Thurrock Flexible Generation Plant

Environmental Statement Volume 4: Cumulative Environmental Assessment
Chapter 30: Marine Environment

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Environmental Impact Assessment

Cumulative Effects Assessment

Volume 4

Chapter 30

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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 marine environment 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 The other environmental topic areas that have potential relevance to aspects considered in this chapter are onshore ecology, and hydrology and flood risk. The specific assessment of the potential cumulative effects of these other environmental topics are provided in Volume 4, Chapter 22 and Chapter 28 respectively.

1.2 Approach to cumulative assessment

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

1.3 Study area

1.3.1 The zone of influence that has been applied for most potential cumulative estuarine processes is within the Thames Estuary and approximately extends between Grays and Mucking Flats, from west to east respectively.

1.3.2 For marine ecology and water quality the zone of influence includes immediate project footprint associated with the causeway and incorporating the Thames Middle Water Framework Directive (WFD) transitional waterbody.

1.4 Screening of cumulative developments

1.4.1 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 projects that fall within the zone of influence for marine environment and have potential for cumulative effects that require assessment in this topic area.

1.4.2 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.

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

1.4.4 The Lower Thames Crossing would be within the zone of influence identified for this chapter. The Scoping Report for the Lower Thames Crossing (Highways England, 2017) identified the opportunity to transport material by water to reduce road construction traffic, viz: *"if transport by water was found to be practicable then this may require either the construction of a new jetty, or the modification of an existing jetty located on the River Thames."*

1.4.5 The subsequent Preliminary Environmental Information Report (PEIR; Highways England, 2018) identified the location of a potential new jetty and the need for intertidal/subtidal macroinvertebrate and sediment surveys together with hydrodynamic and sediment transport modelling, but provided no details of its size, design, orientation or method of construction. Consequently, the potential for cumulative effects cannot be identified. In addition, given the very localised hydrodynamic effects that would result

from the Flexible Generating Plant's causeway (se Volume 6, Appendix 17.2) and the general location of the potential Lower Thames Crossing jetty some 500m downstream, any cumulative effect is considered very unlikely. As such, this project is not considered further.

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
042	TR030003: Tilbury2: 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.	• Cumulative temporary habitat loss/disturbance may have effects on marine ecology receptors; • Cumulative increases in suspended sediment concentrations and associated deposition during dredging activities with potential effects on water quality; • Cumulative increases in suspended sediment concentrations (SSC) and associated deposition during dredging activities with potential effects on marine ecology receptors; and • Cumulative impacts on local hydrodynamics and sediment transport with effects on estuarine processes.	Cumulative impacts on local hydrodynamics and sediment transport with potential effects on estuarine processes are possible during operation. However, such effects would be no different from those introduced through the construction of the causeway assessed in the construction phase. Therefore, no further assessment has been carried out.	The causeway structure is currently expected to be left in situ permanently even were the flexible generation plant to be decommissioned after 35 years, as the environmental effects of demolishing the causeway would be greater than leaving it in place once its effects on sediment transport and estuary habitat including newly created saltmarsh have become established during the 35-year operating lifetime. Therefore, consideration of decommissioning effects is not required.	• Marine habitats and species • Thames water quality • Local hydrodynamics and sediment transport

1.5 Identifying cumulative developments affecting each receptor

1.5.1 Table 1.2 summarises 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 the proposed Thurrock Flexible Generation Plant alone during construction, operation and decommissioning (as established in Volume 3, Chapter 17: Marine Environment).

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
Marine habitat loss/disturbance	Low-medium	Minor adverse (not significant)	042
Thames water quality	Low	Minor adverse (not significant)	042
Marine habitats and species impacted by changes in SSC	Low	Minor adverse (not significant)	042
Local hydrodynamics and sediment transport	Low	Negligible (not significant)	042

2. Assessment of Cumulative Effects

2.1 Construction phase of Thurrock Flexible Generation Plant

Cumulative temporary habitat loss/disturbance may have effects on marine ecology receptors

2.1.1 The Tilbury2 development will include capital and maintenance dredging operations within the Thames Estuary, with similar effects on estuarine habitats as set out for the Thurrock Flexible Generation Plant (see paragraph 4.1.26 *et seq.* of Volume 3, Chapter 17: Marine Environment).

Magnitude of impact

2.1.2 Dredging at the Tilbury2 development will lead to the temporary loss/disturbance of up to 63,000 m^2 of subtidal habitat during both capital dredging (now completed; see paragraph 2.1.9) and maintenance dredging throughout the lifetime of the project. The footprint of dredging associated with the Thurrock Flexible Generation Plant is approximately a fifth of the size (i.e. 13,900 m^2) and the duration of disturbance effect will also be short term, with the vessel grounding pocket dredged for the construction phase only. The cumulative loss/disturbance from dredging is small in the context of the habitats present across the wider area, i.e. representing 0.18% of the total area of the Thames Middle WFD waterbody.

2.1.3 The added cumulative temporary habitat loss/disturbance impact is predicted to be of local spatial extent, medium term duration, intermittent and reversible following the construction phase. As described in the assessment of the construction and operation of the Thurrock Flexible Generating Plant's causeway it is predicted that the added impact will affect marine ecology receptors directly and indirectly. The added magnitude is therefore considered to be **minor**.

Sensitivity of the receptor

2.1.4 Sensitivities of the marine ecology receptors are summarised in paragraph 4.1.33 *et seq*. of Volume 3, Chapter 17: Marine Environment. It is noted that the Tilbury2 dredging will only affect subtidal communities, however these were reported to have low levels of sensitivity, as compared to medium sensitivity for intertidal receptors recorded within the Thurrock Flexible Generation Plant footprint.

2.1.5 Intertidal and subtidal habitats which will be affected by temporary habitat loss effects are considered to be of medium vulnerability, high recoverability and regional to national value. The sensitivity of the receptor is therefore, considered to be **low** to **medium**.

2.1.6 Estuarine fish and marine mammal populations within the Thames Estuary are considered to be of low vulnerability, high recoverability and regional value. The sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

2.1.7 Overall, it is predicted that **minor** magnitude impact on the **low** to **medium** sensitivity receptors would result in a **minor** adverse cumulative effect, which is not significant in EIA terms.

Cumulative increases in SSC and associated deposition during dredging activities with potential effects on water quality and marine ecology receptors

Magnitude of impact

2.1.8 The plume modelling completed for Tilbury2 assumed a worst case dredge using WID and showed that the sediment in the water column (predominantly near bed) could travel *circa* 20 km up and down estuary of the dredge location. The Tilbury2 Newsletter in June 2019 noted that WID has been completed (Graham, 2019a). The August newsletter (Graham, 2019b) states that the capital dredge has been completed with capital dredging undertaken in June 2019 with approximately 77,000m^3 removed by Trailer Hopper Suction Dredger (THSD) for disposal at South Falls.

2.1.9 If dredging operations for Tilbury2 and the marine elements of the Thurrock Flexible Generation Plant were to be undertaken simultaneously or consecutively, both dredge plumes would have the potential to result in increases in SSC within the Thames Estuary and result in cumulative effects. However, based upon the information above, it is assumed that capital dredging operations are now complete and consequently there will be no cumulative effects from capital dredging.

2.1.10 The effects of maintenance dredging operations for Tilbury2 were determined using the construction/capital dredge assessment. This concluded a minor adverse effect on the Thames Estuary (Volume 6, Appendix 17.2: Hydrodynamic Modelling and Sediment Assessment).

2.1.11 The added cumulative increases in SSC for the Thurrock Flexible Generation Plant and associated deposition is predicted to be of **negligible** magnitude should maintenance dredging for both developments occur at the same time.

Sensitivity of the receptor

2.1.12 Sensitivities of the marine environmental receptors to this impact are summarised in paragraph 4.1.49 *et seq.* of Volume 3, Chapter 17: Marine Environment. (i.e. **low** sensitivity).

Significance of effect

2.1.13 There is predicted to be no cumulative effect of increases in SSC and associated deposition for the Thurrock Flexible Generation Plant, cumulatively with other plans of projects and therefore the significance of effect is identical to the assessment presented in paragraph 4.1.56 of Volume 3, Chapter 17: Marine Environment (i.e. **negligible**, which is not significant in EIA terms).

Cumulative impacts on local hydrodynamics and sediment transport

Magnitude of impact

2.1.14 For this cumulative effect assessment, the hydrodynamic model has been run with the causeway (and RoRo barge) along with the operational Tilbury2 new jetty arrangement, including the bathymetry change and three representative vessels at the Terminal. The results of the model run are presented in Volume 6, Appendix 17.2: Hydrodynamic Modelling and Sediment Assessment.

2.1.15 The modelling undertaken for Tilbury2 (HR Wallingford, 2017), showed that the operation of this facility would create changes to the hydrodynamic environment above 0.1 m/s which would extend in front of the causeway at the time of peak ebb flows. The cumulative effect modelling of the causeway with Tilbury2 (Volume 6, Appendix 17.2: Hydrodynamic Modelling and Sediment Assessment) shows that the causeway will not affect the baseline flows to interact with Tilbury2 or the Goshems Farm jetty at the flow speed resolution used for the Tilbury2 Environmental Statement.

2.1.16 At a higher resolution, the fully operational Tilbury2 development will cause a small interactive effect with the causeway, reducing flows up to 0.05 m/s (<10%) passing in front of the Thurrock Flexible Generation Plant berth.

2.1.17 However, the small magnitude of change will not affect the sedimentary patterns in this area. Additionally, on the flood, the 'splitting' of the flow around Tilbury2, pulls more flow inshore, accelerating flows by up to 0.04 m/s outside the causeway. Consequently, the magnitude of change in the estuary flow regime is predicted to be **minor** with a noticeable change limited to within proximity of the causeway.

2.1.18 There are no cumulative effects different to that of the causeway, and the modelling shows the local changes to be almost identical (less than 0.01 m/s) to the causeway with RoRo vessel.

Sensitivity of the receptor

2.1.19 Sensitivities of the marine environmental receptors to this impact are summarised in paragraphs 4.1.10 and 4.1.23 *et seq*. of Volume 3, Chapter 17: Marine Environment (i.e. **low** sensitivity), however as outlined above, there will be no impact as a result of the Thurrock Flexible Generation Plant, cumulatively with other plans or projects.

Significance of effect

2.1.20 There is predicted to be no cumulative effect of changes to local hydrodynamics and sediment transport with other plans of projects and therefore the significance of effect is identical to the assessment presented in paragraphs 4.1.12 and 4.1.26 of Volume 3, Chapter 17: Marine Environment (i.e. **negligible** for hydrodynamics and **minor** for sediment transport, which are not significant in EIA terms).

2.2 Conclusions

2.2.1 The only development which has the potential for cumulative effects with the Thurrock Flexible Generation Plant on the marine environment is Tilbury2.

2.2.2 Only those cumulative effects related to construction have been assessed. Effects related to marine habitats loss/disturbance, Thames water quality, marine habitats and species impacted by changes in SSC would only occur during construction of Thurrock Flexible Generation Plant causeway as it would be left in situ and not demolished during the decommissioning stage. Thus, local minor hydrodynamics and sediment transport changes would occur during its construction and the construction phase of the proposed development overall, these would not change during operation of Thurrock Flexible Generation Plant.

2.2.3 Combined effects of the Thurrock Flexible Generation Plant on the marine environment and Tilbury2 range from negligible to minor in magnitude. Overall, no significant cumulative effects from construction, operation or decommissioning of the proposed development have been identified.

3. References

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