HyNet North West

ENVIRONMENTAL STATEMENT (VOLUME III)

Appendix 9-4 – Bats and Hedgerows Assessment (Tracked Change)

HyNet Carbon Dioxide Pipeline DCO

Planning Act 2008

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1. INTRODUCTION

1.1. DCO ~~PROPOSED~~PROPOSED DEVELOPMENT

1.1.1. This technical appendix supports the assessment contained in **Chapter 9 ~~–~~: Biodiversity (Revision B) (Volume II).**

1.1.1. This **Revision B** of **Appendix 9.4 – Bats and Hedgerows Assessment** replaces and supersedes **Revision A** of **Appendix 9.4 (APP-102 to APP-105)** to take account of updated survey data that was not presented within the **Revision A**.

1.1.2. The Applicant intends to build and operate a new underground carbon dioxide (CO_2) pipeline from Cheshire, England to Flintshire, Wales with necessary Above Ground Installations (AGIs) and Block Valve Stations (BVSs). It is classed as a Nationally Significant Infrastructure Project (NSIP) and will require a Development Consent Order (DCO) under the Planning Act 2008 ('PA2008') granted by the Secretary of State for Business, Energy and Industrial Strategy (BEIS).

1.1.3. The DCO Proposed Development will form part of HyNet North West ('the Project'), which is a hydrogen supply and Carbon Capture and Storage ('CCS') project. The goal of the Project is to reduce CO_2 emissions from industry, homes and transport and support economic growth in the North West of England and North Wales. The wider Project is based on the production of low carbon hydrogen from natural gas. It includes the development of a new hydrogen production plant, hydrogen distribution pipelines, hydrogen storage and the creation of CCS infrastructure. CCS prevents CO_2 entering the atmosphere by capturing it, compressing it and transporting it for safe, permanent storage.

1.1.4. The DCO Proposed Development is a critical component of HyNet North West which, by facilitating the transportation of carbon, enables the rest of the Project to be low carbon. The hydrogen production, distribution and CO_2 capture and storage elements of the Project do not form part of the DCO Proposed Development and will be delivered under separate consenting processes.

1.1.5. The DCO Application will seek consent for the construction, operation and maintenance of the following components which are part of the DCO Proposed Development, namely:

- **Flint Connection to Point of Ayr (PoA) Terminal Pipeline** – a section of existing Connah's Quay to Point of Ayr (PoA) underground onshore pipeline (24" in diameter) which currently transports natural gas but would be

repurposed and reused to transport CO_2. The Flint Connection to PoA Terminal Pipeline is scoped out of the EIA, except for the areas adjacent to the three BVSs that are within the Newbuild Infrastructure Boundary;

- **Four AGIs** - Ince AGI, Stanlow AGI, Northop Hall AGI, and Flint AGI;
- **Six Block Valve Stations (BVSs)** - located along:
  - The new Stanlow AGI to Flint AGI Pipeline (three in total);
  - The existing Flint Connection to PoA Terminal Pipeline (three in total);
- **Other above ground infrastructure**, including Cathodic Protection (CP) transformer rectifier cabinets and pipeline marker posts;
- **Utility Connection infrastructure**, including power utilities and Fibre Optic Cable (FOC); and
- **Temporary ancillary works** integral to the construction of the Carbon Dioxide Pipeline, including Construction Compounds and temporary access tracks.

1.1.6. Further details of each element of the DCO Proposed Development are set out in **Chapter 3 – Description of the DCO Proposed Development (Volume II~~).~~) (APP-055).**

1.2. ECOLOGICAL BACKGROUND

1.2.1. Extended Phase 1 habitat surveys were undertaken from March 2021 to June 2022 across the Newbuild Infrastructure Boundary for the DCO Proposed Development. The Newbuild Infrastructure Boundary is predominantly arable through industrial and rural village landscapes. Hedgerows, woodland, and grassland habitats were present throughout and will be subject to both the direct and indirect effects of the DCO Proposed Development. A detailed description of habitats is provided in **Appendix 9.1 - Habitats and Designated Sites Survey Report ~~(Volume III~~**of the **2022 ES (APP-091 - APP-093~~)~~**.

1.2.2. The ~~Extended~~extended Phase 1 habitat surveys incorporated an ecological desk study that was completed in November 2021. The desk study reviewed existing ecological baseline information, recorded the habitats present and identified the presence, or potential presence, of protected habitats or species which could pose legal and, or planning constraints. This included bat species

data recorded within 5km of the Newbuild Infrastructure Boundary from the last 10 years (as of February 2020). Additionally, habitat with high suitability for bats was reviewed, with Ancient Woodland data from Natural Resources Wales (NRW) and Natural England (NE), along with Ancient Hedgerow data compiled from digitised historical maps from Cheshire Archives and Local Studies and National Library of Wales utilised.

1.3. BRIEF ~~SCOPE~~SCOPE AND OBJECTIVES

1.3.1. The Applicant commissioned hedgerow surveys of all hedgerows located within the Newbuild Infrastructure Boundary. The purpose of this survey was to:

- Assess the potential for hedgerows along the Newbuild Infrastructure Boundary to support bats and determine the type of activity and the species utilising the hedgerows;
- Determine whether the hedgerows could be classed as 'Poor', 'Good' or 'Excellent' under the criteria developed by the Applicant that would inform survey effort, such as, automated static detectors and ~~crossing point~~modified DEFRA Local Scale surveys;
- Identify any resultant legal or planning constraints; and
- Make recommendations with regards to mitigation/compensation requirements should loss or breaching of 'Good' or 'Excellent' be unavoidable.

1.3.2. This report (Revision B) supersedes Revision A. Further surveys were completed from July 2022 to September 2022 which were not reported within Revision A. The results of these surveys are presented within this report. The impact assessment and recommendations for compensation and mitigation are presented within **Chapter 9 ~~–~~: Biodiversity (Revision B) (Volume II).**

1.3.3. The bats and hedgerow assessment detailed within this report, is an innovative approach developed by the Applicant. Liaison regarding this innovative approach has been ~~completed~~conducted with Natural Resources Wales and Natural England, with methodologies and approach agreed and detailed within **Table 9.1, Chapter 9 ~~–~~: Biodiversity (Revision B) (Volume II).**

1.4. RELEVANT LEGISLATION AND POLICY

1.4.1. This report has been compiled with reference to the following relevant nature conservation legislation, planning policy and the UK Biodiversity Framework from which the protection of sites, habitats and species is derived in England.

1.4.2. In England and Wales, the Wildlife and Landscape Criteria in the ~~Hedgerow~~Hedgerows Regulations 1997 (**Ref. ~~51~~51**) (hereafter referred to as 'the Regulations') are intended to protect 'Important' countryside hedgerows from destruction or damage. Hedgerows are assessed against a number of criteria in

relation to their archaeology, and history, and wildlife and landscape value, from which it is determined whether a hedgerow is Important as defined by the Regulations.

1.4.3. As laid out in **Section ~~2.~~2**, the criteria outlined in the Regulations were adapted to fit with a tailored approach aimed towards bat interactions with hedgerows. This drew on several important criteria from the Regulations – see **paragraph ~~2.2.4~~2.2.4** – and as such both 'Excellent' and 'Good' Bat Hedgerow Suitability Assessment (BHSA) classified hedgerows were recognised as equivalents to Important under the Regulations.

1.4.4. Under the Regulations, any person wishing to remove a hedgerow must submit a hedgerow removal notice to the Local Planning Authority (LPA). The LPA will then decide whether to approve the notice or issue a hedgerow retention notice if the hedgerow has been identified as Important under the Regulations.

1.4.5. All native hedgerows are also listed as Habitats of Principal Importance (HPI) in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act (2006) (**Ref. ~~6~~2**). HPIs are habitats in England and Wales that were identified as requiring action in the UK Biodiversity Action Plan (UK BAP) and continue to be regarded as conservation priorities in the UK Post-2010 Biodiversity Framework which superseded the UK BAP. The definition of this priority habitat has been amended from the pre-existing Habitat Action Plan for ancient and/or species-rich hedgerows and is as follows: A hedgerow is defined as any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less that 20m wide (**Ref. ~~2~~;1, Ref. ~~5~~).~~3~~,).

1.4.6. Under Section 40 of the NERC Act (2006) (**Ref. ~~6~~2**), LPAs are required to have due regard for these habitats when exercising their functions, including determining planning applications.

1.4.7. Bat species are afforded a high level of protection under the Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations') (**Ref. ~~3~~4**). The legislation outlines that it is an offence to

- *'Deliberately capture, injure, or kill a bat,*
- *Damage or destroy a breeding site or resting place of a bat*
- *Deliberately disturb bats in such a way as to be likely*

  a) to impair their ability -

  i) to survive, to breed or reproduce, or to rear or nurture their young; or

  ii) to hibernate or migrate; or
- *to affect significantly the local distribution or abundance of the species'.*

1.4.8. Protection is also partially afforded under the Wildlife and Countryside Act 1981 (as amended) (**Ref. ~~45~~5**) with respect to disturbance of animals when using places of shelter or protection, and obstruction of access to places of shelter or protection.

1.4.9. Certain species of bats including noctule *Nyctalus noctula*, brown long-eared bat *Plecotus auritus* and soprano ~~pipistrelles~~pipistrelle *Pipistrellus pygmaeus* are also listed as a Species of Principal Importance (SPI) for the Conservation of Biodiversity in accordance with Section 41 of the NERC Act 2006 (**Ref. ~~6~~2**). Under Section 40 of the NERC Act (**Ref. ~~6~~2**), public bodies (including local planning authorities) have a duty to have regard for the conservation of SPI when carrying out their functions, including determining planning applications.

1.4.10. Certain species of bat, including barbastelle *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, noctule, brown long-eared bat, lesser horseshoe bat *Rhinolophus hipposideros*, greater horseshoe bat *Rhinolophus ferrumequinum*, common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle are also listed as SPI for the purpose of maintaining and enhancing biodiversity in relation to Wales under Section 7 of the Environment (Wales) Act 2016 (**Ref. ~~8~~6**). Section 6 under Part 1 introduced an enhanced biodiversity and resilience of ecosystems duty (the S6 duty) for public authorities in the exercise of functions in relation to Wales, superseding provisions previously set out in the NERC Act 2006 (**Ref. ~~6~~2**).

2. ~~BASELINE~~BASELINE METHODOLOGY

2.1. DESK BASED ASSESSMENT

POTENTIAL HEDGEROW MAPPING

2.1.1. Before field surveys commenced, potential hedgerows were mapped using freely available aerial imagery to help gain an understanding of the extent of the hedgerow count across the Newbuild Infrastructure Boundary and plan surveys accordingly.

ANCIENT HEDGEROW SEARCH

2.1.2. An Ancient Hedgerow search was undertaken for the DCO Proposed Development, using digitised maps from the National Library of Wales and Cheshire Archives.

2.1.3. Any results of the ancient hedgerow search were then checked against the potential hedgerow database before the extended Phase 1 habitat surveys of the hedgerow locations ~~would~~to determine if these ancient hedgerows still ~~exist~~existed.

EXTENDED PHASE 1 HABITAT SURVEYS

2.1.4. Extended Phase 1 habitat surveys were undertaken from March 2021 until November 2021 and continued from January 2022 until June 2022. The data collected on these surveys was ~~utilised~~used to ground-truth the desk based data and add additional optimal bat habitat for consideration within the final BHSA calculation. Once hedgerows were identified/confirmed through the extended Phase 1 habitat surveys, a hedgerow survey was undertaken.

TREE AND STRUCTURE ROOST ASSESSMENT

2.1.5. Preliminary Bat Roost Assessments (PBRA), Aerial Inspections, and Dusk Emergence/ Dawn Re-entry Surveys were undertaken to assess the potential direct and indirect effects of the DCO Proposed Development during construction and operation (emphasis on construction rather than operation due to the nature of the DCO Proposed Development) on bats.

2.1.6. The roost surveys were completed within the Newbuild Infrastructure Boundary and were taken into consideration when undertaking the BHSA. Potential and known roosts identified throughout the survey season were mapped alongside the desk-study data and where possible were included within the BHSA.

2.1.7. Roosts recorded after the completion of BHSA were taken into consideration during the data analysis and mitigation design. Bat activity data from roost surveys are available in **Appendix 9.3 Bat Activity Survey Report (Revision B) (Volume III)**.

2.2. HEDGEROW ASSESSMENT

2.2.1. Hedgerow survey data was recorded using the ArcGIS Collector application (© ESRI) on tablets. Digital proformas were filled in on the application. The location of the hedgerow was recorded and images of the hedgerow captured. This method of recording data commenced during June 2021, as all previous surveys undertaken using paper proformas were subsequently digitised.

HEDGEROW FIELD SURVEYS

2.2.2. The hedgerow field survey undertaken across the Newbuild Infrastructure Boundary aimed to collect data on specific characteristics taken to be beneficial to bat community and diversity. Aligning with Biodiversity Net Gain (BNG) assessment, a hedgerow condition assessment within the Higher Level Stewardship Farm Environment Plan (FEP) Manual (**Ref. ~~11~~7**) was used to influence elements of the assessment categories, alongside a literature review (**Annex B**) of relevant research and guidance notes.

2.2.3. In accordance with the Regulations, the hedgerows were measured from the point or points where there was a gap of more than 20 metres between the end of the hedgerow and the nearest line of hedgerow. Gaps within a hedgerow were included in the total length provided they were 20 metres or less in length.

2.2.4. Notes were made on the following in accordance with the criteria outlined in ~~**Table 1:**~~**Table 1**:

- Hedgerow length, calculated automatically in the ArcGIS Collector application;
- Hedgerow height; measured from the base of woody growth, excluding trees and banks;
- Hedgerow width, measured from the widest point of the hedgerow canopy;
- Number of woody species in the hedgerow length, including species name;
- Number of standard trees, across the entire hedgerow. This was then used with the hedgerow length to calculate the number of trees within each 50m stretch of hedgerow;
- Number of gaps in the hedge, measured as a percentage of the total length of the hedgerow; and
- Presence of ditches (whether wet, dry or absent).

BHSA CALCULATION

2.2.5. All hedgerows within the Newbuild Infrastructure Boundary were surveyed with regard for the information required by the criteria in the BHSA calculator. This was developed using a similar approach to the Great Crested Newt *Triturus cristatus* (GCN) Habitat Suitability Index (HSI) survey, where a number of

factors are assessed for hedgerows that provide an estimate of the likely use of that habitat by bats. With the aim that by undertaking this BHSA, survey effort can be better focused across the Newbuild Infrastructure Boundary, resulting in a proportionate survey effort.

2.2.6. The criteria, outlined in ~~Table 1,~~**Table 1**, were developed to help establish the habitat suitability of each hedgerow for supporting the extant bat populations. This was developed after a literature review looking at which features and characteristics of hedgerows and surrounding habitat influence bat populations positively and negatively (**Annex D**).

2.2.7. The findings of the literature review, combined with the expert opinion of a full member of CIEEM and specialist bat ecologist with over 15 years bat survey and analysis experience, informed the final criteria. This approach was further ratified by stakeholder liaison with NE and NRW, with feedback from both informing the final criteria.

Table 1 - BHSA ~~criteria developed~~Criteria Developed by WSP

Criteria	Output	BHSA ~~scoring~~Scoring
Height	Metres	≥2 = 3 ≥1 = 2 ≥0 = 1
Width	Metres	≥1.5 = 3 ≥1 = 2 ≥0 = 1
Gappiness	As a percentage of the total length.	>20 = 1 >10 = 2 ≥0 = 3
Woody Species Diversity	Number of woody species present along the entire length of the hedgerow.	>6 = ~~Important =~~ 3 >3 = ~~Good =~~ 2 ≥0 = ~~Poor =~~ 1
Ditch present	Wet/ Dry/ Absent	Wet = 2 Dry/Absent = 1
Arable field margin	Metres	≥5.1 = 4

Criteria	Output	BHSA ~~scoring~~Scoring
		≥2.1 = 3 ≥0.1 = 2 ≥0 = 1
Number of trees	Number of trees present per 50m of hedgerow[1]	≥6 = 4 ≥3 = 3 ≥1 = 2 ≥0 = 1

2.2.8. Each of the outputs from the criteria were given a score that was then used to calculate an overall BHSA number. The equation outlined shows how the BHSA score was reached. The score was then used to categorise the hedgerows into the three BHSA categories. The score thresholds for each BHSA category can be seen in ~~Table 2.~~**Table 2**.

$$BHSA = (Sl1 * Sl2 * SI3 * SI4 * Sl5 * SI6 * Sl7)^{1/7}$$

2.2.9. The above criteria and calculations give a maximum score of 3.07, a minimum score of 1, and a range of 2.07. The threshold scores for each BHSA category were ~~set using~~ calculated by dividing the range by three and using the intervals of the calculated thirds from the minimum BHSA score upwards.

Table 2 - BHSA ~~score translation~~Score Translation

BHSA Category	BHSA Score
Excellent	≥2.4
Good	1.7 – 2.39
Poor	1 -1.69

[1] Hedgerow length was calculated automatically using the ESRI ArcGIS Collector application and was then used to calculate the number of trees per 50m post survey.

2.2.10. The BHSA categories attributed to each hedgerow set the level of further survey effort. All 'Good' and 'Excellent' category hedgerows were subject to further survey using Song Meter SM4BAT Full Spectrum (FS) static bat detectors (© Wildlife Acoustics Inc.) (hereafter referred to as 'Statics'). Whereas 'Poor' category hedgerows were discounted and not subject to further survey.

2.2.11. Parameters were developed, highlighted in ~~**Table 3,**~~**Table 3**, that discounted ~~'Not assessed'~~ 'Good' and 'Excellent' hedgerows when certain criteria were met.

2.2.12. Hedgerows ~~categorised as 'Not Yet Assessed' are listed within **Annex E** as rows with n/a inputs. These hedgerows are categorised as such due to field surveys not yet having taken place on the hedgerow, with the intention to undertake a survey. Additionally, hedgerows~~ that ~~have been~~were scoped out in advance of surveying, using the parameters outlined in ~~**Table 3** in advance of surveying are also~~ **Table 3**, are detailed in **Annex E**.

Table 3 – Hedgerow ~~discount parameters~~Discount Parameters

Hedgerow Parameters	Justification
Adjoining residential	Hedgerows adjoining residential ~~are~~areas under the assumption that they will be avoided by the DCO Proposed Development and thus any bat activity along the hedgerow is unlikely to be severed by the Proposed Development.
Hedgerow located parallel to proposed route and thus easier to avoid.	Where the hedgerow is located parallel to the indicative Newbuild Carbon Dioxide Pipeline route, with space to allow avoidance, assumptions have been made that the hedgerow will be avoided in favour of open fields and thus the direct and indirect effects on the hedgerow and any associated bat activity will be reduced significantly.
Over 50% of hedgerow located within 50m of main roads[2].	If over 50% of the hedgerow's length (within the Newbuild Infrastructure Boundary) was within 50m of a main road then the hedgerow was downgraded to poor due to the environment main roads create not being

[2] 'Main roads' were defined by expert opinion from field ecologists based on vast experience working across the entire Development and the typical flow of traffic and any on-street lighting they experienced on those roads. The only caveat for not

Hedgerow Parameters	Justification
	conducive to bat activity, as is referenced in Berthinussen and Altringham's research (**Ref. 1**).

BHSA MODIFICATIONS

2.2.13. Due to the BHSA being an innovative assessment, liaison was undertaken with NE and NRW. Through liaison and completing the ~~initials~~initial stages of the assessment, the BHSA approach was modified.~~-~~ Alterations and justifications for the changes are detailed within **Annex C.**

2.3. AUTOMATED STATIC DETECTOR ASSESSMENT

FIELD ~~SURVEY~~SURVEY

2.3.1. The automated static detector assessment was ~~utilised as a comparison between~~used to assess BHSA categorised 'Good' and 'Excellent' hedgerows~~.~~, in order to assess their original categorisation. The process described in **Section ~~2.2~~2.2** outlines the criteria that was involved in calculating a hedgerows BHSA score and the parameters that could discount an eligible hedgerow from requiring an automated static detector assessment.

2.3.2. Statics were located on 'Good' and 'Excellent' hedgerows to collect recordings of bat echolocation calls and help identify bat activity levels along each hedgerow.

2.3.3. Statics were positioned to cover either individual or groups of hedgerows depending on proximity and connectivity. The hedgerows were assessed as individuals or groups based on the professional judgement of a suitably experienced ecologist and reviewed by a bat specialist with over 15 years bat survey and analysis experience. ~~Statics were deployed once per season[3] and set recording for a minimum of five consecutive nights. The detectors were programmed to start recording 30 minutes before sunset and stop recording 30 minutes after sunrise on each night~~For 'individual' hedgerows, statics were placed in the centre of the hedgerow where possible. For 'grouped' hedgerows, statics were placed in the best position along a hedgerow to cover all hedgerows within the group, where possible.

downgrading due to proximity to main roads was that the hedgerow was tall and dense enough to provide sufficient cover from noise and light pollution.

[3] ~~Seasons = spring (April/May); summer (June/July); autumn (August/September).~~

~~DATA ANALYSIS~~

2.3.4. Statics were deployed three times, once per season[4], and set to record for a minimum of five consecutive nights. The detectors were programmed to turn on at sunset and turn off at sunrise on each night.

2.3.5. The statics were triggered to begin recording when a signal exceeding 16khz was detected (a 'trigger event'). Recording continued until there was a gap of 3 seconds between signals, whereafter the recording would stop. At the next trigger event, a new recording would then be created, resulting in one sound file recording per trigger event.

2.3.6. The survey effort for automated static detector assessments on qualifying hedgerows can be seen in **Table 4**.

Table 4 - Automated Static Detector Assessment Effort 2022

	1 Deployment	2 Deployments	3 Deployments	No deployments
Individual Static	3	10	48	10
Group Static	2	8	40	2

2.3.7. Of the 193 hedgerows which required an automated static detector assessment, 143 were assessed in all three seasons. The locations of the static deployments are presented in **Figure 9.4.3 (Annex A).** Of the remaining hedgerows, seven were assessed in only one season, 29 in only two seasons, and 15 were not subject to any static detector assessment. A full list of all hedgerows which were not subject to the full survey effort, and the reason for this, is provided within **Section 2.7**.

DATA ANALYSIS

~~2.3.4.~~2.3.8. Bat echolocation call recordings gathered from the ~~automated static detector assessment~~Statics were analysed using specialist computer software Wildlife Acoustics Kaleidoscope Pro 5.4.7~~.~~ (KalPro).

~~2.3.5. All .wav files recorded on the Statics (hereafter referred to as 'Static data') were cut into 15 second files using Kaleidoscope Pro software and auto-analysed by the auto-identification feature within Kaleidoscope Pro. The 15 second file was used to define a single~~A 'bat pass'~~.~~ was defined as one trigger event. If multiple species were recorded within a single recording file, there would be one bat

[4] Seasons = spring (April/May); summer (June/July/August); autumn (September/October).

pass ~~would be one~~ for each species recorded. This approach was used to standardise the definition of a bat pass.

~~2.3.6.~~2.3.9. It should be recognised that a series of separate sound files may represent a series of different bats commuting within the range of an automated detector, or a smaller number of bats repeatedly triggering the detector (e.g. bats making repeated foraging passes within the range of a detector).~~All files categorised as 'noise', 'no.id', any species that was not a *Pipistrellus* sp., and *Pipistrellus* sp. calls with a confidence rating of 0.7 or below by the auto-identification analysis were analysed by a suitably experienced ecologist.~~

2.3.10. All files were categorised by the auto-identification analysis on KalPro. All files identified as 'noise', 'no.id', and species which were not a *Pipistrellus* sp., were subject to manual analysis. Additionally, *Pipistrellus* sp. calls with an identification confidence rating of 0.7 or below, were subsequently manually analysed. The manual analysis was completed by a suitably experienced ecologist to confirm or alter the auto-identification.

~~2.3.7.~~2.3.11. A random 10% of the manually checked common pipistrelle ~~*Pipistrellus pipstrellus*~~ and soprano pipistrelle ~~*Pipistrellus pygmaeus* and a separate random 10% of all other species, that were manually analysed~~calls with an identification confidence rating of 0.5 or below, were then quality assured by suitably qualified ecologists with many years' experience analysing bat data. For all other species and noise files, which had been manually analysed, a random 10% was taken of each category and also quality assured to ~~ensure~~confirm no bat echolocation calls were being routinely mis-identified ~~by the auto-identification analysis~~.

~~2.3.8.~~2.3.12. The number of bat passes recorded was ~~utilised~~used to calculate a Bat Activity Index Value (BAIV~~), which~~). This provides an indication of the activity levels of each bat species ~~activity levels for~~ at each hedgerow, per season, and overall, that was identified for an automated static detector assessment~~, in each season, and overall, for~~ within the Newbuild Infrastructure Boundary.

2.3.13. The BAIV of each species, and overall, for the assessed hedgerows was calculated ~~for each automated static detector assessment. The Static data is represented as bat passes per night for each automated static detector assessment. This BAIV was calculated by dividing~~using the number of bat passes per night recorded during each automated static detector assessment. The number of bat passes was divided by the total number of nights the automated static detector assessment ~~consisted of~~took place. This provided ~~an~~the average passes per night (ppn) for each bat species and the ppn overall for all species combined (the 'total ppn'), for each assessed hedgerow.

2.3.14. Inter-quartile analysis was used to identify hedgerows with particularly high ppn in each season. This assessment included the calculation of the lower (1st),

middle (2nd) and upper (3rd) quartiles[5] of the ppn data. The 1st quartile was then subtracted from the 3rd quartile, to give the inter-quartile range[6]. The 'upper bound'[7] of the inter-quartile range was calculated using the below method, where x is the 'upper bound', y is the 3rd quartile and z is the inter-quartile range:

$$X = Y + (1.5 * Z)$$

2.3.15. This was repeated to calculate quartiles and an 'upper bound' for the ppn of each individual bat species in each season, as well as for the total ppn in each season. This enabled an assessment of whether hedgerows had particularly high or low numbers of ppn:

- Where the ppn, either for a particular bat species or overall, exceeded the relevant 3rd quartile, the number of ppn was considered 'high'. This was used to indicate hedgerows with a high level of bat activity (species-specific or in total).
- Where the ppn, either for a particular bat species or overall, was lower than the relevant 1st quartile, the number of ppn was considered 'low'. This was used to indicate hedgerows with low levels of bat activity (species-specific or in total).
- Where the ppn, either for a particular bat species or overall, exceeded the relevant 'upper bound', the number of ppn was considered to be exceptionally higher than expected. This was used to indicate hedgerows with a particularly notable level of bat activity (species-specific or in total), which may be especially suitable or important for supporting bat populations.

2.3.16. Leisler's bat *Nyctalus leisleri*, serotine *Eptesicus serotinus* and Nathusius' pipistrelle *Pipistrellus nathusii* had an average of less than 1ppn across all seasons. Therefore, within this report, the data for these species has been presented as part of the following groups:

- *Nyctalus sp* – Leisler's bat, noctule, and any passes identified only as *Nyctalus sp*. calls.
- NSL – serotine, and any passes identified only as NSL
- *Pipistrellus sp*. ~~automated static detector~~ – including Nathusius' pipistrelle and any passes identified only as *Pipistrellus sp*.

[5] Where the 1st quartile represents the value under which 25% of the lowest data points are found, the 2nd quartile is the median, and the upper quartile represents the value over which 25% of the highest data points are found.
[6] The range of the middle 50% of the data, which lies between the 1st and 3rd quartiles.
[7] Where the 'upper bound' is the highest value in the expected data range, and any values above the upper bound are considered outliers.

2.3.9.2.3.17. Given the aims and objectives of this assessment and each speciesthe behaviour of these species, this is considered to provide sufficient information for the purposes of this report.

2.3.10.2.3.18. The bat activity data from the automated static detector assessments also provided information on the timings of the bat activity. This data can be seen in **Annex G**, **Table G.2 – G.102** and will be scrutinised along with summer and autumn 2022 Static data in an updated version of this report and provided as part of the Supplementary Information of the DCO ApplicationThis data was evaluated to determine whether there were any trends in bat activity during particular hours of the night, which may indicate how the hedgerow was being used by bats.

2.4. IF THE PRESENCE OF ANY ANNEX II SPECIES WAS IDENTIFIED DURING STATIC DATA ANALYSIS, THEN THE HEDGEROW/HEDGEROWS ASSOCIATED WITH THAT FINAL BHSA CATEGORIES

2.4.1. The results of the automated static detector assessment wouldwere used to assess the BHSA category of hedgerows subject to the assessment.

2.4.2. Parameters were set to determine whether the BHSA category of an assessed hedgerow should be automatically updated to upgraded to a higher category or downgraded to a lower category. Hedgerows within static groups were assessed as a group. However, if only a single hedgerow within a Static group qualified against the parameters for upgrading or downgrading, then the categories for all hedgerows within the group were altered accordingly. The BHSA category of assessed hedgerows which did not meet the parameters for either upgrading or downgrading remained unchanged.

2.4.3. The parameters used to determine whether a hedgerow's BHSA category should be upgraded or downgraded are listed below in **Table 5**.

Table 5 - BHSA Category Alteration Parameters

Parameters for upgrading the BHSA category	Parameters for downgrading the BHSA category
The number of ppn for an Annex II[8] or 'sensitive' species[9] exceeds the 'upper bounds' for that species in at least two seasons; and/or The number of total ppn exceeds the 'upper bounds' for total ppn in all three seasons.	The number of total ppn is lower than the 1st quartile for total ppn in all three seasons.

2.4.4. As a result, assessed hedgerows were assigned a 'final BHSA category'. Hedgerows identified within the Newbuild Infrastructure Boundary which had a BHSA category of 'Poor', or were scoped out following the initial BHSA calculation, were not required to undergo the automated static detector assessment and subsequent evaluation. The BHSA category for these hedgerows remained 'Poor' or was altered to a final BHSA category of 'Scoped out'.

2.4.5. Hedgerows identified within the Newbuild Infrastructure Boundary which had a BHSA category of 'Good' were not subject to further evaluation under the modified DEFRA Local Scale surveys.

~~2.3.11.~~2.4.6. Any hedgerows with a final BHSA category of 'Excellent' ~~BHSA classification~~were then subject to further evaluation under the modified DEFRA Local Scale surveys. Any outstanding modified DEFRA Local Scale surveys are due to be completed prior to construction.

2.4.7. The final BHSA categories, in combination with the results of the modified DEFRA Local Scale surveys, have been used to inform recommendations for mitigation and compensation as discussed in the **Chapter 9: Biodiversity (Revision B) (Volume II)**.

[8] Annex II species include *Barbastella barbastellus*, *Myotis bechsteinii*, *Rhinolophus hipposideros* and *Rhinolophus ferrumequinum*. *Myotis bechsteinii* were not considered to form part of the assessment due to the surveys taking place outside of their known geographical range.
[9] Sensitive species = *Myotis* sp. and brown long-eared bat

~~2.4.~~2.5. MODIFIED DEFRA LOCAL SCALE SURVEYS

FIELD SURVEY

~~2.4.1.~~2.5.1. ‘Excellent’ hedgerows were assessed using a modified version of the DEFRA Local Scale survey methods that have been designed to detect important commuting routes in terms of linear infrastructure[10].

~~2.4.2. Two~~ To conduct these surveys, two suitably qualified ~~surveyors were equipped with Elekon Batlogger M or Echometer Touch Pro 2 (©Wildlife Acoustics Inc.) for the recording of echolocation calls and~~ ecologists were positioned on ~~crossing~~ points~~,~~ along the hedge 30m apart~~,~~ (the potential extent of hedgerow loss~~,~~), or a modified location based on the connections between hedgerows.

~~2.4.3.~~2.5.2. ~~Two surveys took place for 60 minutes at each crossing point, starting at sunset, or commencing 60 minutes prior to dawn. Surveyors used crossing point methods to take note~~Where possible, surveyors were positioned on opposite sides of the ~~height of bat activity (only making a note if the bats activity was clearly not associated with the hedgerows presence), species and behaviour exhibited~~hedge.

2.5.3. ~~After the initial two surveys were completed, up~~The surveys were carried out for 60 minutes following sunset or 60 minutes before dawn. Where bat activity was clearly associated with the hedgerow, surveyors recorded the height of bat activity, the species and the behaviour exhibited on data survey sheets (proformas). Elekon Batlogger M, Elekon BatScanner, Echometer Touch Pro 2 (©Wildlife Acoustics Inc.), or Anabat Express Bat Detectors were used to record echolocation calls.

~~2.4.4.~~2.5.4. Two surveys per hedge were initially conducted. Up to four additional surveys were subsequently undertaken if the existing DEFRA thresholds were reached. These thresholds are defined ~~by when~~as any ~~site~~hedgerow which records 10 or more ~~than 10 bats~~commuting bat passes of a single species or genus~~, using a flight path~~ (1~~-5~~ for rare species[11], depending upon rarity) then a full set of surveys should be conducted (**Ref. ~~1~~). ~~Survey timings were also subject to alteration depending on the presence of Annex II species.~~ 8**).

2.5.5. As of the end of October 2022, a minimum of two Modified Defra Local Scale surveys had been undertaken on 32 of 45 hedgerows requiring further survey. The outstanding survey effort is the result of the exceptionally high quantity of hedgerows within the Newbuild Infrastructure Boundary and the practicable limit

[10] WC1060 Development of a cost-effective method for monitoring the effectiveness of mitigation for bats crossing linear transport infrastructure – Local Scale Effects

[11] Rare species are defined as Annex II species which include *Barbastella barbastellus*, *Myotis bechsteinii*, *Rhinolophus hipposideros* and *Rhinolophus ferrumequinum*.
Myotis bechsteinii were not considered to form part of the assessment due to the surveys taking place outside of their known geographical range.

on resources. Where the modified DEFRA Local Scale surveys are not completed in full within the 2022 bat survey season, these will be completed prior to construction. These surveys will form pre-construction requirements.

DATA ANALYSIS

~~2.4.5.~~2.5.6. Modifications to the DEFRA Local Scale surveys occurred in the definitions attributed to the safe and unsafe crossing assessment. As there is no risk of collision post-construction, the assessment was limited to the 'in use' definition and the 'at risk' definition was removed. This meant all ~~passes were~~commuting activity was included within the assessment of use of linear features.

DATA ~~ANALYSIS~~

~~2.4.6. The data~~ recorded ~~on data survey sheets (Proformas) were used for~~during the ~~crossing point analysis. Raw data will be included in subsequent updates of this report when~~modified DEFRA Local Scale surveys ~~have been completed.~~

~~2.4.7.~~2.5.7. ~~Proformas were~~ was assessed ~~for each for each surveyor and each survey, to remove duplicate crossing events. A duplicate 'crossing event' was defined as any bat recorded crossing at the same time, height, and direction by both surveyors. This step within the analysis is to prevent double counting of a single bat.~~as to whether the bats recorded were considered to be using the hedgerow:

- 'In-use' is defined as bats commuting within 5m of the hedgerow.
- 'Non-use' is considered a bat commuting at a distance further than 5m from the hedgerow, or any activity considered foraging rather than commuting.

~~2.4.8.~~ In conjunction with the surveyors' notes made during each modified DEFRA Local Scale survey, analysis of recorded files resulted in the identification / confirmation of species of bats and their activity. Bat echolocation call recordings gathered from the modified DEFRA Local Scale surveys were analysed using specialist computer software Kaleidoscope Pro 5.4.7.~~All recorded events, including any 'heard not seen' (HNS) instances, were assigned a species based on comparing times between Proformas and the sound recordings for consistency.~~

2.5.8. A random 10% of survey visits were then quality assured by suitably qualified ecologists with experience analysing bat data to ensure no bat echolocation calls were being routinely mis-identified. In order to determine numbers of in-use or non-use bat passes, the proformas and sound files recorded by both surveyors during a survey were analysed simultaneously to enable comparison between them. This allowed any duplicate recordings to be removed. A duplicate recording was defined as the identification of the same bat species exhibiting the same behaviour (e.g., travelling in the same direction), at the same time, or within 30 seconds, by both surveyors. This prevented double counting of a single bat.

2.5.9. Number of passes were recorded on the proforma by the surveyor depending on observations in the field. Where this was not recorded, one bat pass was considered to be equivalent to one sound file. Where the surveyor indicated consistent activity within a timeframe or between a range of track numbers, all sound files within these periods were analysed and included in total counts.

2.5.10. Where the surveyor did not state the bat behaviour on the proforma, the corresponding sound files were analysed to aid in behaviour classification. If one feeding buzz was present in the pass, it was determined that this was likely a bat feeding 'on the wing' (e.g., while travelling), therefore the pass was precautionarily classified as commuting and included in the 'in-use' total count. If multiple feeding buzzes were present in the pass, or the proforma indicated various circular flight paths, it was determined that this was likely foraging behaviour and so included in the 'non-use' count.

~~2.4.9.~~2.5.11. When calls from bats were heard on the bat detectors but the surveyor did not see the bat pass, the data was recorded as ~~heard not seen. Each potential crossing point feature was considered on a case-by-case basis as to whether heard not seen records should be included within results. Where both sides of the feature were observed by surveyors, heard not seen data was not used in the analysis of results. Where both sides of the feature could not be observed by a surveyor, heard not seen data was included in the analysis of data. In this case, heard not seen data was analysed under a precautionary principle of being an unsafe crossing event as it cannot be confirmed that the bats were not using the potential crossing point feature at the time it was heard~~'heard not seen' (HNS). All recorded events, including any HNS instances, were assigned a species based on comparing times between the proforma and the sound recordings for consistency.

~~2.4.10. Data was then assessed as to whether the bats recorded were considered to be crossing the features:~~

- ~~'Crossing' or 'in use' is defined as bats passing within 5m of the feature.~~
- ~~'Non-use' is considered bat passing in proximity of the potential crossing point feature but at a distance further than 5m from the feature.~~

~~2.4.11. Further to the above definitions, any bats foraging in a circle next to the feature were not recorded as a pass.~~

~~2.4.12. In conjunction with the surveyors' notes made during each modified DEFRA Local Scale surveys, analysis of recorded files resulted in the identification / confirmation of species of bats and their level of activity.~~

~~2.4.13.~~ ~~Bat echolocation call recordings gathered from the modified DEFRA Local Scale surveys were analysed using specialist computer software Kaleidoscope Pro 5.4.7.~~

2.5.12. Each hedgerow was considered on a case-by-case basis as to whether HNS records should be included within the results. Where surveyors were on opposite sides of the hedgerow and therefore both sides could be observed, HNS data was not used in the analysis of results. Where surveyors were on the same side of the hedgerow and both sides could not be observed, HNS data was included in the analysis. In this case, HNS data was analysed under a precautionary principle of being an 'in-use' pass, as it cannot be confirmed that the bats were not using the hedgerow at the time it was heard. Additionally, as a precautionary measure, if an Annex II species was recorded, but was HNS, it was included in the total count.

2.5.13. When the surveyor observed a bat, but the detector did not record any calls, the data was recorded as 'seen not heard' (SNH). Where the surveyor was able to identify the bat species or genus, this was included towards the total count in order to maintain a precautionary approach.

2.5.14. For modified DEFRA Local Scale surveys, total 'in-use' counts for each species were taken for each crossing point visit. ~~Overall crossing point data is represented as~~Total 'non-use' counts were also recorded to provide an indication of the level of foraging activity and activity in the surrounding area.

~~2.4.14.~~2.5.15. Upon completion of a minimum of two survey visits for each of the 'Excellent' hedgerows, an assessment will be undertaken to determine if it is appropriate to reassess and downgrade those hedgerows to 'Good'. This will comprise assessing the bat passes ~~per hour; this BAIV is calculated by dividing the total number of bat passes during the crossing point~~recorded and the overall bat behaviour exhibited by the ~~number of hours spent surveying each crossing point~~bats recorded, to determine if the hedgerow is an important foraging resource and as such would remain as 'Excellent'. This will be completed on a case-by-case basis.

~~2.5.~~2.6. CALL IDENTIFICATION

~~2.5.1.~~2.6.1. Where possible, bat calls are identified to species level. However, species of the genus *Myotis* are grouped together in most cases as their calls are similar in structure and have overlapping call parameters, making species identification problematic (~~Russ, 2013~~**Ref. 9**). For *Pipistrellus* species the following criteria, based on measurements of peak frequency ~~are~~, were used to classify calls:

- Common pipistrelle ≥ 42 and <49KHz;
- Soprano pipistrelle ≥ 51KHz;
- Nathusius' pipistrelle <39KHz;

- Common/soprano pipistrelle ~~—————~~≥49 and <51KHz; and
- Common/Nathusius' pipistrelle ≥39 and <42KHz.

~~2.5.2.~~2.6.2. In addition, the following categories ~~are~~were used for calls~~,~~ which ~~cannot~~could not be identified with confidence due to the overlap in call characteristics between species or species groups:

- ~~*Myotis/Plecotus* sp.;~~
- *Pipistrellus* sp. (common pipistrelle, soprano pipistrelle, or Nathusius' pipistrelle);
- *Nyctalus* sp. (~~either~~ Leisler's bat or noctule); and
  - ~~Serotine/~~NSL (noctule, serotine, or Leisler's~~; and~~
  - ~~Serotine/*Plecotus* sp.~~

~~2.6. OVERALL ASSESSMENT~~

- ~~All the 'Excellent' hedgerows were assessed as to the type of activity recorded. This included assessing the number of passes recorded during both the DEFRA-based assessment and the automated~~ bat ~~detector analysis. Notes on behaviour were utilised to assess if the hedgerow was utilised by foraging or commuting bats, individuals on multiple occasions or multiple bats passing only once.).~~

~~2.6.1. As DEFRA Local Scale surveys are yet to be undertaken (as of June 2022 month end), scrutinization of the DEFRA-based assessment data cannot yet be undertaken and a decision on whether or not the data could be extrapolated to be applicable for the remaining 'Good' hedgerows cannot be made. The scrutinization of this data and a decision on whether it could be extrapolated to remaining 'Good' hedgerows will be made available in subsequent updates of this report.~~

~~2.6.2. BAIVs calculated from the automated static detector assessment and modified DEFRA Local Scale data sets were utilised to assess the usage of all 'Good' and 'Excellent' hedgerows. The data from this informed and was used to modify the recommendations for mitigation and compensation on each hedgerow depending on where the activity levels fell, if required.~~

2.7. NOTES AND LIMITATIONS

2.7.1. The majority of hedgerow surveys took place between April and October 2021, in-line with the guidelines outlined by the DEFRA Hedgerow Survey Handbook: A Standard Procedure for Local Surveys in the UK, 2nd edition (**Ref. ~~23~~23**) . Those that were not surveyed within the recommended window and were surveyed before April 2021 were revisited later in the year to confirm initial surveying was accurate.

2.7.2. Methodologies within the Regulations, which are used for specific hedgerow assessment, were adapted within this innovative assessment approach. In contrast to the Regulations, the approach taken by the Applicant did not stop measuring a hedgerow after intersection or junction with another hedgerow provided the hedgerow in question continued, after the intersect or junction, on a similar trajectory. This was done as bats using these linear features will not discern between a hedgerow before or after a junction. Therefore, it is not deemed necessary to define hedgerow limits by junctions but by the tangible cessation of the hedge, a clear change in hedgerow direction or the Newbuild Infrastructure Boundary. This deviation from a standard hedgerow assessment technique is deemed a valid approach for this bat assessment.

2.7.3. Ground flora data was collected for ~~phase~~Phase 1 habitat mapping but not taken into consideration when calculating BHSA score of hedgerows. This was due to the optimum time to gather data on ground flora being June-July and the size of the hedgerow data set not allowing for all hedgerows to be practicably surveyed in that time window. Whilst this data would help further substantiate the BHSA scoring for the hedgerows, it is considered that the existing method for calculating the BHSA score is substantiative enough to provide robust BHSA results.

2.7.4. In order to avoid referencing confusion throughout the different survey methods, hedgerows were assigned a permanent hedgerow (H) number during the initial desk study drawing of all potential hedgerows across the original Newbuild Infrastructure Boundary. As the Newbuild Infrastructure Boundary has been refined and ~~phase~~Phase 1 surveys have taken place, many potential and actual hedgerows have been ruled out. This is the reasoning behind 'missing' H numbers from the results seen in **Annex D**.

2.7.5. ~~As of~~ The methodology for the ~~end of~~Automated Static Detector surveys in this report differs from previous iterations in several ways:

1. Within previous iterations, the Summer season included June ~~2022,~~ and July, with the Autumn season covering August and September. This was subsequently altered to extend the Summer season to cover June, July and August, and the Autumn season was shifted to September and October. Temperatures in August were consistently high and much of the month was considered part of a heatwave. Temperatures in October were also warmer than average, with lows of only 7 °C. As a result, it is considered that by shifting the Autumn season later by a month, a truer representation of the difference in bat activity across the seasons was achieved and this deviation from the methodology is not thought to have negatively impacted the results of the assessment.
2. As per the Spring submission of this report, all sound files produced during the Static surveys were to be cut into 15-second intervals during

the data analysis process, with the resulting 15-second file defining one 'bat pass'. Processing the data this way would have increased the number of sound files, by cutting one sound file into several shorter ones. However, this method was not deemed necessary in order to inform a robust baseline, therefore files were assessed using the defined triggered events as per **Section 2.3**.

3. As described in **Section 2.3**, the Static detectors were set to record from sunset to sunrise. This differs from the previous methodology, which determined that they would begin recording 30 minutes before sunset until 30 minutes after sunrise. The majority of bat passes for all species were recorded later in the night (between two hours after sunset to two hours before sunrise). No Annex II species or other 'sensitive' species showed high numbers of bat passes within the first hour after sunset or the final hour before dawn. It is not considered that recording the additional 30-minute buffer around sunset and sunrise would have altered the results of the assessment.

2.7.6. It was not always possible to place Statics centrally within the hedgerow (for individual hedgerows), or in the best position along the hedgerow to cover all hedgerows within the group (for grouped hedgerows). This was due to a variety of reasons, including land access restrictions, the presence of livestock within fields, fences or ditches limiting proximity to sections of the hedge or high levels of dense vegetation. For the same reasons, it was not always possible to place the Static in the same location on hedge for every deployment as conditions changed between seasons. In these circumstances, Statics were placed in the next closest suitable location where coverage of the hedge and grouped hedges remained sufficient.

2.7.7. For twenty-three of the 70 modified Defra Local Scale surveys undertaken, at least one surveyor recorded data in zero crossing rather than full spectrum. This comprised two survey visits for eight hedgerows and one survey visit for seven hedgerows. Zero crossing detectors record the most prominent frequency of an incoming sound. Therefore, zero crossing data does not contain amplitude information and multiple frequencies at any one point are not recorded. The consequence of such, is that bat harmonic calls, overlapping calls and fainter bat calls are not recorded. The modified Defra Local Scale data analysis primarily relies on information from surveyors proformas. As a result, the zero crossing data is not considered to have altered the assessment of whether the hedgerows did or did not meet the threshold for further surveys. The data and conclusions discussed in this report are valid and able to confirm the significance of effects and the mitigation prescriptions described in **Chapter 9: Biodiversity (Revision B) (Volume II)**. All further modified Defra Local Scale surveys will be undertaken using detectors that record in full spectrum.

2.7.8. In some instances, due to health and safety constraints, it was not possible for surveyors to be positioned on opposite sides of the hedgerow for modified Defra Local Scale surveys. For these surveys, as per the methodology, the HNS calls were included in the total counts of 'in-use' passes. This is to precautionarily include recordings that may have been bats using the feature as a commuting route on the other side of the hedgerow. It is acknowledged that in some cases this may have increased the number of bat passes on these hedgerows and lead to these hedgerows meeting the threshold for further surveys. This methodology is considered to be in line with the precautionary principle and therefore the most accurate way to compensate for the constraint in access to both sides of the hedgerow.

~~2.7.5.~~2.7.9. Of the 123 hedgerows where a Static was to be deployed, for 35 hedgerows it was not possible to undertake an automated static detector ~~assessments are required for a number~~survey in every season. Twelve of these hedgerows~~. A breakdown of further~~ were not subject to any automated static detector ~~assessment requirements is detailed in **Table 4** and is explained in **Section 3.4**~~surveys, five were surveyed once, and 18 were surveyed twice. These hedgerows were inaccessible at certain times, either due to a lack of agreed land access or health and safety concerns relating to the presence of cattle. A list of all hedgerows which did not receive the full survey effort is presented in **Table 6Error! Reference source not found.**below. Where the hedgerows were only accessed for one deployment, there was insufficient data for reassessment and the original BHSA was retained.

~~2.7.6. Several automated static detector assessments have been moved from Spring 2022 – Summer 2022 survey effort to a Summer 2022 – Autumn 2022 survey effort due to land access limitations.~~

~~2.7.7. The outstanding survey effort is the result of the exceptionally high quantity of hedgerows within the Newbuild Infrastructure Boundary, and issues surrounding land access. As the survey effort is not yet complete, sound analysis has not yet been completed. Further data will be published in an updated version of this report and provided as part of the Supplementary Information of DCO Application.~~

~~**As of the end of June 2022, no Modified Defra Local Scale surveys had taken place. The outstanding survey effort is the result of the exceptionally high quantity of hedgerows within the Newbuild Infrastructure Boundary and the practicable limit on resources. Further data will be published in an updated version of this report and provided as**~~

~~part of the Supplementary Information of DCO Application. Where the~~Table 6 - Hedgerows not Subject to the Full Survey Effort

Hedgerow	Grouped with	Spring deployment	Summer deployment	Autumn deployment
3	n/a	N – not included in the assessment at this stage	N – no access due to cattle in the field	Y
27	n/a	Y	N – no access due to cattle in the field	Y
31	28	Y	N – no access due to cattle in the field	Y
47	n/a	N – no land access agreed	Y	Y
49	50	Y	Y	N – no land access agreed
51	n/a	Y	Y	N – no land access agreed
53	n/a	Y	Y	N – no land access agreed
59	n/a	Y	Y	N – no land access agreed
64	n/a	Y	N – no land access agreed	Y
133	n/a	Y	Y	N – no land access agreed
140	139	N – no land access agreed	Y	Y
236	n/a	N – not included in the	Y	Y

Hedgerow	Grouped with	Spring deployment	Summer deployment	Autumn deployment
		assessment at this stage		
283	973	N – no land access agreed	Y	Y
317	n/a	N – no land access agreed	N – no land access agreed	N – no land access agreed
331	n/a	N – no land access agreed	N – no land access agreed	N – no land access agreed
335	n/a	N – no land access agreed	N – no land access agreed	N – no land access agreed
336	340, 341	N – no land access agreed	N – no land access agreed	N – no land access agreed
342	344	N – no land access agreed	Y	N – no land access agreed
343	944	N – no land access agreed	Y	N – no land access agreed
356	n/a	N – no land access agreed	N – no land access agreed	N – no land access agreed
358	359	N – no land access agreed	N – no land access agreed	N – no land access agreed
364	n/a	N – no land access agreed	N – no land access agreed	N – no land access agreed
368	n/a	Y	N – no land access agreed	Y
388	n/a	N – no land access agreed	N – no land access agreed	N – no land access agreed
398	400, 399	Y	N – no land access agreed	Y

Hedgerow	Grouped with	Spring deployment	Summer deployment	Autumn deployment
449	n/a	N – not included in the assessment at this stage	Y	N – no land access agreed
522	n/a	N – not included in the assessment at this stage	Y	N – no land access agreed
657	n/a	Y	N – no land access agreed	Y
678	n/a	N – no land access agreed	N – no land access agreed	N – no land access agreed
710	715	Y	Y	N – no land access agreed
906	n/a	N – no land access agreed	N – no land access agreed	N – no land access agreed
913	n/a	N – no land access agreed	N – no land access agreed	N – no land access agreed
954	812, 937	Y	N – no land access agreed	Y
993	134, 138	N – no land access agreed	Y	Y
1008	n/a	N – no land access agreed	N – no land access agreed	N – no land access agreed

~~2.7.8.~~ To date, 32 ‘Excellent’ hedgerows have been subject to two initial Modified DEFRA Local Scale surveys ~~are not completed in full within the 2022 bat survey season, these will be completed during the 2023 bat survey season.~~. The ~~2023~~initial two surveys ~~will form pre-~~for the remaining 13 ‘Excellent’ hedgerows will be completed prior to construction ~~requirements.~~

~~2.7.9.~~2.7.10. ~~Automated static detector assessments are scheduled to be completed by end of October 2022. Conclusions are based on the available data. Once~~along with any further surveys ~~have been completed, the additional data will be~~

~~collated~~required for hedgerows which meet the threshold in order to confirm the ~~findings. Further data will be published in an updated version of this report and provided as part of the Supplementary Information of the DCO Application.~~significance of effects and the mitigation prescriptions for each hedgerow. A precautionary approach has been taken for those hedgerows yet to be surveyed, as outlined in **Chapter 9: Biodiversity (Revision B) (Volume II).**

3. RESULTS

3.1. ANCIENT HEDGEROW SEARCH

3.1.1. An Ancient Hedgerow search was undertaken for the DCO Proposed Development, which returned two records of ancient hedgerow within the Newbuild Infrastructure Boundary. These are highlighted in **Figure 9.4.~~2~~1 (Annex A)**.

3.1.2. The results of the ancient hedgerow search were initially checked against the potential hedgerow database before Phase 1 habitat surveys of the hedgerow locations determined that these ancient hedgerows no longer exist.

3.2. HEDGEROW FIELD SURVEYS

3.2.1. ~~Hedgerow~~Following completion of the hedgerow field surveys in 2022, 357 hedgerows were identified ~~360 hedgerows~~ within the Newbuild Infrastructure Boundary. Details of the data collected for each hedgerow can be seen in **Annex D**~~.~~ and the locations of each are shown in **Figure 9.4.2 (Annex A)**. All identified hedgerows were subject to a BHSA.

3.3. BHSA CALCULATIONS

3.3.1. The data provided by the hedgerow field surveys allowed for the BHSA score and categories to be calculated for each hedgerow. The BHSA score and category for each hedgerow can be seen in **Annex D** ~~but **Table 4**~~. **Table 7**Error! Reference source not found. provides a summary breakdown of the quantity of hedgerows within each category.

Table 7 ~~–~~ BHSA Summary

BHSA Category	Total Number
Excellent	23
Good	~~243~~250
Poor	82
n/a (Not ~~yet~~ assessed – scoped out)	~~12~~2

3.3.2. The BHSA calculations identified 23 ‘Excellent’ hedgerows and ~~243~~250 ‘Good’ hedgerows that would potentially require automated static detector assessment.

3.3.3. ~~**Table 3**~~**Table 8**Error! Reference source not found. highlights the discounting parameters that would rule out an ‘Excellent’ or ‘Good’ hedgerow from requiring

an automated static detector assessment. ~~**Table 5** shows a breakdown, following the implementation of each parameter, of the number of hedgerows requiring automated static detector assessments.~~

3.3.4. In total, 7 'Excellent' and 73 'Good' hedgerows were discounted through these parameters. Hedgerows which were adjoining residential, easier to avoid, or no longer a hedgerow were 'Scoped out'. Hedgerows within 50m of a road were downgraded to 'Poor' due to being less suitable for supporting bats.

Table 8 ~~–~~ BHSA Category Discount Parameters

Hedgerow Parameters	'Excellent' Hedgerows Impacted	'Good' Hedgerows Impacted
Adjoining residential	0	~~6~~9
Hedgerow located parallel to proposed route and thus easier to avoid.	6	44
Majority of hedgerow located within 50m of main roads.	1	18
No longer ~~classified as~~ a hedgerow~~.~~	0	2

~~3.3.4. In total, 7 'Excellent', 70 'Good', and 8 'Not yet assessed' hedgerows were discounted through these parameters.~~

3.3.5. Those remaining after the discounting process were allocated either an individual Static or were grouped depending on location. A full breakdown of automated static detector assessment distribution for individual and grouped Statics can be seen in **Annex E** ~~though a summary can be seen in **Table 6**.~~ . **Table 9** shows a breakdown of the number of hedgerows requiring automated static detector assessments, following the implementation of each parameter.

Table 9 ~~–~~ BHSA Category Static Distribution

BHSA Category	Individual Static	Grouped Static
Excellent	~~6~~5	~~10~~11
Good	~~69~~66	~~104~~111

~~Not Assessed~~	~~0~~	~~2~~[12]

3.3.6. ~~The 116 grouped~~In total, 122 of the hedgerows requiring ~~Statics are groupeda~~ Static were compiled into ~~49~~52 groups, with each ~~requiring~~group assigned one Static. ~~Combined with the 75~~The remaining 71 hedgerows requiring ~~an individuala~~ Static~~, there~~ were ~~124~~individually assigned one Static each. In total, 123 Statics were required.

[12] ~~Potential only, requires assessment to verify BHSA category and eligibility for static assessment.~~

3.4. AUTOMATED STATIC DETECTOR ASSESSMENT

~~3.4.1. The survey effort as of June 2022 for automated static detector assessments on qualifying hedgerows can be seen in **Table 7**.~~

~~Table 7 – Automated static detector assessment effort as of the end of June 2022~~

	~~1st Deployment~~	~~2nd Deployment~~	~~Requiring 1st Deployment~~	~~Requiring 2nd Deployment~~
~~Individual Static~~	~~53~~	~~9~~	~~13~~	~~66~~
~~Group Static~~	~~30~~	~~15~~	~~4~~	~~34~~

~~3.4.2. There are still 13 individual and 4 grouped hedgerows requiring a 1st automated static detector assessment and 66 individual and 34 grouped hedgerows requiring a 2nd automated static detector assessment.~~

~~3.4.3. Results for the number of recordings registered by each Static can be seen in **Annex F.**~~

OVERVIEW

~~3.4.4.~~3.4.1. At least 10 bat species were recorded across the Newbuild Infrastructure Boundary during the automated static detector assessments undertaken during ~~April and May~~ 2022 ~~(Spring 2022).~~. The following species were recorded:

- Serotine ~~*Eptesicus serotinus*~~;
- Common pipistrelle;
- Soprano pipistrelle;
- Nathusius' pipistrelle ~~*Pipistrellus nathusii*~~;
- Noctule ~~*Nyctalus noctule*~~;
- Leisler's bat ~~*Nyctalus leisleri*~~;
- Myotis sp.;
- Brown long-eared bat ~~*Plecotus auritus*~~;
- Lesser horseshoe bat ~~*Rhinolophus hipposideros*~~.

3.4.2. Overall, an average of 234.50ppn was recorded during the automated static detector surveys, over 1,825 nights during 2022, from 111 Statics.

~~3.4.5.~~ Bat data recorded from the automated static detector assessments can be seen in-depth in **Annex G ~~Table~~, for Spring (Tables G.2 – G.102~~, but a~~), Summer**

(Tables G.104 – G.201) and Autumn (Tables G.203 – G.303). A summary of bat passes per night can be seen ~~in **Table G.1**.~~

~~3.4.6.~~3.4.3. ~~The Static data from Spring 2022, shown~~for each season in **Annex G**, ~~included the data from 104 Statics and recorded an average of 245.84ppn over a combined 622 nights of automated static detector assessments. The thresholds for data displayed in summary **Table 8 – 13** has been determined based on hedgerows scoring average ppn in the 3rd quartile for each respective species. The exception to this is **Table 9** which displays all hedgerows with recorded lesser horseshoe activity. This is due to only two hedgerows with recorded activity being outwith the 3rd quartile threshold for that species.~~**Tables G.1, G.103 and 202**.

3.4.4. A summary of the data recorded in each season, for each species, is provided below.

3.4.5. Total ppn for all hedgerows, over all seasons, is presented on **Figure 9.4.4 (Annex A)**. A summary of bat passes per night in each season for Annex II, sensitive species, and species with the highest levels of activity (common pipistrelle and soprano pipistrelle) is presented on **Figure 9.4.5 – Figure 9.4.9 (Annex A)**.

SPRING 2022 SURVEY RESULTS

3.4.6. An average of 245.84ppn was recorded over a combined 622 nights of automated static detector assessments during Spring 2022, from 103 statics. The full Static data from Spring 2022 is shown in **Annex G.**

3.4.7. The hedgerows with the highest bat activity levels throughout automated static detector assessments in Spring 2022 were hedgerows 145 and 429. These two hedgerows recorded average activity levels of ~~1888~~1,888.00ppn ~~over 6 nights~~ and ~~1628~~1,628.17ppn ~~over 6 nights~~, respectively. Hedgerows 67 and 64 also had over ~~1000~~1,000.00ppn with ~~1445~~1,445.17ppn ~~over 6 nights~~ and 1130.80ppn ~~over 5 nights~~, respectively recorded.

3.4.8. The ~~hedgerows~~hedgerow with the lowest bat activity levels throughout automated static detector assessments in Spring 2022 was hedgerow 113, which had no recorded activity. A further ~~5~~five hedgerows (117, 78, 156, 27, 954) had an average activity level of <1.00ppn.

3.4.9. The thresholds for data displayed in summary **Tables 10 – 17** has been determined based on hedgerows scoring average ppn above the 3rd quartile for each respective species. The exception to this is

3.4.10. **Table** 11 and **Table 20** which display all hedgerows with recorded lesser horseshoe and NSL activity, respectively. This is due to a low number of hedgerows with recorded activity being greater than the 3rd quartile threshold for those species.

Brown long-eared bat (BLE)

3.4.11. ~~The average activity for brown long-eared bats across all automated static detector assessments in April and May 2022 was 1.54ppn.~~ Hedgerow 398 was recorded as having the most BLE activity with an average of 16.33ppn ~~across 6 nights.~~. The hedgerows with the next highest amount of BLE activity were hedgerows 64 and 1004 that had average activity levels of 13.80ppn and 13.33ppn, respectively~~, over 5 and 6 nights respectively~~. ~~**Table 8**~~

~~3.4.9.~~3.4.12. Activity levels of BLE for hedgerows in Spring are presented on **Figure 9.4.5a**. **Table 10** highlights all the hedgerows with an average of >1.16ppn for BLE.

Table 10 - Summary of ~~hedgerows~~Hedgerows with BLE ~~activity~~Activity >1.16ppn ~~during~~During Spring 2022

Hedgerow Number	BLE ppn
398	16.33
64	13.80
1004	13.33
30	11.40
491	10.43
202	9.80
420	8.00
489	7.57
53	7.17
419	5.80
51	5.33
59	4.83
811	4.50

Hedgerow Number	BLE ppn
403	3.00
438	2.83
956	2.50
206	2.40
199	2.20
145, 133, 145	2.17
246	2.14
422, **940, 422**	1.60
251	1.57
67, 187	1.17

3.4.10. Of the remaining hedgerows, 2two hedgerows had activity between 1.16- to 1.00ppn with the remaining 76 hedgerows having an activity level below 1.00ppn. 38Thirty-eight of these hedgerows recorded no BLE activity.

Lesser horseshoe

3.4.13. The average activity for lesser horseshoe bats across all during automated static detector assessments in April and MaySpring 2022 was 0.26ppn. .

Lesser horseshoe

3.4.14. Hedgerow 419 was recorded as having the highest lesser horseshoe activity with an average of 5.40ppn across 5 nights.. The hedgerows with the next highest amountnumbers of lesser horseshoe activity were hedgerows 1004 and 420 that had an average 4.00ppn and 3.40ppn across 6 and 5 nights, respectively. **Table**

3.4.15. Activity levels of lesser horseshoe recorded in Spring are presented on **Figure 9.4.6a**.

~~3.4.11.~~3.4.16. **Table** 11 highlights all the hedgerows that recorded lesser horseshoe activity.

Table 11 - Summary of ~~hedgerows~~Hedgerows with ~~lesser horseshoe activity during~~ Lesser Horseshoe Activity During Spring 2022

Hedgerow Number	Lesser horseshoe ppn
419	5.40
1004	4.00
420	3.40
199	1.20
429~~, 434~~	1.17
434	1.17
246	1.14
414	0.80
~~348~~	~~0.69~~
206, 422, 196, 229, 974	0.60
251	0.57
353	0.43
202, 940, 268, 1011	0.40
438, 396, 223	0.33
403, 394	0.20
398, 956, 267, 426, 427~~, 369~~	0.17
247, 354, 255	0.14

~~3.4.12.~~ The remaining ~~70~~71 hedgerows did not record any lesser horseshoe activity during ~~Spring 2022.~~

***~~Myotis~~* sp.**

3.4.17. ~~The average activity for *Myotis* sp. bats recorded across all~~ automated static detector assessments in ~~April and May~~Spring 2022.

***Myotis* sp. ~~was 15.93ppn.~~**

3.4.18. Hedgerow 429 was recorded as having the highest *Myotis* sp. activity with an average of 347.83ppn ~~across 6 nights.~~. Hedgerow 1004 recorded the second highest *Myotis* sp. activity with an average of 227.33ppn ~~across 6 nights.~~. Hedgerows 51, 199, 818 and 145 all had an average activity level of over 100.00ppn. ~~**Table 10**~~

~~3.4.13.~~3.4.19. Activity levels of *Myotis* sp. for hedgerows in Spring are presented on **Figure 9.4.7a**. **Table 12** highlights all the hedgerows with an average *Myotis* sp. activity level of ~~≥8.93ppn~~>9.29ppn.

Table 12 - Summary of ~~hedgerows~~Hedgerows with Myotis sp. ~~activity ≥8.93ppn during~~Activity >9.29ppn During Spring 2022

Hedgerow Number	*Myotis* sp. ppn
429	347.83
1004	227.33
51	142.83
199	129.00
818	115.57
145	105.50
206	51.40
398	47.50
368	34.83
403	32.40
956	30.83
419	30.20
196	26.60
414	20.80
426	19.67
810	18.17

Hedgerow Number	*Myotis* sp. ppn
202	17.80
491	17.00
67	14.33
940	14.00
420	13.80
394	13.40
396	13.33
819	12.14
229	9.80
~~**374**~~	~~9.29~~
~~**438**~~	~~9.00~~

~~3.4.14.~~3.4.20. Of the remaining hedgerows, ~~9~~11 hedgerows had an average of ~~8.93-~~9.28-~~></~~5.00ppn and 58 hedgerows had an average activity level 4.99->0.00ppn. Only 10 hedgerows recorded no *Myotis* sp. activity during automated static detector assessments in Spring 2022.

Common pipistrelle

~~3.4.15.~~3.4.21. ~~The average activity for common pipistrelle bats across all automated static detector assessments in April and May 2022 was 154.50ppn.~~ Hedgerow 67 was recorded as having the highest common pipistrelle activity with an average of 1393.00ppn ~~across 6 nights.~~. Hedgerows 64, 810, 819 and 145 had average activity scores of 795.20ppn ~~over 5 nights~~, 711.83ppn ~~over 7 nights~~, 656.86ppn ~~over 7 nights~~, and 647.33ppn ~~over 6 nights~~, respectively. ~~**Table 11** highlights all the hedgerows with an average common pipistrelle activity level of >221.41ppn.~~

3.4.22. ~~Table 11 Summary of~~ Activity levels of common pipistrelle for hedgerows in Spring are presented on **Figure 9.4.8a**. **Table 13** highlights all the hedgerows with an average common pipistrelle activity ~~>221.41ppn during~~level of >226.16ppn.

Table 13 - Summary of Hedgerows with Common Pipistrelle Activity >226.16ppn During Spring 2022

Hedgerow Number	Common pipistrelle ppn
67	1393.00
64	795.20
810	711.83
819	656.86
145	647.33
199	536.80
403	522.00
811	473.67
429	399.33
398	394.00
420	374.00
818	366.14
1004	352.67
206	339.40
422	329.40
804	328.71
69	312.00
374	274.43
342	272.57
956	272.17
434	272.00
51	271.33

Hedgerow Number	Common pipistrelle ppn
343	267.00
251	265.86
262	259.40
438	226.17

3.4.16.3.4.23. Of the remaining hedgerows, 1one hedgerow had an average recorded activity level of >200.00ppn, a further 21 hedgerows had an average recorded activity level of 199.99-->100.00ppn, 15 hedgerows had an activity level of 99.99-->50.00ppn, and 38 hedgerows had an average recorded activity level of 49.99->0.00ppn. Only 3three hedgerows recorded no common pipistrelle activity during automated static detector assessments in Spring 2022, hedgerows 78, 81 and 113.

Soprano pipistrelle

3.4.17.3.4.24. The average activity of soprano pipistrelle bats across all automated static detector assessments in April and May 2022 was 58.83ppn. Hedgerows 145 and 429 had the highest average recorded soprano pipistrelle activity scores of 967.55ppn over 6 nights and 864.50ppn over 6 nights, respectively. Hedgerows 30 and 199 had the next highest average recorded activity scores of 391.60ppn over 5 nights and 304.80ppn over 5 nights, respectively. **Table 12** highlights all the hedgerows with an average soprano pipistrelle activity level of >45.83ppn.

3.4.25. Table 12 Summary of Activity levels of soprano pipistrelle for hedgerows in Spring are presented on **Figure 9.4.9a**. **Table 14** highlights all the hedgerows with an average soprano pipistrelle activity >45.83ppn duringlevel of >46.16ppn.

Table 14 - Summary of Hedgerows with Soprano Pipistrelle Activity >46.16ppn During Spring 2022

Hedgerow Number	Soprano pipistrelle ppn
145	967.50
429	864.50
30	391.60
199	304.80

Hedgerow Number	Soprano pipistrelle ppn
64	294.40
422	268.60
31	209.40
403	182.00
811	168.67
351	~~151.43~~21.38
427	127.67
810	127.50
1004	112.83
426	111.33
819	110.29
420	109.60
434	106.83
206	102.00
438	91.67
398	86.00
956	81.33
374	70.00
354	52.14
268	50.40
251	48.86
187	46.17

~~3.4.18.~~3.4.26. Of the remaining hedgerows, 27 hedgerows had an average recorded activity level of 45.83~~-->~~10.00ppn, and 43 hedgerows had an average recorded activity level of 9.99->0.00ppn. ~~8~~Eight hedgerows recorded no soprano pipistrelle activity during automated static detector assessments in Spring 2022.

***Pipistrellus* sp.**

3.4.27. ~~The average activity of *Pipistrellus* sp. bats recorded across all automated static detector assessments in April and May 2022 was 9.49ppn.~~ Hedgerows 145 and 482 had the highest average ~~recorded~~ *Pipistrellus* sp. activity scores of ~~153~~159.33ppn ~~over 6 nights and 129.43ppn over 7 nights~~and 143.86ppn, respectively. Hedgerows 398 and 374 had the next highest average recorded activity scores of 100.~~17ppn over 6 nights and 88.71ppn over 7 nights~~33ppn and 90.29ppn, respectively. ~~**Table 13**~~

~~3.4.19.~~3.4.28. **Table 15** highlights all the hedgerows with an average unidentified *Pipistrellus* sp. activity level of >4.~~21ppn~~50ppn.

Table 15 - Summary of the ~~hedgerows~~Hedgerows with *Pipistrellus* sp. ~~activity~~Activity >4.~~21ppn during~~50ppn During Spring 2022

Hedgerow Number	*Pipistrellus* sp. ppn
145	~~153~~159.33
482	~~129.43~~143.86
398	100.~~17~~33
374	~~88.71~~90.29
810	67.83
1004	65.33
403	57.20
422	51.~~00~~20
426	49.00
51	~~22.50~~24.00
49	20.~~57~~86
64	18.40
427	16.50
438	14.33
199	13.20
804	11.~~57~~71
22	~~8.83~~9.67
196	~~8.60~~9.00
491	~~6~~7.43
202	6.~~20~~80
189	6.40
188	6.00

Hedgerow Number		*Pipistrellus* sp. ppn
791		5.83
940		5.80
~~**188**~~	~~5.60~~	
~~**189**~~	~~5.40~~	
956~~, 791~~		~~4.67~~5.17
~~**811**~~	~~4.50~~	

~~3.4.20.~~3.4.29. Of the remaining hedgerows, 42 hedgerows had an average recorded activity level of 4.~~21~~50->0.00ppn. ~~36~~Thirty-six hedgerows recorded no activity within the *Pipistrellus* sp. ~~activity~~group during automated static detector assessments in Spring 2022.

Nyctalus sp.

3.4.30. Hedgerow 804 recorded the highest average activity levels for the group *Nyctalus* sp. in Spring, with 83.29ppn. The hedgerows with the next highest levels were hedgerows 808 and 797 which had 32.14ppn and 21.57ppn, respectively.

3.4.31. **Table 16** highlights all the hedgerows with an average *Nyctalus* sp. activity level of >5.28ppn.

Table 16 - Summary of the Hedgerows with *Nyctalus* sp. Activity >5.28ppn During Spring 2022

Hedgerow number	*Nyctalus* sp. ppn
804	83.29
808	32.14
797	21.57
791	20.33
438	18.50
818	17.43

Hedgerow number	*Nyctalus* sp. ppn
810	17.33
811	16.33
426	15.83
30	12.80
434	12.50
489	11.57
429	11.00
427	10.67
268	9.20
133	9.17
956	8.67
206	8.20
267	8.00
202	7.80
188	7.20
262	6.60
246	6.57
145	6.00
819	5.43

3.4.32. Of the remaining hedgerows, 55 hedgerows had activity levels between 5.28ppn and 0.16ppn. Twenty-three hedgerows had no records within the *Nyctalus* sp. group.

NSL

3.4.33. Hedgerow 804 recorded the highest level of NSL sp. activity, with an average of 3.00ppn. Only 18 hedgerows had records grouped under NSL.

3.4.34.

3.4.35. **Table** 17 highlights all the hedgerows that recorded activity identified within the group NSL sp.

Table 17 - Summary of the Hedgerows with NSL Activity During Spring 2022

Hedgerow number	NSL sp. ppn
804	3.00
196	1.60
956	1.50
420	1.40
489	1.00
30	0.80
818	0.57
51	0.33
188	0.20
199	0.20
206	0.20
268	0.20
173	0.17
167	0.17
791	0.17
145	0.17
398	0.17
368	0.17

3.4.36. The remaining hedgerows had no recorded activity which fell into the NSL group.

SUMMER 2022 SURVEY RESULTS

3.4.37. An average of 278.31ppn was recorded over a combined 602 nights of automated static detector assessments during Summer 2022, from 98 Statics. The full Static data from Summer 2022 is shown in **Annex G**.

3.4.38. Hedgerows 348 and 161 recorded an average activity of 1171.57ppn and 1011.17ppn, respectively. These were the highest bat activity levels throughout automated static detector assessments in Summer 2022.

3.4.39. Hedgerow 819 recorded average activity levels of 24.14ppn, the lowest bat activity levels throughout automated static detector assessments in Summer 2022

3.4.40. The thresholds for data displayed in summary **Table 18 -Table** 25 have been determined based on hedgerows scoring average ppn above the 3rd quartile for each respective species.

Brown long-eared (BLE)

3.4.41. Hedgerow 403 was recorded as having the highest level of BLE activity with an average of 24.17ppn. The hedgerows with the next highest amount of BLE activity were hedgerows 206 and 482 that recorded average activity levels of 21.00ppn and 16.71ppn, respectively.

3.4.42. Activity levels of BLE for hedgerows in Summer are presented on **Figure 9.4.5b**. **Table 18** highlights all the hedgerows with an average of >4.75ppn for BLE.

Table 18 - Summary of Hedgerows with BLE Activity >4.75ppn During Summer 2022

Hedgerow Number	BLE ppn
403	24.17
206	21.00
482	16.71
1004	16.00
187	15.83
419	15.33
69	13.20
491	10.00
202	9.33
51	8.43
413	7.67

Hedgerow Number	BLE ppn
489, 53	7.00
59	6.57
167, 810	6.50
940	6.33
351, 145	6.00
305, 422	5.67
167	5.57
398	5.17
176, 210	5.00

3.4.43. Of the remaining hedgerows, 46 hedgerows had an average activity level of 4.67ppn->1.00ppn. Twenty-two hedgerows had activity level of 0.99ppn->0.14ppn. Six hedgerows recorded no BLE activity during automated static detector assessments in Summer 2022.

Lesser horseshoe

3.4.44. Hedgerow 429 was recorded as having the highest lesser horseshoe activity with an average of 10.33ppn. The hedgerows with the next highest amount of lesser horseshoe activity were hedgerows 229 and 419 that had an average of 1.86ppn and 1.83ppn, respectively.

3.4.45. Activity levels of lesser horseshoe for hedgerows in Summer are presented on **Figure 9.4.6b**. **Table 19** highlights all the hedgerows with an average of >0.17ppn for lesser horseshoe.

Table 19 - Summary of Hedgerows with Lesser Horseshoe Activity >0.17ppn During Summer 2022

Hedgerow Number	Lesser horseshoe ppn
429	10.33
229	1.86
419	1.83
199	1.50

Hedgerow Number	Lesser horseshoe ppn
427	1.33
1004, 202	1.17
353	1.00
267	0.60
940	0.50
255	0.43
156, 420, 422	0.33
974	0.29
157, 207, 416, 414, 377, 396, 351, 426, 206, 398	0.17

3.4.46. Two hedgerows recorded activity levels of 0.14ppn and the remaining 71 hedgerows did not record any lesser horseshoe activity during automated static detector assessments in Summer 2022.

***Myotis* sp.**

3.4.47. Hedgerow 354 was recorded as having the highest *Myotis* sp. activity with an average of 487.57ppn. Hedgerow 1004 recorded the second highest *Myotis* sp. activity with an average of 255.17ppn. Hedgerows 176, 420, 210, 426, 429, 206, and 157 all had an average activity level of over 100.00ppn.

3.4.48. Activity levels of *Myotis* sp. for hedgerows in Summer are presented on **Figure 9.4.7b**. **Table 20** highlights all the hedgerows with an average *Myotis* sp. activity level of >32.66ppn.

Table 20 - Summary of Hedgerows with Myotis sp. Activity >32.66ppn During Summer 2022

Hedgerow Number	*Myotis* sp. ppn
354	487.57
1004	255.17
176	252.00
420	203.00

Hedgerow Number	*Myotis* sp. ppn
429	193.50
426	161.67
206	153.67
210	144.00
157	143.17
202	93.50
196	90.00
348	87.71
90	82.83
398	80.17
434	67.50
156	64.67
958	60.17
187	50.83
427	45.00
974	41.57
419	36.00
811	34.43
83	33.33

3.4.49. Of the remaining hedgerows, 25 hedgerows had an average of 32.66ppn->13.48ppn and 48 hedgerows had an average activity level 13.48->0.00ppn. One hedgerow recorded no *Myotis sp*. activity during automated static detector assessments in Summer 2022.

Common pipistrelle

3.4.50. Hedgerow 161 was recorded as having the highest common pipistrelle activity with an average of 915.67ppn. Hedgerow 67 was recorded as having the second highest common pipistrelle activity with an average of 733.60 ppn. Hedgerows 83, 81, 157, 145 and 348 all had activity levels greater than 500.00ppn.

3.4.51. Activity levels of common pipistrelle for hedgerows in Summer are presented on **Figure 9.4.8b**. **Table 21** highlights all the hedgerows with an average common pipistrelle activity level of >223.09ppn.

Table 21 - Summary of Hedgerows with Common Pipistrelle Activity >223.09ppn During Summer 2022

Hedgerow Number	Common pipistrelle ppn
161	915.67
67	733.60
83	666.67
81	645.83
157	635.50
87	607.00
145	605.40
348	547.43
176	432.29
90	418.67
69	358.20
189	346.67
164	341.33
958	328.50
1004	311.33
993	302.17

Hedgerow Number	Common pipistrelle ppn
88	295.67
449	288.71
305	284.50
251	277.00
268	253.00
426	241.67
91	236.83
246	230.86

3.4.52. Of the remaining hedgerows, 23 hedgerows had an average recorded activity level of 220.50ppn->100ppn, 22 hedgerows had an activity level of 99.99->50.00, and 27 hedgerows had an average recorded activity level of 49.99->10.00ppn. The final two hedgerows had an average recorded activity level of 8.17ppn and 4.67ppn. There were no hedgerows with no common pipistrelle activity recorded during automated static detector assessments in Summer 2022.

Soprano pipistrelle

3.4.53. Hedgerows 1004 and 30 had the highest average recorded soprano pipistrelle activity score of 315.33ppn and 249.17ppn, respectively. Hedgerows 83 and 78 also recoded average activity levels of >100.00ppn.

3.4.54. Activity levels of soprano pipistrelle for hedgerows in Summer are presented on **Figure 9.4.9b**. **Table 22** highlights all the hedgerows with an average soprano pipistrelle activity level of >37.04ppn.

Table 22 - Summary of Hedgerows with Soprano Pipistrelle Activity >37.04ppn During Summer 2022

Hedgerow Number	Soprano pipistrelle ppn
1004	315.33
30	249.17
83	172.67
78	101.17
145	98.60
426	98.50
403	77.17
354	74.57
87	72.83
427	71.67
157	69.50
81	68.67
283	67.33
176	60.14
491	58.50
67	55.60
429	53.83
90	51.17
268	49.40
189	48.50
398	43.67
419	42.67

Hedgerow Number	Soprano pipistrelle ppn
351	38.00
489	37.67

3.4.55. Of the remaining hedgerows, 45 hedgerows had an average recorded activity level of 36.83ppn->10.00ppn, and a further 26 hedgerows had an average recorded activity level of 9.99ppn->1.00ppn. Three hedgerows had an average recorded activity level of 0.99ppn->0.00ppn.

***Pipistrellus* sp.**

3.4.56. Hedgerow 81 had the highest average recorded *Pipistrellus* sp. group activity scores of 197.50ppn. Hedgerows 30 and 403 had the next highest average recorded activity scores of 43.33ppn and 34.33ppn, respectively.

3.4.57. **Table 23** highlights all the hedgerows with an average *Pipistrellus* sp. activity level of >4.58ppn.

Table 23 - Summary of the Hedgerows with *Pipistrellus* sp. Activity >4.58ppn During Summer 2022

Hedgerow Number	*Pipistrellus* sp. ppn
81	197.50
30	43.33
403	34.33
306	28.29
161	25.83
83	24.83
1004	20.50
145	20.40
90	19.17
255, 427	15.86
958	14.33
156	13.67

Hedgerow Number	*Pipistrellus* sp. ppn
993	11.33
283	11.00
449	9.14
426	8.83
173	7.50
246	6.86
157	6.17
818	6.00
398	5.67
87, 422	5.33

3.4.58. Of the remaining hedgerows, 56 hedgerows had an average recorded activity level of between 4.58->0.14ppn. Eighteen hedgerows did not have any activity recorded within the *Pipistrellus* sp. group during automated static detector assessments in Summer 2022.

***Nyctalus* sp.**

3.4.59. Hedgerows 427 and 348 had the highest average numbers of *Nyctalus* sp. activity, recording 591.17ppn and 168.67ppn, respectively. The next highest numbers of ppn were recorded at hedgerows 426 and 522, with 333.33ppn and 148.33ppn, respectively.

3.4.60.

3.4.61. **Table** 24 highlights all the hedgerows with an average *Nyctalus* sp. activity level of >9.58ppn.

Table 24 - Summary of the Hedgerows with *Nyctalus* sp. Activity >9.58ppn During Summer 2022

Hedgerow number	*Nyctalus* sp. ppn
427	591.17
348	497.71
426	333.33
522	148.33
196	77.50
206	43.17
351	41.50
170	39.67
353	31.86
202	30.33
420	27.67
173	24.83
489	20.17
434	19.00
188	16.67
491	16.50
429	16.50
164	15.67
30	13.17
413	12.83
267	12.80
958	12.33

Hedgerow number	*Nyctalus* sp. ppn
482	12.14
187	10.83

3.4.62. Of the remaining hedgerows, 50 had average activity levels of between 9.58ppn and 3.46ppn and 34 hedgerows had average activity levels of between 3.46ppn and 0.00ppn. All hedgerows recorded some level of *Nyctalus* sp. activity.

NSL

3.4.63. The hedgerow with the highest average activity within the NSL group was hedgerow 522, with 116.50ppn. The second highest was hedgerow 351 which recorded 11.17ppn.

3.4.64. Error! Reference source not found. highlights all the hedgerows with an average NSL sp. activity level of >0.35ppn.

Table 25 - Summary of the Hedgerows with NSL SP. Activity >0.35ppn During Summer 2022

Hedgerow number	NSL ppn
522	116.50
351	11.17
489	6.50
202	6.00
414	5.17
940	4.33
420	4.17
419	3.17
416	2.17
206	2.00
429	1.67
354	1.57

Hedgerow number	NSL ppn
808	1.17
374	1.17
791	1.00
810	1.00
434	1.00
413	0.67
804	0.67
818	0.50
449	0.43
353	0.43
47	0.40

3.4.1. Of the remaining hedgerows, 19 recorded an average activity level of between 0.35ppn and 0.00ppn. 55 hedgerows recorded no activity within the NSL group during automated static detector assessments in Summer 2022.

AUTUMN 2022 SURVEY RESULTS

3.4.2. An average of 191.84ppn was recorded over a combined 600 nights of automated static detector assessments during Autumn 2022, from 101 Statics. The full Static data from Summer 2022 is shown in **Annex G.**

3.4.3. The hedgerow with the highest bat activity levels throughout automated static detector assessments in Autumn 2022 was hedgerow 67. Hedgerow 67 recorded average activity levels of 1036.29ppn and was the only hedgerow that exceeded activity levels of 1,000.00ppn. The hedgerows with the next highest amount of bat activity were hedgerows 91 and 87 that recorded average activity levels of 969.33ppn and 965.33ppn, respectively.

3.4.4. The hedgerows with the lowest bat activity levels throughout automated static detector assessments in Autumn 2022 was hedgerow 791 which had an average activity level of 1.80ppn. A further three hedgerows (1004, 808, 3) had an average activity level of <5.00ppn.

3.4.5. The thresholds for data displayed in summary **Table 26. Table 35** has been determined based on hedgerows scoring average ppn above the 3rd quartile for each respective species.

Brown long-eared (BLE)

3.4.6. Hedgerow 154 was recorded as having the most BLE activity with an average of 25.50ppn. The hedgerows with the next highest amount of BLE activity were hedgerows 491 and 489 that had 17.83ppn and 12.17ppn, respectively.

3.4.7. Activity levels of BLE for hedgerows in Autumn are presented on **Figure 9.4.5c**. **Table 26** highlights all the hedgerows with an average of >2.83ppn for BLE.

Table 26 - Summary of Hedgerows with BLE Activity >2.83ppn During Spring 2022

Hedgerow Number	BLE ppn
154	25.50
489	17.83
491	12.17
422	10.50
88	9.83
374	9.67
394	9.33
420	8.83
164	8.67
394	8.33
87	7.33
396	6.17
156	5.83
83	5.33
482	5.17
90	4.83

Hedgerow Number	BLE ppn
351	4.33
1011	3.83
283, 157, 419	3.67
403	3.50
140, 38	3.33

3.4.8. Of the remaining hedgerows, 31 hedgerows had activity between 2.83-1.00ppn and 42 hedgerows having an activity level below 1.00ppn. Eleven of these hedgerows recorded no BLE activity in Autumn.

Lesser horseshoe

3.4.9. Hedgerow 199 was recorded as having the highest lesser horseshoe activity with an average of 7.00ppn. The hedgerows with the next highest amount of lesser horseshoe activity were hedgerows 974 and 419 that had an average 5.50ppn and 5.17ppn, respectively.

3.4.10. Activity levels of lesser horseshoe for hedgerows in Autumn are presented on **Figure 9.4.6c. Table 27** - Summary of Hedgerows with Lesser Horseshoe Activity of >0.4ppn in Autumn 2022Error! Reference source not found.highlights all the hedgerows that recorded lesser horseshoe activity of >0.4ppn.

Table 27 - Summary of Hedgerows with Lesser Horseshoe Activity of >0.4ppn in Autumn 2022

Hedgerow Number	Lesser horseshoe ppn
199	7.00
974	5.50
419	5.17
940	4.00
229	3.86
267	3.71
414	2.83
262	2.50

Hedgerow Number	Lesser horseshoe ppn
429	2.00
176	1.80
207, 214, 287	1.67
225	1.17
422, 348. 438	1.00
223	0.83
268	0.71
420, 202	0.67
236, 246, 354	0.50

3.4.11. The remaining hedgerows, 16 recorded activity levels of 0.40ppn->0.00ppn. Sixty hedgerows did not record any lesser horseshoe activity during automated static detector assessments in Autumn 2022.

***Myotis* sp.**

3.4.12. Hedgerow 354 was recorded as having the highest *Myotis* sp. activity with an average of 644.67ppn. Hedgerow 87 recorded the second highest *Myotis* sp. activity with an average of 376.83ppn. Hedgerows 91, 287, 199, 422 and 154 all had an average activity level of over 100.00ppn.

3.4.13. Activity levels of *Myotis* sp. for hedgerows in Autumn are presented on **Figure 9.4.7c. Table 28**Error! Reference source not found. highlights all the hedgerows with an average *Myotis* sp. activity level of >26.00ppn.

Table 28 - Summary of Hedgerows with Myotis SP. Activity >26.00ppn During Autumn 2022

Hedgerow Number	*Myotis* sp. ppn
354	644.67
87	376.83
91	184.83
287	177.00

Hedgerow Number	*Myotis* sp. ppn
199	160.33
422	149.83
154	109.50
348	92.50
67	92.29
47	63.29
38	54.83
940	54.00
167	53.57
140	43.33
420	42.50
416	40.83
818	35.67
954	35.00
210	33.50
974	31.17
351	29.17
419	28.67
90	28.33
188	27.67
489	26.83

3.4.14. Of the remaining hedgerows, 38 hedgerows had an average of 26.00->5.00ppn and 38 hedgerows had an average activity level 4.99->0.00ppn. No hedgerows

recorded no *Myotis* sp. activity during automated static detector assessments in Autumn 2022.

Common pipistrelle

3.4.15. Hedgerow 91 was recorded as having the highest common pipistrelle activity with an average of 651.17ppn. The next highest common pipistrelle activity was found at hedgerows 187 and 67 which had average activity scores of 516.43ppn and 505.57ppn, respectively.

3.4.16. Activity levels of common pipistrelle for hedgerows in Autumn are presented on **Figure 9.4.8c. Table 29**Error! Reference source not found. highlights all the hedgerows with an average common pipistrelle activity level of >147.50ppn.

Table 29 - Summary of Hedgerows with Common Pipistrelle Activity >147.50ppn During Autumn 2022

Hedgerow Number	Common pipistrelle ppn
91	651.17
187	516.43
67	505.57
22	498.50
87	464.83
167	385.57
113	383.50
251	370.17
414	345.17
161	338.50
420	299.50
958	259.20
145	209.86
940	197.83
422	197.67

Hedgerow Number	Common pipistrelle ppn
974	188.83
207	184.67
90	184.17
47	180.86
156	176.33
419	176.17
287	163.50
246	163.33
154	153.67
38	153.17

3.4.17. Of the remaining hedgerows, six hedgerows had an average recorded activity level of >100.00ppn, a further 19 hedgerows had an average recorded activity level of 99.99->50.00ppn, and 51 hedgerows had an average recorded activity level of 49.99->0.00ppn. No hedgerows recorded no common pipistrelle activity during automated static detector assessments in Autumn 2022.

Soprano pipistrelle

3.4.18. Hedgerows 140 and 67 had the highest average recorded soprano pipistrelle activity scores of 438.67ppn and 432.29ppn, respectively. Hedgerows 145 and 167 had the next highest average recorded activity scores of 316.71ppn and 289.14ppn, respectively.

3.4.19. Activity levels of soprano pipistrelle for hedgerows in Autumn are presented on **Figure 9.4.9c.**

3.4.20. **Table** 30Error! Reference source not found. highlights all the hedgerows with an average soprano pipistrelle activity level of >38.58ppn.

Table 30 - Summary of Hedgerows with Soprano Pipistrelle Activity >38.58ppn During Autumn 2022

Hedgerow Number	Soprano pipistrelle ppn
140	438.67
67	432.29
145	316.71
167	289.14
438	221.80
47	127.71
91	122.00
429	112.60
87	110.17
427	108.00
187	93.57
940	89.33
287	74.50
22	74.33
38	72.50
422	69.50
157	65.17
420	64.50
31	62.83
489	61.50
64	61.17
414	57.67

Hedgerow Number	Soprano pipistrelle ppn
83	49.17
954	44.33
354	39.17

3.4.21. Of the remaining hedgerows, 34 hedgerows had an average recorded activity level of 38.58ppn->10.00ppn, and 42 hedgerows had an average recorded activity level of 9.99ppn->0.00ppn. Four hedgerows recorded no soprano pipistrelle activity during automated static detector assessments in Spring 2022.

***Pipistrellus* sp.**

3.4.22. Hedgerows 287 and 156 had the highest average recorded *Pipistrellus* sp. group activity scores of 123.00ppn and 82.67ppn, respectively. Hedgerows 27 and 414 had the next highest average recorded activity scores of 42.84ppn and 10.00ppn, respectively.

3.4.23. **Table 31**Error! Reference source not found. highlights all the hedgerows with an average *Pipistrellus* sp. activity level of >1.23ppn.

Table 31 - Summary of the Hedgerows with Pipistrellus SP. Activity >1.23ppn During Autumn 2022

Hedgerow Number	*Pipistrellus* sp. ppn
287	123.00
156	82.67
27	42.84
414	10.00
374	8.67
422	8.17
83	8.00
90, 38	5.50
67	4.71
267	4.57

Hedgerow Number	*Pipistrellus* sp. ppn
87	4.50
940	4.17
164, 214	4.00
426	3.60
91	3.17
117	2.33
429	2.20
223, 31	2.00
154	1.83
427	1.60
176	1.40
187	1.28

3.4.24. Of the remaining hedgerows, 42 hedgerows had an average recorded activity level of 1.17->0.00ppn. Thirty-four hedgerows had no activity identified within the *Pipistrellus* sp. group during automated static detector assessments in Autumn 2022.

Nyctalus sp.

3.4.25. Hedgerows 348 had the highest average numbers of *Nyctalus* sp. activity, recording 83.16ppn. The hedgerows with the next highest average activity levels were hedgerows 113 and 414, with 19.34ppn and 19.00ppn, respectively.

3.4.26. **Table 32**Error! Reference source not found. highlights all the hedgerows with an average *Nyctalus* sp. activity level of >2.00ppn.

Table 32 - Summary of the Hedgerows with Nyctalus SP. Activity >2.00ppn During Autumn 2022

Hedgerow number	*Nyctalus* sp. ppn
348	83.16
113	19.34

Hedgerow number	*Nyctalus* sp. ppn
414	19.00
351	18.83
353	13.00
117	8.50
90	8.16
354	6.67
419	6.34
91	6.00
954, 940	5.50
420	5.17
427	4.60
426	4.40
422	4.33
161	4.16
157	3.83
64	3.17
154, 27	2.84
88	2.50
78	2.33
416	2.17

3.4.1. Of the remaining hedgerows, 51 had average activity levels of between 2.00ppn and 0.00ppn. Twenty-six hedgerows recorded no activity identified within the *Nyctalus* sp. group during automated static detector assessments in Autumn 2022.

NSL

3.4.2. The hedgerow with the highest average activity within the NSL group was hedgerow 348, with 5.33ppn. The second highest was hedgerow 429 which recorded 2.00ppn.

3.4.3. **Table 33**Error! Reference source not found. highlights all the hedgerows with an average NSL activity level of >0.14ppn.

Table 33 - Summary of the Hedgerows with NSL Activity >0.14ppn During Autumn 2022

Hedgerow number	NSL ppn
348	5.33
429	2.00
351	1.33
64, 426	1.00
353	0.83
427	0.80
354	0.50
956, 67	0.43
202	0.33
438	0.20
161, 83, 88, 974, 413, 422, 818, 196, 30, 808, 206	0.17

3.4.1. Of the remaining hedgerows, three recorded an average activity level of between 0.14ppn and 0.00ppn. Seventy-five hedgerows recorded no activity within the NSL group during automated static detector assessments in Autumn 2022.

3.5. FINAL BHSA CATEGORY

3.5.1. Of the 193 hedgerows assessed, 30 hedgerows were upgraded from ‘Good’ to ‘Excellent’, one hedgerow was downgraded from ‘Excellent’ to ‘Good’, four hedgerows were downgraded from ‘Good’ to ‘Poor’ and 159 hedgerows

remained unchanged. Of the remaining hedgerows which were not subject to any assessment, 97 remained 'Poor' and 66 were 'Scoped out'.

3.5.2. In total, 45 hedgerows have a final BHSA category of 'Excellent', 144 have a category of 'Good' and 102 have a category of 'Poor'.

3.5.3. **Table H.1** in **Annex H** lists all the hedgerows identified within the Newbuild Infrastructure Boundary, their final BHSA category, and the reason for any BHSA category alterations. **Table 34** below summaries all hedgerows which have a final BHSA category of 'Excellent'. Final BHSA categories are presented on **Figure 9.4.10**.

Table 34 - Summary of Hedgerows with Final BHSA Categories of 'Excellent'

Hedge	BHSA category	Final BHSA Category	Justification
28	Excellent	Excellent	Grouped with 'Good' hedgerow 31, which did not meet any parameters for upgrade or downgrade
66	Good	Excellent	Grouped with 67 – see below
67	Good	Excellent	The number of total ppn was above the upper bounds for Spring, Summer and Autumn
82	Excellent	Excellent	Grouped with 'Good' hedgerow 81 which did not meet any parameters for upgrade or downgrade
91	Excellent	Excellent	Grouped with 'Good' hedgerow 93 which did not meet any parameters for upgrade or downgrade
145	Excellent	Excellent	The number of total ppn was above the upper bounds for Spring, Summer and Autumn
196	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Summer
199	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the

Hedge	BHSA category	Final BHSA Category	Justification
			upper bounds in Spring, Summer and Autumn
202	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Summer
206	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Summer
229	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring, Summer and Autumn
236	Excellent	Excellent	Did not meet the parameters for downgrade
237	Excellent	Excellent	Grouped with 238 – see below
238	Excellent	Excellent	Did not meet the parameters for downgrade
247	Excellent	Excellent	Did not meet the parameters for downgrade
267	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Summer and Autumn
283	Excellent	Excellent	Did not meet the parameters for downgrade
289	Excellent	Excellent	Grouped with 'Good' hedgerow 287 which did not meet any parameters for upgrade or downgrade
348	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Summer and Autumn

Hedge	BHSA category	Final BHSA Category	Justification
349	Good	Excellent	Grouped with 348 and 350 – see above
350	Good	Excellent	Grouped with 348 and 349 – see above
353	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Summer
354	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Summer and Autumn
374	Excellent	Excellent	Did not meet the parameters for downgrade
398	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Summer
399	Good	Excellent	Grouped with 400 and 398 – see above
400	Good	Excellent	Grouped with 399 and 398 – see above
402	Good	Excellent	Grouped with 403 – see below
403	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Summer
405	Good	Excellent	Grouped with 406 and 1004 – see below
406	Good	Excellent	Grouped with 406 and 1004 – see below
414	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Autumn
419	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the

Hedge	BHSA category	Final BHSA Category	Justification
			upper bounds in Spring, Summer and Autumn
420	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring, Summer and Autumn
421	Good	Excellent	Grouped with 420 – see above
422	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Autumn
429	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring, Summer and Autumn
482	Excellent	Excellent	Did not meet the parameters for downgrade
488	Good	Excellent	Grouped with 489 – see below
489	Excellent	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Autumn
491	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Autumn
940	Excellent	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Summer and Autumn
974	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Autumn

Hedge	BHSA category	Final BHSA Category	Justification
1004	Good	Excellent	The number of ppn for an Annex II and/or sensitive species was above the upper bounds in Spring and Summer
1011	Excellent	Excellent	Did not meet the parameters for downgrade

3.6. MODIFIED DEFRA LOCAL SCALE SURVEYS

OVERVIEW

3.6.1. A total of 10 bat species / species groups were recorded across the Newbuild Infrastructure Boundary during the modified DEFRA Local Scale surveys, at the 32 'Excellent' hedgerows subject to survey to date. The following species were recorded:

- Common pipistrelle;
- Soprano pipistrelle;
- Nathusius' pipistrelle;
- *Pipistrellus* sp.;
- Noctule;
- *Nyctalus* sp.
- NSL;
- *Myotis* sp.;
- Lesser horseshoe bat; and
- Brown long-eared bat.

3.6.2. Of the 32 hedgerows which have been surveyed so far, 10 hedgerows had total species counts for in-use passes which exceeded the DEFRA thresholds. Seven hedgerows met the threshold of 10 or more bat passes from at least one species, two hedgerows met the threshold of at least one pass from an Annex II species, and one hedgerow met the threshold for both reasons. A summary of hedgerows where total species count for in-use passes exceeded the DEFRA thresholds is shown below in **Table 35.**

3.6.3. The survey information of each modified DEFRA Local Scale survey is detailed in **Table I.1** in **Annex I** and the data recorded for all modified DEFRA Local Scale surveys undertaken in 2022 can be seen in **Table J.1** in **Annex J.** The relative locations of each 'Excellent' hedgerow subject to the modified DEFRA

Local Scale surveys and those that met the thresholds are presented in **Figure 9.4.11.**

Table 35 - Summary of Hedgerows where Total Species Count for at Least One Survey Exceeded the DEFRA Threshold (Survey where Threshold Was Met is Highlighted in Blue)

Hedgerow	PIPPIP	PIPPYG	NYCNOC	MYOSP	RHIHIP	PIPSP	PLEAUR	NYCSP	NSL
145	1	1	0	0	0	0	0	0	0
	0	2	0	0	0	0	0	0	0
	10	3	0	0	0	0	0	0	0
	9	9	0	0	0	1	0	0	0
	2	5	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0
202	0	4	0	0	0	0	1	0	0
	2	2	0	0	1	0	0	0	0
206	4	3	0	0	1	5	0	0	0
	3	2	0	0	1	1	0	0	0
229	6	0	0	0	1	2	0	0	0
	14	2	0	0	0	0	0	0	0
237	10	3	5	0	0	0	0	0	0

Hedgerow	PIPPIP	PIPPYG	NYCNOC	MYOSP	RHIHIP	PIPSP	PLEAUR	NYCSP	NSL
	5	0	0	0	0	1	0	0	0
267	5	3	0	1	0	0	0	0	0
	34	7	0	0	0	0	1	0	0
354	16	7	1	10	0	0	0	0	0
	1	4	0	0	0	0	0	0	0
419	3	12	0	3	0	1	0	0	0
	0	0	0	0	0	0	0	0	0
940	1	1	0	0	0	0	0	0	0
	7	15	0	3	0	1	0	0	0
974	2	1	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0

4. SUMMARY

4.1.1. Three hundred and fifty-seven hedgerows were identified within the Newbuild Infrastructure Boundary during the hedgerow field surveys. Sixty-six hedgerows were scoped out of further assessment. Of the remaining hedgerows, 98 were categorised as 'Poor' and needed no additional assessment. One hundred and ninety-three hedgerows, which were assigned the BHSA category 'Good' or 'Excellent', required further survey by automated static detectors.

4.1.2. Based on the data collected by the automated static detector surveys, the BHSA category of 'Good' or 'Excellent' hedgerows was downgraded, confirmed or upgraded. As a result, final BHSA categories were assigned as follows:

- 45 'Excellent' hedgerows;
- 144 'Good' hedgerows;
- 102 'Poor' hedgerows; and
- 66 hedgerows which were scoped out.

4.1.3. Modified DEFRA Local Scale surveys are due to be conducted for the 45 'Excellent' hedgerows. To date, 32 'Excellent' hedgerows have been subject to two initial surveys, 10 of which met the relevant thresholds and require a further four survey visits prior to construction. The initial two surveys for the remaining 13 'Excellent' hedgerows will be completed prior to construction along with any further surveys required for hedgerows which meet the threshold, in addition to the remaining surveys required for the 10 hedgerows to date which have met the threshold.

4.1.4. The final BHSA categories, in combination with the results of the modified DEFRA Local Scale surveys, have been used to confirm the significance of effects and the mitigation prescriptions described in **Chapter 9: Biodiversity (Revision B) (Volume II).** This will be revaluated again once the remaining modified DEFRA Local Scale surveys have been completed prior to construction and a final assessment is made.

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- **Ref. 4** - HMSO (1981). *Wildlife and Countryside Act (as amended by the Countryside and Rights of Way Act 2000)*. HMSO, Norwich. Available at: https://www.legislation.gov.uk/ukpga/1981/69/contents [Accessed on 17/08/2022]
- **Ref. 5** - HMSO (1997). *The Hedgerows Regulations 1997, SI 1997/1160*. HMSO: London. Available at: https://www.legislation.gov.uk/uksi/1997/1160/contents/made [Accessed on 08/02/2022]
- **Ref. 6** - HMSO (2006) *Natural Environment and Rural Communities Act*. Available at: https://www.legislation.gov.uk/ukpga/2006/16/pdfs/ukpga_20060016_en.pdf [Accessed on 08/02/2022]
- **Ref. 7** - HMSO (1995) *Environment Act 1995*. Available at: https://www.legislation.gov.uk/ukpga/1995/25/contents [Accessed on 21/06/22]
- **Ref. 8** - HMSO (2016) *Environmental (Wales) Act 2016. Welsh Government*. Available at: https://www.legislation.gov.uk/anaw/2016/3/contents/enacted [Accessed on 21/06/22]
- **Ref. 9** - HMSO (2021) *Environment Act 2021*. Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted [Accessed on 21/06/22]
- **Ref. 10** - Flintshire County Council (2017), *Supplementary Guidance Documents, No. 8 Nature Conservation and Development*, Flintshire County Council, Adopted Date January 2017
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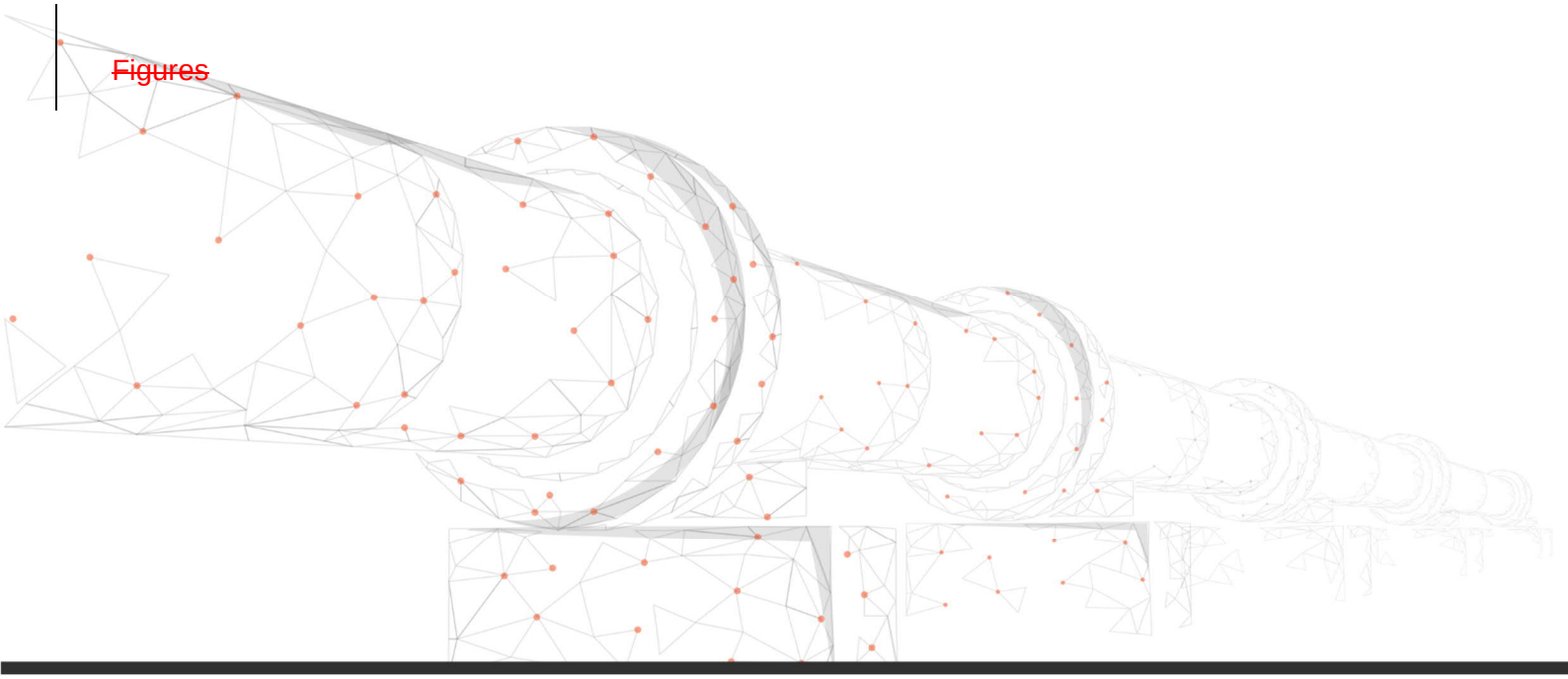
Annex A

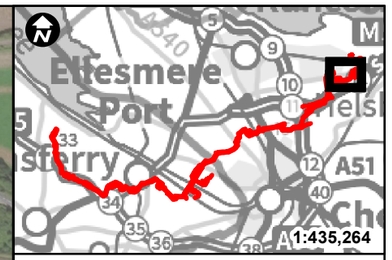
FIGURES

Figures



FIGURES

Figure 9.4.1 – Ancient Hedgerow Locations



Key:

- Newbuild Infrastructure Boundary
- Ancient Hedgerows

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.1 - Ancient Hedgerow Locations

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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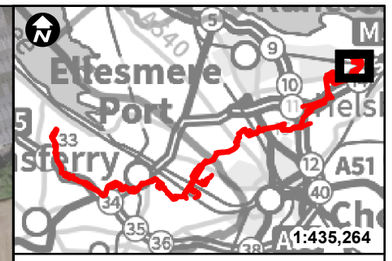
DRAWING NUMBER

EN070007-APP-ES-9.4.1

Figure 9.4.2 – Hedgerow Locations



Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

0 100 200 300 400 Metres

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 1

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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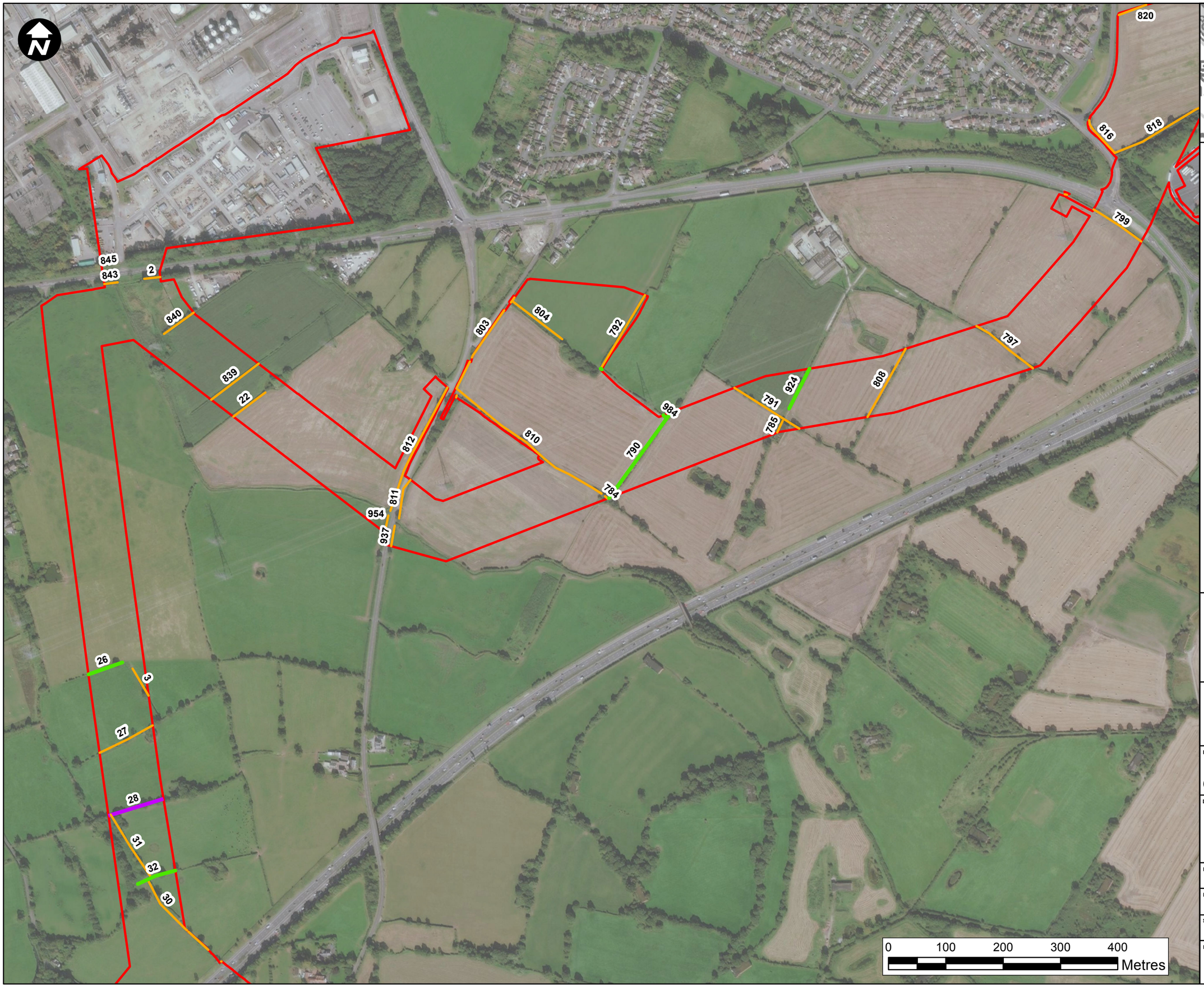
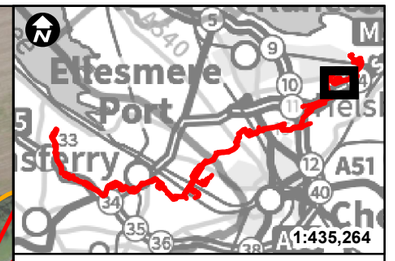
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet1





Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 2

DRAWING STATUS

For Information

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SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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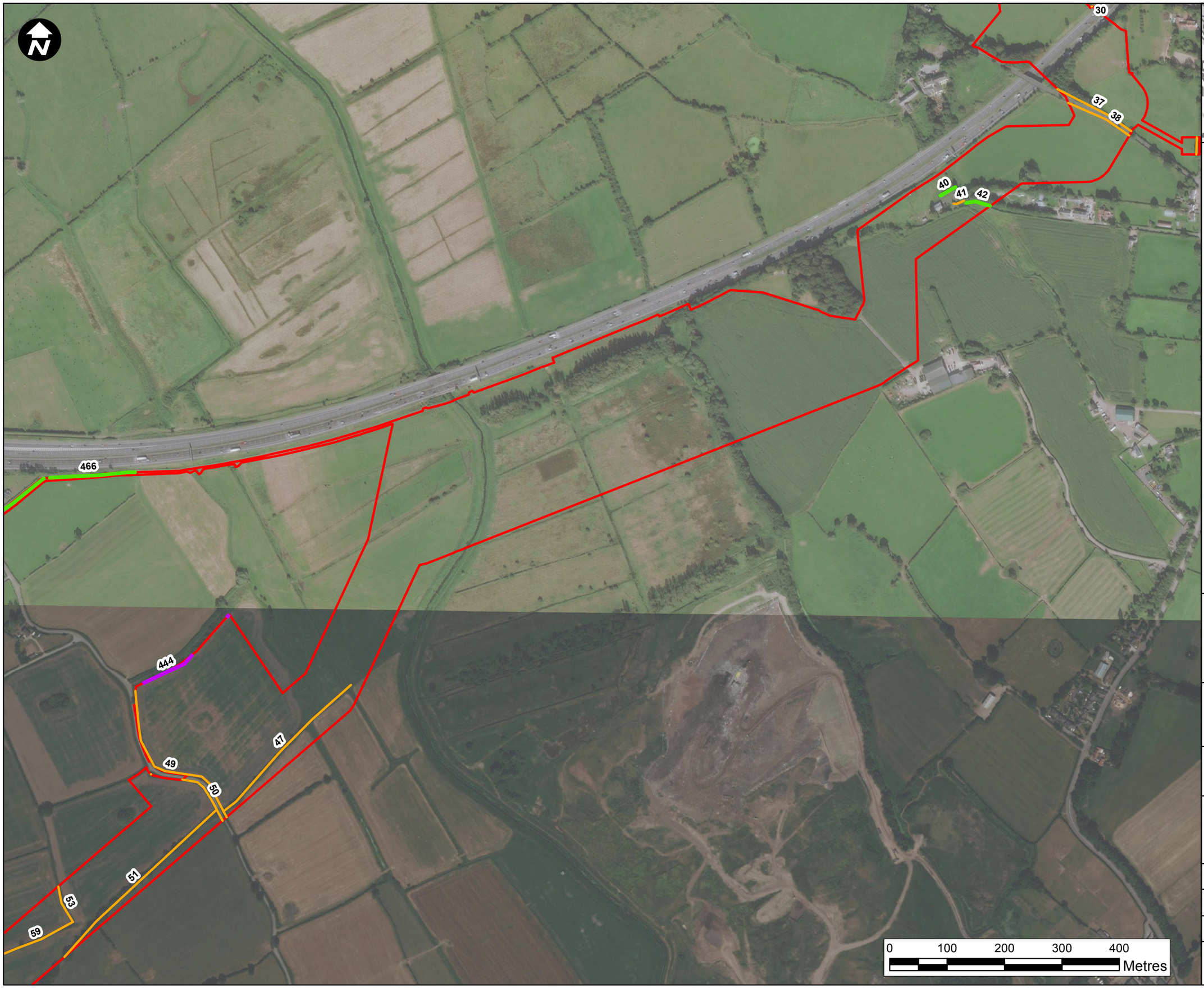
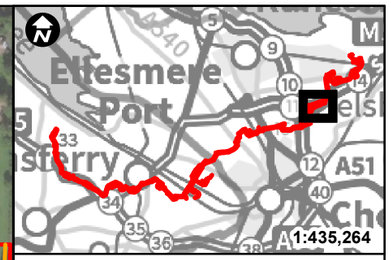
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet2





Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 3

DRAWING STATUS

For Information

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SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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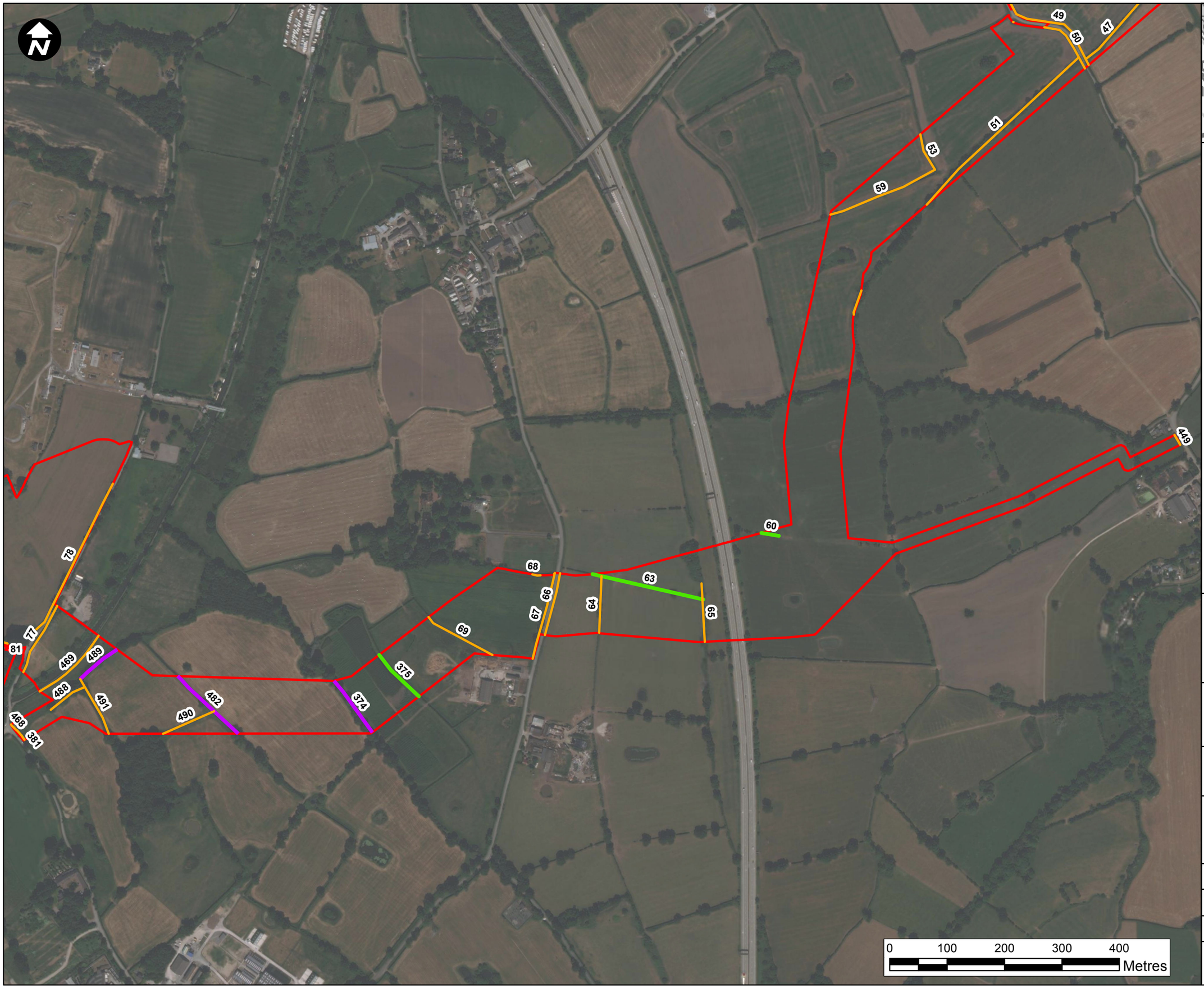
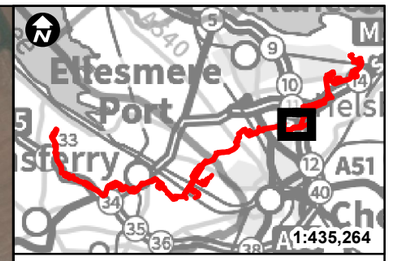
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet3





Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 4

DRAWING STATUS

For Information

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DRAWING NUMBER

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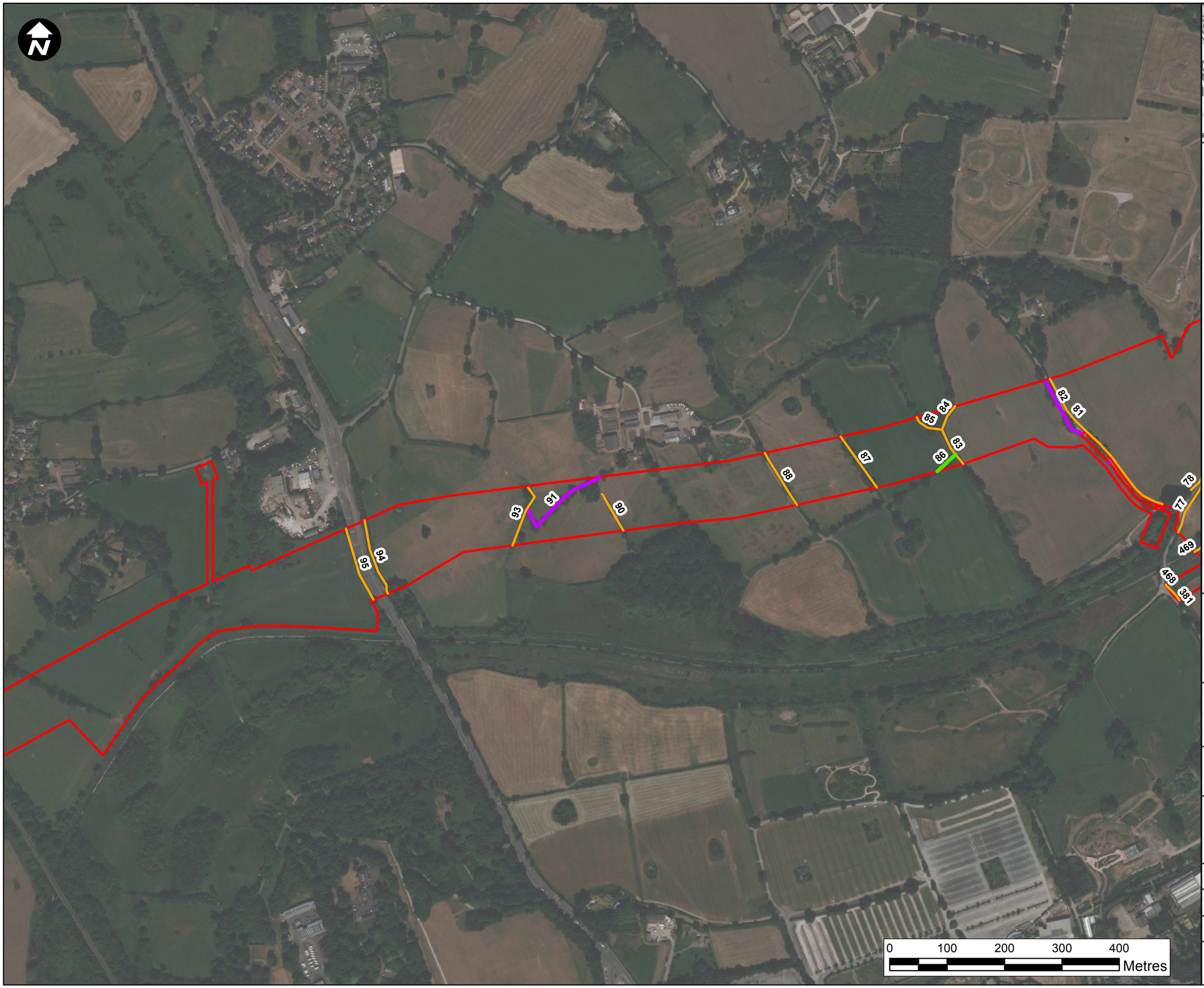

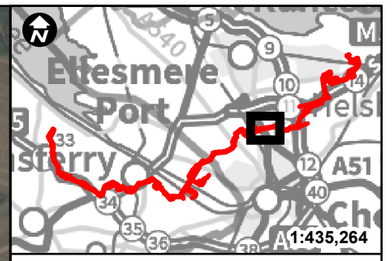

Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 5

DRAWING STATUS

For Information

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SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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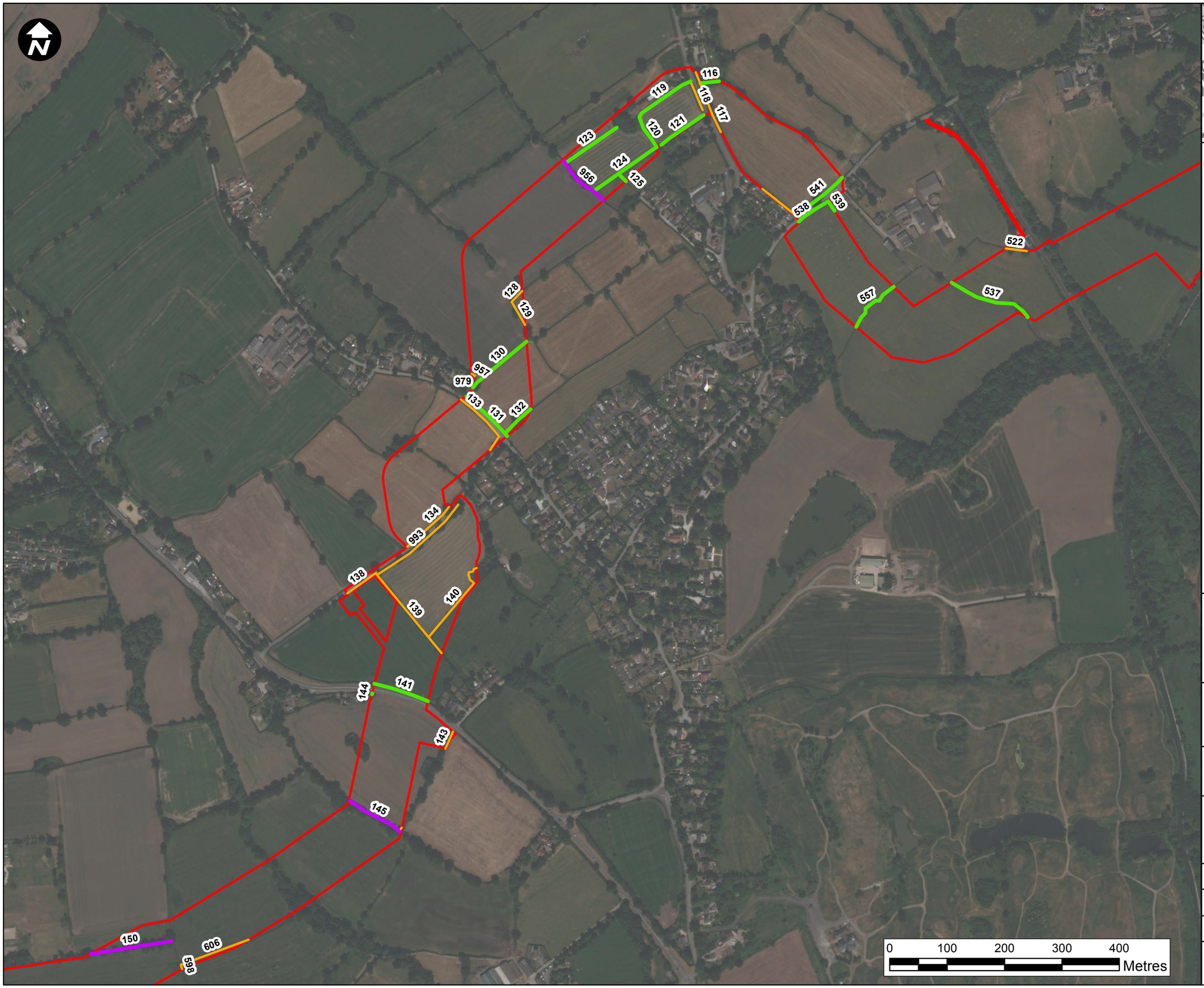
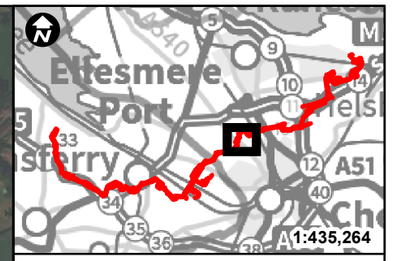
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet5





Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 6

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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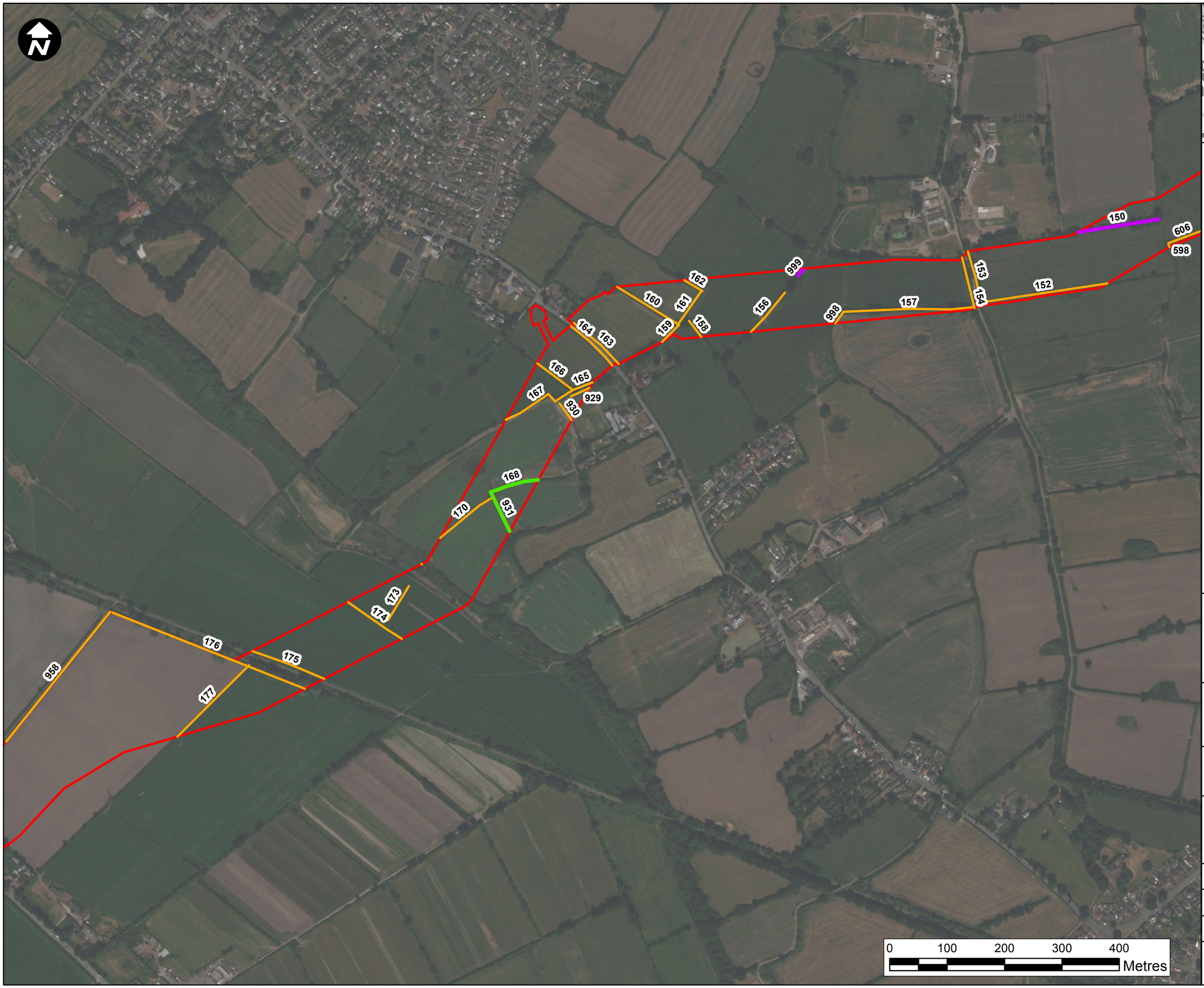
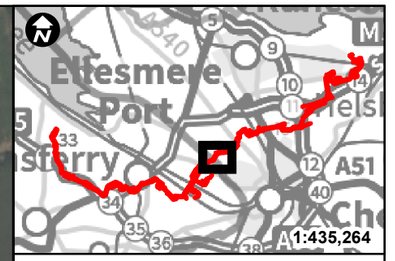
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet6





Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 7

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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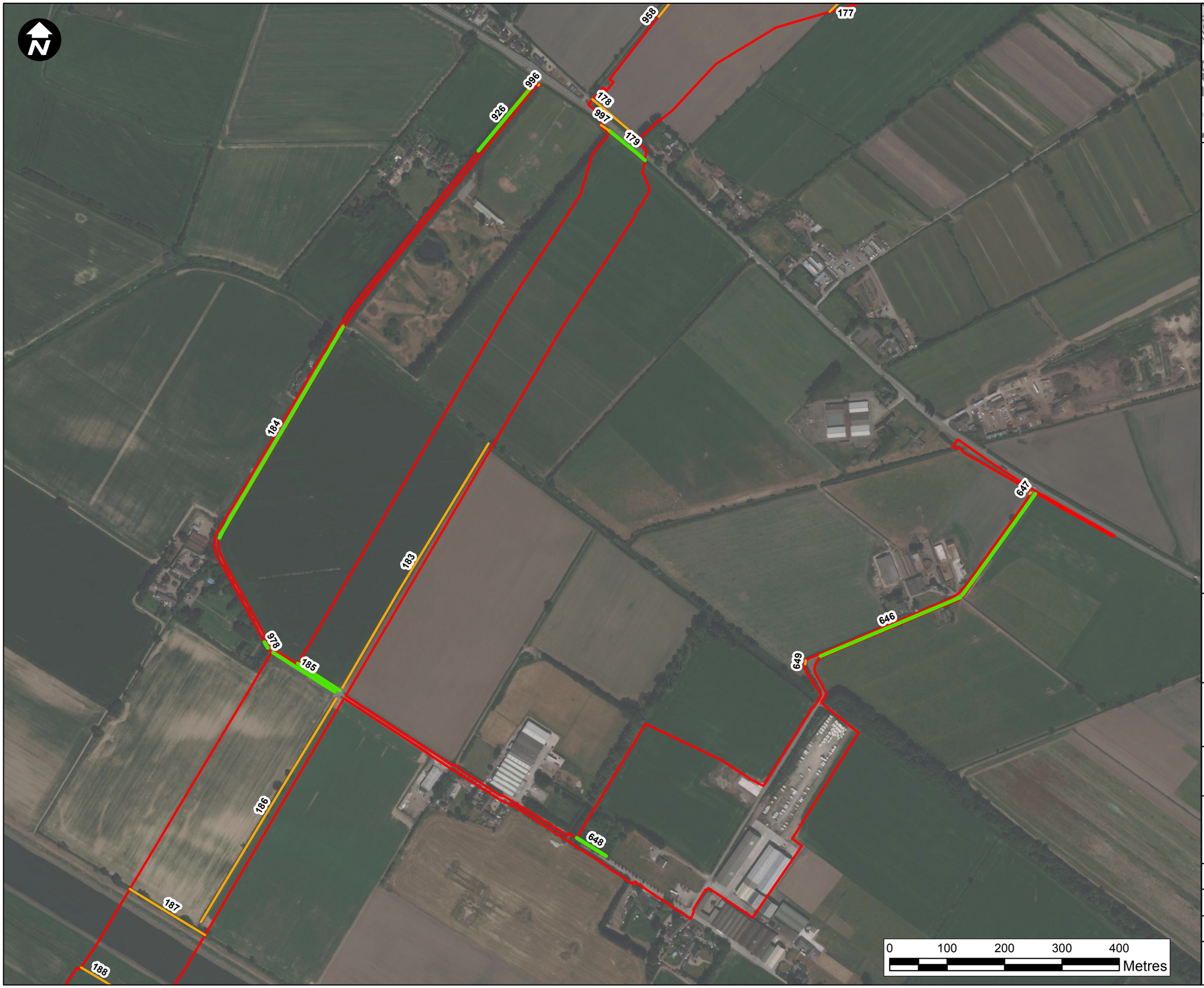
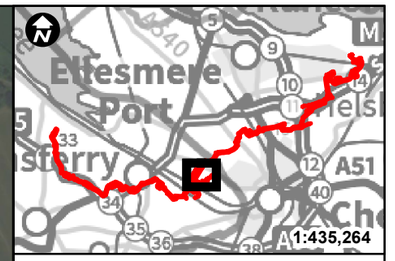
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet7





Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 8

DRAWING STATUS

For Information

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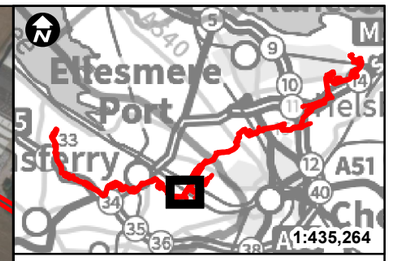

Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 9

DRAWING STATUS

For Information

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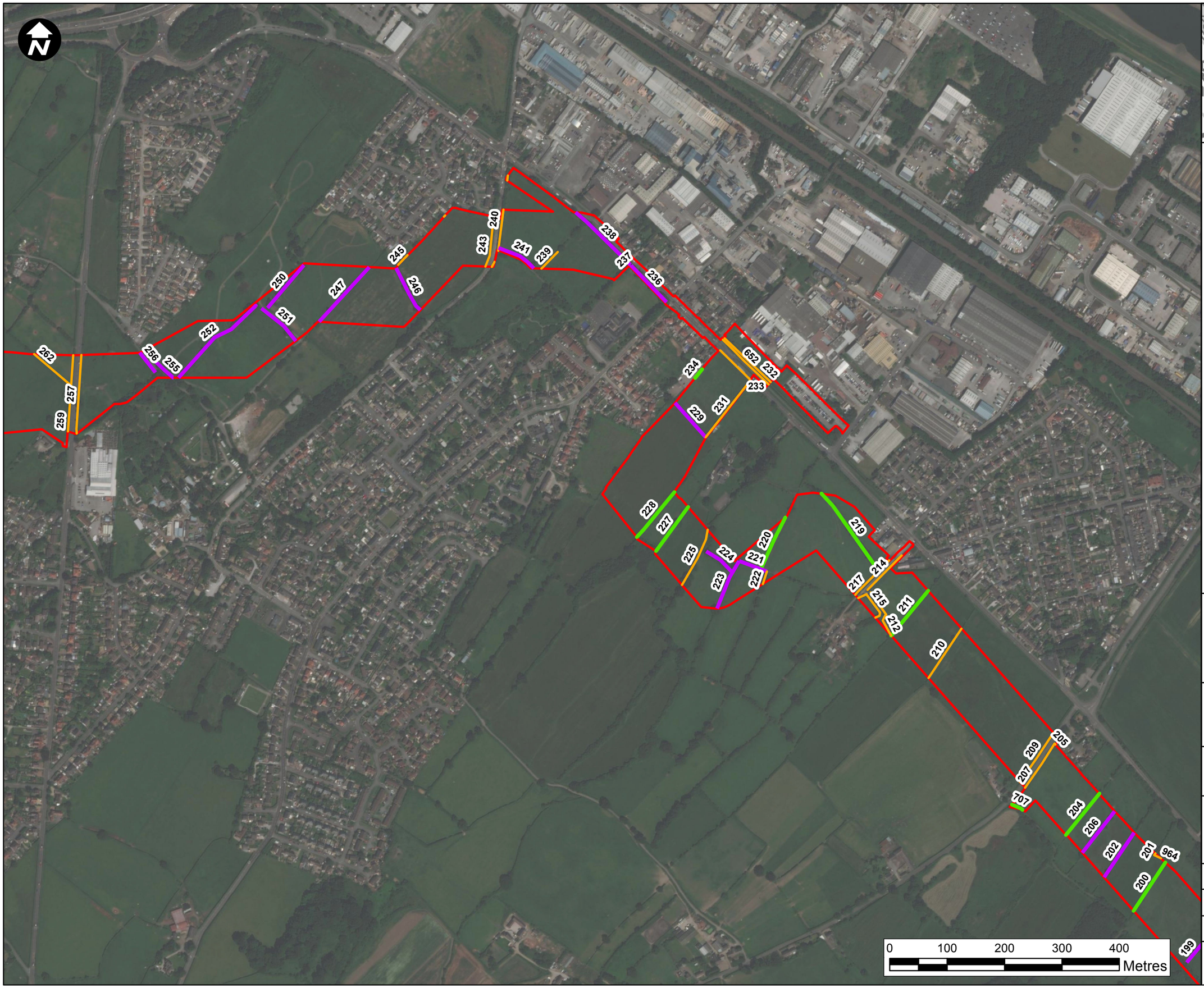
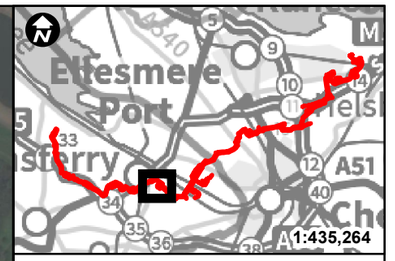
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet9





Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 10

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
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SCALE @ A3 SIZE	DATE	REVISION
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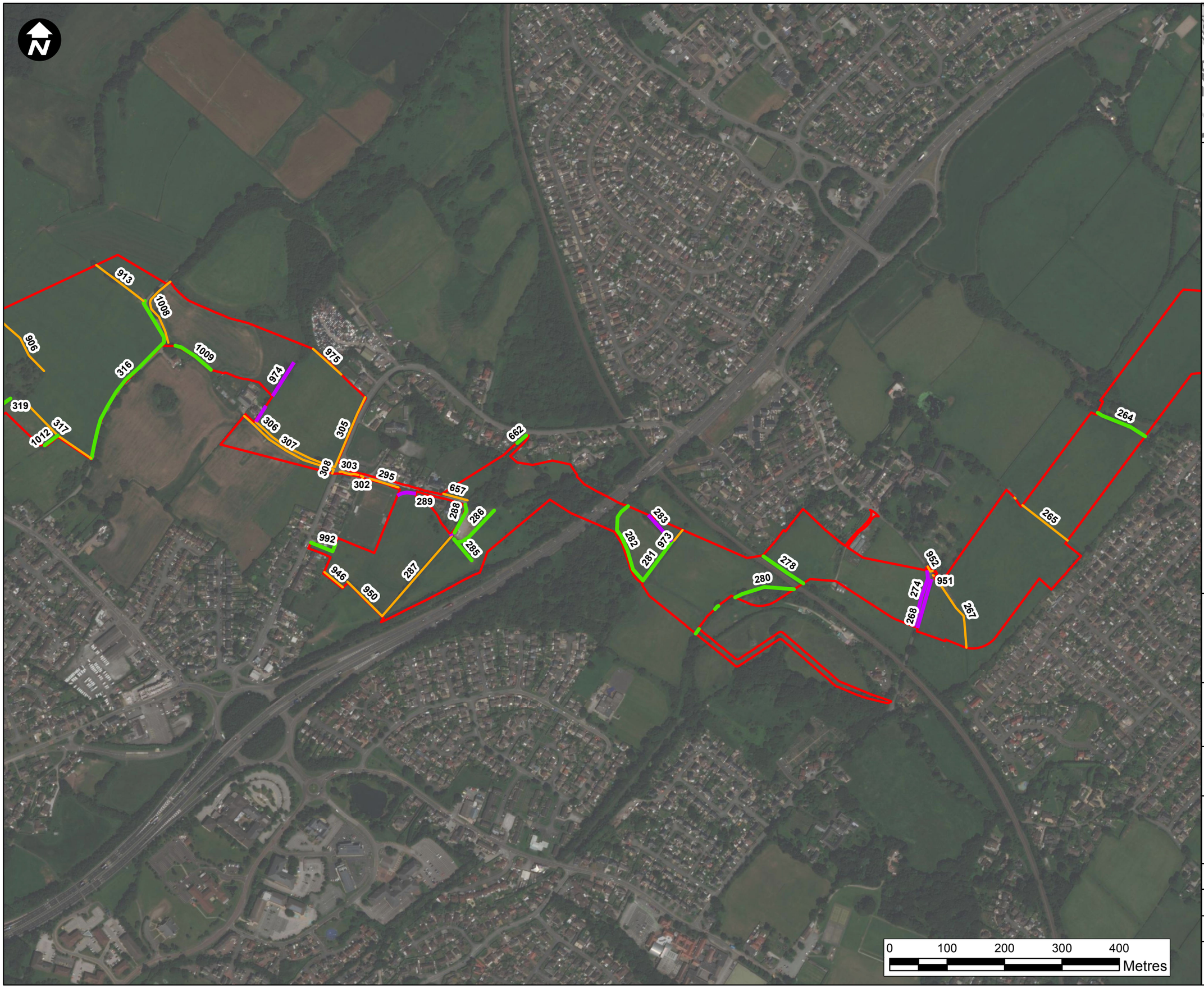
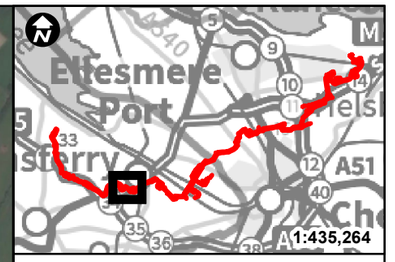
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet10





Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 11

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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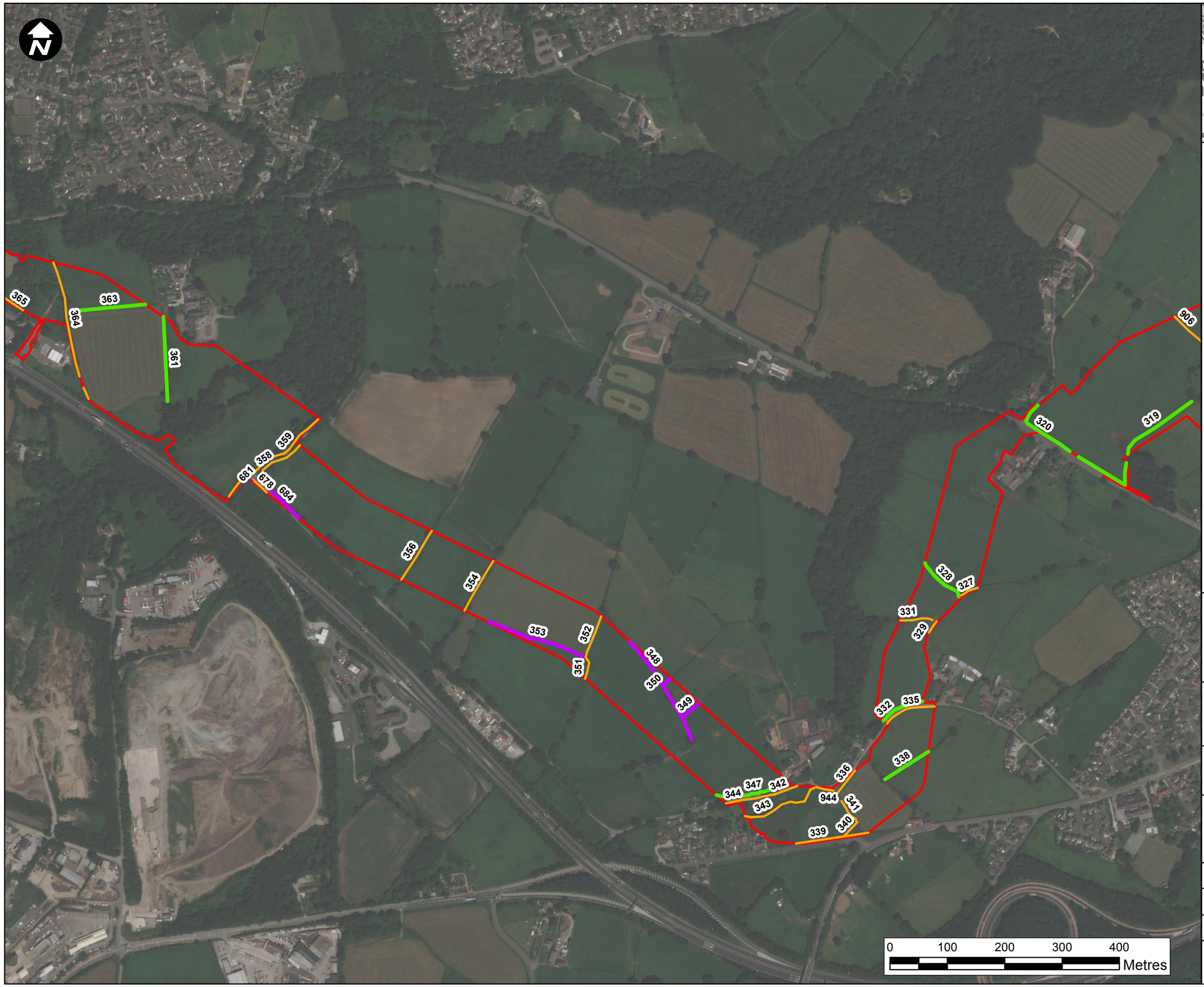
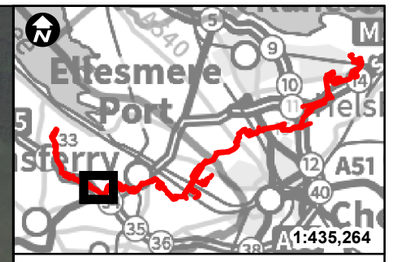
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet11





Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 12

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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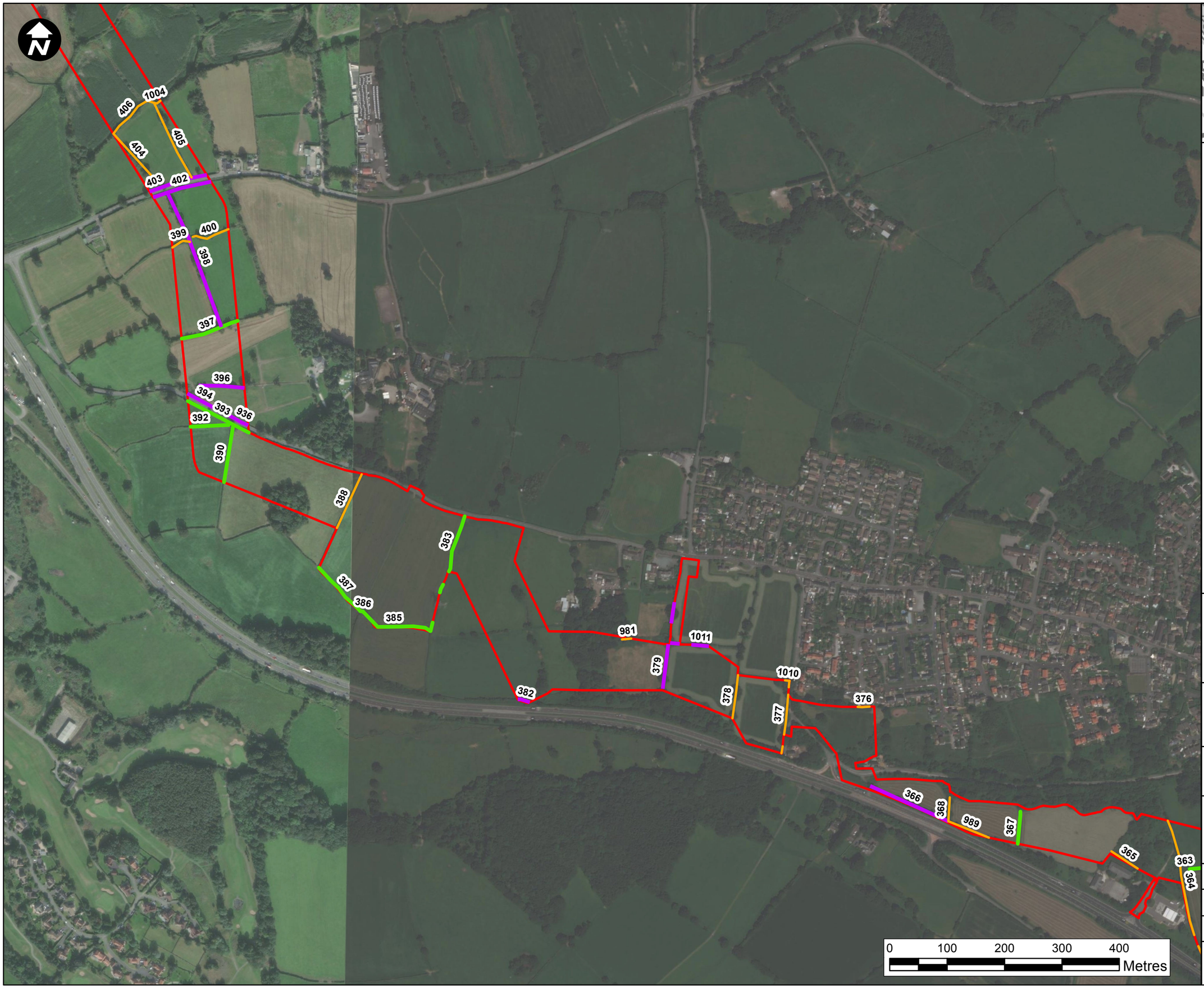
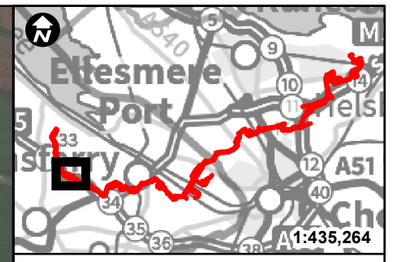
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet12





Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 13

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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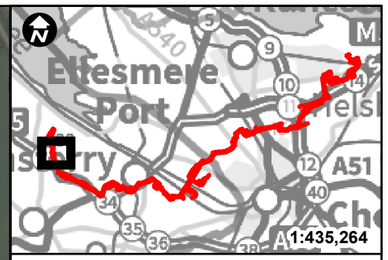
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet13



Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

0 100 200 300 400 Metres

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 14

DRAWING STATUS

For Information

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SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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DRAWING NUMBER

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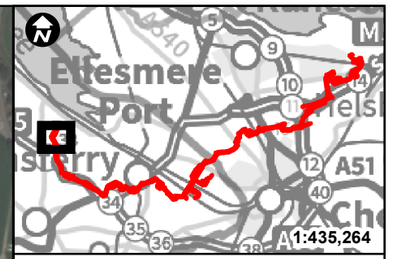

Key:

- Newbuild Infrastructure Boundary
- Scoped Out
- Excellent
- Good
- Poor
- XXX Hedgerow Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.2 - Hedgerow Locations Sheet 15

DRAWING STATUS

For Information

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SCALE @ A3 SIZE	DATE	REVISION
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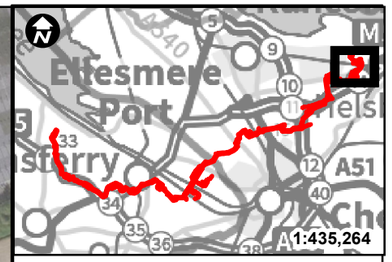
DRAWING NUMBER

EN070007-APP-ES-9.4.2-Sheet15

Figure 9.4.3 – Hedgerow Static Locations



Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 1

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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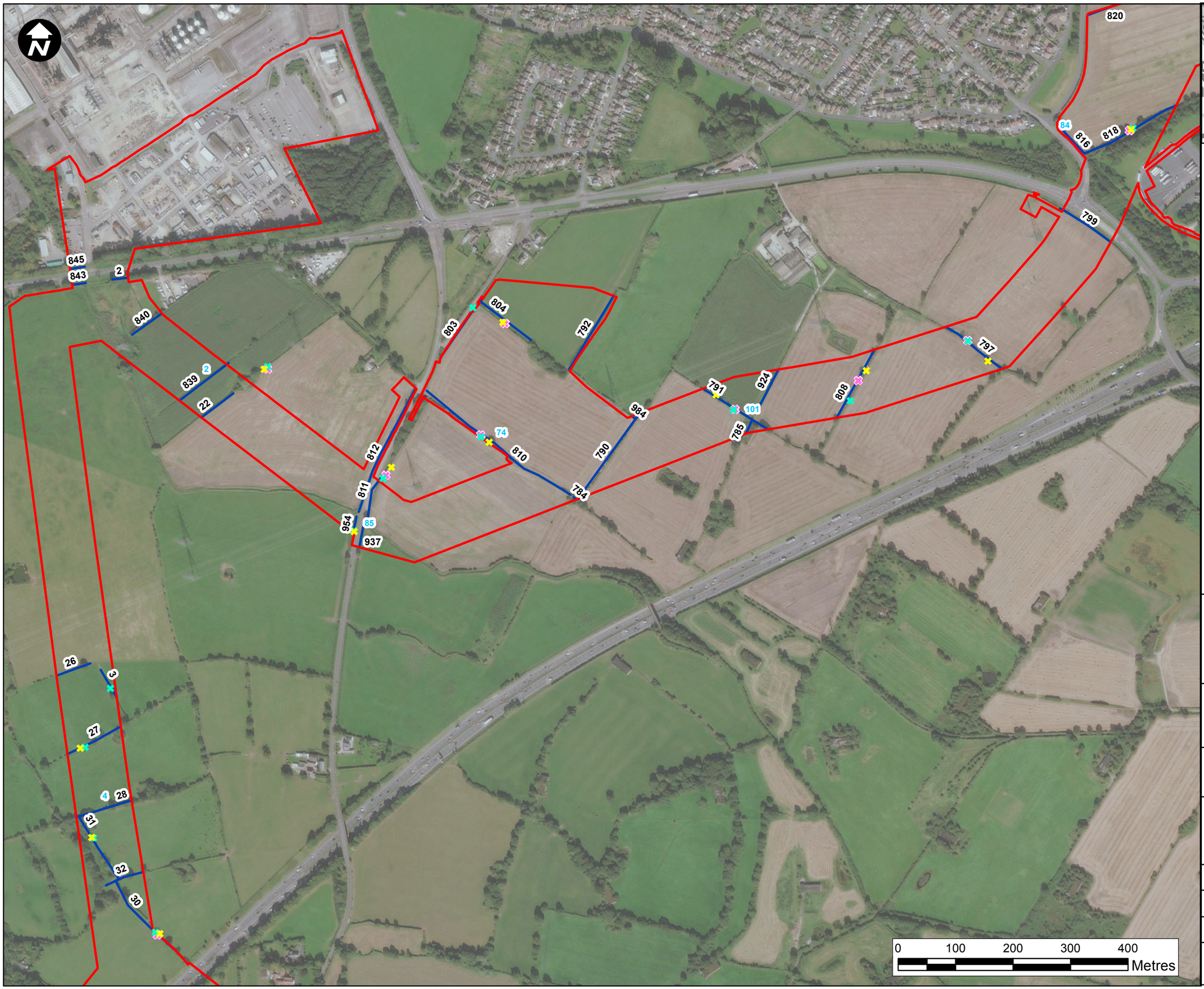
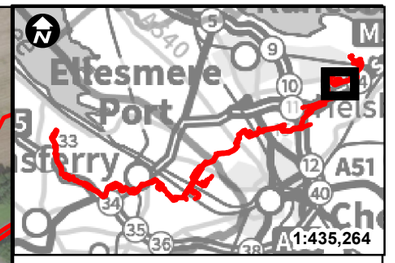
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet1





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 2

DRAWING STATUS

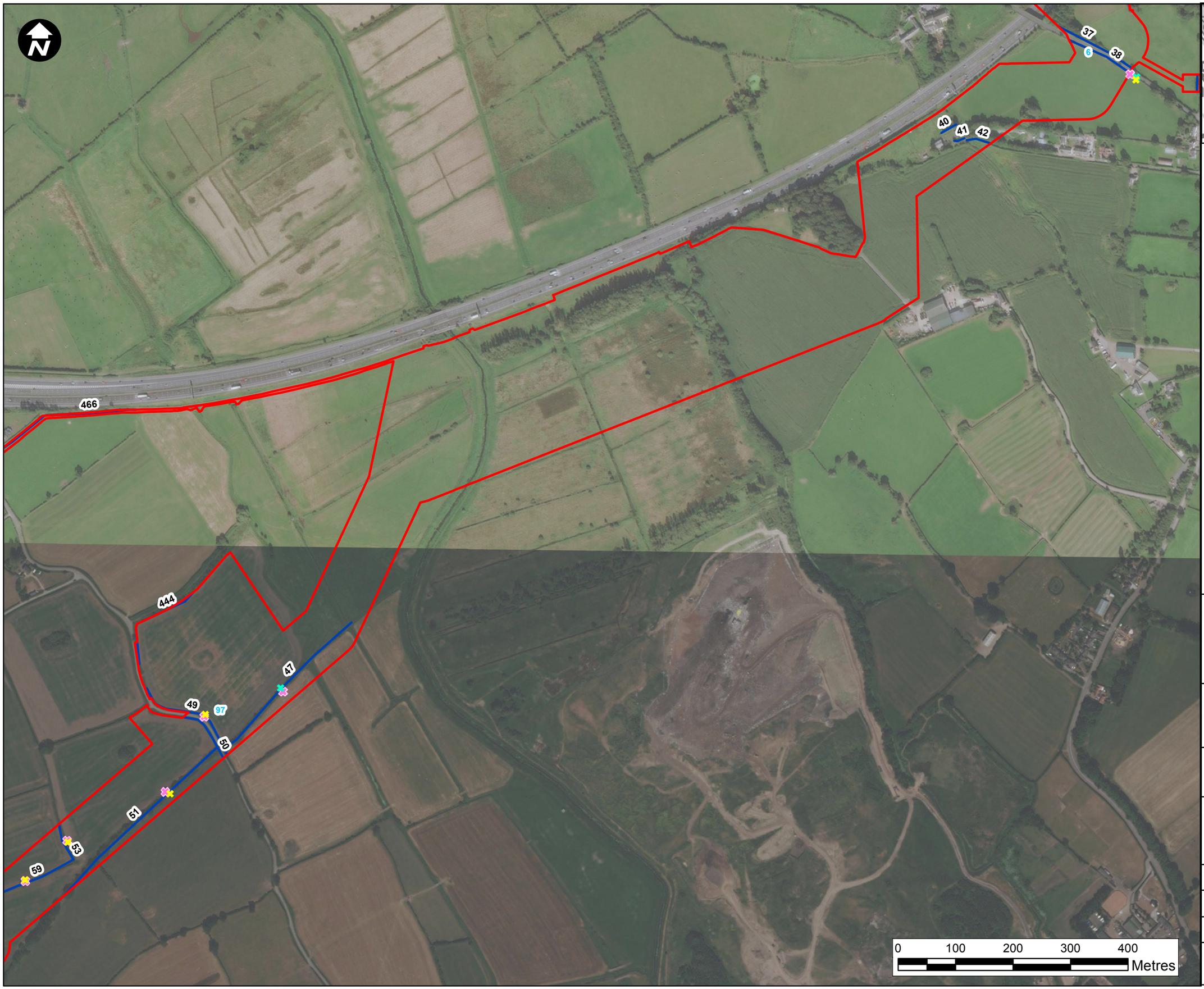
For Information

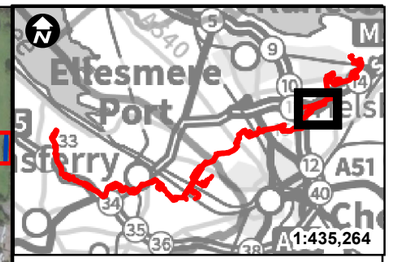
DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
1:6,000	15/12/2022	B

DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet2





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 3

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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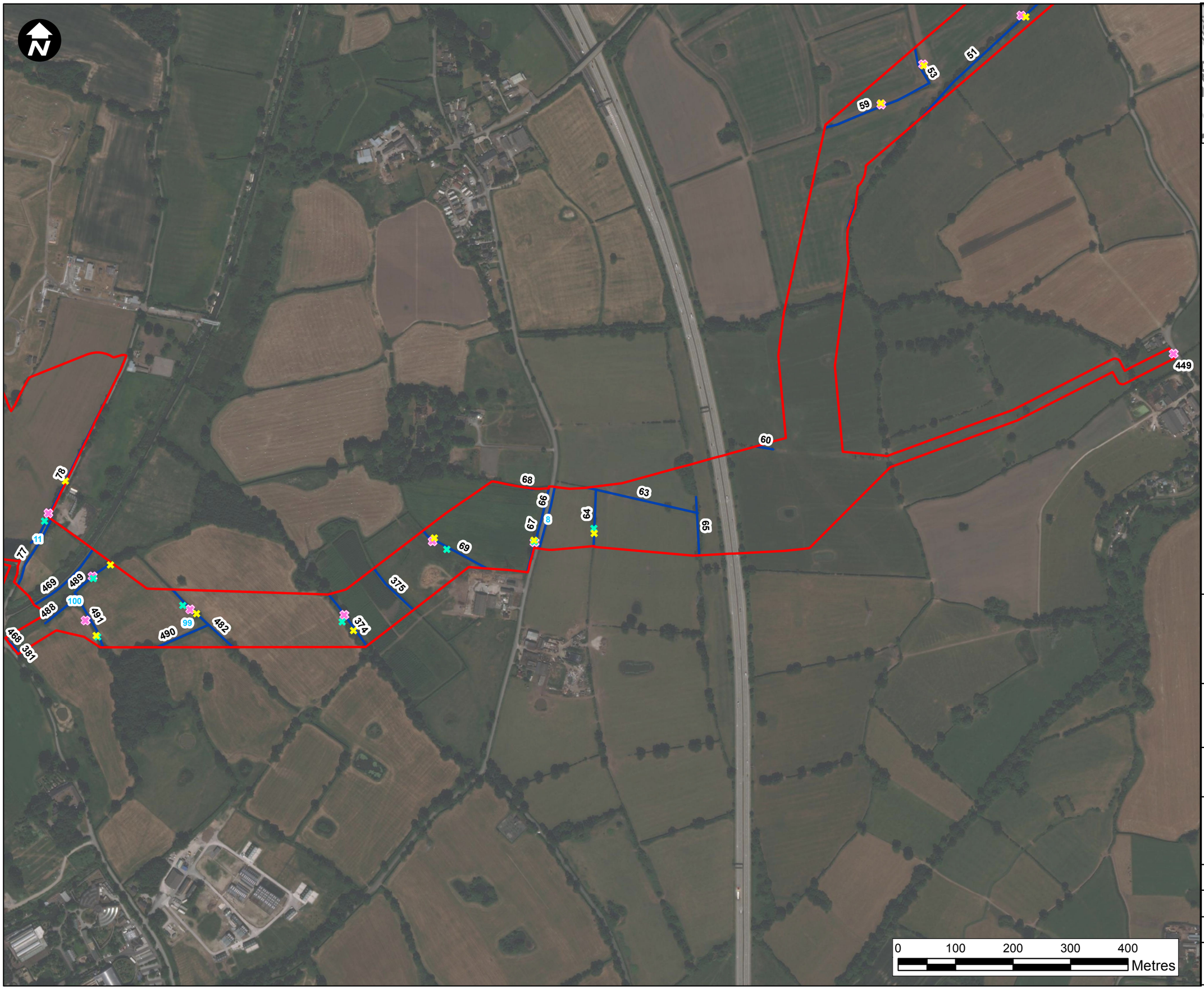
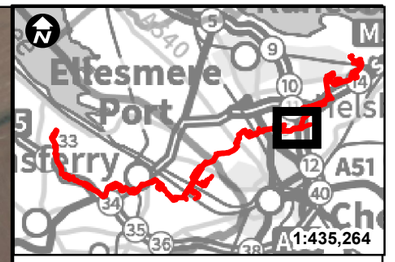
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet3





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 4

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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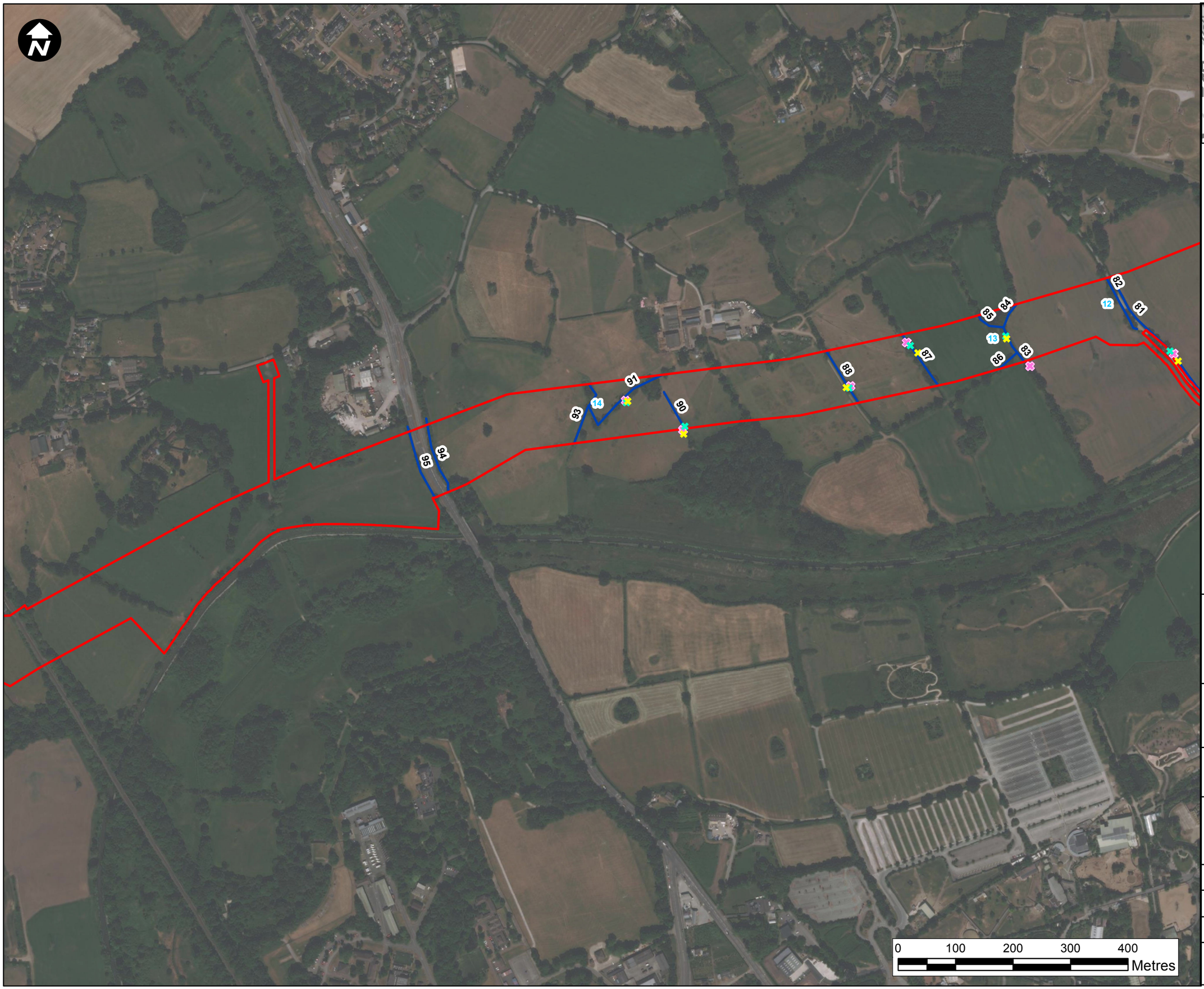
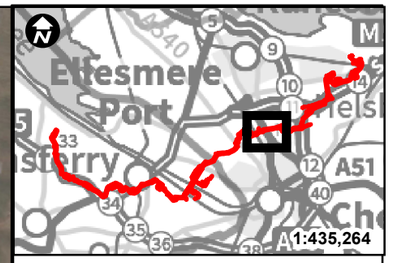
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet4





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 5

DRAWING STATUS

For Information

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SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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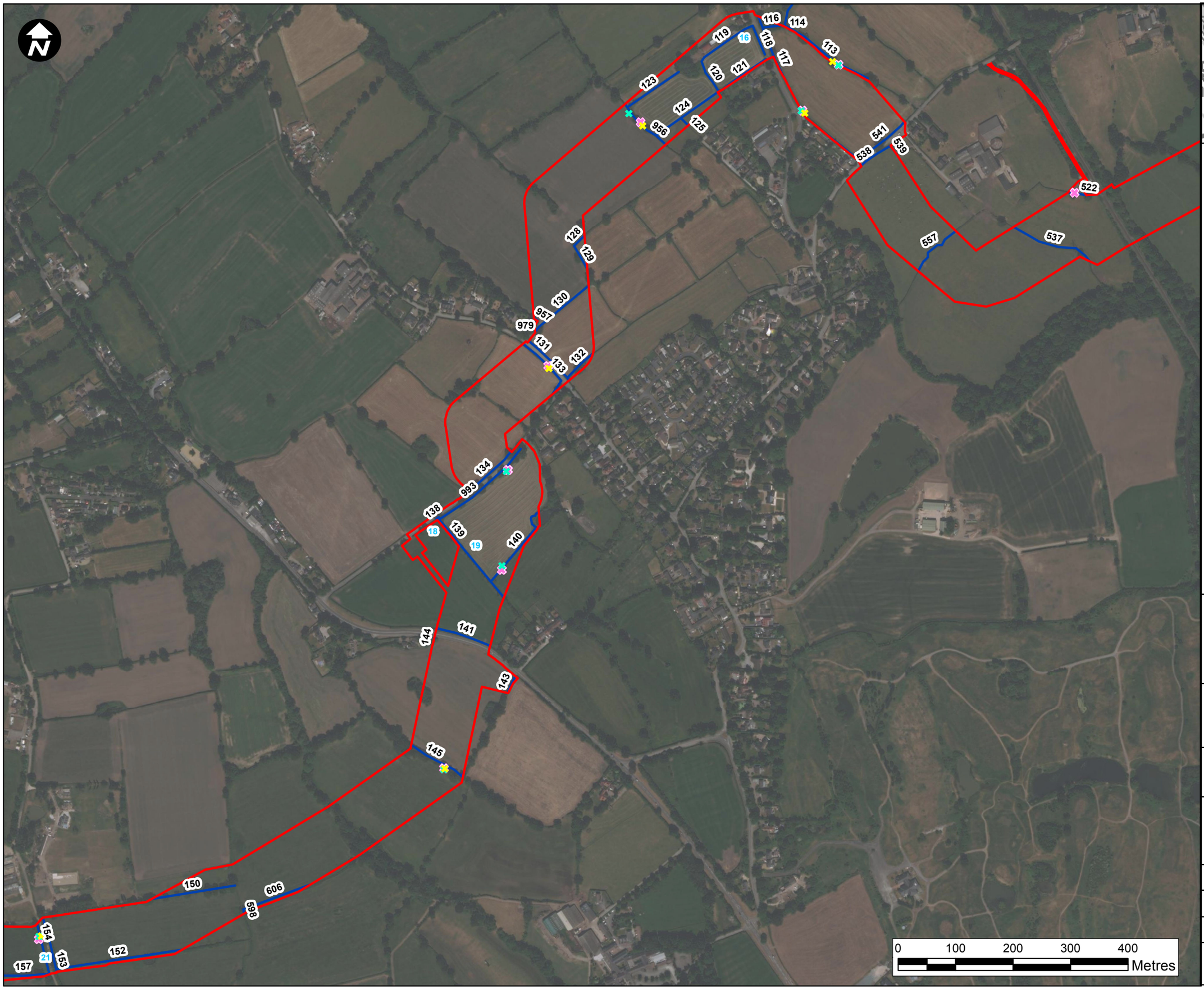
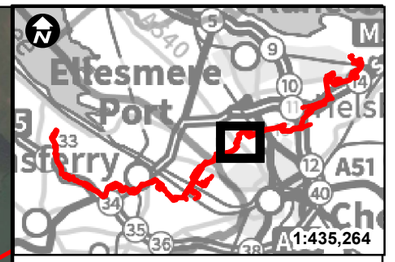
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet5





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 6

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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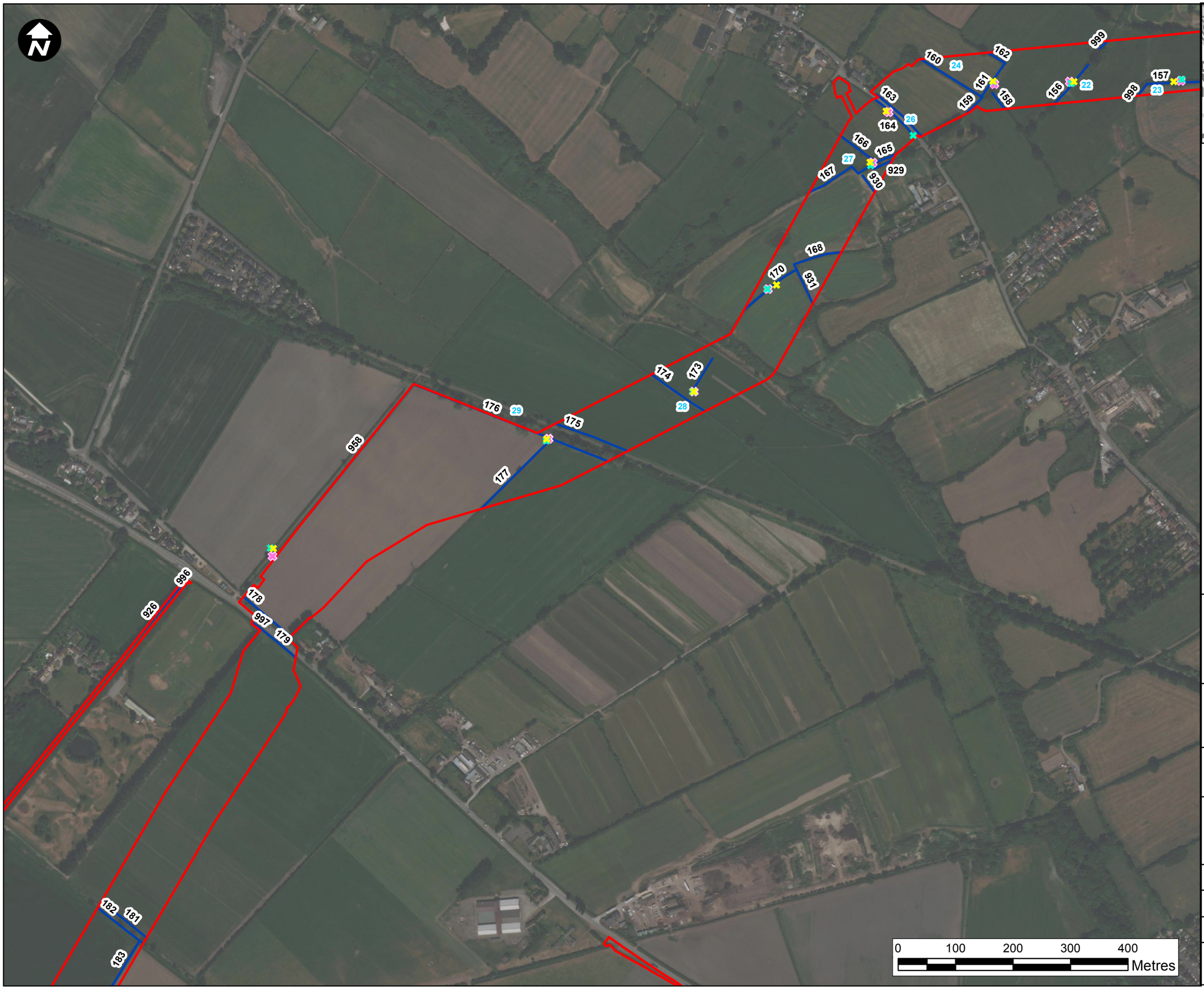
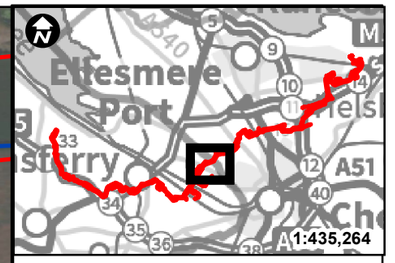
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet6





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 7

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
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SCALE @ A3 SIZE	DATE	REVISION
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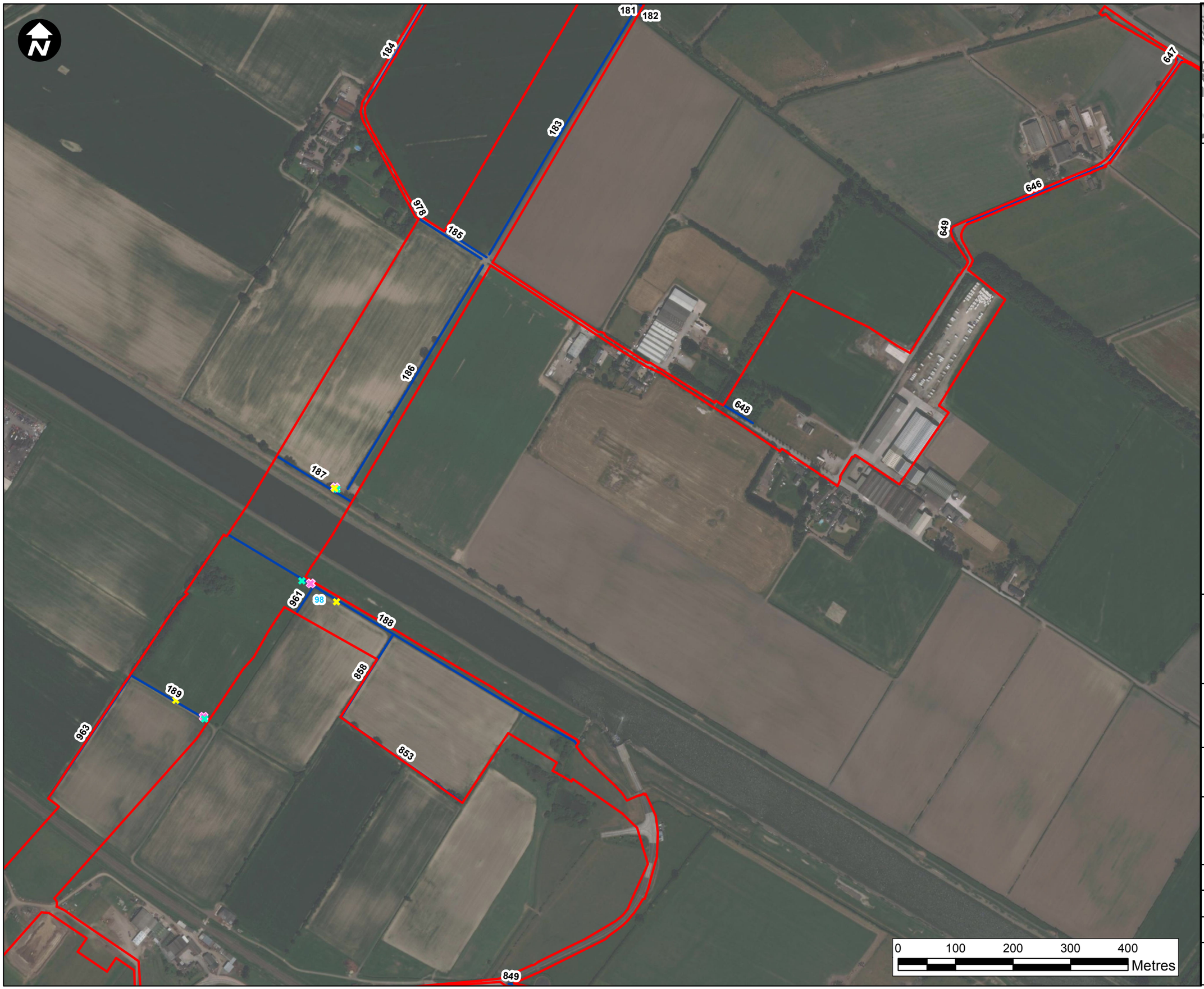
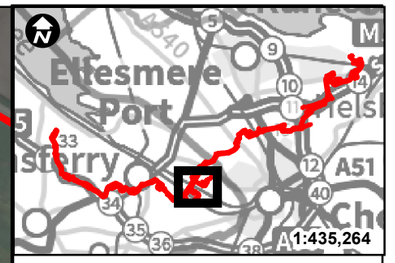
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet7





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 8

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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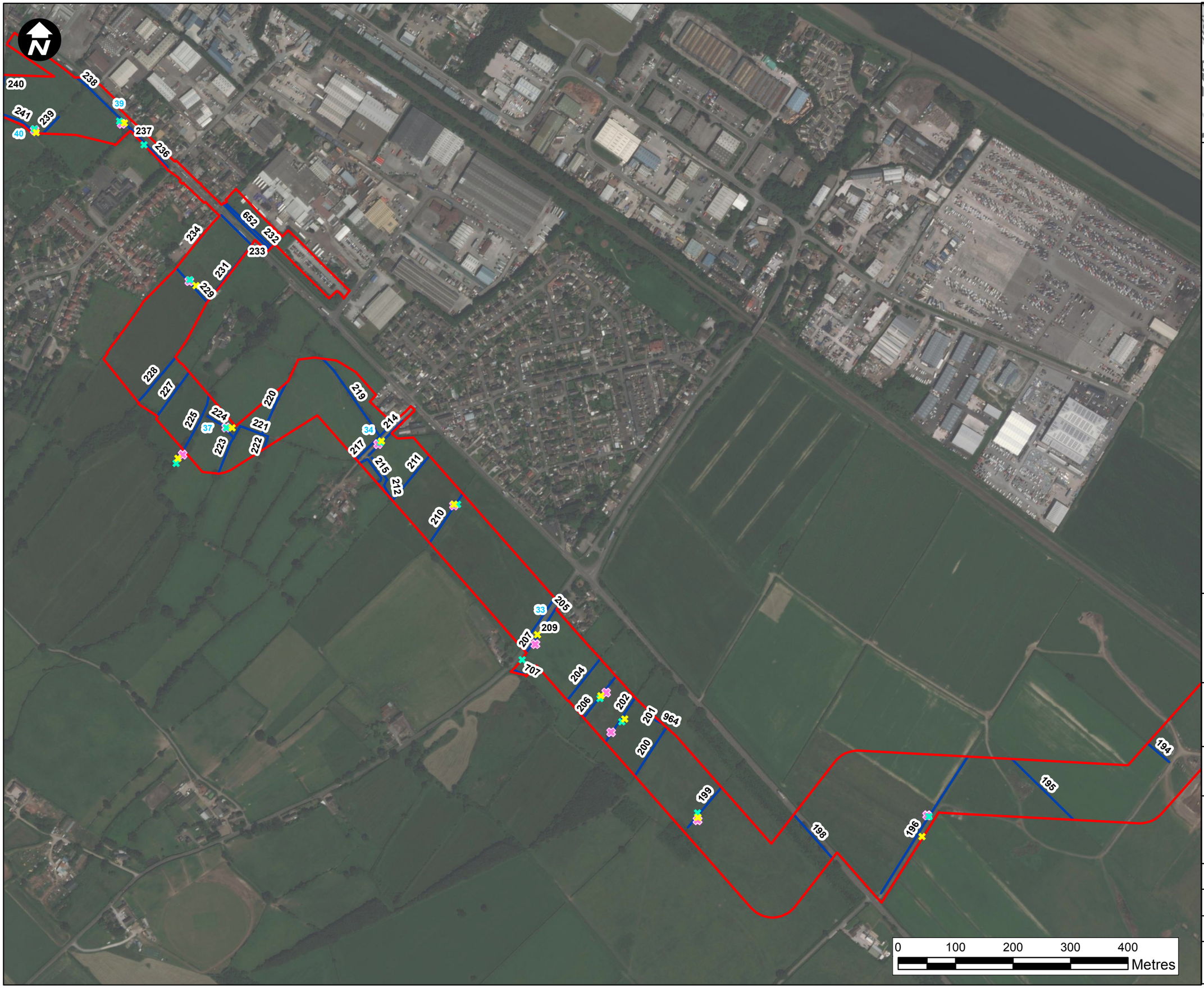
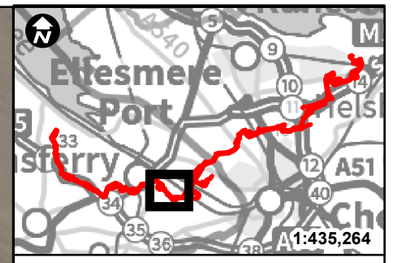
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet8





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 9

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
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SCALE @ A3 SIZE	DATE	REVISION
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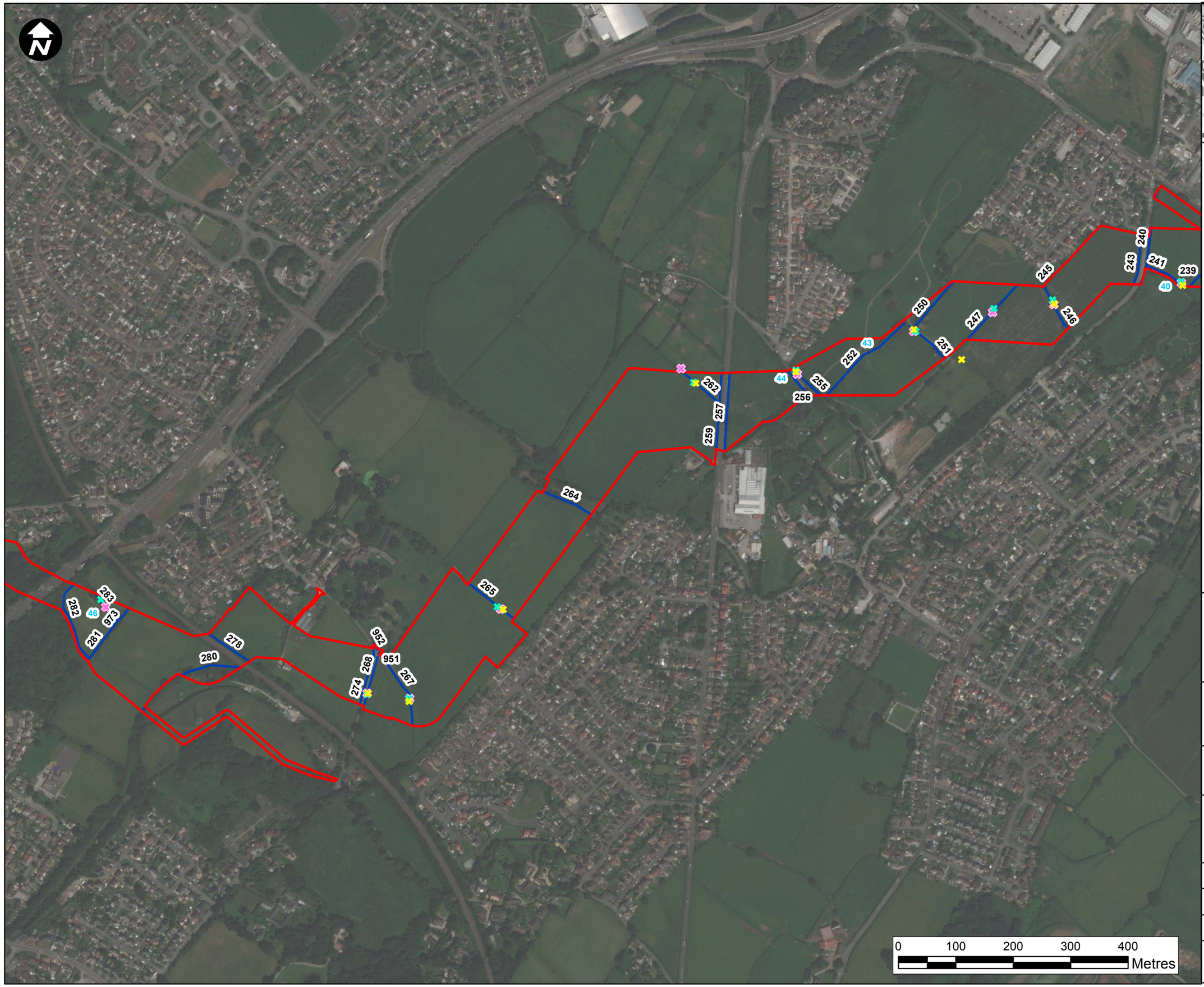
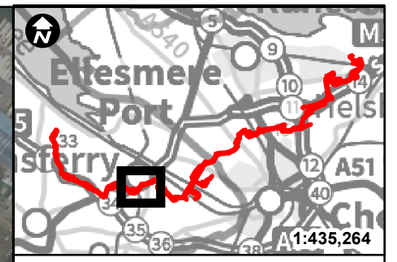
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet9





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 10

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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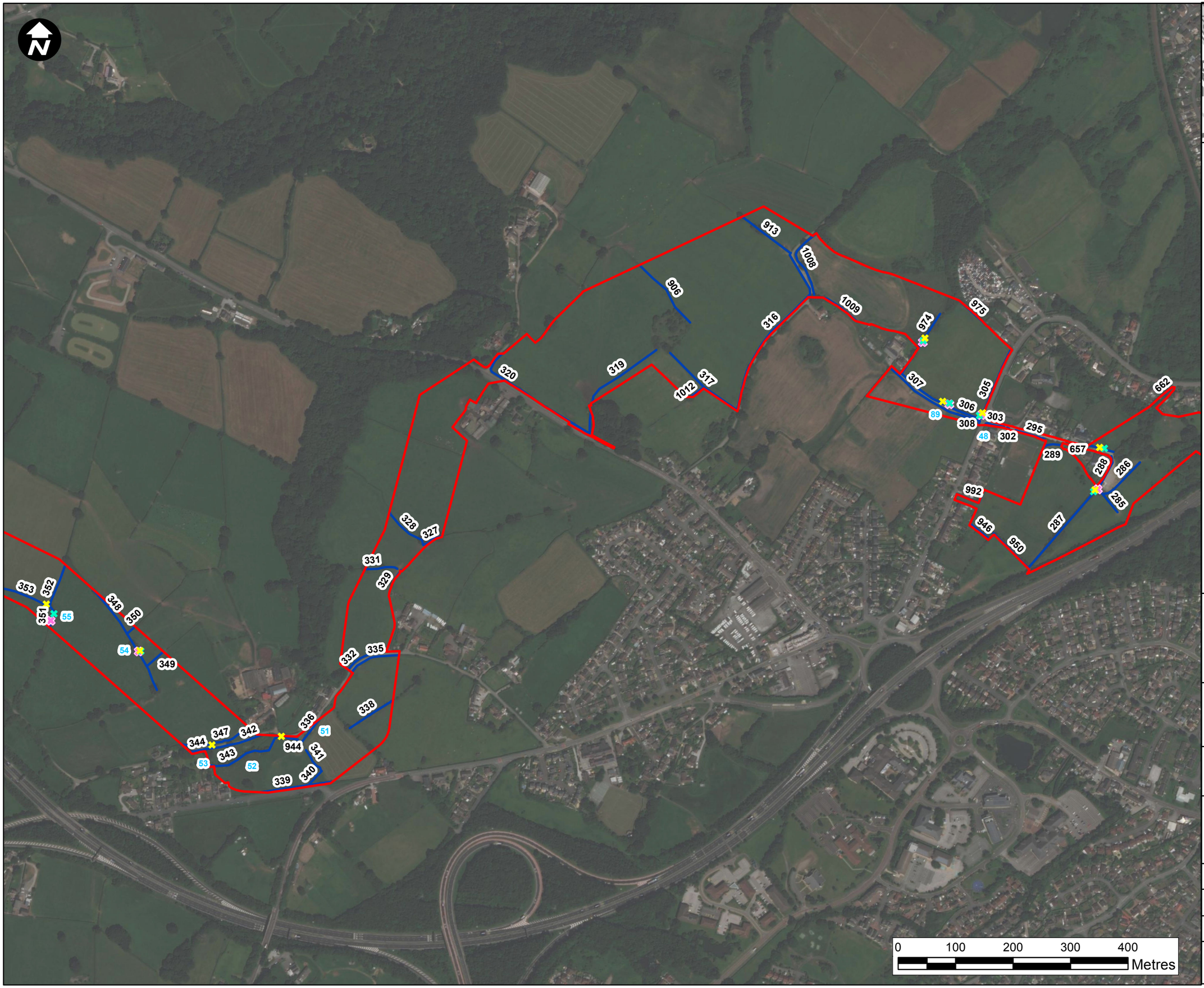
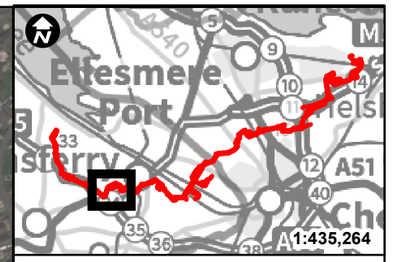
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet10





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 11

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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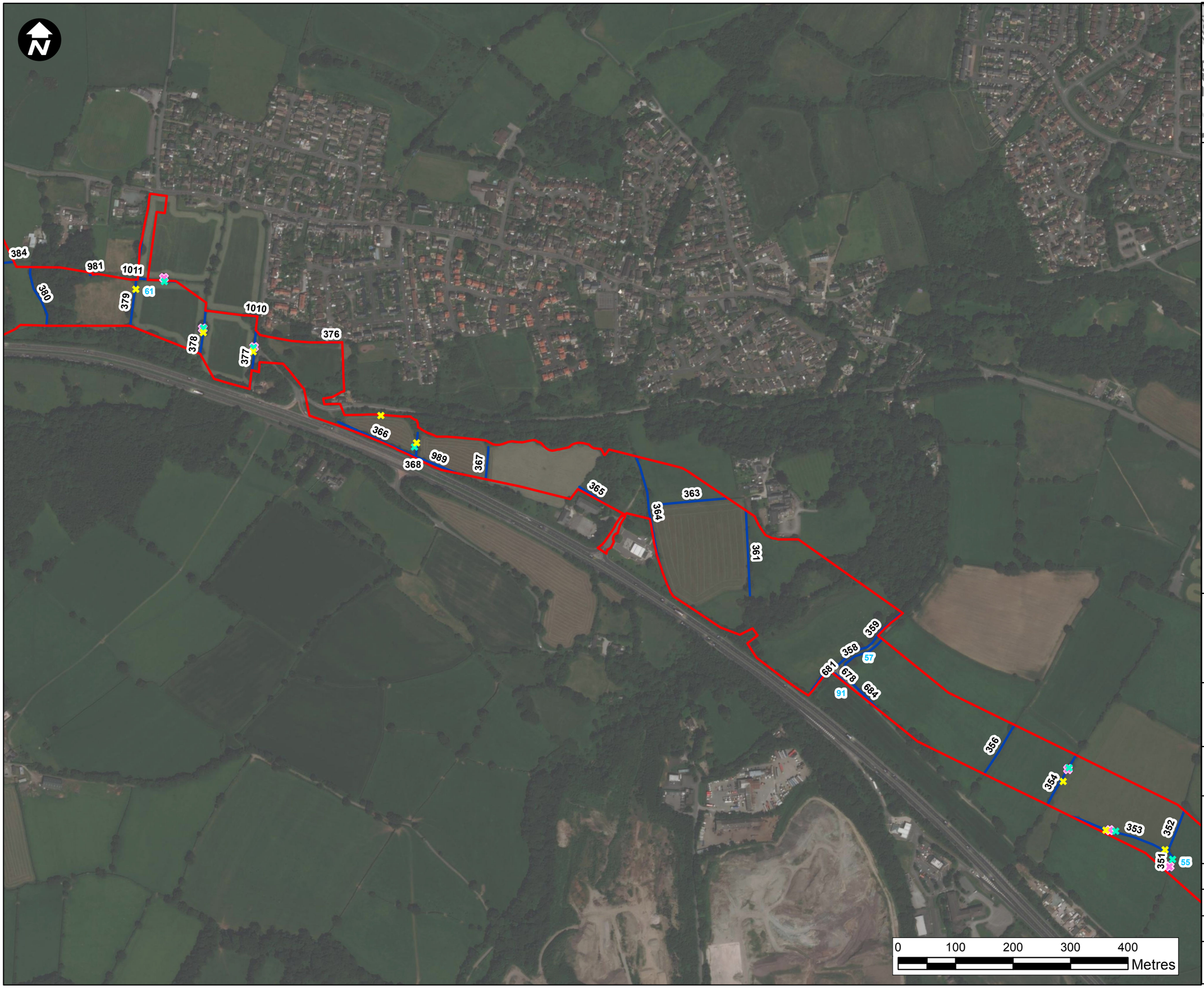
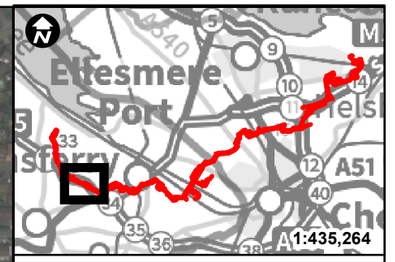
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet11





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 12

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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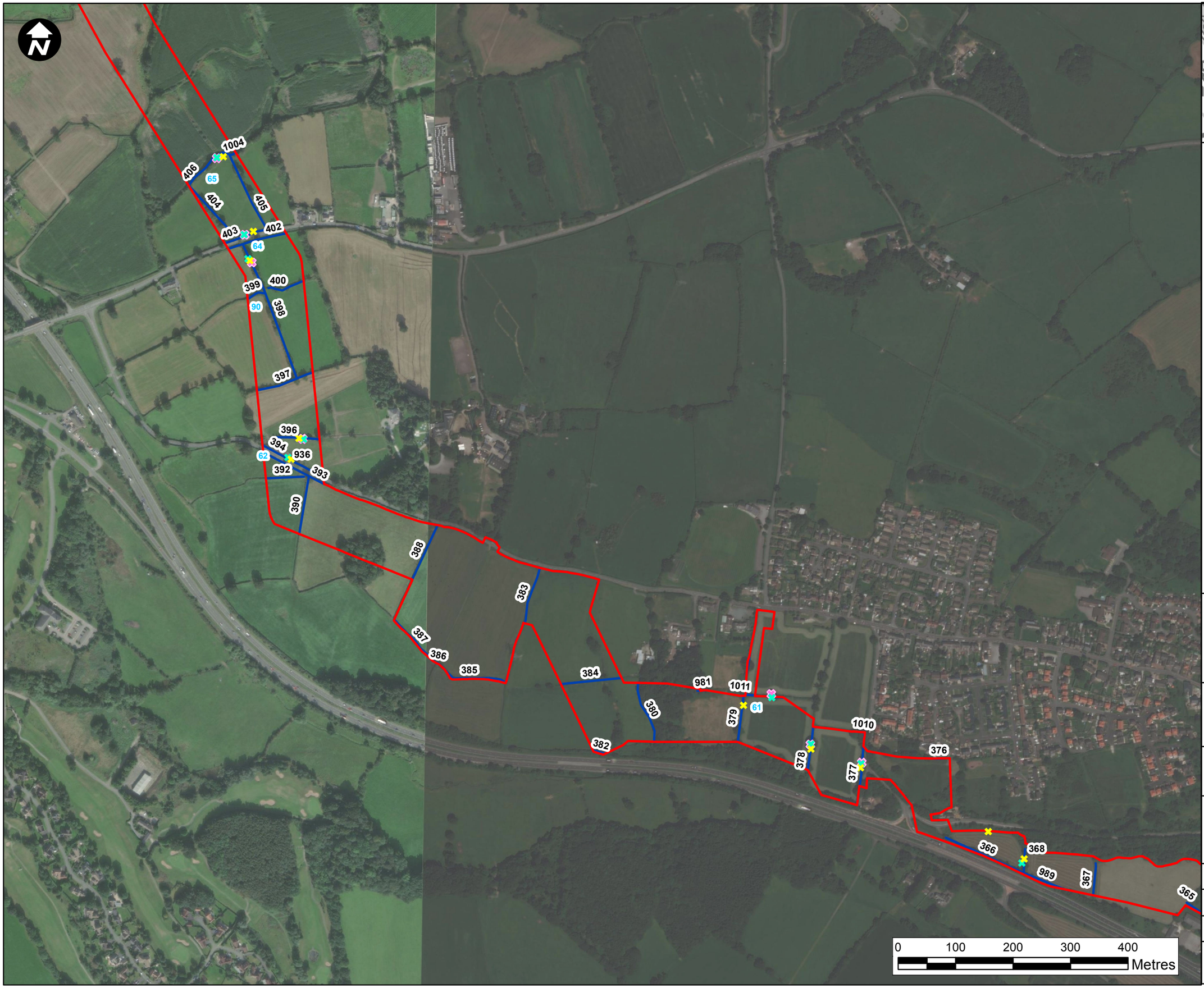
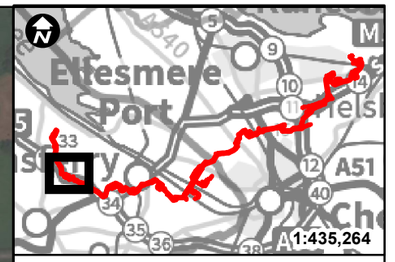
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet12





Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 13

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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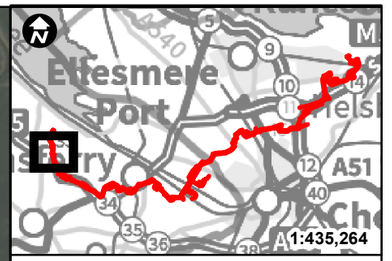
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet13



Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 14

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
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SCALE @ A3 SIZE	DATE	REVISION
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DRAWING NUMBER

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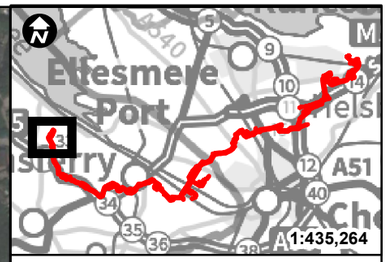

Key:

- Newbuild Infrastructure Boundary
- Spring Static Deployment
- Summer Static Deployment
- Autumn Static Deployment
- Hedgerows
- XXX Hedgerow Number
- XXX Hedgerow Group Number

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.3 - Hedgerow Static Locations Sheet 15

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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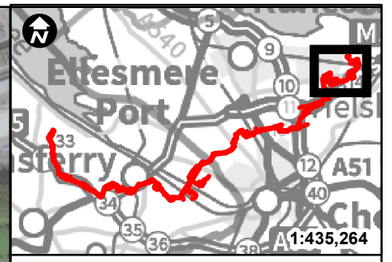
DRAWING NUMBER

EN070007-APP-ES-9.4.3-Sheet15

Figure 9.4.4 – Average Bat Activity



Key:

- Newbuild Infrastructure Boundary
- Hedgerows

Total Average Passes Per Night

- 0.00 - 62.80
- 62.81 - 161.71
- 161.72 - 362.83
- 362.84 - 672.83
- 672.84 - 1130.80
- 1130.81 - 1888.00

XXX Hedgerow Number

*The ranges above are derived from the natural breaks in the data specific to each species and therefore the figures for each species are not directly comparable.

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.4a - Spring Total Average Bat Activity Sheet 1

DRAWING STATUS

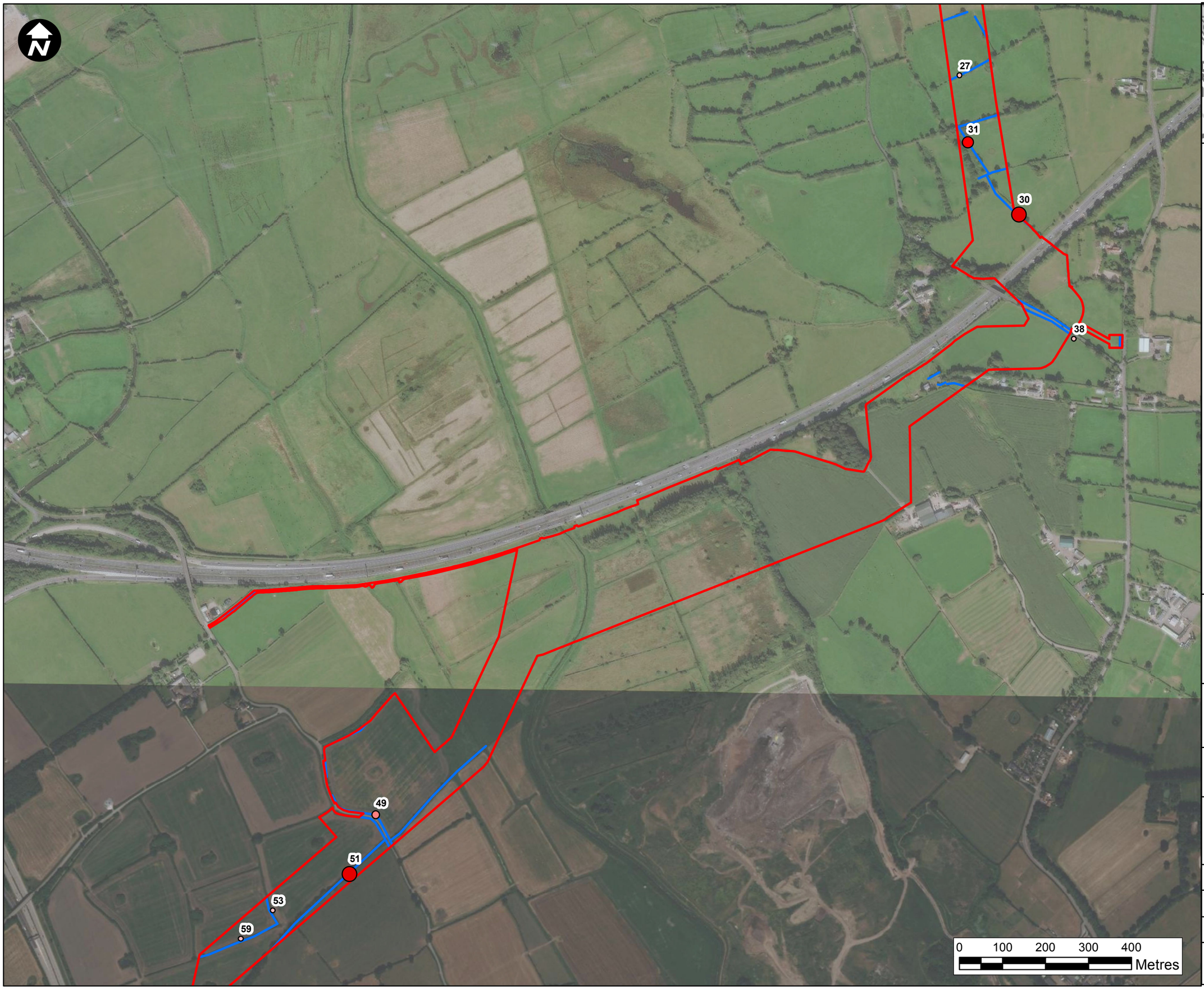
For Information

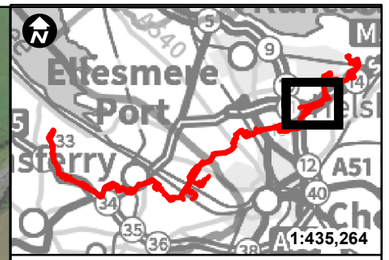
DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
1:8,000	14/12/2022	B

DRAWING NUMBER

EN070007-APP-ES-9.4.4a-Sheet1





Key:

- Newbuild Infrastructure Boundary
- Hedgerows

Total Average Passes Per Night

- 0.00 - 62.80
- 62.81 - 161.71
- 161.72 - 362.83
- 362.84 - 672.83
- 672.84 - 1130.80
- 1130.81 - 1888.00

XXX Hedgerow Number

*The ranges above are derived from the natural breaks in the data specific to each species and therefore the figures for each species are not directly comparable.

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.4a - Spring Total Average Bat Activity Sheet 2

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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DRAWING NUMBER

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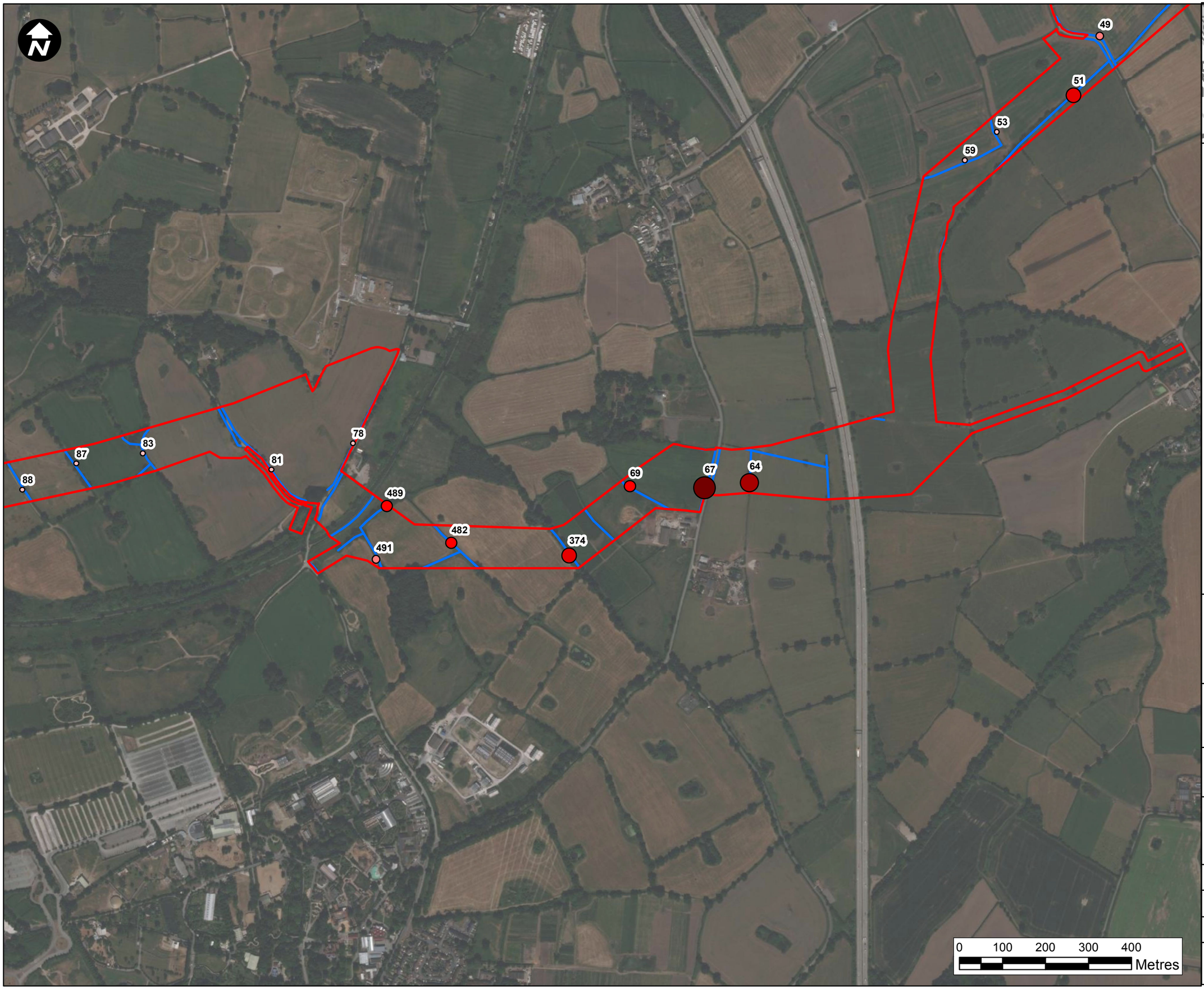

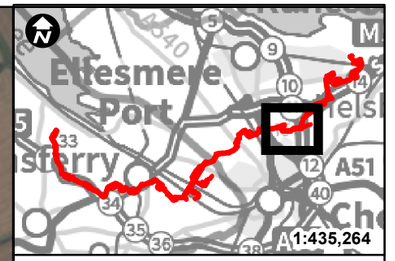

Key:

Newbuild Infrastructure Boundary

Hedgerows

Total Average Passes Per Night

- 0.00 - 62.80
- 62.81 - 161.71
- 161.72 - 362.83
- 362.84 - 672.83
- 672.84 - 1130.80
- 1130.81 - 1888.00

XXX Hedgerow Number

*The ranges above are derived from the natural breaks in the data specific to each species and therefore the figures for each species are not directly comparable.

HyNet North West

PROJECT TITLE

HyNet North West Carbon Dioxide Pipeline DCO

DRAWING TITLE

Figure 9.4.4a - Spring Total Average Bat Activity Sheet 3

DRAWING STATUS

For Information

DRAWN	CHECKED	APPROVED	AUTHORISED
SW	JO	DC	SP

SCALE @ A3 SIZE	DATE	REVISION
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DRAWING NUMBER

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