



Thurrock Flexible Generation Plant

**Environmental Statement Volume 6
Appendix 9.2: Third Party Survey Reports**

Date: December 2019

Environmental Impact Assessment

Environmental Statement

Volume 6

Appendix 9.2

Report Number: OXF10872

Version: Final

Date: December 2019

This report is also downloadable from the Thurrock Flexible Generation Plant website at:

<http://www.thurrockpower.co.uk>

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Prepared by: David Gabb

Checked by: Matthew Fasham and Tom Dearing

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Summary

This appendix contains a range of third-party reports which provide information on a number of species to support the assessment carried out in Volume 3, Chapter 9: Onshore Ecology.

1. Thurrock Flexible Generation Plant Eel Scoping

Mathew Fasham

By e-mail.
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Our ref: 13096
3rd July 2019

FAO: Mathew Fasham

Re: Thurrock Flexible Generation Plant Eel Scoping

Background

Ecus were commissioned by RPS Group to undertake a scoping survey to determine the likelihood of the habitats across the proposed Thurrock Flexible Generation Plant development site (hereafter referred to as the Survey Area) as to having the potential to support a population of European eel *Anguilla anguilla*. The proposed works involve the construction of a new peak generation plant with associated access and infrastructure.

The Survey Area (Areas A, C, D, E, I & J as shown in Figure 1) is located on agricultural land to the north of the old Tilbury B coal-fired power plant approximately 1 km to the east of Tilbury at National Grid Reference (NGR) TQ 66717 77073.

The survey is required to address concerns of the Environment Agency (EA) made during the Preliminary Environmental Information Report (PIER) consultation, in regard to eels using the drains within the survey Area.

The works included:

- A desk-based study to inform the assessment;
- An ecological walkover of the development site, including a wider scoping exercise to determine connectivity of the Survey Area to the Thames estuary and other potential suitable habitat; and
- An ecological assessment including recommendations for further survey work.

Methods

Desk Study

The NBN Gateway (www.nbn.org.uk, accessed June 2019) was consulted for eel records in the vicinity of the Survey Area, and a literature search was also undertaken looking for references specific to eel records for the Survey Area and wider area; this included a review of the Eel Management Plan for the Thames River Basin District, RBD (Defra, 2010).

Web-based satellite imagery was also studied to identify potential suitable waterbodies prior to the field survey commencing.

Field Survey

A walkover survey of the Survey Area was undertaken by Principal Ecologist Nick Carter (MCIEEM) on the 20th and 21st May 2019. The field survey focussed on areas with potential eel habitat that will be impacted by the development, primarily the drains within areas A, C, D, E, I & J (Figure 1) which covers the proposed peak generation plant and the associated permanent and temporary construction infrastructure. The walkover survey was also extended along the Thames Estuary path to the east of Tilbury Fort to assess the connectivity of the drains within the Survey Area to the known eel population in the River Thames.

Limitations

Conditions at the time of the survey were fine and visibility was good, access across the immediate and wider site was comprehensive therefore an accurate assessment of the habitat present was possible without limitations.

Results

Desk Study

Although there are local records of eel within the Thames RBD from the intake screens of the now defunct Tilbury Power Station*, and local catch returns confirm the recent presence of eel from the estuary at Tilbury Fort, there are no records of eel associated with the drains across the Survey Area. The biological records show that locally eels are using the Mar Dyke to the west of Tilbury which maintains good connectivity with the Thames at Purfleet, whereas the drains across the Survey Area are fragmented with poor connectivity to good habitat. Local records of eel are shown in Figure 2.

Field Survey

The walkover survey showed the drains within the Survey Area to be unsuitable to European eel due to them being ephemeral in nature, with limited connectivity to the estuary and any potential habitat further inland (Appendix 1 and Figure 3). The drains in the areas A & C (Figure 1) that will be permanently affected by the development are ephemeral, choked with reed and are not connected to the estuary. The drains in Areas D & E; Figure 1 (where there will be a gas pipeline corridor and connection to the mains) have no suitable habitat and the temporary haul road (Areas I & J in Figure 1) will not be impacted. No eel or fish were observed in the ditches during the field survey.

Discussion and Recommendations

The drains within the Survey Area that will be permanently affected by the proposed development are unsuitable to support the European eel. Throughout the Survey Area and the wider RBD, two factors have combined to reduce access for eel to freshwater habitats: flood defence engineering and weir construction. Many of the rivers in the RBD have been extensively managed to control flooding, particularly in the lower and tidal reaches where low-lying land has been reclaimed for agriculture, housing and urban areas. Flood control tidal flaps and pumped drainage removes water from large areas of potential habitat in the Marsh Dykes.

As such, European eel is not considered to be a constraint to the proposed development.

Reinstating connectivity where suitable and improving freshwater habitats will help to readdress the balance and improve the conservation status for this critically endangered species.

* In 2006 the Zoological Society of London began a programme of sampling at Tilbury Power Station each month in collaboration with the Environment Agency. Fish washed off the intake screens over a 5 hour period are sampled twice a month. The number of fish sampled per month in for the 12 months from March 2006 to February 2007 is shown in Figure 2.8. The number of eels caught is dependent upon abstraction rates and flow, and there will also be a diurnal effect on catches, however a crude extrapolation of these data suggests that 3,800 eels could be entrained each year.

References

www.defra.co.uk (2010) Eel Management Plans for the United Kingdom, Thames River Basin District.

NBN Gateway;

<https://nbn.org.uk/the-national-biodiversity-network/archive.../nbn-gateway/> [Accessed June, 2019]

Appendix 1



Legend

T1. Dry drain

T2. Dry drain

T3. Dry drain

T4. Dry drain



Client

Site Address

Appendix 1. Site Photos

Brook Holt 3 Blackburn Road Sheffield S61 2DW
T: 0114 2669292 www.ecusltd.co.uk



Legend

T5. Ephemeral drain

T6. Dry drain

T7. Drain choked with vegetation

T8. Wet drain, no connectivity to wider habitat.



Client

Site Address

Appendix 1. Site Photos

**Brook Holt 3 Blackburn Road Sheffield S61 2DW
T: 0114 2669292 www.ecusltd.co.uk**



T9



T10



T11



T12

Legend

T9. Drain terminates at coastal flood defences

T10. Barrier to eel migration at coastal defences

T11. Drain choked with vegetation

T12. Dry drain completely occluded with reed

Client

Site Address

Appendix 1. Site Photos

Brook Holt 3 Blackburn Road Sheffield S61 2DW
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Legend

T13. Area D,E Gas pipeline. No suitable habitat

T14. Dry drain

T15. polluted drain terminates at road.

T16. The only permanent fish holding drain at Tilbury. Not impacted by development



Client

Site Address

Appendix 1. Site Photos

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Legend

T17. Dry ditch

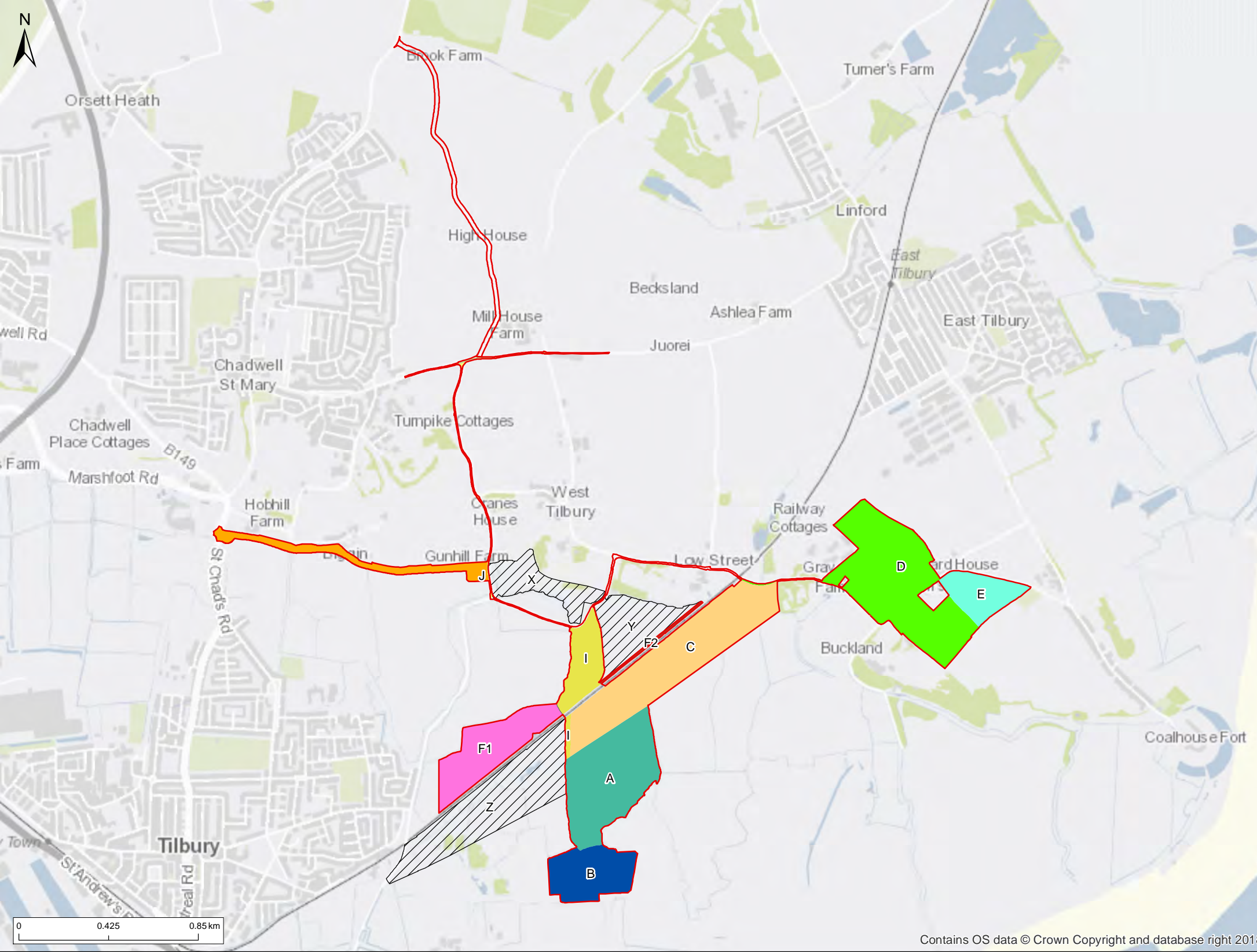
Client

Site Address

Appendix 1. Site Photos

Brook Holt 3 Blackburn Road Sheffield S61 2DW
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Figure 1



Legend

- Development boundary (inclusive of access roads)
 - A - Main Development Site where the gas fired facility, battery storage facility and customer substation will be located
 - B - The existing Tilbury Substation to which an electrical connection will be made
 - C - Corridor for permanent access road and gas pipeline route
 - D - Corridor for gas pipeline
 - E - Field within which above-ground installation for connection to high-pressure gas main will be made
 - F1 - Primary area within which exchange Common Land could be provided.
 - F2 - Wildlife corridor
 - H - Access route including minor works on public highway to accommodate HGV tracking
 - I - Existing Common Land used for temporary construction haul route, laydown area and biodiversity mitigation
 - J - Temporary construction haul route
- Traffic regulation orders**
- Speed restriction
 - Weight restriction
- Additional Zones**
- Zones X, Y & Z - Surveyed as part of previous development boundary, no longer part of development plan

Created by: KM Scale: A3@ 1:20,763 Date: 02/10/2018
 Checked by: MF Doc no: 110-0001-02 Development zones

Thurrock Flexible Generation Plant
 Development zones

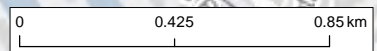


Figure 2

Legend

- ★ Thurrock Power Plant
- ⬠ Eel *Anguilla anguilla* records



Figure 3

Eel Scoping Target Notes, Thurrock Power.



2. Preliminary Appraisal of Invertebrate Habitats

COLIN PLANT ASSOCIATES (UK)

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13 May 2019

Our Reference: CPA-19107
Your Reference / PO Number: ECO00110 / 0309317

Tilbury Peaking Plant access road, Tilbury, Essex

Preliminary Appraisal of Invertebrate Habitats

Dear Matt,

Further to your instruction of 26th April 2019, we have now visited the above site; the surveyors on this occasion were Marcel Ashby and Tristan Bantock. This letter is our formal report of that visit.

Statement of impartiality

Please note that this report presents our surveyors' impartial and unbiased opinion on the existing invertebrate ecology of the site at the date of examination. Unless otherwise stated, our findings and any conclusions drawn or recommendations made are independent of the detail of any proposed development to the site and are wholly independent of any third party opinions where these may exist.

If this report contains suggestions or recommendations relating to mitigating losses, these have been made without specific consideration of the details of the proposed development works and are offered on the assumption that the entire area inside the red line would be lost.

Introduction

The site visit was undertaken on 8th May 2019 in overcast and damp conditions. All areas of the site were accessible and were examined.

Purpose of visit

The purpose of the visit was to appraise the invertebrate habitats present on site and to advise whether or not it is likely that a proposed development would have an impact on invertebrate ecology. Of particular concern was the potential for the site to support Species of Principal Importance in England, as defined

within Section 41 of the *Natural Environment and Rural Communities (NERC) Act 2006*, although species included in other conservation categories were also considered.

You also asked us to determine the scope of any additional invertebrate survey work required to make a comprehensive site assessment.

Invertebrate habitats present in May 2019

The site comprises two discrete parcels of land in the Tilbury area. The eastern compartment (c 4 ha) borders Tilbury substation on its southern margin and has a centroid at approximately TQ664764. The western compartment (c 3 ha) lies east of Fort Road at approximately TQ653761.

Fields adjacent to the northern boundary of the eastern section are currently under arable cultivation and examination of aerial imagery indicates that the area in question was also cultivated until around 2003. The area is currently dominated by dense and uniform hawthorn, blackthorn and bramble scrub, which has developed unchecked following the abandonment of agriculture. The lack of structural variation and low floristic diversity predicts a species-poor invertebrate assemblage dominated by those with more generalist ecological requirements, which are usually of lower conservation value.

The hedgerows consist mainly of hawthorn, some of which are becoming mature and these provide a large number of potential niches for invertebrates. The ditches are steep-sided and lacking in marginal vegetation with the exception of some common reed. They are likely to be subject to considerable fertiliser run-off and to support an impoverished invertebrate fauna. However, ditches in arable land can sometimes support valuable aquatic invertebrate communities. We recommend retention of the hedgerows and ditches.

The western section presents as fields of dry semi-improved grassland which were historically presumably part of the extensive system of coastal grazing marshes characteristic of the outer Thames Estuary. They have a recent history as livestock pasture and are heavily degraded in nature, with a closely-cropped and species-poor sward. Again, our expectation is that this area will not support a rich invertebrate fauna.

Conclusions and recommendations

No site is completely lacking in value to invertebrates. All green areas make some contribution to the wider ecological interest of the landscape for invertebrates, even if it is simply the maintenance of an open aspect. However, it is our opinion that the site under discussion does not have an intrinsic invertebrate interest that is likely to be raised significantly above the expected regional background level. We are not of the opinion that additional survey work would alter this conclusion and no such further work is recommended.

** * end of formal report * * **

I hope that you will find this report adequate for your client's current needs.

With all best wishes,



Tristan Bantock
Partner

3. Full Common Reptile Survey



www.cherryfieldecology.co.uk

Report prepared for: Statera Energy (Kirsty Cassie)

For the Site of: Tilbury Substation, Walton Common, RM18 8UL

Version:	Written by:	Checked by:	Final:
Draft	Martin O'Connor 19/09/2019		
Draft 2	Martin O'Connor 14/10/2019		
Final	Martin O'Connor 14/10/2019	Tanya O'Connor 16/10/2019	Martin O'Connor 16/10/2019

Cherryfield Ecology has prepared this report for the named clients use only.

Ecological reports are limited in shelf life, Natural England usually expect reports for licenses to be no more than 12 months old and therefore should the project not proceed within 12 months of this report an updated survey should be undertaken in order to check for changes that may have occurred on site. Information is believed to be accurate at the time of survey; recommendations are made without bias based on good practice guidelines within the industry. However, species presence and ecological parameters can change over time.

Martin O'Connor Dip, BSc (Hons), CBIol, MRSB

Bat license level 3 and 4

martin@cherryfieldecology.co.uk

07950279790

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Full Common Reptile Survey

0.0 Non Technical Summary

0.1 Background -

All surveys follow national guidelines allowing for refuges, commonly known as ‘felts’, to be placed across the site and then checked for reptiles. Recommendations for mitigation if considered necessary are detailed in section 4. If a deviation from the guidelines has been made this will be detailed in the Method Section.

The following report details the findings and recommendations for the site of Tilbury Substation, Walton Common, RM18 8UL.

The client commissioned Cherryfield Ecology to undertake a full reptile survey as the proposals include for a gas turbine electricity station and a battery storage centre.

0.2 Results and Findings -

Following a stage 1 ecological assessment undertaken on 28/05/2019 further surveys were recommended. This included for standard common reptile surveys on area 1 to 4 (however due to an issue on site only areas 1 and 2 have been surveyed). These surveys have shown high populations of common lizard and good populations of slow worm on site.

0.3 Impact Assessment and Recommendations -

A high impact will occur for common lizard and slow worm, with low impacts for grass snake and adder.

Mitigation and compensation will be required prior to works beginning, please refer to section 4 for detail.

1.0 Introduction

The client, Statera Energy, has commissioned Cherryfield Ecology to undertake a full reptile survey (FRS) for the site of Tilbury Substation, Walton Common, RM18 8UL. Planning permission is being sought to include for a gas turbine electricity station and a battery storage centre.

This survey has utilized standard methods for checking for reptiles, by placing out felts, tins or carpet tiles across the site. These are then checked in suitable weather for reptiles. Whilst checking the felts the surveyor also looks for reptiles moving around the site.

The inspection(s) was conducted on the 17/09/2019 (set-up), 26/09/2019, 27/09/2019, 30/09/2019, 03/10/2019, 08/10/2019, 09/10/2019 and 14/10/2019.

The survey can only ever provide a ‘snap shot’ of the site at the time of the survey and circumstances may change following this report. Health and Safety restrictions or obstructions may limit the ability to find reptiles e.g. flooding.

Biological records have been requested to give the report context and allow a study of the surrounds. The information is often sensitive and therefore a synopsis is provided and the full data released separately for verification.

The survey can be conducted between March to October when temperatures of between 9-18°C are generally accepted to be the optimum for reptiles to be active. These months are generally considered optimal for observing active reptiles, except the warmest summer months (where temperatures can exceed 18°C, which are considered sub-optimal).

Summary of legislation and National Planning Policy that protects bats in England:

- Wildlife and Countryside Act 1981 as amended.
- Countrywide and Rights of Way Act 2000.
- Natural Environment and Rural Communities Act 2006.
- National Planning Policy Framework (“NPPF”).
- Circular 06/05.

This legislation makes it illegal to:

- Intentionally or deliberately kill or injure common and rare reptiles.
- Deliberately disturb or capture rare reptiles.
- Damage, destroy or obstruct access to rare reptile habitat.
- Possess or transport a rare reptile or any part of a rare reptile, unless acquired legally.
- Sell, barter or exchange common and rare reptiles.

Rare reptile species are found in highly restricted ranges in the south east of England and receive full European protection. There are populations of sand lizard in e.g. coastal Wales and Cornwall. Smooth snake populations are found in lowland heaths in e.g. Surrey.

2.0 Methods

The survey follows the national guidelines, which is taken as following: -

- Froglife (1999). Reptile Survey. Froglife Advice Sheet 10. Froglife, Halesworth.
- Herpetofauna Groups of Britain and Ireland (1998). Evaluating local mitigation/translocation programs: Maintaining Best Practice and Lawful Standards. HGBI.
- JNCC (2004). Common Standards Monitoring Guidance for Reptiles and Amphibians.
- Edgar et al (2010). Reptile Habitat Management Handbook. Amphibian and Reptile

The survey consists of placing out felts, tin or carpet tiles across the site. These are then checked for reptiles in suitable weather and notes made of the species, sex and age.

From this information an estimate of the population can be made e.g. more than 5 slow worm on the site would be a good population.

If a deviation from the guidelines has been made the reason and justification will be explained below: -

Checks have been undertaken close together in order to ensure that all checks have been made in the optimal season.

3.0 Results

The following section details the results of the desk study, inspection and survey, it includes MAGIC information, biological records data and map/aerial photo information.

3.1 Desk Study

The desk study is centred on Grid Ref - TQ663770 and postcode - RM18 8UL (nearest to site).

Table 1: Weather records -

Date	Survey	Weather: Start	Weather: Finish
17/09/2019	Set-up	Temp: 17 °C Cloudy: 20% Wind: 0/8 Rain: None	Temp: 19 °C Cloudy: 20% Wind: 0/8 Rain: None
26/09/2019	Check 1	Temp: 18 °C Cloudy: 50% Wind: 0/8 Rain: None	Temp: 18 °C Cloudy: 50% Wind: 1/8 Rain: None
27/09/2019	Check 2	Temp: 17 °C Cloudy: 50% Wind: 0/8 Rain: None	Temp: 17 °C Cloudy: 50% Wind: 0/8 Rain: None
30/09/2019	Check 3	Temp: 15 °C Cloudy: 50% Wind: 0/8 Rain: None	Temp: 15 °C Cloudy: 50% Wind: 0/8 Rain: None
03/10/2019	Check 4	Temp: 10 °C Cloudy: 50% Wind: 0/8 Rain: None	Temp: 12 °C Cloudy: 0% Wind: 0/8 Rain: None
08/10/2019	Check 5	Temp: 16 °C Cloudy: 50% Wind: 0/8 Rain: None	Temp: 16 °C Cloudy: 50% Wind: 0/8 Rain: None
09/1/0/2019	Check 6	Temp: 14 °C Cloudy: 50% Wind: 0/8	Temp: 14 °C Cloudy: 50% Wind: 0/8

		Rain: None	Rain: None
14/10/2019	Check 7	Temp: 13 °C Cloudy: 20% Wind: 0/8 Rain: None	Temp: 14.3 °C Cloudy: 40% Wind: 0/8 Rain: None

3.2 Magic:

The following statutory sites have been located on the search (see Figure 1) -

- There are no SSSI's or EPS licenses issued within the search area. However, there is a great crested newt license found just outside of the 2km radius to the north and Mucking Flats and Marshes SSSI is found to the east.

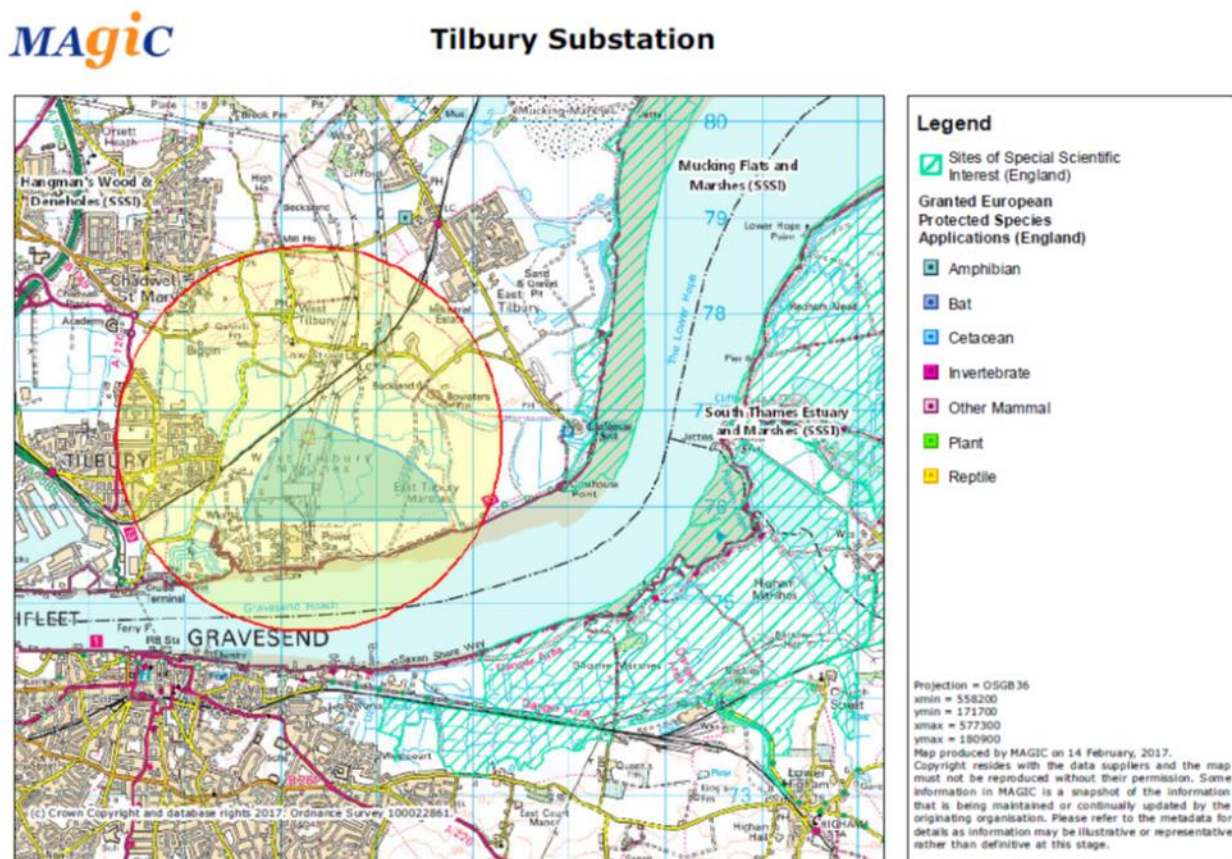


Figure 1: Magic search

3.3 Biological Records Data:

A 1km data search of existing records for protected species and nature reserves has been commissioned, below details the results and site context:

Biological records have been ordered from Essex Records Centre (ERC, 2017). There are two local wildlife sites close to the site of development, with a further four well outside 1km of the site. The first of these is known as Lytag Brownfield Site and it sits approx. 200m to the west of the site. Survey works undertaken on the site has shown there to be a good population of common reptiles present, including slow -worm, common lizard, adder and grass snake. The second is known as The Tilbury Centre located approx. 500m southwest of the site. It is designated for a complex mosaic of grassland, flower-rich early successional/pioneer vegetation, ditches, a small reedbed and a pond, notable for its colony of Stonewort *Chara sp.* and the nationally rare (Red Data Book) Great Silver Beetle *Hydrophilus piceus*. The pioneer vegetation includes abundant Bird's-foot Trefoil *Lotus corniculatus*, on which the national BAP bumblebees *Bombus humilis* forages. Other important invertebrates have also been recorded here. Species information is lacking from the area, with only seven records, three of which are for badger. The others include bluebell and three butterfly records.

3.4 Site Location and Surrounds:

The site is located in Essex, Tilbury and is surrounded by arable fields in the immediate local. Table 2 details the commuting, feeding and habitat features in a 1km radius of the site.

Table 2: Habitat features suitable for reptile use

Feature	Description
Water course	The river Thames is located approx. 600m to the south of the site. There are many agricultural drainage ditches within the surrounds.
Water bodies	A large pond is located to the west of the site, approx. 100m from the boundary.
Woodland	No true woodland is located within 2km of the site, however small area of scrubby woodland is found scattered across the landscape.

Linear e.g. hedgerows	Defunct agricultural hedges are found scattered across the landscape in all directions.
Pasture/arable	The dominant land-use in the area is arable with grazed fields to the north.
Other	A railway line runs east/west to the north of the site.

3.5 Observations

Table 3: Results and observations of the surveyors' checks (see Figure 2 for site plan)

Surveyor	Survey	Reptile Activity Observed and other observations
Mike Marriott (MM)	Set-up	No reptiles observed.
MM	Check 1	Area 1 - 9 common lizards and 1 juvenile slow worm Area 2 - 5 common lizards
MM	Check 2	Area 1 - 3 common lizards, 2 juvenile common lizards and 1 juvenile slow worm. Area 2 - 1 Juvenile common lizard.
MM	Check 3	Area 1 - 9 common lizards and 2 juvenile slow worms. Area 2 - 3 common lizards
MM	Check 4	Area 1 - 7 common lizards and 1 slow worm. Area 2 - 1 common lizard.
MM	Check 5	Area 1 - 9 common lizards, 1 slow worm and 1 juvenile slow worm. Area 2 - 7 common lizard and 1 juvenile slow worm.
MM	Check 6	Area 1 - 12 common lizard and 2 sub-adult slow worms. Area 2 - 6 common lizards.
MM	Check 7	Area 1 - 2 common lizards. Area 2 - 8 common lizards.

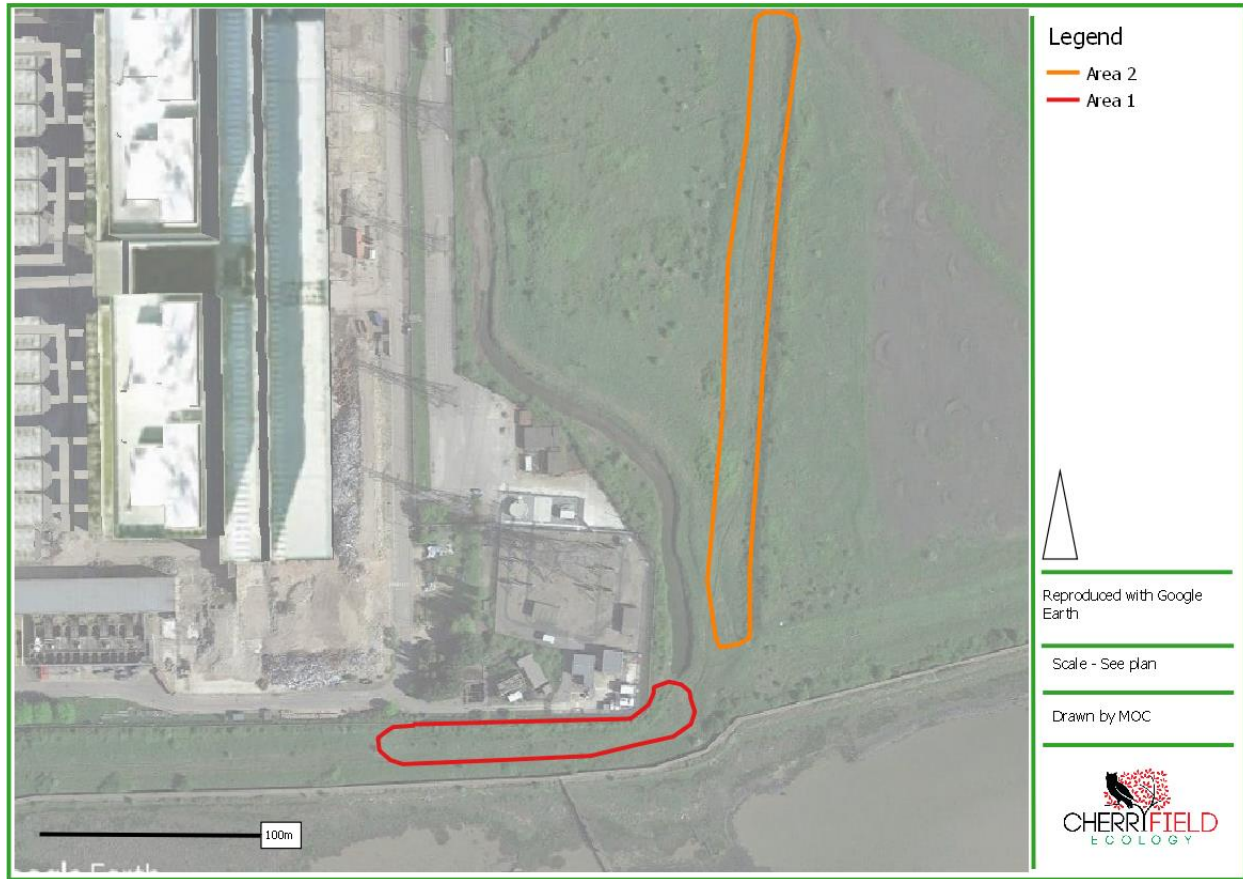


Figure 2: Site plan

4.0 Conclusions, Discussion and Recommendations

The following section details the conclusions, discussion and recommendations in the context of the proposed works.

4.1 Conclusion and Discussion

The development will involve building a new gas turbine centre and battery storage site, the areas covered for this report included for the potential route to the main site. This is large infrastructure project involving a large area of the site and routes to and from the main site. Common reptile species have been found to be using the site, which includes good populations of both common lizard and slow worm.

4.2 Potential Impact

Impact assessments must be proportionate to the scale of the development (CIEEM, 2018) and the following details a proportionate impact assessment based on current information -

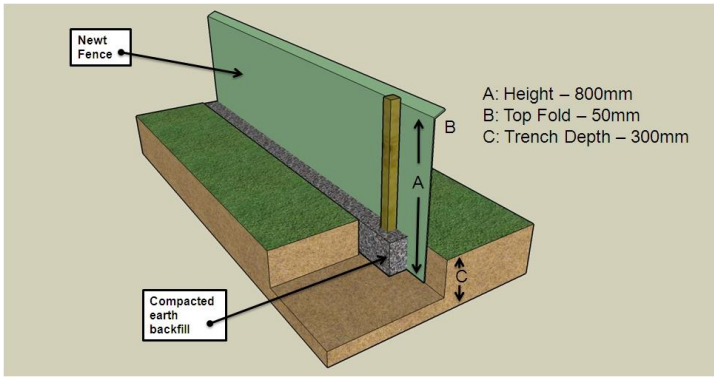
Table 5: Impact assessment

Impact	Common reptiles will be impacted by the proposed works, including good populations of common lizard and slow worm, in addition adder and grass snake have been found in low numbers to the main site.
Characterisation of unmitigated impact on the feature	A major impact will occur for common lizard and slow worm, with a low impact for adder and grass snake at the local level.
Effect without mitigation	Common reptiles could be killed, injured and disturbed in the works.
Mitigation	Please refer to table 6.
Significance of effects of residual impacts (after mitigation)	Once mitigation and compensation is provided no net loss will occur on site.

4.3 Recommendations

The following table details the proposed mitigation and compensation required to protect the common reptile species on site.

Table 6: Mitigation and compensation

<p>Reptile mitigation and compensation</p>	<p>As common reptiles are protected under the Wildlife and Countryside Act 1981 (as amended) the normal methodology to protect reptile populations is by trapping and moving reptiles to a receptor site either elsewhere or on site. Therefore, the following must be followed in order to allow the development to proceed -</p> <ul style="list-style-type: none"> • A semi-permanent reptile fence will be installed that consists of a 1x850mm sheet of recycled HDPE plastic. The plastic is buried to a depth of 200mm. The plastic sheet is scored 100mm in from the base to allow for the creation of a 100mm underground return. Alternatively, the plastic can be buried vertically to 300mm with no underground return. The plastic sheet is semi rigid so requires support. This is provided by 50x50x1000mm tanalised timber stakes. The sheet is fixed to the stakes using 35mm screws (3 No. per post). The plastic is scored 50mm in from the top edge. This allows for folding and the creation of an overhang to further prevent the passage of reptiles (see Figure 3) <div data-bbox="625 894 1334 1268" data-label="Image">  </div> <p>Figure 3: Example of reptile fence</p> <ul style="list-style-type: none"> • Where vehicle access is required into the trapping area, a grid shall be installed to allow the free passage of vehicles. This consists of two 5m RSJs set into a concrete beam with a gap between them. Exit points are provided at the end of the grid to allow any animals that fall into the void between the two RSJs to escape/move back into the site (see Figure 4).
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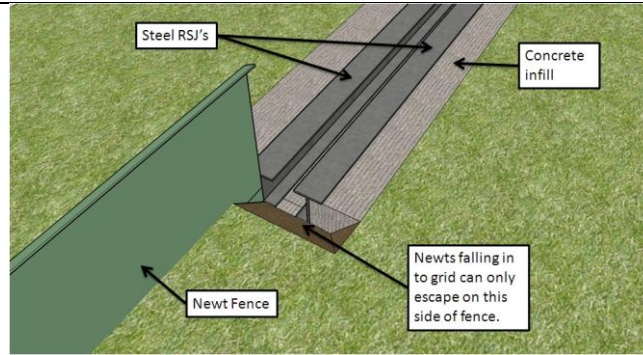


Figure 4: Example of vehicle access

- Pitfall traps will be constructed from 10l plastic containers/buckets with snap on lids sunk into the ground along the inner perimeter of the fenced area. The containers will be sunk flush to the ground level and with their outer edge flush against the UPVC fencing. The traps will be set at 1 trap per 10m length of fence where it is possible to do so. If necessary, small tile refugia will be used where pitfall traps cannot be placed.
- All pitfall traps will be designed to minimise any impacts upon animals that may fall into them. Vegetation will be provided as cover in the bottom of the trap and drainage holes will be created to avoid a build-up of water in the trap that could lead to drowning of animals.
- Mammal ladders will be positioned in the trap to allow any small mammals captured an escape route. A small piece of timber stick or plant stem may be used.
- All pitfall traps will be checked regularly during a 24-hour period and will be checked at least twice a day between 0600 and 1100hrs and 1700 and 1900 hrs.
- In addition, artificial refugia (felt/carpet/tins) will be deployed in areas to be trapped in locations assessed as being most likely to attract animals (i.e. breaks in the habitat and near to obvious topographical features e.g. south facing slopes).
- A minimum of 90 trapping days in suitable weather will be required, followed by 5 clear days of trapping.
- Once the site has been deemed clear of reptiles by the ecologist, habitat manipulation will be used to clear the site fully of any final reptiles that have not been trapped.

- This will involve cutting the grass area to a level no higher than 50mm from the centre of the site out to the edges leaving a 0.5m buffer around the reptile fence in order to capture the remaining reptiles.
- After the final trapping session, the remaining buffer can be cut to a height of no more than 50mm.
- The reptile fence will remain in place and intact until the works are then completed.

5.0 References

CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, September 2018. Chartered Institute of Ecology and Environmental Management, Winchester, online at <https://www.cieem.net/data/files/ECIA%20Guidelines.pdf>

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4. Activity Bat Survey



www.cherryfieldecology.co.uk

Report prepared for: Statera Energy

For the Site of: Tilbury Substation, Walton Common, RM18 8UL

Version:	Written by:	Checked by:	Final:
Draft	Martin O'Connor 29/04/2019		
Draft 2	Martin O'Connor 14/08/2019		
Final	Martin O'Connor 14/08/2019	Tanya O'Connor 15/08/2019	Martin O'Connor 16/08/2019

Cherryfield Ecology has prepared this report for the named clients use only.

Ecological reports are limited in shelf life, Natural England usually expect reports for licenses to be no more than 12 months old and therefore should the project not proceed within 12 months of this report an updated survey should be undertaken in order to check for changes that may have occurred on site. Information is believed to be accurate at the time of survey; recommendations are made without bias based on good practice guidelines within the industry. However, species presence and ecological parameters can change over time.

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Activity Bat Survey (ABS)

0.0 Non Technical Summary

0.1 Background -

This report follows national guidelines Collins (2016) allowing for Transect surveys and recommends mitigation if considered necessary. If a deviation from the guidelines has been made this will be detailed in the Method Section.

The following report details the findings and recommendations for the site of Tilbury Substation, Walton Common, RM18 8UL.

The client commissioned Cherryfield Ecology to undertake an ABS as the proposals include for a gas turbine electricity station and a battery storage centre.

0.2 Results and Findings -

The bat activity on site is very poor, other the whole season and surveys bat activity was limited to along the railway line, with very occasional passing. The areas around the arable fields, improved grassland and ditch systems was almost nonexistent.

0.3 Impact Assessment and Recommendations -

No impacts foreseen.

No further survey is considered necessary. Enhancement is provided in section 4, please refer.

1.0 Introduction

The client, Statera Energy, has commissioned Cherryfield Ecology to undertake an activity survey for the site of Tilbury Substation, Walton Common, RM18 8UL.

This survey has been designed to provide information on bats using the site, by using transect routes to establish bat foraging and commuting in the area. A new gas turbine electricity station and a battery storage centre will be built.

The surveys were conducted on - 29/04/2019, 25/06/2019 and, 13/08/2019.

The survey can only ever provide a 'snap shot' of the site at the time of the survey and circumstances may change following this report. Health and Safety restrictions or obstructions may limit the ability to find/see emergence and/or evidence.

Biological records have been requested to give the report context and allow a study of the surrounds. The information is often sensitive and therefore a synopsis is provided and the full data released separately for verification.

The survey can be conducted between May and September with the optimal season for surveying maternity colonies limited to mid-May to August inclusive, however it can also be limited due to bad weather, when bats are less active.

Summary of legislation and National Planning Policy that protects bats in England:

- Conservation of Habitats and Species Regulations 2017.
- Wildlife and Countryside Act 1981 as amended.
- Countrywide and Rights of Way Act 2000.
- Natural Environment and Rural Communities Act 2006.
- National Planning Policy Framework ("NPPF").
- Circular 06/05.

This legislation makes it illegal to:

- Intentionally or deliberately kill, injure or capture bats.
- Deliberately disturb bats, whether at roost or not.
- Damage, destroy or obstruct access to bat roosts.
- Possess or transport a bat or any part of a bat, unless acquired legally.
- Sell, barter or exchange bats, or any part of a bat.

A bat roost is well-defined by the legislation as the 'resting place' of a bat. However, the word roost is used to describe this resting place and is generally accepted as the word describing where a bat or bats rest, feed or sleep.

2.0 Methods

The survey follows the national guidelines Collins (2016) and the following equipment is available for the inspections:

- Torches (e.g. LED Lensar type).
- Ladders (Standard 4m telescopic surveying ladder).
- Endoscope where holes, cracks and crevices are accessible.
- Mirrors (extendable and movable mirror face).
- Binoculars (Pentax close focus).
- Thermometer/hygrometer.
- Camera.
- Sample bags for collecting dropping and feeding evidence.
- Echo Meter Touch, EM3, and Pettersson D240X.
- IR night vision (when required) Sony HD Camcorder, Spec IR lights.
- FLIR one Thermal Imaging Camera (when required).

Surveyors walk set transect routes in order to cover the park and establish the bat activity in the park. Each transect has up to six, five minute stopping points to listen for activity. The surveys also then observed for emerging or re-entering bats from suitable features such as holes, cracks and crevices, in trees when these are noted.

If a deviation from the guidelines has been made the reason and justification will be explained below: -

Only three surveys have been conducted, however these have been conducted over the entire survey season, giving a pattern of bat activity across the year and the site.

2.1 Limitations

This survey provides a snap -shot of the site at the time of the survey(s) only. Bats are highly mobile and can and do turn-up from time to time unexpectedly. All care has been taken to ensure the results and recommendations are suitable to the context of the development and the information gathered on surveys.

Table 1: Habitat value (likelihood) of bat presence assessed against Collins (2016) guidelines *Source: Adapted from Collins (2016) pp 35, Table 4.1.*

Likelihood of bat presence (Habitat Value)	Features that bats can and will use, regardless of evidence being present.
Confirmed Bat Presence	Bats are found to be present during the survey. Evidence of bats is found to be present during the survey.
Higher likelihood of bat presence.	Pre-20th century or early 20th century construction. Agricultural buildings of traditional brick, stone or timber construction. Large and complicated roof void with unobstructed flying spaces. Large (>20 cm) roof timbers with mortice joints, cracks and holes. Entrances for bats to fly through. Poorly maintained fabric providing ready access points for bats into roofs, walls, bridges, but at the same time not too draughty and cool. Roof warmed by the sun, in particular south facing roofs. Weatherboarding and/or hanging tiles with gaps. Low level of disturbance by humans. Bridge structures, follies, aqueducts and viaducts over water and/or wet ground.
Moderate and Lower likelihood of bat presence.	Modern, well-maintained buildings or built structures that provide few opportunities for access by bats. Small, cluttered roof space. Buildings and built structures comprised primarily of prefabricated steel and sheet materials. Cool, shaded, light or draughty roof voids. Roof voids with a dense cover of cobwebs and no sections of clean ridge board. High level of regular disturbance. Highly urbanised location with few or no mature trees, parkland, woodland or wetland. High levels of external lighting.
Negligible likelihood of bat presence.	No features suitable for roosting, minor foraging or commuting.

Notes on using this table

- 1 The features listed here may not be indicative of use of the site by bats during winter or spring.
- 2 Pre-1914 buildings may present the greatest likelihood of providing roost space for bats due to their design, materials used and age. Pre-1990 buildings, especially when close to good foraging habitat, and with favoured features such as cavity walls and soffits, also have a high likelihood of providing roost sites for some bat species.
- 3 Post-1990 buildings are generally less likely than older buildings to house roosts; however, some modern designs provide access to suitable roosting spaces for bats. Pipistrelles in particular occupy modern buildings and built structures providing that there are suitable access gaps (> 8mm) and provided the structure has appropriate characteristics for roosting.

3.0 Results

The following section details the results of the desk study, inspection and survey, it includes MAGIC information, biological records data and map/aerial photo information. The results detail the building, structure or tree (numbered for reference) description of any evidence found and habitat value if no evidence has been located.

3.1 Desk Study

The desk study is centred on Grid Ref - TL089228 and postcode - LU2 7HA.

Table 2: Weather records -

Date	Survey	Time: from/to	Weather: Start	Weather: Finish
29/04/2017	Dusk	20.00 to 22.30 SS: 20.18	Temp: 14 °C Humidity: 55% Cloudy: 0% Wind: 1/8 Rain: None	Temp: 10 °C Humidity: 80% Cloudy: 10% Wind: 1/8 Rain: None
25/06/2019	Dusk	21.05 to 23.05 SS: 21.20	Temp: 21 °C Humidity: 80% Cloudy: 100% Wind: 0/8 Rain: None	Temp: 19 °C Humidity: 90% Cloudy: 100% Wind: 0/8 Rain: None
13/08/2019	Dusk	20.26 to 22.26 SS: 20.35	Temp: 19 °C Humidity: 50% Cloudy: 90% Wind: 0/8 Rain: None	Temp: 18 °C Humidity: 50% Cloudy: 30% Wind: 0/8 Rain: None

3.2 Magic:

The following statutory sites have been located on the search (2km) see Figure 1 -

- There are no SSSI's or EPS licenses issued within the search area. However there is a great crested newt license found just outside of the 2km radius to the north and Mucking Flats and Marshes SSSI is found to the east.

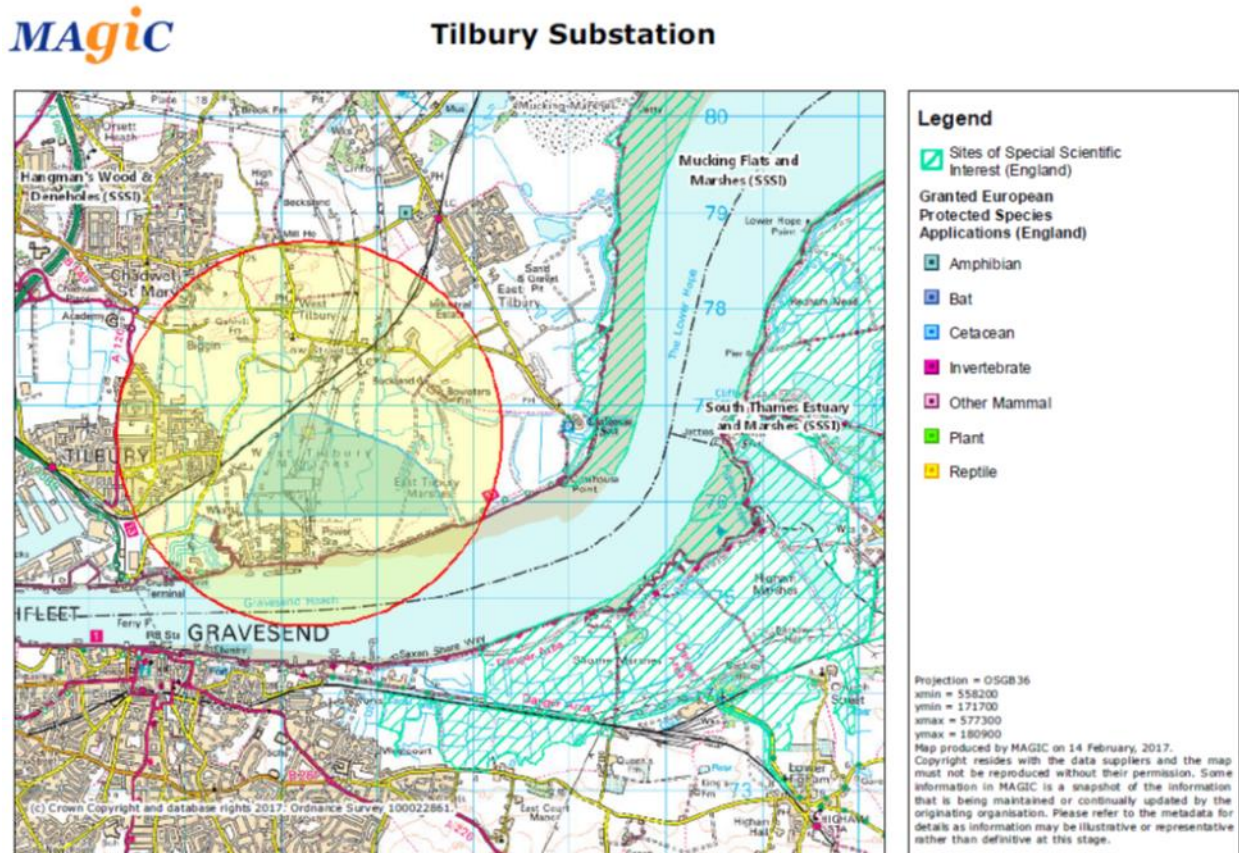


Figure 1: Magic search

3.3 Biological Records Data:

A 1km data search of existing records for protected species and nature reserves has been commissioned, below details the results and site context:

Biological records have been ordered from Essex Records Centre (ERC, 2017). There are two local wildlife sites close to the site of development, with a further four well outside 1km of the site. The first of these is known as Lytag Brownfield Site and it sits approx. 200m to the west of the site. Survey works undertaken on the site has shown there to

be a good population of common reptiles present, including slow -worm, common lizard, adder and grass snake. The second is known as The Tilbury Centre located approx. 500m southwest of the site. It is designated for a complex mosaic of grassland, flower-rich early successional/pioneer vegetation, ditches, a small reedbed and a pond, notable for its colony of Stonewort *Chara sp.* and the nationally rare (Red Data Book) Great Silver Beetle *Hydrophilus piceus*. The pioneer vegetation includes abundant Bird's-foot Trefoil *Lotus corniculatus*, on which the national BAP bumblebees *Bombus humilis* forages. Other important invertebrates have also been recorded here. Species information is lacking from the area, with only seven records, three of which are for badger. The others include bluebell and three butterfly records.

3.4 Site Location and Surrounds:

The site is located in Essex, Tilbury and is surrounded by arable fields in the immediate local. Table 3 details the commuting, feeding and habitat features in a 1km radius of the site.

Table 3: Habitat features suitable for bat use

Feature	Description
Water course	The river Thames is located approx. 600m to the south of the site. There are many agricultural drainage ditches within the surrounds.
Water bodies	A large pond is located to the west of the site, approx. 100m from the boundary
Woodland	No true woodland is located within 2km of the site, however small area of scrubby woodland is found scattered across the landscape.
Linear e.g. hedgerows	Defunct agricultural hedges are found scattered across the landscape in all directions.
Pasture/arable/grassland	The dominant land-use in the area is arable with grazed fields to the north.
Other	A railway line runs east/west to the north of the site.

3.5 Transects

The following section details transects reference, bats located, evidence located and observed activity (see Figure 2 transect routes and activity).

Transect reference - T1 and T2

3.6 Observations

Table 5: Results and observations of the surveyors located around the building, tree or structure.

Surveyor	Transect	Dates and Times and survey type	Bat Activity Observed
Team A - Martin O'Connor and Tanya Dickson	1 (6 stopping points)	29/04/2019 20.00 to 22.30 SS: 20.18	No activity
Team B - Tanya O'Connor and Jake O'Connor	2 (five stopping points)	As above	No activity
Team A	1 (6 stopping points)	25/06/2019 21.05 to 23.05 SS: 21.20	A single noctule (Nyc) <i>Nyctalus noctula</i> heard and seen at 21.52, flying overhead. Common pipistrelle (CP) <i>Pipistrellus pipistrellus</i> heard and seen at 21.55 and 21.58, flying in from a field opposite and then up the rail-track. Soprano pipistrelle heard at 22.04 and 22.17 along the woodland edge.
Team B	2 (five stopping points)	As above	No activity over the main field at any point, a single CP heard along the rail track at 22.13.
Team A	1 (6 stopping points)	13/08/2019 20.26 to 22.26 SS: 20.35	CP and SP heard twice at 21.04 and 21.42 along the railway line.
Team B	2 (five stopping points)	As above	CP heard distantly along the woodland edge.

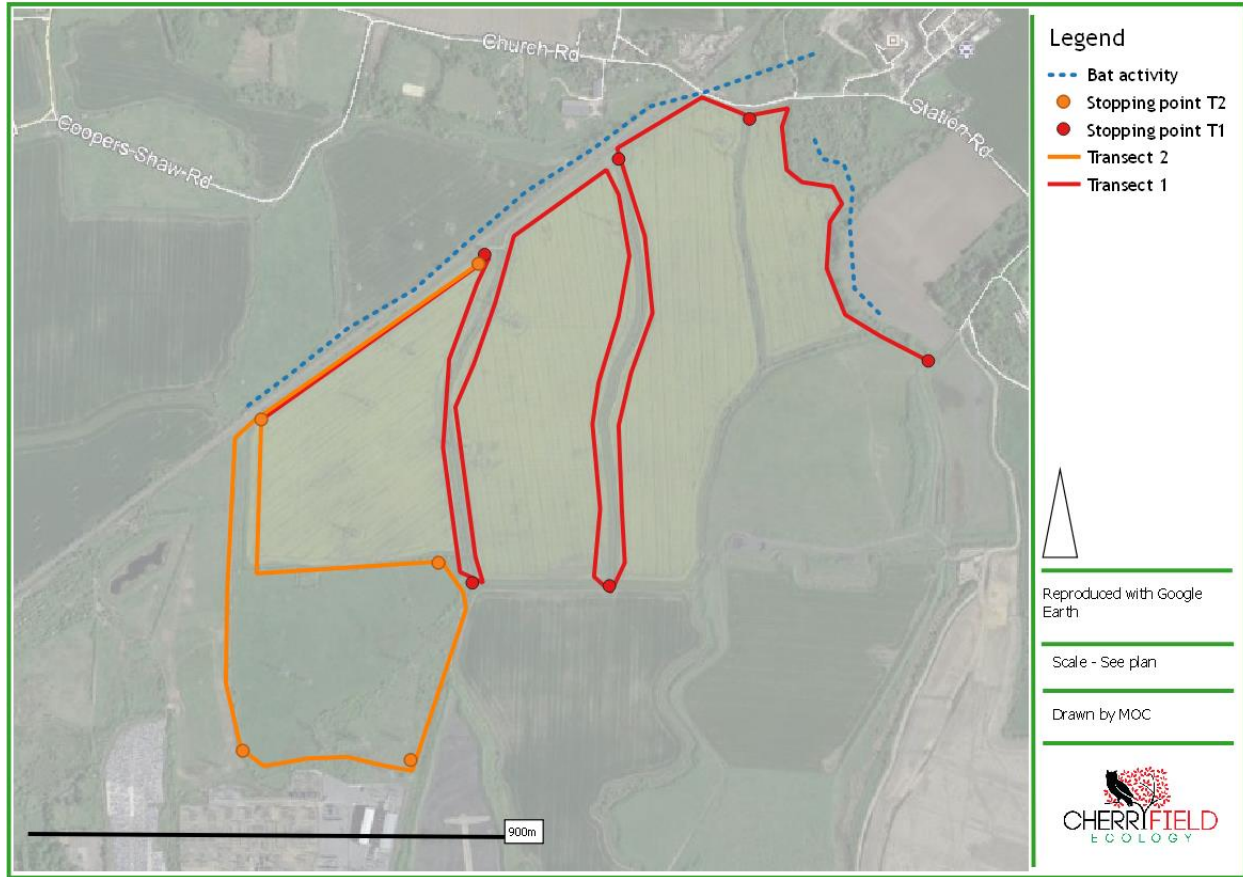


Figure 2: Transect and bat activity

4.0 Conclusions, Discussion and Recommendations

The following section details the conclusions, discussion and recommendations in the context of the proposed works.

Transect references - T1 to T3

4.1 Conclusion and Discussion

The whole site is poorly utilized by bats, with three of the most common species found to be present, these being common and soprano pipistrelle and noctule. These species have been found using the railway line mostly and woodland edge habitat occasionally. The bats are utilizing these areas for occasional foraging, and commuting and it is highly likely that roosts will be found some distance from the site. The arable and improved grassland is not used to any extent and the bats actively avoid flying over these areas. On the whole the site is considered to be poor for both activity and foraging behavior.

4.2 Potential Impact

Impact assessments must be proportionate to the scale of the development (CIEEM, 2018) and the following details a proportionate impact assessment based on current information -

Table 5: Impact assessment

Impact	None foreseen.
Characterisation of unmitigated impact on the feature	n/a
Effect without mitigation	n/a
Mitigation/enhancement	See table 6.
Significance of effects of residual impacts (after mitigation)	n/a


4.3 Recommendations

- No further survey considered necessary.

4.4 Recommendations and/or Enhancement

The following table details the recommended enhancement, allowing the LPA to meet its net gain duty for biodiversity.

Table 6: Enhancement

Work	Specification
<p>Enhancement</p>	<p>Bat boxes will be installed, there are trees that can be used for this purpose, these will be no less than 3m above ground level and away from any neighbouring ledge to prevent local cats predated on bats using the boxes.</p> <p>A minimum of ten Schweglar 1FF or similar boxes (see Figure 3) will be hung on the trees at a minimum of 3m from ground level and face south/southwesterly. These boxes are known to be used by crevice and void dwelling species.</p> <div data-bbox="797 730 1049 1039" data-label="Image">  </div> <p data-bbox="732 1041 1117 1073">Figure 3: Schweglar 1FF bat box</p> <p>Commuting bats maybe using the grounds and surrounds - therefore any tree, hedges or linear feature should be retained were possible.</p>
<p>Lighting</p>	<p>Any lighting near or shining onto any trees, especially those with bat boxes in or commuting routes shown to be present at further survey stage should be designed to minimize the impact it has on potential bat roosting and commuting.</p> <p>Lighting should be in-line with the BCT lighting guidelines (Bats and Lighting in the UK (Bat conservation trust, 2018) https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/)</p> <p>This lighting should be of low level, be on downward deflectors and ideally be on PIR sensors. Using LED directional lighting can also be a way of minimizing the light spill affecting the habitat. No up-lighting should be used.</p> <p>This will ensure that the roosting and commuting resources that the bats are likely to be using is maintained.</p>

5.0 References

Collins, J. (ed), (2016), Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd Edition, BCT, London Mitchell-Jones, A. J. (2004), Bat Mitigation Guidelines. English Nature.

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MAGIC, (2017): Magic maps, EPS licences and designated sites, online <http://www.magic.gov.uk/Login.aspx?ReturnUrl=%2fMagicMap.aspx>, accessed as report date.

Mitchell-Jones, A.J. (2004), Bat Mitigation Guidelines, English Nature, Peterborough National Planning Policy Framework, 2012 <http://www.communities.gov.uk/publications/planningandbuilding/nppf>

Office of the Deputy Prime Minister (2005). Circular 06/2005: Biodiversity and Geological Conservation. Para.99 <http://www.communities.gov.uk/documents/planningandbuilding/pdf/147570.pdf>

Records: Essex Environmental Records Centre (2019).

5. Great Crested Newt Surveys



Tilbury Energy Centre

Great Crested Newt Surveys



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1	07/09/2018	William Taylor	Tamsin Clark	Updated based on final masterplans to support PEIR and to reduce impact and recommendations section as this is covered in the PEIR
2	17/10/2018	Tim Bradford	Chris Meddins	Update following comments from client
3	26/11/2018	Chris Meddins	-	Updated based on RWE final comments following stop on project
4	03/06/2019	Chris Meddins	-	Updated based on RWE final comments from April 2019

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Figure 3 – Lower Thames Crossing GCN Results Data

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Appendices

Appendix A – Port of Tilbury eDNA Survey Results from 2016 / 2017

Appendix B – Great Crested Newt Survey Map, WYG 2009

Appendix C – Proposed Mitigation Area from 2008 (WYG 2008^b)

Appendix D – Great Crested Newt Survey, WYG 2009

Appendix E – Waterbody Location Map, WYG 2010

Appendix F – Waterbodies Surveyed for GCN, WYG 2015

Appendix G – Raw Survey Data

Appendix H – Photographs of Waterbodies

Appendix I – Results from 2018 Bioscan GCN Survey



Executive Summary

Contents	Summary
<p>Site Location</p>	<p>The location of the proposed Tilbury Energy Centre (TEC) is at the Former Tilbury Power Station site in Tilbury, Thurrock, south Essex. The centre of the survey area is at Ordnance Survey Grid Reference TQ 67347 76541.</p>
<p>Proposals</p>	<p>The proposed TEC development will comprise the following main elements; up to 3 units / 2600MW of Combined Cycle Gas Turbine (CCGT) Power Plant, 1 Open Cycle Gas Turbine (OCGT) Power plant of up to 299MW, up to 100MW of flexible energy storage (e.g. batteries) and a 3 km gas pipeline which at present the route has not been determined between a southern and northern route. Space will also be allocated on site to allow installation of carbon capture plant in the future which will be subject to a separate planning application.</p>
<p>Existing Site Information</p>	<p>Multi-species survey reports including great crested newt (GCN) <i>Triturus cristatus</i> surveys, are available for the TEC, spanning the period 2007-2018. The following reports are those that specifically refer to surveys for GCN or their habitat:</p> <ul style="list-style-type: none"> • Tilbury Energy Centre Ecological Appraisal WYG 2018^a • Tilbury Energy Centre Great Crested Newt eDNA Analysis WYG 2018^b • Ecology Surveys (Demolition Area and Land within RWE Holdings) WYG 2015 • Great Crested Newt Survey (Gas Pipeline Study Area). WYG Environment, 2010^a • Great Crested Newt Survey (Tilbury Power Station Site). WYG Environment, 2009^a. • Great Crested Newt Survey (Potential Construction Laydown Areas). WYG Environment, 2009^b • Great Crested Newt Survey (Water Bodies near Lytag Brownfield/Tilbury Centre). WYG Environment, 2008^a • Great Crested Newt Mitigation Plan (Tilbury Power Station). WYG Environment, 2008^b • Reptile and Great Crested Newt Survey (Tilbury Power Station site). Ecological Sustainability Ltd, 2007
<p>Scope of this Survey(s)</p>	<p>A GCN survey was recommended by the most recent Ecological Appraisal (EA) (WYG 2018) the scope of the works included the following components:</p> <ul style="list-style-type: none"> • Determine if GCN are present or likely absent from the TEC and a 0.5 km buffer using a combination of conventional and eDNA survey techniques; • Estimate the population size class of GCN in any waterbodies with recorded presence; and



	<ul style="list-style-type: none"> • Identify if any additional surveys are required and provide preliminary assessment of the importance of the site for GCN and potential impacts of the TEC.
<p>Results</p>	<ul style="list-style-type: none"> • Survey results from Port of Tilbury (Port of Tilbury, 2017) were used to inform the assessment for the western area of the TEC. The results showed that GCN were likely to be absent from this area. • There were twenty-seven ponds within the survey area with potential to support breeding populations of GCN. Following a field visit, five of these were scoped out as being unsuitable, leaving 22 ponds recommended for further survey. • HSI assessments were undertaken on 22 of the waterbodies, with results varying from below average to excellent habitat for GCN. The waterbodies were also surveyed for presence / likely absence using conventional or eDNA surveys, including Waterbody 2 which was surveyed using both methods. • Surveys confirmed the presence of GCN within 10 of the waterbodies. GCN were considered likely to be absent from 12 of the waterbodies, including three waterbodies which could not be surveyed due to steep banks, but for which existing data indicated that GCN were unlikely to be present. • In addition, a review of data collected by other ecological consultants collected within the survey area (Bioscan and Lower Thames Crossing, report yet to be produced) identified the presence of GCN within a waterbody (P139N) which is within a 0.5 km buffer of the TEC following changes in the boundary. • The waterbodies where GCN presence were confirmed were assessed as likely to comprise three separate populations (Population A, B and C, see Figure 4). Population A consisted of nine waterbodies (Waterbodies 3 – 11) to the north of the northern pipeline (Work Area 11) at Low Street Pit. Population B consisted of a single waterbody (Waterbody 1), which lies to the south of the northern pipeline (Work Area 11). Population C consists of a single waterbody (P139N) to west of the southern pipeline route (Work Area 10). • Mitigation will be required to avoid the proposed development causing habitat loss and degradation, fragmentation, injury / harm to GCN and disturbance along the northern and southern pipeline routes. The extent of the impacts will depend upon the final proposals and also on which pipeline route is selected.
<p>Recommendations</p>	<p>Without appropriate mitigation, there are likely to be adverse effects on GCN through loss of habitat, killing and injury, and habitat fragmentation during the construction phase.</p> <p>Further detail with reference mitigation, compensation and enhancement will be provided within the Environmental Statement (ES) following ongoing discussions with statutory bodies.</p>



Glossary

CCGT	Combined Cycle Gas Turbine
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology & Environmental Management
EcoW	Ecological Clerk of Works
eDNA	Environmental Deoxyribonucleic Acid (survey technique used to detect the presence of GCN)
EFC	Essex Field Club
EPS	European Protected Species
EWT	Essex Wildlife Trust
GCN	Great Crested Newt
Habitats Regulations	Conservation of Habitats and Species Regulations 2017
HAP	Habitat Action Plan
HIS	Habitat Suitability Index
LBAP	Local Biodiversity Action Plan
LERC	Local Ecological Record Centre
LWS	Local Wildlife Site
NE	Natural England
NERC Act	Natural Environment and Rural Communities Act 2006
NPPF	National Planning Policy Framework
OCGT	Open Cycle Gas Turbine
PIER	Preliminary Environmental Information Report
PFA	Pulverised Fly Ash
PINS	Planning Inspectorate
SAP	Species Action Plan
SMP	Species Management Plan
SPI	Species of Principal Importance
TEC	Tilbury Energy Centre
W&CA	Wildlife & Countryside Act 1981 (as amended)



1.0 Introduction

1.1 Background

WYG was commissioned by RWE in April 2018 to undertake a Great Crested Newt (GCN) *Triturus cristatus* survey of the proposed development known as Tilbury Energy Centre hereafter referred to as the TEC. The TEC lies between the town of Tilbury, and East Tilbury in Essex. The survey was undertaken to identify potential ecological constraints of the TEC with regards to GCN. This follows the completion of an Ecological Appraisal (EA) in May 2017 (WYG 2018^a) which identified potential habitat for GCN.

This report was prepared by William Taylor, Principal Ecologist.

1.2 TEC Location

The location of the proposed TEC is at the Former Tilbury Power Station in Tilbury, Thurrock, South Essex. The TEC is centred at Ordnance Survey National Grid Reference TQ 67347 76541.

The Indicative Order Limits (red line in Figure 1) defines the area within which the TEC development is proposed. The TEC includes the Former Tilbury A Power Station, the Former Coal Stock Yard, the Substation, Ashfields, the (now mainly defunct) Goshems Farm LWS and DHL land (refer to Figure 2 for the location of these areas). A recent revision of the TEC includes a connection along Station Road to the Asda supermarket roundabout. This area has not been considered as part of any WYG survey; but given that it follows the existing road, this area has been eliminated from the impact assessment.

Specific Area Names and Working Areas referred to in the report are shown on Figure 2 on Figure 2a respectively.

The survey area (shown on Figure 1) includes the area within a 0.5 km buffer of the TEC, except for an area in the west of the main site, which belongs to Port of Tilbury and is part of the access and sewage connection works for the TEC. In addition areas within 0.5 km to the east and west of the TEC were not included as a result of changes to the TEC boundary post surveys. Habitats within the area surveyed include the areas of Pulverised Fuel Ash (PFA) and disturbed ground associated with the Former Tilbury A Power Station, over which sparse vegetation has grown in some areas (and can be classified as Open Mosaic Habitat on Previously Developed Land), arable and pasture land, drainage ditches and waterbodies and smaller habitat areas including dense scrub, broadleaved woodland and tall ruderal vegetation. The eastern extent of the TEC, the southern pipeline option, lies within 0.1 km of the foreshore, and in close proximity to the Thames Estuary and Marshes SPA and Ramsar, and Mucking Flats and Marshes SSSI.

1.3 Development Proposals

The proposed TEC development comprises the following main elements:

- up to 3 units / 2600 MW of Combined Cycle Gas Turbine (CCGT) Power Plant
- 1 Open Cycle Gas Turbine (OCGT) Power plant of up to 299 MW
- up to 100 MW of flexible energy storage (e.g. batteries)
- a 3 km gas pipeline



The total electrical generating capacity (net generated output) of the TEC is up to 2,899 MW. It is proposed that the station will be once through cooled using water from the Thames Estuary, thus there will be no requirement for cooling towers.

Space will be allocated within the TEC to allow installation of carbon capture plant in the future. Any carbon capture plant will form part of a future planning consent and will be constructed as and when required.

Further detail of the proposed development will be included within Chapter 3: Description of the TEC Development within the Preliminary Environmental Information Report (PEIR) (RWE 2018).

1.4 Purpose of the Report

The aims of the survey work and the subsequent report presented herein were to:

- Determine if GCN are present or likely absent from the site and 0.5 km buffer;
- Estimate the population size class (if possible) of GCN if they are present; and
- Identify if any additional surveys are required and provide preliminary assessment of the importance of the site for GCN and potential impacts of the TEC.

Please note this is a factual report to provide additional information for the PEIR (RWE 2018) and subsequently the Environmental Statement (ES). Further detail with reference mitigation, compensation and enhancement will be provided within the ES following ongoing discussions with statutory bodies.

Note that scientific names are provided at the first mention of each species and common names (where appropriate) are then used throughout the rest of the report for ease of reading.



2.0 Methodology

2.1 Desk Study

2.1.1 Previous Survey Reports

Previous survey reports relating to GCN within the survey area were reviewed. Where these were available they were provided by the applicant or viewed on the Local Planning Authority (LPA) website. The following reports relating to TEC and immediate environs were consulted:

- Tilbury Energy Centre Ecological Appraisal WYG 2018^a
- Tilbury Energy Centre Great Crested Newt eDNA Analysis WYG 2018^b
- Ecology Surveys (Demolition Area and Land within RWE Holdings) WYG 2015
- Great Crested Newt Survey (Gas Pipeline Study Area). WYG Environment, 2010^a
- Great Crested Newt Survey (Tilbury Power Station Site). WYG Environment, 2009^a.
- Great Crested Newt Survey (Potential Construction Laydown Areas). WYG Environment, 2009^b
- Great Crested Newt Survey (Water Bodies near Lytag Brownfield/Tilbury Centre). WYG Environment, 2008^a
- Great Crested Newt Mitigation Plan (Tilbury Power Station). WYG Environment, 2008^b
- Reptile and Great Crested Newt Survey (Tilbury Power Station site). Ecological Sustainability Ltd, 2007

Historic reptile surveys within the survey area were also used to assist in the assessment of terrestrial habitat because where GCN are present in terrestrial habitat, they will use refugia such as reptile mats for shelter. The following reptile reports were reviewed for incidental GCN sightings:

- Reptile Survey Tilbury Energy Centre WYG 2018^c
- Ecology Surveys (Demolition Area and Land within RWE Holdings) WYG 2015
- Reptile Survey (Gas Pipeline Study Area). WYG Environment, 2010^b
- Reptile Survey (Potential Construction Laydown Areas). WYG Environment, 2009^b
- Reptile Survey (Potential Receptor Sites). WYG Environment, 2008^c
- Reptile and Great Crested Newt Survey (Tilbury Power Station site). Ecological Sustainability Ltd, 2007.

In addition to the surveys listed above, data within this report has been complemented by data provided by Arcadis on behalf of the Lower Thames Crossing (Arcadis 2018) and Bioscan on behalf of RWE (Bioscan 2018), both of whom have been undertaking GCN surveys within the survey area.

The WYG eDNA survey (2018^b) has been incorporated in this report to provide a single comprehensive report.

2.2 Habitat Surveys

2.2.1 Pond Assessment

An initial desktop assessment was used to identify waterbodies within the survey area with potential to support GCN. This consisted of a review of an OS map and the reports listed in Section 2.1.1 to determine the location of any potential waterbodies within the survey area.



The field assessment was based on English Nature's *Great Crested Newt Mitigation Guidelines* (2001) and additional guidance within Froglife's *Great Crested Newt Conservation Handbook* (2003) and the Herpetological Conservation Trust's *National Amphibian and Reptile Recording Scheme* (NARRS) (2008). The assessment consisted of a visit by a suitably experienced ecologist to the location of each waterbody during the GCN breeding season (between mid-April and the end of June). Any waterbodies with insufficient water to support breeding GCN were scoped out. If there was sufficient water, the surveyor recorded details of the pond and completed a Habitat Suitability Index (HSI) assessment (further details provided in Section 2.2.2).

The assessments were undertaken by Joshua Stafford (Natural England Class Licence Number 2015-18075-CLS-CLS.) and Tim Bradford (Natural England Class Licence Number 2015-18813—CLS-CLS) between May and June 2017.

2.2.2 Habitat Suitability Index

The HSI provides an objective method for assessing the suitability of a pond as habitat for GCN (Oldham et al., 2000; Herpetological Conservation Trust, 2008). The system provides an index between 0 and 1, with 0 indicating unsuitable habitat and 1 optimal habitat. Ten suitability indices are used to calculate the index score, each representing a factor considered to affect GCN. These factors are listed and briefly explained below:

1. *Location*: i.e. where the pond is located in the British Isles. Lowlands are generally thought to be most suitable; suitability declines with increases in altitude
2. *Pond area*: i.e., the water surface area of a pond. Suitability peaks at approximately 800m²;
3. *Pond drying*: how often a particular pond dries out. Ponds which dry out more frequently are less suitable;
4. *Water quality*: an indication of water quality based on the invertebrate diversity present. High invertebrate diversity indicates high water quality and suitability;
5. *Shade*: an estimate of the total shaded perimeter of a pond. Shoreline shade below 60% is optimal;
6. *Fowl*: indication of impact by waterfowl. High waterfowl numbers are generally considered detrimental;
7. *Fish*: indication of fish abundance. High fish numbers are generally considered detrimental;
8. *Pond count*: based on the density of ponds occurring within 1km of a particular pond. Suitability is positively correlated with pond density;
9. *Terrestrial habitat*: based on the availability of suitable habitat in the pond vicinity, e.g. rough grassland, scrub and woodland. For this assessment, the categories provided in the NARRS Survey Pack (Herpetological Conservation Trust, 2008) were used. This differs from the assessment criteria by Oldham et al. (2000), and is based on work by Lee Brady (unpublished); and
10. *Macrophytes*: based on an estimate of the percentage cover by emergent and aquatic vegetation. Suitability peaks at between 70% and 80% cover.

The results are also compared against a categorical scale developed by Lee Brady (ARG 2010). Results from individual water bodies are categorised as follows:



- <0.5 = poor
- 0.5 – 0.59 = below average
- 0.6 – 0.69 = average
- 0.7 – 0.79 = good
- >0.8 = excellent

2.3 Environmental DNA Analysis

2.3.1 Sample Collection

Environmental DNA (eDNA) samples were collected from 10 waterbodies following Natural England's accepted protocol (Biggs *et al.*, 2014). Samples were collected on the 25th of May and 21st of June 2017 by Josh Stafford (Natural England Class Licence Number 2015-18075-CLS-CLS.) and Tim Bradford (Natural England Class Licence Number 2015-18813—CLS-CLS) and sent to Fera Science Ltd for analysis.

A total of 20 water samples were taken from each waterbody, to form the basis of the DNA sample. The samples were taken using a sterile ladle and emptied into a sterile self-supporting Whirl-Pak bag. These samples were taken from locations around the margin of both ponds which could be utilised by GCN for egg laying or displaying. Once all 20 samples were collected the sterile self-supporting bag was shaken to mix any DNA across the whole sample. A sterile plastic pipette was used to transfer approximately 15 ml of the mixed pond sample water into a sterile conical tube. This was undertaken for each of the six sterile conical tubes in the kits. Each sterile conical tube contained 35 ml of ethanol to preserve any DNA within the samples. The box of six sterile conical tubes were returned the following day at ambient air temperature to the FERA eDNA testing service for laboratory analysis.

2.3.2 eDNA Analysis

FERA eDNA testing service analysed the samples and provided the following text to describe the laboratory analysis methodology:

'The method detects pond occupancy from great crested newts (GCN) using traces of DNA shed into the pond environment (eDNA). The detection of GCN eDNA is carried out using real time PCR to amplify part of the cytochrome 1 gene found in mitochondrial DNA. The method followed is detailed in Biggs et al, (2014).

2.4 Presence / Likely Absence Surveys and Population Surveys

Conventional survey methods consisting of torch surveys, eggs searching, netting and bottle trapping were used to determine presence / likely absence of GCN within 16 waterbodies (Waterbodies 1 – 16, Figure 1) within the survey area. Although the eDNA results for Waterbody 2 had been negative, its close proximity to waterbodies which had been known to contain GCN (WYG 2010) suggested that GCN could easily migrate into it, which is why it was added to the scope of additional surveys.

Four initial survey visits were undertaken to determine presence or likely absence. Where presence was confirmed, an additional two visits were made to inform a population size class assessment.

Where possible, surveys were undertaken in accordance with English Nature's Great Crested Newt Mitigation Guidelines (2001). This included completing three of the four recognised survey methods on each visit. A minimum of two of the four surveys were undertaken during the peak period for GCN



activity between mid-April to mid-May, and the remainder were completed by the end of the GCN survey season in mid-June. A description of the recognised survey methods is provided below:

- **Bottle Trapping:** Plastic bottle traps were set around the margins of the waterbodies approximately every 2-3 m where access allowed, shortly before dusk. The traps were left in-situ overnight and checked & removed the following morning before 10 am. All surveys were undertaken when the predicted air temperature exceeded 5 °C, when GCN are most active.
- **Torch Searches:** This technique involves a visual search for individual newts inhabiting each water body. High-powered torches were used to search the waterbodies after nightfall. Pond perimeters were walked taking care to count all the individuals seen. To maximise the reliability of this technique, all torch surveys were conducted on evenings where the air temperature exceeded 5 °C, when newts are generally considered being most active.
- **Egg Searches:** GCN eggs were searched for among submerged, floating and other aquatic vegetation. When laying their eggs, this species folds leaves of aquatic plants around the egg, although dead leaves and a variety of artificial materials are also known to be used. This behaviour is exploited to demonstrate that GCN are breeding in a particular waterbody. However, egg numbers cannot be used to estimate population size due to predation and high mortality rates. Therefore, to limit disturbance, this method is ceased as soon as any eggs have been positively identified in a waterbody.
- **Netting:** A long handled dip net was used to sample the area around the pond edge. The netting was conducted in the evening as better results are obtained at night when adult newts are more likely to be in open water. The perimeter of the pond was walked and 15 minutes of netting was undertaken per 50m of shoreline as recommended in the Great Crested Newt Mitigation Guidelines (2001). Netting is a good technique for augmenting other surveys and gauging presence / likely absence.

The maximum adult count per night per pond as recorded through either a bottle trap survey or a torch survey is the number which is used to inform the population estimate for that pond. Where there is reasonable certainty that there is a regular interchange of animals between ponds (typically within 0.25 km) counts can be summed across ponds (note only where counts observed are made on the same visit). Populations are then classified as follows:

- Small for maximum counts up to 10
- Medium for maximum counts between 11 and 100
- Large for maximum counts over 100

The GCN surveys were conducted between 11th of April 2018 and 5th June 2018 by WYG licensed surveyor, Joshua Stafford (NE class licence registration number: 2015-18075-CLS-CLS). Joshua was supported by a team of experienced ecologists working as accredited agents under his license, including William Taylor, Harriet Baber, Robert Sinclair, Rachel Sore and Remi Kitazono. Surveys were undertaken on dry nights with cool to mild air temperatures. A summary of the weather conditions are detailed in Table 1. The survey effort for each waterbody is shown in Table 2.



Table 1 Survey Dates and Weather Conditions

Visit No.	Waterbodies Surveyed*	Date	Time		Air Temperature (°C)**		Wind Speed (Beaufort Scale)	Precipitation (mm)
			Start	End	Min	Max		
1	1 – 11	11/04/18 – 12/04/18	19:00	09:00	7	8	2	0
2	1 – 14	17/04/18 – 18/04/18	19:00	09:00	11	16	2	0
3	1 – 16	25/04/18 – 26/04/18	19:00	09:00	9	15	2	0
4	1 – 16	03/05/18 – 04/05/18	19:00	09:00	8	18	2	0
5	1, 2, 4, 8 – 10, 12 – 15	08/05/18 – 09/05/18	20:00	08:00	7	12	4	0
6	1, 3 – 16	16/05/18 – 17/05/18	20:00	08:00	11	16	2	0
7	3, 5 – 7, 11, 16	22/05/18 – 23/05/18	20:00	08:00	11	19	4	0
8	6, 7, 11	30/05/18 – 31/05/18	20:00	08:00	14	19	3	0
9	6, 7, 11	04/06/18 – 05/06/18	20:00	08:00	13	15	2	0

*Access limitations meant that it was rarely possible to survey all waterbodies at any one time. This is discussed further in Section 2.5

**Overnight air temperature data from East Tilbury Weather Station (Source: www.timeanddate.com)

Table 2: Survey effort (number of occasions)

WB	Bottle Traps	Torching	Egg Search	Netting
1	6	6	6	0
2	4	4	4	0
3	6	6	6	0
4	6	6	6	0
5	6	6	6	0
6	6	8	1	0
7	5	8	8	1
8	6	6	6	0
9	6	6	6	0
10	6	6	1	0
11	5	8	8	1
12	5	0	5	2
13	5	0	5	2
14	5	0	5	2
15	4	4	4	0
16	4	0	4	1



2.5 Limitations

NE guidance requires surveys of connected and suitable waterbodies within 0.5 km of a site, access restrictions meant surveys could not be undertaken on waterbodies within the Port of Tilbury land (see Figure 2). However, WYG have previously completed surveys of these waterbodies (WYG 2007; 2008) and more recent surveys have been undertaken by Port of Tilbury (2017). References to these results have been used to inform the impact assessment.

Waterbodies 17, 18 and 19 had steep banks, and deep layers of mud at the base which meant that access to the water's edge was dangerous at night, and layers of sediment on the surface would make torch surveys inconclusive. Water samples for eDNA were collected using an extension to the sampling wand. However, the eDNA analysis results for these waterbodies was inconclusive and it was not possible to safely access the waterbodies for conventional survey methods. NE were contacted in January and March 2018 to discuss these known limitations prior to the survey and determine if further work would be necessary, but were unable to answer at the time. These three waterbodies had been surveyed by WYG in 2015 (WYG 2015) when GCN were considered likely to be absent. Surveys between April and June 2018 by Thames Lower Crossing (2018) of Waterbodies 18 and 19 also found no evidence of GCN in these waterbodies. Furthermore HSI results showed that the waterbodies had only average suitability for GCN. Therefore, GCN are considered likely to be absent from Waterbodies 17, 18 and 19.

Where possible, surveys were undertaken in accordance with NE's standing advice (NE, 2015). In situations where this was not possible, efforts were made to ensure that there was sufficient information available to make an informed assessment. Waterbodies 12, 13, 14 and 16 were within secure areas of the Former Tilbury Power Station, which meant that access for torching after 6pm was not possible. However, two of these waterbodies (Waterbodies 12 and 14) had recently been sampled by Bioscan, which meant that the data from these surveys could be used to complement the data collected by WYG. The Bioscan surveys did not include Waterbody 13 and 16. These waterbodies could not be torched due to after-hours access limitations. Additional netting surveys were undertaken for Waterbody 13 however, a single attempt at netting survey of Waterbody 16 was ineffective due to vegetation restricting the ability of the surveyor to effectively utilise the net. Therefore, only two methods were used to survey this waterbody (bottle trapping and egg searches). The survey effort is considered sufficient to have confidence in the context of previous GCN survey and reptile refugia search results which have also found no evidence of GCN within this pond or the immediate vicinity (WYG 2015). The closest GCN record was from a waterbody near the Site Entrance approximately 350m to the west in 2017, however, recent Port of Tilbury (2017) surveys did not find any GCN present

During two of the scheduled visits to Waterbodies 7 and 11, the waterbodies could not be surveyed due to an unexpected scheduling conflict with Arcadis who were surveying the same waterbodies on behalf of Lower Thames Crossing. Therefore, it was not possible to undertake bottle trapping at these waterbodies on these dates and it is possible that any torching results could have been influenced by disturbance caused by the other consultancy. Additional survey effort was used to compensate for the dates where surveys were cancelled or disrupted. Furthermore, survey data from Arcadis on behalf of Lower Thames Crossing (Arcadis 2018) was used to augment the data collected during this survey.

The details of this report are considered to remain valid for a period of two years from the date of the survey commencement date (i.e. until April 2019 for waterbodies surveyed for eDNA and until April 2020 for waterbodies surveyed using conventional methods), subject to no significant changes in land use / management. Beyond this period, if works have not yet been undertaken, it is recommended



that consideration is given to updating the assessment. Note that the recommendations within this report should be reviewed (and reassessed if necessary) upon finalisation of the proposed TEC development.



3.0 Results

3.1 Desk Study

3.1.1 Previous survey reports

Between April and May 2007, Ecological Sustainability carried out GCN presence / likely absence surveys of 30 waterbodies on or adjacent to the Former Tilbury Power Station using conventional survey techniques (bottle trapping, egg searches, torching, and netting). The survey results included a male and female GCN, and a GCN egg, in a ditch east of the Gatehouse (refer to waterbody 12a Appendix A). Further surveys of this ditch were undertaken to make a population size class assessment. The results showed that this ditch had a low population of GCN. The survey found smooth newt were abundant across the survey area, but no further records of GCN. The report suggested that this could be due to the greater susceptibility of GCN larvae to fish predation because many of the waterbodies contained three-spined stickleback (*Gasterosteus aculeatus*) and ten-spined stickleback (*Pungitius pungitius*).

Between April and June 2008 WYG completed HSI assessments of all waterbodies within 0.25 km of the ditch to the east of the Site Entrance (referred to in those reports as the Gatehouse), which had been recorded as a GCN breeding site by Ecological Sustainability, excluding waterbodies which were unsafe to survey (WYG 2008^a). After unsuitable ponds were scoped out, the remaining seven waterbodies were surveyed for presence / likely absence. A single female GCN was recorded in the ditch to the east of the Site Entrance (refer to waterbody 12a, Appendix B). Further surveys were undertaken for a population size class assessment, but no additional records were made. Therefore, the ditch was considered to support a low population of GCN. The survey also reported that the ditch where GCN were recorded was the only one where stickleback fish had not been recorded, which adds further weight to the hypothesis by Ecological Sustainability, that this predatory fish could be a significant factor in affecting the distribution of GCN at this location.

Following the 2008 GCN survey, WYG produced a GCN mitigation plan for the redevelopment of the Former Tilbury Power Station (WYG 2008^b). The report discussed three different approaches to address the GCN breeding site which had been identified in earlier surveys by Ecological Sustainability (2007) and WYG (2008^a). The three approaches included, a 'do-nothing approach', a redesign of the proposed development plan to avoid the GCN population and a translocation of the population to a receptor site. The report concluded that a translocation was the only practical approach and proposed a receptor site at a pond beside the Site Entrance (refer to newt translocation area in Appendix C). Recent eDNA surveys following a change in land ownership have demonstrated that the GCN are no longer present at this location (Port of Tilbury 2017) and therefore no translocation has been required.

In 2009 WYG undertook HSI assessments of all waterbodies within 0.25 km of the construction laydown area (refer to Appendix D), excluding waterbodies which were unsafe to survey. Between May and June seven waterbodies were surveyed for GCN presence / likely absence using conventional survey methods (bottle trapping, torching and egg searches). No GCN were recorded in any of these waterbodies.

Between April and May 2010 WYG undertook HSI assessment, GCN presence / likely absence and population size class assessments (where appropriate) using conventional survey methods (bottle trapping, torching and egg searches) of the what was known as gas pipeline study area, covering the



waterbodies within 0.5 km of the current southern and northern pipelines (Work Areas 10 and 11 respectively) (refer to Appendix E, WYG 2010). GCN were recorded as present in nine waterbodies including a group of eight at Low Street Pit LWS; which lies approximately 100 m north-west of the proposed northern pipeline route and one waterbody 400 m south-east of the closest waterbody at Low Street Pit LWS. The ponds were assessed as a single population. The results of the population class assessment revealed a peak count of 27, which corresponds to a medium sized population.

In 2015 waterbodies within 0.5 km of the demolition boundary were assessed for their suitability to support GCN (refer to Appendix F, WYG 2015). Excluded from the survey were waterbodies to the north of the demolition boundary, which were affected by contamination at the time, and waterbodies to the east of the demolition boundary, which had substantial hardstanding areas preventing connectivity with habitat within the demolition site. Between mid-March and mid-June, the 20 waterbodies within this area were considered suitable for GCN were surveyed for presence / likely absence and population class assessments (where appropriate) using conventional survey methods (bottle trapping, torching and egg searches). Despite a peak count of over 100 smooth newts, no GCN were recorded in any of the waterbodies surveyed.

eDNA surveys were undertaken between April and June 2016, and April and June 2017 of the seven waterbodies assessed as potentially suitable GCN breeding sites within Port of Tilbury owned land on the western side of the TEC (refer to Appendix A, Port of Tilbury 2017). A waterbody 0.125 km to the north of the Port of Tilbury land was also surveyed because Essex Wildlife Trust had a record of GCN at this location. All waterbodies surveyed had negative results for eDNA, except one which was inconclusive, but later scoped out because it had dried up. The ditch near the Site Entrance (waterbody 12a, Appendix A) where previous surveys had confirmed presence of GCN (Ecological Sustainability 2007, WYG 2008), was amongst those that tested negative. The report concluded that GCN were no longer likely to be present in this waterbody.

In May 2018, Bioscan completed two presence / likely absence survey visits to Waterbodies 12 and 14 (refer to Figure 1). The survey methodology was consistent with those described in the *Great Crested Newt Mitigation Guidelines* (2001). The surveys recorded no evidence of GCN (refer to Appendix I for the results).

In 2018, Arcadis completed presence / likely absence surveys of 14 waterbodies (refer to Figure 1, waterbodies 1, 2, 3, 5, 6, 7, 10, 13, 18, 19, 22, 23, P139, P195) within the survey area. The survey methodology was consistent with those described in the *Great Crested Newt Mitigation Guidelines* (2001). The results are presented in Figure 3. Presence was confirmed within Waterbodies 1, 3 and P139. The peak count for population A was 18 and the peak count for population B was 3. Therefore, the population size classes were medium and low, respectively. For the purposes of this report, waterbody P139 will be referred to as 'population C'. Only a single GCN had been recorded at this location and therefore it can be considered a low population size.

Refugia searches (for reptiles) were completed in 2007 by Ecological Sustainability (refer to land within RWE ownership in Appendix F), 2008 by WYG (refer to land within potential receptor sites in Appendix B), 2009 by WYG (potential construction laydown areas, refer to survey area in Appendix D), 2010 by WYG (the gas pipeline study area in Appendix E), 2015 by WYG (land within RWE ownership), and in 2018 by WYG (land within RWE ownership and the gas pipeline study area). No GCN have been recorded under refugia during any of these surveys.



3.1.2 Local Records Centre and Online Resources

A search of a 2 km buffer surrounding the TEC using Natural England’s web-based portal ‘MAGIC’ (magic.defra.gov.uk) revealed a single GCN EPSL application, issued in June 2014 for disturbance to a GCN resting place at a location 1.4 km north of the survey area. A search of the local ecological records centre (LERC), Essex Wildlife Trust (EWT), and Essex Field Club (EFC), found no records of GCN within 0.5 km of the survey area.

3.2 Habitat Surveys

3.2.1 Pond Assessment

Waterbodies within the survey area to the west of the southern pipeline (Work Area 10) have not been included in the assessment because the saline conditions make them unsuitable for GCN. Waterbodies to the west of the survey area were surveyed by Port of Tilbury (Port of Tilbury 2017).

Table 3 provides a brief description of the 27 waterbodies assessed within the survey area in 2017. Photographs of the ponds are provided in Appendix H. Sixteen of the 27 waterbodies were within the TEC, including one in the Former Coal Stock Yard (waterbody 16), one north of the substation (waterbody 17), three intersecting the northern pipeline (waterbodies 18, 19, 27), five intersecting the southern pipeline (waterbodies 15, 23, 24, 25 and 26) and six in the Ashfields (waterbodies 12, 13, 14, 20, 21 and 22); refer to Figure 1. The remaining 11 waterbodies were outside the TEC, but within 0.5 km of the TEC boundary, including one to the south-east of the northern pipeline route, and 10 north-west of the northern pipeline route.

Six of the 27 waterbodies were considered too dry or water levels too low for breeding GCN when they were visited (Waterbodies 20, 22, 23, 25 and 27). As such, five of these were scoped out (Waterbodies 20, 22, 23, and 25), however, further surveys were undertaken on Waterbody 27 because previous surveys had identified it as a GCN breeding pond (WYG 2010).

Table 3 Location, size and description of waterbodies assessed

WB No.	OS grid Reference	Approx. Size (m ²)	Approximate distance and direction from development	Description
1	TQ 67480 77118	200	Approx. 0.12 km SE of northern pipeline corridor (Work Area 11)	A shallow pond (<1m deep) surrounded by mixed native broadleaf tree species and bramble (<i>Rubus fruticosus</i> agg).
2	TQ 67344 77494	515	Approx. 0.12 km SE of northern pipeline corridor (Work Area 11)	A shallow pond (<1m deep) containing a dense stand of <i>Typha sp.</i>
3	TQ 67320 77504	550	Approx. 0.12 km SE of northern pipeline corridor (Work Area 11)	A deep waterbody (>1m deep) surrounded by mixed native broadleaf tree species.
4	TQ 67308 77480	40	Approx. 0.12 km SE of northern pipeline	A shallow waterbody (<1m deep) surrounded by goat willow (<i>Salix caprea</i>).



WB No.	OS grid Reference	Approx. Size (m ²)	Approximate distance and direction from development	Description
			corridor (Work Area 11)	
5	TQ 67288 77471	200	Approx. 0.12 km SE of northern pipeline corridor (Work Area 11)	A shallow waterbody (<1m deep) surrounded by bramble
6	TQ 67264 77464	100	Approx. 0.12 km SE of northern pipeline corridor (Work Area 11)	A shallow waterbody (<1m deep) surrounded by bramble
7	TQ 67233 77487	60	Approx. 0.12 km SE of northern pipeline corridor (Work Area 11)	A deep waterbody with shallow margins, which is surrounded by goat willow.
8	TQ 67237 77443	50	Approx. 0.12 km SE of northern pipeline corridor (Work Area 11)	A deep waterbody (>1m deep) with grassy margins and two goat willow within it.
9	TQ 67227 77443	25	Approx. 0.12 km SE of northern pipeline corridor (Work Area 11)	A small shallow waterbody with grassy margins.
10	TQ 67194 77414	80	Approx. 0.12 km SE of northern pipeline corridor (Work Area 11)	Two small shallow (<1m deep) waterbodies with grassy margins.
11	TQ 67213 77498	617	Approx. 0.12 km SE of northern pipeline corridor (Work Area 11)	A shallow waterbody with grass margins and goat willow.
12	TQ 66545 75824	1,659	Within the Ashfields (between A1 and A2)	A deep ditch (>1m deep) with margins of grass and <i>Typha sp.</i>
13	TQ 66812 75839	10,355	Within the Ashfields (south end of B)	A shallow pond (<1m deep) with margins of grass and <i>Typha sp.</i>
14	TQ 66685 75639	2,250	Within the Ashfields (east side of A1)	A deep ditch (>1m deep) with margins of grass and <i>Typha sp.</i>
15	TQ 68821 76205	1,061	Intersects the southern pipeline corridor (Work Area 10)	A shallow (<1m deep) ditch with margins of mixed broadleaved trees, grass and <i>Typha sp.</i>
16	TQ 66265 75945	1,242	Within the CDM area (Work Area 1)	A shallow (<1m deep) ditch containing <i>Typha sp.</i> with margins of grass.



WB No.	OS grid Reference	Approx. Size (m ²)	Approximate distance and direction from development	Description
17	TQ 66145 76309	213	Parallel with northern boundary of substation	A shallow (<1m deep) ditch containing <i>Typha sp.</i> with margins of grass.
18	TQ 66790 76674	1,896	Intersects with northern pipeline corridor (Work Area 11)	A shallow (<1m deep) ditch containing <i>Typha sp.</i> with margins of grass.
19	TQ 67064 77081	1,691	Intersects with northern pipeline corridor (Work Area 11)	A very shallow (<5cm deep) ditch containing <i>Typha sp.</i> with margins of grass.
20	TQ 66687 75966	1,759	Parallel with northern boundary of Ashfields (between A2/3 and B)	A shallow (<1m deep) ditch containing <i>Typha sp.</i> with margins of grass.
21	TQ 66339 75575	552	Parallel with western boundary of Ashfields (A1)	A deep (>1m deep) ditch, with steep banks, containing <i>Typha sp.</i> with margins of grass.
22	TQ 67307 76409	932	Parallel with western boundary of Goshems Farm LWS	A seasonally dry ditch with very steep banks devoid of vegetation.
23	TQ 67535 76419	1,046	Parallel with eastern boundary of Goshems Farm LWS	A seasonally dry ditch containing <i>Typha sp.</i> with margins of grass.
24	TQ 67741 76273	1,042	Parallel with western boundary of DHL land	A shallow (<1m deep) ditch containing <i>Typha sp.</i> with margins of grass.
25	TQ 68436 76886	1,142	Parallel with eastern boundary of DHL land	A seasonally dry ditch containing <i>Typha sp.</i> with margins of grass and bramble.
26	TQ 68402 76496	967	Parallel with eastern boundary of DHL land	A seasonally dry ditch containing <i>Typha sp.</i> with margins of grass and bramble.
27	TQ 67225 77184	830	Y-shaped ditch running south of Low Pit Street LWS	A seasonally dry ditch surrounded by mixed native broadleaf tree species and bramble.

3.2.2 Habitat Suitability Index (HSI)

HSI's were undertaken on 22 of the 27 waterbodies within the survey area in 2017. The remaining five had been scoped out during the initial pond assessment. The results are summarised in Table 4.



Table 4 Habitat Suitability Index of waterbodies surveyed

WB No.	HSI score	Category
1	0.74	Good
2	0.89	Excellent
3	0.76	Good
4	0.74	Good
5	0.90	Excellent
6	0.83	Excellent
7	0.72	Good
8	0.61	Average
9	0.68	Average
10	0.77	Good
11	0.93	Excellent
12	0.83	Excellent
13	0.58	Below Average
14	0.74	Good
15	0.87	Excellent
16	0.72	Good
17	0.67	Average
18	0.65	Average
19	0.65	Average
20	Scoped out (water level too low)	
21	0.74	Good
22	Scoped out (water level too low)	
23	Scoped out (dry)	
24	0.71	Good
25	Scoped out (dry)	
26	0.58	Below Average
27	Scoped out (dry)	

Results for the HSI were as follows:

- Six waterbodies had 'Excellent' suitability to support GCN.
- Nine waterbodies had 'Good' suitability to support GCN.



- Five waterbodies had 'Average' suitability to support GCN.
- Two waterbodies had 'Below average' suitability to support GCN.
- No waterbodies had 'Poor' suitability to support GCN.
- Five waterbodies were not assessed for HSI because they were either too shallow or dry.

3.3 eDNA Surveys

eDNA surveys were undertaken on 13 of the 27 waterbodies within the survey area (waterbodies 12 – 22, 24, 26).

- Four of the waterbodies (Waterbody 2, 21, 24 and 26) tested negative for GCN eDNA, with GCN considered likely to be absent.
- Inconclusive results were obtained from the remaining nine waterbodies, which is thought to be due to silica sediment present in the samples. Silica is a constituent of pulverized fuel ash which has been stored in an area known as the Ashfields, and is likely to be present in many of the waterbodies.

eDNA results have been incorporated into Table 5.

3.4 Presence / Likely Absence Surveys

Presence / likely absence surveys using conventional survey methods (i.e. a combination of netting, bottling, egg searches and torching) were undertaken on 16 of the 27 waterbodies within the survey area. This included Waterbody 2, which had previously tested negative for GCN eDNA (refer to Section 3.3), but was surveyed a second time because its close proximity to Waterbodies 3-11 which had GCN presence confirmed in a 2010 survey by WYG (WYG 2010). A summary of the results of the presence / likely absence surveys are shown in Table 5.

Results for the presence / likely absence surveys were as follows:

- Ten waterbodies had GCN presence confirmed.
- Nine waterbodies GCN were determined as GCN likely to be absent.
- Three waterbodies had inconclusive eDNA results and were considered unsafe to survey using conventional survey methods.
- As outlined above, five waterbodies were scoped out as unsuitable for GCN due to being dry or too shallow.

GCN were confirmed as being present in 10 of the waterbodies, and likely to be absent from nine. The locations where GCN were found to be present included a group of nine waterbodies (waterbodies 2 – 11) to the north of the northern pipeline corridor (Work Area 11) at Low Street Pit, and one waterbody to the south of the northern pipeline corridor. Despite its close proximity and connectivity to the nine waterbodies where GCN were confirmed as present, no GCN were recorded in Waterbody 2. This confirms the result from the eDNA survey (WYG 2018^b), which concluded that GCN were likely absent from this waterbody. A summary of the combined results from the eDNA and presence / likely for waterbodies 1 - 27 are provided in Table 5. The raw data is provided in Appendix G.



Table 5 GCN Presence / Likely Absence

WB	Presence / Likely Absence	Survey Method
1	Presence	Conventional methods
2	Likely Absence	Conventional methods and eDNA
3	Presence	Conventional methods
4	Presence	Conventional methods
5	Presence	Conventional methods
6	Presence	Conventional methods
7	Presence	Conventional methods
8	Presence	Conventional methods
9	Presence	Conventional methods
10	Presence	Conventional methods
11	Presence	Conventional methods
12*	Likely Absence	Conventional methods
13*	Likely Absence	Conventional methods
14*	Likely Absence	Conventional methods
15*	Likely Absence	Conventional methods
16	Likely Absence	Conventional methods
17*	No Access (steep bank)	
18*	No Access (steep bank)	
19*	No Access (steep bank)	
20*	Scoped out (water level too shallow)	
21	Likely Absence	eDNA
22*	Scoped out (water level too shallow)	
23	Scoped out (dry)	
24	Likely Absence	eDNA
25	Scoped out (dry)	
26	Likely Absence	eDNA
27	Scoped out (dry)	

* Waterbodies which had been surveyed for eDNA where the results were inconclusive.



3.5 Population Class Assessment

The waterbodies where GCN were found to be present were split into two distinct populations. Population A consisted of Waterbody 1 which had a recorded peak count of 13 GCN, which meets the criteria of a moderate population class. Population B consisted of Waterbodies 2 – 11 and had a peak count of 7, which meets the criteria of a low population class. The raw data is provided in Appendix G.

The survey data was complemented with data provided by Lower Thames Crossing (2018). The results from the Lower Thames Crossing surveys were consistent for Populations A and B, which were medium and low populations, respectively. Lower Thames Crossing also recorded GCN in waterbody P139N, which had not been included in the WYG (2018) surveys. The reason it had not been included was that it had been outside the original survey area. However, subsequent to the extension of the TEC boundary at the eastern end of the southern pipeline route in April 2018, the pond now lies within 0.5 km of the TEC (refer to Figure 1). Waterbody P139N was found to have a peak count of one GCN and is therefore classified as a low population. The population has been referred to as Population C within this report.

The population class assessment results are summarised in Table 6. The buffer zones around each population are presented in Figure 4.

Table 6 Population Class Assessments

Group	Waterbodies	Peak Count	Date	Population Class
A	1	13 (bottle trap survey)	17/4 – 18/4	Moderate
B	3-11	7 (bottle trap survey)	11/4 – 12/4	Low
C*	P139N	1 (Torch survey)	20/5	Low

*From survey data provided by Arcadis on behalf of Lower Thames Crossing (Arcadis 2018)



4.0 Legislation

GCNs are afforded protection under the Habitats Regulations and the W&CA which apply to all of its life stages.

It is an offence to:

- Deliberately, intentionally or recklessly kill, injure or take a great crested newt;
- Deliberately, intentionally or recklessly takes or destroys the eggs;
- Possess or control any live or dead specimen or anything derived from a great crested newt;
- Deliberately, intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a great crested newt; and
- Deliberately, intentionally or recklessly disturb a great crested newt while it is occupying a structure or place which it uses for that purpose.



5.0 Discussion

5.1 Potential Impacts to GCN

The combined results of the desk study and the presence/ likely absence surveys show no evidence of GCN breeding ponds within the TEC boundary. However, there is suitable GCN terrestrial habitat within the TEC boundary, which is within 0.5 km of confirmed breeding ponds. This includes Waterbody 1, associated with Population A, which lies approximately 0.1 km to the south of the northern pipeline (Work Area 11) and Waterbodies 3 – 11, associated with Population B, which lie approximately 0.125 km to the north of the proposed northern pipeline (refer to Figure 4). Surveys by Lower Thames Crossing also recorded the presence of GCN in Waterbody 139N associated with Population C located 0.4 km to the west of the eastern end of the southern pipeline (Work Area 10).

Potential impacts to GCN as a result of the TEC construction include:

- Temporary direct loss of habitats- in areas associated with the Pipeline Routes and Gas Connection Area during construction;
- Degradation and disturbance of habitats during construction due to indirect impacts, such as dust, noise and lighting etc and impacts to water quality and quantity;
- Fragmentation (temporary);
- Killing and injury of individuals.

Where the development is likely to require habitat loss or disturbance to suitable GCN habitat within 0.5 km of identified populations, to avoid an offence further mitigation will be required and will be detailed in the ES. This will potentially include application for a European Protected Species Licence (dependent on level of impacts) and/ or mitigation including sensitive clearance techniques, translocation and/ or habitat enhancements to increase the carrying capacity of receptor sites. If impacts are low works could potentially proceed under a Non- licenced Method Statement. In addition, guidance will also be provided in the ES so the TEC follows planning policy to minimise impacts on biodiversity and provide net gains in biodiversity.

A full impact assessment along with the recommendations for mitigation, compensation and ecological enhancements will be included in the ES.



6.0 Summary

Three GCN populations were recorded within 0.5 km of the TEC as summarised below.

- Population A is approximately 0.1 km from the TEC boundary of the northern pipeline (Work Area 11);
- Population B is approximately 0.125 km from the TEC boundary of the northern pipeline (Work Area 11);
- Population C is 0.4 km from the TEC boundary of the southern pipeline (Work Area 10).

Where the development is likely to require habitat loss or disturbance to suitable GCN habitat within 0.5 km of identified populations, to avoid an offence further mitigation will be required and will be detailed in the ES. This will potentially include application for a European Protected Species Licence and/ or mitigation covered under a Non- licenced Method Statement, depending on level of impacts.

A full impact assessment along with the recommendations for mitigation, compensation and ecological enhancements will be included in the ES.



7.0 References

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- Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F (2014) Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford..
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- WYG (2008^a) Great Crested Newt Survey
- WYG (2008^b) Great Crested Newt Mitigation Plan
- WYG (2008^c) Reptile Survey
- WYG (2009^a) Great Crested Newt Survey (Potential Construction Laydown Areas)
- WYG (2009^b) Reptile Survey
- WYG (2010) Great Crested Newt Survey
- WYG (2015) Ecology Surveys
- WYG (2018^a) Ecological Appraisal
- WYG (2018^b) Great Crested Newt eDNA Analysis
- WYG (2018^c) Reptile Survey Report



FIGURES

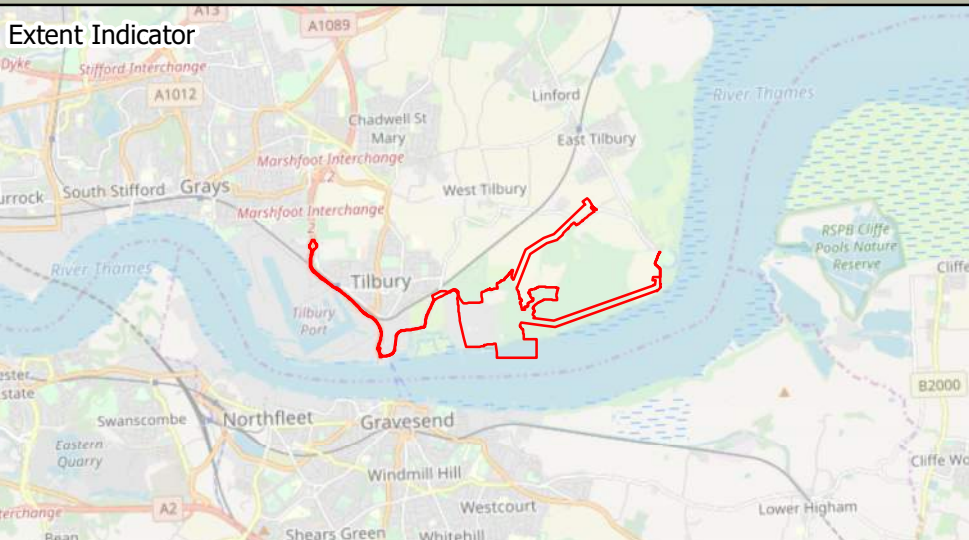
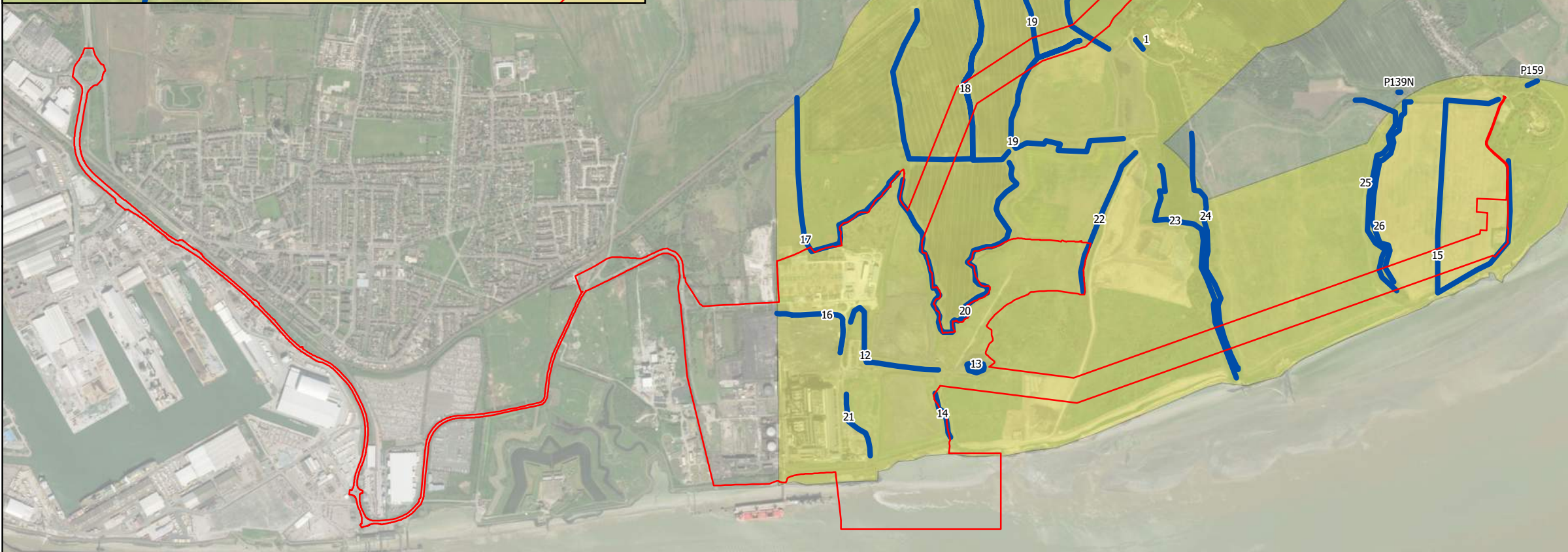
Figure 1 – Site Location and Survey Area

Figure 2 – Tilbury Area Names

Figure 2a – Work Areas

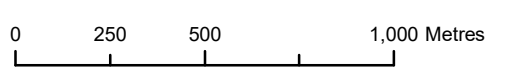
Figure 3 – Lower Thames Crossing GCN Results Data

Figure 4 – Population Class Assessment Results from GCN Surveys



Rev	Date	Notes
A	06/09/18	Initial map production
B	26/10/18	New Order Limits

- Legend**
- Indicative Order Limits
 - Survey area
 - Waterbodies surveyed
 - Waterbodies 2-11

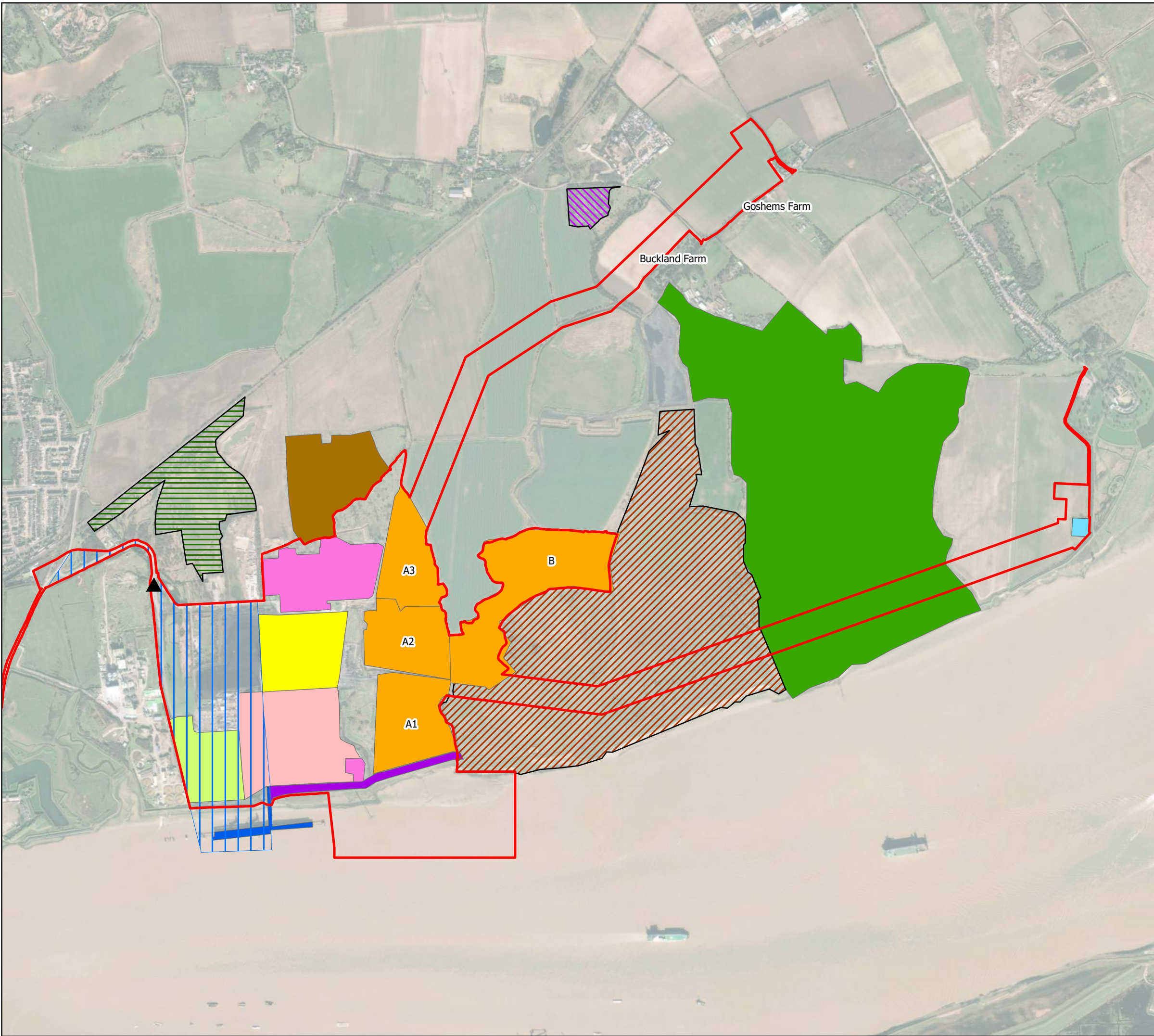


Site Location and Survey Area

**Tilbury Energy Centre
RWE**

Scale at A3: 1:20,000	Project No: A103397	Drawing No: Figure 1	Revision: B
Drawn by: Ben Blowers		Drawn date: 26/10/2018	Approved by: Will Taylor

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Rev	Date	Notes
A	06/09/18	Initial map production
B	26/10/18	New Order Limits

- Indicative Order Limits
- Goshems Farm LWS
- Low Street Pit LWS
- Lytag Brownfield LWS
- Port of Tilbury Land
- Former Tilbury A
- Former Tilbury B station
- Ashfields
- Former Coal Stock Yard
- DHL land
- Above ground installation
- Port of Tilbury jetty
- Sub station
- Tilbury Riverside Project Community Meadow
- Walton Common
- Site entrance

0 100 200 400 Metres

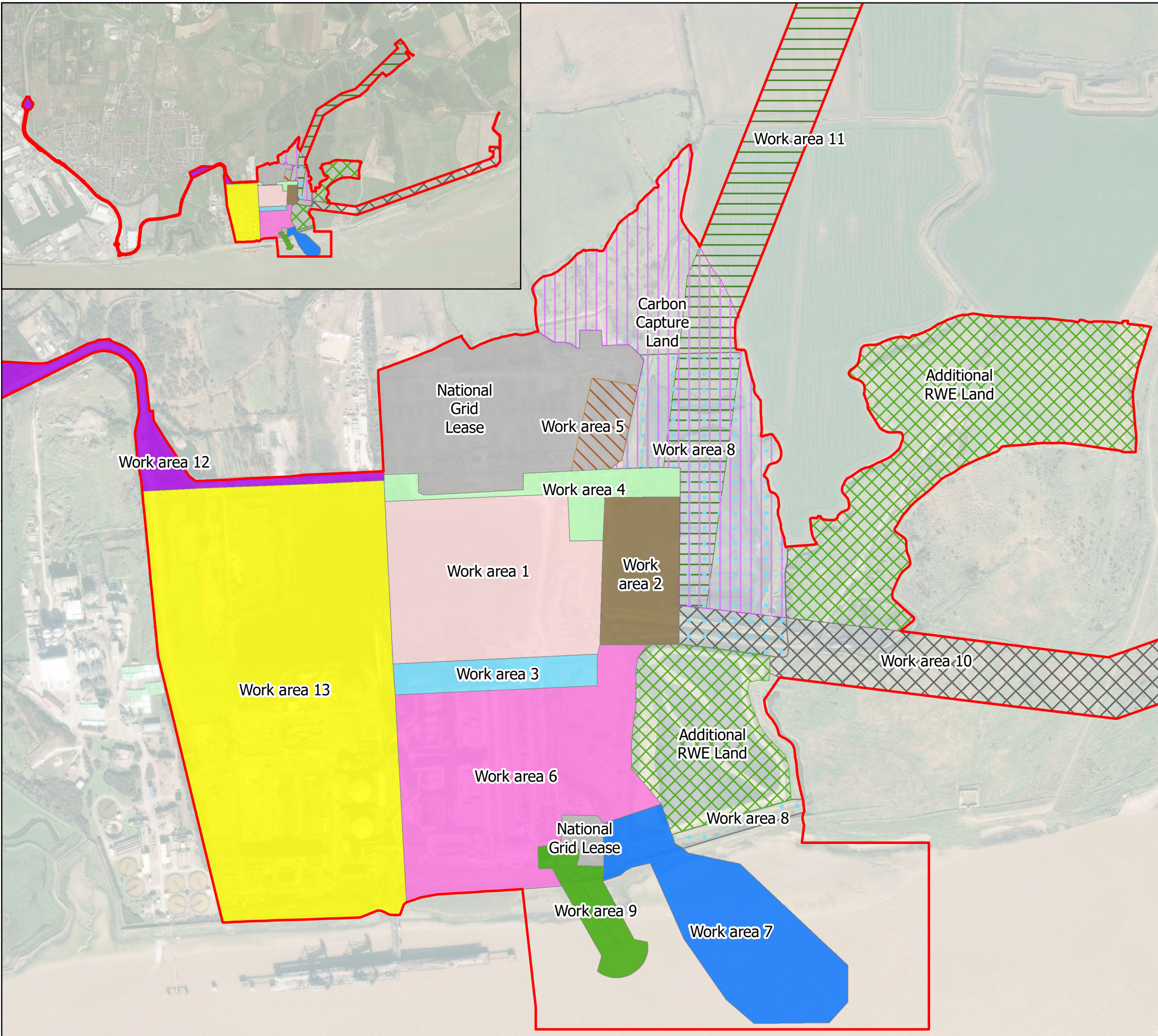


Tilbury Area Names

Tilbury Energy Centre RWE

Scale at A3: 1:13,000	Project No: A103397	Drawing No: Figure 2	Revision: B
Drawn by: Ben Blowers		Drawn date: 26/10/2018	Approved by: Will Taylor

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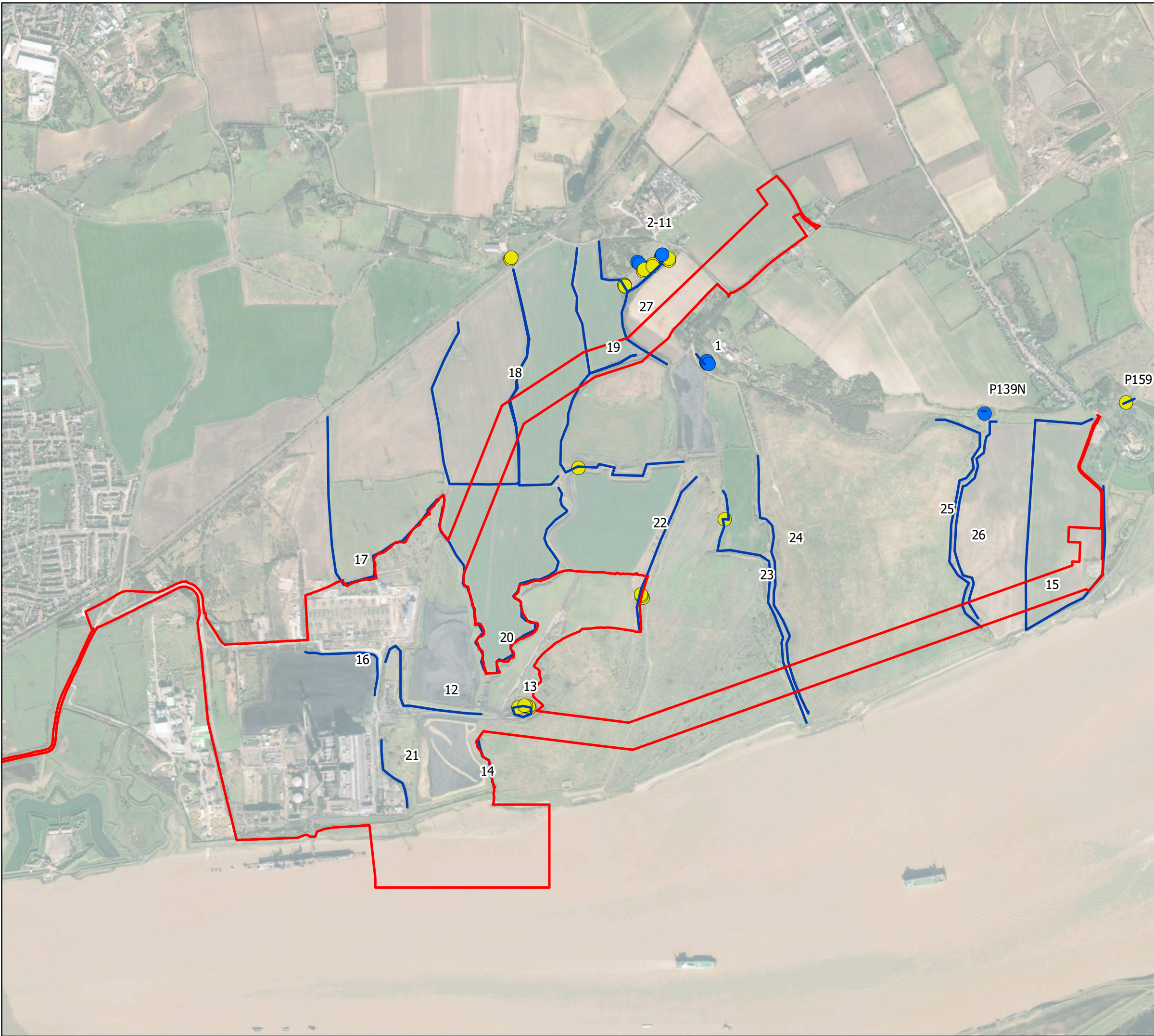
Rev	Date	Notes
A	06/06/19	Initial map production

- Legend**
- Indicative order limits
 - Additional RWE Land
 - Carbon Capture Land
 - National Grid Lease
 - Work area 1
 - Work area 2
 - Work area 3
 - Work area 4
 - Work area 5
 - Work area 6
 - Work area 7
 - Work area 8
 - Work area 9
 - Work area 10
 - Work area 11
 - Work area 12
 - Work area 13



Work Area			
Tilbury Energy Centre RWE			
Scale at A3: 1:6,000	Project No: A103397	Drawing No: Figure 2a	Revision: A
Drawn by: Ben Blowers	Drawn date: 06/06/2019	Approved by: Chris Meddins	

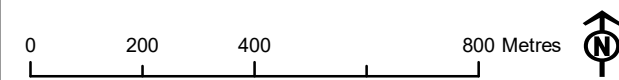
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Rev	Date	Notes
A	06/09/18	Initial map production
B	26/10/18	New Order Limits

Legend

- Indicative Order Limits
- Waterbodies
- Presence
- Absence

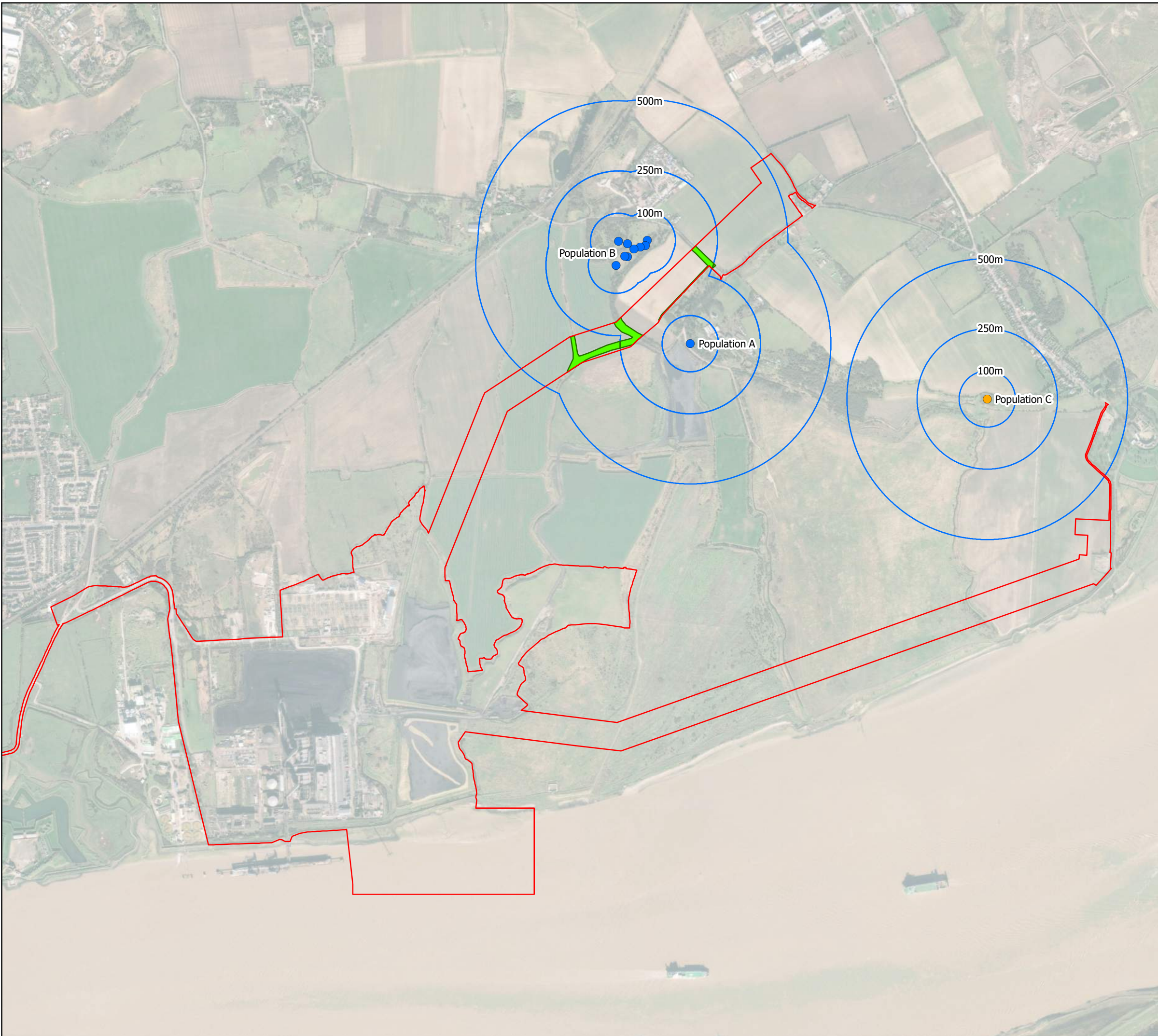


Lower Thames Crossing GCN Results Data

**Tilbury Energy Centre
RWE**

Scale at A3: 1:13,500	Project No: A103397	Drawing No: Figure 3	Revision: B
Drawn by: Ben Blowers		Drawn date: 26/10/2018	Approved by: Will Taylor

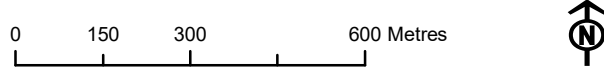
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Rev	Date	Notes
A	06/09/18	Initial map production
B	26/10/18	New Order Limits

Legend

- Indicative Order Limits
- GCN pond buffers
- GCN pond (1, 3-11)
- GCN pond (identified from Lower Thames Crossing data)
- Suitable GCN habitat in order limits within 500 m of breeding ponds (arable field margins)



Population Class Assessment of Great Crested Newts – April - June 2018

Tilbury Energy Centre RWE

Scale at A3: 1:13,000	Project No: A103397	Drawing No: Figure 4	Revision: B
Drawn by: Ben Blowers		Drawn date: 26/10/2018	Approved by: William Taylor

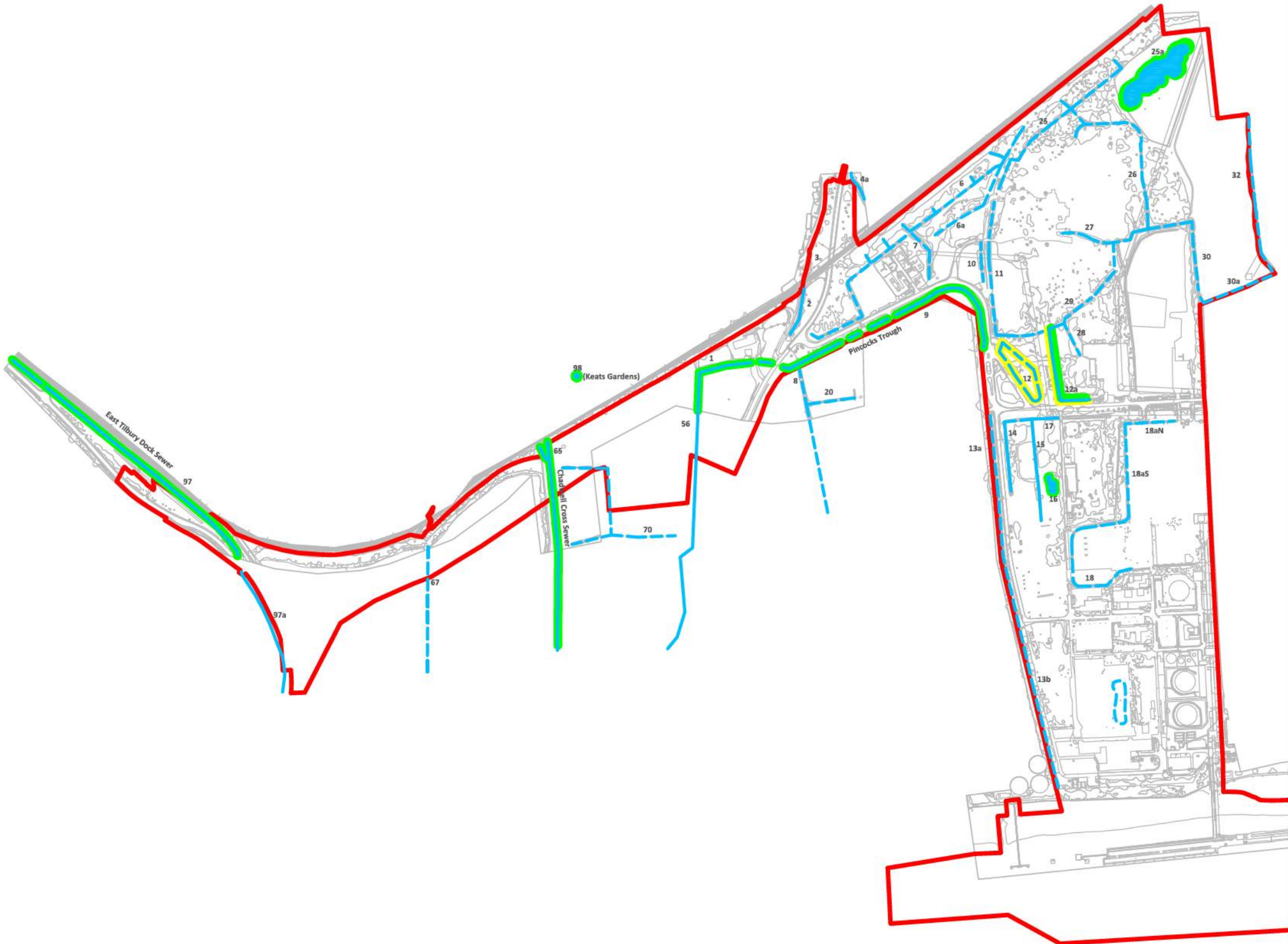
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APPENDICES



Appendix A – Port of Tilbury eDNA Survey Results from 2016 / 2017



- ORDER LIMITS
- - - WATERBODY (WET/DRY)
- WATERBODY SUBJECT TO eDNA ANALYSIS IN 2016 WITH NO POSITIVE RESULTS
- WATERBODY SUBJECT TO eDNA ANALYSIS IN 2017 WITH NO POSITIVE RESULTS



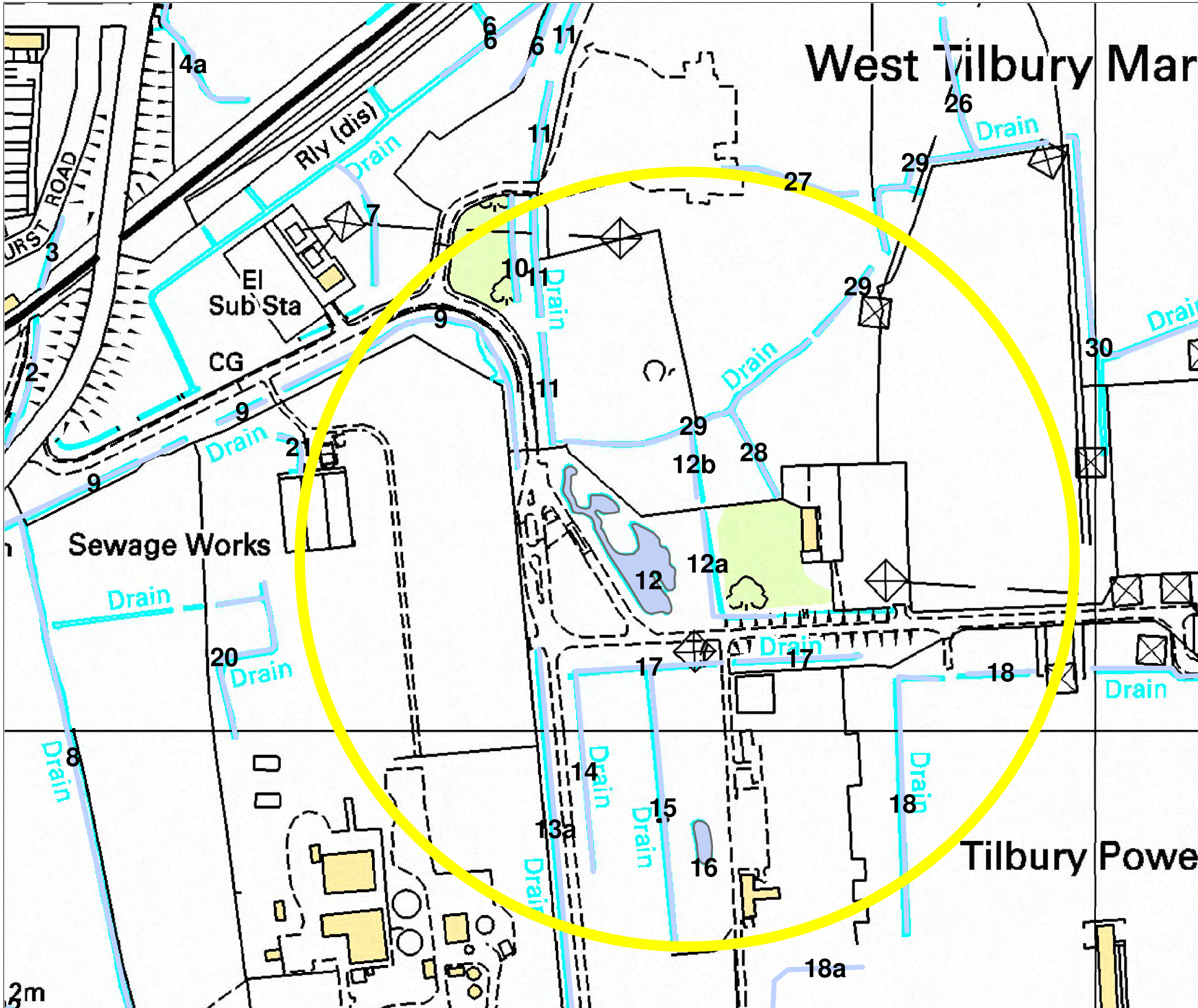
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DRAWING TITLE		
GREAT CRESTED NEWT eDNA ANALYSIS RESULTS		

SCALE	DRAWN	FIG. 10.9
1:7936 @ A3	STM	
DATE	CHECKED	
OCT 2017	DW	








Appendix B – Great Crested Newt Survey Map, WYG 2009



Key

-  Ditches
-  Ponds
-  Extent of survey Apr-Jun 2008



Drawing title:
Great crested newt survey map

Project:
A043998-5 Tilbury Power Station

Client:
RWE npower

Scale (A3): 1:2500	Created by: TJB 24/07/08	Reviewed by: PXJ 24/07/08	Verified by: DJS 24/07/08
-----------------------	--------------------------------	---------------------------------	---------------------------------

Office: 4004	Drawing number: GCN D01	Revision: Rev.01
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 Sunley House,
 4 Bedford Park,
 London CR0 2AP
 Tel: 0208 649 6600
 Fax: 0208 649 6629
 Email: environ.london@wyg.com

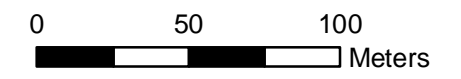
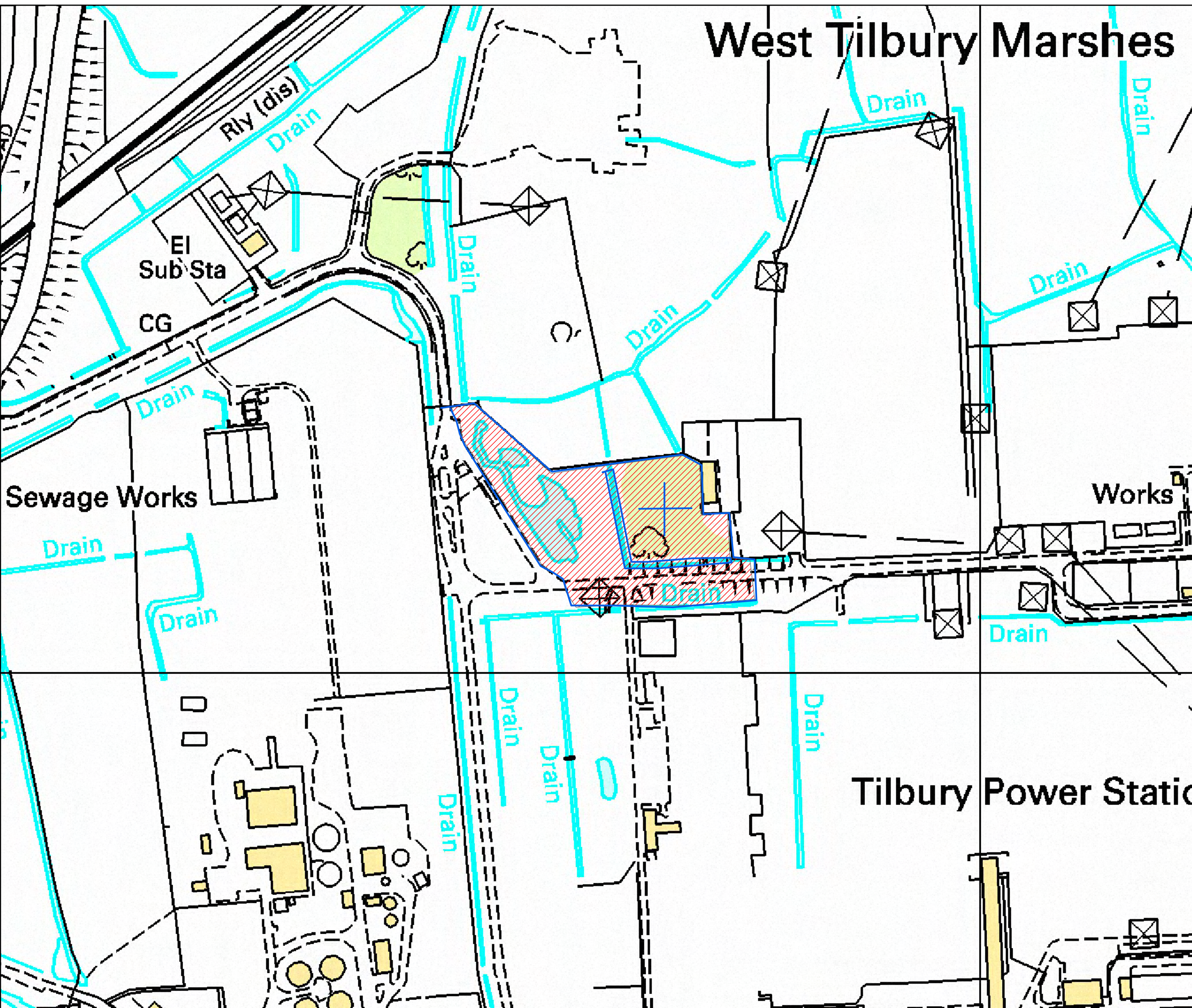


Appendix C – Proposed Mitigation Area from 2008 (WYG 2008^b)

West Tilbury Marshes

Key

-  Newt drift fencing
-  Newt translocation area

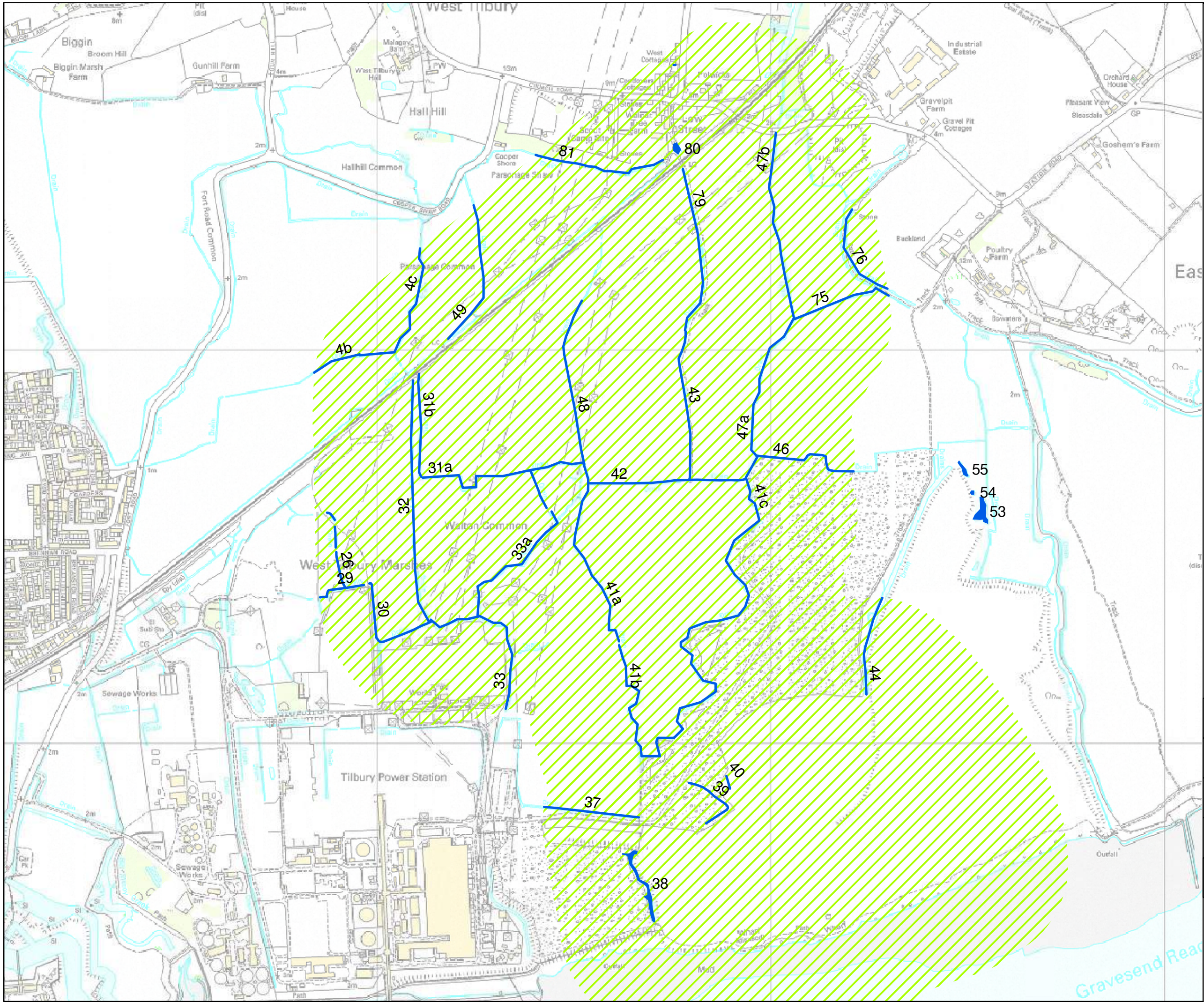


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Project: Tilbury Power Station			
Client: RWE npower			
Scale (A3): 1:2,500	Created by: TJB 25/07/08	Reviewed by: --- -/-/-	Verified by: --- -/-/-
Office: 4004	Drawing number: D01	Revision: Rev.1	

WYG Environment Transport Planning
 Sunley House,
 4 Bedford Park,
 London CR0 2AP
 Tel: 0208 649 6600
 Fax: 0208 649 6629
 Email: environ.london@wyg.com

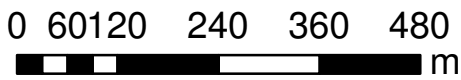


Appendix D – Great Crested Newt Survey, WYG 2009



Legend

- Survey area
- Ditches
- Ponds



Drawing title: Great crested newt survey (2009)			
Project: Tilbury Power Station - Lay down areas			
Client: RWE npower			
Office: 4004	Created by: TJB 06/07/09	Reviewed by: ---	Verified by: CW 15/07/09
Scale (A3): 1:9,000	Drawing number: PLAN 01	Revision: 01	

WYG Environment

Sunley House,
4 Bedford Park,
London CR0 2AP
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Fax: 0208 649 6629
Email: environ.london@wyg.com

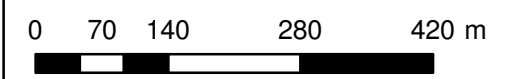


Appendix E – Waterbody Location Map, WYG 2010



Legend

- Waterbody surveyed for great crested newts 2010
- Waterbody not surveyed for great crested newts
- Waterbody surveyed for great crested newts 2009
- Gas Pipeline Study Area



Drawing title:
Waterbody location map

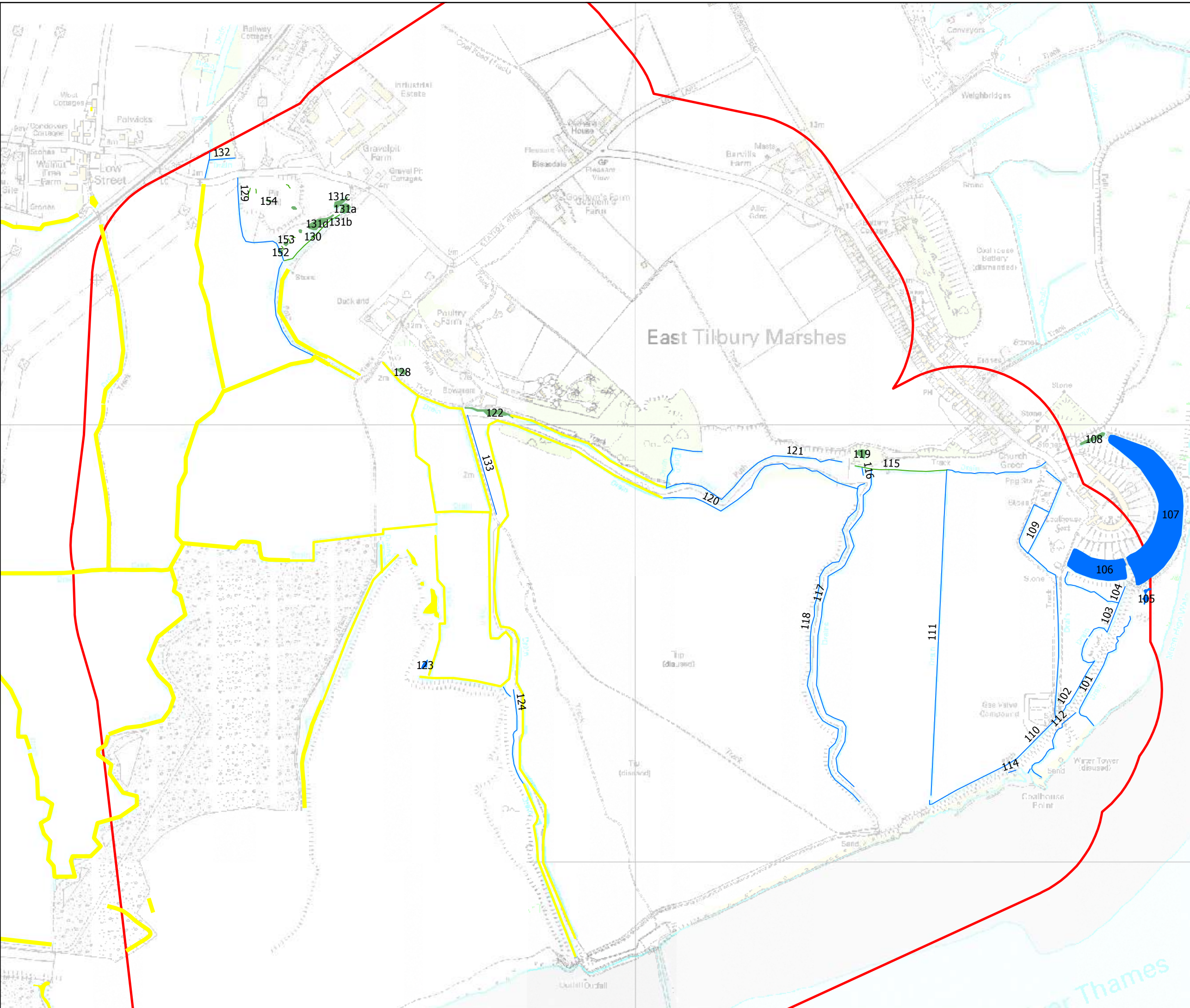
Project:
A063609-5 Tilbury Pipeline Great Crested Newt Survey

Client:
RWE npower

Scale (A3): 1:8000	Created by: TJB 05/07/10	Reviewed by: DJS 05/07/10	Verified by: CW 05/07/10
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Office: 4094	Drawing number: PLAN 01	Revision: Rev.01
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WYG Environment
 100 St. John Street,
 London
 EC1M 4EH
 Tel: 0207 250 7500
 Fax: 0207 250 7501
 Email: ecology.londonsouth@wyg.com

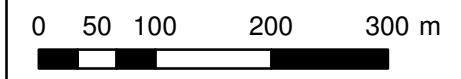


Appendix F – Waterbodies Surveyed for GCN, WYG 2015



Legend

- RWE Ownership Boundary
- Demolition Boundary
- X Bottle Locations
- Dry
- Waterbodies Surveyed
- Polluted



Drawing title:
Waterbodies surveyed for GCN's

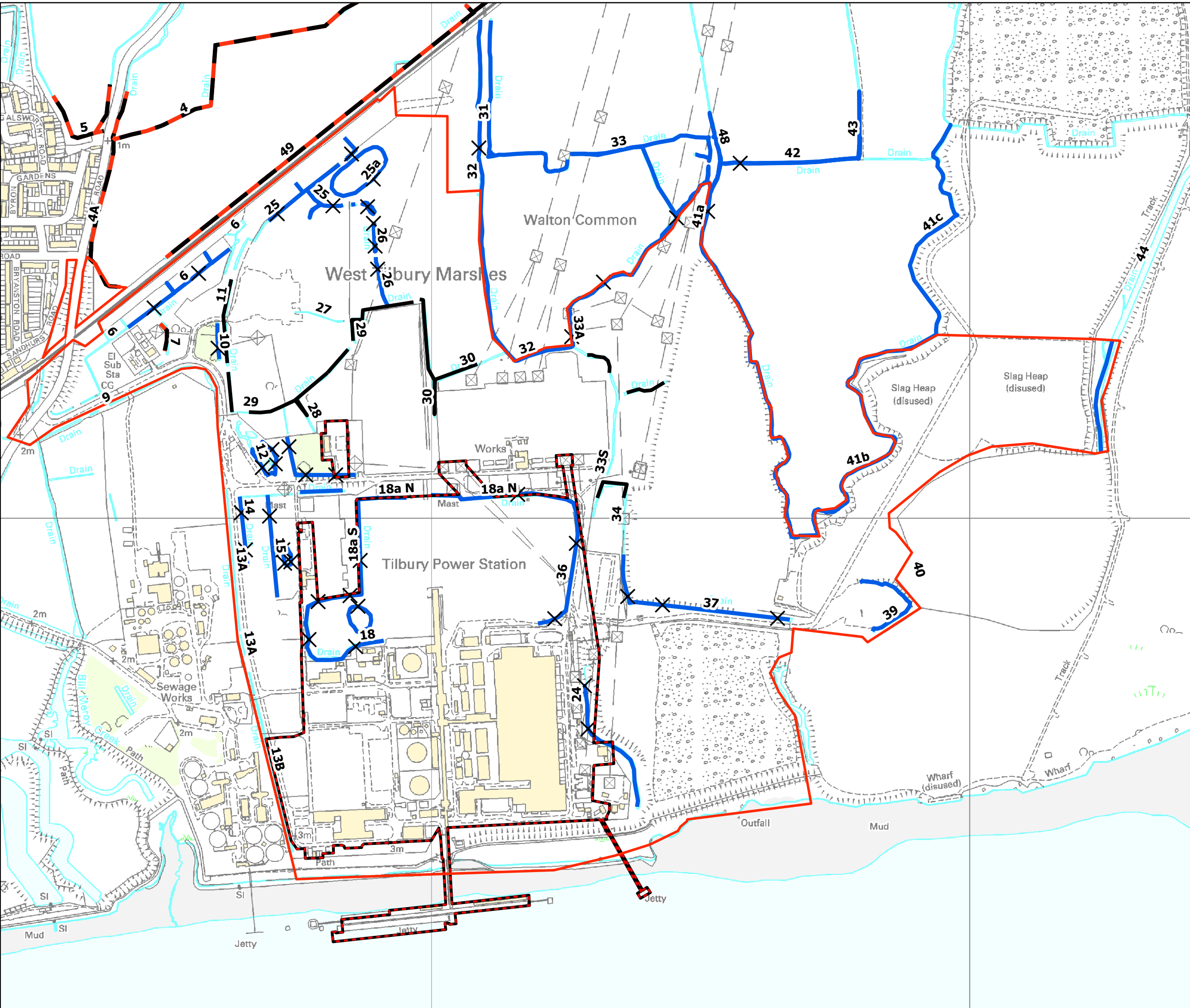
Project:
A088550 Tilbury Powerstation

Client:
RWE nPower

Scale (A3): 1:6,500	Created by: JAS 11/11/15	Reviewed by: DS 11/11/15	Verified by: CW 11/11/15
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Office: 4594	Drawing number: Figure 5.1	Revision: Rev.01
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Appendix G – Raw Survey Data



Table 7 EDNA survey results

Waterbody	eDNA Results
WB 1	Not Sampled - Dry
WB 12	Inconclusive
WB 13	Inconclusive
WB 14	Inconclusive
WB 15	Inconclusive
WB 16	Negative
WB 17	Inconclusive
WB 18	Inconclusive
WB 19	Inconclusive
WB 20	Inconclusive
WB 21	Negative
WB 22	Inconclusive
WB 23	Not Sampled - Dry
WB 24	Negative
WB 25	Not Sampled - Dry
WB 26	Negative



Table 8 Bottle trap survey results

Group	WB	11/4 - 12/4	17/4 - 18/4	25/4 - 26/4	3/5 - 4/5	8/5 - 9/5	16/5 - 17/5	22/5 - 23/5	4/6 - 5/6	Peak Count
A	1	2	13	4	6	3	2	-	-	
A Total		2	13	4	6	3	2	0	-	13
B	2	0	0	0	0	0	-	-	-	
B	3	0	0	0	1	-	0	0	-	
B	4	1	1	0	0	0	0	-	-	
B	5	0	0	0	0	-	0	0	-	
B	6	3	1	0	0	-	0	-	0	
B	7	-	2	0	0	-	0	-	1	
B	8	3	0	1	1	0	1	-	-	
B	9	0	0	0	0	0	0	-	-	
B	10	0	1	0	1	0	0	-	-	
B	11	-	0	0	3	-	0	-	0	
B Total		7	5	1	6	0	1	0	1	7
C	12	-	0	0	0	0	0	-	-	
C	13	-	0	0	0	0	0	-	-	
C	14	-	0	0	0	0	0	-	-	
C	16	-	-	0	0	-	0	0	-	
C Total		0	0	0	0	0	0	0	-	0
D	15	-	-	0	0	0	-	-	-	
D Total		0	0	0	0	0	0	0	-	0



Table 9: Torch survey results

Group	WB	11/4	17/4	25/4	03/5	08/5	16/5	22/5	30/5	4/6	Peak Count
A	1	2	6	4	5	2	4	-	-	-	-
A Total		2	6	4	5	2	4	0	-	-	6
B	2	0	0	0	0	0	-	-	-	-	-
B	3	0	3	0	2	-	0	0	-	-	-
B	4	2	0	0	0	0	0	-	-	-	-
B	5	0	1	0	0	-	0	0	-	-	-
B	6	1	0	2	0	-	0	0	0	0	-
B	7	1	0	0	2	-	0	1	5	0	-
B	8	3	0	1	0	3	0	-	-	-	-
B	9	0	1	1	1	1	0	-	-	-	-
B	10	1	2	0	0	0	1	-	-	-	-
B	11	0	0	1	0	-	0	0	0	0	-
B Total		8	7	5	5	4	1	1	5	0	8
D	15	-	-	0	0	0	-	-	-	-	-
D Total	-	0	0	0	0	0	0	0	-	-	-



Table 10 Netting survey results

Group	WB	26/4	16/5	17/5	5/6	Peak Count
B	7	-	-	-	0	0
B	10	-	-	-	0	0
C	12	-	0	0	-	0
C	13	-	0	0	-	0
C	14	-	0	0	-	0
C	16	0	-	-	-	0



Table 11 Egg search results



WB	Findings
1	None Found
2	None Found
3	None Found
4	None Found
5	None Found
6	Eggs Found (11/4)
7	None Found
8	None Found
9	None Found
10	Eggs Found (11/4)
11	None Found
12	None Found
13	None Found
14	None Found
15	None Found
16	None Found



Appendix H – Photographs of Waterbodies





Table 12: Photographs of waterbodies

WB No.	Date Taken	Photograph
1	8/6/2018	
2	8/6/2018	



Tilbury Energy Centre: Great Crested Newt Survey



WB No.	Date Taken	Photograph
3	8/6/2018	
4	8/6/2018	



Tilbury Energy Centre: Great Crested Newt Survey



WB No.	Date Taken	Photograph
5	8/6/2018	 A photograph showing a narrow, shallow stream flowing through a dense thicket of green trees and bushes. The water is clear and reflects the surrounding foliage.
6	8/6/2018	 A photograph of a stream flowing through a field of tall, green reeds. The water is dark and reflects the sky. The background shows a line of trees under a blue sky with some clouds.



Tilbury Energy Centre: Great Crested Newt Survey



WB No.	Date Taken	Photograph
7	8/6/2018	
8	8/6/2018	

Tilbury Energy Centre: Great Crested Newt Survey



WB No.	Date Taken	Photograph
9	8/6/2018	 A photograph showing a dense field of tall, green grasses with some purple flowers, likely a meadow or wetland area.
10	8/6/2018	 A photograph of a small, dark pond or stream surrounded by tall green grasses and bushes, situated in a field.
11		Not taken



Tilbury Energy Centre: Great Crested Newt Survey



WB No.	Date Taken	Photograph
12	31/5/2018	A photograph showing a narrow, shallow water channel or ditch cutting through a lush green field. The water is slightly rippled, and the surrounding vegetation is dense and tall.
13	31/5/2018	A photograph of a wide, shallow water body, possibly a pond or a large ditch, with a gravel or dirt path leading towards it. The background shows a flat, open landscape with some distant trees under a clear sky.
14	31/5/2018	A photograph of a water channel or ditch enclosed by a wire fence with wooden posts. The water is calm, and the surrounding area is covered in green grass and some reeds.

Tilbury Energy Centre: Great Crested Newt Survey



WB No.	Date Taken	Photograph
15	31/5/2018	 A photograph showing a small, dark pond surrounded by dense green foliage. Two Great Crested Newts are visible in the water, one near the center and one near the bottom left.
16	31/5/2018	 A photograph showing a field of tall, green grasses and reeds, likely a natural habitat for Great Crested Newts.



Appendix I – Results from 2018 Bioscan GCN Survey



Table 13 Results from 2018 Bioscan Survey for waterbody 12

Pond reference (e.g. "Pond 1") - enter in box below:						Torch			Bottle-trap			Net			Egg search	Larvae
North ditch ('Ditch A') TQ 66520 75830						Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
No. of survey visits to this pond: 2						Clulite CB2			90							
Sex/life stage:						Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Water temp	Veg cover	Turbidity		0	0	0	0	0	0				no	no
14/05/2018	10	15	3	4	Adult totals:	0			0							
(2) Date:	Air temp	Water temp	Veg cover	Turbidity		0	0	0	0	0	0				no	no
15/05/2018	5.9	9	3	4	Adult totals:	0			0							

Comments and constraints: 1000+/- Brackish water prawn *Palaemonetes varians* and some brackish water shrimp *Gammarus duebeni* in bottle traps along with 90+/- 3-spine stickleback *Gasterosteus aculeatus*. Low numbers of other invertebrates.

Table 14 Results from 2018 Bioscan Survey for waterbody 14

Pond reference (e.g. "Pond 1") - enter in box below:						Torch			Bottle-trap			Net			Egg search	Larvae
East ditch ('Ditch B') TQ 66676 75647						Torch power:			No. of traps used in pond:						eggs found?	larvae found? (any method)
No. of survey visits to this pond: 2						Clulite CB2			120							
Sex/life stage:						Male	Female	Imm.	Male	Female	Imm.	Male	Female	Imm.		
(1) Date:	Air temp	Water temp	Veg cover	Turbidity		0	0	0	0	0	0				no	no
14/05/2018	10	15	1	5	Adult totals:	0			0							
(2) Date:	Air temp	Water temp	Veg cover	Turbidity		0	0	0	0	0	0				no	no
15/05/2018	5.9	9	1	5	Adult totals:	0			0							

Comments and constraints: High numbers of invertebrate in bottle traps with Diving beetle *Dytiscus sp.* dominant, possibly *Dytiscus dimidiatus* found mostly, larval and adult stages.

6. Winter Bird Surveys



Tilbury Energy Centre

Winter Bird Surveys



RWE Generation UK Plc

June 2019

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Executive Summary

Contents	Summary
Site Location	The location of the proposed Tilbury Energy Centre (TEC) is at the Former Tilbury Power Station site in Tilbury, Thurrock, south Essex. The centre of the survey area is at Ordnance Survey Grid Reference TQ 67347 76541.
Proposals	The proposed TEC development will comprise the following main elements; up to 3 units / 2600MW of Combined Cycle Gas Turbine (CCGT) Power Plant, 1 Open Cycle Gas Turbine (OCGT) Power plant of up to 299MW, up to 100MW of flexible energy storage (e.g. batteries) and a 3 km gas pipeline which at present the route has not been determined between a southern and northern route. Space will also be allocated on site to allow installation of carbon capture plant in the future which will be subject to a separate planning application.
Existing Site Information	Multi-species survey reports are available for the TEC, spanning the period 2007-2015.
Scope of this Survey(s)	<p>The scope of this survey is to:</p> <ul style="list-style-type: none"> • Outline the legislative protection given to wintering birds; • Detail existing bird records and locally designated sites of relevance to wintering birds; • Summarise the findings of the winter bird surveys and report on the presence or otherwise of winter bird species on and around the TEC; and • Inform an assessment of the potential ecological constraints to the proposed works and potential impacts of the TEC development as part of the EIA and HRA process.
Results	<p>The peak counts of Ramsar/SPA qualifying bird species were generally higher with increased proximity to the Thames Estuary and Marshes SPA/Ramsar. The highest counts were associated with avocet, black-tailed godwit and dunlin.</p> <p>The highest peak counts of non-Ramsar/SPA qualifying species include black-headed gull, curlew and teal. The highest peak counts generally mirrored that of the SPA/Ramsar qualifying bird species, in that numbers generally increased towards the SPA/Ramsar.</p> <p>No high-tide winter roosts were recorded within the TEC. Birds qualifying as Ramsar/SPA species and additional wetland birds were found to be confined to the immediate foreshore line during high tide.</p>
Recommendations	Further detail with reference mitigation, compensation and enhancement will be provided within the Environmental Statement (ES) and Habitat Regulations Assessment (HRA) following ongoing discussions with statutory bodies.



Glossary

BoCC	Bird(s) of Conservation Concern
BTO	British Trust for Ornithology
CCGT	Combined Cycle Gas Turbine
CIEEM	Chartered Institute of Ecology & Environmental Management
CRoW Act	Countryside and Rights of Way Act 2000
EFC	Essex Field Club
EIA	Environmental Impact Assessment
Habitat Regulations	Conservation of Habitats and Species Regulations 2017
HAP	Habitat Action Plan
HPI	Habitat(s) of Principal Importance
HRA	Habitats Regulations Assessment
JNCC	Join Nature Conservancy Council
LERC	Local Ecological Record Centre
LBAP	Local Biodiversity Action Plan
LNR	Local Nature Reserve
LPA	Local Planning Authority
LWS	Local Wildlife Site
MCIEEM	Member of Chartered Institute of Ecology & Environmental Management
Natura 2000 site	A European site designated for its nature conservation value
NE	Natural England
NERC Act	Natural Environment and Rural Communities Act 2006
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
OCGT	Open Cycle Gas Turbine
PEIR	Preliminary Environmental Information Report
PFA	Pulverised Fly Ash
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SAP	Species Action Plan
SNCO	Statutory Nature Conservation Organisations
SPA	Special Protection Area
SPI	Species of Principal Importance
SSSI	Site(s) of Special Scientific Interest
TEC	Tilbury Energy Centre
W&CA	Wildlife & Countryside Act 1981 (as amended)
WeBS	The Wetland Bird Survey



1.0 Introduction

1.1 Background

WYG was commissioned by RWE in April 2017 to undertake winter bird surveys of the proposed development known as Tilbury Energy Centre hereafter referred to as the TEC. The TEC lies between the town of Tilbury, and East Tilbury in Essex. The survey was undertaken to identify potential ecological constraints of the TEC with regards to wintering birds. This follows the completion of an EA site visit in May 2017 (WYG 2018) and previous survey data identifying potential habitat for wintering birds.

This report has been prepared by WYG Consultant Ecologist Marc Anderton BSc (Hons) MSc who is an experienced ornithologist.

1.2 Site Location

The location of the proposed TEC is at the Former Tilbury Power Station in Tilbury, Thurrock, South Essex. The TEC is centred at Ordnance Survey National Grid Reference TQ 67347 76541.

The Indicative Order Limits (red line in Figure 1) define the TEC and area within which development is proposed. The TEC includes the Former Tilbury A Power Station, the Former Coal Stock Yard, the Substation, Ashfields, the (now mainly defunct) Goshems Farm LWS and DHL land (refer to Figure 2 for the location of these areas). A recent revision of the TEC includes a connection along Station Road to the Asda supermarket roundabout. This area has not been considered as part of any WYG survey; but given that it follows the existing road, this area has been eliminated from the impact assessment.

Specific Area Names and Working Areas referred to in the report are shown on Figure 2 on Figure 2a respectively.

The survey area (shown on Figure 1) indicates the land within the TEC and the land that has been assessed as the zone of influence i.e. an area over which wintering birds may be subject to significant effects as a result of the proposed project and associated activities. Habitats within the area surveyed include the areas of Pulverised Fuel Ash (PFA) and disturbed ground associated with the Former Tilbury A Power Station, over which sparse vegetation has grown in some areas (and can be classified as Open Mosaic Habitat on Previously Developed Land), arable and pasture land, drainage ditches and waterbodies and smaller habitat areas including dense scrub, broadleaved woodland, tall ruderal vegetation and saltmarsh and foreshore habitats associated with the Thames Estuary. The eastern extent of the TEC, the southern pipeline option, lies within 0.1 km of the foreshore, and in close proximity to the Thames Estuary and Marshes SPA and Ramsar, and Mucking Flats and Marshes SSSI.

1.3 Development Proposals

The proposed TEC development comprises the following main elements:

- up to 3 units / 2600 MW of Combined Cycle Gas Turbine (CCGT) Power Plant
- 1 Open Cycle Gas Turbine (OCGT) Power plant of up to 299 MW
- up to 100 MW of flexible energy storage (e.g. batteries)
- a 3 km gas pipeline



The total electrical generating capacity (net generated output) of the TEC is up to 2,899 MW. It is proposed that the station will be once through cooled using water from the Thames Estuary, thus there will be no requirement for cooling towers.

Space will be allocated within the TEC to allow installation of carbon capture plant in the future. Any carbon capture plant will form part of a future planning consent and will be constructed as and when required.

Further detail of the proposed development will be included within Chapter 3: Description of the TEC Development within the Preliminary Environmental Information Report (PEIR) (RWE 2018).

1.4 Purpose of the Report

The aims of the survey work and the subsequent report presented here are to:

- Outline the legislative protection given to winter birds;
- Detail existing winter bird records and designated sites of relevance to birds;
- Summarise the findings of the winter bird surveys and report on the presence or otherwise of winter bird species on and around the TEC.

Please note this is a factual report to provide additional information for the PEIR (RWE 2018) and subsequently the Environmental Statement (ES) and Habitats Regulation Assessment (HRA). Further detail with reference mitigation, compensation and enhancement will be provided within the ES and HRA, including Appropriate Assessment, following ongoing discussions with statutory bodies.

Note that scientific names are provided at the first mention of each species and common names (where appropriate) are then used throughout the rest of the report for ease of reading.



2.0 Methodology

2.1 Desk Study

2.1.1 Previous Reports

Multi-species survey reports are available for the survey area, spanning the period 2007-2015. Previous surveys undertaken and relevant to this report include the following:

- WYG (2018) Tilbury Energy Centre – Preliminary Ecological Appraisal
- Lower Thames Crossing Part One Appropriate Assessment (AA) refers to a high tide roost – we have not received this document but report will need to be updated once received. WYG have not found any high tide roosts.
- RPS (February 2008) Intertidal and Terrestrial Waterfowl Survey (Foreshore within RWE ownership, as well as the shoreline to the east).

In addition, bird survey data from the proposed Lower Thames Crossing project has been provided by Arcadis. This data will be analysed and included within the future ecology chapter for the ES.

2.1.2 Local Ecological Records Centre

Information was requested from the Essex Field Club (EFC) in December 2017 for information on protected or notable bird species records within 2 km of the survey area.

The data search covers:

- Legally protected bird species;
- Notable bird species, such as those listed as SPI; and,
- Priority bird species within the Essex LBAP.

2.1.3 Literature and Online Resources

The Birds of Essex by Simon Wood (2007) was utilised to gain an understanding of the baseline bird populations within the county of Essex. In addition, the citation documents for the Thames Estuary and Marshes Ramsar / SPA and Mucking Flats and Marshes SSSI were used to obtain a baseline about populations of birds within these designations. This data was supplemented with more up-to-date counts obtained from the British Trust for Ornithology (BTO) Wetland Bird Survey (WeBS) data taken from Liley (2011).

A search for relevant information was also made on the following websites:

- MAGIC www.magic.gov.uk - DEFRA's interactive, web-based database for statutory designations.

2.2 Field Surveys

Surveys were undertaken on 21 occasions either at high tide or low tide during the winter season between 11th October 2017 and 28th March 2018. In addition, two extra surveys were undertaken in April 2018. Survey effort was increased between January and March (i.e. an additional low tide visit per month) and extended into April 2018 (see Table 1) above the standard methodology (Bibby et al, 2007 & Gilbert et al., 2002) in order to provide a more informative set of results as agreed following



discussions with (Mark Nowers Conservation officer) RSPB on the 29th of March 2018. These extra surveys were considered a priority to monitor the passage bird period particularly in relation to ringed plover *Charadrius hiaticula*, a qualifying species within the Ramsar and SPA, and black-tailed godwit *Limosa limosa islandica* which are on passage a qualifying species within the RAMSAR. Furthermore, two low tide visit and a single high tide visits were undertaken September 2018 (given the September 2017 survey visit wasn't undertaken).

WeBS count data presented in the birds of Essex (Wood, 2007) shows that majority of the peak counts of ring plover occur between September-November as birds transition through. However some will remain as the SPA is also designated for overwintering. For black tailed godwits, there is a build-up of numbers in September but the two highest counts occur in October and November forming a double peak demarcating the point when the native and Icelandic populations arrive. Numbers are then fairly constant over winter and then start declining in March to April as the birds leave the area.

Each low tide visit involved a number of evenly distributed vantage points (conducted by two surveyors) along the foreshore of the Thames Estuary which lies within 0.1 km of the proposed southern pipeline (Work Area 10) within the TEC area (see Figures 1 & 4). For calculating an accurate distribution of winter bird assemblages and aid in the description of the results and species coverage, the foreshore was divided into three relatively even sections with peak counts taken from each section (Section 1-3 as displayed in Figures 5- 12). Section 1 is the demolition area of the Former A and B Station and water intake and outfall area, Section 2 is farmland and Section 3 is the Thames Estuary and Marshes SPA & Ramsar and the Mucking Flats and Marshes SSSI.

Each high tide visit involved walked transects. These transects were divided into two parts, one transect walked in close proximity to the proposed northern pipeline and one adjacent to the proposed southern pipeline and within the TEC area (See Figure 4 for locations).

Surveys provided a comprehensive spatial and temporal coverage of all areas potentially impacted and were undertaken using the standard mapping techniques as detailed in Bibby *et al.* (2007). Registrations of birds, using standard British Trust for Ornithology (BTO) two letter species codes and activity codes (Gilbert *et al.*, 2002), were placed onto an appropriate field map. Surveys were undertaken by Josh Stafford, Marc Anderton, Vivienne Greenough and Luke Verrall using high quality binoculars for most short range viewing and scopes for the more longer range spotting. All surveyors are experienced ornithologists with a minimum of six years professional experience.

In addition, the peak counts of qualifying bird species noted in the SPA / Ramsar designations recorded within the survey area were compared to the population estimates found within the SPA / Ramsar citation documents. Generally, if 1% or more of the total population of the SPA / Ramsar bird assemblage is recorded within the survey area, then the numbers are deemed 'significant'.

Weather conditions encountered during the surveys and tide times are shown in Table 1 below.

Table 1 Weather Conditions

Date:	Survey time	High tide/low tide	Weather conditions
11/10/17	09:22 – 13:22	Low tide = 11:22	16°C; wind = 2: rain = Nil: cloud cover = 80%
12/10/17	07:30 – 09:30	High tide = 08:30	11°C; wind =2: rain = light: cloud cover = 60%



Date:	Survey time	High tide/low tide	Weather conditions
28/11/17 20/11/17	11:29 – 15:29 13:01 - 15:01	Low tide = 13:29 High tide = 14:01	9°C; wind =2: rain = Nil: cloud cover =90% 9°C; wind = 4: rain = Nil: cloud cover = 90%
12/12/17 19/12/17	12:20 – 16:20 12:40 – 14:40	Low tide = 14:20 High tide =13:40	5°C; wind = 2: rain = Nil: cloud cover = 10% 10°C; wind =1: rain =Nil: cloud cover =90%
11/01/18 23/01/18 15/01/18	12:15 – 16:15 08:35 – 12:35 11:06 – 13:06	Low tide = 14:15 Low tide = 10:35 High tide = 12:06	7°C; wind =1: rain = Nil: cloud cover =100% 9°C; wind =3: rain = Nil: cloud cover =100% 9°C; wind = 5: rain = light: cloud cover =100%
07/02/18 23/02/18 16/02/18 21/02/18	09:33 – 13:33 09:22 – 13:22 12:35 – 14:35 15:38 – 17:38 (this month's high tide survey was divided into two visits).	Low tide = 11:33 Low tide = 11:22 High tide = 13:35 High tide = 16:38	1°C; wind = 2: rain = Nil: cloud cover =100% 3°C; wind = 4: rain = Nil: cloud cover = 75% 7°C; wind = 2: rain = Nil: cloud cover = 10% 9°C; wind = 1: rain = Nil: cloud cover = 100%
22/03/18 27/03/18 28/03/18	07:58 – 11:58 14:07 – 18:07 10:28 – 12:28	Low tide = 09:58 Low tide = 16:07 High tide = 11:28	8°C; wind = 4: rain = Nil: cloud cover = 75% 14°C; wind = 2: rain = light: cloud cover = 50% 6°C; wind = Nil: rain = moderate: cloud cover = 100%
09/04/18 17/04/18	11:26 – 15:26 06:42 – 10:42	Low tide = 13:26 Low tide = 08:42	10°C; wind = 2-3: rain = Nil: cloud cover = 100% 13°C; wind = 1: rain = Nil: cloud cover = 50%
25/09/18 27/09/18 1/10/18	12:45 – 14:45 06:59 – 10:59 09:13 – 13:13	High Tide = 14:45 Low Tide = 08:59 Low Tide = 11:13	8°C; wind = 1: rain = Nil: cloud cover = 0% 14°C; wind = 2: rain = Nil: cloud cover = 50% 15°C; wind = 1: rain = Nil: cloud cover = 50%

2.3 Limitations

Most of the bird surveys were carried out in appropriate weather conditions. However, one survey (dated 28th March 2018) was undertaken in moderate rain which is considered as sub-optimal survey conditions; however, this is considered a minor limitation due to the presence of birds recorded during this time (a peak count for skylark was recorded on this day). Access was available across most of the survey area during all survey occasions except for some arable fields. However, these fields could be accurately assessed from the allocated transect routes using binoculars.



A single September 2018 low tide survey was undertaken on the 01/10/18 due to low tide times and surveyor availability. However, given that the survey was undertaken just outside the September window, it is not considered a limitation to the assessment.

The details of this report will remain valid for a period of **two years** from the date of the last survey; hence, the surveys are considered valid until mid-April 2020. Following this date, the validity of this assessment should be reviewed to determine whether further updates are necessary. Note that the recommendations within this report should be reviewed (and reassessed if necessary) upon finalisation of the proposed TEC development.



3.0 Baseline Conditions

3.1 Designated Sites

The following designated sites of nature conservation importance have been identified within 2 km of the survey area (15 km for international sites) with a known bird interest.

Table 2 Designated Sites within 2 km (15 km for international sites) with a bird interest

Designation	Site Name	Distance & Direction	Summary of Features
SPA	Thames Estuary and Marshes	Within 0.1 km of the eastern extent of the southern gas pipeline option	The estuary and adjacent grazing marsh areas support an important assemblage of wintering waterbirds including avocet, hen harrier <i>Circus cyaneus</i> and ringed plover <i>Charadrius hiaticula</i> . The site is also important for ringed plover in the spring and autumn migration periods.
Ramsar	Thames Estuary and Marshes	Within 0.1 km of the eastern extent of the southern gas pipeline option	A complex of brackish, floodplain grazing marsh, ditches, saline lagoons and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterfowl including ringed plover, black-tailed godwit, grey plover <i>Pluvialis squatarola</i> , red knot <i>Calidris canutus</i> , dunlin <i>Calidris alpina</i> and common redshank <i>Tringa totanus</i> . The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.
SSSI	Mucking Flats and Marshes	Within 0.1 km of the eastern extent of the southern gas pipeline option	The mudflats form the largest intertidal feeding area for wintering wildfowl and waders west of Canvey Island on the north bank of the Thames. Ringed plover occur in internationally important numbers, with nationally important populations of shelduck <i>Tadorna tadorna</i> , grey plover, dunlin, black-tailed godwit and redshank. Between the sea wall and mean high water line lie areas of high level saltmarsh, of a type uncommon in Essex.
SSSI	South Thames Estuary and Marshes	1.3 km SE	On the south bank of River Thames, the site supports outstanding numbers of waterfowl with total counts regularly exceeding 20,000. Many species regularly occur in nationally important numbers and some species regularly use the site in internationally important numbers. The breeding bird community is also of particular interest. The diverse habitats within the site support a number of nationally rare and scarce invertebrate species and an assemblage of nationally scarce plants.
LNR	Linford Wood	1.9 km N	The woodland consists of a hedge bank, mixed woodland willow plantation, ditches and open



Designation	Site Name	Distance & Direction	Summary of Features
			area. It is surrounded by arable farmland. The woods provide a habitat for wildlife including tawny owls <i>Strix aluco</i> , great spotted woodpeckers <i>Dendrocopos major</i> and green woodpeckers <i>Picus viridis</i> and is an oasis for migrant birds in spring and autumn.
Ramsar	Medway Estuary and Marshes	10.1 km SE	A complex of rain-fed, brackish, floodplain grazing marsh with ditches, and intertidal saltmarsh and mudflat. These habitats together support internationally important numbers of wintering waterfowl. Rare wetland birds breed in important numbers. The saltmarsh and grazing marsh are of international importance for their diverse assemblages of wetland plants and invertebrates.
SPA	Medway Estuary and Marshes	10.1 km SE	The tidal channels with saltmarsh and grazing marsh support internationally important populations of species over winter and the breeding season including avocet and little tern <i>Sterna albifrons</i> , and migratory species including ringed plover and black-tailed godwit.
Ramsar	Benfleet and Southend Marshes	13.7 km NE	Benfleet and Southend Marshes comprise an extensive series of saltmarshes, mudflats, and grassland which support a diverse flora and fauna, including internationally important numbers of wintering waterfowl.
SPA	Benfleet and Southend Marshes	13.7 km NE	A series of saltmarshes, cockle-shell banks, mudflats and grassland supporting internationally important migratory bird assemblages including ringed plover, dark-bellied Brent goose <i>Branta bernicla bernicla</i> and knot.

3.2 Notable Bird Species

3.2.1 Relevant existing reports

An Intertidal and Terrestrial Waterfowl Survey was undertaken by RPS along the shoreline of the Former A and B Stations for RWE in 2007/2008. RPS recorded 22 species of waterfowl between November – December 2007. The diurnal counts of two species of waterfowl, black-tailed godwit and avocet *Recurvirostra avosetta* during November-December 2007, suggested the survey area to be of national importance for these species. Significant proportions (>5%) of the Thames Estuary and Marshes SPA / Ramsar populations for these two waterfowl species were recorded. In early winter 2007, diurnal counts of three species of waterfowl (black-tailed godwit, avocet & ringed plover) in the study area exceeded 5% of the winter five-year peak mean counts for the Thames Estuary as published by the Wetland Bird Survey (2001/02 – 2005/06). Most waterfowl were spatially distributed by day during November-December in the central and eastern sections of the intertidal study area,



with the higher densities of waterfowl in the eastern half. However, some species (e.g. black-tailed godwit) were present in the western section of the recording area.

3.2.2 Local record centre

7,049 Bird records were provided by EFC, comprising of a total of 184 species all within 2 km of the TEC.

In particular, 40 bird species listed under Schedule 1 Part I and three species listed under Schedule 1 Part II of the W&CA have been recorded within 2 km of the TEC. Additionally, 41 BoCC Red List species and 66 BoCC Amber List species have been recorded within 2 km of the TEC. No records were returned from within the TEC, however a number of results have the same distance and bearing from site, suggesting the records have only been recorded to a 4 figure grid reference, in which case records could come from within the 1 km grid square.

Eleven of these local species appear on both the BoCC Red List and Schedule 1 of the W&CA, namely black redstart *Phoenicurus ochruros*, common scoter *Melanitta nigra*, black-tailed godwit, fieldfare *Turdus pilaris*, greater scaup *Aythya marila*, long-tailed duck *Clangula hyemalis*, merlin *Falco columbarius*, redwing *Turdus iliacus*, roseate tern *Sterna dougallii*, velvet scoter *Melanitta fusca* and whimbrel *Numenius phaeopus*.

3.2.3 Literature and Online Resources

Data on the population within the Thames Estuary and Marshes SPA has been collated by the BTO as part of their WeBS data. The most recent five-year period for the peak mean count for which data is available is 2004/05-2008/09. Five years is taken as a good period to balance out annual fluctuations in the species' populations. The data for the SPA citation species is shown in Table 3 (taken from Lilley 2011)

Table 3 Winter bird numbers on SPA citation and from WeBS data

Species	Number of individuals listed on SPA citation	Number of individuals: Peak mean from WeBS data
Avocet	283	1395
Black-tailed godwit	1699	5311
Dunlin	29646	37251
Grey plover	2593	5673
Knot	4848	42871
Hen harrier	7	0
Redshank	3251	4313
Ringed plover	1324	1186

3.3 Field survey

A total of 28 bird species were recorded during the 2017-18 winter bird surveys carried out between October 2017 and April 2018 and in September 2018. Species recorded have been divided in the sections below. Section 3.4.1 includes birds present within the survey area that are listed under



Article 4.1 & 4.2 of the Directive (79/409/EEC) and are a qualifying species associated with the Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI. Section 3.3.2 shows additional species wintering within the survey area that are not included within the SPA/Ramsar/SSSI.

3.3.1 SPA / Ramsar / SSSI species wintering within the survey area

The Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI bird species recorded wintering within the survey area are listed in Table 4 below.

The Birds of Essex (Wood, 2007) provides an assessment of the species' distribution in the County. The WeBS carried out to inform this publication were undertaken between 2000/01 - 2003/04 for winter birds. Please see the status accounts descriptions as stipulated by Woods (2007) below:

- Abundant: occurs in large numbers in suitable weather and habitat
- Common: occurs regularly or is widely distributed in suitable habitat
- Fairly common: occurs in small numbers in suitable habitat and season
- Locally common: occurs in small numbers but restricted to specific habitats
- Uncommon: occurs annually in small numbers
- Scarce: one or two records each year or restricted to specific habitats
- Rare: occurs less than annually
- Very rare: 6-25 records in the past 30 years
- Accidental/Vagrant: less than six records in the past 30 years

In addition, the peak counts of qualifying birds species noted in the SPA / Ramsar designations recorded within the survey area were compared to the population estimates found within the SPA / Ramsar citation documents. Generally, if 1% or more of the total population of the SPA / Ramsar bird assemblage is recorded within the survey area, then the numbers are deemed 'significant'.

Thames Estuary and Marshes SPA/Ramsar bird species listed within Table 4 have also been given their protected/notable status. Species with additional legal protection (above the normal W&CA legal protection) are those listed under Schedule 1 of the W&CA. Notable species are considered to be those listed under one or more of the following:

- SPI for the conservation of biodiversity in England listed under Section 41 of the Natural Environment and Rural Communities Act 2006;
- Red and Amber species listed under the Birds of Conservation Concern (BoCC) (Eaton *et al* 2016);
- Local Biodiversity Action Plan (Essex) and those listed as Rare, Scarce or Declining in *The Birds of Essex*.

These statuses/conservation lists are detailed in Section 4 of this report with associated potential constraints/opportunities for the proposed development. Table 4 and Table 5 below summarise the notable bird species recorded wintering within the survey area during the survey period.



Table 4 Thames Estuary and Marshes SPA / Ramsar and Mucking Flats and Marshes SSSI bird species recorded wintering/ on passage within the survey area (See Figure 1 and 5-12)

Common Name (BTO code)	Scientific Name	Qualifying species of Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI	Peak Counts per section (Date)	Status (see Section 4.4.2 for full explanation of terms)	Chart showing peak of SPA/Ramsar birds counts per Section	% of existing population estimates for winter birds associated with SPA found within the survey area	% of existing population estimates for passage birds associated with Ramsar found within the survey area	% of existing population estimates for winter birds associated with SPA found within the TEC								
Avocet (AV)	<i>Recurvirostra avosetta</i>	SPA RAMSAR SSSI	S1: 8 (Feb 2018) S2: 10 (Feb 2018) S3: 550 (Sep 2018)	Schedule 1, BoCC Amber List, Increasing summer visitor, locally common passage migrant and winter visitor in Essex.	<table border="1"> <caption>Peak Counts per Section for Avocet</caption> <thead> <tr> <th>Section</th> <th>Peak Count</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>8</td> </tr> <tr> <td>2</td> <td>10</td> </tr> <tr> <td>3</td> <td>550</td> </tr> </tbody> </table>	Section	Peak Count	1	8	2	10	3	550	199%	Unknown	2.8%
Section	Peak Count															
1	8															
2	10															
3	550															



Common Name (BTO code)	Scientific Name	Qualifying species of Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI	Peak Counts per section (Date)	Status (see Section 4.4.2 for full explanation of terms)	Chart showing peak of SPA/Ramsar birds counts per Section	% of existing population estimates for winter birds associated with SPA found within the survey area	% of existing population estimates for passage birds associated with Ramsar found within the survey area	% of existing population estimates for winter birds associated with SPA found within the TEC								
Black-tailed godwit (BW)	<i>Limosa limosa</i>	SPA RAMSAR SSSI	S1: 1 (Oct 2017) S2: 721 (Mar 2018) S3: 220 (March 2018)	BoCC Red List, SPI, Common passage migrant and winter visitor in Essex.	<table border="1"> <caption>Peak Counts for Black-tailed godwit</caption> <thead> <tr> <th>Section</th> <th>Peak Count</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>1</td> </tr> <tr> <td>2</td> <td>721</td> </tr> <tr> <td>3</td> <td>220</td> </tr> </tbody> </table>	Section	Peak Count	1	1	2	721	3	220	55.3%	32.9%	0.05%
Section	Peak Count															
1	1															
2	721															
3	220															
Dunlin (DN)	<i>Calidris alpina</i>	SPA RAMSAR SSSI	S1: 0 S2: 220 (Dec 2017) S3: 2000	BoCC Amber List, Very common passage migrant and winter visitor in Essex.	<table border="1"> <caption>Peak Counts for Dunlin</caption> <thead> <tr> <th>Section</th> <th>Peak Count</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> </tr> <tr> <td>2</td> <td>220</td> </tr> <tr> <td>3</td> <td>2000</td> </tr> </tbody> </table>	Section	Peak Count	1	0	2	220	3	2000	6.7%	Unknown	0%
Section	Peak Count															
1	0															
2	220															
3	2000															



Common Name (BTO code)	Scientific Name	Qualifying species of Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI	Peak Counts per section (Date)	Status (see Section 4.4.2 for full explanation of terms)	Chart showing peak of SPA/Ramsar birds counts per Section	% of existing population estimates for winter birds associated with SPA found within the survey area	% of existing population estimates for passage birds associated with Ramsar found within the survey area	% of existing population estimates for winter birds associated with SPA found within the TEC
			(March 2018)					
Gadwall (GA)	<i>Anas strepera</i>	Not listed as qualifying species but within the Ramsar designation gadwall noted under noteworthy fauna as population levels of national importance.	S1: 20 (Mar 2018) S2: 0 S3: 0	BoCC Amber List, Uncommon resident, increasing passage migrant and winter visitor in Essex.	<p>The chart displays peak counts for Gadwall across three sections. The y-axis is labeled 'Peak Counts' and ranges from 0 to 25. The x-axis is labeled 'Sections' and has categories 1, 2, and 3. A blue bar for section 1 reaches the value of 20. Sections 2 and 3 have no bars, indicating a count of 0.</p>	5.5%	Unknown	5.5%



Common Name (BTO code)	Scientific Name	Qualifying species of Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI	Peak Counts per section (Date)	Status (see Section 4.4.2 for full explanation of terms)	Chart showing peak of SPA/Ramsar birds counts per Section	% of existing population estimates for winter birds associated with SPA found within the survey area	% of existing population estimates for passage birds associated with Ramsar found within the survey area	% of existing population estimates for winter birds associated with SPA found within the TEC								
Grey plover (GV)	<i>Pluvialis squatarola</i>	SPA RAMSAR SSSI	S1: 0 S2: 2 (Dec 2017) S3: 60 (Mar 2018)	BoCC Amber List, common passage migrant and winter visitor in Essex.	<table border="1"> <caption>Peak Counts for Grey plover</caption> <thead> <tr> <th>Section</th> <th>Peak Count</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> </tr> <tr> <td>2</td> <td>2</td> </tr> <tr> <td>3</td> <td>60</td> </tr> </tbody> </table>	Section	Peak Count	1	0	2	2	3	60	2.31%	Unknown	0%
Section	Peak Count															
1	0															
2	2															
3	60															
Common Redshank (RK)	<i>Tringa totanus</i>	Ramsar SSSI	S1: 2 (Sep 2018) S2: 13 (Feb 2018) S3: 100 (Mar 2018)	BoCC Amber List, resident, common passage migrant and winter visitor in Essex.	<table border="1"> <caption>Peak Counts for Common Redshank</caption> <thead> <tr> <th>Section</th> <th>Peak Count</th> </tr> </thead> <tbody> <tr> <td>S1</td> <td>2</td> </tr> <tr> <td>S2</td> <td>13</td> </tr> <tr> <td>S3</td> <td>100</td> </tr> </tbody> </table>	Section	Peak Count	S1	2	S2	13	S3	100	3%	Unknown	0.03%
Section	Peak Count															
S1	2															
S2	13															
S3	100															



Common Name (BTO code)	Scientific Name	Qualifying species of Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI	Peak Counts per section (Date)	Status (see Section 4.4.2 for full explanation of terms)	Chart showing peak of SPA/Ramsar birds counts per Section	% of existing population estimates for winter birds associated with SPA found within the survey area	% of existing population estimates for passage birds associated with Ramsar found within the survey area	% of existing population estimates for winter birds associated with SPA found within the TEC
Red Knot (KN)	<i>Calidris canutus</i>	SPA RAMSAR	None were recorded	BoCC Amber List, Fairly common passage migrant and winter visitor	No birds were recorded within the survey area.	0%	0%	0%
Hen Harrier (HH)		SPA RAMSAR	None were recorded	BoCC Red List, SPI, Fairly common passage migrant and winter visitor	No birds were recorded within the survey area.	0%	0%	0%



Common Name (BTO code)	Scientific Name	Qualifying species of Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI	Peak Counts per section (Date)	Status (see Section 4.4.2 for full explanation of terms)	Chart showing peak of SPA/Ramsar birds counts per Section	% of existing population estimates for winter birds associated with SPA found within the survey area	% of existing population estimates for passage birds associated with Ramsar found within the survey area	% of existing population estimates for winter birds associated with SPA found within the TEC								
Lapwing (L)	<i>Vanellus vanellus</i>	SPA RAMSAR	S1: 4 (Dec 2017) S2: 0 S3: 2 (Jan 2018)	BoCC Red List, SPI, Abundant passage migrant and winter visitor and uncommon resident in Essex.	<table border="1"> <caption>Peak Counts for Lapwing</caption> <thead> <tr> <th>Section</th> <th>Peak Count</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4</td> </tr> <tr> <td>2</td> <td>0</td> </tr> <tr> <td>3</td> <td>2</td> </tr> </tbody> </table>	Section	Peak Count	1	4	2	0	3	2	Population estimates have not been stipulated within the SPA citation.	N/A	Population estimates have not been stipulated within the SPA citation
Section	Peak Count															
1	4															
2	0															
3	2															
Little grebe (LG)	<i>Tachybaptus ruficollis</i>	SPA RAMSAR SSSI	S1: 0 S2: 0 S3: 16 (Nov 2017)	BoCC Green List, Locally common resident, fairly common passage migrant and	<table border="1"> <caption>Peak Counts for Little grebe</caption> <thead> <tr> <th>Section</th> <th>Peak Count</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> </tr> <tr> <td>2</td> <td>0</td> </tr> <tr> <td>3</td> <td>16</td> </tr> </tbody> </table>	Section	Peak Count	1	0	2	0	3	16	Population estimates have not been stipulated within the SPA citation.	29.6%	0%
Section	Peak Count															
1	0															
2	0															
3	16															



Common Name (BTO code)	Scientific Name	Qualifying species of Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI	Peak Counts per section (Date)	Status (see Section 4.4.2 for full explanation of terms)	Chart showing peak of SPA/Ramsar birds counts per Section	% of existing population estimates for winter birds associated with SPA found within the survey area	% of existing population estimates for passage birds associated with Ramsar found within the survey area	% of existing population estimates for winter birds associated with SPA found within the TEC								
				winter visitor.												
Little egret (ET)	<i>Egretta garzetta</i>	RAMSAR	S1: 0 S2: 1 (Sep 2018) S3: 2 (Jan 2018)	BoCC Amber List, common resident, passage migrant and winter visitor.	<table border="1"> <caption>Peak Counts for Little egret</caption> <thead> <tr> <th>Section</th> <th>Peak Count</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> </tr> <tr> <td>2</td> <td>1</td> </tr> <tr> <td>3</td> <td>2</td> </tr> </tbody> </table>	Section	Peak Count	1	0	2	1	3	2	N/A	0%	0%
Section	Peak Count															
1	0															
2	1															
3	2															
Ringed plover (RP)	<i>Charadrius hiaticula</i>	SPA Ramsar SSSI	S1: 0 S2: 23 (Oct 2017)	BoCC Red List, resident, locally common passage migrant and winter	<table border="1"> <caption>Peak Counts for Ringed plover</caption> <thead> <tr> <th>Section</th> <th>Peak Count</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0</td> </tr> <tr> <td>2</td> <td>23</td> </tr> <tr> <td>3</td> <td>60</td> </tr> </tbody> </table>	Section	Peak Count	1	0	2	23	3	60	4.5%	10.1%	0%
Section	Peak Count															
1	0															
2	23															
3	60															



Common Name (BTO code)	Scientific Name	Qualifying species of Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI	Peak Counts per section (Date)	Status (see Section 4.4.2 for full explanation of terms)	Chart showing peak of SPA/Ramsar birds counts per Section	% of existing population estimates for winter birds associated with SPA found within the survey area	% of existing population estimates for passage birds associated with Ramsar found within the survey area	% of existing population estimates for winter birds associated with SPA found within the TEC								
			S3: 60 (Oct 2017)	visitor in Essex.												
Shelduck (SU)	<i>Tadorna tadorna</i>	SSSI	S1: 4 (Oct 2017) S2: 30 (Jan 2018) S3: 30 (Sep 2018)	BoCC Amber List, Locally common resident, common passage migrant and winter visitor in Essex.	<table border="1"> <caption>Peak count data from chart</caption> <thead> <tr> <th>Section</th> <th>Peak Count</th> </tr> </thead> <tbody> <tr> <td>S1</td> <td>4</td> </tr> <tr> <td>S2</td> <td>30</td> </tr> <tr> <td>S3</td> <td>30</td> </tr> </tbody> </table>	Section	Peak Count	S1	4	S2	30	S3	30	Population estimates have not been stipulated within the SPA citation.	Unknown passage. Wintering birds recorded within the survey area represent 2.4% population.	Population estimates have not been stipulated within the SPA citation.
Section	Peak Count															
S1	4															
S2	30															
S3	30															



The SSSI & Ramsar winter bird percentages were not included within this report due to the larger numbers recorded within the Thames Estuary and Marshes SPA and the fact some species qualify under Article 4.2 of the Directive (79/409/EEC) as the site regularly supporting at least 20,000 waterfowl. As displayed within Table 3, the peak counts of Thames Estuary and Marshes SPA and Ramsar and Mucking Flats and Marshes SSSI qualifying bird species (and in some cases noteworthy populations but not qualifying) were generally higher within Sections 2 and 3 of the survey area. This would suggest that SPA/Ramsar/SSSI bird species assemblages are higher with increased proximity to the Thames Estuary and Marshes SPA and Ramsar and Mucking Flats and Marshes SSSI.

The highest counts recorded within the survey area were associated with avocet and black-tailed godwit (which both represent >50% of the SPA population) and dunlin (which represent >5% of the SPA population). In addition, gadwall and lapwing were found to be in higher or equal numbers within Section 1, when compared with the rest of the survey area.

The SPA/Ramsar/SSSI species were largely absent within the TEC and only a small proportion of black-tailed godwit (0.05%), and common redshank (0.03%) were present. A peak count of 8 avocet were recorded on a single occasion in February 2018, in the vicinity of the proposed CW Intake works. This amounts to approximately 2.8% of the SPA population; however, this many avocet are unusual for this area which usually supported on average around 2 birds throughout the survey (0.7% of the SPA assemblage). However it has been noted that avocet numbers have increased in the Thames Estuary and Marshes SPA, demonstrated by the peak count of 550 in September 2018 almost 200% of the SPA citation population. When reviewed against the peak mean counts for 2004/5-2008/09 (Lilley 2011) the peak avocet number within the TEC is only 0.57% of the SPA population.

The conditions on the day were close to freezing (1°C) and a winter storm (named Emma) followed on over the next week with weather warnings of snow and below freezing conditions. It is considered likely that these birds were forced to utilize this area (in such adverse conditions) and would not usually use the area in such numbers during normal weather conditions.

It is considered unlikely that avocet will be negatively impacted by the development, given the low level or regular use, however, it will be important that works do not negatively impact them during periods of extreme weather.

The distribution of the winter bird species generally matched that found during winter bird surveys conducted by RPS in 2007/2008. The peak counts of most SPA/Ramsar species recorded during the 2017/18 season exceeded the RPS peak counts by at least 50% whilst the only SPA species to have lower counts was ringed plover which were down by 25% this year compared to the 2007/08 season. This may be due to a wider population trend which has seen plover numbers decline by some 28% over the last 25 years, the impact of a changing climate is decreasing the number of winter visitors as birds are no longer pushed across to the UK by cold weather on the Continent. The overall decline in this species has seen the birds recently upgraded to the BoCC red list (Eaton *et al* 2015).

3.3.2 Additional species wintering within the survey area that are not included as Thames Estuary and Marshes SPA/Ramsar/SSSI species

The following additional non SPA/ Ramsar/SSSI species were recorded within the survey area (Table 5). Species included below have been confined to BoCC red listed, amber listed and SPI. These species have not been displayed on a figure.



Table 5 Non-SPA/Ramsar/SSSI bird species recorded wintering within the survey area

Common Name (BTO code)	Scientific Name	Peak Count (Date)	Status (see Section 4.4.2 for a fuller explanation of terms)
Bar-tailed godwit	<i>Limosa lapponica</i>	3 (11 th Jan 2018)	BoCC Amber List, Common passage migrant and winter visitor in Essex.
Black-headed gull	<i>Chroicocephalus ridibundus</i>	520 (11 th Jan 2018)	BoCC Amber List, Abundant resident, passage migrant and winter visitor in Essex.
Common gull	<i>Larus canus</i>	6 (22 nd Mar 2018)	BoCC Amber List, Common passage migrant and winter visitor in Essex.
Corn bunting	<i>Emberiza calandra</i>	25 (22 nd Mar 2018)	BoCC Red List, Locally common but much declined resident in Essex.
Curlew	<i>Numenius arquata</i>	58 (27 th Mar 2018)	BoCC Red List, Common passage migrant and winter visitor in Essex.
Great black-backed gull	<i>Larus marinus</i>	8 (11 th Oct 2017)	BoCC Amber List, Common winter visitor and passage migrant in Essex.
Herring gull	<i>Larus argentatus</i>	7 (23 rd Jan 2018)	BoCC Red List, SPI, Locally Common winter visitor and passage migrant in Essex.
Fieldfare	<i>Turdus pilaris</i>	40 (19 th Dec 2017)	Schedule 1 (N/A in Essex), BoCC Red List, Common winter visitor and passage migrant.
Lesser black-backed gull	<i>Larus fescus</i>	7 (23 rd Jan 2018)	BoCC Amber List, Common passage migrant but present all year in Essex.
Linnet	<i>Carduelis cannabina</i>	30 (15 th Jan 2018)	BoCC Red List, SPI, Common resident, summer visitor and passage migrant with small numbers wintering in Essex.
Mallard	<i>Anas platyrhynchos</i>	100 (11 th Jan 2018)	BoCC Amber List.
Mute Swan	<i>Cygnus olor</i>	2 (9 th Apr 2018)	BoCC Amber List, Common resident and winter visitor in Essex.



Common Name (BTO code)	Scientific Name	Peak Count (Date)	Status (see Section 4.4.2 for a fuller explanation of terms)
Meadow pipit	<i>Anthus pratensis</i>	20 (21 st Feb 2018)	BoCC Amber List, Resident, passage migrant and winter visitor in Essex.
Redwing	<i>Turdus iliacus</i>	40 (20 th Nov 2017)	Schedule 1 (N/A in Essex), BoCC Red List, Common winter visitor and passage migrant in Essex.
Skylark	<i>Alauda arvensis</i>	12 (28 th Mar 2018)	BoCC Red List, SPI, Common but recently declined resident, passage migrant and winter visitor in Essex.
Starling	<i>Sturnus vulgaris</i>	30 (9 th April 2018)	BoCC Red List, SPI, Abundant but declining resident, passage migrant and winter visitor in Essex.
Teal	<i>Anas crecca</i>	550 (23 rd Feb 2018)	BoCC Amber List, Very common passage migrant and winter visitor in Essex.
Wigeon	<i>Anas penelope</i>	8 (9 th Apr 2018)	BoCC Amber List, Abundant passage migrant and winter visitor in Essex.

The highest peak counts of non-SPA qualifying species include black-headed gull, curlew and teal. The highest peak counts and locations generally mirrored those of the SPA/Ramsar/SSSI qualifying bird species, in that the peak counts were generally recorded closer to these designated sites.

No high-tide winter roosts were recorded within the TEC. Birds qualifying as SPA/Ramsar/ SSSI species and additional wetland birds were found to be confined to the immediate foreshore line during high tide.



4.0 Legislation

Forty-nine bird species are listed as 'species of principal importance for the conservation of biological diversity in England' under Section 41 of the NERC Act. These are abbreviated to SPIs in this report. Section 40 of this act places a duty (the Statutory Biodiversity Duty) on public bodies (including local planning authorities) when undertaking their duties (including the making of planning decisions) "to take such measures as they consider expedient for the purposes of conserving biodiversity". The conservation of species listed on Section 41 of the NERC Act, including the restoration or enhancement of a population or habitat, is therefore legally required to be considered in planning decisions. *ODPM Circular 06/2005* further clarifies that they are capable of being a material consideration for planning decisions, along with Local Biodiversity Action Plan priority species.

In addition, Annex 1 of the EU 'Birds' Directive (1979) lists 194 species that are subject to special conservation measures concerning their habitat in order to ensure their survival and reproduction. Member States are required to designate SPAs for the Annex 1 and all migratory species. SPAs are scientifically identified areas critical to the survival of the targeted species. The SPAs form part of the Natura 2000 EU network of protected nature sites. The designation of an area as an SPA gives it a high level of protection from potentially damaging developments (European Commission (EC) 2004).

The convention of wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

4.1 Other Conservation Lists and Guidance

4.1.1 Birds of Conservation Concern (BoCC)

The conservation status of all regularly occurring British birds has been analysed in co-operation with the leading governmental and non-governmental conservation organisations, including the Royal Society for the Protection of Birds (RSPB), British Trust for Ornithology (BTO) and Birdlife International Birds of Conservation Concern 4 (Eaton *et al.*, 2015). The basis of species ongoing population trends are assigned to one of three lists of Conservation Concern. These are the UK Red, Amber and Green list.

The criteria for birds are as follows.

Red List

- Globally threatened.
- Historical population decline in UK during 1800–1995.
- Severe (at least 50%) decline in UK wintering population over last 25 years, or longer-term period (the entire period used for assessments since the first BoCC review, starting in 1969).
- Severe (at least 50%) contraction of UK wintering range over last 25 years, or the longer-term period.

Amber List

- Species with unfavourable conservation status in Europe (SPEC = Species of European Conservation Concern).



- Historical population decline during 1800–1995, but recovering; population size has more than doubled over last 25 years.
- Moderate (25-49%) decline in UK wintering population over last 25 years, or the longer-term period.
- Moderate (25-49%) contraction of UK wintering range over last 25 years, or the longer-term period.
- Moderate (25-49%) decline in UK non-breeding population over last 25 years, or the longer-term period.
- Rare non-breeders; less than 900 individuals.
- Localised; at least 50% of UK breeding or non-breeding population in 10 or fewer sites, but not applied to rare breeders or non-breeders.
- Internationally important; at least 20% of European breeding or non-breeding population in UK (NW European and East Atlantic Flyway populations used for non-breeding wildfowl and waders respectively).

Although the lists confer no legal status in themselves, they are useful in evaluating the conservation significance of bird assemblages, and for assessing the potential significance of impacts and informing appropriate levels of mitigation with respect to bird populations.



5.0 Discussion

5.1 Potential Impacts to Thames Estuary and Marshes SPA and Ramsar and Mucking Flats and Marshes SSSI Bird Species

Detailed assessment of all impacts on Thames Estuary and Marshes SPA and Ramsar and Mucking Flats and Marshes SSSI bird species will be provided in the ES and HRA, including Appropriate Assessment where necessary. However a preliminary assessment of potential impacts is provided below.

The Thames Estuary and Marshes SPA and Ramsar site and Mucking Flats and Marshes SSSI are the closest statutory designated sites which lie within 0.1 km to the proposed route of the southern pipeline (Works Area 10). All sites are designated for supporting internationally important assemblages of wintering waders and waterfowl.

Due to the close proximity of the these designated sites, there is potential for indirect adverse effects to occur during the construction phases of the development (impacts during the operation phase are considered less likely as there will be limited activity associated within proximity to the designated site during operation). As such a Habitats Regulations Assessment (HRA) screening assessment is being completed with an Appropriate Assessment as necessary to determine if any significant effects are likely.

Given the proximity of the TEC (Figure 1) to the designated sites (see Figure 3), the following impacts on Thames Estuary and Marshes Ramsar and SPA and Mucking Flats and Marshes SSSI qualifying bird species could potentially occur:

- Noise / vibration
- Increase in Water Temperature
- Pollution
- Sediment run off / siltation
- Visual Disturbance
- Artificial Lighting
- Nutrient Enrichment
- Air Quality Impacts
- Disturbance by Recreation

In summary, given that the wintering bird species (associated with the Thames Estuary and Marshes SPA and Ramsar and Mucking Flats and Marshes SSSI) are confined to the foreshore and within the designated sites (during high tide and low tide), the northern proposed pipeline is the preferable option to help reduce the impacts on wintering birds.

A full impact assessment along with the recommendations for mitigation, compensation and ecological enhancements will be included in the ES and HRA.



5.2 Potential Impacts to Additional Notable Winter Bird Species (that do not qualify as SPA/Ramsar/ SSSI species)

Areas of arable fields, dense scrub, pasture fields and sections of drainage ditches are likely to be temporarily disturbed as part of the proposals. The temporary loss of arable land and pasture fields is likely to temporarily reduce potential habitat for wintering larks and pipits such as red listed species skylark and amber listed species meadow pipit, both observed within the TEC. The temporary loss of arable field and grassland margins are also likely to reduce temporarily foraging resources for corn bunting (BoCC red listed, also recorded within the TEC) and the temporary loss of dense scrub will reduce the local availability of winter berries considered suitable for red listed species such as redwing and fieldfare.

Impacts from the water cooling system associated with the CCGT area and noise/vibration from the construction of the CCGT, southern pipeline (and possibly the northern pipeline) may also impact on wintering curlew (BoCC red listed), teal and wigeon (both amber listed) recorded within the survey area.

A full impact assessment along with the recommendations for mitigation, compensation and ecological enhancements will be included in the ES.



6.0 Summary

The peak counts of qualifying bird species for the designated sites were generally higher with increased proximity to the Thames Estuary and Marshes SPA/Ramsar and Mucking Flats and Marshes SSSI. The highest counts were associated with avocet, black-tailed godwit and dunlin.

The highest peak counts of non-SPA qualifying species include black-headed gull, curlew and teal. The highest peak counts and locations generally mirrored that of the SPA/Ramsar and SSSI qualifying bird species in that counts increased with increased proximity to the designated sites.

No high-tide winter roosts were recorded within the TEC. Qualifying bird species associated with the designated sites and additional wetland birds were found to be confined to the immediate foreshore during high tide (i.e. within close proximity to the proposed southern pipeline).

A full impact assessment along with the recommendations for mitigation, compensation and ecological enhancements will be included in the ES and HRA.



7.0 References

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-
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- Wood, S (2007). The Birds of Essex. London: Christopher Helm.
- WYG (2018) Ecological Appraisal. WYG, London.



FIGURES

Figure 1 – Location Plan

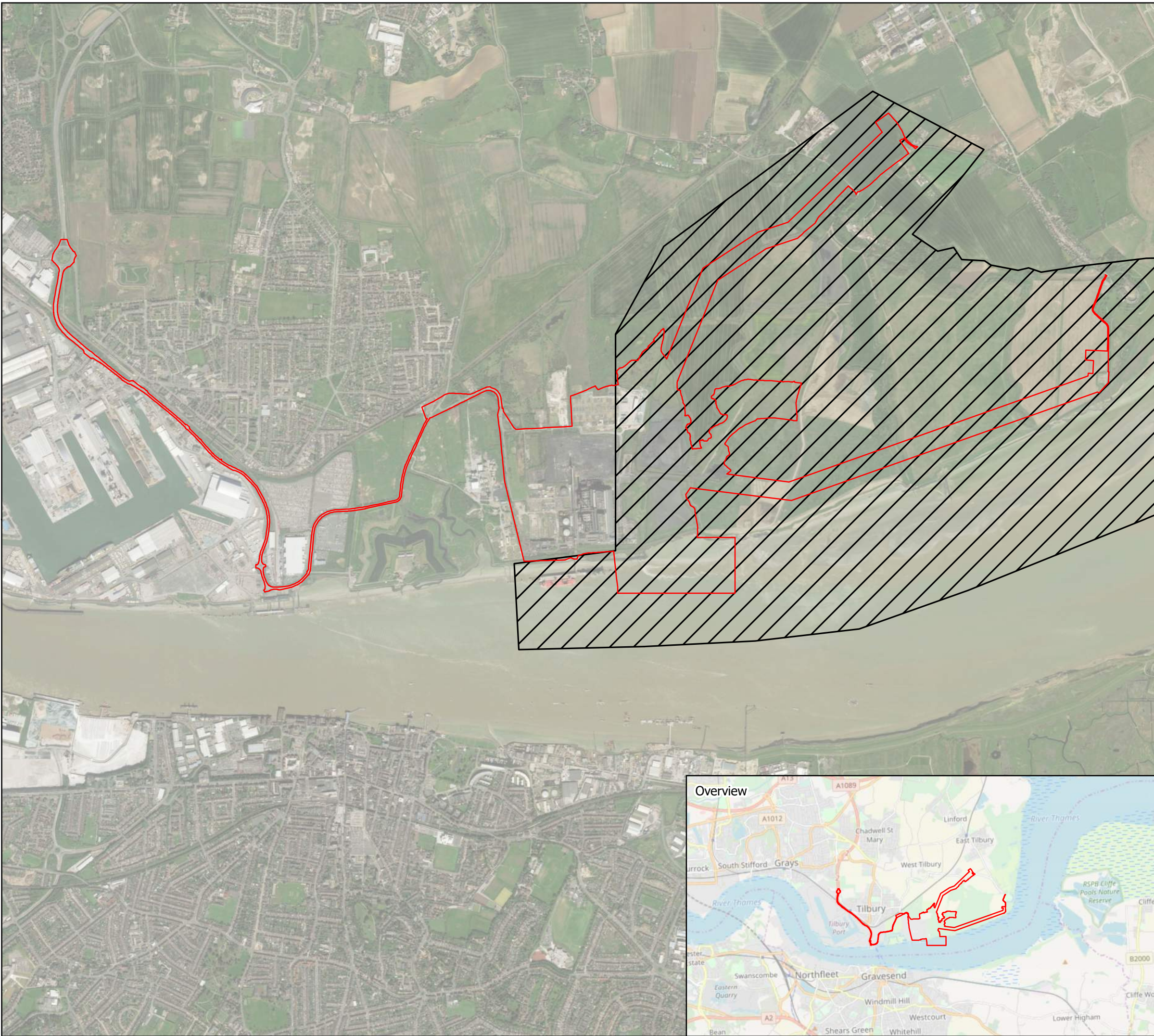
Figure 2 – Tilbury Area Names

Figure 2a – Work Areas

Figure 3 – Location of SPA



**Figure 4 – Transect and Vantage
Point Map**

**Figures 5-12 – Distribution of SPA
Bird Species**



Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

-  Indicative Order Limits
-  Survey area

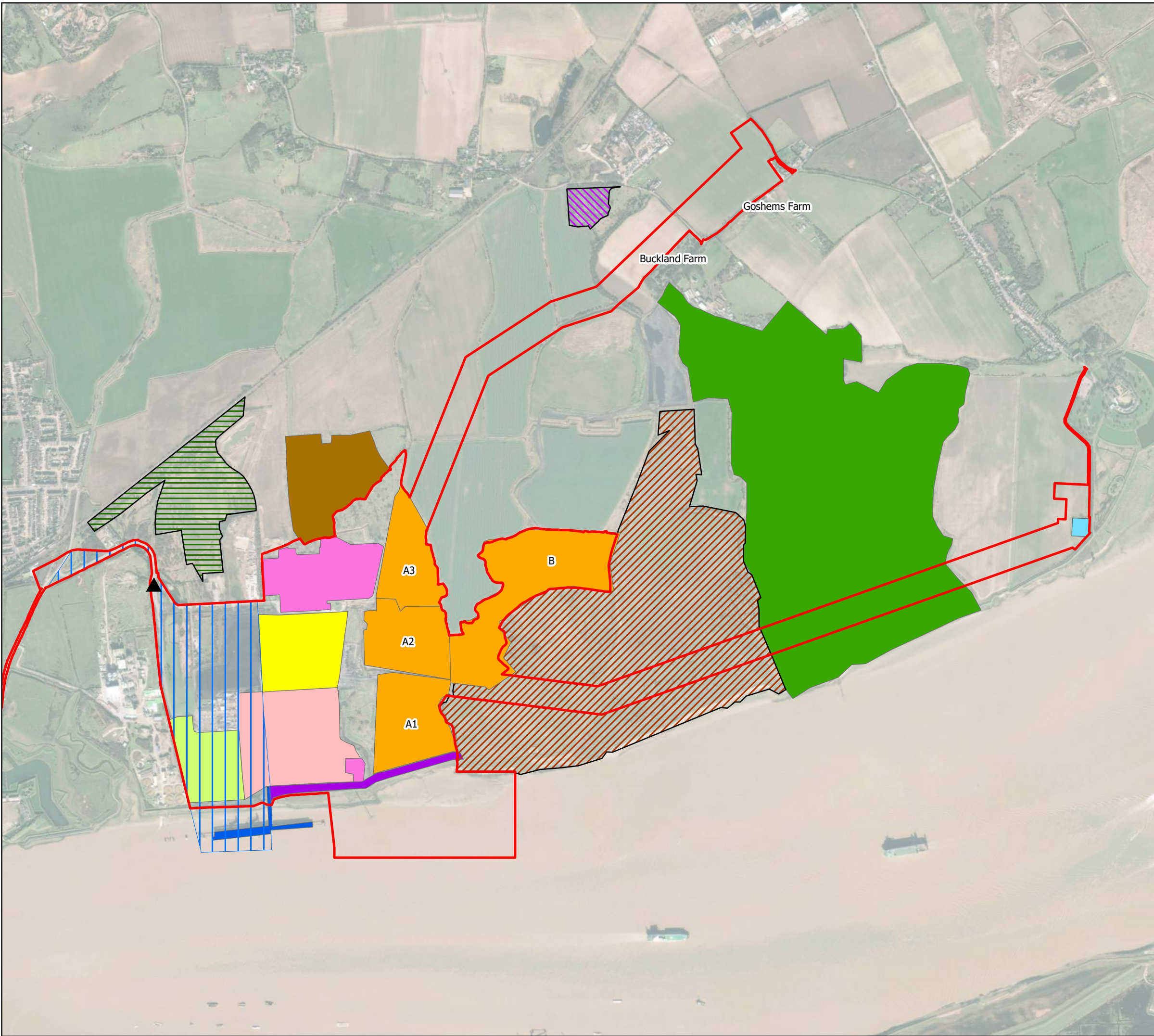


Site Location and Survey Area

Tilbury Energy Centre RWE

Scale at A3: 1:20,000	Project No: A103397	Drawing No: Figure 1	Revision: B
Drawn by: Ben Blowers		Drawn date: 06/12/2018	Approved by: Josh Stafford

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Rev	Date	Notes
A	06/09/18	Initial map production
B	26/10/18	New Order Limits

- Indicative Order Limits
- Goshems Farm LWS
- Low Street Pit LWS
- Lytag Brownfield LWS
- Port of Tilbury Land
- Former Tilbury A
- Former Tilbury B station
- Ashfields
- Former Coal Stock Yard
- DHL land
- Above ground installation
- Port of Tilbury jetty
- Sub station
- Tilbury Riverside Project Community Meadow
- Walton Common
- Site entrance

0 100 200 400 Metres

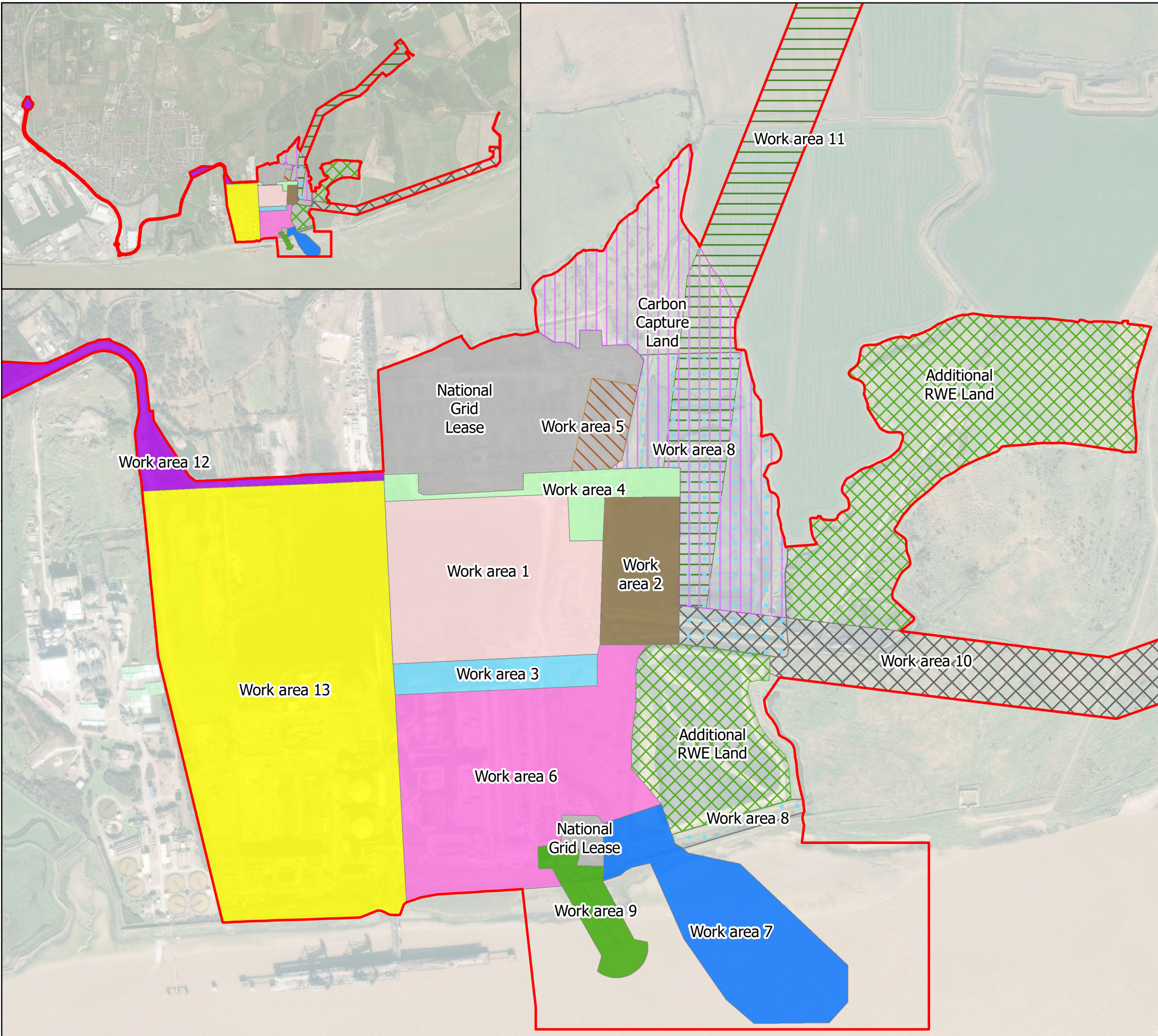


Tilbury Area Names

Tilbury Energy Centre RWE

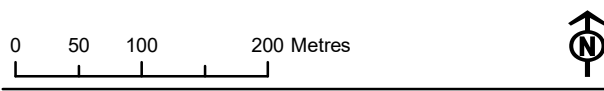
Scale at A3: 1:13,000	Project No: A103397	Drawing No: Figure 2	Revision: B
Drawn by: Ben Blowers		Drawn date: 26/10/2018	Approved by: Will Taylor

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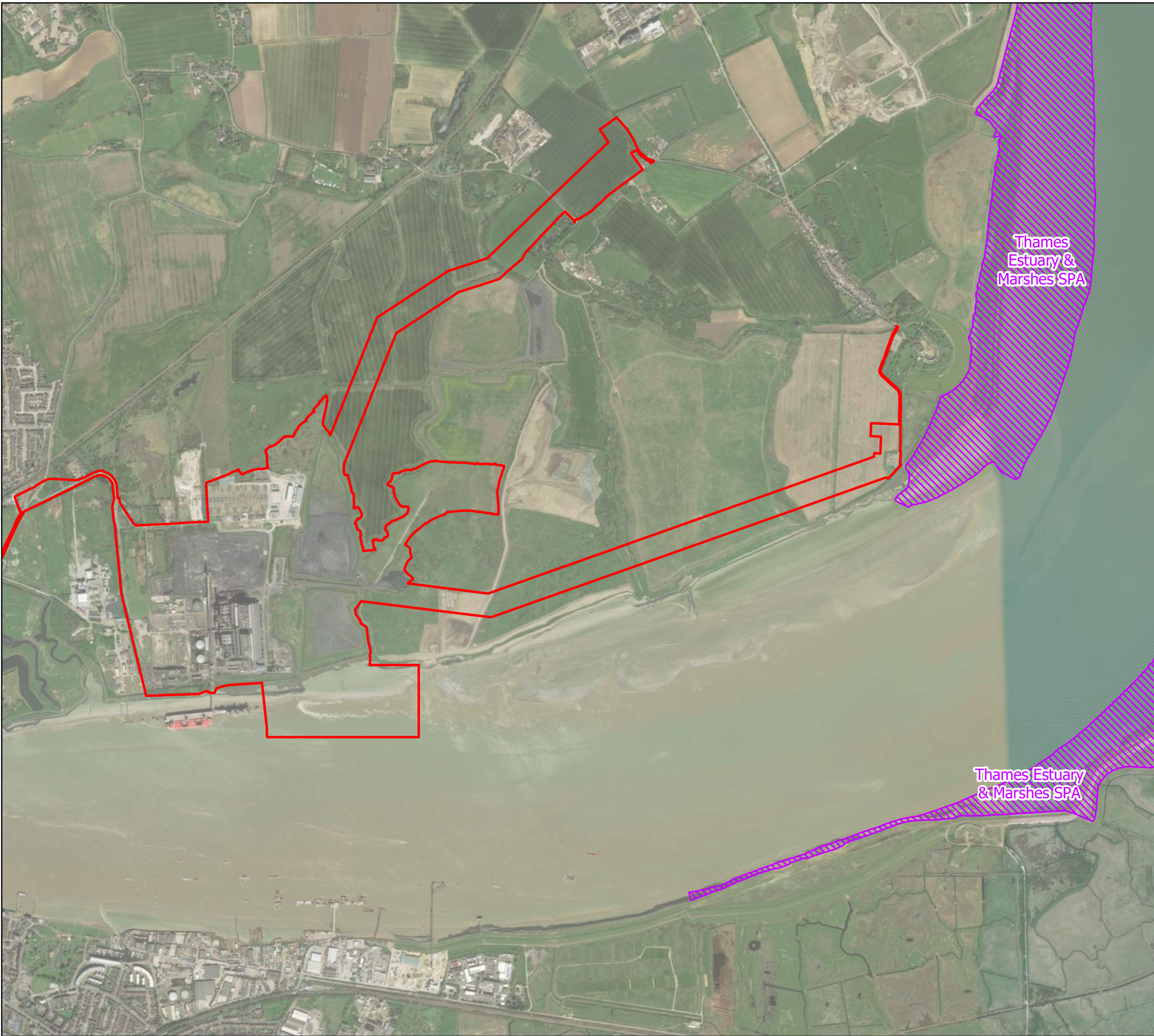
Rev	Date	Notes
A	06/06/19	Initial map production

- Legend**
- Indicative order limits
 - Additional RWE Land
 - Carbon Capture Land
 - National Grid Lease
 - Work area 1
 - Work area 2
 - Work area 3
 - Work area 4
 - Work area 5
 - Work area 6
 - Work area 7
 - Work area 8
 - Work area 9
 - Work area 10
 - Work area 11
 - Work area 12
 - Work area 13





Work Area			
Tilbury Energy Centre RWE			
Scale at A3: 1:6,000	Project No: A103397	Drawing No: Figure 2a	Revision: A
Drawn by: Ben Blowers	Drawn date: 06/06/2019	Approved by: Chris Meddins	

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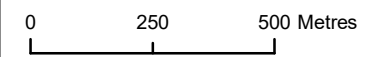
Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

-  Indicative Order Limits
-  Special Protection Area (SPA)

Thames Estuary & Marshes SPA

Thames Estuary & Marshes SPA



Location of Special Protection Area

**Tilbury Energy Centre
RWE**

Scale at A3: 1:15,500	Project No: A103397	Drawing No: Figure 3	Revision: B
Drawn by: Ben Blowers		Drawn date: 06/12/2018	Approved by: Chris Meddins

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Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

- Indicative Order Limits
- ▲ Vantage point
- Line of sight
- Transect route
- Survey area

0 250 500 Metres

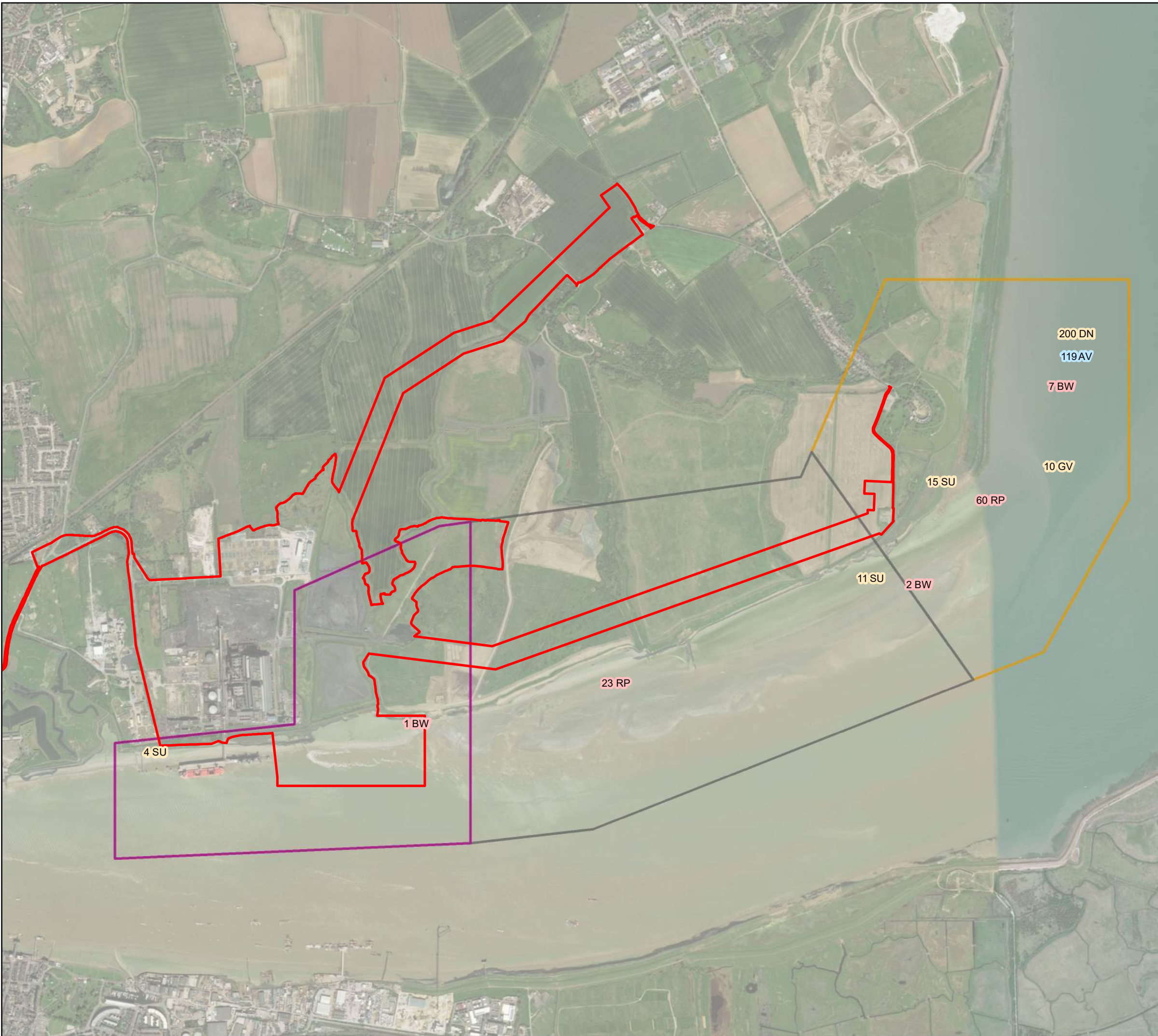


Winter Bird Survey Transects and Vantage Points: Oct 2017 - April 2018

Tilbury Energy Centre RWE

Scale at A3: 1:16,000	Project No: A103397	Drawing No: Figure 4	Revision: B
Drawn by: Rachel Sore		Drawn date: 06/12/2018	Approved by: Chris Meddins

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Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

- Indicative Order Limits
- Section 1
- Section 2
- Section 3
- AV - Avocet
- BW - Black-tailed Godwit
- D - Dunlin
- RP - Ringed Plover
- SU - Shelduck

- Red listed bird
- Amber listed bird
- Schedule 1 bird

0 250 500 Metres

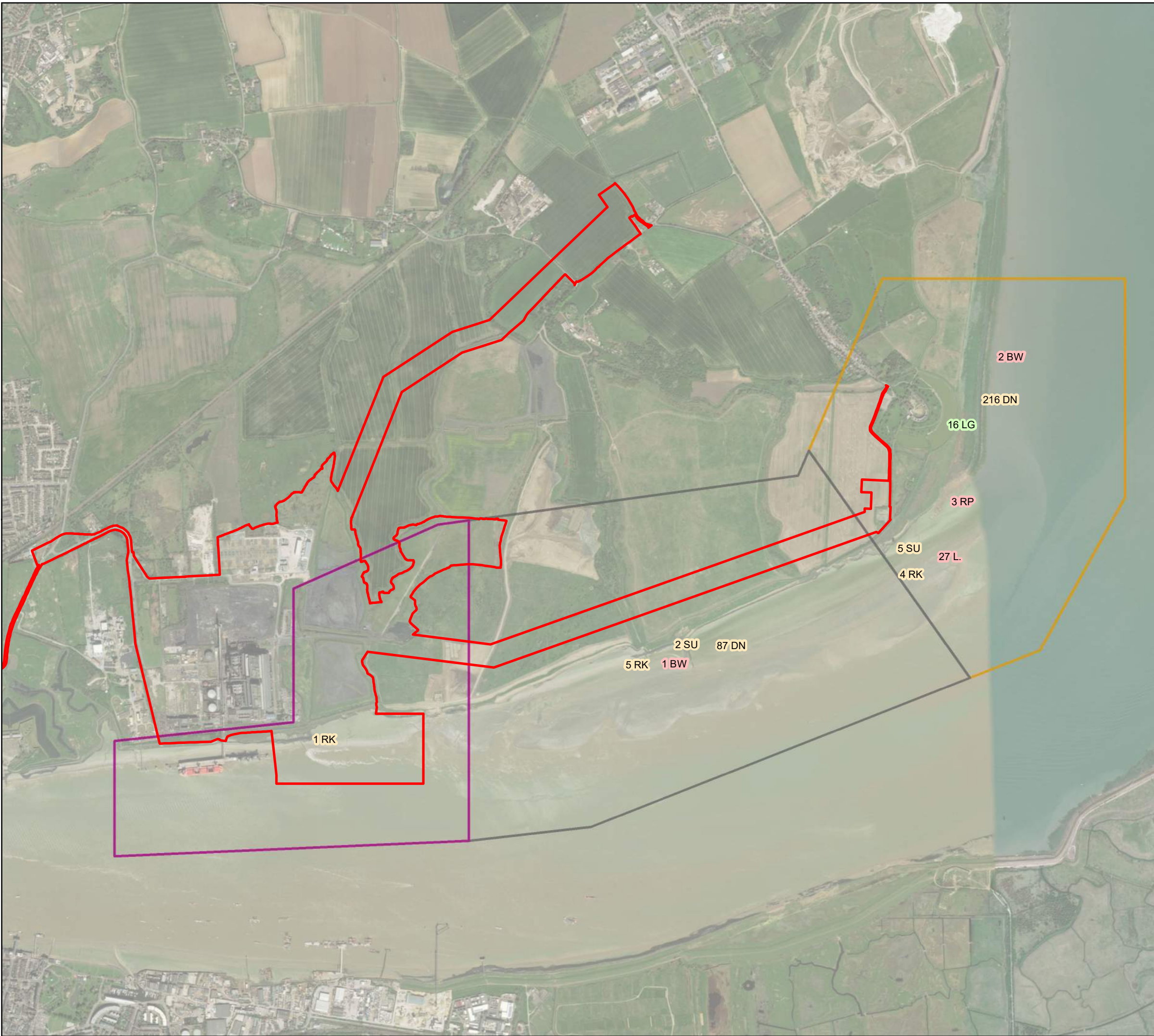


**Winter Bird Survey Peak Counts by Section
October 2017**

**Tilbury Energy Centre
RWE**

Scale at A3: 1:16,000	Project No: A103397	Drawing No: Figure 5	Revision: B
Drawn by: Rachel Sore		Drawn date: 06/12/2018	Approved by: Chris Meddins

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Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

Indicative Order Limits

Section 1

Section 2

Section 3

BW - Black-tailed Godwit

D - Dunlin

RK - Redshank

RP - Ringed Plover

SU - Shelduck

Red listed bird

Amber listed bird

Green listed bird

0 250 500 Metres



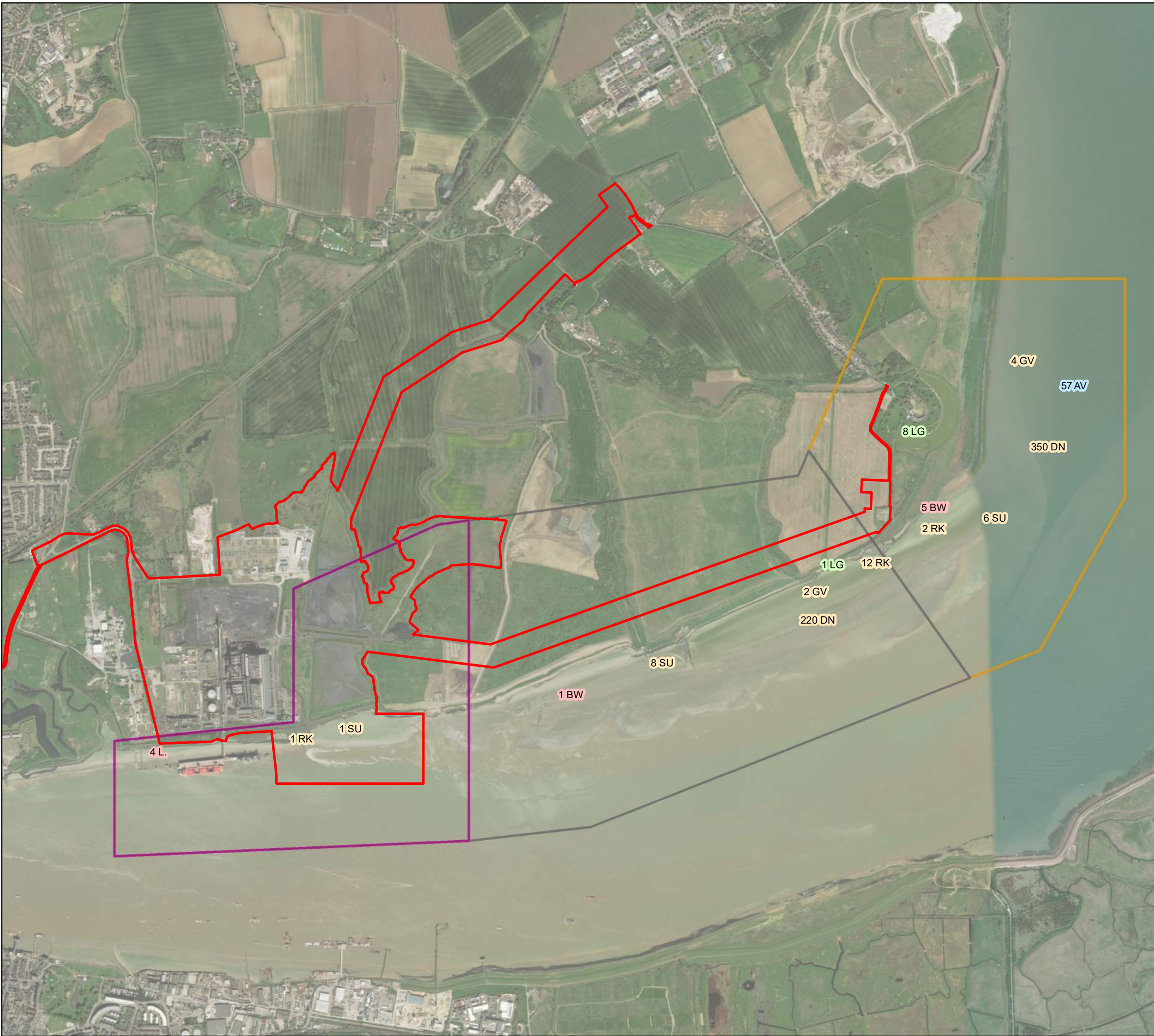
**Winter Bird Survey Peak Counts by Section
November 2017**

**Tilbury Energy Centre
RWE**

Scale at A3: 1:16,000	Project No: A103397	Drawing No: Figure 6	Revision: B
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Drawn by: Rachel Sore	Drawn date: 06/12/2018	Approved by: Chris Meddins
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Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

Indicative Order Limits

Section 1

Section 2

Section 3

AV - Avocet

BW - Black-tailed Godwit

D - Dunlin

RK - Redshank

SU - Shelduck

Red listed bird

Amber listed bird

Green listed bird

Schedule 1 bird

0 250 500 Metres



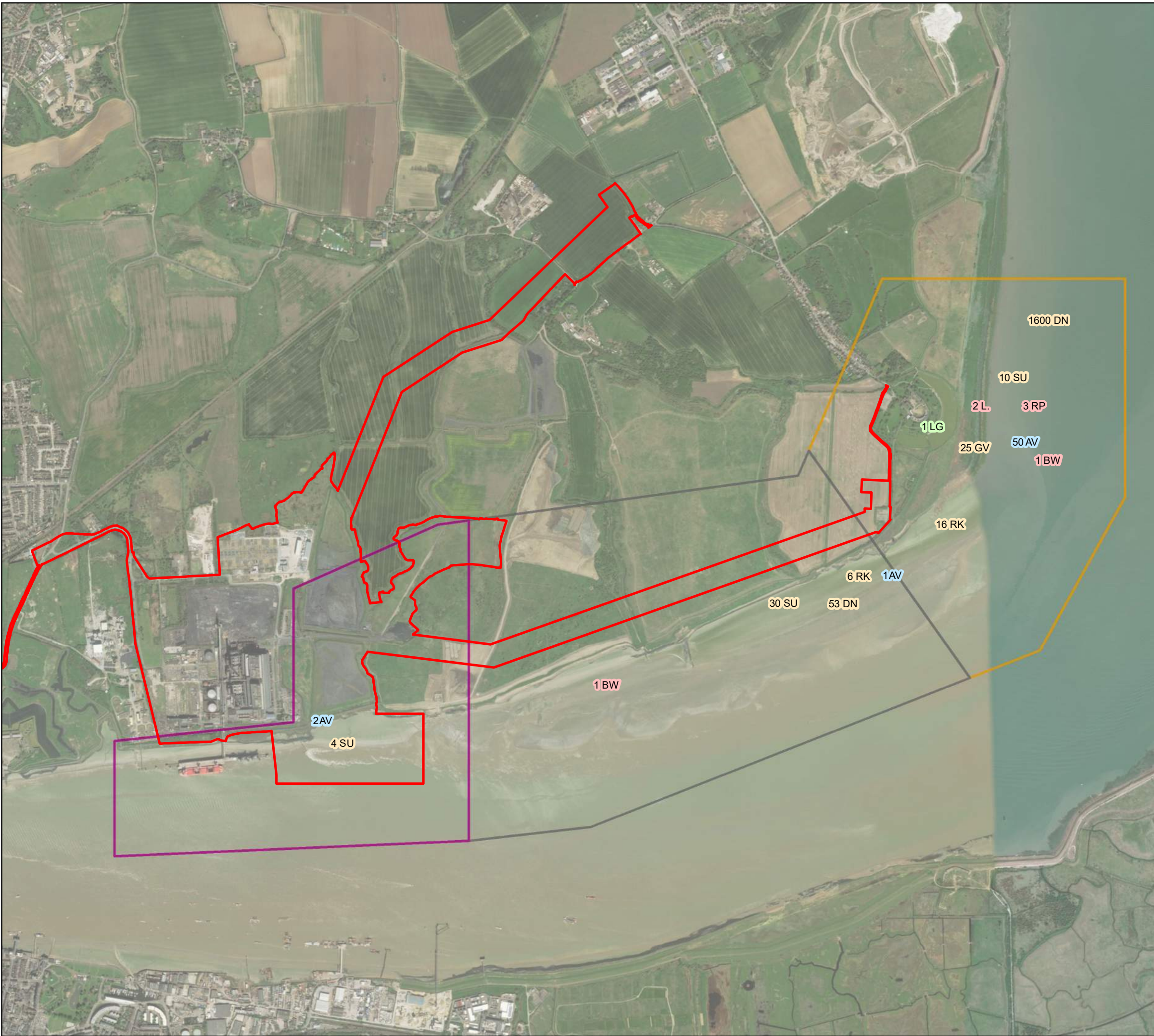
**Winter Bird Survey Peak Counts by Section
December 2017**

**Tilbury Energy Centre
RWE**

Scale at A3: 1:16,000	Project No: A103397	Drawing No: Figure 7	Revision: B
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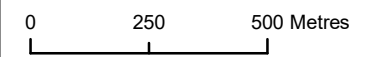


Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

- Indicative Order Limits
- Section 1
- Section 2
- Section 3
- AV - Avocet
- BW - Black-tailed Godwit
- D - Dunlin
- RK - Redshank
- RP - Ringed Plover
- SU - Shelduck

- Red listed bird
- Amber listed bird
- Green listed bird
- Schedule 1 bird

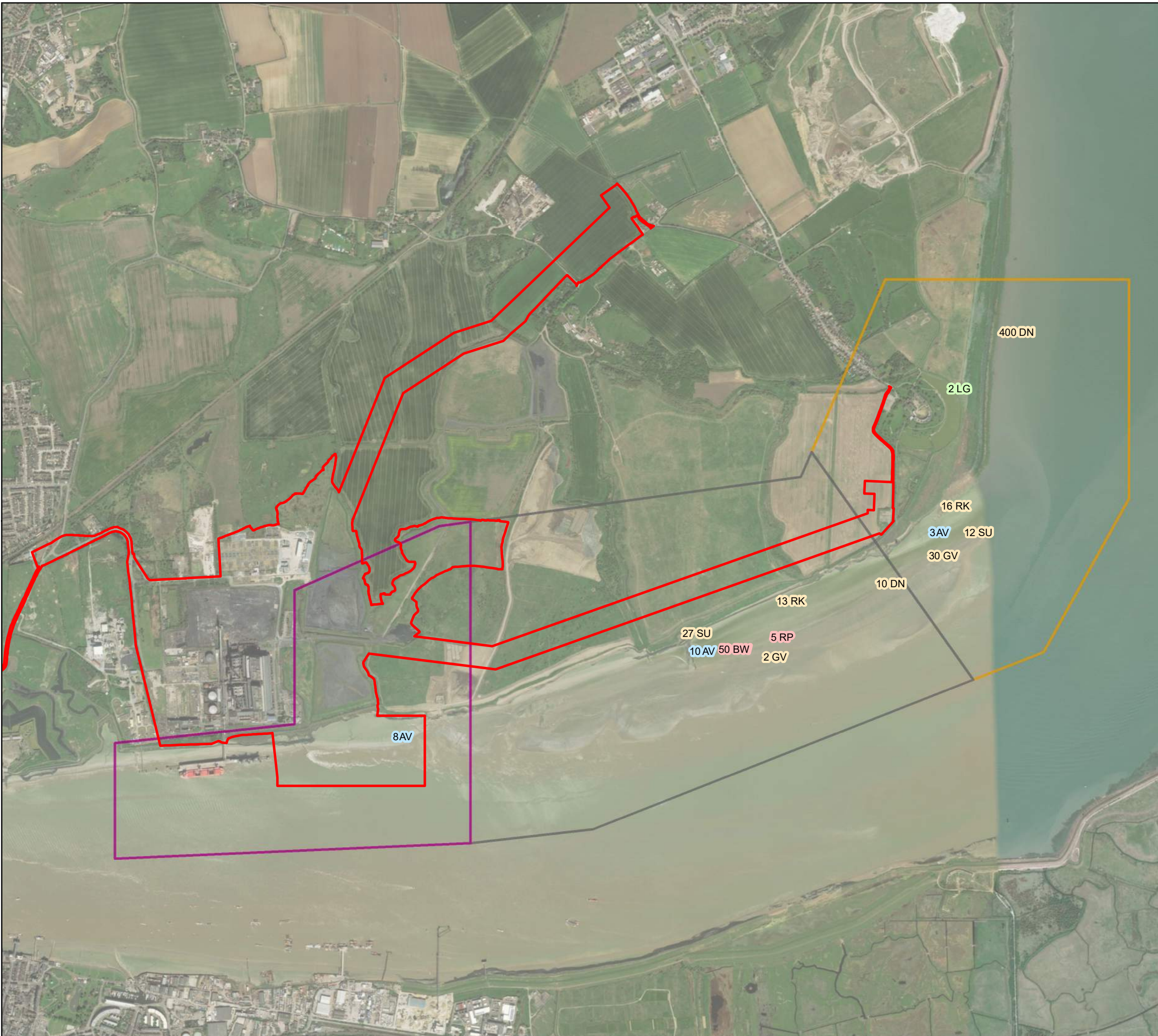


**Winter Bird Survey Peak Counts by Section
January 2018**

**Tilbury Energy Centre
RWE**

Scale at A3: 1:16,000	Project No: A103397	Drawing No: Figure 8	Revision: B
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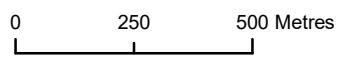


Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

- Indicative Order Limits
- Section 1
- Section 2
- Section 3
- AV - Avocet
- BW - Black-tailed Godwit
- D - Dunlin
- RK - Redshank
- RP - Ringed Plover
- SU - Shelduck

- Red listed bird
- Amber listed bird
- Green listed bird
- Schedule 1 bird

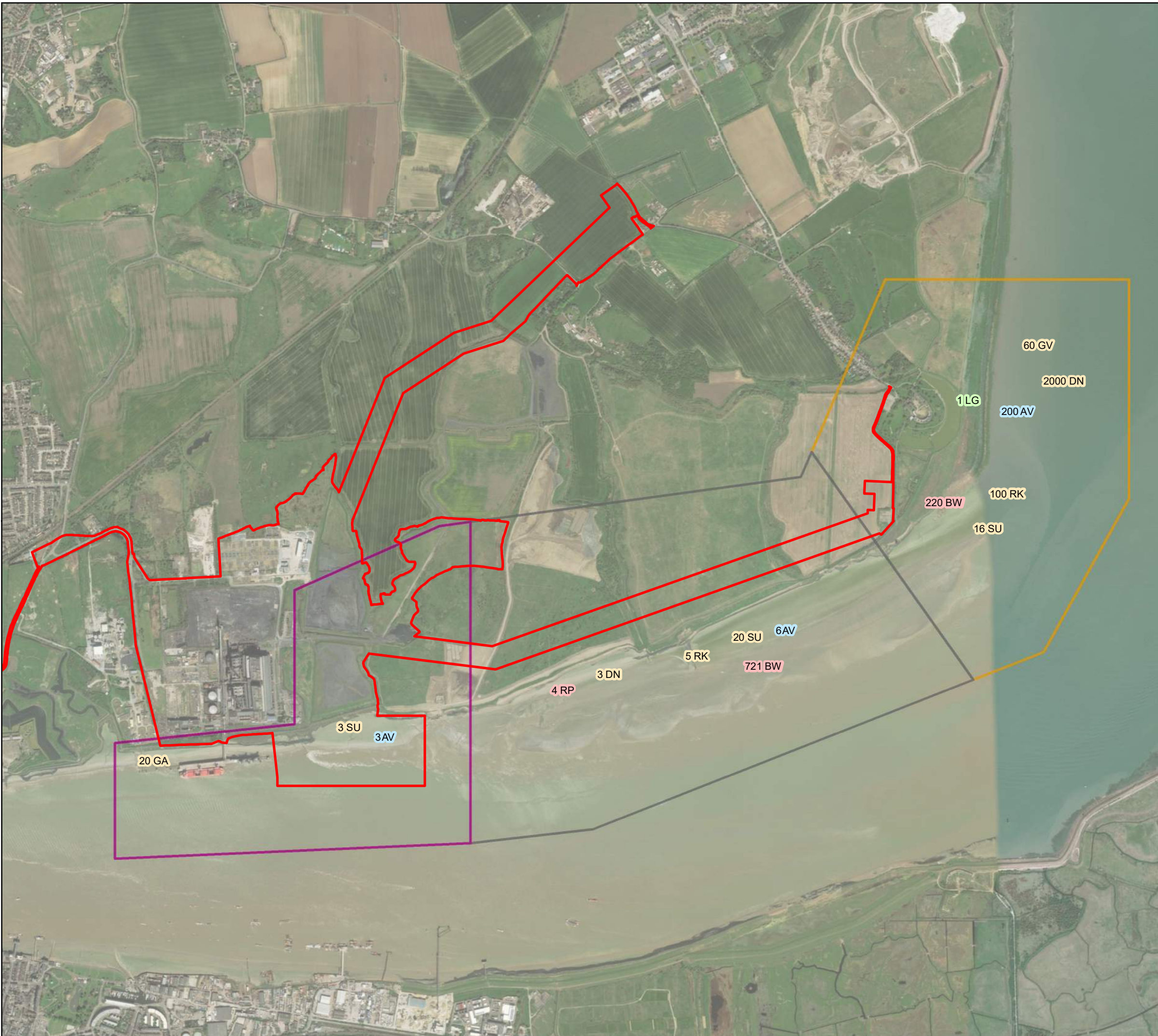


**Winter Bird Survey Peak Counts by Section
February 2018**

**Tilbury Energy Centre
RWE**

Scale at A3: 1:16,000	Project No: A103397	Drawing No: Figure 9	Revision: B
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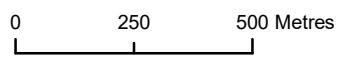


Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

- Indicative Order Limits
- Section 1
- Section 2
- Section 3
- AV - Avocet
- BW - Black-tailed Godwit
- D - Dunlin
- RK - Redshank
- RP - Ringed Plover
- SU - Shelduck

- Red listed bird
- Amber listed bird
- Green listed bird
- Schedule 1 bird

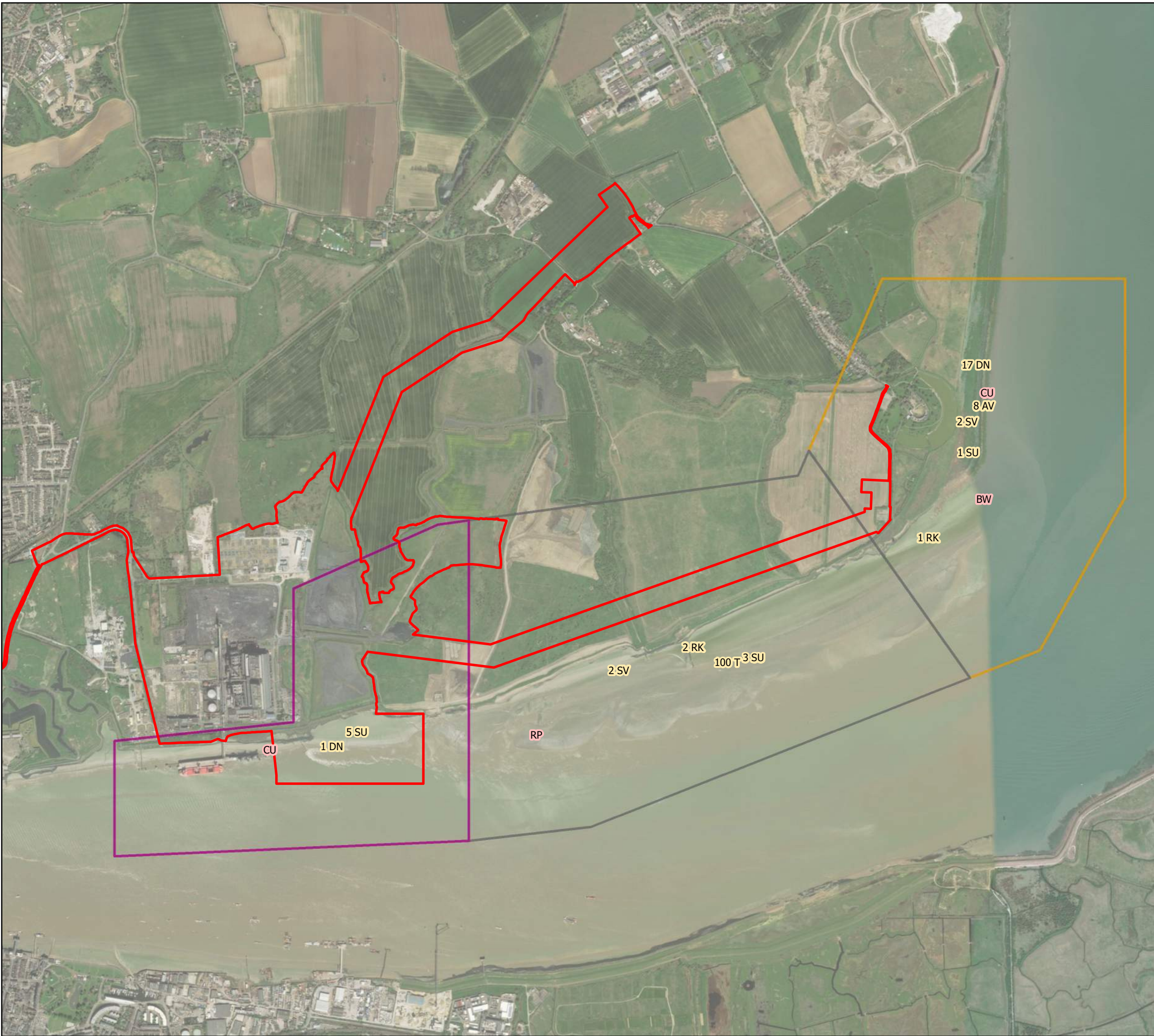


**Winter Bird Survey Peak Counts by Section
March 2018**

**Tilbury Energy Centre
RWE**

Scale at A3: 1:16,000	Project No: A103397	Drawing No: Figure 10	Revision: B
Drawn by: Rachel Sore	Drawn date: 06/12/2018	Approved by: Chris Meddins	

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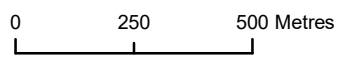
Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

- Indicative Order Limits
- Section 1
- Section 2
- Section 3

- AV - Avocet
- BW - Black-tailed Godwit
- CU - Curlew
- DN - Dunlin
- RK - Redshank
- RP - Ringed Plover
- SU - Shelduck
- SV - Shoveler
- T - Teal

Red listed bird
Amber listed bird

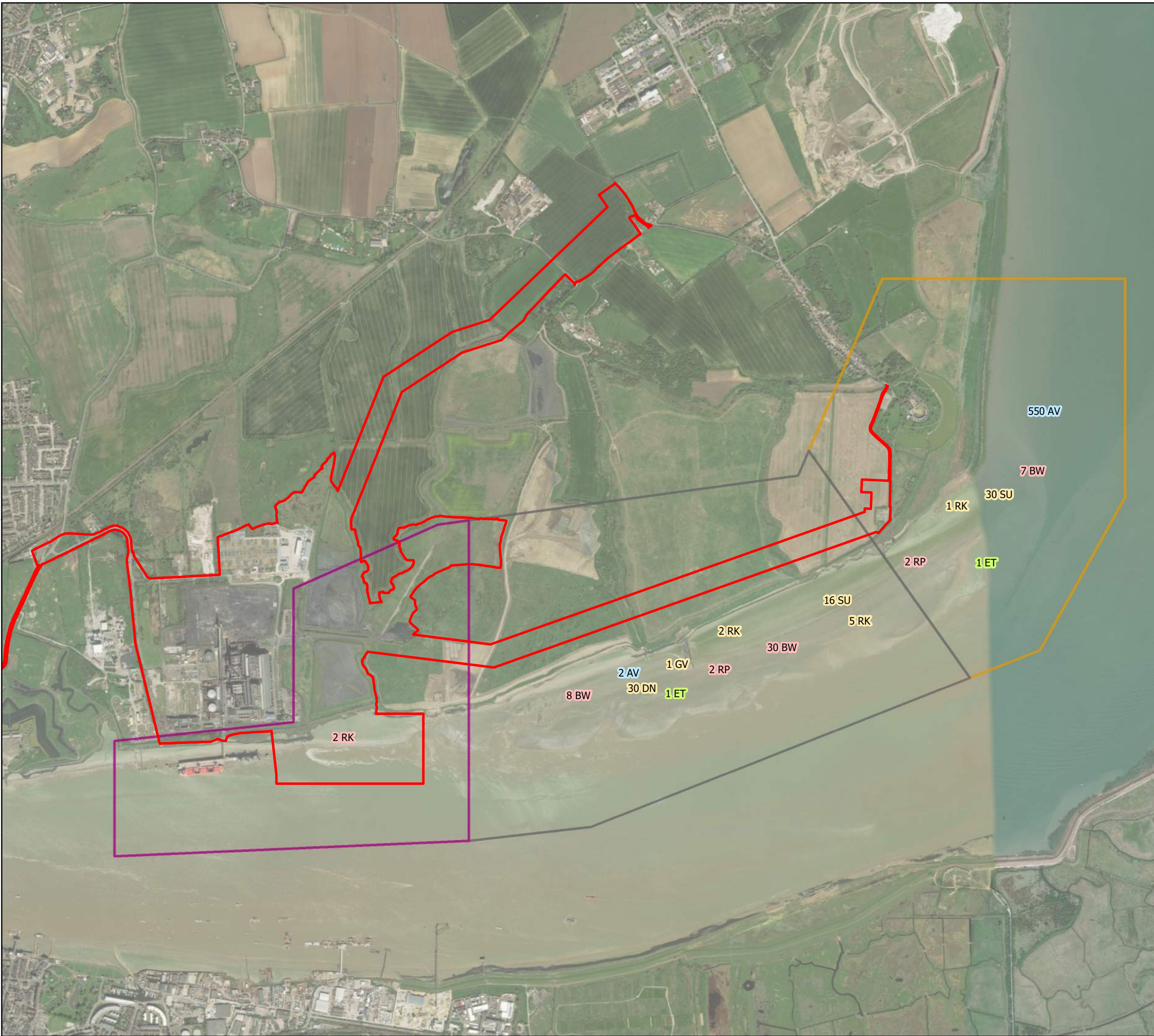


**Winter Bird Survey Peak Counts by Section
 April 2018**

**Tilbury Energy Centre
 RWE**

Scale at A3: 1:16,000	Project No: A103397	Drawing No: Figure 11	Revision: B
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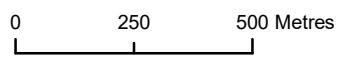


Rev	Date	Notes
A	06/09/18	Initial map production
B	06/12/18	Update Order Limits

Legend

- Indicative Order Limits
- Section 1
- Section 2
- Section 3
- AV - Avocet
- BW - Black-tailed Godwit
- DN - Dunlin
- ET - Little Egret
- GV - Grey Plover
- RK - Redshank
- RP - Ringed Plover
- SU - Shelduck

- Red listed bird
- Amber listed bird
- Green listed bird
- Schedule 1 listed bird



**Winter Bird Survey Peak Counts by Section
September 2018**

**Tilbury Energy Centre
RWE**

Scale at A3: 1:16,000	Project No: A103397	Drawing No: Figure 12	Revision: B
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7. Water Vole and Otter Survey



Tilbury Energy Centre

Water Vole and Otter Survey



RWE Generation UK Plc

June 2019

Confidential: Contains sensitive data

11th Floor, 1 Angel Court, London EC2R 7HJ




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Executive Summary

Contents	Summary
Site Location	The location of the proposed Tilbury Energy Centre (TEC) is at the Former Tilbury Power Station site in Tilbury, Thurrock, south Essex. The centre of the survey area is at Ordnance Survey Grid Reference TQ 67347 76541.
Proposals	The proposed TEC development will comprise the following main elements; up to 3 units / 2600MW of Combined Cycle Gas Turbine (CCGT) Power Plant, 1 Open Cycle Gas Turbine (OCGT) Power plant of up to 299MW, up to 100MW of flexible energy storage (e.g. batteries) and a 3 km gas pipeline which at present the route has not been determined between a southern and northern route. Space will also be allocated on site to allow installation of carbon capture plant in the future which will be subject to a separate planning application.
Existing Site Information	Multi-species survey reports including water vole and otter, are available for the TEC, spanning the period 2007-2018. The following reports are those that specifically refer to surveys for water voles/ otter or their habitat: <ul style="list-style-type: none"> • Ecological Appraisal. WYG 2018. • Proposed Port of Tilbury at Former Tilbury Power Station 'Tilbury 2'. Environmental Statement. Port of Tilbury. Bioscan 2017. • Ecology Surveys (Demolition Area and Land within RWE Holdings) WYG 2015. • Water Vole Survey (Tilbury Power Station Site and land to a 0.5 km radius). WYG Environment, 2008. • Water Vole Survey (Tilbury Power Station Site only). RPS Group, 2007.
Scope of Works	A water vole and otter survey was recommended by the most recent Ecological Appraisal (EA) (WYG 2018) the scope of the works included the following components: <ul style="list-style-type: none"> • Determine if water voles and otters are present or likely absent from the TEC; • Estimate the population size class; and • Inform an assessment of the potential ecological constraints to the proposed works and potential impacts of the TEC development as part of the EIA process and identify if any additional surveys are required.
Results	Water voles were recorded present in seven of the 20 waterbodies surveyed. The waterbodies varied in their population densities between low and high. No evidence of otter was found during the surveys which is consistent with historical survey results.



	<p>In addition, the review of previous data confirmed water vole presence in waterbodies outside of the survey area, but within the TEC, which could not be accessed as it was under the ownership of Port of Tilbury.</p>
<p>Recommendations</p>	<p>Without appropriate mitigation, there are likely to be adverse effects on water voles through loss of habitat, habitat deterioration (hydrology including water level, water flow and pollution/leaching/sediment run off into ditches), fragmentation, incidental injury/mortality and disturbance to resting place during the construction phase.</p> <p>Further detail with reference mitigation, compensation and enhancement will be provided within the Environmental Statement (ES) following ongoing discussions with statutory bodies.</p>



Glossary

CCGT	Combined Cycle Gas Turbine
CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology & Environmental Management
ECoW	Ecological Clerk of Works
EFC	Essex Field Club
EPS	European Protected Species
EWT	Essex Wildlife Trust
GCN	Great Crested Newt
Habitats Regulations	Conservation of Habitats and Species Regulations 2017
HAP	Habitat Action Plan
LBAP	Local Biodiversity Action Plan
LERC	Local Ecological Record Centre
NE	Natural England
NERC Act	Natural Environment and Rural Communities Act 2006
NPPF	National Planning Policy Framework
OCGT	Open Cycle Gas Turbine
PEIR	Preliminary Environmental Information Report
PFA	Pulverised Fly Ash
SAP	Species Action Plan
SMP	Species Management Plan
SPI	Species of Principal Importance
TEC	Tilbury Energy Centre
W&CA	Wildlife & Countryside Act 1981 (as amended)



1.0 Introduction

1.1 Background

WYG was commissioned by RWE in June 2017 to undertake a water vole and otter survey of the proposed development known as Tilbury Energy Centre hereafter referred to as the TEC. The TEC lies between the town of Tilbury, and East Tilbury in Essex. The survey was undertaken to identify potential ecological constraints of the TEC with regards to water vole and otter. This follows the completion of an Ecological Appraisal (EA) in May 2017 (WYG 2018) which identified potential habitat for water vole and otter, and previous surveys which found evidence of water vole at TEC.

This report was prepared by William Taylor, Principal Ecologist.

1.2 Site Location

The location of the proposed TEC is at the Former Tilbury Power Station in Tilbury, Thurrock, South Essex. The TEC is centred at Ordnance Survey National Grid Reference TQ 67347 76541.

The Indicative Order Limits (red line in Figure 1) defines the area within which the TEC development is proposed. The TEC includes the Former Tilbury A Power Station, the Former Coal Stock Yard, the Substation, Ashfields, the (now mainly defunct) Goshems Farm LWS and DHL land (refer to Figure 2 for the location of these areas). A recent revision of the TEC includes a connection along Station Road to the Asda supermarket roundabout. This area has not been considered as part of any WYG survey; but given that it follows the existing road, this area has been eliminated from the impact assessment (however if the proposals require development outside the existing road further assessment will be required).

Specific Area Names and Working Areas referred to in the report are shown on Figure 2 on Figure 2a respectively.

The survey area includes the land within and the TEC and a minimum of 0.1 km upstream and downstream (however additional lengths were surveyed where access allowed- as shown on Figure 3). An area in the west, which belongs to Port of Tilbury, was not surveyed due to access limitations. Habitats within the area surveyed include the areas of Pulverised Fuel Ash (PFA) and disturbed ground associated with the Former Tilbury A Power Station, over which sparse vegetation has grown in some areas (and can be classified as Open Mosaic Habitat on Previously Developed Land), arable and pasture land, drainage ditches and waterbodies and smaller habitat areas including dense scrub, broadleaved woodland and tall ruderal vegetation. The eastern extent of the TEC, the southern pipeline option, lies within 0.1 km of the foreshore, and in close proximity to the Thames Estuary and Marshes SPA and Ramsar, and Mucking Flats and Marshes SSSI.

1.3 Development Proposals

The proposed TEC development comprises the following main elements:

- up to 3 units / 2600 MW of Combined Cycle Gas Turbine (CCGT) Power Plant
- 1 Open Cycle Gas Turbine (OCGT) Power plant of up to 299 MW
- up to 100 MW of flexible energy storage (e.g. batteries)
- a 3 km gas pipeline



The total electrical generating capacity (net generated output) of the TEC is up to 2,899 MW. It is proposed that the station will be once through cooled using water from the Thames Estuary, thus there will be no requirement for cooling towers.

Space will be allocated within the TEC to allow installation of carbon capture plant in the future. Any carbon capture plant will form part of a future planning consent and will be constructed as and when required.

Further detail of the proposed development will be included within Chapter 3: Description of the TEC Development within the Preliminary Environmental Information Report (PEIR) (WYG, 2018).

1.4 Purpose of the Report

The aims of the survey work and the subsequent report presented herein were to:

- Detail existing records and locally designated sites of relevance to water vole and otter;
- Determine the presence or likely absence of water vole and otter within the survey area;
- Estimate the population size class of water vole, if confirmed to be present;
- Identify if any additional surveys are required and provide preliminary assessment of the importance of the site for water voles and otters and potential impacts of the TEC.

Please note this is a factual report to provide additional information for the PEIR (RWE 2018) and subsequently the Environmental Statement (ES). Further detail with reference mitigation, compensation and enhancement will be provided within the ES following ongoing discussions with statutory bodies.

Note that scientific names are provided at the first mention of each species and common names (where appropriate) are then used throughout the rest of the report for ease of reading.



2.0 Methodology

2.1 Desk Study

2.1.1 Previous Ecological Survey Reports

Previous ecological survey reports relating to water voles and otters for the location of the TEC and surrounding area were reviewed and used to inform the desk study. The relevant reports are listed below:

- Ecological Appraisal. WYG 2018.
- Proposed Port of Tilbury at Former Tilbury Power Station 'Tilbury 2'. Environmental Statement. Port of Tilbury. Bioscan 2017.
- Ecology Surveys (Demolition Area and Land within RWE Holdings) WYG 2015.
- Water Vole Survey (Tilbury Power Station Site and land to a 0.5 km radius). WYG Environment, 2008.
- Water Vole Survey (Tilbury Power Station Site only). RPS Group, 2007.

In addition, water vole and otter data from the proposed Lower Thames Crossing project has been provided by Arcadis. This data will be analysed and included within the future ecology chapter for the ES.

2.1.2 Local Ecological Records Centre

A review of available ecological information and relevant environmental databases was undertaken for the TEC and general environs. The area of search was taken as 2 km, which is the standard search area required by most local authorities. This provided the overall ecological context for the TEC and surrounding areas and potential basis for the reptile survey.

A data search was obtained as part of the Ecological Appraisal (WYG 2018a) from the Local Environmental Record Centres (LERC); Essex Wildlife Trust (EWT) and Essex Field Club (EFC) in December 2017 within 2 km of the TEC.

2.1.3 Online Resources

A search for relevant information was also made on the following websites:

- MAGIC www.magic.gov.uk - DEFRA's interactive, web-based database for statutory designations and information on any reptile EPSL applications that have been granted in the local area since 2015.

2.2 Water Vole Survey

2.2.1 Presence and Likely Absence

The survey included waterbodies within the TEC and waterbodies within 0.1 km of the TEC, with the exception of any waterbodies within Port of Tilbury Land due to access constraints. The area defined above is referred to as the survey area and this included a total of 20 waterbodies, 16 within the TEC and four within 0.1 km of the TEC (see Figure 3 for location). For consistency, the numbering of waterbodies was retained from the most recent water vole surveys (WYG, 2015). Waterbodies which



had not been surveyed in earlier surveys were assigned consecutive numbers starting from the end point of the existing numbering scheme.

The survey was undertaken by Tim Bradford, Joshua Stafford and Marc Anderton which are all suitably qualified surveyors following guidance provided in the Water Vole Mitigation Handbook (Dean *et al*, 2016). The surveyor searched for water vole field signs along the waterbody and the associated terrestrial habitat up to 2 m from the water’s edge. Where ditches crossed the proposed pipeline route corridor, the surveyor also inspected a minimum of 0.1 km upstream and 0.1 km downstream from the TEC (see Figure 3).

In accordance with guidelines for water vole survey (Dean *et al*, 2016), the waterbodies were visited once in the first half of the season (mid-April to end of June) and once in the second half of the season (July to September). Water vole were considered present within waterbodies and adjacent terrestrial habitat where evidence was recorded on at least one survey visit. Water vole were considered likely absent if no signs of water vole were recorded on either survey visit (refer to Table 1 for descriptions of water vole field sign terms).

The weather conditions were suitable on each of the survey visits (refer to Table 2).

Table 1 Descriptions of terms water vole field sign terms

Term	Description
Droppings	A water vole faecal pellet. Pellets are round ended, 8-10 mm long and 4-5 mm wide with a variable colour, but usually dark green, especially when fresh.
Latrines	A pile of droppings created to mark breeding territories.
Feeding evidence and feeding stations	Water vole eat at least 240 species of plant but most notably grasses, rushes and sedges. Stems of eaten plants are leftover in neat piles called feeding stations. The leftover stems are often over 10 cm long and have a cleanly cut edge at a neat 45 degrees angle at one or both ends.
Burrows and above ground nests	Water vole burrows are 4-8 cm diameter and typically near the water edge. The entrances may be above or below the water level. There will be no spoil or worn areas near the burrow. Above ground woven nests are created amongst dense vegetation. Water voles often use a network of burrows and/or nests.
Grazed lawns	Grazed lawns are present around the entrances of burrows within which a female is nesting young.
Footprints	Water vole footprints are similar to rat footprints, and can be difficult to distinguish. The front feet have four toes and create a 'star shaped' footprint approximately 14-18 mm long. The hind feet are approximately 24-35 mm long and have five toes with horizontally splayed outer toes.
Runways	Water voles create runways and tunnels through vegetation between burrows/nests and the water’s edge. Runways also exist beneath ground between burrows.



Table 2 Weather conditions during water vole and otter survey visits

Visit No.	Date	Min. Air Temp. (°C)	Max. Air Temp. (°C)	Rain	Wind (mph)	Cloud Cover	Waterbodies Surveyed
1	25.05.17	12	26	None	1 - 11	None	All except 36
2	25.07.17	13	23	None	4 - 9	Scattered	All except 36
3	18.04.18	11	25	None	6 - 13	Scattered	36 only

*Weather data from East Tilbury weather Station (Source: www.timeanddate.com)

2.2.2 Relative Population Density

An assessment of the relative population density of water voles on/adjacent to the waterbody was determined by calculating the number of latrines per 0.1 km and using this to estimate a relative population density in accordance with the Water Vole Mitigation Handbook (Dean *et al*, 2016; see Table 3).

Table 3 Relative population density

Relative population density	Approximate number of latrines per 0.1 km of bankside habitat	
	First half of survey season (mid-April to end of June)	Second half of survey season (July to September)
High	10 or more	20 or more
Medium	3 - 9	6 - 19
Low	≤ 2 (or none, but with other confirmatory field signs)	≤ 5 (or none, but with other confirmation field signs)

2.3 Otter Field Survey

2.3.1 Presence / Likely Absence Survey

Whilst undertaking the water vole survey (refer to Section 2.2.1) surveyors simultaneously searched for signs of otter. The otter survey was undertaken within the optimal survey season (May – September, inclusive) by two suitably qualified and experienced ecologists, with reference to published methodology (Chanin, 2003). The surveyor searched a width of 2 m from the water’s edge for otter field signs along each waterbody (refer to Table 4 for description of otter field sign terms). Where the proposed pipeline route corridors crossed ditches, the surveyor also inspected 0.1 km upstream and 0.1 km downstream from the proposed works area (Figure 3).

The weather conditions were fine on each of the survey visits (refer to Table 2).



Table 4 Descriptions of otter field sign terms

Term	Description
Spraint	An otter dropping. Smell strongly of otter and are left at conspicuous landmarks along rivers such as on rocks, at weirs and under bridges. Appearance variable but often contain fish scales and bones.
Spraint site	A place that is regularly used by otters, including spraint that is regularly refreshed. Often leaves discolouration on substrate.
Anal jelly	A jelly like secretion which can vary in colour and smells strongly of otter.
Feeding remains	Otters eat fish, amphibians and small mammals. Feeding remains are often hard to distinguish from those of other animals.
Resting site	The generic term used to describe areas where otter sleep during the day (commonly termed holts and couches). All resting sites are afforded protection by the Habitats Regulations. Otter resting sites are categorised as one of three types: <ul style="list-style-type: none"> • Holt - an underground or other fully enclosed shelter of which the full extent cannot be seen, can range from enlarged rabbit holes and cavities amongst tree roots to rock piles and man-made structures. • Hover - an above ground, semi-enclosed resting place, often found under overhanging river banks or tree root plates. • Couch - a nest-like structure (0.3 – 1 m in diameter) constructed from nearby vegetation or a depression in a stick pile.
Tracks and scratch marks	Otter feet have five toes positioned in front of the large pad. Prints are asymmetrical. Tracks can be found in soft ground and are typically 5-7 cm wide for an adult otter. Sometimes only four toes sink sufficiently into ground to leave mark. Scratch marks can be found on logs and along embankments used by otters to climb out aquatic habitats and up slopes.
Sign heaps and slides	Sign heaps are areas of sand/earth/vegetation that have been scraped into a pile. The pile is then scent marked usually with urine. Otters often move by sliding for instance down embankments, across mud and across fallen leaves leaving a flattened area of ground often with occasional footprints where the otter has pushed itself along.

2.4 Limitations

It is not possible to make a robust population estimate of water voles from latrine counts. However, latrines provide relative indices of activity, which are suitable for the purposes of assessing impacts or designing mitigation (Dean *et al*, 2016; Table 3).

Waterbody 24 has steep banks which meant that surveyors could not access the waterbody for safety reasons. Therefore, surveyors had to undertake inspections with binoculars from the top of the bank.

Access limitations to waterbody 36 due to nearby construction activity, meant that it could not be surveyed in 2017. To account for this, a survey visit was made in April 2018. The survey confirmed presence of water vole at a moderate relative population density. In accordance with the water vole



guidance, a second visit is usually recommended between July and September (inclusive) 2018. However, given this affects only one ditch, the moderate water vole density found here is considered sufficient information, but pre-commencement surveys are likely required to inform the licence.

Patterns of water vole presence / likely absence, and relative population densities have changed considerably since the last survey in 2015. Furthermore, no evidence of water vole was recorded for waterbody 37 and 47a during the survey in 2017, but during the GCN surveys in May 2018 evidence of water vole was found. It is recommended that regular surveys are undertaken to maintain data validity. The data in this report is considered valid for a period of two years from when it was first collected in May 2017, after which the validity of this assessment should be reviewed to determine whether further updates are necessary. Note that the recommendations within this report should be reviewed (and reassessed if necessary) upon finalisation of the proposed TEC development to inform licensed mitigation works.

It was not possible to access Port of Tilbury Land, however this area was surveyed for water vole in 2016 and 2017 (Port of Tilbury, 2017), therefore this is not considered to be a limitation.

Since the surveys were undertaken there have been some changes to the TEC indicative order limits. This includes an extension to the west, which does not contain any suitable habitat for water vole and otter, as well as amendments to the proposed pipeline route corridors. This has resulted in one waterbody not being surveyed, which falls within 0.1 km of the updated northern pipeline route corridor (immediately south of Poultry Farm Figure 3).

The details of this report will remain valid for a period of two years from the date of the survey (i.e. May 2019), after which the validity of this assessment should be reviewed to determine whether further updates are necessary. Note that the recommendations within this report should be reviewed (and reassessed if necessary) should there be any changes to the TEC or development proposals which this report was based on.



3.0 Results

3.1 Desk Studies

3.1.1 Previous Ecological Reports

RPS conducted water vole surveys in 2007 (RPS, 2007) on 32 waterbodies across an area stretching from Goshems Farm LWS to Port of Tilbury Land, up to 0.6 km north of the Substation (see Appendix A). Over half of the waterbodies were identified as having water vole activity, with high populations within the Ashfields, including watercourse 37 and 38 in the TEC, and part of the Port of Tilbury Land. A medium population was observed north-west of the gatehouse in watercourse 9, within the TEC, and low populations were found bordering the north of the Ashfields, around the Substation and in part of the Port of Tilbury Land.

In 2008, three water vole surveys (April, July and September) were undertaken on waterbodies in an area similar to that surveyed by RPS (2007), though across an area stretching 1 km west of Port of Tilbury Land and up to 1.4 km north of the Substation (WYG, 2008; Appendix B). This comprised a total of 108 distinct waterbodies, including ponds and an extensive drainage ditch system, of which 95 were accessible for survey. All waterbodies were divided into 0.5 km sections and allocated an identification number following the system used by RPS (RPS, 2007). The surveys included a habitat assessment and a search for evidence of water vole activity. Suitable habitat and evidence of water vole were found along waterbodies throughout the survey area, with high populations within the Ashfields (watercourse 37 and 38 within the TEC), northern part of the Port of Tilbury Land (watercourse 15 within the TEC) and to the eastern border of Goshems Farm LWS (watercourse 39 within the TEC, see Appendix B). A medium population was noted at waterbodies bordering the north of the Ashfield and a low population was found inside the TEC to the north and east of the Substation (watercourse 34).

In 2015, updated water vole surveys were undertaken of waterbodies located between Lytag Brownfield LWS, Port of Tilbury Land and throughout to 0.5 km north of the Ashfields (refer to Appendix C for results). Despite changes in the presence and population densities along specific waterbodies since the 2008 surveys, water vole remained widespread throughout the survey area (WYG, 2015).

In 2016 and 2017 land within the TEC belonging to Port of Tilbury and north-west of the gatehouse, as well as throughout the Lytag Brownfield LWS, was surveyed for water voles (Port of Tilbury, 2017). The results of these surveys are presented in Appendix D. The 2016 survey identified one waterbody with a low relative population density, one waterbody with medium relative population density and two waterbodies with high relative population density. The 2017 survey identified eight waterbodies with low relative population density, three waterbodies with medium relative population density and two waterbodies with high population density.

3.1.2 Local Records Centre

The most recent ecological appraisal identified habitats within and adjacent to the TEC as potentially suitable to support water vole and otter (WYG, 2018). The results of the local ecological records centres search, Essex Wildlife Trust (EWT) and Essex Field Club (EFC), within 2 km radius of the TEC revealed records of water vole, but not otter. Three water vole records from EWT include a record adjacent to the eastern TEC and two records 1.7 km and 1.9 km north-east of the TEC. The EFC



provided 21 records of water vole, as close as 0.3 km from the TEC centroid, the latest from 2006. Despite otter records in all other Anglian catchments, a national survey for otters in 2009 / 2010 recorded no signs of otter within the South Essex catchment (Environment Agency, 2010) within which the TEC is located.

Despite the extensive survey effort along waterbodies within the TEC and surrounding area demonstrated in the surveys listed above, no evidence of otters has been recorded in previous surveys of the TEC.

3.2 Water Vole Survey

3.2.1 Presence / Likely Absence Survey

The results of the presence / likely absence survey are shown in Table 5. Twenty waterbodies were surveyed (Figure 3). Water vole were recorded in seven of these waterbodies, whilst the remaining 13 of the waterbodies were considered to be likely absent of water vole.

The table also includes the 2015 results for comparison. Fourteen waterbodies from the 2017 / 2018 surveys were not within the 2015 survey area. However, of the six which were covered by both surveys, five were recorded as having water vole present in the 2015 study, compared with just two in the 2017 / 2018 surveys.

Table 5 Results of presence / likely absence survey and comparison with 2015 results for water voles

Waterbody	Presence / Likely Absence (2017 / 2018)	Field Signs (2017 / 2018)	Presence / Likely Absence (2015)
24	Likely Absence		Not surveyed
33	Likely Absence		Presence
36	Presence	April 2018: 19 feeding stations, 8 latrines, 6 burrows - 0.1 km bankside surveyed	Presence
37	Presence	May 2018: Water vole presence was confirmed through the incidental sighting of a burrow.	Presence
38	Presence	May 2017: 25 latrines, 12 feeding stations – 0.1 km bankside surveyed	Not surveyed
39	Likely Absence		Presence
41a	Likely Absence		Presence
41c	Likely Absence		Likely Absence
42	Likely Absence		Not surveyed
43	Likely Absence		Not surveyed



Waterbody	Presence / Likely Absence (2017 / 2018)	Field Signs (2017 / 2018)	Presence / Likely Absence (2015)
47a	Presence	May 2018: Water vole presence was confirmed through the incidental sighting of a burrow.	Not surveyed
47b	Likely Absence		Not surveyed
48	Likely Absence		Not surveyed
52	Likely Absence		Not surveyed
96	Likely Absence		Not surveyed
97	Presence	May 2017: 14 latrines (approximately 0.25 km of bank surveyed)	Not surveyed
98	Presence	July 2017: 1 latrine (approximately 0.4 km of bank surveyed)	Not surveyed
99	Presence	July 2017: 1 latrine (approximately 0.8 km of bank surveyed)	Not surveyed
100	Likely Absence		Not surveyed
102	Likely Absence		Not surveyed

3.2.2 Relative Population Density

Relative population densities were calculated for all waterbodies where water vole were confirmed present, except 37 and 47a. These two waterbodies had no signs recorded during the initial two visits, but burrows were noted as incidental evidence during a great crested newt (GCN) *Triturus cristatus* surveys on 17th May 2018 (TN1) and 24th May 2018 (TN2). Notes and photos of these records are presented in Appendix E, and their locations are shown on (Figure 3) demarcated by TN1 and TN2.

The relative population density results are presented on Figure 3. Waterbody 38 had a high relative population density. Waterbodies 36 and 97 had moderate relative population densities. Waterbodies 98 and 99 had low relative population densities.

The water vole distribution within the survey area has contracted since the last survey in 2015 due to unknown reasons. Noting the above the historic data suggests that the local water vole population is subject to a large degree of change from year to year with water vole movement throughout the survey area. Therefore, pre-commencement checks of potentially suitable habitat should occur the survey season prior to the works commencing. The survey length and licensing processing period for NE should be considered when deciding timeframes and works programmes.



3.3 Otter Survey

3.3.1 Presence / Likely Absence Survey

No evidence of otter activity was recorded at any of the waterbodies surveyed. This finding is consistent with the results of prior surveys and existing data searches with EWT and EFC. Therefore, it is concluded that otter are likely to be absent from the survey area.



4.0 Legislation

4.1 Water Vole

In the UK, water voles are protected under Schedule 5 of the W&CA which makes it illegal to:

- Intentionally or recklessly kill, injure or take water voles;
- Possess or control live or dead water voles or derivatives thereof;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection; and
- Intentionally or recklessly disturb water voles whilst occupying a structure or place used for that purpose.

4.2 Otter

Otters are classified as a European Protected Species (EPS) under the Habitats Regulations. Under Part 3, Section 43 (1 & 2) it is considered an offence for a person to:

- Deliberately capture, injure or kill an otter;
- Deliberately disturb an otter in such a way as to be likely to significantly affect the local distribution or abundance of otters or the ability of any significant group of otters to survive, breed, rear or nurture their young; and
- Damage or destroy an otters breeding site or resting place (e.g. an otter holt or couch).

Otters are also fully protected under Section 9 (4) (b) and (c) and (5) of the W&CA. This means that, in addition to the provisions of the Habitats Regulations, it is also illegal to:

- Intentionally or recklessly disturb any otter whilst it is occupying a holt; and
- Intentionally or recklessly obstruct access to a holt.

4.3 UK Post-2010 Biodiversity Framework

The Environment Departments of all four governments in the UK work together through the Four Countries Biodiversity Group. Together they have agreed, and Ministers have signed, a framework of priorities for UK-level work for the Convention on Biological Diversity. Published on 17 July 2012, the 'UK Post-2010 Biodiversity Framework' covers the period from 2011 to 2020.

Although the UK Post-2010 Biodiversity Framework does not confer any statutory legal protection, in practice many of the species listed already receive statutory legal protection under UK and / or European legislation. In addition, the majority of Priority national (UK) Biodiversity Action Plan (BAP) habitats and species are now those listed as Habitats and Species of Principal Importance in England (HPI / SPI) (listed under Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act) All public bodies have a legal obligation or 'biodiversity duty' under Section 40 of the NERC Act to conserve biodiversity by having particular regard to those species and habitats listed under S41. The water vole and otter are both listed as SPI under Schedule 43 of the NERC Act. For the purpose of this report, habitats and species listed under S41 of the NERC Act are referred to as having superseded the UK BAP.



5.0 Discussion

5.1 Potential Impacts to Water Vole

Evidence of water vole activity was recorded in seven waterbodies across the survey area. Potential impacts to reptiles as a result of the TEC construction include:

- Permanent direct loss of habitat- in areas included within the construction of buildings and other infrastructure;
- Temporary direct loss of habitats- in areas associated with the Pipeline Routes and Gas Connection Area during construction;
- Degradation and disturbance of habitats during construction due to indirect impacts, such as dust, noise and lighting etc and impacts to water quality and quantity;
- Fragmentation (both temporary and permanent);
- Killing and injury of individuals;
- Disturbance to a water vole resting place.

Where the development is likely to require habitat loss or disturbance to suitable water vole habitat, to avoid an offence under W&CA further mitigation will be required and will be detailed in the ES. This will potentially include sensitive clearance techniques, translocation and/ or habitat enhancements to increase the carrying capacity of receptor sites. Guidance will also be provided so the TEC follows planning policy to minimise impacts on biodiversity and provide net gains in biodiversity.

A full impact assessment along with the recommendations for mitigation, compensation and ecological enhancements will be included in the ES

5.2 Potential Impacts to Otter

No evidence of otter was recorded on/ adjacent to the TEC. Based on this and previous surveys, including the Environment Agency (EA) surveys (EA, 2010) within the wider catchment which have not recorded otter, it is highly unlikely that otter are present or would be impacted by the TEC.



6.0 Summary

Water vole were recorded in seven of the twenty waterbodies surveyed with relative population densities ranging from low to high. However the historic data suggests that the local water vole population is subject to a large degree of change from year to year with water vole movement throughout the survey area. Therefore, pre-commencement checks of potentially suitable habitat should occur the survey season prior to the works commencing.

Survey, mitigation and monitoring works should be completed in accordance with the Water Vole Mitigation Handbook (Dean *et al*, 2016).

No signs of otter have been recorded during current or historic surveys and they are considered absent from the TEC.

A full impact assessment along with the recommendations for mitigation, compensation and ecological enhancements will be included in the ES.



7.0 References

- Bioscan 2017
- Dean, M. Strachan, R. Gow, D. And Andrews, R. (2016) The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series). Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.
- Environment Agency (2010) Fifth Otter Survey of England 2009 – 2010, Technical Report
- Natural England (2015) Guidance – Water voles: Surveys and Mitigation for Development Projects. <https://www.gov.uk/guidance/water-voles-protection-surveys-and-licences#avoidance-and-mitigation-methods> – Accessed 30/05/2018
- Natural England (2017) Class Licence – Intentional Disturbance of water voles and damage / destruction of water vole burrows by means of ‘displacement’. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/670126/cl31-watervole-displacement-licence.PDF - Accessed 30/05/2018
- Port of Tilbury (2017) Proposed Port Terminal at Former Tilbury Power Station – Tilbury2 – Volume 6 Part A – Environmental Statement – Document Ref: 6.1.
- RPS Group “RPS” (2007) Proposed Tilbury ‘C’ Coal-fired Power Station, Tilbury, Essex – Water Vole Survey Report
- RWE (2018) Tilbury Energy Centre Preliminary Environmental Information Report: Draft
- WYG (2018) Tilbury Energy Centre – Ecological Appraisal
- WYG (2015) Tilbury Energy Centre – Ecological Surveys
- WYG (2008) Tilbury Energy Centre – Water Vole Survey
- WYG (2018) Ecological Appraisal. WYG, London.



FIGURES

Figure 1 – Site Location

Figure 2 – Tilbury Area Names


Figure 2a – Work Areas

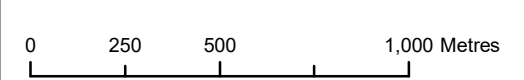
**Figure 3 – Survey Area and Relative
Population Density Estimates for
Water Vole**



Rev	Date	Notes
A	06/09/18	Initial map production
B	26/10/18	New Order Limits

Legend

 Indicative Order Limits

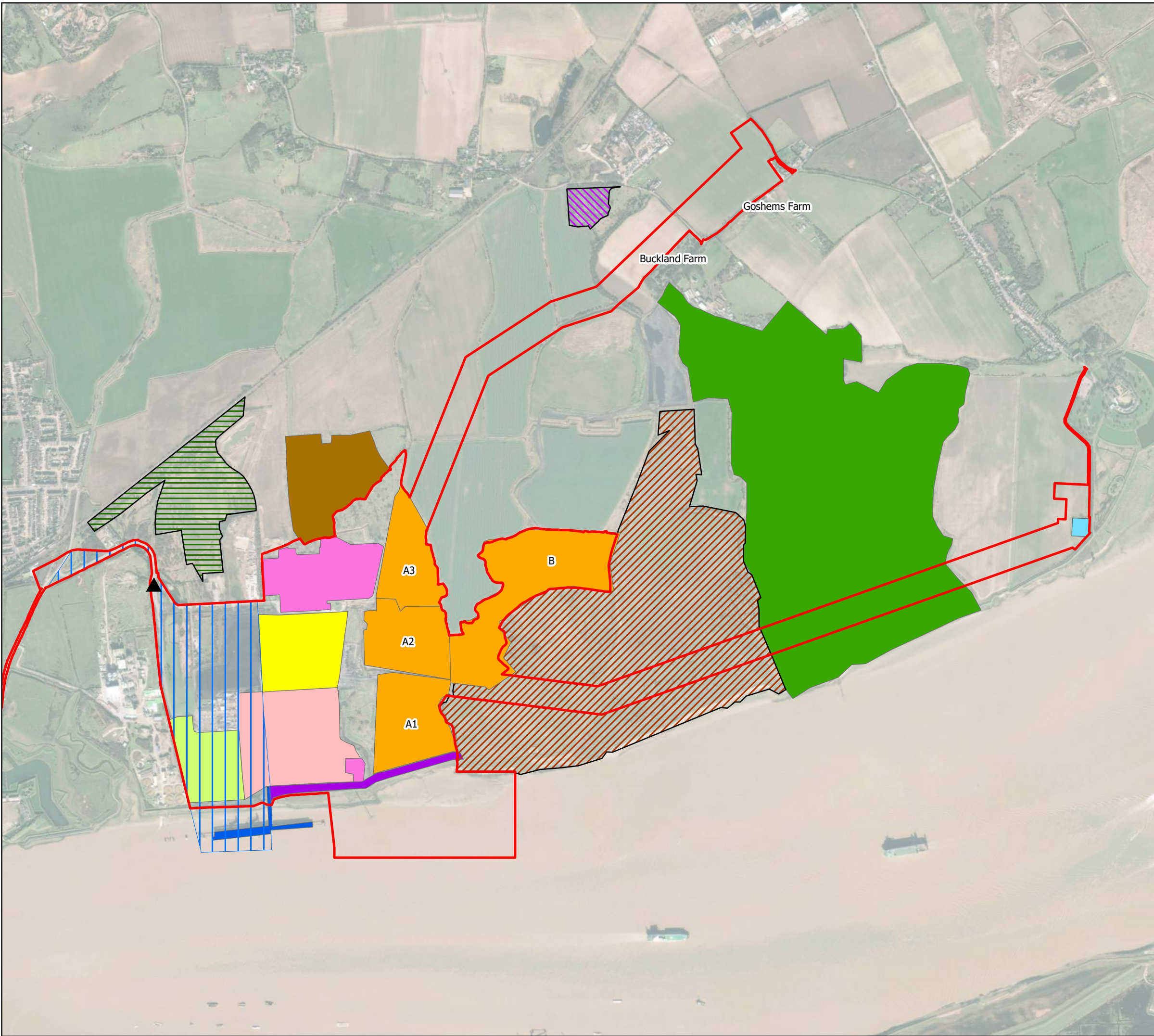


Site Location

Tilbury Energy Centre RWE

Scale at A3: 1:20,000	Project No: A103397	Drawing No: Figure 1	Revision: B
Drawn by: Ben Blowers		Drawn date: 26/10/2018	Approved by: Will Taylor

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Rev	Date	Notes
A	06/09/18	Initial map production
B	26/10/18	New Order Limits

- Indicative Order Limits
- Goshems Farm LWS
- Low Street Pit LWS
- Lytag Brownfield LWS
- Port of Tilbury Land
- Former Tilbury A
- Former Tilbury B station
- Ashfields
- Former Coal Stock Yard
- DHL land
- Above ground installation
- Port of Tilbury jetty
- Sub station
- Tilbury Riverside Project Community Meadow
- Walton Common
- Site entrance

0 100 200 400 Metres

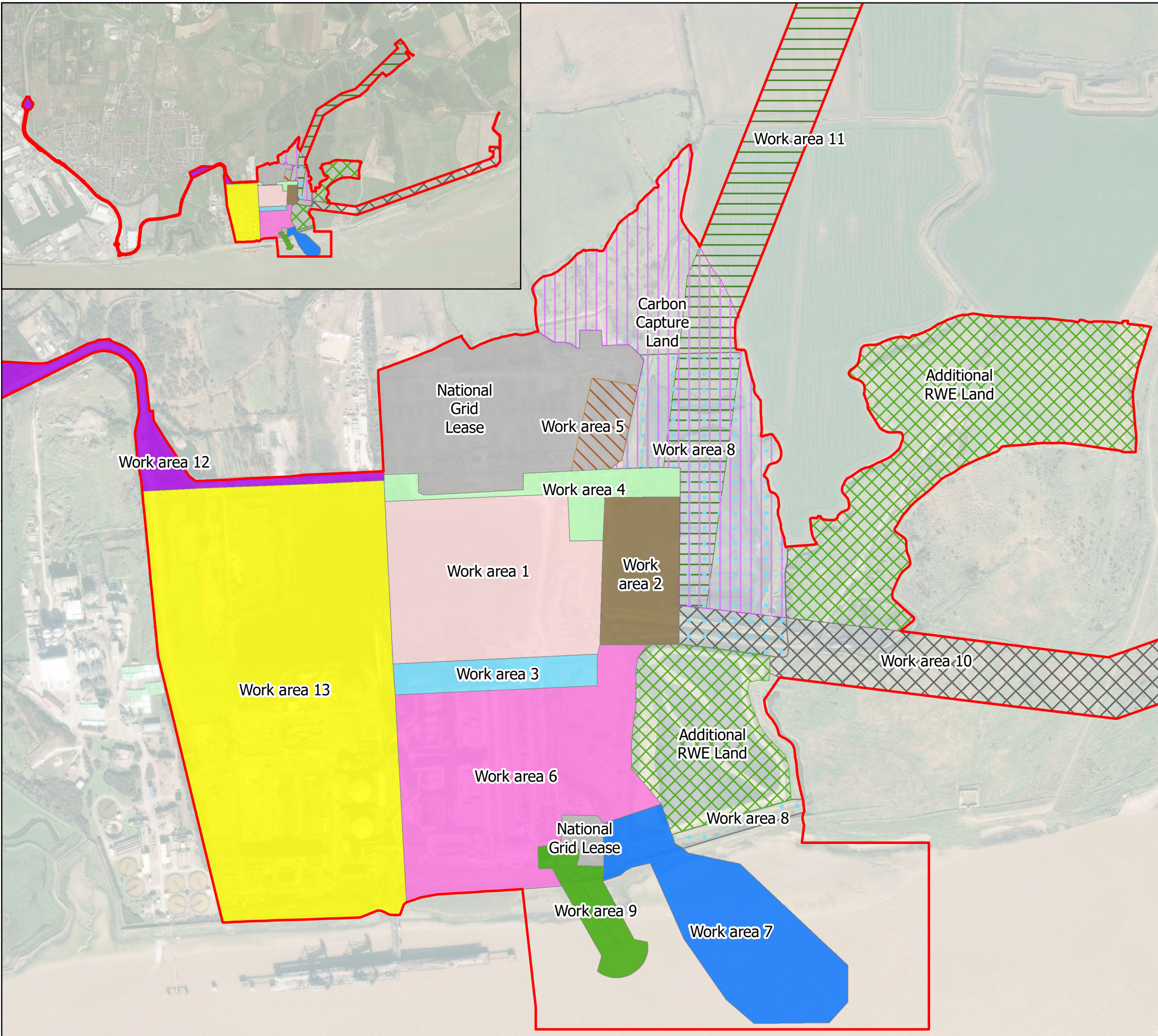


Tilbury Area Names

Tilbury Energy Centre RWE

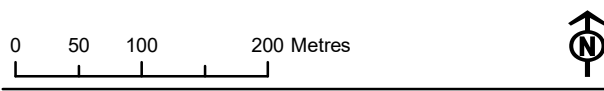
Scale at A3: 1:13,000	Project No: A103397	Drawing No: Figure 2	Revision: B
Drawn by: Ben Blowers		Drawn date: 26/10/2018	Approved by: Will Taylor

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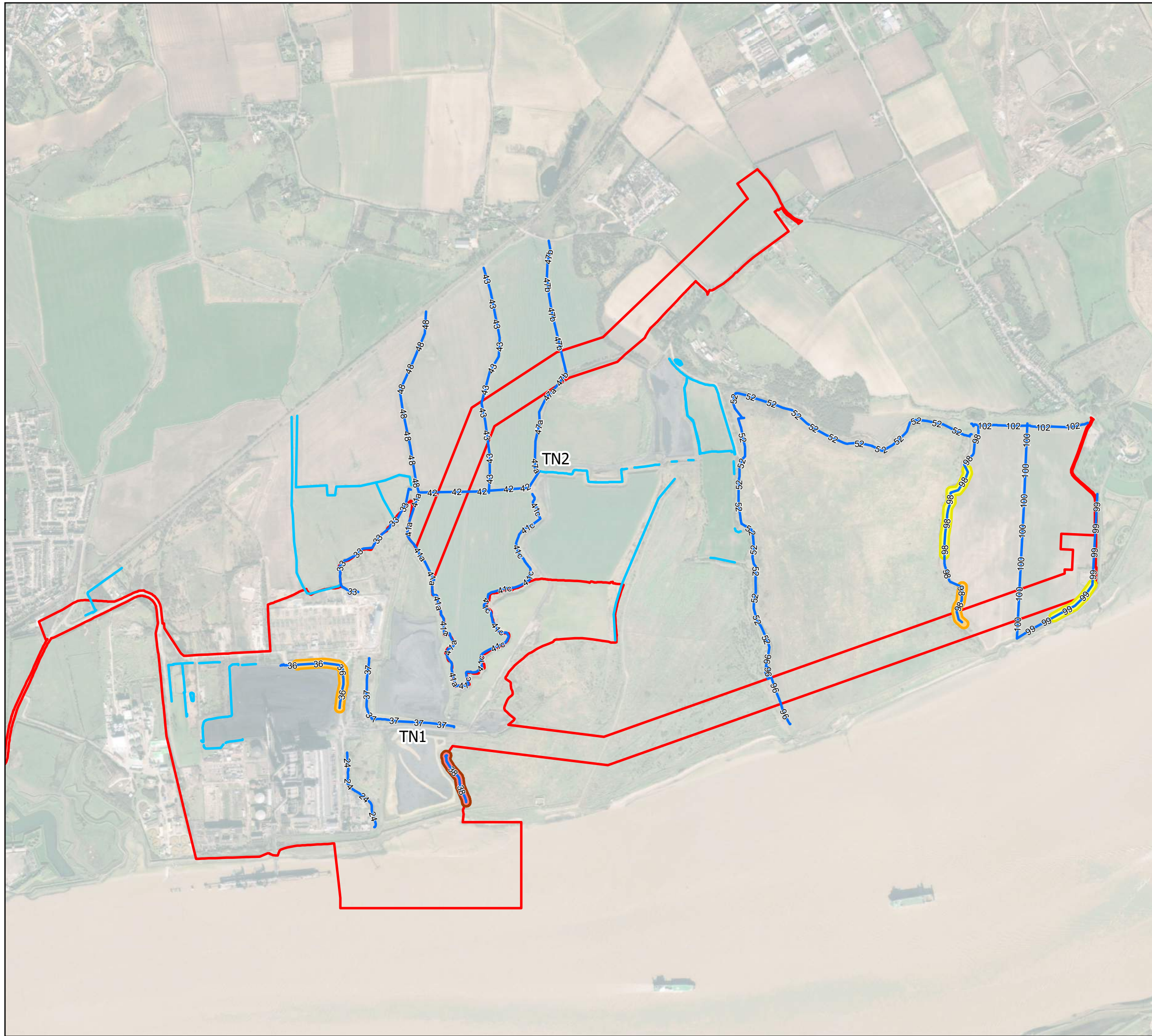
Rev	Date	Notes
A	06/06/19	Initial map production

- Legend**
- Indicative order limits
 - Additional RWE Land
 - Carbon Capture Land
 - National Grid Lease
 - Work area 1
 - Work area 2
 - Work area 3
 - Work area 4
 - Work area 5
 - Work area 6
 - Work area 7
 - Work area 8
 - Work area 9
 - Work area 10
 - Work area 11
 - Work area 12
 - Work area 13



Work Area			
Tilbury Energy Centre RWE			
Scale at A3: 1:6,000	Project No: A103397	Drawing No: Figure 2a	Revision: A
Drawn by: Ben Blowers	Drawn date: 06/06/2019	Approved by: Chris Meddins	

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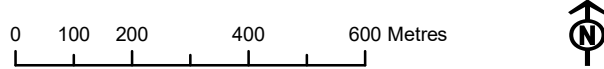
Rev	Date	Notes
A	06/09/18	Initial map production
B	26/10/18	New Order Limits
C	06/12/18	Amendments

Legend

- Indicative Order Limits
- Waterbody surveyed
- Waterbody not surveyed

Water Vole Survey - Relative Population Density

- High
- Moderate
- Low



Relative Population Densities for Water Vole

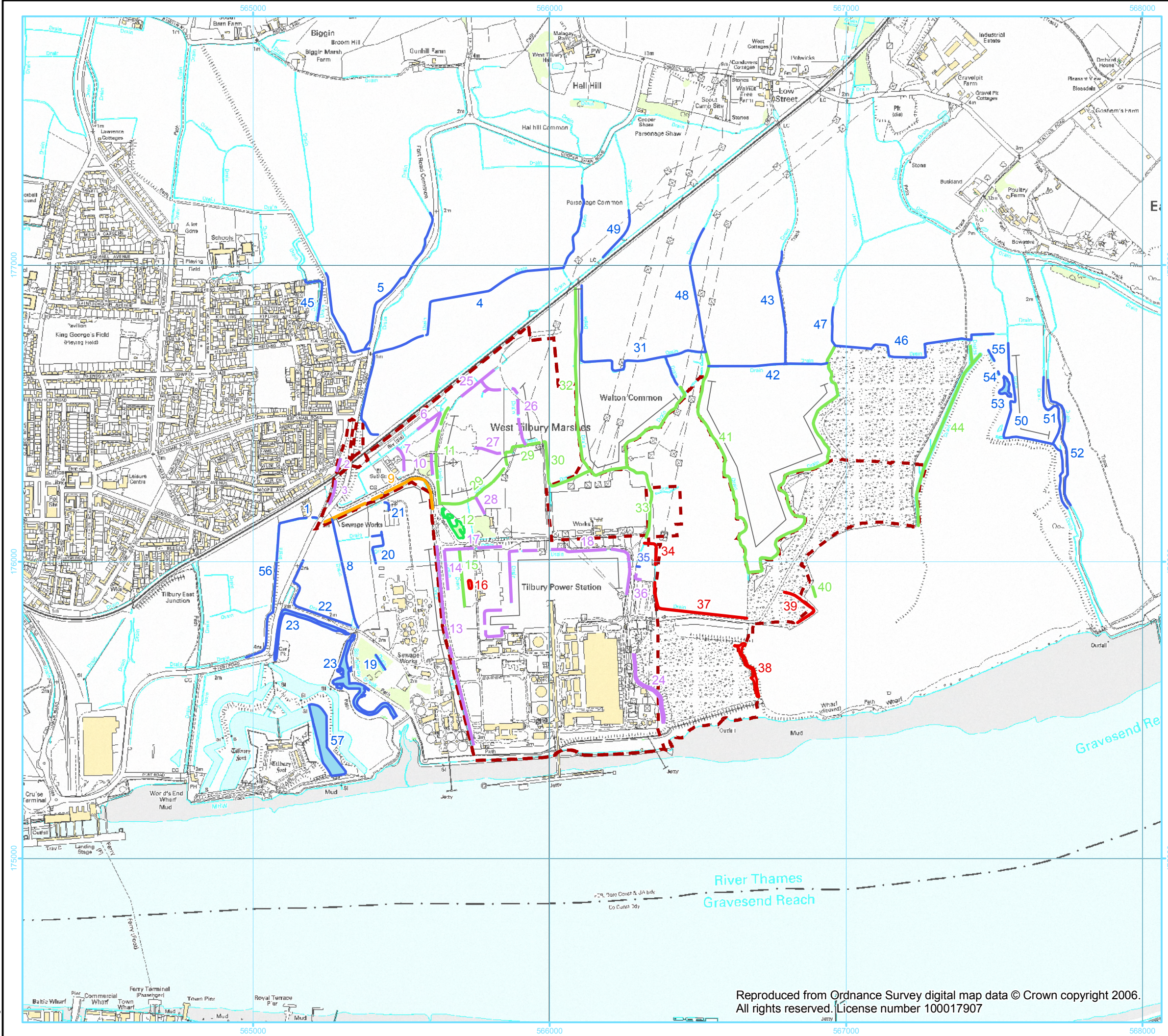
Tilbury Energy Centre RWE

Scale at A3: 1:13,000	Project No: A103397	Drawing No: Figure 3	Revision: C
Drawn by: Ben Blowers	Drawn date: 06/12/2018	Approved by: Rachel Sore	

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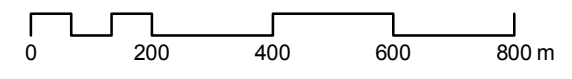


Appendix A – 2007 Water Vole Survey Results



Key

- Site boundary
- Ponds - Abundance of Water Voles**
- High
- Medium
- Low
- Ditches - Abundance of Water Voles**
- High
- Medium
- Low
- Ponds with no evidence of Water Voles
- Ditches with no evidence of Water Voles
- Ponds not surveyed
- Ditches not surveyed



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 St. Ives Cambridgeshire PE27 5JL
 T 01480 466335 F 01480 466911 E rpscm@rpsgroup.com

■	Client: RWE npower
■	Project: Tilbury Power Station
■	Title: Water Vole survey 2007
■	Date: September 2007 Scale: 1:12,500 @A3
■	Drawn: KM Checked: SS
■	Drawing based upon: British National Grid

■ Job: **JPP1503** Figure No: **3.1** Rev: **B**

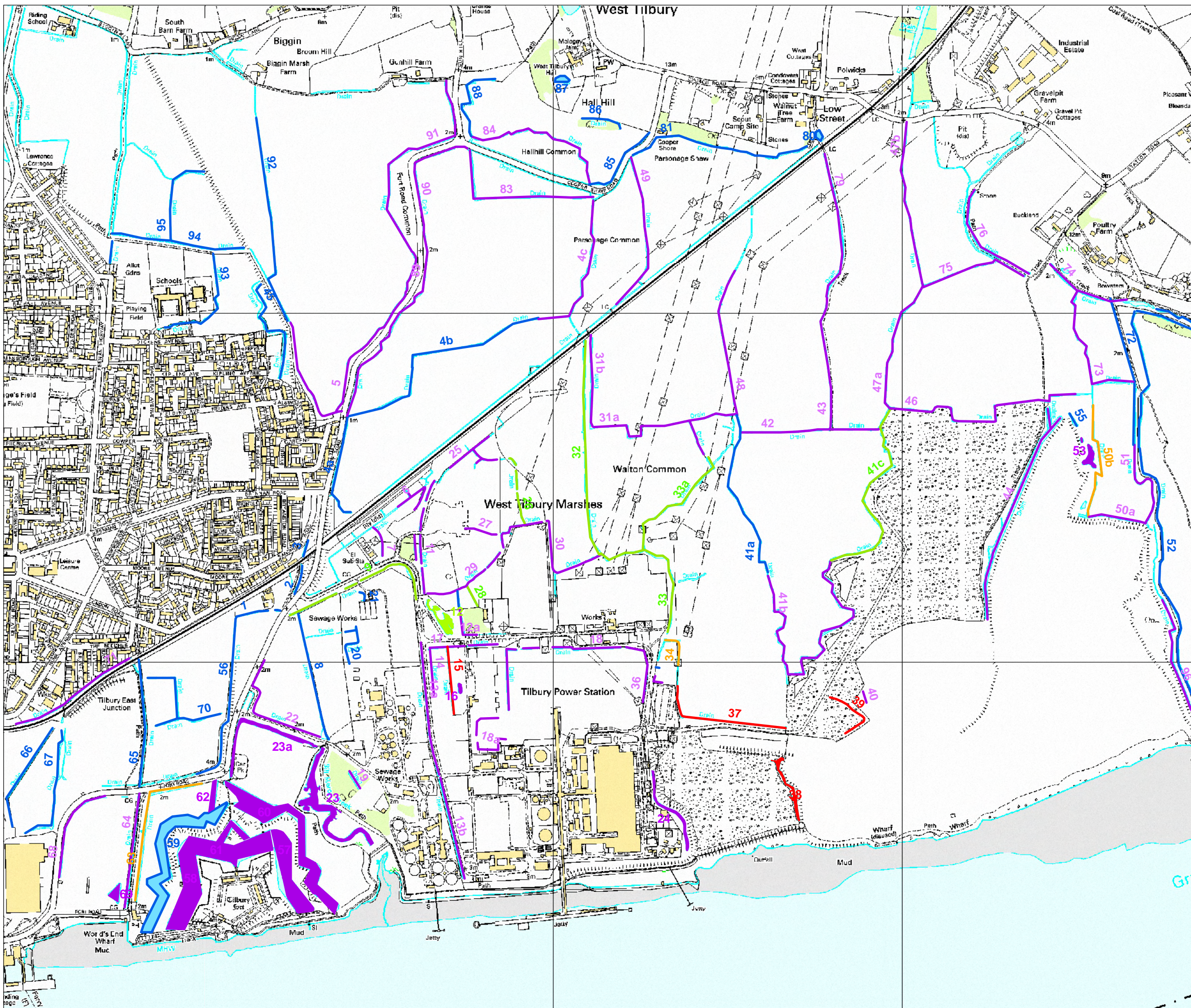
www.rpsgroup.com

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Drawing Ref:



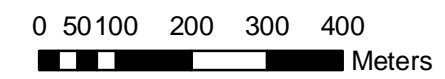
Appendix B – 2008 Water Vole Survey Results



Key

Water vole population category

- Unknown
- High
- Medium
- Low
- None
- Not Surveyed



Drawing title:
Water vole survey map - Spring 08

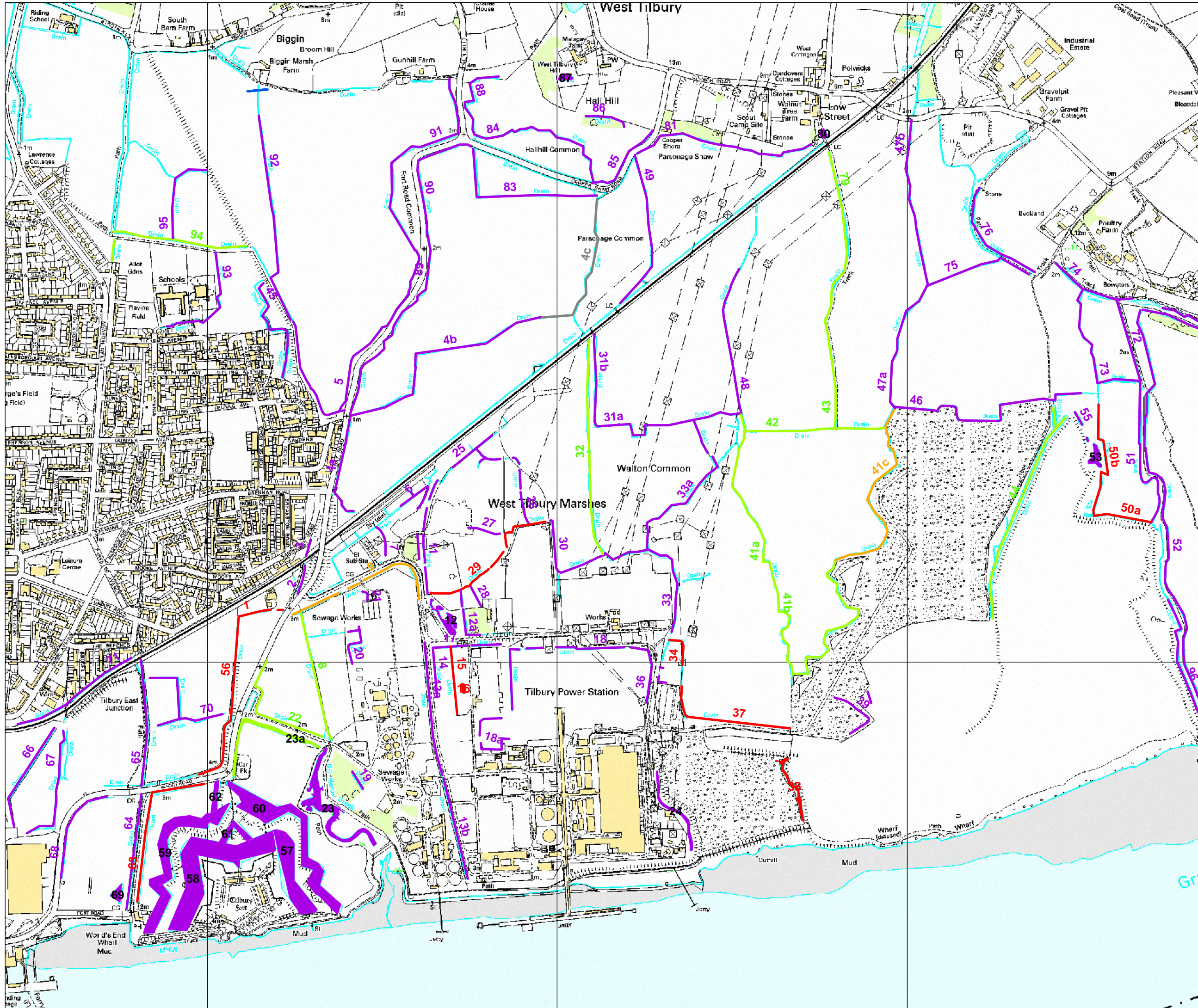
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A043998-1 Tilbury Power Station

Client:
RWE npower

Scale (A3): 1:10,000	Created by: TJB 12/05/08	Reviewed by: --- -/-/-	Verified by: --- -/-/-
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Office: 4004	Drawing number: WVL D01	Revision: Rev.01
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WYG Environment Transport Planning
 Sunley House,
 4 Bedford Park,
 London CR0 2AP
 Tel: 0208 649 6600
 Fax: 0208 649 6629
 Email: environ.london@wyg.com



Key

Water vole population category

- Unknown
- High
- Medium
- Low
- None
- Not Surveyed

0 50 100 200 300 400 Meters

Drawing title:
Water vole survey map - Summer 08

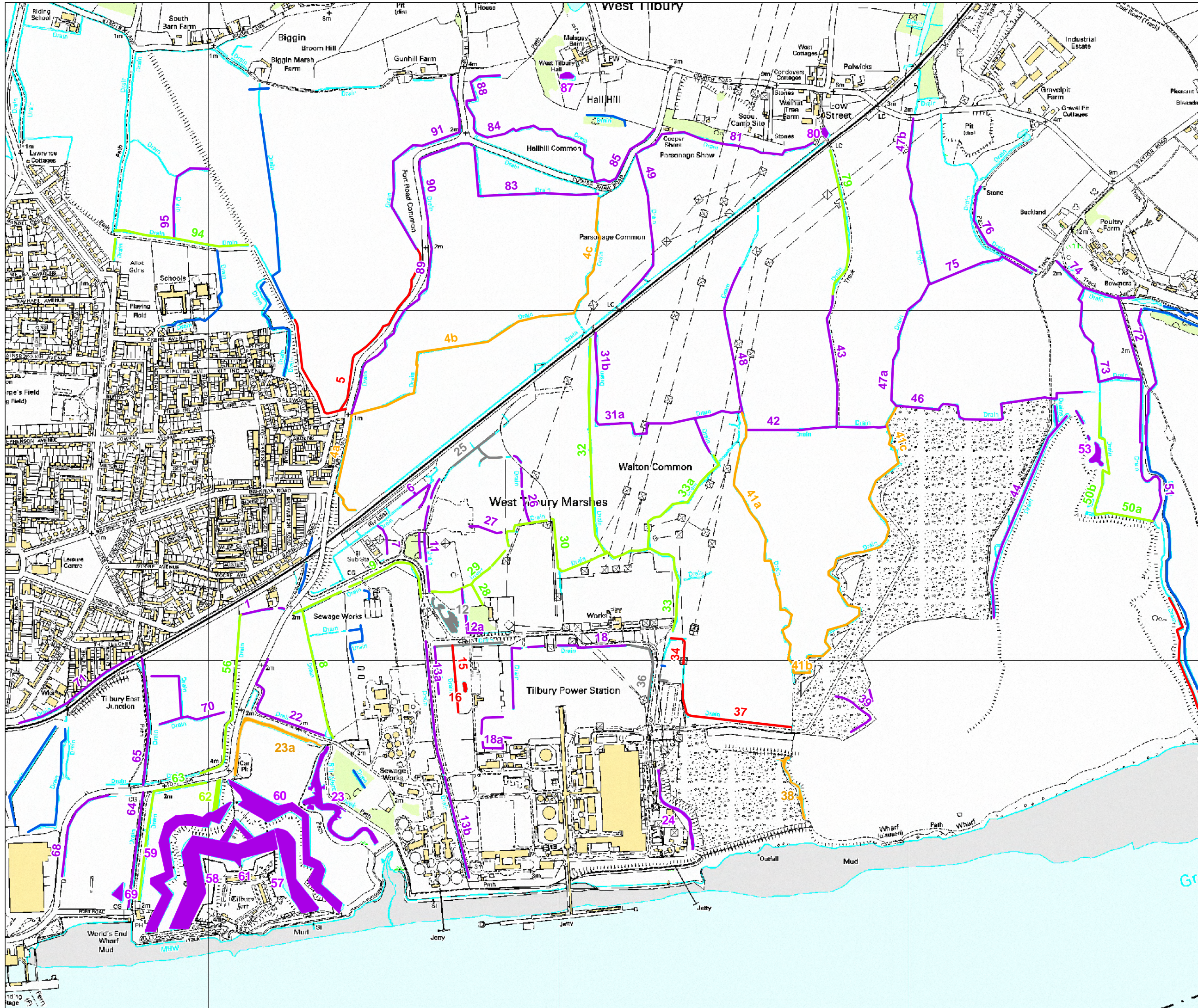
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A043998-1 Tilbury Power Station

Client:
RWE npower

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WYG Environment Transport Planning

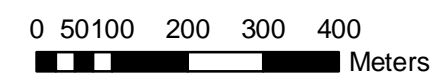
Sunley House,
4 Bedford Park,
London CR0 2AP
Tel: 0208 649 6600
Fax: 0208 649 6629
Email: environ.london@wyg.com



Key

Water vole population category

- Unknown
- High
- Medium
- Low
- None
- Not Surveyed



Drawing title:
Water vole survey map - Autumn 08

Project:
A043998-1 Tilbury Power Station

Client:
RWE npower

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Office: 4004	Drawing number: WVL D03	Revision: Rev.01	

WYG Environment Transport Planning

Sunley House,
4 Bedford Park,
London CR0 2AP
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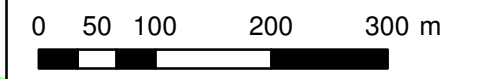
Appendix C – 2015 Water Vole Survey Results



Legend

Water vole population category

- High
- Moderate
- Low
- None
- Demolition Boundary



Drawing title:
Water vole survey map

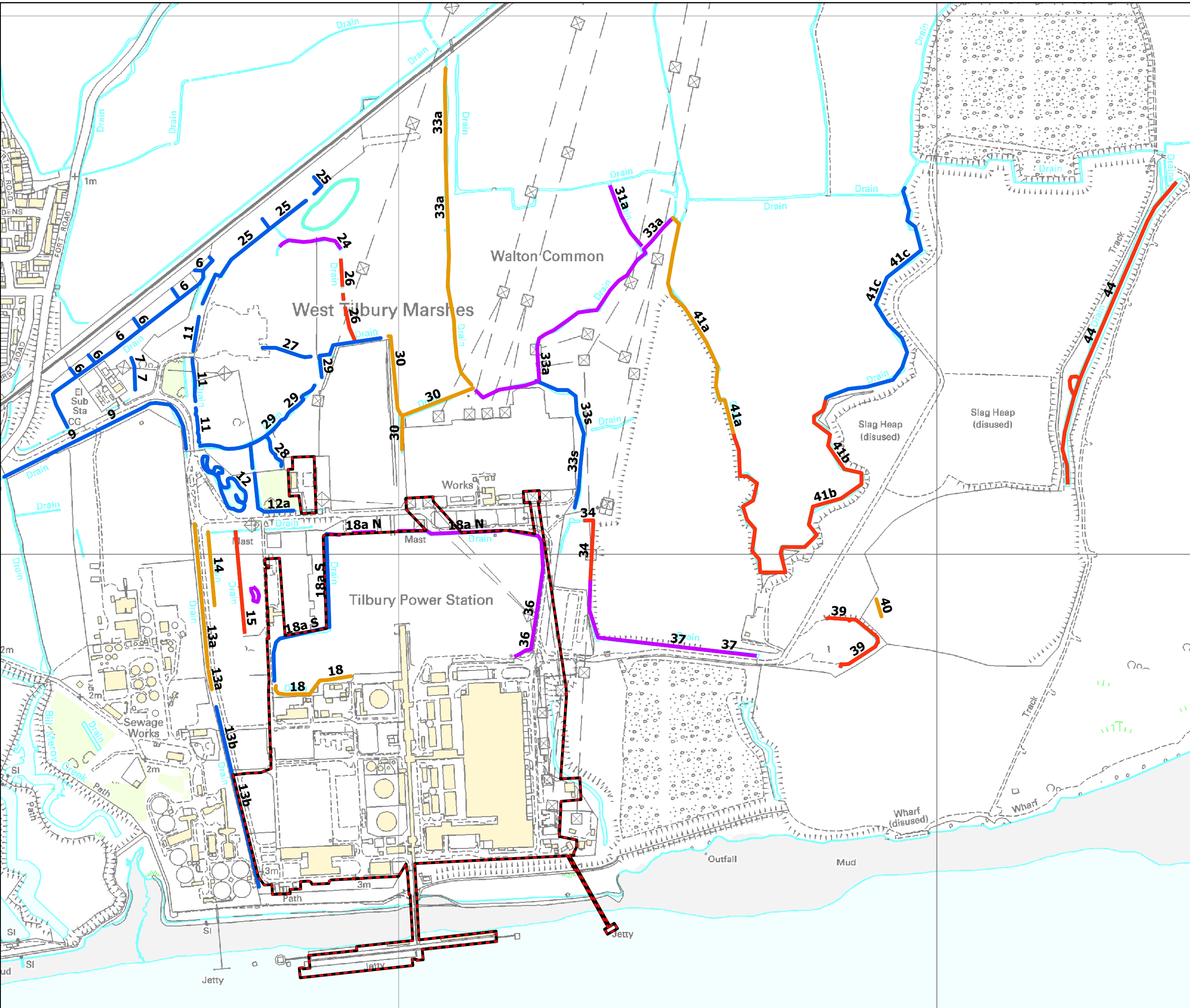
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Client:
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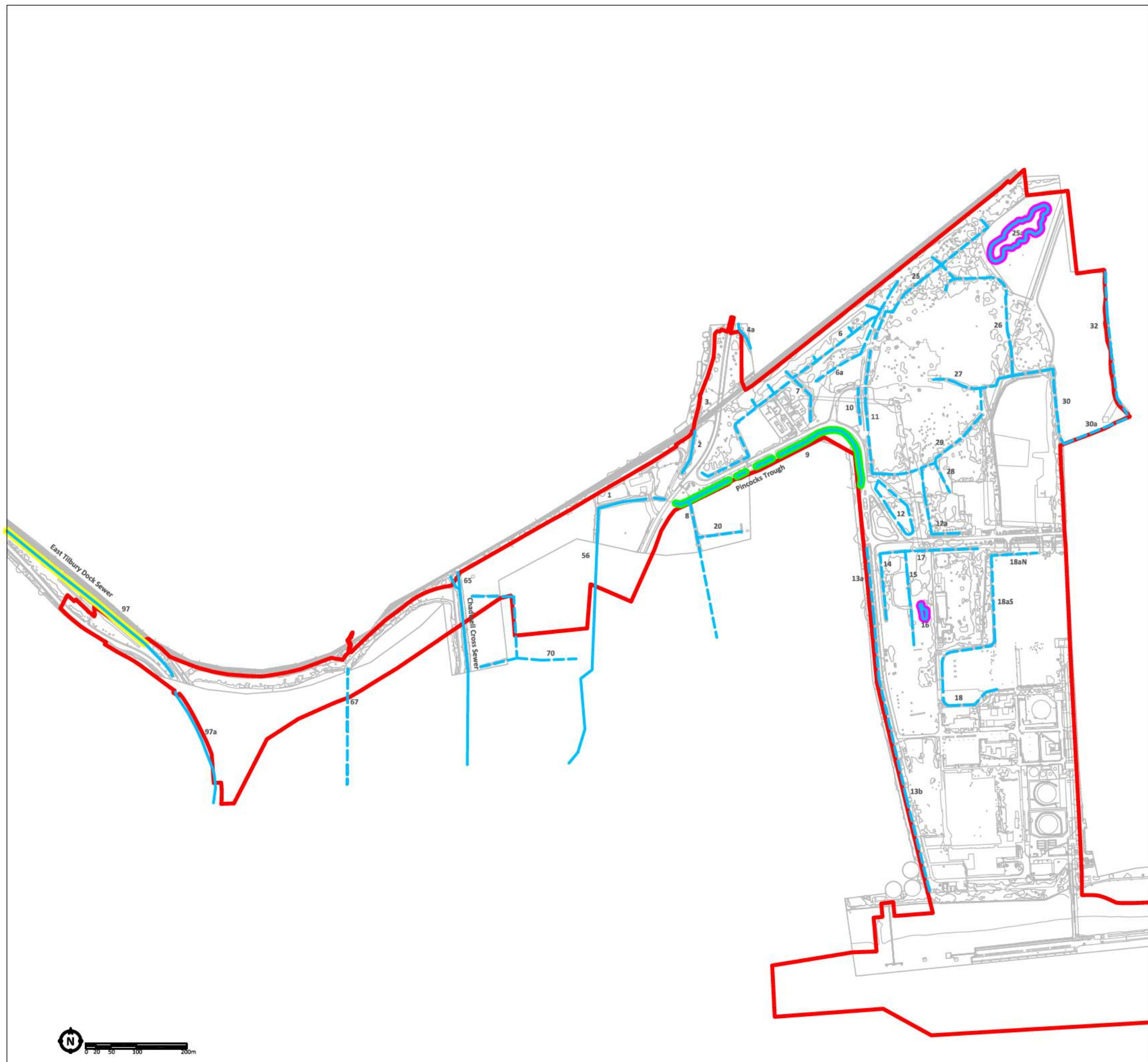
Office: 4594	Drawing number: PLAN 01	Revision: Rev.01
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WYG Environment
 100 St. John Street
 London
 EC1M 4EH
 Tel: 0207 250 7500
 Fax: 0207 250 7501
 Email: ecology@wyg.com



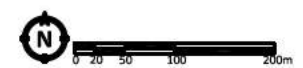
Appendix D – 2016 and 2017 Water Vole Survey Results for Port of Tilbury Land



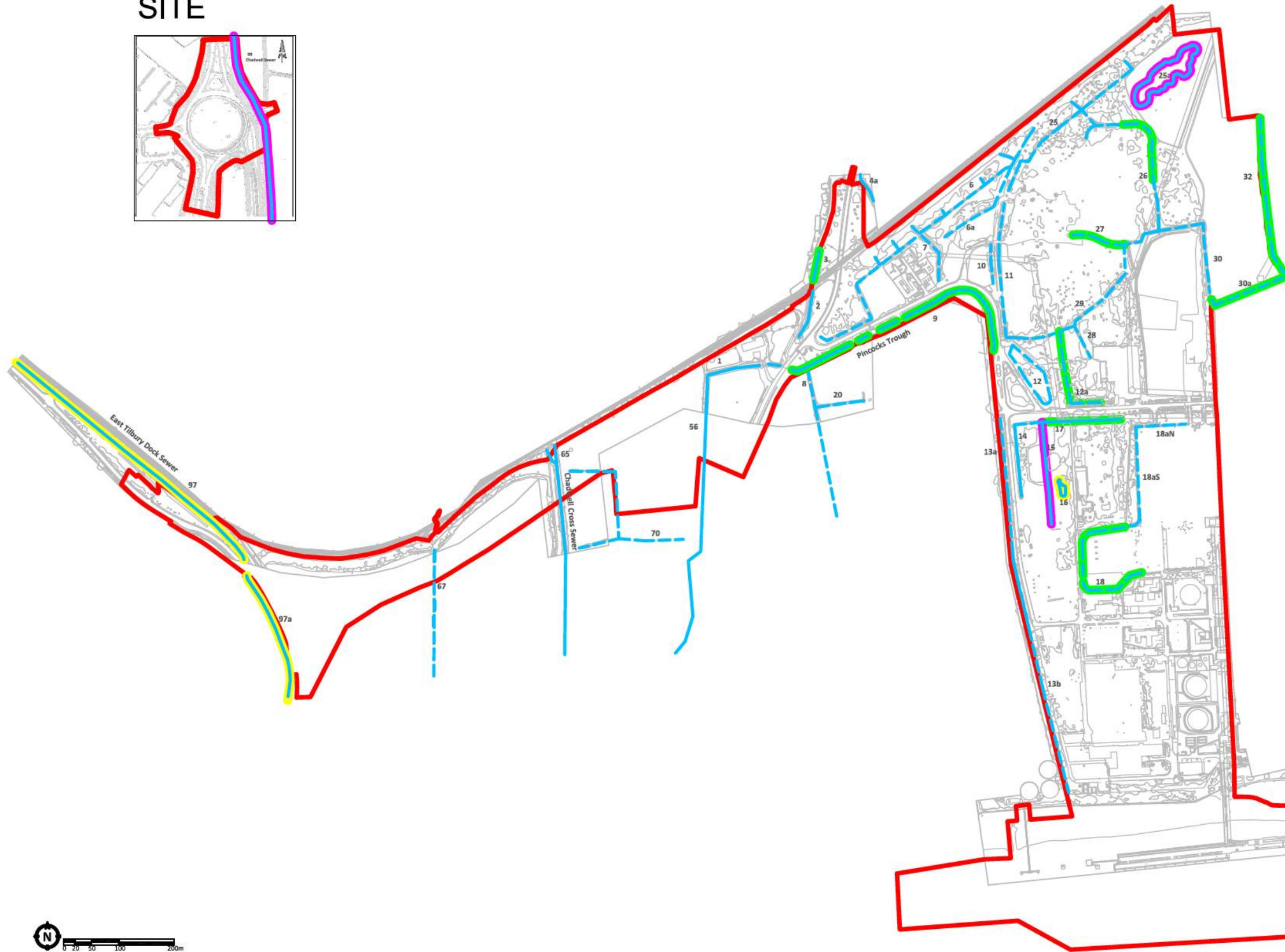
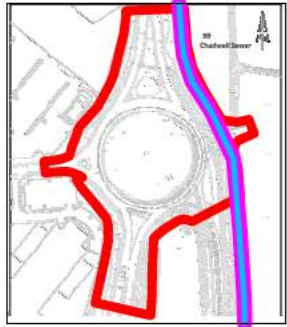
- ORDER LIMITS
- WATERBODY HOLDING WATER AT TIME OF SEPTEMBER 2016 SURVEY
- - - WATERBODY DRY AT TIME OF SEPTEMBER 2016 SURVEY
- RELATIVE WATER VOLE POPULATION DENSITY
- HIGH
- MEDIUM
- LOW

REV	DATE	DESCRIPTION
DRAWING TITLE		
WATER VOLE SURVEY RESULTS (2016)		

SCALE	DRAWN	STM	FIG. 10.8a
1:7575 @ A3			
DATE	CHECKED	DW	
OCT 2017			



**INSET:
ASDA ROUNDABOUT
SITE**



- ORDER LIMITS
 - WATERBODY HOLDING WATER AT TIME OF MAY 2017 SURVEY
 - - - WATERBODY DRY AT TIME OF MAY 2017 SURVEY
- RELATIVE WATER VOLE POPULATION DENSITY
- HIGH
 - MEDIUM
 - LOW



REV	DATE	DESCRIPTION
DRAWING TITLE		
WATER VOLE SURVEY RESULTS (2017)		


SCALE	1:7936 @ A3	DRAWN	STM	FIG. 10.8b
DATE	OCT 2017	CHECKED	DW	





Appendix E – Target Notes



Target Note	Description	Photograph
TN1	17 th May 2018: Incidental record of water vole burrow at waterbody 37 during GCN survey	
TN2	24 th May 2018: Incidental record of water vole burrow at waterbody 47a during a GCN survey	