

National Grid Cable Tunnel Replacement Project

Environmental Statement Volume VI

Appendix 7.7: Reptile Survey Report

December 2023

Quality information

Prepared by		Checked by		Verified by		Approved by
CF		JC		TC		JS
Consultant Ecologist ACIEEM		Senior Ecologist ACIEEM		Associate Ecologist MCIEEM		Technical Director MCIEEM CEcol CEnv

Prepared for:

National Grid Electricity Transmission

Prepared by:

AECOM Limited
Aldgate Tower, 2 Leman Street
London, E1 8FA
United Kingdom

T: +44 20 7061 7000
aecom.com

© 2023 AECOM Limited. All Rights Reserved.

This document has been prepared by AECOM Limited (“AECOM”) for sole use of our client (the “Client”) in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.

Table of Contents

1	Introduction.....	1
1.1	Background	1
1.2	Site Description	1
1.3	Pre-existing Information.....	2
1.4	Objectives	2
2	Legislation	3
2.1	Wildlife and Countryside Act 1981 (as amended)	3
2.2	Natural Environment Rural Communities Act 2006 (as amended)	3
2.3	Licensing Requirements	3
3	Methods.....	4
3.1	Desk Study	4
3.2	Field Survey	4
3.3	Quality Assurance	8
4	Results	9
4.1	Tilbury	9
4.2	Gravesend.....	12
5	Discussion	14
5.1	Tilbury	14
5.2	Gravesend.....	15
	Annex A Survey Locations.....	16
	Annex B Reptile Presence/Likely Absence Survey Results	17
	Annex C Photographs.....	19

Tables

Table 1: Tilbury Site: Survey Dates and Weather Conditions	5
Table 2: Gravesend Site: Survey Dates and Weather Conditions	5
Table 3: Froglife Criteria for Assessing Reptile Population Status using Survey Peak Counts.....	7
Table 4: Reptile Size Classes.....	7
Table 5: Summary of common lizard presence/likely absence Results (Tilbury)	11
Table 6: Summary of slow worm presence/likely absence Results (Tilbury).....	11
Table 7: Summary of adder presence/likely absence Results (Tilbury)	11
Table 8: Summary of common lizard presence/likely absence Results (Gravesend)	13
Table 9: Summary of slow worm presence/likely absence Results (Gravesend).....	13
Table 10: Tilbury Presence/Absence Survey Results	18
Table 11: Gravesend Presence/Absence Survey Results	18

1 Introduction

1.1 Background

1.1.1 AECOM Ltd (hereafter referred to as AECOM) was commissioned by National Grid to undertake an ecological assessment to support the Environmental Statement for the Tilbury to Grain and Tilbury to Kingsnorth (TKRE) Cable Tunnel Replacement Project (hereafter referred to as ‘the Proposed Development’). The Proposed Development relates to the replacement of the below ground cabled section of the TKRE 400 kV circuits with the construction of new bored tunnel under the River Thames to carry new XLPE cables, together with new associated infrastructure either side of the Thames comprising:

- **A new cable sealing end compound:** consisting of:
 - **a new tunnel headhouse** which will cover the shaft into the tunnel;
 - **a new overhead line gantry structure** which will connect the overhead line downlead conductors and transfer them to six sealing end structures; and
- **Modifications to the existing overhead line (OHL):** The new OHL conductors will be connected to the existing TKRE 400kV OHL conductors via new terminal pylons. The old OHL conductors and existing pylons will be either replaced, refurbished or removed.

1.1.2 The required headhouses and SECs would fall within the jurisdiction of Thurrock Council (north of the River Thames) and Gravesham Borough Council (south of the River Thames).

1.2 Site Description

1.2.1 The extent of land required for the Proposed Development (hereafter ‘the Site’) is split into two areas, one in Tilbury (‘the Tilbury Site’) and the other in Gravesend (‘the Gravesend Site’). They are split from each other by the River Thames and Thames Estuary.

Tilbury Site

1.2.2 The area north of the River Thames is located in Tilbury in the borough of Thurrock, Essex at Ordnance Survey (OS) grid reference TQ 66312 75869. The Tilbury Site is a mixture of in-use and disused industrial grounds and consists of a mixture of sparsely vegetated hard-standing, and larger areas of grassland, scrub and adjoining ditches.

1.2.3 The Tilbury Site is surrounded by an industrial and agricultural landscape with the River Thames adjacent to the south.

Gravesend Site

1.2.4 The area to the south of the River Thames is located in Gravesend, in the borough of Gravesham, Kent at OS grid reference TQ 67440 74151. The habitats on Site include grassland, scrubland, bare ground, ditches and marshy grassland. The eastern sections of the Gravesend Site are within Milton Rifle Range, and the western sections contain grazed pasture fields and the existing Eastcourt Marshes Electricity Substation.

1.2.5 The River Thames adjoins the northern boundary and the Thames and Medway Canal runs along the southern boundary of the Gravesend Site.

1.3 Pre-existing Information

- 1.3.1 A Preliminary Ecological Appraisal (PEA)¹ was completed in November 2022 in support of the Proposed Development, covering a wider area than the current Red Line Boundary as part of the site selection process. The area covered by the PEA survey is shown in Figure 1 of the PEA report (ES Volume VI Appendix 7.1).
- 1.3.2 The PEA identified that both the Tilbury Site and Gravesend Site contained habitat suitable to support widespread reptile species (i.e. adder, common lizard, grass snake and slow worm).
- 1.3.3 Correspondence with Bioscan who undertake ecological monitoring of the Site at Tilbury on behalf of the Port of Tilbury has confirmed that reptiles are known to be present at the Tilbury Site, with the wider surrounding area supporting a notable population of adder.

1.4 Objectives

- 1.4.1 The objectives of the reptiles surveys undertaken were to:
- Determine the presence or likely absence of reptiles in both the Tilbury and Gravesend Sites; and
 - Record and map evidence of reptiles, and the species present; and
 - Provide an initial indication of the population size class of reptiles present at each Site.
- 1.4.2 Recommendations for future works will be provided in the main body of the Environmental Statement, within the Environmental Statement (ES) Volume III Chapter 7: Biodiversity – Tilbury and ES Volume IV Chapter 15: Biodiversity - Gravesend Biodiversity chapter.

¹ AECOM Ltd (2023) TKRE Preliminary Ecological Appraisal.
December 2023

2 Legislation

2.1 Wildlife and Countryside Act 1981 (as amended)

- 2.1.1 The Wildlife and Countryside Act 1981 (as amended), provides protection to certain wild animals.
- 2.1.2 Schedule 5 provides a list of animals that are protected under the provision of this Act. This includes all reptile species native to Great Britain. The more widespread British reptile species are the common lizard (*Zootoca vivipara*), grass snake, slow worm (*Anguis fragilis*) and adder (*Vipera berus*). The protection afforded to these species is limited to Section 9 (1) and (5) only under Part 1 of the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to:
- Intentionally kill or injure reptiles; and
 - Sell, offer or expose for sale, or to possess or transport for sale alive or dead reptile or any part of or anything derived from a reptile.
- 2.1.3 Please note that the sand lizard and smooth snake, are both fully protected under the Conservation of Habitats and Species Regulations 2017² (as amended). For these species, it is unlawful to capture or possess them, or to damage/obstruct access to places they use for shelter or protection, or to disturb them whilst in such a place. However, neither of these species have been recorded on or near the Gravesend and Tilbury Sites and therefore they are not considered further in this report.

2.2 Natural Environment Rural Communities Act 2006 (as amended)

- 2.2.1 All native species of reptile are also listed as Species of Principal Importance (SPI) for the conservation of biodiversity in England in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Under Section 40 of the NERC Act 2006, public bodies and statutory undertakers including local planning authorities and the Environment Agency have a duty to have regard for SPI when carrying out their functions.
- 2.2.2 Under this Act, common lizard, adder, grass snake and slow worm are listed as SPIs and as such all three species are protected against killing and injuring, sale or advertisement for sale.

2.3 Licencing Requirements

- 2.3.1 No licence is required to survey for or handle the reptile species likely to be present on the Site (common lizard, grass snake, adder and slow worm). Nevertheless, measures (such as, not handling reptiles and not putting lifted refuges back on top of animals unless they will not be injured) were taken to ensure that any reptiles potentially present were not harmed during the surveys or exposed to additional risk of predation or persecution due to the survey methodology being utilised.

² The Conservation of Habitats and Species Regulations (2017) <http://www.legislation.gov.uk/ukssi/2017/1012/made>
December 2023

3 Methods

3.1 Desk Study

- 3.1.1 Records of protected and/or notable species recorded within a 2km radius of Proposed Development were obtained from Essex Field Club and Kent³ and Medway Biological Records Centre (KMBRC)⁴ in support of the PEA⁵.
- 3.1.2 In addition, a review of publicly available information collected in support of nearby large scale infrastructure developments has been undertaken, and included a search for relevant data in planning documentation for the following developments:
- Lower Thames Crossing⁶;
 - Thurrock Flexible Generation Plant⁷;
 - Tilbury 2⁸ and
 - Application for external storage for a temporary period at former Tilbury B Power Station (Application Reference; 21/01927/FUL)⁹.

3.2 Field Survey

- 3.2.1 This section details the methods used to conduct the reptile presence/ likely absence surveys.

Habitat Appraisal

- 3.2.2 An appraisal of the suitability of the habitats at each Site was undertaken with particular reference to the key reptile habitat requirements identified within Chapter 4 of the Reptile Habitat Management Handbook¹⁰.

Presence/Absence Reptile Survey

- 3.2.3 The surveys utilised four recognised methods:
- Use of artificial refugia (mats) to attract reptiles on Site;
 - Searching of suitable refugia already present on Site;
 - Checks for signs of reptile activity including sloughed skins, burrows, egg laying sites etc.; and
 - Sustained visual observation of banks and any other suitable habitat within the Site.
- 3.2.4 The method for the reptile surveys was based on that provided in the Herpetofauna Workers' Manual¹¹ as applicable to the survey and assessment of adder, grass snake, common lizard and slow worm.
- 3.2.5 A total of 100 reptile mats were placed within suitable reptile habitat (grassland and scrubland) within the two sites; 50 in the Tilbury Site and 50 in the Gravesend Site, at a density of at least 10 per hectare. Refugia at the Tilbury Site were deployed on 4 May 2023, with refugia at the Gravesend Site deployed on 9 May 2023.
- 3.2.6 Refugia comprising sheets of bitumen roofing-felt and corrugated felt measuring approximately 50cm x 50cm were utilised. All artificial reptile refugia were placed in suitable grassland habitat and along the edge of scrub habitat that receives full or partial sun exposure in morning and late

³ Essex Field Club (2022) Datasearch Report Ref: EFC5454 28-11-2022

⁴ Kent and Medway Biological Records Centre (2022) Records Search Ref: ENQ/22/506

⁵ AECOM Ltd (2023) TKRE Preliminary Ecological Appraisal.

⁶ [Lower Thames Crossing | National Infrastructure Planning \(planninginspectorate.gov.uk\)](https://planninginspectorate.gov.uk/lower-thames-crossing/)

⁷ [Thurrock Flexible Generation Plant | National Infrastructure Planning \(planninginspectorate.gov.uk\)](https://planninginspectorate.gov.uk/thurrock-flexible-generation-plant/)

⁸ [Tilbury2 | National Infrastructure Planning \(planninginspectorate.gov.uk\)](https://planninginspectorate.gov.uk/tilbury2/)

⁹ Bioscan (2021) Land at the Former Tilbury Power Station: Tilbury 3: Temporary Use of Land For Port-Related Storage – Ecological Appraisal November 2021 Available at https://regs.thurrock.gov.uk/online-applications/files/CAC2F3238A203CAD43D932A0A07E81B5/pdf/21_01927_FUL-ECOLOGICAL_APPRAISAL-754664.pdf

¹⁰ Edgar, P., Foster, J., and Baker J (2010) Reptile Habitat Management Handbook. Amphibian and Reptile Conservation, Bournemouth.

¹¹ Gent, T and Gibson, S (2003) Herpetofauna Works Manual. JNCC, Peterborough

afternoon with preferential targeting of south facing areas. Refugia locations can be seen in Figures 2 and 3.

- 3.2.7 In total seven survey visits were undertaken at the Gravesend Site and eight visits at the Tilbury Site between May and September 2023 with at least two days between survey visits. Survey visits were planned to target suitable weather conditions, in particular light wind, no precipitation and temperatures between 9°C and 18°C¹².
- 3.2.8 A summary of survey conditions for individual visits are provided in Tables 1 and 2.

Table 1: Tilbury Site: Survey Dates and Weather Conditions

Site	Visit No.	Date and Time	Temp °C (start/ end)	Cloud Cover (start /end	Wind – Beaufort scale (start/ end)	Precipitation (start/ end)
Tilbury	1	19/05/2023 09:00-10:30	13 / 16	overcast/ overcast	3 / 2	Drizzle / Dry
Tilbury	2	26/05/2023 09:00-10:35	14 / 16	Few clouds / clear	2 / 2	Dry / Dry
Tilbury	3	02/06/2023 09:00-10:40	15 / 19	Few clouds / Few clouds	3 / 3	Dry / Dry
Tilbury	4	08/09/2023 07:30-10:40	21/ 27	Clear / Clear	0 / 1	Dry / Dry
Tilbury	5	11/09/2023 09:00-11:30	23 / 25	Overcast / Few Clouds	2 / 3	Dry / Dry
Tilbury	6	18/09/2023 09:30 – 11:30	19 / 19	Scattered clouds / Few clouds	1 / 3	Dry / Dry
Tilbury	7	25/09/2023 09:30 – 11:00	19 / 22	Few clouds / Scattered clouds	2 / 2	Dry / Dry
Tilbury	8	05/10/2023 09:30 – 11:30	15 / 18	Few clouds / Scattered clouds	1 / 1	Dry / Dry

Table 2: Gravesend Site: Survey Dates and Weather Conditions

Site	Visit No.	Date	Temp °C (start/ end)	Cloud Cover – Okta (start /end	Wind – Beaufort scale (start/ end)	Precipitation (start/ end)
Gravesend	1	19/05/2023 11:30-12:20	16 / 17	overcast/ overcast	3 / 2	Drizzle / Dry
Gravesend	2	26/05/2023 11:30-12:20	14 / 16	Few clouds / clear	2 / 2	Dry / Dry
Gravesend	3	08/06/2023 11:30-12:20	22 / 22	Scattered clouds / Few clouds	3 / 3	Dry / Dry

¹² Froglife (2016) Surveying for Reptiles: Tips, techniques and skills to help you survey for reptiles. Froglife. Halesworth
December 2023

Site	Visit No.	Date	Temp °C (start/ end)	Cloud Cover – Okta (start /end	Wind – Beaufort scale (start/ end)	Precipitation (start/ end)
Gravesend	4	05/09/2023 09:30-11:00	25 / 31	Clear / Clear	1 / 2	Dry / Dry
Gravesend	5	08/09/2023 08:15-10:30	27 / 30	Clear / Clear	0 / 1	Dry / Dry
Gravesend	6	11/09/2023 11:40-12:40	23 / 25	Overcast / Few clouds	2 / 3	Dry / Dry
Gravesend	7	18/09/2023 15:10-15:20	19 / 19	Scatted clouds / Few clouds	1 / 3	Dry / Dry

3.2.9 During each survey visit each refugia was initially inspected from a suitable distance (2-3m) to identify any reptiles that may be present basking on top of the reptile refugia, without causing disturbance. The refugia were then approached quietly, carefully and lifted swiftly to examine the ground beneath; any reptiles present were noted. In moving between artificial refugia any other refugia already present at the Site and other suitable basking locations were observed to check for presence of reptiles.

3.2.10 Where reptiles were encountered the following information was recorded:

- species;
- number of individuals encountered;
- location of record (including refugia number where using artificial refugia);
- size/age class; and
- sex (where discernible without handling).

Population Size

3.2.11 Undertaking a full population size assessment (requiring 20 survey visits) was not considered necessary given availability of data from multiple sources, and the spread of survey visits in 2023 including both spring and autumn survey windows.

3.2.12 The survey results from the 2023 presence/absence surveys, alongside those available from previous surveys were considered suitable to provide a broad estimate of the likely reptile population size at each Site.

3.2.13 Estimates have been made based on peak adult counts recorded by surveyors in a single visit (based on Froglife¹³, 1999).

3.2.14 Reptile populations can be classed into three broad groups, low population, good population and exceptional population.

3.2.15 Table 3 below provides the criteria for each category.

¹³ Froglife Advice Sheet 10 (1999) Reptile Surveys. An introduction to planning, conducting and interpreting surveys for snake and lizard conservation.

Table 3: Froglife Criteria for Assessing Reptile Population Status using Survey Peak Counts

Species	Low population (Score 1)	Good population (Score 2)	Exceptional population (Score 3)
Adder (<i>Vipera berus</i>)	<5	5 - 10	>10
Grass snake (<i>Natrix helvetica</i>)	<5	5 - 10	>10
Slow worm (<i>Anguis fragilis</i>)	<5	5 - 20	>20
Common lizard (<i>Zootoca vivipara</i>)	<5	5 - 20	>20

Source: Froglife, 1999. *Figures in the table refer to the maximum number of adults seen by one person in one day.

- 3.2.16 Reptiles were broadly classed as either adult or juvenile for the purposes of estimating size class based on individual characteristics and surveyor experience. Refer Table 4 for further details on size classes.

Table 4: Reptile Size Classes

Species	Juvenile/Sub-adult (TL*, mm)	Adult (TL*, mm)
Adder (<i>Vipera berus</i>)	150 - 350	>350
Grass snake (<i>Natrix helvetica</i>)	170 - 450	>450
Slow worm (<i>Anguis fragilis</i>)	70 - 175	>175
Common lizard (<i>Zootoca vivipara</i>)	40 - 100	>100

*TL = Total Length

Limitations

- 3.2.17 Desk study information is dependent on records having been submitted for the area of interest. As such, a lack of records for particular habitats or species does not necessarily mean they are absent from the area of interest. Similarly, the presence of records for particular habitats and species does not automatically mean they still occur within the area of interest or are relevant in the context of the Proposed Development.
- 3.2.18 The surveys aimed to follow best practice guidance to confirm presence/likely absence of reptiles and where present, characterise the Site in terms of species and distribution, habitat suitability and context with the wider landscape.
- 3.2.19 The survey method was designed to identify the presence or likely absence of common reptile species and provide an initial population size. However, the information collected, alongside that from other survey work at the Sites is considered suitably robust to provide an indication of the likely population size class of those species encountered during the surveys.
- 3.2.20 Due to the size of the Site it was not possible to access and closely inspect every part of the survey area. However, the number of survey refugia (mats) placed out was in accordance with best practice advice, and checks of other refugia/features of potential value to reptiles targeted those features deemed most likely to be utilised. If a reptile species occurs at a low density, it is possible that it will not have been detected during the surveys.
- 3.2.21 Due to a change in the expected working area, the field to the north of the proposed Tilbury Sealing End Compound (SEC) and the road verge habitat surrounding the hardstanding slab to the west of the proposed SEC was not included in the 2023 artificial refugia. However, this area of habitat is well

connected with those areas surveyed at Tilbury and there is recent third-party survey data available from surveys of this area undertaken in 2021¹⁴. As a consequence the range of data available is considered to provide a suitable indication of likely reptile populations utilising these areas of the Site, which will be subject to temporary works only.

- 3.2.22 Twenty of the mats on the Gravesend Site were inaccessible due to restricted access to the field where they had been laid, which was pony grazed following initial deployment of refugia. However, this is unlikely to have significantly impacted the survey, as it became apparent that these locations were of limited value for reptiles as they were grazed to a short sward and heavily disturbed by grazing ponies. Refugia associated with marginal habitats of greater value to reptiles, and those in other areas of the site (30 in total) continued to be accessible for survey throughout.
- 3.2.23 Survey visits were completed in the optimal survey season (September), however, some of the surveys in early September took place at a higher temperature than optimal due to exceptionally high overnight temperatures for the time of year. Reptiles were found during these surveys, and an additional two survey visits were added in October 2023 at Tilbury to provide further visits during more suitable conditions. The implications of these constraints and how they have been considered in the analysis of the results are discussed further in Section 5 of this report.
- 3.2.24 It should be noted that ecosystems are dynamic and constantly changing, and therefore species may move or new species may be recorded in subsequent years. For this reason, and in accordance with current guidance¹⁵, the existing survey data have a 'shelf-life' of, and should only be relied on for a period of, two years from the date of survey. After this date, update surveys may be required and advice should be sought from an appropriately qualified ecologist to determine survey scope and methods.

3.3 Quality Assurance

- 3.3.1 All AECOM ecologists follow the Chartered Institute of Ecology and Environmental Management (CIEEM) code of professional conduct when undertaking ecological work and many are Full or Fellow Members. They are appropriately qualified and will conduct their work using all reasonable skill and care. Many senior AECOM ecologists are also Chartered Environmentalists or Ecologists.

¹⁴ https://regs.thurrock.gov.uk/online-applications/files/CAC2F3238A203CAD43D932A0A07E81B5/pdf/21_01927_FUL-ECOLOGICAL_APPRAISAL-754664.pdf

¹⁵ Chartered Institute of Ecology and Environmental Management (2019). Advice Note: On the lifespan of ecological reports and surveys.

4 Results

4.1 Tilbury

Desk Study

- 4.1.1 The desk study completed within the Preliminary Ecological Appraisal (PEA)¹⁶ for the Tilbury Site returned records from the Essex Field Club of slow worm, grass snake, adder and common lizard within 1km of the Tilbury Site within the last 10 years.
- 4.1.2 Reptile surveys undertaken in 2016 and 2017 in support of the Tilbury2 Development Consent Order¹⁷ (DCO) did not cover the Tilbury Site, but identified populations of adder, grass snake, slow worm and common lizard within the wider Tilbury Power Station site. An exceptional population of slow worm was identified associated with the sea wall habitats located approximately 70m to the east of the southern margin of the existing Tilbury Sealing End Compound (SEC).
- 4.1.3 The Lower Thames Crossing DCO¹⁸ included a survey of a small section of the land to the east of the Tilbury Site in 2017. This survey identified a low population of adder; and good populations of slow worm and common lizard.
- 4.1.4 The Thurrock Flexible Generation Plant Environmental Statement did not involve refugia surveys within the Tilbury Site.
- 4.1.5 Reptile surveys undertaken by Bioscan in 2021 in support of an application for a temporary change in use included some parts of the Tilbury Site as follows:
- marginal strip of grassland habitat surrounding the large hardstanding slab to the west of the proposed Tilbury SEC ('former power station coal stockyard') and
 - road verge adjoining and to north east of proposed Tilbury SEC and field to the north of the proposed SEC ('land east of former coal stockyard');
- 4.1.6 Artificial refugia surveys were undertaken in each of the above locations, with four survey visits undertaken at each between April 2021 and July 2021 to check refugia. Peak adult counts were as follows:
- marginal strip of grassland habitat surrounding the large hardstanding slab to the west of the proposed Tilbury SEC ('former power station coal stockyard'): 6 slow worm; 2 common lizard; 2 adder; 1 grass snake;
 - road verge adjoining and to north east of proposed Tilbury SEC and field to the north of the proposed SEC ('land east of former coal stockyard'): 14 slow worm; 3 adder; 0 grass snake (1 immature only).

Field Survey

Habitat Assessment

Location of Study Area

- 4.1.7 Due to the location of Survey Area in the River Thames Valley the potential presence or likely absence of all widespread British native reptile species was considered during the design and planning of the reptile surveys.

¹⁶ AECOM Ltd (2023) National Grid TKRE Preliminary Ecological Appraisal

¹⁷ Port of Tilbury Proposed Port Terminal at Former Tilbury Power Station – Tilbury 2 : Reptile Survey Results 2016-2017. Appendix 10.N [TR030003-000241-ES Appendix 10.N Reptile survey results \(2016-17\).pdf \(planninginspectorate.gov.uk\)](#)

¹⁸ National Highways (2022) Lower Thames Crossing 6.3 Environmental Statement Appendices – Appendix 8.6 Reptiles [TR010032-001525-6.3 Environmental Statement Appendix 8.6 - Reptiles.pdf \(planninginspectorate.gov.uk\)](#)

- 4.1.8 The potential presence of sand lizard was scoped out from the surveys as this species tends to be restricted to lowland heath and sand dunes in the south of England or to coastal sand dunes in the north-west of England and Wales. The potential presence of smooth snake was also scoped out from the surveys as this species is restricted to sandy heaths on the south coast of England. On this basis, both these species were considered likely to be absent.

Vegetation Structure

- 4.1.9 There are numerous areas of habitat within the Tilbury Site and adjoining areas suitable to support reptiles. However, these are predominately associated with the areas of the Site required for temporary works to realign the overhead lines (OHLs). The proposed Tilbury Sealed End Compound (SEC) and tunnel shaft / headhouse is located within an area of hardstanding of limited value for reptiles. A small strip of road verge on the western edge of the hardstanding will be required for construction and was found to support tussocky grassland suitable for reptiles which is dominated by tall fescue (*Festuca arundinacea*) with encroaching bramble (*Rubus fruticosus* agg) scrub.
- 4.1.10 A larger area of grassland to the south of the Tilbury SEC provides optimal reptile habitat consisting of a combination of tussocky semi-improved grassland, scrub and tall ruderals, with occasional areas of shorter vegetation and bare ground providing good structural diversity.
- 4.1.11 A field directly to the north of the Tilbury SEC supports a denser stand dominated by false-oat grass (*Arrhenatherum elatius*), with stands of dense scrub and common reed (*Phragmites australis*).
- 4.1.12 A large area of hardstanding to the west of the Tilbury SEC consists of bare ground, but is fringed by a narrow strip of tussocky grassland, with a seasonally wet ditch which provide areas of good quality habitat.

Insolation (exposure to sun)

- 4.1.13 Areas that provided exposure to sunlight for basking reptiles were chosen to lay the reptiles mats. This included bare-ground, unmanaged grassland areas, scrub, and areas of tall ruderal habitat.

Refuge opportunity, breeding habitat and hibernation habitat

- 4.1.14 The semi-improved grassland and scrub in the fields to the north and south of the proposed Tilbury SEC provided a high density of invertebrates which offered an abundance of prey for common reptile species. These areas also provided dead wood and brash piles present providing refugia and hibernation for reptiles. The areas of habitat within the verges to the west of the proposed Tilbury SEC area more isolated and contain less refugia or features suitable for hibernation.

Presence/Likely Absence

- 4.1.15 This section summaries the results of the presence/likely absence surveys carried out on the Site.
- 4.1.16 Tables 5 to 10 provides results of the presence/likely absence surveys for each Survey Area. Common lizard, slow worm and adder were all recorded at the Tilbury Site. The peak count of adders at the Tilbury Site was a single adult observed on surveys carried out on the 8 and 26 September 2023. The peak count of slow worm at the Tilbury Site was nine adults recorded on the 26 May 2023. A peak count of two adult common lizard were recorded at the Tilbury Site on the 8 September. No grass snake were recorded during the 2023 presence/likely absence survey.
- 4.1.17 The locations reptiles were found during the surveys can be seen in Figure 2.

Table 5: Summary of common lizard presence/likely absence Results (Tilbury)

Survey Number	Date	Adult Male	Adult Female	Adult unsexed	Juvenile	Peak adult Count
1	19/05/2023	0	0	2	0	2
2	26/05/2023	0	0	0	0	0
3	02/06/2023	0	0	1	0	1
4	08/09/2023	0	0	2	0	2
5	11/09/2023	0	0	0	0	0
6	18/09/2023	0	0	0	0	0
7	25/09/2023	0	0	0	0	0
8	05/10/2023	0	0	0	0	0

Table 6: Summary of slow worm presence/likely absence Results (Tilbury)

Survey Number	Date	Adult Male	Adult Female	Adult unsexed	Juvenile	Peak adult Count
1	19/05/2023	3	3	0	3	6
2	26/05/2023	4	2	5	1	11
3	02/06/2023	3	4	0	2	7
4	08/09/2023	1	7	1	0	9
5	11/09/2023	0	1	1	0	2
6	18/09/2023	0	1	0	0	1
7	25/09/2023	0	1	0	0	1
9	05/10/2023	1	0	1	0	2

Table 7: Summary of adder presence/likely absence Results (Tilbury)

Survey Number	Date	Adult Male	Adult Female	Adult unsexed	Juvenile	Peak adult Count
1	19/05/2023	0	0	0	0	0
2	26/05/2023	0	0	0	0	0
3	02/06/2023	0	0	0	0	0
Incidental sighting	07/07/2023	0	1	0	0	1
4	08/09/2023	1	0	0	0	1
5	11/09/2023	0	0	0	0	0
6	18/09/2023	0	0	0	0	0
7	25/09/2023	0	0	1	1	2

Survey Number	Date	Adult Male	Adult Female	Adult unsexed	Juvenile	Peak adult Count
8	05/10/2023	0	0	0	0	0

4.2 Gravesend

Desk Study

- 4.2.1 The Lower Thames Crossing DCO did not include artificial refugia surveys at the Gravesend Site. However, survey results do include incidental records of both slow worm and grass snake at the Gravesend Site¹⁹.

Field Survey

Habitat Assessment

Location of Study Area

- 4.2.2 Based on the location of the Gravesend Site all widespread British native reptile species were considered during the design and planning of the surveys. Sand lizard and smooth snake were considered likely to be absent.

Vegetation Structure

- 4.2.3 The central areas of the three fields to the south of the existing SEC at Gravesend were considered likely unfavourable areas to support reptiles because these habitats were isolated, and the short grassland areas did not provide shelter for reptiles or the elements (e.g. heat, dry weather and wind) or predators.
- 4.2.4 However, the smaller areas of habitats such as rough grassland, scrub and ruderal habitats present around the margins of these fields provide areas of more suitable habitat that offer favourable vegetation structure for abundant prey, cover and connectivity with other areas of suitable habitat.
- 4.2.5 Areas of rough grassland, tall ruderals and scattered scrub located adjoining the existing sealing end compound and to the west of the access track adjoining the Metropolitan Police Training Centre also provide good structural diversity suitable for reptiles.
- 4.2.6 The rifle range to the east of the proposed Gravesend SEC supports areas of shorter grassland of limited value for reptiles. However, the bunds, surrounding the rifle range and the areas of grassland to the north have greater structural complexity and thus greater suitability to support widespread reptiles.

Insolation (exposure to sun)

- 4.2.7 The habitats with suitable structural complexity at the Gravesend Site described above all provide suitable insolation to be suitable for basking reptiles. The soil bunds within the fields to the south of the proposed new Gravesend SEC and surrounding the rifle range are particularly suitable for basking reptiles.

Refuge opportunity, breeding habitat and hibernation habitat

¹⁹ National Highways (2022) Lower Thames Crossing 6.3 Environmental Statement Appendices – Appendix 8.6 Reptiles TR010032-001525-6.3 Environmental Statement Appendix 8.6 - Reptiles.pdf (planninginspectorate.gov.uk)

- 4.2.8 The areas of habitat identified above as having good structural diversity all offer good availability of suitable refuges. The earth bunds within the fields to the south of the proposed Gravesend SEC and surrounding the rifle range provide optimal areas of potential breeding habitat. These features also provide suitable hibernation habitat.

Presence/Likely Absence

- 4.2.9 No adder were recorded during the presence/absence survey at Gravesend.
- 4.2.10 A peak adult count of two adult common lizard were recorded at the Gravesend Site on 19 May 2023. The peak adult count of six adult slow worm was achieved on the same date.
- 4.2.11 Grass snake was not recorded during the presence/absence survey. However, they have been sighted utilising the ditches within the Gravesend Site during water vole and otter surveys undertaken in 2023.

Table 8: Summary of common lizard presence/likely absence Results (Gravesend)

Survey Number	Date	Adult Male	Adult Female	Adult unsexed	Juvenile	Peak adult Count
1	19/05/2023	0	1	0	0	1
2	26/05/2023	0	0	0	0	0
3	08/06/2023	0	0	0	0	0
4	05/09/2023	0	0	0	0	0
5	08/09/2023	0	0	0	0	0
6	11/09/2023	0	0	0	0	0
7	18/09/2023	0	0	0	0	0

Table 9: Summary of slow worm presence/likely absence Results (Gravesend)

Survey Number	Date	Adult Male	Adult Female	Adult unsexed	Juvenile	Peak adult Count
1	19/05/2023	0	1	2	1	3
2	26/05/2023	3	0	2	0	5
3	08/06/2023	0	0	0	0	0
4	05/09/2023	0	0	0	0	0
5	08/09/2023	0	0	0	0	0
6	11/09/2023	0	0	0	0	0
7	18/09/2023	2	1	0	0	3

5 Discussion

5.1 Tilbury

- 5.1.1 Artificial refugia surveys undertaken at the Tilbury Site in 2023 confirmed the presence of adder, slow worm and common lizard. While grass snake was not recorded during the refugia survey, it was recorded as present within the ditch to the east of the proposed Tilbury SEC location during other species surveys undertaken at the Site during 2023 and therefore is known to be present.
- 5.1.2 Peak adult counts for the Tilbury Site were as follows:
- adder – 2 adults;
 - slow worm – 11 adults; and
 - common lizard – 2 adults;
 - grass snake – 1 adult (from incidental observation during another 2023 survey).
- 5.1.3 Taking into account the results from the 2023 surveys, alongside the constraints identified in Section 3.2, and historic data for other nearby developments it is possible to make an initial estimate of the likely population sizes. The 2023 results alone indicate a 'good' population of slow worm and 'low' populations of adder and grass snake.
- 5.1.4 It is possible that several factors may have acted to reduce the total peak counts during the 2023 surveys as follows:
- Unusually hot weather (including high overnight temperatures) during September 2023, which may have reduced reptiles encountered during Visits 4, 5 and 7 (see Tables 5, 6 and 7);
 - Adders often preferentially utilise natural refugia and are slower start to utilise artificial refugia, in good quality habitat which can lead to peak counts underestimating population size;
 - The small field to the north of the proposed Tilbury SEC and verge around the margin of the hardstanding slab to the west of the proposed SEC was not included in the refugia survey. These areas have been surveyed by Bioscan in 2021 and these surveys indicated slow worm and adder in particular present in these areas.
- 5.1.5 On a precautionary basis it is recommended that for the purposes of the assessment the wider habitat surrounding the Tilbury Site is considered suitable to support up to a 'Good' population of adder, and exceptional population of slow worm.
- 5.1.6 Given the peak counts of grass snake (1 adult), and common lizard (2 adults) obtained from valid surveys, despite the above constraints it is considered unlikely that the peak count would have increased sufficiently to alter the low population status categories indicated by the 2023 surveys.
- 5.1.7 The presence of four confirmed species (adder, common lizard, slow worm and grass snake) and an aggregated score of six (two low populations, one moderate population, and one exceptional population) for the Tilbury Site. are indicators of a key reptile site based on the guidance set out in Froglife's Advice Sheet 10²⁰. As such the Tilbury Site and wider surrounding habitats are considered an 'important' Site in relation to reptile biodiversity and population.
- 5.1.8 The location of the main areas required for the construction of the Proposed Development at Tilbury, is predominately within areas of existing hardstanding. However, it will result in small areas of habitat loss from the existing road verge to the west of the proposed Tilbury SEC.
- 5.1.9 Works within the field to the north of the proposed Tilbury SEC will require temporary disturbance of habitats in order to enable to relocation of a pylon tower and the restringing of the overhead lines. Works within the areas of most suitable reptile habitat to the south of the Tilbury SEC will be limited to restringing of overhead lines only and therefore will result in low level temporary disturbance only.

²⁰ Froglife (1999) Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

- 5.1.10 Full details of the impacts of the Proposed Development and proposed mitigation measures will be provided within the Biodiversity Chapter of the Environmental Statement.

5.2 Gravesend

- 5.2.1 Artificial refugia surveys undertaken at the Gravesend Site in 2003 confirmed the presence of slow worm, common lizard. Grass snake was not recorded during the refugia survey. However, grass snake was recorded as present within the north to south ditch on the eastern boundary of the proposed Gravesend SEC location during bird surveys undertaken in 2023, and therefore is known to be present.
- 5.2.2 Adder was not recorded during the 2023 surveys, and there are no known records of adder from the immediate surrounding area. As a consequence, adder is assumed to be absent from the Gravesend Site.
- 5.2.3 Peak adult counts for the Gravesend Site were as follows:
- slow worm – 5 adults; and
 - common lizard – 1 adult; and
 - grass snake – 1 adult (incidental record during other surveys).
- 5.2.4 As set out in Section 3.2 it was not possible to check all of the deployed artificial refugia due to ponies grazing some of the areas of grassland that had been originally identified for survey. This is considered unlikely to have significantly altered the peak counts achieved during the survey as it was evident as the survey progressed that these areas provided habitat of limited value for common reptiles given that they were regularly grazed to a short sward and heavily disturbed by ponies. Those refugia that remained accessible for survey (30 no.) were those providing the most suitable areas of reptile habitat at the Gravesend Site.
- 5.2.5 It is likely that hot weather (including high overnight temperatures) during September 2023 may have reduced reptiles encountered during Visits 3, 4, 5, and 6 (see Tables 8 & 9), in particular in the areas of most suitable habitat for this species in less disturbed or grazed habitats around the margins of the Gravesend Site.
- 5.2.6 As the most frequently recorded reptile at the Gravesend Site it is likely that slow worm may have been most impacted by the above constraints. As a consequence, on a precautionary basis it is recommended that for assessment purposes the Gravesend Site is considered suitable to support up to a 'Good' population of slow worm.
- 5.2.7 Given the peak counts of grass snake (1 adult) and common lizard (1 adult) it is considered unlikely that the peak count would have increased sufficiently to alter the low population status categories indicated by the 2023 surveys.
- 5.2.8 The presence of three confirmed species (common lizard, slow worm and grass snake) and an aggregated score of four (three low populations and one moderate population) in regards to population on the Gravesend Site. These two factors are indicators of a key reptile site according to Froglife's Advice Sheet 10²¹ and as such Gravesend would be considered an 'important' Site in relation to reptile biodiversity and population.
- 5.2.9 Full details of the impacts of the Proposed Development and proposed mitigation measures will be provided within the Environmental Statement (ES) Volume III Chapter 7: Biodiversity – Tilbury and ES Volume IV Chapter 15: Biodiversity - Gravesend.

²¹ Froglife (1999) Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation. Froglife Advice Sheet 10. Froglife, Halesworth.

Annex A Survey Locations



AECOM

PROJECT
TKRE National Grid

CLIENT
National Grid

CONSULTANT
AECOM Limited
100 Embankment
Cathedral Approach
Manchester, M3 7FB
www.aecom.com

LEGEND

Red Line Boundary (Above Ground)

Reptile Refugia

- Corrugated Felt Tile
- Felt Tile

NOTES

© 2023 Microsoft Corporation © 2023 Maxar
©CNES (2023) Distribution Airbus DS

ISSUE PURPOSE
Reptile Report

PROJECT NUMBER
60677311

FIGURE TITLE
Reptile Mats
Page 1 of 2 - Tilbury

FIGURE NUMBER
Figure 1



This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.

FIGURE NUMBER
Figure 1



AECOM

PROJECT
TKRE National Grid

CLIENT
National Grid

CONSULTANT
AECOM Limited
100 Embankment
Cathedral Approach
Manchester, M3 7FB
www.aecom.com

LEGEND

Red Line Boundary (Above Ground)

Reptile Refugia

- Corrugated Felt Tile
- Felt Tile

NOTES

© 2023 Microsoft Corporation © 2023 Maxar
©CNES (2023) Distribution Airbus DS

ISSUE PURPOSE
Reptile Report

PROJECT NUMBER
60677311

FIGURE TITLE
Reptile Mats
Page 1 of 2 - Tilbury

FIGURE NUMBER
Figure 1



AECOM

PROJECT
TKRE National Grid

CLIENT
National Grid

CONSULTANT
AECOM Limited
100 Embankment
Cathedral Approach
Manchester, M3 7FB
www.aecom.com

LEGEND

Red Line Boundary (Above Ground)

Reptile Refugia

- Corrugated Felt Tile
- Felt Tile

NOTES

© 2023 Microsoft Corporation © 2023 Maxar
©CNES (2023) Distribution Airbus DS

ISSUE PURPOSE
Reptile Report

PROJECT NUMBER
60677311

FIGURE TITLE
Reptile Mats
Page 2 of 2 - Gravesend

FIGURE NUMBER
Figure 1

This drawing has been prepared for the use of AECOM's client. It may not be used, modified, reproduced or relied upon by third parties, except as agreed by AECOM or as required by law. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that uses or relies on this drawing without AECOM's express written consent. Do not scale this document. All measurements must be obtained from the stated dimensions.

Annex B Reptile Presence/Likely Absence Survey Results

Table 10: Tilbury Presence/Absence Survey Results

Survey Number	Date	Species	Adult Male	Adult Female	Adult unsexed	Juvenile	Peak adult count
1	19/05/2023	Slow worm	3	3		3	9
1	19/05/2023	Common lizard			2		2
2	26/05/2023	Slow worm	4	2	5	1	11
3	02/06/2023	Slow worm	3	4		2	7
3	02/06/2023	Common lizard			1		1
4	08/09/2023	Slow worm	1	7	1		9
4	08/09/2023	Common lizard			2		2
5	11/09/2023	Slow worm		1	1		2
6	18/09/2023	Slow worm		1			1
7	25/09/2023	Slow worm			1		1
7	25/09/2023	Adder		1	1		2
8	05/10/2023	Slow worm	2				2
Incidental check	07/07/2023	Adder		1			1
	08/09/2023	Slow worm				1	0

Table 11: Gravesend Presence/Absence Survey Results

Survey Number	Date	Species	Adult Male	Adult Female	Adult unsexed	Juvenile	Peak adult count
1	19/05/2023	Slow worm	-	1	2	1	3
1	19/05/2023	Common lizard	-	1	-	-	1
2	26/05/2023	Slow worm	3	-	2	-	5
7	18/09/2023	Slow worm	2	1	-	-	3

Annex C Photographs

		
Slowworms found in Tilbury on 19/05/2023	Slowworm found in Tilbury on 19/05/2023	Slowworm found in Tilbury on 19/05/2023
Photographs 		
Slowworm found in Tilbury on 19/05/2023	Slowworm found in Tilbury on 19/05/2023	Slowworm found in Tilbury on 26/05/2023

		
Slowworm found in Tilbury on 26/05/2023	Slowworms found in Tilbury on 26/05/2023	Slowworm found in Tilbury on 26/05/2023
		
Slowworm found in Tilbury on 26/05/2023	Slowworm found in Tilbury on 06/08/2023	Slowworm found in Tilbury on 06/08/2023

		
Slowworm found in Tilbury on 06/08/2023	Slowworm found in Tilbury on 06/08/2023	Adder found in Tilbury on 25/09/2023
		
Adder found in Tilbury via incidental check during badger survey	Slowworm found in Tilbury on 11/09/2023	Slowworm found in Tilbury on 25/09/2023

		
Slowworm in Gravesend on 19/05/2023	Common lizard found in Gravesend on 19/05/2023	Slowworms found in Gravesend on 19/05/2023
		
Slowworm in Gravesend on 26/05/2023	Slowworm in Gravesend on 26/05/2023	Slowworm in Gravesend on 26/05/2023



Slowworms in Gravesend on 18/09/2023

