Thurrock Flexible Generation Plant

Environmental Statement Volume 4: Cumulative Effects Assessment
Chapter 22: Onshore Ecology

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Environmental Impact Assessment

Cumulative Effects Assessment

Volume 4

Chapter 22

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1. Introduction and Approach

1.1 Purpose of this chapter

1.1.1 This chapter of the Environmental Statement (ES) provides an assessment of the onshore ecological effects of the proposed development in combination with other relevant future development projects that have been scoped into the cumulative assessment.

1.1.2 In particular, this cumulative effects assessment (CEA) topic chapter:

- identifies the potential impact interactions of the proposed development in combination with other relevant future development projects;
- identifies the receptors with the potential to be significantly affected by these potential impact interactions and characterises these receptors, including their sensitivity and any relevant environmental thresholds;
- evaluates the likely significant cumulative effects on these key receptors as a result of the proposed development in combination with other development projects;
- identifies any additional mitigation measures that are proposed to prevent, minimise, reduce or offset these significant cumulative effects; and
- taking into account any proposed mitigation measures, evaluates the significance of predicted residual cumulative effects.

1.1.3 There are other environmental topic areas that have relevance to aspects considered in this chapter, namely Air Quality, Hydrology & Flood Risk and the Marine Environment. The specific assessment of potential cumulative effects of these other environmental topics are provided in the relevant chapters of ES Volume 4.

1.2 Approach to cumulative assessment

1.2.1 The assessment of onshore ecological cumulative effects follows the approach set out in ES Volume 2, Chapter 4: EIA Methodology, Section 3.

1.2.2 Specifically, this chapter considers the likely cumulative effects of Thurrock Flexible Generation Plant on ecological receptors during construction, operation and decommissioning. With the exception of wintering birds, this chapter considers effects on receptors on the landward side of the sea wall only. For an assessment of cumulative effects on intertidal and marine habitats and receptors other than wintering birds, refer to Volume 4, Chapter 30: Marine Environment.

1.3 Study area

1.3.1 The zone of influence that has been applied for most potential cumulative ecological effects arising from the proposed development used a search area of 2 km from Thurrock Flexible Generation Plant. However, for air quality, a 15 km buffer was used to assess sites for atmospheric emission effects, as set out in Volume 3, Chapters 6 & 9.

1.4 Screening of cumulative developments

1.4.1 ES Volume 4, Chapter 18: Cumulative Effects Assessment Introduction and Screening identifies a short-list of potential cumulative developments that have been screened as potentially relevant to the CEA overall (i.e. for one or more topic areas). From this shortlist of cumulative development projects, Table 1.1 identifies those development projects that would affect a particular environmental pathway or receptor for ecology. Specific developments have been shortlisted in Table 1.1 where:

- the conclusions of the environmental assessments for those developments predicted significant effects on receptors within the zone of influence for the proposed Thurrock Flexible Generation Plant development; or
- where there is considered to be potential for effects that were not predicted to be significant for those individual developments but that may become significant in the cumulative scenario; or
- where environmental studies for those developments have not been published but there is sufficient information available about the development to both indicate the potential for cumulative effects and allow assessment.

1.4.2 Where sufficient information about a development to consider its potential for cumulative effects was not publicly available, the development has not been shortlisted.

Table 1.1: Shortlist of relevant cumulative developments

ID	Development	Potential cumulative impacts (construction)	Potential cumulative impacts (operation and maintenance)	Potential cumulative impacts (decommissioning)	Receptor(s) affected
005	18/00664/CONDC Redevelopment of an area of previously developed land towards the southern boundary of Thames Industrial Estate to provide 50 dwellings, together with an associated financial commitment towards the repair, upkeep and stewardship of surrounding former factory buildings (some of which are listed), improved access arrangements and the creation of an area of public open space along the site frontage.		Potential cumulative effects for species such as breeding birds, reptiles and terrestrial invertebrates from habitat loss		Breeding birds, reptiles and terrestrial invertebrates from habitat loss
006	18/00458/FUL The construction of a temporary load out and storage area and access to Station Road to enable removal of Pulverised Fuel Ash	Potential cumulative disturbance effects during construction			Disturbance to wintering inter-tidal birds Habitat loss for invertebrates, reptiles and birds
012	16/01232/OUT 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.		Potential cumulative effects for species such as breeding birds, reptiles and terrestrial invertebrates from habitat loss		Breeding birds, reptiles and terrestrial invertebrates from habitat loss
018	11/50361/TTGETL An extension of time limit for implementation of planning permission ref 01.08.04/87C. To construct and operate a Biomass and Energy from waste fuelled generating station for a period of two years to 26 Aug 2014.		Potential cumulative air quality effects		NOx sensitive designated sites
025	16/00186/DMI Demolition of Tilbury B power station and all associated buildings and structures (including remaining structures from Tilbury A power station). The Jetty will not be demolished.	Potential cumulative disturbance effects during construction. Impacts on brownfield habitats			Disturbance to wintering inter-tidal birds; habitat loss for invertebrates, reptiles and birds
042	Tilbury 2: A new port facility acting alongside the existing Port of Tilbury. This will involve the extension of existing jetty facilities and the dredging of berth pockets in the River Thames, and land works and facilities for: a “Roll-On / Roll-Off” (Ro-Ro) terminal for importing and exporting containers on road trailers; a facility for importing and processing bulk construction materials; and areas of external storage for a variety of goods such as imported cars. The project also involves the construction of road and rail links to the site from adjacent networks.	Tilbury2 results in loss of majority of Lytag Brownfield LWS, for which compensatory habitat is proposed offsite. Impacts on invertebrate communities on site is therefore likely to be high. Potential for cumulative disturbance effects if construction phases overlap.	Tilbury 2 On-site habitat creation proposals are adjacent to Zone A and close to Zone F some additive benefit therefore possible from this. Potential for cumulative effects on air quality.	Potential cumulative disturbance effects during decommissioning	Disturbance to wintering inter-tidal birds; habitat loss for invertebrates, reptiles and birds NOx sensitive designated sites
058	TR010032 The Lower Thames Crossing will be a new road crossing connecting Essex and Kent. Located east of Gravesend and Tilbury, this new crossing will offer the improved journeys, new connections and network reliability, and economic benefits that only a new, alternative crossing, away from Dartford, can provide.	Potential for cumulative disturbance effects if construction phases overlap. Potential for cumulative effects on air quality.	Potential cumulative effects for species such as breeding birds, reptiles and invertebrates from habitat loss or fragmentation	Potential cumulative disturbance effects during decommissioning	Disturbance to wintering inter-tidal birds; habitat loss for invertebrates, reptiles and birds NOx sensitive designated sites

ID	Development	Potential cumulative impacts (construction)	Potential cumulative impacts (operation and maintenance)	Potential cumulative impacts (decommissioning)	Receptor(s) affected
063	20090238 Outline planning permission with all matters (except for access) reserved for the demolition, phased remediation and redevelopment of 167 hectares of former Coryton Oil Refinery to provide up to 480,000 sq. m of commercial development including a Food Park (Use Class B2/B8); Energy & Waste related facilities (Use Class Sui Generis/B2/B8); A Central Hub incorporating a range of active uses (office, leisure, education, hotel and conferencing facilities) (Use Classes B1; D1; D2; C1) and ancillary retail/leisure/community facilities (Use Classes A1, A3, A4, A5, D2 & Sui Generis), as well as additional land set aside for a Rail Freight Terminal; 4.1 Hectares of Open Storage (Use Class B8); Lorry Parking Facilities; structural landscaping; car parking, new road and access facilities; vehicular crossing over Shellhaven Creek; pedestrian crossing facilities to existing and proposed estate roads; retention of existing jetties; and associated infrastructure works.		Potential for cumulative effects on air quality.		NOx sensitive designated sites
079	19/01274/FUL Proposed Short Term Operation Reserve (STOR) electricity generating station comprising 14 no. gas-fired generators with a capacity up to 21 MW with associated development at land adjacent to Tilbury Waste Water Treatment Works, Fort Road, Tilbury.	Potential cumulative disturbance effects during construction	Potential for cumulative effects on air quality.	Potential cumulative disturbance effects during decommissioning	Habitat loss for invertebrates, reptiles and birds NOx sensitive designated sites
081	12.04.09.04/266C Tilbury Green Power Phase 2 S36C application. Biomass and energy from waste fuelled generation station at Tilbury Docks, Essex: variation application under section 36c of the electricity act 1989.		Potential for cumulative effects on air quality.		NOx sensitive designated sites
082	01.08.10.04/462C Gateway Energy Centre: Development up to 1250 MW capacity to comprise either: up to two CCGT units; or one CCGT unit and one or more OCGT units and/or battery energy storage		Potential for cumulative effects on air quality.		NOx sensitive designated sites

1.5 Identifying cumulative developments affecting each receptor

1.5.1 Table 1.2 to Table 1.4 summarise the cumulative developments that have the potential to cause cumulative effects at each identified receptor, the sensitivity of that receptor to cumulative impacts, and the starting position to the cumulative effects assessment, which is the predicted residual effect of Thurrock Flexible Generation Plant alone during construction, operation and decommissioning (as established in ES Volume 3).

1.5.2 Two NSIP developments are on land adjacent to and in some places overlapping with the Thurrock Flexible Generation Plant application boundary. The consented Tilbury2 port expansion (ID 042 in Table 1.1, above) is under construction, adjacent to the west. The Lower Thames Crossing (LTC) motorway (ID 058) to the east and north is in the process of EIA and public consultation.

1.5.3 Outline planning permission has been granted for several residential and mixed-use developments expanding Linford and East Tilbury in the direction of Thurrock Flexible Generation Plant. However, these are generally further than 500m for the FGP site and so are unlikely to have direct cumulative effects on habitats or most species groups. These non-NSIP projects are also in-land so avoid disturbance effects on the inter-tidal habitats and wintering birds and also do not affect the costal grassland strip which is of value to the invertebrate assemblage.

1.5.4 Should all of these developments proceed, Thurrock Flexible Generation Plant's main development site would be close to temporary or permanent works for the two NSIPs. Its gas connection point to Feeder 18 could be adjacent to the expanded outskirts of East Tilbury and the pipeline route and accesses could cross land to be developed for the LTC.

1.5.5 Thurrock Borough Council is drafting a new Local Plan to replace the Core Strategy. At the time of desk study, consultation on the December 2018 'Issues and Options (Stage 2)' consultation document had recently ended in March 2019. As the draft Local Plan documents are at an early stage of development they would be given limited weight in decision-making, but in general the consultation document shows that the Local Plan issues and options proposals include zones for possible residential and commercial/employment development in areas east of the proposed development (where this would be facilitated by the Lower Thames Crossing project), and also that the green belt status of land on and around the proposed development site is under review. However, these Tier 3 development possibilities are afforded only limited weight due to the early stage of this local plan development process.

Table 1.2: Summary of cumulative developments affecting each receptor (construction)

Receptor affected	Sensitivity of receptor to cumulative effects	Standalone effect of Thurrock Flexible Generation Plant on receptor	Cumulative development(s) with the potential to affect this receptor
Habitat loss for invertebrates, reptiles and birds	Parish-county *(note - invertebrates offsite are considered to be of national importance)*	Minor beneficial Invertebrate habitat; pre-commencement and construction phase temporary flower-rich foraging provision provide continuity of habitat and greater area than permanently lost	All, particularly those within 500m
Disturbance to wintering inter-tidal birds	District *(based on 2017-2018 surveys*	Minor adverse	Those developments on or close to the estuary foreshore (006, 025, 042 and 058) could also displace the bird assemblage

1.5.6 The construction phase potential cumulative effects relate to habitats that could be either temporarily disturbed or lost during the construction phase. These habitats often support a range of species, but notably invertebrates and reptiles and some breeding birds (in scrub and edge habitats mainly) and the construction programmes could overlap in some cases.

Table 1.3: Summary of cumulative developments affecting each receptor (operation and maintenance)

Receptor affected	Sensitivity of receptor to cumulative effects	Standalone effect of Thurrock Flexible Generation Plant on receptor	Cumulative development(s) with the potential to affect this receptor
Habitat loss for invertebrates, reptiles and birds	Parish-county (*note - invertebrates offsite are considered to be of national importance*)	Minor beneficial invertebrate habitat; permanent habitat creation in Zone E, Zone F and elsewhere provides improved continuity of habitat and greater area than permanently lost	All, particularly those within 500m

Receptor affected	Sensitivity of receptor to cumulative effects	Standalone effect of Thurrock Flexible Generation Plant on receptor	Cumulative development(s) with the potential to affect this receptor
Disturbance to wintering inter-tidal birds	District (*based on 2017-2018 surveys*	Negligible adverse	Those developments on or close to the estuary foreshore (006, 025, 042 and 058) could also displace the bird assemblage
NO_x-sensitive designated sites	International	No significant air quality effects on designated habitat sites are expected to arise due to the proposed development	All developments with significant NO_x emissions potential were modelled

1.5.7 The two NSIP projects adjacent to the Flexible Generation Plant application boundary are being designed with the same ecological baseline in mind so mitigation/compensation and enhancements are being designed to address the key receptors, particularly the terrestrial invertebrate assemblage, reptiles and other protected species present. The impact of Tilbury2 on the invertebrate assemblage was extensively discussed during the Examination for that project, and an offsite habitat creation package is proposed in addition to habitat creation and enhancement on the Tilbury2 site. The main onsite Tilbury2 mitigation area is immediately adjacent to the west boundary of Zone A.

Table 1.4: Summary of cumulative developments affecting each receptor (decommissioning)

Receptor affected	Sensitivity of receptor to cumulative effects	Standalone effect of Thurrock Flexible Generation Plant on receptor	Cumulative development(s) with the potential to affect this receptor
Habitat loss for invertebrates, reptiles and birds	Parish-county (*note - invertebrates offsite are considered to be of national importance*)	Decommissioning should aim to retain habitats, unless replaced within a further development application - Negligible adverse	042, 058 and 079
Disturbance to wintering inter-tidal birds	District (*based on 2017-2018 surveys*	Minor adverse	Those developments on or close to the estuary foreshore (006, 025, 042 and 058) could also displace the bird assemblage

1.5.8 The decommissioning phase of the Thurrock Flexible Generation Plant could overlap with the operational or less likely decommissioning phases of the assessed projects. Therefore, the cumulative effect during the Flexible Generation Plant decommissioning are likely to be less because the operational effects of most of these projects is less than the construction or the decommissioning phases and thus the potential of cumulative effects is reduced in general in this time period. In addition, it is likely that habitats created as part of these schemes would either be retained within the future land use or would need to be mitigated for as part of a further biodiversity net gain commitment that is likely to be in place more formally in the future and may also be extended to future NSIP projects, in due course.

2. Assessment of Cumulative Effects

2.1 Construction phase of Thurrock Flexible Generation Plant

Habitat loss for invertebrates, reptiles and birds

2.1.1 Developments within 500m of the Thurrock FGP are identified as having potential cumulative effects on habitats utilised by the invertebrate assemblage and the populations of reptiles and breeding birds. Of these, the potential effects arising from the two adjacent NSIP projects affecting habitats locally are particularly of importance to the assessment because of their proximity. Tilbury2 will result in the loss of the majority of the Lytag Brownfield LWS. The LTC would result in permanent and temporary habitat loss on land east of Thurrock Flexible Generation Plant Zone A. Both of these schemes are being brought forward with associated mitigation. The direct impact on the Lytag Brownfield LWS is entirely due to Tilbury2, and hence the Thurrock Flexible Generation Plant would not contribute to the direct cumulative effect on the habitats present within the LWS. However, there are effects from Thurrock Flexible Generation Plant on habitats outwith this LWS which also contribute to the support of the invertebrate assemblage and the populations of reptiles and breeding birds.

2.1.2 The survey report of the invertebrate assemblage associated with the Tilbury2 (invertebrate survey of Tilbury2; Telfer, 2017) recognised that site as being of high conservation importance for invertebrates in a national context. Each adjacent project will as part of the consenting process have its own mitigation/compensation measures but for Tilbury2 much of this is off-site compensation. There is therefore an identified cumulative risk to this assemblage within the wider landscape context and associated with all of the developments within 500m which at its worst could cause '*possible extinction of the regional metapopulations of a number of the Priority species currently present'* as highlighted by the Essex Field Club in their s42 consultation response.

Disturbance to wintering inter-tidal birds

2.1.3 There is potential for greater disturbance and displacement effects on mobile species, particularly wintering birds, that could occur if construction phases for the NSIPs overlap, or for these effects to last for a greater duration if construction is sequential.

2.1.4 A review of wintering bird surveys was undertaken in 2016/17 for Tilbury2 and 2017/18 for RWE (Volume 6, Appendix 9.1: Ecological Desk Study and Survey Report and Volume 6, Appendix 9.2: Third Party Survey Reports). The data from these multiple sources indicates only sporadic to occasional use by low numbers of SPA species in the intertidal area of zone G in the vicinity of the proposed causeway. Higher aggregations of waders and wildfowl are recorded outside and to the east of the survey area and further east within the SPA itself.

2.1.5 On this basis it is considered that there is no potential for in-combination construction effects on birds associated with the SPA, as they do not occur in significant numbers within the zone of influence of the zone G causeway and no further mitigation is required, nor are there significant residual disturbance effects to wintering inter-tidal birds.

Further mitigation or enhancement

2.1.6 Given the potentially significant cumulative effects on invertebrates, a number of additional pre-commencement mitigation measures have been incorporated into the Thurrock Flexible Generation Plant proposals to address risks of temporary habitat losses occurring at the same time as construction effects from adjacent projects, all of which could impact on the invertebrate assemblage concurrently causing cumulative effects to the assemblage within the wider landscape. These additional mitigation measures comprise the following.

- Enhancement of the grassland to be created as part of the common land replacement (zone E) to ensure that it is established initially as 'like for like' in relation to the existing semi-improved hay meadow grassland habitat to be lost in Walton Common. The restoration of this area of arable land to meadow grassland will ensure that this new permanent grassland is flower-rich with an emphasis on 'legumes and labiates' (Telfer 2017) and this seeding will take place as an early pre-commencement action once the scheme is consented. Zone E provides around 10 ha of grassland habitat, with an additional 5.8 ha in Zones F1-3, together greater than the 7.7 ha of grassland habitat to be lost in Walton Common. Overall therefore, a total of 15.8 ha of grassland will be created to mitigate for the loss of 7.7 ha and hence there will be a net gain of grassland area of c. 8.1 ha.

- A flower-rich grassland margin for the access road across Zone C will be established early in the programme as part of the new access construction and to be a permanent retained feature providing a permanent east/west habitat link connecting habitats south of the site (Zone A) with the new habitats in Zones E and F.

- Similarly, the road in zone G where it crosses land currently in arable farming use will include a flower-rich grass margin which will be maintained for the duration that the road is in use during the construction phase, also ensuring connectivity across the wider landscape is maintained. (Other sections of Zone G haul road route are on brownfield land that may also be subject to development by third parties in future, or are already subject to a consented restoration plan for habitats following

completion of the Ingrebourne Valley land raising operation, so are not proposed for verge creation.)

- Retained habitats will be enhanced with deadwood piles and 'bee banks' as already identified for Zone F, where this is practicable.

2.1.7 These habitat areas are also of interest for a number of breeding bird species, notably Cetti's Warbler, and also populations of up to four reptile species. Mitigation for the Thurrock FGP addresses the potential effects on breeding birds and reptiles during the construction phase. The Outline Ecological Management Plan (OEMP, application document A8.7) sets out measures to retain and enhance habitat for reptiles. These enhancements are required to increase their carrying capacity for translocated animals and to safeguard undisturbed patches of scrub habitat as breeding sites for Cetti's Warbler. As part of these habitat enhancements, elements will be designed to benefit invertebrates, particularly ensuring the length of scrub edge is increased and designed to provide sheltered sunny 'mini-glades'.

2.1.8 The increase of open water habitats, including ditches and ponds will also benefit the wider invertebrate assemblage and where possible these habitats will also be provided at the front end of the construction process, to enable drainage control and water management and to provide habitat for translocated water voles.

Residual effects

2.1.9 Together these elements will provide a range of micro-habitats for invertebrates and provide continuity spatially and temporally around the Thurrock Flexible Generation Plant site. These elements will also benefit the breeding bird and reptile populations. Alone, Thurrock Flexible Generation Plant provides a minor beneficial effect for these habitats and species groups. Cumulatively, it assists in addressing potential effects caused in the main by the adjacent developments, specifically including elements to reduce fragmentation during the construction phase and to minimise the temporal effects of habitat losses adjacent to the project caused by the other NSIP schemes.

2.1.10 Overall, the construction effects on these habitats and the species they support, when balanced with the mitigation measures, are considered to be minor beneficial, providing mitigation for effects caused by the other adjacent schemes.

2.2 Operation and maintenance phase of Thurrock Flexible Generation Plant

Disturbance to wintering inter-tidal birds

2.2.1 There is potential for disturbance and displacement effects on mobile species, particularly wintering birds, that could occur if use of the causeway were required for a plant item delivery during the operational phase of Thurrock Flexible Generation Plant, and this were to overlap temporally with operational phase activities for the NSIPs, particularly relating to vessel movements.

2.2.2 However, possible use of the causeway to deliver a replacement for a large failed plant item during operation would be an exceptional event, not part of routine operation. Any cumulative effect would be one-off and much lesser than the effect of 60 barge deliveries during construction.

2.2.3 As already noted, a review of wintering bird surveys has indicated only sporadic to occasional use by low numbers of SPA species in the intertidal area of zone G in the vicinity of the proposed causeway.

2.2.4 On this basis it is considered that there is no potential for significant in-combination operational effects on birds associated with the SPA.

Habitat loss for invertebrates, reptiles and birds

2.2.5 The habitat mitigation and enhancement in place during the operational phase for Thurrock Flexible Generation Plant is designed to provide an overall biodiversity net gain for habitats and will also build in features for reptiles, breeding birds and terrestrial invertebrates. These habitat provisions within the application boundary are assessed as providing a minor beneficial effect, creating or enhancing invertebrate habitat. The permanent habitat creation in Zone F and elsewhere provides improved continuity of habitat and greater area than permanently lost.

2.2.6 The assessment within Volume 3 identifies a minor beneficial effect for the Thurrock scheme alone, and cumulatively the two key NSIP projects adjacent to the site are also being designed with the same ecological baseline in mind and are also therefore providing a range of complementary new or enhanced habitats. For example, the LTC scoping report (2017) indicates that following the initial surveys "*it is considered that likely effects can be avoided, mitigated or, if necessary, compensated through the design and that the Project offers good opportunities for biodiversity enhancement within the study area*". This approach is confirmed within the LTC PEIR (2018) where habitat loss for these groups, if unavoidable, will be compensated for by habitat creation in close proximity to existing habitats to facilitate colonisation. These mitigation/compensation and enhancements, once matured, will to address the

requirements of the key receptors, particularly terrestrial invertebrate assemblage, reptiles and other protected species present and no adverse cumulative effects are therefore predicted.

2.2.7 No further mitigation is required, nor are there significant residual disturbance cumulative effects to terrestrial invertebrate assemblage, reptiles or breeding birds.

NO_x-sensitive Natura 2000 sites

2.2.8 The assessment in Volume 3 and within the Habitat Regulations Assessment Report (HRAR, application document A5.2) of the impact from Thurrock Flexible Generation Plant alone concludes that there is no effect on either of the Annex 1 species for The Thames Estuary and Marshes SPA (avocet or hen harrier) and no effect is predicted on the designated habitats or species within the SPA or the SAC. This is supported by the air pollutant dispersion modelling and analysis reported in Volume 6, Appendix 12.1: Air Quality Impacts on Ecological Receptors.

2.2.9 Effects occurring from operational air pollutant emissions on The Thames Estuary and Marshes SPA and also all more distant designated sites from Thurrock Flexible Generation Plant alone were therefore screened out, as no likely significant effects are anticipated.

2.2.10 For these designated ecological receptors, the potential cumulative effects of Thurrock Flexible Generation Plant together with other developments with relevant air pollutant emissions have been assessed in the *Ecological Receptors* section of Volume 4, Chapter 25: Air Quality Cumulative Effects Assessment.

2.2.11 This assessment showed that potential for cumulative effects on the majority of designated ecological receptors could be screened out. This was on the basis that either (a) there was substantial headroom between the predicted environmental concentration (PEC) and the critical load or critical level (CL, as applicable) for the habitat *before* considering cumulative developments, meaning it is unlikely that the cumulative PEC will exceed the CL, and/or (b) the PC of the cumulative development alone was already predicted to exceed 1% of the CL, therefore being significant in its own right and requiring mitigation to be applied to reduce that effect (which for the purpose of this cumulative effects assessment is assumed to occur).

2.2.12 There were 13 interest features within designated sites that could not be screened out of further assessment using those criteria:

- Thames Estuary and Marshes SPA – Charadrius hiaticula (Europe/Northern Africa – wintering) Ringed plover (A137);
- South Thames Estuary and Marshes SSSI – Anas querquedula – Garganey
- South Thames Estuary and Marshes SSSI – Numenius arquata – Curlew
- North Downs Woodlands SAC - Taxus baccata woods of the British Isles (H91J0);
- Canvey Wick SSSI – Bombus sylvarum Shrill Carder Bee;
- Canvey Wick SSSI – Invertebrate assemblage;
- Darenth Wood SSSI – Broad-leaved, mixed and yew woodland (Fraxinus excelsior – Acer campestre – Mercurialis perennis woodland);
- Darenth Wood SSSI – (Quercus robur – Pteridium aquilinum – Rubus fruticosus woodland);
- Halling to Trottscliffe Escarpment SSSI - Broad-leaved, mixed and yew woodland (Taxus baccata woodland);
- Langdon Ridge SSSI – Broad-leaved, mixed and yew woodland (Crataegus monogyna – Hedra helix scrub);
- Langdon Ridge SSSI – Broad-leaved, mixed and yew woodland (Fraxinus excelsior – Acer campestre – Mercurialis perennis woodland); and
- Langdon Ridge SSSI – Broad-leaved, mixed and yew woodland (Quercus robur – Pteridium aquilinum – Rubus fruticosus woodland).

2.2.13 In each case, further more specific information has been obtained about the habitat or features present in each designated site, their sensitivity to NO_x impacts (either gaseous or via deposition) and the appropriate CL that should be used. Further assessment using that information showed that no significant cumulative effect was predicted. This is detailed in the *Ecological Receptors* section of Volume 4, Chapter 25.

2.2.14 Therefore based on the results of air pollutant dispersion modelling and a qualitative assessment of potential cumulative impacts from other developments, no significant cumulative air quality effects on designated habitat sites are expected to arise. No mitigation is required, nor are there significant residual cumulative effects.

2.3 Decommissioning phase of Thurrock Flexible Generation Plant

Habitat loss for invertebrates, reptiles and birds

2.3.1 If Thurrock Flexible Generation Plant continues to operate after 35 years, its contribution to any cumulative effects would be no greater than those for operational assessment as described above.

2.3.2 If Thurrock Flexible Generation Plant is decommissioned and deconstructed after 35 years, taking into account the time delay between construction and decommissioning and the commitment to reinstatement of habitats temporarily lost due to construction, for the purpose of this assessment it is assumed that ecological baseline conditions during decommissioning will be similar to those assessed for construction in terms of the species likely to be present and the ecological value of those populations or assemblages. Species distributions and numbers may change due to natural population fluctuations, but any changes in distribution would need to be determined by surveys prior to decommissioning.

2.3.3 It is expected that consultation would be undertaken with Natural England and the local planning authority prior to the commencement of decommissioning, that a decommissioning plan would be developed and followed, and that applicable regulations would be followed to minimise environmental effects. It is presumed that no additional hedgerow or tree clearance will be required.

2.3.4 Works would be undertaken in accordance with best practice guidelines and legislative requirements which apply at the time.

2.3.5 By the time Thurrock Flexible Generation Plant is decommissioned, the projects identified for assessment in this chapter will be in operational phase and mitigation associated with those developments will be well-established. The removal of permanent infrastructure in Zones A, C and D is not therefore expected to give rise to significant cumulative impacts in combination with known developments, as decommissioning works would be undertaken with appropriate mitigation for protected species as required.

Disturbance to wintering inter-tidal birds

2.3.6 The causeway structure is currently expected to be left in situ permanently even were Thurrock Flexible Generation Plant to be decommissioned after 35 years. On this basis it is considered that there is no potential for cumulative effects on wintering birds from decommissioning.

2.4 Conclusions

2.4.1 No significant cumulative effects from construction, operation or decommissioning of the proposed development have been identified, with the exception of a potential effect on invertebrates during construction. The potentially significant cumulative adverse effect on invertebrates would arise because of the proximity of other developments resulting in the loss of invertebrate habitat (particularly Tilbury2 and the Lower Thames Crossing), and the potential time-lag between habitat losses and the maturation of habitat creation measures intended to mitigate losses for these other developments.

2.4.2 For this reason, additional mitigation for invertebrates has been proposed to address risks of temporary habitat losses occurring at the same time as construction effects from adjacent projects, all of which could impact on the invertebrate assemblage. The additional mitigation comprises provision of habitat at the pre-commencement and construction phase in addition to the mitigation proposed in Volume 3 Chapter 9: Terrestrial Ecology. With this mitigation, no significant residual cumulative effects are expected.

2.4.3 Based on a review of wintering bird surveys conducted in 2016/17 and 2017/18, no cumulative effects on wintering birds associated with the SPA utilising the foreshore for foraging are predicted.

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