n/a	Manmade	0
Historic Interest,Structure	Cross	Manmade	0
Inland Water	Conduit	Manmade	0
Inland Water	Drain	Natural	0
Inland Water	Lock	Manmade	0
Inland Water	Mill Leat	Manmade	0
Inland Water	Swimming Pool	Manmade	0
Inland Water,Structure	Fountain	Manmade	0

Descriptive Group	Descriptive Term	Make	Score
Inland Water,Structure	Weir	Manmade	0
Inland Water,Structure	Well	Manmade	0
Landform,Rail	Slope	Manmade	0
Landform,Road Or Track	Slope	Manmade	0
Path	Electricity Sub Station	Manmade	0
Path	Gas Governor	Manmade	0
Path	Roadside	Manmade	0
Path	Step	Manmade	0
Path	n/a	Manmade	0
Path,Structure	Bridge	Manmade	0
Path,Structure	Footbridge	Manmade	0
Path,Structure	Footbridge	Natural	0
Path,Structure	Footbridge,Step	Manmade	0
Path,Structure	Lock Gate	Manmade	0
Path,Structure	Step	Manmade	0
Path,Structure	n/a	Manmade	0
Path,Structure	n/a	Natural	0
Rail	Electricity Sub Station	Manmade	0
Rail	n/a	Manmade	0
Rail,Road Or Track	Level Crossing	Manmade	0

Descriptive Group	Descriptive Term	Make	Score
Rail,Structure	Bridge	Manmade	0
Rail,Structure	Rail Signal Gantry	Manmade	0
Rail,Structure	n/a	Manmade	0
Road Or Track	Traffic Calming	Manmade	0
Road Or Track	n/a	Manmade	0
Road Or Track,General Feature	n/a	Manmade	0
Road Or Track,Structure	Bridge	Manmade	0
Road Or Track,Structure	n/a	Manmade	0
Roadside	n/a	Manmade	0
Roadside	n/a	Unknown	0
Roadside,Structure	Bridge	Manmade	0
Roadside,Structure	Gantry	Manmade	0
Slope	n/a	Manmade	0
Sloping Masonry	n/a	Manmade	0
Structure	Chimney	Manmade	0
Structure	Conveyor	Manmade	0
Structure	Conveyor,Overhead Construction	Manmade	0
Structure	Crane	Manmade	0
Structure	Electricity Sub Station	Manmade	0
Structure	Inland Water	Manmade	0

Descriptive Group	Descriptive Term	Make	Score
Structure	Pylon	Manmade	0
Structure	Tank	Manmade	0
Structure	Telecommunications Mast	Manmade	0
Structure	Upper Level Of Communication	Manmade	0
Structure	Wind Turbine	Manmade	0
Structure	n/a	Manmade	0
Unclassified	n/a	Unclassified	0

Appendix C

Selected settlements for N01 seeing settlements

Table C-1: Selected settlements for N01 seeing settlements

Selected settlements
Abingdon-on-Thames
Benson
Berinsfield
Blewbury
Botley
Chalgrove
Chinnor
Chilton (Vale of White Horse)
Cholsey
Crowmarsh Gifford
Cumnor
Didcot
Drayton
East Challow
East Hendred
Faringdon
Goring

Selected settlements
Grove
Harwell
Harwell Campus
Henley-on-Thames
Kennington
Kingston Bagpuize with Southmoor
Marcham
Nettlebed
Radley
Shrivenham
Sonning Common
Stanford-in-the-Vale
Steventon
Sutton Courtenay and Milton
Thame
Uffington
Wallingford
Wantage
Watchfield
Watlington
Wheatley
Woodcote
Wootton
Aldbourne
Appleton

Selected settlements
Askett and Whiteleaf
Bampton (West Oxfordshire)
Bledlow Ridge
Boars Hill
Bradfield (West Berkshire)
Brightwell-cum-Sotwell
Broad Blunsdon
Burchett's Green
Burghfield
Carterton
Caversham
Charvil
Chiseldon
Clifton Hampden
Compton (West Berkshire)
Dunfield
East Hanney
Eynsham
Fairford
Freeland
Garsington
Haddenham (Buckinghamshire)
Highworth
Horspath
Hurley (Windsor and Maidenhead)

Appendix C Selected settlements for N01 seeing settlements

Selected settlements
Hurst
Kidlington
Knowl Hill
Lacey Green and Loosley Row
Lambourn
Lambourn Woodlands
Lane End
Lechlade-on-Thames
Long Crendon
Long Hanborough
Longwick
Lower Shiplake
Milton Hill
Moulsford
Oxford
Pangbourne
Princes Risborough
Reading
Shinfield
Shippon
Sindlesham
Sonning
Spencers Wood and Three Mile Cross
Standlake
Stoke Row

Selected settlements
Stokenchurch
Stratton St Margaret
Streatley (West Berkshire)
Sutton Courtenay
Swindon (Swindon)
Theale (West Berkshire)
Twyford (Wokingham)
Upper Arncott
Upper Basildon
Walter's Ash and Naphill
Waltham St Lawrence
Wanborough
Warborough and Shillingford
Wargrave
Watlington (South Oxfordshire)
Winnersh
Woodley
Woodstock
Worminghall
Yarnton

Appendix D

Selecting industrial buildings and warehouses for N03

The AddressBasePlus CSV file was filtered as per the following table to select the location points corresponding to factory, manufacturing, warehouse, storage, storage depot, postal sorting/distribution, wholesale distribution in South Oxfordshire and Vale of White Horse District Councils. The selected points were matched using a 10m radius search to their corresponding building footprint from OS Mastermap dataset.

Table D-1: Selecting industrial buildings and warehouses for N03

Concatenated	Class	Primary	Secondary	Tertiary	Quaternary
CI01	Factory/Manufacturing	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Factory/Manufacturing	n/a

Concatenated	Class	Primary	Secondary	Tertiary	Quaternary
CI01BW	Brewery	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Factory/Manufacturing	Brewery
CI01CM	Chemical Works	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Factory/Manufacturing	Chemical Works

Concatenated	Class	Primary	Secondary	Tertiary	Quaternary
CI01DA	Dairy Processing	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Factory/Manufacturing	Dairy Processing
CI01MG	Manufacturing	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Factory/Manufacturing	Manufacturing

Concatenated	Class	Primary	Secondary	Tertiary	Quaternary
CI01PW	Printing Works	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Factory/Manufacturing	Printing Works
CI01SW	Steel Works	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Factory/Manufacturing	Steel Works

Concatenated	Class	Primary	Secondary	Tertiary	Quaternary
CI04	Warehouse / Store / Storage Depot	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Warehouse / Store / Storage Depot	n/a
CI04PL	Postal Sorting / Distribution	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Warehouse / Store / Storage Depot	Postal Sorting / Distribution

Concatenated	Class	Primary	Secondary	Tertiary	Quaternary
CI05	Wholesale Distribution	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Wholesale Distribution	n/a
CI06	Recycling Plant	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Recycling Plant	n/a

Concatenated	Class	Primary	Secondary	Tertiary	Quaternary
CI07	Incinerator / Waste Transfer Station	Commercial	Industrial Applicable to manufacturing, engineering, maintenance, storage / wholesale distribution and extraction sites	Incinerator / Waste Transfer Station	n/a

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