# Appendix A – Biodiversity Table of Consultation Contact

| Organisation | Relevance to project | Date of correspondence | Topic of communication |
|---|---|---|---|
| Natural England | Designated sites (SPA, SAC, Ramsar and SSSI) | June 2013 | Written feedback on basic options for a new Lower Thames Crossing. |
| | | November 2014 | Letter issued to request to provide technical information to inform route options development work, response received. |
| | | January 2015 | **Workshop 1**: To present to statutory environmental bodies (SEBs) on emerging thinking regarding route options and draft approach to environmental appraisal. |
| | | | Note to inform on the HRA |
| | | March 2015 | **Workshop 2**: Presentation of long list of route options and update on progress regarding development of environmental appraisal, details of crossing options and request for formal feedback on environmental appraisal findings. |
| | | April 2015 | Email feedback on environmental appraisal approach requested by LTC at Environment Workshop 2. |
| | | June 2015 | **Workshop 3**: To obtain feedback on the draft shortlist and rejected options; the detailed assessment of the shortlist; proposed methodology and survey work; update on the crossing types. |
| | | July 2015 | Telephone conference to discuss approach to bird survey methodology required |

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| | | | to support DCO application and to inform options appraisal |
| | | | Email feedback on draft short list of options; survey and appraisal approach; design and opportunities requested at Workshop 3. |
| | | | Bilateral meeting to seek feedback on the proposed approach to the HRA for the short list; discuss issues associated with uncertainty and the scheme design; give an update on modifications to the bird survey methodology; discuss the timetable for sharing HRA information and the information that Natural England would be expecting to receive. |
| | | | **Compensatory land meeting:** To understand opportunities for habitat creation from other schemes and to obtain lessons learned from the EA on other projects. |
| | | October 2015 | Bilateral meeting to provide LTC project update, initial findings of detailed appraisal and to discuss feedback on the draft HRA AA part 1 report to confirm approach. |
| | | November 2015 | **Workshop 4**: To present LTC project update including the final shortlist and gain feedback on initial environmental appraisal |
| | | February 2016 | Bilateral meeting to discuss the LTC public consultation materials, with a view to |

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|---|---|---|---|
| | | | answering any questions about the proposals now that the materials are available. |
| | | March 2016 | Written response to the 2016 Public Consultation |
| | | July 2016 | **Workshop 6**: To update the attendees on the LTC project post consultation and project next steps. It was also an opportunity to discuss SEB consultation responses and to clarify any issues. |
| | | January 2017 | Bilateral meeting to providing an update on the Project and to discuss survey proposals to inform EIA and HRA. Survey discussions centred on bird survey requirements associated with crossing locations and functional habitat and also sought feedback on ecological surveys of the wider route. |
| | | March 2017 | Bilateral meeting to review scope of GI works in relation to biodiversity and designated sites to identify any consents that may be required for the works. |
| | | September 2017 | Surface water drainage review to discuss ground water and biodiversity impacts. |
| Environment Agency | Water Framework Directive, Fisheries information | July 2013 | Feedback on basic options for a new Lower Thames Crossing |
| | | November 2014 | Letter issued to request to provide technical information to inform route options development work, response received. |

| Organisation | Relevance to project | Date of correspondence | Topic of communication |
|---|---|---|---|
| | Ecology surveys<br>Flood risk<br>Surface water drainage<br>Marine GI works | January 2015 | **Workshop 1** (as above) |
| | | March 2015 | **Workshop 2** (as above) |
| | | April 2015 | Feedback on environmental appraisal approach requested by LTC at Environment Workshop 2 |
| | | May 2015 | Email feedback on environmental appraisal approach requested by LTC at Environment Workshop 2 |
| | | June 2015 | **Workshop 3** (as above) |
| | | July 2015 | Bilateral meeting. To present of emerging shortlist of route options and approach to detailed environmental appraisal, seek feedback on level of assessment required for EA WebTAG topics and explore opportunities for environmental enhancements) |
| | | | Email feedback on emerging short list and proposed methodology for detailed appraisal presented at Environment Workshop 3 |
| | | | **Compensatory Habitat meeting** with EA to understand opportunities for habitat creation from other schemes and to obtain lessons learned from the Environment Agency and Natural England on other projects |
| | | September 2015 | Bilateral meeting to present the shortlist of route options and emerging findings of the detailed appraisal to date; update on project programme |

| Organisation | Relevance to project | Date of correspondence | Topic of communication |
|---|---|---|---|
| | | November 2015 | **Workshop 4** (as above) |
| | | February 2016 | **Workshop 5** To discuss the LTC public consultation materials, with a view to answering any questions about the proposals now that the materials are available. |
| | | March 2016 | Written response to the 2016 Public Consultation |
| | | July 2016 | **Workshop 6** (as above) |
| | | September 2017 | Catch-up meeting to review flood risk and approach to ecology surveys |
| | | | Surface water drainage review to discuss ground water and biodiversity impacts. |
| | | October 2017 | To provide details of proposed marine GI works, seek guidance on licensing and consenting requirements, identify any constraints to jetty proposals and ecological survey requirements. |
| | | | Catch-up meeting to review flood risk & ecology surveys |
| RSPB | HRA and RSPB Sites | June 2015 | Bilateral meeting to present emerging route options and approach to environmental appraisal, to seek more detailed feedback on the environmental constraints mapping to identify gaps in the data; and to build an understanding of the potential impacts a LTC will have on European sites and RSPB sites |

| Organisation | Relevance to project | Date of correspondence | Topic of communication |
|---|---|---|---|
| | | August 2015 | Bilateral meeting to discuss LTC project update, HRA methodology and approach, approach to compensatory habitat review, bird survey methodology update and public consultation proposals. |
| | | March 2016 | To discuss the LTC public consultation materials with the RSPB during public consultation.<br>To provide an overview of the Project background and approach to environmental appraisal. |
| | | March 2017 | To provide overview of bird surveys in advance of PRA and seek feedback on proposed approach. |
| | | June 2017 | To provide a project update, brief on proposed approach to GI surveys with specific reference to RSPB Shorne Marshes and European sites, discuss initial survey bird results, and wider ecology survey approach. |
| Marine Management Organisation | Proposed Marine Conservation Zone (rMCZ),<br>Fisheries<br>Marine GI in-river works<br>Possible jetty options | July 2013 | Feedback on basic options for a new Lower Thames Crossing |
| | | January 2015 | **Workshop 1** (as above) |
| | | March 2015 | **Workshop 2** (as above) |
| | | June 2015 | **Workshop 3** (as above) |
| | | November 2015 | **Workshop 4** (as above) |
| | | March 2016 | Written response to the 2016 Public Consultation |
| | | October 2017 | To provide details of proposed marine GI works, seek |

| Organisation | Relevance to project | Date of correspondence | Topic of communication |
|---|---|---|---|
| | | | guidance on licensing and consenting requirements, identify any constraints to jetty proposals and ecological survey requirements. |
| Port of London Authority | Protected habitats and species within PLA jurisdiction<br>Marine GI works<br>Possible jetty options | July 2013 | Feedback on basic options for a new Lower Thames Crossing |
| | | November 2014 | Letters with 'annex A' technical information requests, To obtain technical information for route options development work. |
| | | January 2015 | Introductory bilateral meeting: Understand the PLA's current position on the Project.<br>Understand its priorities, issues and feedback to date – both strategically and from an options and technical perspective.<br>To review indicative route options for A and C. Establish a collaborative relationship with regular engagement. |
| | | March 2015 | Bilateral meeting: To discuss long list route options.<br>To develop a greater understanding of the constraints around foundations, vessel sizes and construction impacts in relation to bridge and immersed tube tunnel options. |
| | | April 2015 | Bilateral meeting: To consider potential construction scenarios based on crossing type |
| | | September 2015 | Bilateral meeting: To update on LTC project, and have a discussion of the emerging |

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|---|---|---|---|
| | | | shortlist, gain update on PLA's Marine Traffic Assessment and Hydrodynamics Assessment.<br><br>Explain the LTC approach to public consultation. Discuss PLA's 'Thames Vision' and consultation. |
| | | October 2017 | To provide details of proposed marine GI works, seek guidance on licensing and consenting requirements, identify any constraints to jetty proposals and ecological survey requirements. |
| Buglife | Invertebrate interest and Thames terrace grassland habitats in the vicinity of the Project | August 2016 | Bilateral meeting: Highlighted concerns and options for net gain for invertebrates in relation to the scheme. Many important sites are not designated or protected even at local level. |
| Woodland Trust | Ancient woodland within the vicinity of the Project | August 2016 | Bilateral meeting: To update The Woodland Trust (WT) on the LTC project post consultation and project next steps. It was also an opportunity to discuss WT's response to the public consultation and to clarify any issues where necessary. |
| | | July 2017 | To provide project update following PRA and ecological survey approach (where relevant to Woodland Trust interests). |
| Essex Wildlife Trust | Local wildlife interest features | September 2016 | Bilateral meeting: To update Essex Wildlife Trust on the LTC project post consultation and project next steps. It was |

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|---|---|---|---|
| | within vicinity of the Project | | also an opportunity to discuss Essex Wildlife Trust's response to the public consultation and to clarify any issues where necessary. |
| | | June 2017 | Bilateral meeting to provide a project update following PRA and to discuss the proposed approach to Ecology surveys and initial thoughts on potential mitigation/enhancement opportunities. |
| Kent Wildlife Trust | Local wildlife interest features within vicinity of the Project | August 2016 | Bilateral meeting: To update Kent Wildlife Trust on the LTC project post consultation and project next steps. It was also an opportunity to discuss Kent Wildlife Trust's response to the public consultation and to clarify any issues where necessary. |
| | | June 2017 | Bilateral meeting to provide a project update following PRA and to discuss the proposed approach to Ecology surveys and initial thoughts on potential mitigation/enhancement opportunities. |
| North Kent Internal Drainage Board | Drainage and flood risk | September 2017 | Surface water drainage review to discuss ground water and biodiversity impacts. |
| Essex CC | County Council | September 2017 | To provide project update post PRA and introduce EIA scoping proposals |
| Kent CC | County Council | March 2017 | To review ecology surveys and land access requirements in advance of PRA. |

| Organisation | Relevance to project | Date of correspondence | Topic of communication |
|---|---|---|---|
| | | June 2017 | To provide project update post PRA and introduce EIA scoping proposals |
| | | September 2017 | Surface water drainage review to discuss ground water and biodiversity impacts. |
| Thurrock BC | Borough Council | March 2017 | To review ecology surveys and land access requirements in advance of PRA. |
| | | July 2017 | To provide project update post PRA and introduce EIA scoping proposals |
| LB Havering | Borough Council | July 2017 | To provide project update post PRA and introduce EIA scoping proposals |
| Gravesham BC | Borough Council | July 2017 | To provide project update post PRA and introduce EIA scoping proposals |

# Appendix B – Biodiversity Desk Study Data Required

| Desk study data | Source |
|---|---|
| Ringing studies undertaken for Redshank | Natural England |
| Updated guidance on impact of air quality on ecological receptors | |
| Tilbury 'C' project, Final Ecology Reports | |
| Goshems Farm - invertebrate information | |
| Local casework on area between Tilbury and Chadwell St Mary (former marshland) | |
| Any data regarding use of coastal path in Essex | |
| Any studies for the Ramsar site, specifically in relation to the freshwater habitats - Paul Hyde | |
| An RSPB study in 1999 ‘The Distribution of Colour Marked Dunlin and Ringed Plover Roosting at Canvey Island in the Inner Thames Estuary’ | RSPB |
| Data on location of terrestrial roosts for dunlin, ringed plover and corn bunting west of Goshems Farm | |
| Annual WeBS Core Count data updates for Thames Estuary | BTO |
| Low Tide Count for Thames Estuary (if this becomes available) - last Low Tide Count undertaken 2008/9" | |
| Important invertebrate areas | Buglife |
| Data on rare invertebrates for LWS impacted being the scheme (e.g. Goshems Farm, any info regarding Ramsar species) | |

| | |
|---|---|
| Important Plant Areas - data on distribution and habitat requirements for rare plant species impacted by scheme | Plantlife International |
| Biological Records for Essex | Essex record centre or Essex Wildlife Trust |
| Biological Records for Kent | Kent and Medway Biological Records Centre |
| Kent Downs AONB Management Plan | Kent Downs AONB |
| Marine licences and protected species information | Marine Management Organisation |
| Protected (aquatic) species information (e.g. crayfish, water voles, otter) | Environment Agency |
| Water Frameworks Directive salt marsh survey (2016) | |
| Badger Records for Kent ( if not available from record centre) | West Kent Badger Group |
| Local bird reports | Kent Ornithological Society |
| Local bird reports | Essex Birdwatching Society |
| Information on ancient woodland protection | Woodland trust |
| Location of veteran/ancient trees for mapping purposes | |
| Land cover data (aerial photography used to inform habitat mapping) | Centre for Ecology and Hydrology |
| Review BSBI website for protected plant species distribution for Ramsar rare plants | Botanical Society of Britain and Ireland (BSBI) |
| Marine and terrestrial ecology data | DP World (London Gateway port) |
| Maintenance dredge data/locations; marine survey data in relation to protected species | Port of London Authority |
| Marine mammal sightings | Zoological Society of London |

# Appendix C – Biodiversity Survey Methodology

Survey work is required to comply with EIA and HRA assessment requirements to comply with UK and European wildlife legislation (Wildlife & Countryside Act 1981 (as amended), the Natural Environment and Rural Communities Act 2006 (NERC) and the Conservation of Habitats and Species Regulations 2010 (as amended) – often abbreviated to 'Habs Regs'). These surveys have been informed by the preliminary desk study undertaken for the long and short list of options, including consultation with key stakeholders and statutory consultees. This approach to assessment is also consistent with the principles set out in Highways England's Biodiversity Plan.

These surveys will inform likely mitigation and/or compensation requirements for the Project on a species- and habitat-specific basis. Survey information will also be used for micro-siting or minor realignments (where route allows) and will inform, where necessary, safe methods of work (e.g. root protection zones) or licensing requirements (specifically for European Protected Species which are protected under the Habs Regs, badgers which are protected under The Protection of Badgers Act 1992 and water voles which are protected under Schedule 5 of the Wildlife & Countryside Act). Surveys methodologies follow best practice guidance including, but not restricted to, NE & Defra guidelines, DMRB Volume 10, Section 4, Parts 1 to 6 and CIEEM Competencies for species surveys, as appropriate.

Unless otherwise stated, surveys are undertaken during the day. If a licence is required to undertake the survey this is underlined. All surveys assume a minimum of two surveyors, either to assist the lead surveyor and/or to provide second person for H&S requirements. Surveys are divided into the following categories:

- Surveys to inform the Environmental Impact Assessment (EIA)
  - Botanical surveys
  - Protected species surveys
  - Bird surveys
  - Noise surveys (particularly in relation to birds)
- Surveys to inform the Habitat Regulations Assessment (HRA).
  - Botanical surveys
  - Bird surveys
  - Noise surveys (particularly in relation to SPA and Ramsar site bird species)
  - Air quality surveys (particularly in relation to SAC, SPA and Ramsar site habitats)

## Surveys to inform EIA

### Botanical surveys

Extended Phase 1 habitat and protected species walk over

**When:** main survey period **April to October inclusive**. The results of the Extended Phase 1 habitat and protected species walk over survey will identify the requirement for further surveys for protected species (e.g. bats, great crested newts, s41 species etc.) and areas to focus further detailed habitat assessment such as National Vegetation Classification (NVC).

**Coverage:** Length of the route plus 50m either side of the application site boundary, which will include all areas of temporary land take, e.g. construction compounds. This will be extended in areas where desk study indicates potential for European protected species such as great crested newts (e.g. waterbodies up to 500m from application site boundary) or bats (e.g. 2-5km from application site boundary, where existing roosts are identified, up to 10km for any SSSIs supporting bats).
**Equipment:** Binoculars, hand lens, red line boundary map, iPad and/or GPS and paper map (to record data in the event of an equipment failure) and camera.
**Surveyor experience requirement:** Experienced botanists and assistants. No licence required for survey.
**Methodology:** The entire extent of land within red line boundary will be walked by the survey team. The habitat will be classified following the Phase 1 habitat classification guidelines (JNCC 2010) and any evidence of European protected species, habitat for protected species or species of conservation concern will be detailed as Target Notes.

Detailed botanical surveys: e.g. NVC or Defra OMH (open mosaic habitat) surveys
**When:** main survey period **May to September**, but dependant on species and habitats. Single survey visit per site is required – to coincide with optimal survey period for the habitat/species it supports. If detailed mapping to identify the distribution of particular rare/notable species is required, then multiple visits may be necessary to complete the survey.
**Coverage:** Local wildlife sites (e.g. Goshems Farm; adjacent to River Thames crossing location), important habitats (e.g. sites supporting Thames terrace grasslands and important brownfield sites) and areas of noteworthy priority and/or inventory habitat (s41 habitats, ancient woodlands) identified during the Extended Phase 1 habitat and protected species walk over survey. Invertebrate surveys are also likely to be required in these locations.
**Equipment**: Hand lens, camera, quadrat, iPad and/or GPS and paper map (to record data in the event of an equipment failure) and camera.
**Surveyor experience /licence requirement**: Experienced botanists and assistants. No licence required for survey.
**Methodology**: For NVC survey quadrats will be located in identified stands of vegetation distributed across the targeted survey area identified during the Phase 1 survey and the percentage species composition will be evaluated. In addition species lists will be made that will enable the botanical value of a site to be assessed. Survey methodology follows the current NVC survey guidance (Rodwell, 2006). Where suspected open mosaic habitats are identified during NVC surveys, they will be assessed following the guidance outlined in the Open Mosaic Habitat Survey Handbook (Lush *et al*., 2013).

Tree surveys
**When: no seasonal constraints** (other than avoiding periods of bad weather due to health and safety concerns).
**Coverage:** Locations along the length of the route where tree constraints/woodland lost is identified during the Phase1 survey. Areas surveyed will include a 20m buffer

either side of the application site boundary (maximum root protection area (RPA) is set at 15m so 20m will allow a small buffer on the buffer).
**Equipment:** iPad/tablet, diameter tape, laser hypsometer, weather writer, camera, tree probe, mallet, binoculars
**Surveyor experience:** Qualified Arboriculturist (Level 3 minimum) plus 2 years surveying experience and an assistant. No licence required for survey.
**Additional requirement:** The arboricultural survey requires a topographical survey of the study area in electronic (AutoCAD format) which has marked the location of all trees with a trunk over 75mm diameter within the survey area boundary (application site + 20m buffer). In addition, information on any Tree Preservation Orders (TPOs) impacted by the route would also be required (obtained via desk study).
**Methodology:** The tree survey and assessment will be undertaken to '*British Standard 5837:2012 - Trees in relation to design, demolition and construction – Recommendations*'
During the field survey the following information will be collected for each tree/group of trees:

- Tree species;
- Reference number (to be recorded on the Tree Survey Plan);
- Height in metres;
- Stem diameter in millimetres at 1.5 m above adjacent ground level; stem diameter may be estimated where access is restricted;
- Branch spread in metres taken at the four cardinal points to derive an accurate representation of the crown; in case where access is restricted this attribute will be estimated.
- Height in metres of crown clearance above adjacent ground level (to inform on ground clearance, crown stem ratio and shading);
- Age class (young, middle aged, mature, over-mature, veteran);
- Preliminary management recommendations, including further investigation of suspected defects that require more detailed assessment and potential for wildlife habitat;
- Estimated remaining contribution in years (e.g. less than 10, 10+, 20+ and 40+);
- Removal and retention categories - U or A to C category grading to be recorded on the Tree Survey Plan.

**Protected species surveys**
Water Vole Surveys
**When:** Two surveys one between **mid-April and the end of June** and one between **July and September (inclusive)**. Surveys should be at least two months apart (Dean *et al* 2016).
**Coverage:** initial assessment within application site boundary. Extent of survey area depends on the impact of the Project (Dean *et al* 2016) which is detailed below:

- If crossing location is temporarily affecting ≤50m of watercourse survey requirement: 50m up and down stream of any affected watercourse.
- If works permanently impacting 15-50m of watercourse as survey of the footprint of the works and 100-200m upstream and downstream of the works.

- If works are permanently impacting on >50m of watercourse field surveys need to cover the footprint of the works, plus any temporary work areas and 200m-500m upstream and downstream of the works.

**Equipment:** Chest (plus wading belt)/ thigh waders, buoyancy aid, wading pole, rope and harness (depending on depth of ditch), throw line, Verkon (disinfectant spray required for biosecurity), iPad and/or GPS and paper map (to record data in the event of an equipment failure).
**Surveyor experience/ licence requirement:** Experienced water vole surveyor and an assistant. No licence required for survey.
**Methodology:** All watercourses likely to be affected or impacted by installation of proposed crossing points or outfall installations will require a water vole survey. Surveyors will enter the watercourse where practical and safe, to evaluate its habitat suitability for water voles and search for field signs indicating the presence of water voles, e.g. dung (droppings), latrines (collections of droppings), feeding stations (including feeding remains), burrows (entrance to below ground resting sites), tracks (footprints), runs or pathways to feeding areas, watercourse and burrows.

Otter Surveys
**When**: Any time of year, but spring is best as evidence is easier to find as water levels recede and wet mud is exposed (paw prints can be seen more easily) – **no seasonal constraints (but avoid periods of heavy rain which would make field signs difficult to detect)**. Surveys should be repeated at three monthly intervals over a 12 month period to take into account any seasonal variations in otter activity (DMRB, 2001).
**Coverage**: Application site boundary. Survey to cover 1km up and downstream of crossing locations for any watercourse that is crossed by the application site boundary for the Project (DMRB, 2001).
**Equipment**: Chest (plus wading belt)/ thigh waders, buoyancy aid, wading pole, rope and harness (depending on depth of watercourse), Verkon (disinfectant spray required for biosecurity), throw line, iPad and/or GPS and paper map (to record data in the event of an equipment failure).
**Surveyor experience/ licence requirement**: An appropriately experienced and/or licensed otter surveyor and assistant. If a holt or lying up location is identified, these must be checked by a licensed surveyor, again at three monthly intervals. If a holt is suspected to be in use (and would be impacted by the Project) further assessment (e.g. via trail camera) to identify level and type of use (e.g. is it a breeding site) would be required.
**Methodology**: All watercourses likely to be affected or impacted by installation of proposed crossing points or outfall installations will require an otter survey. Surveyors will enter the watercourse (where safe to do so) to search for field signs indicating the presence of otters, i.e. dung (spraints), tracks (footprints), feeding remains, otter slides (into water), holts (underground sites) and couches/lying up site (above ground sites where otters rest during the day). The methodology would follow the guidelines published by Natural England (NE) and Department for Environment Food and Rural Affairs (Defra) (2014) CIEEM (2013) and DMRB (2001).

Great crested newts

**When**: Initial Habitat Suitability Index (HSI) surveys will be undertaken for all suitable waterbodies identified within a 500m buffer of the application site boundary. If a large number of waterbodies are identified, eDNA surveys may be undertaken to identify those which *do not* support great crested newts, to rule them out of any further assessment. If taken forward, eDNA surveys would be carried out between **mid-April and late June** (NE and Defra (2015)). Both the HSI and eDNA surveys will be undertaken during the day. Ponds confirmed as GCN positive from eDNA (or all ponds if eDNA not undertaken) would be surveyed to confirm population size of great crested newts, to inform mitigation and licensing requirements. Four to six surveys would be undertaken between **mid-March and mid-June** per pond, with **at least two surveys occurring between mid-April and mid-May**. These surveys are undertaken after dark and require access early in the morning to check traps.

**Coverage**: Any ponds or suitable waterbodies within a 500m buffer of the application site boundary would be assessed and surveyed. Surveys would record presence of other s41 amphibians which share similar habitat requirements (e.g. common toad, pool frog, smooth newt and palmate newt).

**Equipment:** For HSI surveys - Dip net, Verkon (disinfectant spray required for biosecurity), camera, iPad and/or GPS and paper map and forms (to record data in the event of an equipment failure).

For great crested newt surveys: Clu-lite (high powered torch), chest (plus wading belt)/ thigh waders, buoyancy aid, wading pole, throw line, bottle traps (plastic bottles and bamboo canes), Verkon (disinfectant spray required for biosecurity), a hand net, iPad and/or GPS and paper map and forms (to record data in the event of an equipment failure).

**Surveyor experience/ licence requirement:** All surveys require two surveyors and at least one surveyor must be licenced for great crested newt surveys.

**Methodology**:

HSI methodology involves surveyors visiting a pond and recording specific criteria laid out in Amphibian and Reptile Group of the United Kingdom (ARG) UK Advice sheet 5, e.g. dimension of the pond, the quality of the water, presence of waterfowl, presence of fish etc.

Great crested newt survey methodology taken from Langton *et al* (2001) and NE and Defra (2015). Ponds will be surveyed between four and six times using three survey techniques on each visit, depending on the ponds characteristics. Most commonly these surveys will include trapping (using bottle traps), egg searching and torching. Netting will be undertaken if the pond is unsuitable to deploy traps in. Typically bottle traps will be deployed in the late afternoon and a search for eggs will occur at the same time, then a high powered torch (Clu-lite) will be used to search for newts after dark. NB Torch survey results are subject to high variation due to weather conditions, and so should only be carried out under the following conditions: night-time air temperature >5°C, no/little wind, no rain. Bottle traps are then collected early the following morning (NB traps should not be left for longer than 6-7hrs in hot weather conditions) and any newts or other amphibians released. Egg search requires a check of submerged vegetation for great crested newt eggs and is carried out in daylight either prior to setting bottle traps on their retrieval in the morning. As soon as great crested new eggs are confirmed present, no further egg search should be undertaken.

Bats

**When**: April to October (**core survey period May to September**), frequency based on a case by case basis dependant on potential roost suitability. Internal and external inspections of potential bat tree roosts and built structures are undertaken during the day. Inspections are likely to require follow-up emergence surveys to confirm presence/absence of roost and details of numbers and species of bat that are present and to identify the type of roost (e.g. summer maternity roost, autumn transitional roost or winter hibernation site) to inform mitigation requirements. Emergence and activity surveys are nocturnal (these can comprise dusk surveys, which start from 15 minutes before sunset for 1.5 - 2hrs post-sunset, and dawn re-entry surveys, which start 1.5 - 2hrs before sunrise up to 15 minutes after sunrise). Potential commuting routes (tree lines/hedgerows/woodland edge) and foraging areas (watercourses/ woodland/meadows) associated with roosts are likely to require activity surveys to inform mitigation requirements if impacted by the route alignment.

**Coverage**: Bat survey requirements will be informed by desk study data for nearest known roosts within 2-5km and potentially up to-10km of the application site boundary where sites have been designated for bats (e.g. SSSI or SACs) ((IAN 116/08 2008, Rasey 2006) and the Extended Phase 1 habitat and protected species survey within the application site boundary + 500m buffer.

**Equipment:** Emergence and activity surveys: Bat detector (bat logger), head phones, static bat detectors (SM4), head torch, walkie-talkies, and digital recorder to record bat survey data. In addition, tree and internal inspections of structures will require the following, but will be dependent on the location: GPS, ladders, climbing harness, ropes, helmets, hard hats, Clu-lite torch, fibrescope and overalls.

**Surveyor experience/ licence requirement**: Experienced survey team, to be led by an Ecologist specialising in bats and/or who is a licensed surveyor. Internal inspections of trees and structures will require a licenced surveyor; tree climbing surveys (to undertake internal inspection) also require that both surveyors hold the appropriate climbing qualifications (including aerial rescue).

**Methodology:** Initial assessment of bat tree/structures will be surveyed once to assess the suitability of features that have been identified a possible bat roosts during the Phase 1 survey. Surveyor will look for potential access points, i.e. split branches, woodpecker holes or other features which could support roosting bats (for trees) and gaps in brickwork/roof tiles/soffits/fascias/wall tops and gable ends, lifted or missing roof felt/lead flashing, and open or broken windows etc. (for built structures).

Internal inspections of tree holes and structures would look for evidence of occupation by bats, i.e. bat specimens (live or dead), droppings, urine splashes, fur-oil staining, feeding remains (moth wings) and squeaking noises (which may indicate presence of an otherwise hidden roost). These surveys follow best practice guidance as published by the Bat Conservation Trust (BCT), Collins (2016)

Emergence surveys will commence at dusk (starting 15 minutes prior to sunset continuing for 1.5-2hrs after sunset) and/or at dawn (starting up to two hours before sunrise, continuing until 15minutes after sunrise), and will involve surveyors looking at potential access points that have been identified on buildings/trees, using bat detectors to determine if any bats leave/return to the building/tree. The frequency of the surveys will be dependent on the habitat suitability. Static detectors will be deployed for five nights at a time and will record bat activity.

Activity surveys follow the same timings, the survey will consist of a walked transect being undertaken by surveyors with bat detectors.

If, after the following survey methodologies (as outlined above) have been carried out, there is insufficient information to assess the impacts on or to provide robust mitigation methodologies for Annex II species (greater horseshoe, lesser horseshoe, barbastelle or Bechstein's bats), bats associated with SSSIs (e.g. Deneholes Hangmans Wood SSSI) or more cryptic woodland dwelling species, then the requirement to undertake radio-tracking may need to be considered. This advanced licence survey technique is not without risk to bats and should **only be considered where the Project proposals are judged likely to have a significant effect on the bats or their habitats** (e.g. roosts or core sustenance zones). The requirement for radio-tracking would be assessed following the first year of bat surveys.

Dormice
**When:** Surveys are undertaken between **April to October** (inclusive) for monitoring using nest tubes and **September to December** for nut searches.
**Coverage**: Survey of suitable habitat within the application site boundary + 500m buffer, specifically woodland that will either be lost under the footprint of the Project or which is directly linked to hedgerows that will be bisected by the Project.
**Equipment**: Nest tubes, wire, markers, handling bag and iPad and/or GPS and paper map (to record data in the event of an equipment failure) and camera
**Surveyor experience/ licence requirement**: Experienced surveyor, likely to be Senior Ecologist and an assistant. Licenced surveyor required for nest tube checks.
**Methodology:** For nest tubes: these will be deployed in habitat suitable for dormice, with at least 50 tubes used to sample a site, spaced every 20m. These tubes will be kept out for the entire season and will be checked regularly (approximately once a month) and a survey 'score' of 20 will need to be obtained using the survey guidance index of probability (Bright *et al* 2006).

Nut searches (looking for distinctive dormouse gnawed hazel nuts) will occur along hedgerows and in wooded areas. This involves collecting 100 hazel nuts, *for each hedgerow or woodland area*, that have been opened by small rodents (voles and mice, but avoiding caches made by these species and also ignoring nuts opened by squirrels). If this sample contains no nuts that have been opened by dormice it is highly probably that dormice are not present (Vaughan 2009), but this survey technique should not be used in isolation to confirm absence of dormice due to risk

of 'false negative' where dormice densities are low, NE & Defra (2015). This method can, therefore, only be reliably used to confirm *presence* of dormice.

**If dormice will be adversely affected by the Project, it will be necessary to install nest boxes to obtain a population estimate to inform mitigation and licensing requirements for the Project (DMRB, 2001). The requirement for more detailed dormouse survey would be identified following the initial dormouse survey in year 1.**

Badgers

**When**: Early winter is the best time to undertake surveys, when vegetation is dying back, e.g. **November and December**. However, if required, surveys can be undertaken at any time of year if, for example, access restraints restrict survey timings.

**Coverage**: All suitable habitat within a 500m buffer of the application site boundary would be assessed and surveyed. The survey footprint may need to be widened to 1km (as necessary) to locate nearby setts or other features of importance (DMRB 1997).

**Equipment**: iPad and/or GPS and paper map (to record data in the event of an equipment failure) and camera

**Surveyor experience/ licence requirement**: Experienced surveyor, likely to be Senior Ecologist and assistant, no licence is required for survey.

**Methodology:** Survey methodology is provided by NE (2015). Areas identified as potentially suitable for badgers, which could not be ruled out during the Phase 1, will be surveyed further and all setts will be classified confirming level of use and current occupation. All areas of suitable habitat (e.g. areas of woodland, dense scrub, field margins etc.) will be searched thoroughly for signs of badger activity, e.g. tracks (foot prints), badger runs (paths), latrines (dung pits), badger hair on fences and vegetation, snuffle holes (evidence of digging for food), sett entrances, and bedding or spoil heaps outside sett entrances (NE and Defra 2015).

If a sett is identified within 1km of the application site boundary, where badgers may be impacted by the proposals, it will be necessary to monitor the sett to see if it is active (i.e. currently occupied). If the sett is confirmed as active (and will be directly impacted by proposals), a bait marking survey will be carried out to determine the territorial boundaries of the sett and if the animals using the sett have an alternative place of shelter (this will also determine if there is the requirement to provide a replacement artificial sett and inform the mitigation proposals i.e. suitable location for the replacement sett

**When:** During Late February to early April or early September and mid-October

**Coverage:** Approximately 1km around sett that will be impacted, all other setts in the immediate vicinity that a badger from the sett to be impacted could reach.

**Equipment:** Buckets, peanuts, golden syrup, peanut butter, coloured beads (red, blue, orange white, not muted or similar colours - enough colours to be different for each sett within the survey), spade (to deploy bait), signs for members of the public

(if in a public location) and iPad and/or GPS and paper map (to record data in the event of an equipment failure) and camera.
**Surveyor Experience:** Experience of looking for signs of badgers beneficial when looking for coloured pellets.
**Methodology:** Plastic beads are mixed with peanuts and syrup bait and placed in the vicinity of each sett. Different coloured beads are placed at each sett. Dung pits and latrines are checked after bait deployment and the colour beads in the dung pits are recorded. Bait marking and latrine inspections should be undertaken on a daily basis for approximately three weeks depending on bait uptake and weather conditions (Scottish Natural Heritage (SNH) 2004).

Reptiles
**When: April to May** (inclusive), and **September** (inclusive) mid-morning and late afternoon.
**Coverage:** Within the application site boundary in areas identified by the Extended Phase 1 and protected species walkover survey and any potential receptor sites adjacent to the application site boundary (as translocation is likely to be required).
**Equipment:** 0.5m x 0.5m squares of roofing felt or corrugated metal, spray paint, adder handling gloves, a snake stick, iPad and/or GPS and paper map (to record data in the event of an equipment failure) and camera.
**Surveyor experience/ licence requirement:** Experienced surveyor and assistant. No licence is required for survey of common reptiles. However, surveys for smooth snakes and sand lizards require an appropriately licensed surveyor. All surveyors would have venomous snake training if the desk study identifies that adders are present within the application site boundary or any potential off-line receptor sites.
**Methodology:** Methodology follows the guidance published by Froglife (1999) and NE and Defra (2015). Reptile surveys incorporate two survey techniques: artificial refuges ('tins') and direct observation. Direct observation is usually undertaken in conjunction with the use of artificial refuges. This involves walking slowly scanning the area 3-4m in front of the surveyor, paying particular attention to natural (as well as artificial) basking locations. The survey will encompass all s41 reptile species identified from desk study (e.g. grass snakes, adders, slow worms, common lizards and, if present, smooth snake and sand lizard).

Reptile tins are typically deployed at a minimum density of 10 tins/ha, in areas of suitable reptile habitat (sunny areas near to cover), e.g. along hedgerow bases, grassy banks, rides or verges. The tins act as artificial basking sites and refuges. Tins are left to 'bed in' for a minimum of 2 weeks (to allow animals to find and start using them). These are then are checked for the presence of reptiles (both basking on top and resting beneath the tins) on a minimum of seven occasions during suitable conditions (as appropriate to time of year and daytime temperatures).

Invertebrate surveys (e.g. Thames Terrace Grasslands and other relevant s41 priority habitats)
**When: May to September** to include two main survey periods between **May-June** and **August-September** (depending on target species and habitat type)

**Coverage:** Survey of areas identified within the application site boundary + 200m buffer during the Extended Phase 1 survey as important for terrestrial invertebrates which will be impacted by the Project – e.g. Thames terrace grasslands and brownfield sites, ancient woodland and potentially areas of functionally linked land adjacent to the SPA/Ramsar site). Survey to include s41 invertebrates (determined by habitat suitability) as well as qualifying species for designated (e.g. SSSI) or local wildlife sites.
**Equipment:** Depending on survey type, surveyors will require a number of the following items (NB this list is indicative, not comprehensive); sweep net, beating tray, pouter, containers (plastic buckets for pitfall traps or aquatic sampling), pond net, trowel, hand saw, auger, industrial methylated spirit (IMS), Verkon (disinfectant spray required for biosecurity) and iPad and/or GPS and paper map (to record data in the event of an equipment failure) and camera.
**Surveyor experience /licence requirement:** Experienced Entomologist and an assistant, no licence is required for survey. Surveys should aim to target key species groups associated with specific habitat types rather than providing a full site species inventory. If key target species are known for specific sites, this should be taken into account in designing survey methodology.
**Methodology:** Survey effort: the typical survey period for an 'average site' of between 10 - 50ha is 3 - 7days (respectively) with each survey day comprising 5-7hrs of active fieldwork. Duration of fieldwork is therefore dependant on the size of the site/area requiring assessment. Survey techniques should include (for terrestrial habitats) standardised sweeping, spot sweeping from flowers, ground searching and beating. Passive trapping methods such as pitfall, water or malaise traps may be useful to help counteract poor weather conditions (but are prone to disturbance). For aquatic habitats surveys may need to include pond netting and (potentially) kick-sampling (in areas of running water, e.g. streams and ditches). For ancient woodland sites dead wood methods and arboreal survey techniques such as Malaise trap and flight-inception traps may be required. Surveyors should also record a site description, map of survey locations and photographs of habitats and species (as appropriate) to facilitate assessment of likely impacts (Natural England (2014); Drake *et al.* (2007)).

**Bird surveys**

Breeding bird surveys

**When**: **April to June** (inclusive), starting ideally 0600 – 0700 BST and no later than 0900 BST. Additional visits during evenings (timings) would be required where crepuscular species are identified through desk study and the Extended Phase 1 survey. Up to two years of surveys to inform the EIA assessment. Following initial year of surveys, we will review the requirement to extend the survey period to earlier (e.g. February and/or March) or later (July) in the year.
**Coverage**: Breeding bird surveys will be required within the application site boundary + 500m buffer, depending on desk study findings and Extended phase 1 and protected species walk over. This data should be no more than two years old when the application is submitted - survey will include s41 bird species, if present.

**Equipment**: Binoculars, iPad and/or GPS and paper map (to record data in the event of an equipment failure) for each surveyor.
**Surveyor experience/licence requirement**: Experienced bird surveyors and assistants, no licence is required for survey.
**Methodology:** Breeding bird surveys follow methodology from Gilbert *et al*. (1998). Transect walked along hedgerows and suitable habitat. Surveyors will use binoculars, and will plot observations (both audial and visual) of Schedule 1, Section 41, Red list and Amber list species on a transect map, with a tally kept of all other bird species.

Winter and Migration bird surveys
**When**: **September to March** (inclusive)
**Coverage**: Winter bird surveys will be required along Preferred Route application site + 500m buffer, depending on desk study findings and Extended phase 1 and protected species walk over. This data should be no more than two years old when the application is submitted - survey will include s41 bird species, if present. One year of surveys will be required to inform the EIA assessment.
**Equipment**: Binoculars, iPad and/or GPS and paper map (to record data in the event of an equipment failure) for each surveyor.
**Surveyor experience/licence requirement**: Experienced bird surveyors and assistants. No licence is required for survey.
**Methodology:** Winter surveys will follow generic methodology from Gilbert *et al*. (1998) will be focused within the red line boundary. Transect walked along hedgerows and suitable habitat. Surveyors will use binoculars, and will plot observations (both audial and visual) of Schedule 1, Red list and Amber list species on a transect map, with a tally kept of all other bird species. These surveys are likely to coincide with the functionally linked land transect surveys for the HRA, detailed below.

**Noise surveys**
Noise surveys for birds
**When**: Once a quarter, currently proposed to cover March, May, September, and November (encompassing all key seasonal constraints: breeding birds, spring and autumn passage and overwintering). Noise specialists will confirm the duration required for each survey visit to collect a representative sample of baseline conditions.
**Coverage**: Noise monitoring will only be required in areas where **notable bird interests** have been identified from the desk study and extend Phase 1 survey. Noise surveys will establish the existing baseline within 500m of the application site boundary (i.e. application site + 500m buffer) at these specified locations. NB the baseline noise data will be interpreted in relation to previously reported noise disturbance distances for the notable bird species, as well as direct observations during the bird survey work to any loud noises, and will be used to interpret the likely impacts of construction and operation (once noise contouring mapping has been produced).
**Equipment:** Noise monitor and tripod

**Surveyor experience/ licence requirement**: No licence is required for survey. Noise specialist and ecologists will agree the locations where equipment would be deployed. Noise sampling (to obtain baseline) would coincide with breeding and wintering bird surveys. Equipment to be set up and retrieved by noise specialists at the end of each survey.
**Methodology**: Noise monitor will be set up at the appropriate location (and height – relative to bird behaviours) for the duration of the bird survey. Analysis of the results will be undertaken by noise specialist. This data will be interpreted in relation to observations of birds' behaviour during the surveys.

### Section 41 species not included in survey methods outlined above

Fish

Advice would be sought from the Environment Agency and through assessment of desk study records for any s41 fish species that could be impacted by river crossings proposed for the Project. If impacts cannot be avoided (e.g. through use of clear-span bridges) and targeted mitigation is required as a result of the Project then it may be necessary to undertake targeted fish surveys to inform the EIA.

White clawed crayfish

Advice would be sought from the Environment Agency and through assessment of desk study records for white clawed crayfish that could be impacted by river crossings proposed for the Project. If impacts cannot be avoided (e.g. through use of clear-span bridges) and targeted mitigation is required as a result of the Project, then it may be necessary to undertake targeted white clawed crayfish survey to inform the EIA.

Mammals (harvest mouse, brown hare, and hedgehog)

Detailed desk study coupled with Extended Phase 1 survey to confirm presence of suitable habitats would inform the requirement to undertake detailed surveys for these s41 mammals, which will also be dependent on the likely impacts of the Project on local populations and whether detailed mitigation would be required.

Lower plants (fungi, bryophytes, lichens)

Detailed desk study coupled with Extended Phase 1 survey to confirm presence of suitable habitats would inform the requirement to undertake detailed surveys for notable s41 lower plants, which will also be dependent on the likely impacts of the Project on local populations and whether detailed mitigation would be required. Note, specialist surveyor is likely to be required if surveys for lower plants are required.

## Survey to inform HRA

### Botanical surveys

Botanical survey for Ramsar site plant species

**When:** main survey period **June to October**, two visits one in early June/ July and one later in August/ September (subject to modification to align with target species

flowering or fruiting period). A single year of survey is required to assess the botanical interests.
**Coverage**: Within the Ramsar site/SSSI – targeted surveys and at specified distances from the tunnel alignment and tunnel portal. Survey area up to 200 m from route alignment to take account of air quality impacts, potentially extending further dependent of anticipated changes to hydrogeology and/or groundwater associated with the tunnelling. The current 'worst case scenario' is a 'radius of influence' of 3km around the tunnel portals. Standard modelling of changes in air quality in relation to roads has shown that pollution levels reduce to pre-existing background levels by the time you are 200m from the road. Therefore, impacts are only typically considered where sites lie within a 200m buffer of a road.
**Equipment:** Hand lens, camera, quadrat, iPad and/or GPS and paper map (to record data in the event of an equipment failure).
**Surveyor experience /licence requirement**: Experienced botanist, likely to be Principal Ecologist and assistant. No licence is required for survey.
**Methodology:** Quadrats will be distributed across suitable habitat within the area of the site identified as potentially impacted by the Project and the percentage species composition will be evaluated. In addition, species lists will be made that will enable the botanical value of a site to be assessed. Particular attention will be paid to habitats of the qualifying plant species identified on the Ramsar site designation (if confirmed present). Survey methodology follows the current NVC survey guidance (Rodwell, 2006).

**Invertebrate surveys**
Invertebrate surveys (Ramsar site)
**When: May to September** to include two main survey periods between **May-June** and **August-September** (depending on target species and habitat type)
**Coverage:** The area of Ramsar site at risk of hydrological/hydrogeological/groundwater impacts from tunnelling and/or changes in air quality; i.e. at least 200m radii from tunnel portal (for air quality impacts). NB potential hydrological/groundwater impact likely to be greater (current 'worst case scenario' is a radius of influence of 3km around the tunnel portals). Survey may also be required for areas of 'functionally linked land' adjacent to the Ramsar site – (e.g. grazing marsh and ditches) that will be affected by the impacts resulting from the route alignment. Extended Phase 1 survey will help inform areas outside the Ramsar site that require survey.
**Equipment:** Depending on survey type, surveyors will require a number of the following items (NB this list is indicative, not comprehensive); sweep net, beating tray, pouter, containers (plastic buckets for pitfall traps or aquatic sampling), pond net, trowel, hand saw, auger, industrial methylated spirit (IMS), and iPad and/or GPS and paper map (to record data in the event of an equipment failure) and camera.
**Surveyor experience /licence requirement:** Experienced Entomologist and an assistant, no licence is required for survey. Surveys should aim to target areas of suitable habitat for key species groups associated with Ramsar site citation rather than providing a full site species inventory. The Ramsar site species list should be taken into account in designing survey methodology.

**Methodology:** Survey effort: the typical survey period for an 'average site' of between 10 - 50ha is 3 - 7days (respectively) with each survey day comprising 5-7hrs of active fieldwork. Duration of fieldwork is therefore dependant on potential impacts (air and water) to the site (area requiring survey). Survey techniques should include (for terrestrial habitats) standardised sweeping, spot sweeping from flowers, ground searching and beating. Passive trapping methods such as pitfall, water or malaise traps may be useful to help counteract poor weather conditions (but are prone to disturbance). For aquatic habitats surveys may need to include pond netting and (potentially) kick-sampling. Surveyors should also record detailed site description, map of survey locations and photographs of habitats and species (as appropriate) to facilitate assessment of likely impacts (Natural England (2014); Drake *et al.* (2007)).

**Bird surveys**

Wetland bird surveys

**When**:

- Spring passage: April to June inclusive
- Autumn passage: July to October inclusive.
- Wintering birds: November to March inclusive.

Spring and autumn passage and wintering bird surveys will include hours of darkness around dusk and dawn (linked to timing of high and low tides) and may also require nocturnal surveys. Two years of spring and autumn passage and wintering bird surveys are required to inform the HRA.

**Coverage**:

- For spring and autumn passage and wintering birds: River crossing location including Ramsar site/SPA/SSSI and areas of functionally linked land. Assessment of functionally linked land would cover anything suitable up to 1km inland from the SPA boundary and within 1km of the route.
- Survey to include 500m buffer either side of crossing locations in terms of vantage point locations. Two years of data are required.

**Equipment**: Binoculars, high powered telescope and tripod, walkie-talkie, iPad and/or GPS and paper map (to record data in the event of an equipment failure) for each surveyor.

**Surveyor experience/ licence requirement**: Bird surveyors with experience of wader and waterfowl surveys and assistant. No licence is required for survey.

**Methodology:**

Twice monthly vantage point (VP) surveys will be undertaken from high to low tide (or vice versa). Counts will be made hourly, for a total of six hours. VPs will be located at either side of the river, for any crossing option going forward. This survey will occur during all survey periods and follows methodology detailed in Gilbert *et al*., (1998).

Transect surveys will be undertaken once a month in all survey periods for spring, autumn and winter. These will focus on suitable roosting habitat associated with the Thames Estuary and Marshes SPA, located within 1km of the proposed crossing locations. During each survey visit, the surveyors would also walk a predefined transect route around the boundaries of the fields within and adjacent to the

proposed construction areas in order to assess the potential impacts upon SPA species and other wintering birds of conservation concern that may be using the fields to forage or roost. The transect surveys would be undertaken to coincide with the period two hours either side of high-tide when birds are more likely to be utilising fields for foraging.
For all transect surveys, surveyors will carry binoculars, and will be plotting observations (both audial and visual) of Schedule 1, Red list and Amber list species on a transect map, with a tally kept of all other bird species. For VP surveys, surveyors will use telescopes and binoculars and record all waterfowl and waders and a tally will be kept of non-focal species.

**Noise surveys**
Noise surveys for birds

**When**: Once a quarter, currently proposed to cover March, May, September, and November (encompassing all key seasonal constraints: breeding birds, spring and autumn passage and overwintering). Noise specialists will confirm the duration required for each survey visit to collect a representative sample of baseline conditions.
**Coverage**: Noise monitoring, to establish the existing baseline, within 500m of application site boundary (i.e. application site + 500m buffer) and within SPA and Ramsar site boundaries and areas of functionally linked land that lie within application site + 500m buffer. NB the exact survey locations may be subject to change as the Project design is finalised. This baseline noise data will be interpreted in relation to previously reported noise disturbance distances for the SPA/Ramsar site wetland birds, as well as direct observations during the bird survey work to any loud noises, and will be used to interpret the likely impacts of construction and operation (once noise contouring mapping has been produced).
**Equipment:** Noise monitor and tripod
**Surveyor experience/ licence requirement**: No licence is required for survey. Noise specialist and ecologists will agree the locations where equipment would be deployed. Noise sampling (to obtain baseline) would be carried out once a quarter and will coincide with the fortnightly bird surveys in relation to the SPA and Ramsar sites. Equipment will be set up and retrieved by noise specialists at the end of every survey.
**Methodology**: Noise monitor will be set up at the appropriate location (and height – relative to bird behaviours). Analysis of the results will be undertaken by noise specialist. This data will be interpreted in relation to observations of birds' behaviour during the surveys.

**Air quality survey**
Air quality assessment of designated sites within 200m of the road network
**When:** Diffusion tubes have been deployed in areas with good air flow, adjacent to existing roads or at the boundary of designated sites (i.e. not *within* woodland) and collected monthly for a *minimum* of three months (ideally 12 months to establish a robust baseline). No seasonal constraints

**Coverage:** Any designated sites within 200m of the road/tunnel portals. Currently designated sites south of the River Thames include: North Downs Woodland SAC and Wouldham to Detling Escarpment SSSI (these sites are not directly impacted, but changes in traffic volume on the A229 as a result of LTC may worsen current traffic-related air quality impacts), Cobham Woods SSSI, Shorne and Ashenbank Woods SSSI; Great Crabbles Wood SSSI and the Thames Estuary and Marshes Ramsar site/South Thames Marshes SSSI, , and. Survey locations would be selected to gather the necessary baseline data to assess current pre-construction air quality and to predict future changes to air quality based on traffic modelling for the Lower Thames Crossing.
**Equipment:** Diffusion tubes, associated ties and clips, hammer and posts (to install diffusion tubes), map/GPS/iPad to record monitoring locations
**Surveyor experience:** Air quality specialist to set up initial sampling locations, monthly collection/replacement of diffusion tubes could be carried out by trained ecology staff undertaking bird survey work. No licence required for surveys.
**Methodology:** Survey and assessment methodology to follow Highways Agency (2007) Design Manual for Roads and Bridges (DMRB) air quality survey guidelines for the assessment of designated sites. **Note**, further guidance for assessing impacts from traffic related changes in air quality on designated sites is due to be published by Natural England. Assessment criteria may need to be revised if new guidance is published prior to the DCO application.

## Marine survey methodology

EIA Intertidal ecology survey: Phase I GIS Mapping of Marine Biotopes
**When:** Between April and October, at least two hours before spring tide low water (daylight permitting)
**Coverage:** Tidal areas within the application site boundary for marine works (area TBC)
**Equipment:** Collection equipment, pots and labels, spade and 0.5mesh sieve for sediment shores, GPS, map of site/ipad, camera
**Surveyor experience:** Specialist surveyor
**Methodology:** Following JNCC Marine Monitoring Handbook methodology. An evenly spaced grid of sampling stations is set up across the site from high water spring tides down to low water spring tides. Depending on the substrate samples are collected and infauna are identified or collected for later identification. For conspicuous species such as bivalves it is straightforward to count the number of individuals per $m^2$. If the $1m^2$ around the sample station contains more than 5% cover of saltmarsh plants then it is classed as saltmarsh and the epifauna/floral species, their abundance and percentage cover are recorded but the sediment infauna are not sampled. If, however, the $1m^2$ contains less than 5% cover of saltmarsh plants the infauna and surface species are recorded as for other sediment biotopes.

EIA Collection and analysis of sediments and contaminant samples
**When:** Timing of surveys to occur during low flow conditions of summer or autumn.
**Coverage:** Application site boundary for marine works

**Equipment:** Specialist equipment provided by subcontractor
**Surveyor experience:** Specialist surveyor
**Methodology:** Bespoke methodology, subcontractor will be entrusted with this. Survey method is to be based on a clear scope of works and understanding of level of data that will be required to inform the EIA.

EIA and HRA Hydrodynamic modelling of the movement of sediment in relation to works
**When:** No timing constraints
**Coverage:** Assessment to determine impacts of potential jetty construction – modelling required for river Thames in vicinity of the works. Results of modelling will identify extent of impacts from in-river works and likely suspended sediment plumes/amount and location of sediment deposition. These results would be used to inform and help refine scope of ecological surveys (currently based on 'worst case scenario' from earlier hydrodynamic modelling, as noted below).
**Equipment:** N/A this is a laboratory and computer-based assessment.
**Surveyor experience:** Coastal Modelling Technologist
**Methodology:** Bespoke methodology, subcontractor will be entrusted with this. Assessment would be based on a clear scope of works and understanding of level of data that will be required to inform the EIA and HRA.

EIA and HRA Subtidal ecology surveys /Benthic substrate and invertebrate surveys
**When:** Early autumn, two years of survey required for HRA assessment
Coverage: Application site boundary for marine works + 1km buffer upstream and 0.3km buffer downstream of application site. This proposed survey buffer is based on current knowledge of suspended sediment transfer from initial 2D hydrodynamic modelling that was carried out to assess the impacts of dredging associated with the construction of an immersed tube crossing at this location (NB this represented the 'worst-case scenario' from assessments of the long list of options). The difference in survey buffer is based on the results of this modelling, which accounts for the fact that the Thames has a much stronger ebb than flow tide.
**Equipment:** Specialist equipment provided by surveyor
**Surveyor experience:** Specialist surveyor
**Methodology:** Bespoke methodology, subcontractor will be entrusted with this. Survey method is to be based on a clear scope of works and understanding of level of data that will be required to inform the EIA and HRA respectively.

The requirement for the following surveys has been ruled out due to substantial desk study data:

- Marine mammal surveys- ZSL Thames marine mammal survey: http://sites.zsl.org/inthethames/main/#Public sightings, plus desk study data will be sufficient.
- Fish surveys: Benthic ecology of Thames Estuary trawl data for PLA 2002-2005, Fisheries sensitivity map of British waters main spawning and nursery

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# Appendix D – Materials Baseline

### Active and Inactive Aggregates Quarries in Kent

| Quarry | Operator | Material |
|---|---|---|
| Hermitage Quarry, Maidstone | Gallagher Aggregates Ltd | Crushed Rock |
| Blaise Farm, West Malling | Hanson Aggregates Ltd | Crushed Rock |
| Stone Castle Farm, Whetsted | Lafarge Aggregates Ltd | Sandstone Sand and Gravel |
| Faversham Quarries, Faversham | Brett Aggregates Ltd | Sharp Sand and Gravel |
| Lydd Quarry (Scotney Court Farm), Lydd | Brett Aggregates Ltd | Sharp Sand and Gravel |
| Allens Bank, Lydd | Brett Aggregates Ltd | Sharp Sand and Gravel |
| Conningbrook Quarry | Brett Aggregates Ltd | Sharp Sand and Gravel |
| Highstead Quarry, Chislet | Brett Aggregates Ltd | Sharp Sand and Gravel |
| Denge Quarry, Lydd | CEMEX UK | Sharp Sand and Gravel |
| Darenth & Joyce Green Quarry, Dartford | J Clubb Ltd | Sharp Sand and Gravel |
| East Peckham Quarry, East Peckham | J Clubb Ltd | Sandstone Sand and Gravel |
| Joyce Green Quarry, Dartford | Hanson (Joyce Green Aggregates) Ltd | Sharp Sand and Gravel |
| Aylesford Quarry, Aylesford | Aylesford Heritage Ltd | Soft Sand |
| Borough Green Sand Pit, Sevenoaks | Borough Green Sandpits Ltd | Soft Sand |
| Charing Quarry, Charring | Brett Aggregates Ltd | Soft Sand |
| Lenham Quarry, Maidstone | Brett Aggregates Ltd | Soft Sand |
| Ightham Sand Pit, Sevenoaks | H&H Ltd | Soft Sand |
| Wrotham Quarry (Addington Sand Pit), Wrotham | Hanson Aggregates | Soft Sand |
| Nepicar Sand Quarry, Sevenoaks | J Clubb Ltd | Soft Sand |
| Greatness Farm, Sevenoaks | Tarmac Ltd | Soft Sand |

**Permitted Sand and Gravel Reserves in Greater Essex**

| Year | Quantities (tonnes) |
|---|---|
| 2010 | 37,360,000 |
| 2011 | 37,010,000 |
| 2012 | 35,500,000 |
| 2013 | 32,880,000 |
| 2014 | 30,720,000 |
| 2015 | 32,690,000 |

**Permitted Primary Aggregate Sites in Greater Essex, March 2015**

| Site Name | Operator | Cessation Date for Planning Permission |
|---|---|---|
| **Operational Sand and Gravel Quarries with Permitted Reserves** | | |
| Alresford Creek, Alresford | Brett Aggregates | 2042 |
| Birch Quarry, Birch | Hanson Aggregates | 2018 |
| Bradwell Quarry, Silver End | Blackwater Aggregates | 2022 |
| Brightlingsea (Moverons) Quarry | Brett Aggregates | 2026 |
| Bulls Lodge Quarry - Boreham Airfield area | Hanson Aggregates | 2030 |
| Cobb's Farm, Goldhanger | Sewells Reservoir Construction Ltd | 2028 |
| Colchester Quarry, Stanway | Lafarge Tarmac | 2042 |
| Crown Quarry (Ardleigh Reservoir Extension) | Sewells Reservoir Construction Ltd | 2028 |
| Crumps Farm, Great Canfield | Edviron Ltd | 2029 |
| Dansand Quarry, Stanford Road, Orsett | Rio Aggregates | 2025 |
| East Tilbury Quarry | S. Walsh & Sons Ltd | 2021 |
| Elsenham Quarry, Elsenham | Brett Aggregates | 2030 |
| Fingringhoe Quarry | JJ Prior Ltd | 2042 |
| Highwood Quarry, Little Easton | Sewells Reservoir Construction Ltd | 2026 |
| Martells Quarry, Ardleigh | Aggregate Industries UK Ltd | 2026 |
| Mill House Farm, West Tilbury | RJD Ltd | 2017 |

| Site Name | Operator | Cessation Date for Planning Permission |
|---|---|---|
| **Operational Sand and Gravel Quarries with Permitted Reserves** | | |
| Widdington Pit | Carr & Bircher Ltd | 2029 |
| **Non Operational Sand & Gravel Quarries with Permitted Reserves** | | |
| Lufkins Farm, Great Bentley | Brett Aggregates | Commencement within 5 years from July 2014, cessation three years after commencement |
| Orsett Quarry - Stanford-le-Hope | Ingrebourne Valley Ltd | 2042 |
| Rivenhall Airfield (Waste Facility) | Gent Fairhead & Co Ltd | Planning Permission for waste management was granted in February 2016. |
| **Operational Brick Clay Sites with Permitted Reserves** | | |
| Bulmer Brickworks | Bulmer Brick & Tile Co | 2027 |
| Marks Tey Brickworks | W H Collier Ltd | 2042 |
| **Operational Chalk Sites with Permitted Reserves** | | |
| Newport Chalk Pit | Needham Chalks Ltd | 2042 |

**Permitted Primary Processing Plants in Greater Essex, 2015**

| Operator | Quarry | Primary Processing | Bagging | Concrete Mortar | Asphalt Coating | Aggregate Recycling | Transhipment Facility |
|---|---|---|---|---|---|---|---|
| Aggregate Industries | Martells Quarry, Ardleigh | Y | | | | | |
| Blackwater Aggregates | Bradwell Quarry, Rivenhall Airfield (including Extension A2) | Y | Y | Y | | | |
| Brett Aggregates | Alresford Creek, Tendring | Y | Y | | | | |
| | Brightlingsea Quarry, Brightlingsea | Y | | | | | |
| | Elsenham Quarry, Uttlesford | Y | Y | | | Y | |
| Carr and Bircher | Widdington Pit, Widdington | Y | | | | Y | |
| Dewicks | Curry Farm, Bradwell-on- Sea | Y | | | | | |
| Edviron | Crumps Farm, Great Canfield | Y | | | | | |
| Frank Lyons Plant Services | Blackley Quarry, Great Leighs | Y | | | | | |
| G&B Finch | Asheldham Quarry, Asheldham | Y | | Y | | | |
| Hanson Aggregates | Birch Quarry, Birch | Y | | Y | | | |
| | Bulls Lodge Quarry, Boreham | Y | Y | Y | Y | Y | |
| JJ Prior Ltd | Fingringhoe Quarry | | | | | | Y |
| Tarmac Ltd. | Colchester Quarry, Stanway | Y | | Y | Y | Y | |
| | Wivenhoe Quarry, Wivenhoe | Y | | | Y | Y | |
| S Walsh and Sons Ltd | East Tilbury Quarry | | | | | Y | |

| Operator | Quarry | Primary Processing | Bagging | Concrete Mortar | Asphalt Coating | Aggregate Recycling | Transhipment Facility |
|---|---|---|---|---|---|---|---|
| Sewells Reservoir Construction | Crown Quarry, Ardleigh | Y | | Y | | | |
| | Highwood Quarry, Little Easton | Y | Y | | | Y | |

## Active Landfill Sites that take CD&E Waste

| Landfill Sites | Permit Number | Postcode | Annual Tonnes permitted |
|---|---|---|---|
| Bamber Quarry Landfill | EA/EPR/CB3908CE/T001 | DA10 0AN | 250,000 |
| Margetts Pit Landfill | EA/EPR/AP3698HB/V006 | ME1 3XU | 100,000,000 |
| Medebridge Road Landfill | EA/EPR/SP3999NT/A001 | RM16 5TZ | 500,000 |
| East Tilbury Quarry | EA/EPR/SP3439LE/V005 | RM18 8PH | 699,999 |
| Rainham Landfill | EA/EPR/QP3996NB/V010 | RM13 9DA | 802,270 |
| Ayletts Farm Quarry, Rainham | EA/EPR/JP3096NP/V002 | RM13 9XW | 127,117 |
| Mardyke Farm | EA/EPR/QP3196NT/V003 | RM13 7RS | 692,250 |
| Rainham Landfill (Phase 4) Ferry Lane | EA/EPR/BP3891NJ/A001 | RM13 9BJ | 2,213,400 |
| Baldwins Farm | EA/EPR/BP3197ND/V003 | RM15 5SD | 150,000 |
| Aveley No2 Clay Pit | EA/EPR/AP3293MC/V005 | RM15 4XP | 250,000 |
| South Hall Farm | EA/EPR/KP3197NU/V003 | RM13 9EW | 260,000 |
| Coldharbour Lane, Rainham | EA/EPR/BP3493ET/A001 | RM13 9DA | 1,700,000 |
| Spring Farm Landfill | EA/EPR/DP3794ER/A001 | RM13 9GF | 300,000 |
| Marks Warren Quarry Landfill | EA/EPR/CP3190VE/T001 | RM6 6RB | 244,000 |
| Workhouse Quarry Inert Landfill | EA/EPR/BX8505IG/ | ME19 5SJ | 400,000 |
| Stone Pit 2 Inert Landfill | EA/EPR/BS6726IL/V006 | DA9 9DT | 624,000 |

## Active Waste Management Facilities that take CD&E Waste

| Waste Management Facilities | Permit Number | Postcode | Annual Tonnes permitted |
|---|---|---|---|
| Viridor Waste Kent Limited | EA/EPR/TP3495HH/V007 | ME2 4NF | 261,975 |
| Countrystyle Recycling Ltd | EA/EPR/CP3095HT/V006 | ME2 2BA | 146,250 |
| Street Fuel Limited | EA/EPR/AB3007XN/V002 | ME4 4SR | 280,000 |
| F C C Recycling (UK) Limited | EA/EPR/GP3198HY/V006 | DA13 9PA | 130,000 |
| Pinden Ltd | EA/EPR/WP3598HY/T002 | DA2 8EB | 233,200 |

| Waste Management Facilities | Permit Number | Postcode | Annual Tonnes permitted |
|---|---|---|---|
| Ecoclear Ltd | EA/EPR/DP3898HK/V005 | ME6 5JX | 111,400 |
| Mayer Parry Recycling Ltd | EA/EPR/KP3899NQ/V002 | RM18 8QR | 1,500,000 |
| European Metal Recycling Ltd | EA/EPR/VP3094NK/V002 | RM18 7EH | 300,000 |
| Veolia E S Cleanaway (UK) Ltd | EA/EPR/KP3497NF/A001 | RM13 9DA | 505,000 |
| Kilnbridge Construction Services Ltd | EA/EPR/VP3697NS/V003 | RM13 7SS | 100,310 |
| R White Waste Management Ltd | EA/EPR/KB3532AM/T002 | RM9 6QJ | 288,570 |
| Veolia E S Cleanaway (UK) Ltd | EA/EPR/MP3393EA/A001 | RM13 9DA | 400,000 |
| Mayer Parry Recycling Ltd | EA/EPR/LP3890EY/V002 | DA8 2AD | 276,960 |
| Veolia E S Cleanaway (UK) Ltd | EA/EPR/RP3095EY/A001 | RM13 9BJ | 234,000 |
| Veolia E S (UK) Ltd | EA/EPR/BP3396LD/A001 | ME2 4DZ | 249,999 |
| Port of Sheerness Ltd | EA/EPR/GP3295LY/A001 | ME4 4SW | 250,000 |
| S Walsh And Son Ltd | EA/EPR/JB3535AT/V004 | RM19 1TD | 500,000 |
| Ingrebourne Valley Ltd | EA/EPR/LP3995VS/A001 | RM13 9ED | 600,000 |
| Knowl Hill Limited | EA/EPR/PP3698VX/V002 | ME3 8RZ | 380,000 |
| Connect Waste Management U K Ltd | EA/EPR/KB3431RW/T001 | RM13 9BU | 100,000 |
| Woodland Environmental Limited | EA/EPR/KB3435AK/T001 | DA11 9SW | 114,800 |
| Ingrebourne Valley Limited | EA/EPR/WP3094EP/A001 | RM18 8QR | 759,000 |
| London Gateway Parkland Ltd | EA/EPR/YP3691EK/A001 | SS17 9PD | 2,400,000 |
| Rural Arisings Ltd | EA/EPR/AB3331RU/V002 | RM15 5DP | 1,156,984 |
| Ballast Phoenix Ltd | EA/EPR/BB3239RD/V002 | RM18 7EH | 275,000 |
| B P R Group Europe Ltd | EA/EPR/EB3135AD/A001 | RM15 4YA | 149,998 |
| S Walsh And Son Limited | EA/EPR/PB3933DJ/V002 | RM18 7EH | 249,999 |
| Recresco Limited | EA/EPR/AB3103KR/A001 | DA10 0LL | 220,000 |

| Waste Management Facilities | Permit Number | Postcode | Annual Tonnes permitted |
|---|---|---|---|
| Seales Road Haulage Limited | EA/EPR/AB3408HK/A001 | RM15 4YD | 250,000 |
| Hanson Quarry Products Europe Ltd | EA/EPR/BB3005TG/A001 | RM9 6QD | 249,999 |
| Land Logical Limited | EA/EPR/BB3906MD/A001 | DA9 9ED | 250,000 |
| Ingrebourne Valley Limited | EA/EPR/CB3104CE/A001 | RM13 9EJ | 305,999 |
| Tarmac Trading Limited | EA/EPR/CB3304UZ/V003 | ME6 5LA | 100,000 |
| Sheerness Recycling Limited | EA/EPR/CB3305XA/A001 | DA10 0PP | 149,999 |
| Sita U K Limited | EA/EPR/ZP3434EU/V002 | RM18 7NS | 179,999 |

# Appendix D – 'Other Development' Matrix for Cumulative Effects Assessment

| 'Other development' details | | | | | | |
|---|---|---|---|---|---|---|
| **ID** | **Local Authority** | **Application Reference** | **Applicant for 'other development' and brief description** | **Distance from project** | **Status** | **Tier** |
| 1 | Brentwood | 16/00152/FUL | Peri Ltd Warley Street Little Warley Essex CM13 3JZ<br><br>Demolition and redevelopment for new office, warehouse and shed. 6.21ha | 2.7km | Consented | 1b |
| 2 | Brentwood | 13/00327/FUL | Orchard Farm Little Warley Hall Lane West Horndon Little Warley Essex CM13 3EN<br><br>Installation and operation of a ground mounted solar PV system with a capacity of up to 250kW | 2.7km | Consented | 1b |
| 3 | Gravesham | 20141214 | Coldharbour Road Northfleet, Gravesend, Kent<br><br>Development of up to 400 new homes and associated infrastructure including provision of open space - *Bovis Homes Ltd, Persimmon Homes and the Colyer-Fergusson Charitable Trust* | 1.9km | Pending | 1c |
| 4 | Gravesham | 20130446 | RSPB Shorne Marshes Queens Farm Road Shorne Gravesend Kent<br><br>Creation of two lengths of security ditch (Section A and B) to protect the nature reserve from trespass. | 0.0km | Consented | 1b |
| 5 | Gravesham | 20150893 (20160244 - relates to conditions for this application) but is not | Singlewell County Primary School Mackenzie Way Gravesend Kent DA12 5TY<br><br>Construction of a new building to accommodate eight new classrooms, a new studio hall, staff room, ICT suite, group room, hygiene room, plant room and associated storage and wc facilities. New hard play area with access ramps and steps. New car park. | 0.1km | Consented | 1b |

| 'Other development' details | | | | | | |
|---|---|---|---|---|---|---|
| | | referenced on figure 16.1) | | | | |
| 6 | Gravesham | 20130923 | Land East of St Mary's Church, Chalk Rochester Road Gravesend Kent<br><br>The development of a Memorial Park including a cemetery, woodland burial, crematorium and wildlife area with new access off Rochester Road and ancillary works. | 0.0km | Consented | 1b |
| 7 | Gravesham | 20160963 | Land West of Springhead Road Springhead Road Northfleet Gravesend Kent<br><br>Countryside Properties (UK) Ltd<br>Development of land at Ebbsfleet for mixed use up to 789,550m2 gross floorspace comprising employment, residential, hotel and leisure uses, supporting retail and community facilities and provision of car parking, open space, roads and infrastructure. | 4.3km | Pending | 1c |
| 8 | Gravesham | 20160924 | Northfleet Embankment East (Employment Site) Crete Hall Road Northfleet Gravesend Kent<br><br>Proposed development of brownfield land to provide up to 240,000sq.ft of employment floorspace. | 2.9km | Pending | 1c |
| 9 | Thurrock | 16/01120/OUT | Intu Lakeside West Thurrock Way West Thurrock Essex<br><br>Part demolition of existing Debenhams store and demolition of existing bus station. Alteration and extension of the northern end of the shopping centre including erection of new buildings for uses with Use Classes A1-A5 and new multi-storey car park. Erection of a new bus station and the alteration and extension of the shopping centre | 3.5km | Consented | 1b |

| ‘Other development’ details | | | | | | |
|---|---|---|---|---|---|---|
| | | | on its eastern side including the erection of new buildings for uses with Use Classes A1-A5. Provision of new public realm and landscaping area. Provision of Temporary Bus Station comprising works to existing surface car parking area, alterations of existing and construction of new vehicular, pedestrian and cycle access and egress arrangements and car parking and other ancillary works and operations. \| | | | |
| 10 | Medway | MC/16/2917 | 178 And Land North of Brompton Farm Road Strood Rochester Kent<br><br>Outline application with some matters reserved (appearance, landscaping, layout, scale) for residential development comprising of up to 135 residential dwellings with associated landscaping, public open space and associated works. | 4.3km | Pending<br><br>Objection received | 1c |
| 11 | Gravesham | 20160670 | M Block Former Gravesend & North Kent Hospital Bath Street Gravesend Kent DA11 0DG<br><br>Demolition of a former hospital block and erection of up to 80 residential units and flexible A1/A2/A3/B1/D1/D2 ground floor unit, and associated works including construction of podium, car and cycle parking, refuse and cycle storage and landscaping. | 2.2km | Pending | 1c |
| 12 | Havering | P0459.16 | St Georges Hospital Suttons Lane Hornchurch<br><br>The redevelopment of the St George's Hospital site, inclusive of partial demolition and conversion of existing buildings, to provide upto 279 dwellings, on 10.11 ha of the wider site, together with associated car parking, landscape and infrastructure works. | 3.8km | Pending | 1c |
| 13 | Thurrock | 14/00326/SCR | Land Adjacent Portland Lodge and Brentwood Road Bulphan Essex | 2.6km | Pending | 1c |

| 'Other development' details | | | | | | |
|---|---|---|---|---|---|---|
| | | | Proposed Solar Park on land east of Brentwood Road (A128) (EIA required) | | | |
| 14 | Thurrock | 11/50403/TTGFUL | Thurrock And Basildon College Wood View Grays Essex RM16 2YR<br><br>Demolition and redevelopment for 362 dwellings comprising 12 no 1 bed apartments, 24 no 2 bed apartments, 36 no 2 bed houses, 235 no 3 bed houses, 55 no 4 bed houses, 754 car parking spaces, public open space, temporary car parking, landscaping, access and associated development. Revision to previously approved details (12/00515/CONDC). | 0.7km | Consented | 1b |
| 15 | Thurrock | 16/00307/FUL | Land to Rear & North of Bannatynes Sports Centre, Howard Road Chafford Hundred, Grays, Essex<br><br>Mixed use development to provide 203 no. residential units, landscaping, car/cycle parking. A doctor's surgery (280 sq.m.). Commercial units totalling 370sq.m. floor space, comprising: Class A1 (shops) / Class A2 (financial and professional services) / Class A3 (food and drink) / Class A4 (drinking establishments) / Class A5 (hot food takeaways) / Class D1 (non-residential institutions) | 3.0km | Consented | 1b |
| 16 | Thurrock | 14/01315/FUL | Dansand Quarries Stanford Road Orsett Essex RM16 3BB<br><br>Use of existing quarry as a recycling centre for the storage, processing and sale of aggregate waste and soils together with ancillary facilities and access | 0.0km | Consented | 1b |
| 17 | Thurrock | 15/00379/OUT | Land Adjacent 39 and 41 and to the South of St Johns Road Chadwell St Mary Essex<br><br>Outline application (with all matters reserved for a subsequent | 1.4km | Pending | 1c |

| ‘Other development’ details | | | | | | |
|---|---|---|---|---|---|---|
| | | | application) for proposed residential redevelopment of land between 39 and 41 St John's Road consisting of up to 43 dwellings, landscaping and new access. | | | |
| 18 | Thurrock | 15/00649/FUL | Tarmac Orsett Quarry Buckingham Hill Road Linford Essex SS17 0PP<br><br>Engineering works using imported inert materials to construct an Ecology Park including ancillary treatment plant and buildings and the provision of a footway along Buckingham Hill Road. | 1.0km | Consented | 1b |
| 19 | Thurrock | 10/50235/TTGOUT | Land West of Butts Lane Stanford Le Hope Essex<br><br>Redevelopment of 15ha area comprising part of existing golf course and agricultural land for up to 350 residential dwellings together with associated infrastructure including: new vehicular accesses onto Butts Lane, on-site vehicular, cycle and footway network, amenity space, landscaping, a community building (Use Class D2- Assembly and Leisure) and Doctors Surgery (Use Class D1 - Non-Residential Institution). Landscaping, including limited re-profiling of land on parts of the 15ha development site, 51.5ha of strategic open space, including formal and informal recreation uses. Change of use of existing golf clubhouse as cafe and/or information centre in connection with the strategic open space. Outline application with all matters reserved for the means of access to the site. | 1.4km | Consented | 1b |
| 20 | Thurrock | 15/01354/OUT | Land Part of Little Thurrock Marshes Thurrock Park Way Tilbury Essex<br><br>Application for outline planning permission (with details of landscaping, scale and appearance reserved) for the development of | 2.1km | Pending | 1c |

| 'Other development' details | | | | | | |
|---|---|---|---|---|---|---|
| | | | 13.11 ha of land to provide 280 residential units, a 250 sq.m. health centre (Use Class D1) and 1,810 sq.m. of commercial floorspace (Use Class B2/B8) with associated landscape, flood improvement and access works. | | | |
| 21 | Thurrock | LGLPLDO | DP World Development London Gateway Stanford Le Hope Essex<br><br>London Gateway Logistics Park Local Development Order (LDO) The LDO will permit, subject to a range of controls, a total of 829,700m2 of commercial floor space – including warehouse/ storage/ distribution, research and development and industrial accommodation – together with ancillary uses and a range of supporting servicing facilities, plant, landscaping and roadways. | 4.9km | Consented | 3 |
| 22 | Thurrock | 13/00165/ETL | Bata Field Land Adj Bata Avenue and to rear of 201 To 251 Princess Margaret Road East Tilbury Essex<br><br>Extension of time limit for planning application 09/50045/TTGOUT Residential Development of up to 299 dwellings | 0.4km | Consented | 1b |
| 23 | Thurrock | 14/00950/REM | Former Ford Motor Company Arisdale Avenue South Ockendon Essex RM15 5JT<br><br>Creation of 185 no. two and three bedroom houses and apartments, plus associated roads, paths, drives, car parking, ancillary structures and landscaping. | 1.3km | Consented | 1b |
| 24 | Thurrock | 14/00836/FUL | South Ockendon Quarry and Landfill Site Medebridge Road South Ockendon Essex<br><br>Erection of solar Photovoltaic (PV) arrays with associated infrastructure (ancillary equipment includes inverters, transformers | 0.0km | Consented | 1b |

| 'Other development' details | | | | | | |
|---|---|---|---|---|---|---|
| | | | and substations), access tracks, fencing, security including pole mounted CCTV on Ockendon Landfill Site. | | | |
| 25 | Thurrock | 14/01321/OUT | Land Adjacent Railway Line the Manorway and West of Victoria Road Stanford Le Hope Essex<br><br>Outline application with all matters reserved apart from access for the residential development of up to 153 dwellings. | 2.9km | Consented | 1b |
| 26 | Thurrock | 14/01274/FUL | Former St Chads School St Chads Road Tilbury Essex<br><br>Residential re-development of former St.Chads School site for 128 units, comprising two, three and four bed houses plus new associated landscaping and infrastructure. | 2.2km | Consented | 1b |
| 27 | Thurrock | 16/01300/FUL | South 3 Pacific Avenue Stanford Le Hope Essex SS17 9FA<br><br>The provision and use for a period of up to 10 years for a temporary lorry park providing a maximum of 441 HGV parking bays within a mix of haulage yard and ad-hoc parking areas. Ancillary facilities including office/welfare buildings, refuelling facilities, access facilities including a new single carriageway access road, lighting, landscaping, drainage and a new electricity substation. | 5.0km | Consented | 1b |
| 28 | Thurrock | 15/00236/FUL (as amended by 15/00238/CV and 14/00480/CV) | Land Part of Recreation Ground West of M25 And North of Aveley Bypass Belhus Park Park Lane Aveley South Ockendon Essex<br><br>Relocation of two junior football pitches to be provided in association with proposed Community Football Facility with associated fencing. | 3.5km | Consented | 1b |
| 29 | Thurrock | 16/01232/OUT | Land for Development Muckingford Road Linford Essex | 0.0km | Pending | 1c |

| ‘Other development’ details | | | | | | |
|---|---|---|---|---|---|---|
| | | | Application for outline planning permission with some matters (appearance, landscaping, layout and scale) reserved: Proposed development of up to 1,000 dwellings (Use Class C3), a new local road network including a vehicular / pedestrian railway crossing, a new single form entry primary school, local centre including provision for a maximum of 750 sq.m. Use Class A1 (shops) / Use Class A3 (food and drink) / Use Class D1 (non-residential institutions) floorspace, and new areas of open space, including formal recreation. | | | |
| 30 | Thurrock | 16/01194/SCO | Tilbury 2 Power Station Fort Road Tilbury Essex RM18 7NR<br><br>**NOTE: This is an NSIP**<br><br>Request for an Environmental Impact Assessment (EIA) Scoping Opinion in respect of (a): Proposed redevelopment of land for use as a port in association with the existing Port of Tilbury, comprising a Roll on / Roll off (Ro-Ro) terminal, aggregates terminal including new and improved conveyors, external storage, improvements to existing land access, creation of hard surfaced pavements, erection of welfare buildings, improvement of an extensions to existing jetty including creation of new Ro-Ro berth and (b) construction of new and improved surface access to the land at the former Tilbury Power Station in association with the change of use and redevelopment of the land for port uses comprising new link road from Ferry Road (A1089) to Fort Road, (including associated changes to local highway and rights of way network) and formation of a rail spur and sidings. | 0.2km | Pending | 1c |

| 'Other development' details | | | | | | |
|---|---|---|---|---|---|---|
| 31 | Thurrock | 15/00234/FUL | Land Off and Adjacent to School Manor Road Grays Essex<br><br>Proposed development of 93 dwellings consisting of apartments, terraced, semi-detached and detached houses with amenity space and access road. | 2.4km | Pending | 1c |
| 32 | Thurrock | 13/01179/FUL (as amended by 16/00783/CV) | Former Cargill Site Tilbury Freeport Tilbury Essex<br><br>The construction and operation of a waste wood processing facility incorporating process building, a visual screen to the River Thames, external plant and equipment, storage areas and car parking | 2.8km | Consented | 1b |
| 33 | Thurrock | 15/01483/FUL | Land East of St Andrews Road North of Gaylor Road and West of Dock Road Tilbury Essex<br><br>Full planning application for development of southern part of London Distribution Park (approved under outline planning permission 14/00487/CV) for new sortation and fulfilment centre comprising warehouse and distribution building (B8) with ancillary offices and yard areas, security and amenity buildings, staff car parking, circulation routes and landscaping, with access from existing roundabout on A1089 and formation of new access from Dock Road. | 2.6km | Consented | 1b |
| 34 | Thurrock | 16/00923/FUL | Land to North Of Rosebery Road Castle Road And Belmont Road Grays Essex<br><br>Erection of 80 no. one, two and three storey houses (10 x 2 bed bungalows, 6 x 2 bed houses, 52 x 3 bed houses, 12 x 4 bed houses) with associated roads, parking, refuse and bicycle storage and amenity space. | 3.1km | Pending | 1c |

| 'Other development' details | | | | | | |
|---|---|---|---|---|---|---|
| 35 | Thurrock | 16/00767/TBC | Open Space Adjacent Delargy Close Defoe Parade and Brentwood Road Chadwell St Mary Essex<br><br>Residential development of 53 affordable units | 0.6km | Consented | 1b |
| 36 | Thurrock | 16/00711/SCR | Stanford Le Hope Railway Station London Road Stanford Le Hope Essex<br><br>Request for EIA Screening Opinion: Proposed demolition and reconstruction of railway station, replacement footbridge and expansion of forecourt. (Update: Screening not required) | 2.8km | Pending | 1c |
| 37 | Thurrock | 16/00412/OUT | Star Industrial Estate Linford Road Chadwell St Mary Essex<br><br>Outline application for proposed residential redevelopment, with all matters reserved apart from principle and access (Indicative layout provided indicates up to 203 dwellings) | 1.3km | Pending | 1c |
| 38 | Thurrock | 14/00912/OUT | Land Adjacent to Thatched Cottage Baker Street Orsett Essex<br><br>Outline application for 14 dwellings with garages (all matters reserved) | 0.0km | Consented | 1b |
| 39 | Thurrock | 17/00412/FUL | Land Adjacent Tilbury Power Station Fort Road Tilbury Essex<br><br>Continued re-profiling of the site to 9 metres AOD using inert reclamation material imported by river, in place of Pulverised Fuel Ash from the adjacent now redundant Power Station. | | Pending | 1b |
| 40 | Brentwood | 020,021 | Housing led Mixed Use, 500 dwellings | 3.5km | Proposed Site Allocation | 3 |

| ‘Other development’ details | | | | | | |
|---|---|---|---|---|---|---|
| 41 | Brentwood | 101A | Brentwood Enterprise Park (M25 works site) 23.41Ha. | 1.9km | Proposed Site Allocation | 3 |
| 42 | Brentwood | 101B | Brentwood Enterprise Park (land at Codham Hall) 6.64Ha | 2.5km | Proposed Site Allocation | 3 |
| 43 | Brentwood | 111 | Upminster Trading Park 2.6ha | 1.8km | Proposed Site Allocation | 3 |
| 44 | Brentwood | 228 | PERI Site, Warley Street, Warley 5.36ha | 2.7km | Proposed Site Allocation | 3 |
| 45 | Brentwood | 112D | Childerditch Industrial Estate 2.34 | 3.7km | Proposed Site Allocation | 3 |
| 46 | Brentwood | 200 | Dunton Hills<br>2,500 new homes | 4.6km | Proposed Site Allocation | 3 |
| 47 | Gravesham | CS03 | Northfleet Embankment and Swanscombe Peninsula East Opportunity Area | 2.9km | Proposed Site Allocation | 3 |
| 48 | Gravesham | CS04 | Gravesend Riverside East and North East Gravesend Opportunity Area | 0.4km | Proposed Site Allocation | 3 |

| ‘Other development’ details | | | | | | |
|---|---|---|---|---|---|---|
| 49 | Gravesham | CS05 | Gravesend Town Centre Opportunity Area | 1.9km | Proposed Site Allocation | 3 |
| 50 | Gravesham | CS06 | Ebbsfleet (Gravesham) Opportunity Area | 4.2km | Proposed Site Allocation | 3 |
| 51 | Gravesham | CS21 | Land at Coldharbour Road | 1.9km | Proposed Site Allocation | 3 |
| 52 | Gravesham | Paramount/13/01406/SCREEN | World Class Resort and Leisure Entertainment District known as ‘London Paramount’. London Resort Company Holdings<br><br>Scoping report submitted for this Nationally Significant Infrastructure Project<br>Swanscombe Peninsula and land to the south towards Ebbsfleet Station, Kent | 3.5km | Pending | 2 |

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