

Southampton to London Pipeline Project

Volume 6

Environmental Statement (Volume A)
Non Technical Summary

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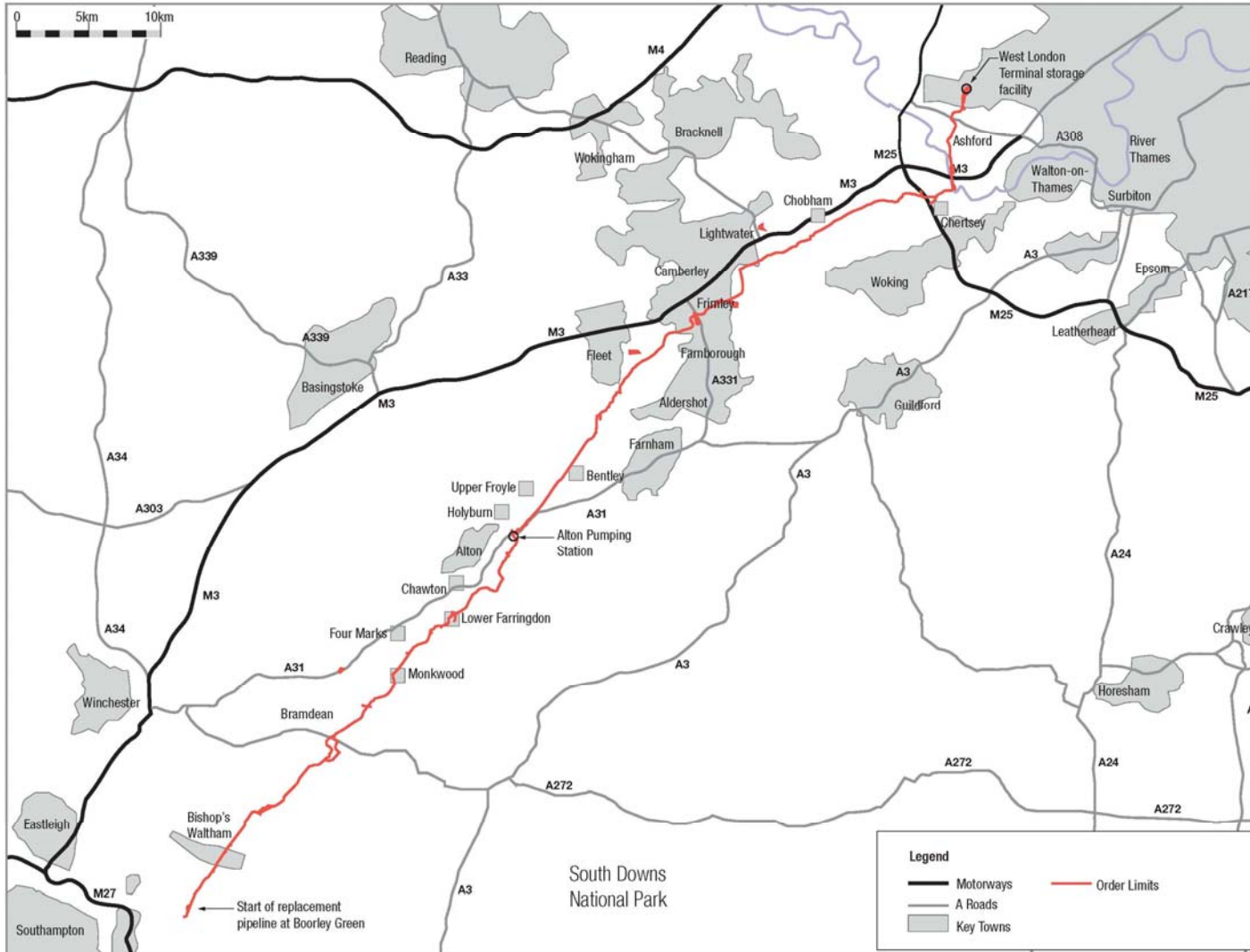
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Non-Technical Summary of the Southampton to London Pipeline Project





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1 Introduction

- 1.1.1 Esso Petroleum Company, Limited (Esso) is making an application for development consent to replace 90km (56 miles) of an existing pipeline to transport aviation fuel between Boorley Green in Hampshire and the Esso West London Terminal storage facility in Hounslow.
- 1.1.2 The existing pipeline is working adequately, but the need for inspections and maintenance is increasing. In 2002, 10km (6 miles) of pipeline were replaced between Hamble and Boorley Green in Hampshire. Replacement of the remaining pipeline is now proposed to maintain the supply of aviation fuel
- 1.1.3 The length and purpose of the replacement pipeline means that under the Planning Act 2008 it is classified as a Nationally Significant Infrastructure Project (NSIP). This means it requires a Development Consent Order (DCO).
- 1.1.4 The application for development consent, including the Environmental Statement (ES), would be considered by the Planning Inspectorate and the Department for Business, Energy and Industrial Strategy.
- 1.1.5 This document is the non-technical summary of the ES. The ES reports the findings of the environmental impact assessment (EIA) for the project. The EIA identifies the likely significant effects of the project and how they would be mitigated. The EIA covers the biological, physical and human environment in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations).
- 1.1.6 Full details of all likely significant effects identified are presented in the ES, along with information on all mitigation proposals in the Register of Environmental Actions and Commitments (REAC), which includes good practice measures in the Code of Construction Practice (CoCP).
- 1.1.7 The ES is available online via www.slpproject.co.uk. Here you can also find an interactive map that allows you to see the pipeline route and information such as environmental features.

2 Description of the Project

2.1 Features of the Project

2.1.1 The Southampton to London Pipeline replacement project (referred to as 'the project' in this document) comprises:

- 97km of new steel pipeline, approximately 300mm in diameter;
- a new "pigging" station at Boorley Green to allow the entry and exit points for Pipeline Inspection Gauges or 'PIGs' from time to time;
- 14 remotely-operated in-line valves along the pipeline to allow isolation of sections of pipeline for maintenance or in case of emergency;
- a Pressure Transducer (PT), to monitor pressure;
- six above ground cathodic protection (CP) transformer rectifier cabinets to supply power to the existing CP system;
- pipeline markers along the route at all road crossings and boundaries and new red and black colour-coded flight marker posts to track the pipeline route when inspected by helicopter; and
- modifications to the pigging station at the Esso West London Terminal storage facility including installation of a new PIG receiver and connection to the replacement pipeline;

2.1.2 The intended design life of the replacement pipeline is 60 years.

2.1.3 The decommissioning of the existing pipeline is covered by the original pipeline consent and does not form part of this project.

The existing pipeline would be decommissioned after the proposed pipeline becomes operational.

2.2 Construction

2.2.1 The pipeline would largely be installed in open cut trenches at least 1.2m deep, as shown in illustration 2.1. In some locations, the pipeline would be installed using trenchless methods. 'Trenchless crossings' would be used to avoid impacting important features such as major roads or rivers and may be considerably deeper than open cut sections.

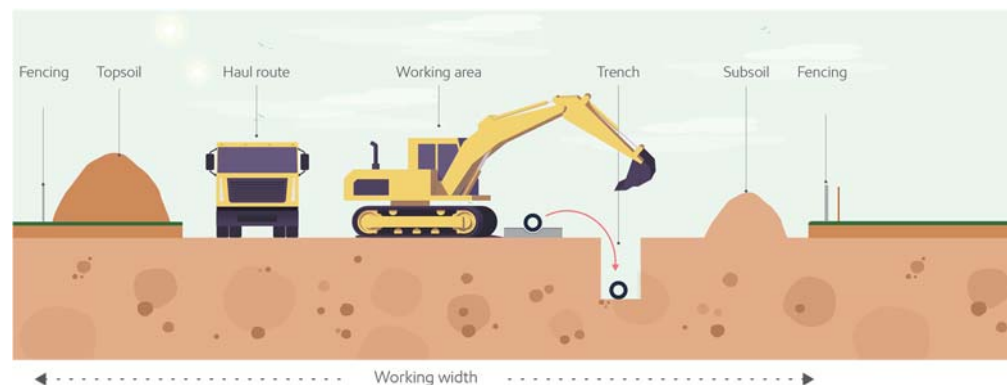


Illustration 2.1. Open Cut Trenching Installation Technique (not to scale)

2.2.2 Temporary infrastructure would be required to install the pipeline. This includes:

- up to six logistics hubs which would be placed at strategic locations and used for pipe storage and distribution as well as providing site offices for workers;



- construction compounds close to the route and used for storing equipment, providing staff facilities, and laying down pieces of the pipeline and equipment; and
- haul roads and access tracks to link the pipeline installation areas with the local road network.

2.2.3 Installation is planned to commence in early 2021 and continue into early 2023. Certain advance works may commence prior to 2021 either after the DCO has been granted or where permitted under alternative regimes, such as a separate planning application.

2.3 Measures Incorporated into the Project

2.3.1 A number of measures have been incorporated into the project to reduce certain environmental effects. The full list of measures can be found in the REAC within Chapter 16 Environmental Management and Mitigation, of the ES. These include:

- Overarching design measures embedded into the project (Table 2.1);
- good practice measures incorporated into a Code of Construction Practice (CoCP) and other DCO requirements to prevent, reduce and offset adverse construction-related effects; and
- compliance with regulatory and legislative regimes, such as preparation of European Protected Species licences.

Table 2.1 Overarching Embedded Design Measures

Embedded Design Measures	Justification
Commitment to reduce the working width to 10m when crossing boundaries between fields where these include hedgerows, trees or watercourses.	To reduce loss of habitats.
Design route alignment to avoid all areas of existing classified Ancient Woodland.	To avoid loss of existing classified Ancient Woodland.
The standard working width for open trench construction in rural areas is a nominal 30m.	To reduce working area and loss of habitats and degradation of soil quality.
Trenchless techniques to be used for all crossings of trunk roads, motorways and railways.	To avoid the need for closures that would impact commuters and communities.
Trenchless crossing technology to be used for crossings of waterways over 30m wide.	To avoid or reduce construction effects to the environment and navigation.
The proposed pipeline would not cross existing Source Protection Zone 1 (SPZ 1) areas associated with licensed drinking water abstractions.	To reduce risk of potential effects on protected aquifers.
Where required, stanks (or water stops) would be installed at intervals to create an impermeable barrier.	To reduce groundwater flow along the pipeline trench.
The principles of inherent safe design have been incorporated into the design of the pipeline as per Esso design standards for fuel pipelines, relevant industry codes of practice and standards, and the requirements of the Pipeline Safety Regulations 1996.	To avoid potential impacts to sensitive environmental receptors.
Inclusion of remotely operated valves to allow isolation of sections of the pipeline if required.	To avoid potential impacts to sensitive environmental receptors.



Embedded Design Measures	Justification
24-hour remote monitoring of pipeline operation to detect leaks and enable remote shut down of the pipeline if required.	To avoid potential impacts to sensitive environmental receptors.

2.3.2 In addition to the overarching measures in Table 2.1, numerous small amendments were made to the route to avoid features including individual or groups of trees and hedges, residential properties and areas of flood risk.



3 Approach to the EIA

- 3.1.1 The EIA Regulations require an assessment of the likely significant effects of a project on the environment. Its primary purpose is to inform the decision as to whether a project should go ahead. The EIA is documented within the ES and includes:
- the impacts of the project on biodiversity (habitats and protected species), water, heritage (including archaeology and historic buildings), landscape and views, soils and geology, land use, and people and communities;
 - the vulnerability of the project to major accidents and environmental hazards, and
 - the in-combination and cumulative effects.
- 3.1.2 As the project potentially affects European designated sites, a Habitats Regulations Assessment (HRA) report has been produced in parallel with the EIA. The HRA has considered the potential implications of the project on European sites in terms of habitat loss, disturbance, recreational pressure, hydrological processes, invasive species introductions, reductions in air and water quality and in-combination effects with other projects.
- 3.1.3 A Scoping Report was submitted to the Secretary of State for Business, Energy and Industrial Strategy in July 2018. This set out the scope of the EIA and the likely significant effects. The Planning Inspectorate responded with a Scoping Opinion in September 2018 confirming what topics should be included within the EIA.
- 3.1.4 Extensive engagement and consultation has been undertaken with the local planning authorities, regulatory authorities, people with an interest in the land and affected communities. Engagement and consultation have helped to identify issues and concerns regarding the project, its design and the EIA process.
- 3.1.5 The ES covers the potential significant effects associated with installation of the pipeline and also the operation phase, which would include routine inspections. The ES does not cover taking the proposed pipeline out of use (decommissioning). Esso would implement a decommissioning strategy taking account of good industry practice, its obligations to landowners under the pipeline deeds, and the statutory requirements at the appropriate time.
- 3.1.6 The study area used within the EIA is different for each topic, as it is based on the distances over which impacts are likely to occur. The minimum study area comprises the Order Limits, which define the area of the application for consent. These include the pipeline route, the permanent 3m easement that extends to either side, and the land that would need to be acquired for the valves and the new pigging station at Boorley Green. The Order Limits also include the temporary areas required during pipeline installation.
- 3.1.7 The baseline conditions describe what the existing environment is like now and how this may change in the future without the project. The baseline conditions were identified from different sources including existing desk-top information, site surveys,



and consultation and engagement with the regulatory and planning authorities, landowners, and members of the public.

- 3.1.8 The baseline environment was valued based on the importance of the features present or features that were likely to be sensitive to the project either during construction or operation. For example, designated sites were given a high level of importance.
- 3.1.9 The EIA then considered the magnitude (or size) of the effects that would be expected if the pipeline were installed. The magnitude was assessed after the embedded design measures and good practice measures were included.
- 3.1.10 The significance of the effect on the environment was a combination of the value or sensitivity of a feature and the

magnitude of the impact. Where the effects were moderate or large, these were considered to be 'significant'.

- 3.1.11 Where likely significant effects are predicted to occur, measures were identified to reduce the effects. These are known as mitigation. The residual effects are the effects that remain after the mitigation has been applied. Significant residual effects are of material consideration in determining whether consent should be granted.
- 3.1.12 There is a requirement under the EIA Regulations to consider transboundary effects, i.e. those effects that could affect features within other countries. No transboundary effects have been identified for the project as confirmed by the Planning Inspectorate.



4 Evolution of the Project

4.1 Assessment of Alternative

- 4.1.1 EIA legislation requires a description of reasonable alternatives studied by the applicant to be included in the ES together with an indication of the main reasons for the option chosen, taking into account likely significant effects on the environment.
- 4.1.2 The main alternatives considered were: not to progress with the project, alternatives to a pipeline, and alternatives that arose during the development of the project.

4.2 'Do Nothing' Option

- 4.2.1 One alternative considered was the 'do nothing' option. This assumes that no new pipeline is constructed. At present, the existing pipeline is working adequately, but the need for inspections and maintenance is increasing. For the 'do nothing' option to be viable, it would need to be feasible to maintain the existing pipeline for the next 60 years (the proposed design life for the project), but this is unlikely. If the 'do nothing' option was taken forward, the need for increased repairs would result in the periodic shutdown and eventual closure of the existing pipeline and impacts on fuel supply.

4.3 'Do Something' Alternatives to the Project

Road Transportation

- 4.3.1 Esso considered alternative ways of transporting fuel other than using a new pipeline. One option was to transport the fuel by

tankers on roads. Based on an estimate of the volume of aviation fuel transferred from the Fawley Refinery to the West London Terminal via pipeline in 2015, the replacement pipeline would keep around 100 road tankers off the road every day.

- 4.3.2 Transporting such large quantities of fuel by road daily would be unreliable, uneconomical and have long-term environmental and social consequences when compared with the short term impacts of the project. The alternative of transporting aviation fuel by road was therefore rejected.

In-Line Renewal of the Existing Pipeline

- 4.3.3 Esso also considered replacing short sections of the existing pipeline in turn. The requirement to maintain fuel supplies to the Esso West London Terminal storage facility would severely limit the amount of time the existing pipeline could be shut down during engineering work. Consequently, only relatively short sections of pipeline could be renewed at any one time and the renewal of the entire pipeline could not be achieved within the necessary timeframe. The alternative of in-line renewal of the existing pipeline was therefore rejected.

4.4 Development of the Preferred Option

- 4.4.1 The development of the route followed two distinct stages:
- Stage 1: selection of the consultation corridors and preferred corridor; and
 - Stage 2: development of the route within the corridor.



Project Objectives and Guiding Principles

4.4.2 Esso started by defining the project objectives and setting guiding principles to support the process for selecting potential corridors and routes. These objectives and guiding principles were used in Stage 1 and Stage 2.

Project Objectives

4.4.3 The following project objectives were developed as fundamental requirements for delivering a successful project:

- to replace the pipeline from Boorley Green to the Esso West London Terminal storage facility in Hounslow, via Alton in Hampshire, to connect to existing pipeline infrastructure;
- to meet all the relevant planning requirements;
- to maintain fuel supply during replacement; and
- to develop and install a safe, buildable, operational and economically feasible pipeline.

Guiding Principles

4.4.4 The guiding principles were prepared to support the selection process. Any individual corridor and route was considered as having an advantage over other alternatives if it:

- would benefit from existing equipment (infrastructure) and relationships with landowners;
- would be likely to have better environmental outcomes versus the other options considered, especially relating to internationally and nationally important features along the final route;

- would provide social and economic outcomes of greater benefit compared to the other corridors;
- would pass through less complex or built-up areas (where possible);
- would achieve compliance with National Policy Statements; and
- could be installed in a timely and realistic manner at reasonable cost.

Stage 1: Corridor Selection

4.4.5 A long list identified 17 corridor options in early 2018. These comprised seven corridors to the south of Alton Pumping Station (between Boorley Green and Alton) and ten corridors to the north of Alton Pumping Station (up to the Esso West London Terminal storage facility).

4.4.6 Each option was assessed in an iterative process that comprised:

- consideration of corridors against the project objectives;
- comparative appraisal based on guiding principles;
- review of constraints data and other information relating to guiding principles, and the development of 'criteria' to inform the above; and
- a multi-disciplinary workshop to discuss overall relative performance of corridors.

4.4.7 A short list comprising three south and three north options was presented in a public consultation in March and April 2018.



- 4.4.8 The preferred pipeline corridor was selected following an independent review on the consultation findings and a detailed review of the options by the project's senior management team. The preferred pipeline corridor was announced on 30 May 2018.

Stage 2: Development of the Route

- 4.4.9 The pipeline route (and Order Limits) within the preferred corridor was developed during summer 2018. This drew on the results of environmental surveys and engineering design. Further updates were made following responses gathered during the statutory consultation on the preferred route in September and October 2018 and further statutory consultation on route refinements in February 2019, when some sub-options were rejected and the logistic hubs were introduced.

5 Environmental Impacts and Mitigation

5.1 Biodiversity

Baseline

- 5.1.1 Biodiversity considers the variety of species of plants and animals and ecosystems. This includes sites with important habitats and species which are designated by national and international bodies. This topic covers designated sites along the pipeline route, and species protected by legislation.
- 5.1.2 The project lies within 1km of 20 European, national and local statutory designated sites, and a further 237 sites that are not protected in legislation but deemed to be of conservation value.
- 5.1.3 The Order Limits cross parts of internationally designated sites. These are:
- Bourley and Long Valley Site of Special Scientific Interest (SSSI), which forms part of the Thames Basin Heaths Special Protection Area (SPA);
 - Colony Bog and Bagshot Heath SSSI, part of the Thames Basin Heaths SPA and Thursley, Ash, Pirbright and Chobham Special Area of Conservation (SAC); and
 - Chobham Common SSSI and National Nature Reserve (NNR), which forms part of the Thames Basin Heaths SPA and the Thursley, Ash, Pirbright and Chobham SAC.
- 5.1.4 The Order Limits cross the Basingstoke Canal SSSI, pass close to Eelmoor Marsh SSSI, which forms part of the Thames Basin Heaths SPA, and crosses the Chertsey Meads Local Nature Reserve (LNR)
- 5.1.5 The Order Limits also cross 24 non-statutory designated sites, which are of value in themselves and may form linking habitats to statutory designated sites, or support mobile species for which the core habitat is in the statutory designated site.
- 5.1.6 The project crosses a wide range of habitats, from arable land and woodland to areas of rare habitat. A total of 35 notable plants have been identified along the route. There are also records of invasive non-native species of plants. Protected species along the route include bats, breeding birds, dormice, great crested newts and reptiles.
- 5.1.7 The project would cross 81 water bodies, comprising 78 watercourses, two canals and the Blackwater Valley. Some of these features are crossed more than once, resulting in 93 crossings in total. About half of the watercourses are minor field drains with limited aquatic biodiversity interest. The larger watercourse crossings support a number of fish species. There was little evidence of water-based mammals such as otters and water voles at these locations.
- 5.1.8 Where possible, hedgerows which extend into the Order Limits have been assessed regarding their ecological and landscape importance under the Hedgerows Regulations 1997. A total of 146 Important Hedgerows and 21 likely important have been identified based on their ecological value.

Approach to the Assessment

- 5.1.9 Existing information was collected based on the Order Limits plus 1km on either side. The study area was extended at watercourse crossings where the effects of the project could reach further.
- 5.1.10 Site surveys were undertaken based on professional judgement, consultation and engagement with environmental stakeholders, good practice guidelines, and an understanding of the project's zone of influence. The site surveys included:
- habitat and botanical surveys;
 - aquatic habitat surveys at proposed watercourse crossings;
 - hedgerow surveys; and
 - protected species surveys of badger, bats, dormouse, fish, great crested newt, otter, water vole, and reptiles.

Embedded Design and Good Practice Measures

- 5.1.11 The project evolution considered avoiding important sites where practicable. All areas of designated Ancient Woodland were avoided and trenchless crossings would be used to pass beneath the major watercourse crossings.
- 5.1.12 Good practice measures include programming construction activities to avoid sensitive times of the year, for example undertaking vegetation removal outside of the bird breeding season where practicable. Where this is not possible, clearance would be carried out under the supervision of an Environmental Clerk of Works (ECoW), responsible for finding and cordoning off nest sites until birds have fledged.

Potential Impacts (Without Mitigation)

Construction

Designated Sites

- 5.1.13 The project would not affect the integrity of any European sites designated as SPAs, SACs or Ramsar (protected wetlands).
- 5.1.14 Overall, no significant impacts are anticipated on designated European designated sites due to proposed working methods such as:
- using a narrow working width to reduce habitat loss and fragmentation;
 - using trenchless crossings to go under valuable habitats (for example wetland habitats);
 - following existing tracks through sites, where practicable;
 - programming works to avoid disturbing breeding birds especially birds listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended); and
 - allowing heathland cleared during installation to regenerate naturally and where possible clearing poor quality scrub and secondary woodland to encourage valuable heathland habitats.
- 5.1.15 *Bourley and Long Valley SSSI (Part of the Thames Basin Heaths SPA)*
- Plants: While individual notable plant species would be lost, this would not significantly affect their population in the area.



Individual rare plants would be moved to suitable sites where practicable.

- Habitat: Temporary loss of habitat could affect breeding birds, rare insects and reptiles, such as adder. However, the temporary loss of habitat is small compared with the total area of the designated site and it would be restored after construction. Therefore, it is unlikely that there would be significant effects on the populations of these species.

5.1.16 *Eelmoor Marsh SSSI (Part of the Thames Basin Heaths SPA)*

- Groundwater: The open cut trench in which the pipeline would be installed is expected to be above the water table so there would be no need to pump water out of the trench during installation, and therefore no reduction in groundwater levels which support wetland habitats.

5.1.17 *Colony Bog and Bagshot Heath SSSI (part of the Thames Basin Heaths SPA and Thursley, Ash, Pirbright and Chobham SAC)*

- Plants: Some individual notable plant species would be lost during installation. However, only a small area of the site would be affected and the species are present elsewhere in the SSSI.
- Habitat: The surveys have shown that there are other areas of habitat available nearby for breeding birds, insects and reptiles. Therefore, it is unlikely that there would be significant effects on the populations of these species.
- Groundwater: Where practicable, the pipeline route would be positioned in an area of higher ground in this location. This would reduce the risk of encountering the water table and

affecting wetland habitats. Temporary stanks would be used along the pipeline trench to prevent the migration of water.

5.1.18 *Chobham Common SSSI and NNR (Part of the Thames Basin Heaths SPA and the Thursley, Ash, Pirbright and Chobham SAC)*

- Plants: Individual notable plant species would be lost during installation. However, these are found elsewhere on the site and the population is unlikely to be significantly affected.
- Habitat: The surveys have shown that there are other areas of habitat available nearby for breeding birds, reptiles and insects. The works would be programmed for the winter under a European protected species (EPS) licence when the rare Sand lizards are hibernating. Also, good practice measures would be taken to reduce the effect of pipeline installation on groundwater and wetland habitats.

5.1.19 Although the Order Limits would cross 24 non-designated sites, no significant effects are anticipated due to the good practice measures outlined in the REAC.

Protected Species

5.1.20 Overall, no significant effects on protected species are anticipated. Works affecting protected species would be done under licence where required as described below, or under non-licensable method statements such as those for breeding birds and common reptiles.

5.1.21 *Aquatic macroinvertebrates such as crayfish*: no species of value have been identified; habitat loss and fragmentation would be temporary and habitats would recover following construction.



- 5.1.22 *Bats*: the route has been selected to reduce the loss of trees (potential bat roosts). Crossings at hedgerows have been reduced to 10m to protect these features as feeding and navigation corridors. Buffer zones would also be maintained around trees, buildings and structures that are to be retained, which may support bats.
- 5.1.23 It is likely that most bat roosts within the Order Limits could be retained and avoided. However, if roosts are encountered and avoidance measures are not practicable, a bat licence may be required to provide mitigation and monitoring where appropriate. The temporary loss of hedgerows during construction is not expected to have a significant effect on bat populations. The hedgerows would be reinstated after installation.
- 5.1.24 Construction lighting would be of the lowest luminosity necessary for safe working and designed, positioned and directed to reduce disturbance to bats. Construction activities would be largely restricted to daytime hours, avoiding sensitive times for bats.
- 5.1.25 *Breeding Birds*: where practicable, habitat with potential to support bird nests would be removed outside of the breeding season. If this was not possible it would be cleared under the supervision of an ECoW. The habitats that would be temporarily affected during installation occur widely in the area and would be reinstated after installation. Therefore, there is unlikely to be a significant effect on breeding birds.
- 5.1.26 *Dormouse*. Crossings at hedgerows have been reduced to 10m to protect these features as habitats for dormice. Where vegetation requires removal during construction this would be undertaken carefully and under licence. Temporary loss and fragmentation of dormouse habitat is unavoidable but is a small proportion of available habitat and would be replaced by replanting hedgerows after installation.
- 5.1.27 *Fish*: trenchless crossings are proposed to avoid impacting on higher value watercourses and fish. In the remaining locations, good practice measures in the REAC would reduce the impact of open cut crossings. This includes narrow working areas, buffer zones and reinstatement of the banks after installation. If required, fish can be removed from the crossing area and relocated at an unaffected part of the same watercourse.
- 5.1.28 *Great crested newt*: no ponds supporting great crested newts would be directly affected by the project. Foraging habitat around ponds may be temporarily affected by clearance or groundworks but habitats would be reinstated after installation. A great crested newt licence would be obtained for works in these areas.
- 5.1.29 *Reptiles*: construction activities could affect the rare sand lizard at Chobham Common SSSI through direct harm, habitat fragmentation, and disturbance. The works at Chobham Common SSSI would be completed under a licence. For common reptiles, the vegetation would be cut prior to work commencing, to encourage reptiles to move away to more suitable habitats outside the works. Habitat lost during installation would be reinstated and impacts to features such as log piles used for hibernating would be avoided where practicable.
- 5.1.30 *Riparian mammals*: otter and water vole are absent in much of the study area therefore no significant effects are anticipated.



Pipeline Operation

- 5.1.31 As habitats would be reinstated after installation, there is no anticipated net loss of habitats as a result of the works. Wetland habitats could potentially be impacted due to changes in groundwater movement. However, installing stanks where required at intervals through the pipe bedding and side fill would reduce changes to groundwater flow. These actions would result in negligible changes in groundwater flow.
- 5.1.32 At Boorley Green pigging station there would be periodic activity during operation to clean or inspect the pipeline. While this may result in some short term disturbance, it is unlikely to significantly disturb any sensitive fauna that may be nearby.
- 5.1.33 The replacement pump at Alton Pumping Station is unlikely to produce significant increases in noise or vibration compared to existing levels. Therefore, there is unlikely to be disturbance to protected species.
- 5.1.34 The potential overall construction and operational effects on habitats and protected species are not significant.

Mitigation

- 5.1.35 With the identified design measures and good practice, there are no significant effects to biodiversity. Therefore, no further mitigation is proposed.

Residual Impacts (With Mitigation)

- 5.1.36 There are no likely significant effects of the project on biodiversity during construction and operation. A three-year

aftercare period would be established for the reinstatement planting and a programme of post-construction monitoring would be undertaken to monitor the success of reinstatement of habitats and species.



5.2 Water

Baseline

Groundwater

- 5.2.1 Groundwater feeds water levels in lakes, rivers and wetlands and is abstracted to supply drinking water. Rising groundwater can cause flooding in low-lying areas.
- 5.2.2 Groundwater sources used for public drinking water supply such as wells, boreholes and springs are protected by Source Protection Zones (SPZ). These zones indicate the risk of contamination from any activities that might cause pollution in the area. The SPZs are classified according to potential risk with three zones: inner (SPZ1), outer (SPZ2) and total catchment (SPZ3).
- 5.2.3 All water abstractions in excess of 20m³/day have to be licensed by the Environment Agency. Both licensed and unlicensed groundwater abstractions may supply water to industry or agriculture for irrigation.
- 5.2.4 The route crosses four groundwater study areas which have been defined based on their geology and groundwater environment. Groundwater quality across all areas is generally good.
- Groundwater Study Area between Boorley Green and Bishop's Waltham. There are no public drinking water supplies, mapped SPZs, or licensed groundwater abstractions in this area. Five unlicensed private water

supplies and three habitats dependent on groundwater were identified.

- Groundwater Study Area between Bishop's Waltham and Crondall: The route crosses an aquifer which is a major source of drinking water. The route passes through SPZ2 and SPZ3. Thirteen licensed groundwater abstractions, 25 unlicensed private water supplies and four habitats dependent on groundwater were identified.
- Groundwater Study Area between Crondall and Chertsey South: There are no public water supplies or mapped SPZs. No unlicensed private water supplies were identified. Two licensed groundwater abstractions and ten habitats dependent on groundwater were identified.
- Groundwater Study Area between Chertsey South and the Esso West London Terminal storage facility: The route crosses principal aquifers and passes through SPZ2 and SPZ3. Thirteen licensed groundwater abstractions, three unlicensed private water supplies and three habitats dependent on groundwater were identified.

Surface Water and Watercourses

- 5.2.5 The Order Limits cross 78 watercourses, two canals and the Blackwater Valley. Some of the watercourses are crossed more than once resulting in 93 crossings in total. Most watercourses crossed are of low value for their water-based habitats and species. Only nine are classified as moderate or high value.
- 5.2.6 There are licensed surface water abstractions (where water is taken from the river and used for drinking water supply and agriculture) within 5km of five proposed watercourse crossings.



- 5.2.7 Watercourses and their floodplains are shaped by the processes of erosion and deposition, known as geomorphology. Five watercourses have a high geomorphological value and four moderate geomorphological value. The remaining watercourses are low or negligible geomorphological value, as they have few natural features.
- 5.2.8 A total of 39 surface waterbodies and 10 groundwater bodies were identified within the Water Framework Directive (WFD) assessment.

Flood Risk

- 5.2.9 The study area includes floodplains and areas at risk of flooding from rivers, heavy rainfall and rising groundwater. The largest areas of floodplain are associated with the main rivers including the Thames, Blackwater and Ash.

Approach to the Assessment

- 5.2.10 Existing information was collected for each study area including the Order Limits plus 1km on either side for groundwater; and the Order Limits plus 500m either side for surface water, watercourses, flood risk and the WFD assessment.
- 5.2.11 Site surveys were undertaken to assess existing site conditions. Information has also been taken from borehole records and ground investigations undertaken for the project and other schemes.
- 5.2.12 The Environment Agency, the lead local flood authorities, water companies and Natural England were all consulted on the scope of the assessment.

- 5.2.13 A Flood Risk Assessment (FRA) was undertaken to determine whether the project would change the risk of flooding along the route. This was issued to the Environment Agency for comment, as part of the pre-submission engagement.

- 5.2.14 An assessment of the project against the objectives of the WFD was undertaken. The project was assessed in relation to the risk of causing deterioration in water body status or the potential to compromise the objectives and planned measures within River Basin Management Plans.

Embedded Design and Good Practice Measures

- 5.2.15 The design evolution avoided large areas of floodplain where practicable. Other embedded design measures identified in Table 2.1 include avoiding SPZ1s and areas associated with licensed abstractions, a project commitment to use trenchless crossings at waterways over 30m wide, and the use of stanks to reduce the risk of water movement along the pipeline.
- 5.2.16 Good practice measures set out in the REAC include the control of site drainage, implementation of a sediment and erosion control plan, procedures to be followed during open cut crossings of watercourses and de-watering, and protocols for reducing flood risk during construction.

Potential Impacts (Without Mitigation)

Construction

- 5.2.17 Localised dewatering (pumping of water out from the trench) during installation would not significantly affect groundwater levels in most locations. Without mitigation, local dewatering



may affect ground water levels and significantly affect the wetland-dependent habitats at Bourley and Long Valley SSSI and parts of Folly Bog area of Colony Bog and Bagshot Heath SSSI.

- 5.2.18 Temporary dewatering to excavate shafts for trenchless crossings would not significantly affect water dependent habitats. However, there are eleven locations where changes in groundwater levels could potentially affect ground settlement under buildings, and one location potentially affecting railway infrastructure close to the Order Limits where changes in groundwater could affect settlement. Without mitigation, this could result in a significant effect to these structures.
- 5.2.19 No significant effects have been identified on licensed and known unlicensed private water abstractions. However, there is the potential for significant effects on unknown private water abstractions that lie close to the Order Limits.
- 5.2.20 At Wintershill, the existing groundwater is poor quality. There is a risk that new pathways may be created during installation of the crossing at this location which could result in a significant effect due poor quality groundwater entering the watercourse.
- 5.2.21 There are no cases where trenchless crossings are likely to connect two otherwise unconnected groundwater bodies. Artesian groundwater, confined under pressure, is present at the trenchless crossing at Ford Lake Valley but potential effects related to this would be addressed through the good practice measures in the REAC.
- 5.2.22 In potentially contaminated sites, there is a risk that contamination could be released during construction as new pathways are created. However, with good practice measures in place, there are no likely significant effects. Water quality monitoring requirements would be agreed with the Environment Agency through the permitting process.
- 5.2.23 All watercourses identified as having high or medium fluvial geomorphological sensitivity (except the Caker Stream), are to be crossed using trenchless crossing techniques (see Figure 5.1) so no significant impacts are forecast. The Caker Stream has medium sensitivity and is to be crossed by open cut. However, with the good practice measures in place, there are no likely significant effects.
- 5.2.24 There is an increased risk of flooding during construction, where works take place within the floodplain. The risk is high close to watercourse crossings and in areas where there are increased hardstanding areas such as the compounds and logistics hubs. The FRA concluded that without mitigation there is potential for significant adverse effects on flood risk in these areas during construction.
- 5.2.25 Increased sediment from the drainage of construction working areas can potentially affect water quality in surface waters such as rivers. An Erosion and Sediment Control Plan would be produced by the contractor prior to the start of the construction phase. Drainage would be discharged under a licence or permit from the Environment Agency or Local Lead Flood Authority. With these good practices in place, there are unlikely to be significant effects on water quality.
- 5.2.26 The WFD assessment concluded that the construction of the project is compliant with the objectives of the WFD.

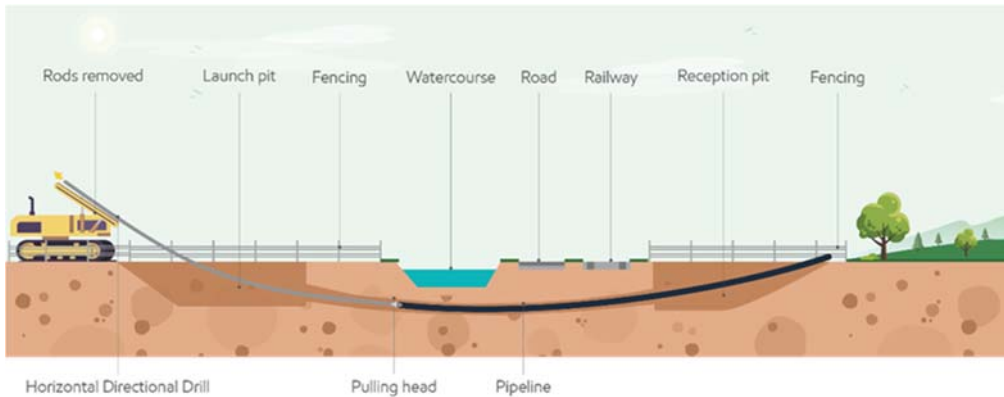


Illustration 5.1 Schematic Illustration of a Trenchless Crossing

Pipeline Operation

5.2.27 No potential significant operational effects were identified.

Mitigation

5.2.28 The following mitigation would be undertaken to address potential significant effects to groundwater during construction:

- Dewatering would be limited in areas near habitats that are dependent on groundwater.
- Temporary sheet piling or similar would be put in place during construction where the assessment has identified potential for groundwater level drawdown close to buildings.
- The contractor would take emergency action in the event of a significant spill to protect private water supplies. This would involve contacting the landowner or tenant within 24 hours and providing an alternative water supply as appropriate.

- The FRA identified a number of additional measures to mitigate for potential increased flood risk in areas of high flood risk, and at the logistics hubs and construction compounds. These mainly comprise avoiding the siting of supporting construction activities such as construction compounds or storage of materials within the floodplain.

Residual Impacts (With Mitigation)

5.2.29 On the basis of the proposed mitigation there are no likely significant impacts during construction and operation for groundwater, surface water, fluvial geomorphology, and flood risk; and the project is compliant with the objectives of the WFD.



5.3 Historic Environment

Baseline

- 5.3.1 The historic environment comprises archaeological remains, historic buildings and historic landscapes. Some of these are designated sites such as Scheduled Monuments and Listed Buildings. Many are undesignated but are still important to the understanding of the historic environment.
- 5.3.2 A total of 1,761 heritage assets were identified within 1km of the Order Limits, of which 638 are designated sites including Scheduled Monuments and Listed Buildings. Of the 1,761 total assets, 907 are archaeological remains, 752 are historic buildings and 102 are historic landscape types.
- 5.3.3 There are no high value heritage assets within the Order Limits and only 30 high value heritage assets within 500m of the Order Limits. Examples of high value heritage assets within 500m of the Order Limits are:
- archaeological remains: Scheduled Monuments including prehistoric barrows, Roman occupation sites, and Lomer deserted medieval village;
 - historic buildings: Farnborough Hill Convent (Grade I), Abbey Church of St Michael in Farnborough (Grade I) and Steep Acre Farm (Grade II) near Chobham; and
 - historic landscapes: Chawton House, Woburn Farm and Frimley Park Registered Parks and Gardens.
- 5.3.4 The project also crosses two Conservation Areas: the Basingstoke Canal and Farnborough Hill.
- 5.3.5 All hedgerows which extend into the Order Limits have been assessed regarding their historical importance under the Hedgerows Regulations 1997 and a total of 157 Historically Important Hedgerows have been identified.
- ### Approach to the Assessment
- 5.3.6 Existing information was obtained from sources available online and at archive and records offices to establish the recorded historic environment baseline and identify heritage assets within the Order Limits and place them within their wider geographical and chronological context. The study area comprised the Order Limits and surrounding 500m buffer. Heritage assets between 500m and 1km of the Order Limits whose setting may be affected by the project were also included in the baseline. This approach also allows for the potential presence of unknown archaeological remains to be assessed.
- 5.3.7 Walkover surveys were undertaken by archaeologists to confirm site features identified during the desktop study.
- 5.3.8 A targeted geophysical survey (for assessment of below ground features) was undertaken in November 2018 to identify hidden archaeological features. This will be followed by a programme of archaeological trial trenching in 2019 to further understand the archaeology that lies beneath the surface.
- 5.3.9 Historic England and the local authority archaeologists from Hampshire and Surrey County Councils, and Winchester City Council were consulted regarding the assessment methodology and the results of the work to date.



Embedded Design and Good Practice Measures

- 5.3.10 The route was designed to avoid known high value heritage assets such as Scheduled Monuments, Conservation Areas, Listed Buildings and Registered Parks and Gardens where practicable. In addition, a trenchless crossing is proposed at the Basingstoke Canal Conservation Area, which would avoid significant effects on the canal and its setting.
- 5.3.11 An archaeological mitigation strategy has been produced as part of the ES, which sets out the archaeological works that would be undertaken prior to and during construction. This would include the targeted trial trenching in 2019 and depending on the results of this, the potential for strip, map and sample excavation and a watching brief.

Potential Impacts

Construction

- 5.3.12 During construction, physical impacts may occur on known and unknown archaeological remains due to partial or complete removal during excavations and compression through the movement of machinery or from stockpiling within laydown areas. Without the archaeological mitigation strategy in place, construction activities could have a significant effect on 12 known archaeological remains of low to medium value and a further 20 archaeological features identified during the geophysical surveys, and non-significant effects on over 100 low to medium value archaeological remains. However, with the archaeological mitigation strategy, effects on buried known and unknown archaeology would be reduced, and no significant effects would be anticipated.

- 5.3.13 The groundwater assessment identified that without mitigation, construction works could change the depth of groundwater near the Grade II Listed Building at Steep Acre Farm, near Chobham. This could lead to potential significant effects to the building and any archaeological remains within the area due to settlement.
- 5.3.14 There could be short term impacts on setting at sites close to the construction works. For example, the route passes through the Farnborough Hill Conservation Area and close to Farnborough Hill Convent Grade I Listed Building. However, as the work would be short term and localised, it would not significantly affect these sites or their setting.
- 5.3.15 Construction activities may affect Chobham Common Historic Landscape Type due to the temporary loss of heathland, the effect of construction noise and visual impacts in what is normally a tranquil environment, and temporary restrictions on use. However, as the work would be short term and localised, it would not significantly affect this site or setting.

Pipeline Operation

- 5.3.16 During the operation phase, the pipeline would be not visible as it would be underground. The above ground features are relatively small and would not have significant visual effect on the setting of archaeological remains, historic buildings, landscapes and Conservation Areas.

Mitigation

- 5.3.17 Temporary sheet piling or similar would be used at the Grade II Listed Building at Steep Acre Farm, to control groundwater



levels, unless further site survey demonstrates that the building is not at risk of differential settlement.

- 5.3.18 With the identified design measures and good practice, there are no significant effects to heritage assets during operation. Therefore, no operational phase mitigation is proposed.

Residual Impacts (With Mitigation)

- 5.3.19 On the basis of the proposed mitigation, there are no likely significant impacts on archaeological remains, historic buildings, and historic landscapes during construction and operation of the project.



5.4 Landscape and Visual

Baseline

5.4.1 This section considers landscapes and views which may be affected by the project. The landscape assessment includes designations such as the South Downs National Park and landscape features such as Ancient Woodland and common land. The assessment also considers views from a range of locations across the study area.

Landscape

5.4.2 The study area passes through seven National Character Areas, each with its own unique set of characteristic features. From south to north these are the South Hampshire Lowlands; the South Downs; the Hampshire Downs; the Wealden Greensand; the Thames Basin Lowlands; the Thames Basin Heaths, and the Thames Valley.

5.4.3 The project crosses the South Downs National Park over approximately 25km between Bishop's Waltham and Alton. The landscape character of the National Park is rural and varied and includes downlands, panoramic views from ridgelines and hill tops, secluded valleys, prehistoric features such as barrows and hillforts, field enclosures and parklands, and low-density settlement with farms, hamlets and small villages.

5.4.4 One of the special qualities of the National Park is its tranquillity. It is also valued for its dark skies. Other landscape features of interest include trees, woodland and hedgerows; ancient tracks and lanes, watercourses and ponds.

5.4.5 Locally important sites along the pipeline route include:

- Chawton House and Woburn Farm Registered Parks and Gardens;
- Formal parkland (undesignated) at Brockwood Park Krishnamurti Centre;
- Chobham Common and areas of registered common land and open access land such as along The Maultway B3015, Red Road B311 southeast of Lightwater and at Turf Hill;
- Lightwater and Bedfont Lakes Country Parks; and
- the Woburn Hill and Chertsey Meads Area of Landscape Importance (ALI) near Addlestone.

5.4.6 There are areas of designated Ancient Woodland within the study area including at Monkwood and Ewshot Wood. There are also Tree Preservation Orders (TPOs) on individual and groups of trees in a number of locations. Trees within Conservation Areas, such as the Basingstoke Canal and Farnborough Hill Conservation Areas are also given protection.

Views

5.4.7 In the southern part of the project between Boorley Green and Ewshot, many views are restricted due to the rolling downland and woodlands, although there are some more extensive views from the ridgelines and hill tops.

5.4.8 Between Ewshot and the Esso West London Terminal storage facility, the route passes through both heavily wooded and built-up areas, especially between Crondall and Chertsey, which limit the extent of views. Mature vegetation belts on the edges of



residential areas largely screen views from the properties along highways, even in winter. There are more open views where the route passes through golf courses, the heathland on Chobham Common, Dumsey Meadow and Chertsey Meads.

- 5.4.9 The assessment on views has taken into account:
- people living near to the project;
 - visitors to the South Downs National Park;
 - people using footpaths including The South Downs Way, Thames Path and National Trails, and long-distance paths,
 - visitors to historic parks and gardens;
 - people using publicly accessible areas such as common land, open access land, Country Parks and recreational areas; and
 - people visiting private facilities such as golf courses, school playing fields, and cemeteries.

Approach to the Assessment

- 5.4.10 A study area comprising the Order Limits plus 1km either side was used to assess the effects on landscape and views. The effects beyond this distance are unlikely to be significant given the temporary nature of the construction works and the small scale of the permanent features.
- 5.4.11 Information was gathered on designated sites and landscape character assessments. Site visits were undertaken by landscape architects in both winter and summer. A tree survey was also undertaken to identify large trees or tree groupings contributing to the landscape character.

5.4.12 The assessment has considered the effect of the project on Ancient Woodland and TPOs within 15m of the Order Limits. The assessment on registered common land and open access land focuses on the land directly affected by the project.

5.4.13 Representative views were selected across the study area. These viewpoints were discussed with the landscape officers at the relevant local planning authorities. Additional viewpoints were chosen beyond 1km following comments from the South Downs National Park Authority.

5.4.14 The landscape and visual assessment considered the effect of the project during construction, one year after pipeline installation before reinstatement planting would have become established (Year 1) and fifteen years after pipeline installation when reinstatement planting would have matured (Year 15). Effects from pipeline operation were also assessed.

Embedded Design and Good Practice Measures

5.4.15 The project was designed to avoid designated features such as Registered Parks and Gardens, country parks, designated Ancient Woodland and substantial woodland blocks. The potential impacts were further reduced by narrowing the working width to 10m across field boundaries (hedgerows, trees or watercourses) and adopting trenchless crossing techniques, for example across the Basingstoke Canal Conservation Area. Good practice measures would include reinstating vegetation that is lost.

Potential Impacts (Without Mitigation)

Construction

- 5.4.16 During construction, there would be short term disruption to the landscape due to the presence of construction plant, temporary fencing, stockpiled soils and materials, and construction activity within the working area. While these effects would be temporary, they would be untypical. The removal of hedgerows, trees and woodland would result in longer-term effects because it would take up to 15 years for hedgerows to become established and longer for trees and woodland.
- 5.4.17 The effect of the project on the national landscape character areas is assessed to be significant during construction and Year 1, based on the temporary construction effects and loss of vegetation. The potential loss of trees along the northern part of the route would be most notable, and reinstatement planting may be more constrained due to the proximity to houses, roads and underground services. By Year 15, the effects caused during the construction phase would no longer be significant because the reinstatement planting would have matured.
- 5.4.18 The effect of the project on the South Downs National Park is assessed to be significant during construction and Year 1, based on the temporary construction effects and loss of vegetation. By Year 15, the effects caused during the construction phase would no longer be significant because the reinstatement planting would have matured. Within the South Downs National Park, construction works would temporarily affect the tranquillity along the route, but the effects would be transient and not significant as the working front progresses. The effects of temporary night-time lighting would be managed to avoid glare and light spill and would not occur within the Dark Sky Core identified by the South Downs National Park Authority. This approach would not result in significant effects on the darkest skies.
- 5.4.19 Within the Woburn Hill and Chertsey Meads ALI, the route would run through largely flat open grassland. There would be limited tree loss, as this has been reduced by trenchless crossings under the Bourne and the River Thames. Temporary disruption caused by construction would be significant, but the effects in Year 1 and Year 15 are not predicted to be significant.
- 5.4.20 There would be no significant effects on classified Ancient Woodland as the route has been designed to avoid these sites. Where the route passes close to Ancient Woodland protection of trees and their roots would apply where these are likely to extend into the Order Limits.
- 5.4.21 Potential (non-designated) ancient woodland (less than 2ha) occurs within the Order Limits at various locations. Impacts on these woodlands would be reduced by adopting measures such as trenchless crossings, using existing farmers' tracks, routing in gaps between trees and avoiding tree removal. The effects of the project on potential ancient woodland is predicted to be negligible.
- 5.4.22 There would be a significant effect on TPO trees during construction and up to and beyond Year 15. While reinstatement planting would establish lost planting, it would not be possible to mitigate fully the potential permanent loss of TPO trees. There would be restrictions on planting trees over and around pipeline easements so it would not be possible to replace all trees lost *in situ*. There may also be less scope to accommodate



reinstatement of trees within the wider urban area because of restrictions caused by built development.

- 5.4.23 Construction disturbance and the loss of some trees on Chobham Common would not significantly affect the landscape character. Construction along The Maultway B3015, Red Road B311, and Turf Hill north of Red Road B311 would not have a significant effect on the overall character of the landscape in these areas, although there would be tree losses.
- 5.4.24 There would be no significant effects on formal parkland (undesigned) at Brockwood Park Krishnamurti, or on Lightwater and Bedfont Lakes Country Parks which would not be physically affected.
- 5.4.25 Significant short term effects on views towards the construction works are predicted for a number of sites, but are not significant by Year 1 when construction activity would no longer be visible, for example:
- views along some lanes and roads, including Maddoxford Lane in Boorley Green, Woodthorpe Road in Ashford and Ashford Road in Staines-upon-Thames;
 - views along some Public Rights of Way and Long Distance Paths that cross the Order Limits;
 - views from a localised part of Chawton House Registered Park and Garden;
 - views from Dippenhall Street and southern residential edge of Crondall Conservation Area; and
 - views from playing fields east of Southwood.

- 5.4.26 Significant effects were identified during construction and Year 1 at three locations: Queen Elizabeth Park and Church Path public footpath, both in Farnborough, and Fordbridge Park in Staines-upon-Thames. These are not significant by Year 15.

Pipeline Operation

- 5.4.27 Operational landscape and visual effects would be limited because the pipeline would be underground. Permanent above ground features include the Boorley Green pigging station, the fourteen valve chambers along the route, the pressure transducer chamber and the markers along the route. These features are small within the overall landscape context. Overall, the operational landscape and visual effects are assessed to be localised and not significant.

Mitigation

- 5.4.28 Planting native trees and hedgerows in specified locations will be undertaken.

Residual Impacts (With Mitigation)

- 5.4.29 By Year 15, when reinstatement planting would be established, almost all landscape and visual effects would be not significant. The only residual effect would be on TPO trees due to the time it takes for trees to grow to maturity and the inability to plant new trees within the easement. Operational landscape and visual effects would be localised and not significant.



5.5 Soils and Geology

Baseline

- 5.5.1 This section considers soils, designated geological sites, mineral resources, and land quality issues resulting from historic land use and existing landfill sites.
- 5.5.2 The pipeline route crosses a variety of soil types including loamy soils, sandy soils, and lime-rich soils, waterlogged loamy and clay soils in wetlands, and peat soils in heathlands.
- 5.5.3 Around 55% of the Order Limits is assumed to cover the best and most versatile agricultural land based on the Agricultural Land Classification Grades 1, 2 and 3a. The remaining 45% crosses moderate to poor quality agricultural land, and non-agricultural, urban and other land.
- 5.5.4 The pipeline route crosses Water Lane Site of Importance for Nature Conservation (SINC) which is designated in part for its geology, where rock exposures occur along sections of this sunken lane.
- 5.5.5 The Order Limits do not cross any Minerals Safeguarding Areas in Hampshire, but do cross several Mineral Consultation Areas for clays, fine sands and sands near Boorley Green, Bishop's Waltham, Crondall, Alton and Fleet.
- 5.5.6 About one third of the route through Surrey from south of Lyne to the Esso West London Terminal storage facility crosses Minerals Safeguarding Areas for sands and gravels. There are two Preferred Areas for mineral extraction lying partly within the Order Limits: Queen Mary Reservoir in Sunbury and Homers Farm at Bedfont. Manor Farm in Laleham is also a Preferred Area adjacent to the Order Limits, and it is planned to work the minerals via conveyor which crosses the Order Limits.
- 5.5.7 A number of sites have been identified along the route, where the previous land uses indicate there could be a risk of contamination. Approximately fifty sites were assessed which include old landfill sites, railway and military land, and previous and current industrial sites.
- ### Approach to the Assessment
- 5.5.8 The study area for the assessment of soils and minerals comprises the Order Limits, while the study area for geological sites only considers the Water Lane SINC.
- 5.5.9 Baseline information was obtained from published sources including historical Ordnance Survey maps, aerial photography, geological mapping and reports on potentially contaminated sites. The mineral planning authorities and mineral extraction operators were contacted for information and site visits were undertaken to confirm desk-based information. Information was also obtained through historic and project-related ground investigations.
- ### Embedded Design and Good Practice Measures
- 5.5.10 The route was developed to avoid impacting on geological sites, potentially contaminated sites, landfills, and minerals resources and operations where practicable.
- 5.5.11 The pipeline has been designed to avoid risks from unstable ground and to withstand the attack of aggressive contaminants



that may be present in soils and shallow groundwater. Where required, stanks would be installed at intervals along the pipeline to reduce groundwater flow, which could be contaminated in some locations.

- 5.5.12 The REAC includes good practice measures to protect soils during installation such as separating topsoil from subsoil and not undertaking works when the ground is saturated. Any potentially contaminated soil encountered during construction would be removed and disposed of at a suitable facility.

Potential Impacts (Without Mitigation)

Construction

- 5.5.13 The potential for effects on soil, including damage to the structure and fertility, would be avoided by following good practice measures set out within the REAC. With these measures in place, there would be no significant effects on soils during installation of the pipeline.
- 5.5.14 The pipeline would cross Water Lane SINC, which is approximately 2km long. The crossing point coincides with an existing farmer's track where the lane is level with the surrounding land. Following reinstatement of the crossing, there would be no significant impact on the geological outcrops visible along the Water Lane SINC.
- 5.5.15 While efforts have been made to avoid sites potentially affected by land contamination, it is likely that the route would still cross some such sites. However, with good practice measures in place, the potential risks to human health, land and water

resources would be managed to avoid significant risks due to pipeline installation.

Pipeline Operation

- 5.5.16 Potential effects were identified during operation in relation to the loss of mineral resources at current or proposed quarry sites at three Preferred Areas for mineral development: Queen Mary Reservoir, Manor Farm and Homers Farm, all located between the M3 and the Esso West London Terminal storage facility. No impacts are predicted on Queen Mary Quarry or Manor Farm. The extraction of sand and gravel at Homers Farm is expected to have largely ceased before construction of the pipeline reaches the site. No significant effects are anticipated at these sites.

Environmental Mitigation

- 5.5.17 With the identified design measures and good practice, there are no significant effects predicted for soils, geology, and contaminated land. Therefore, no further mitigation is proposed.

Residual Impacts (With Mitigation)

- 5.5.18 No significant residual impacts are predicted to any soils, geology or contaminated land during construction and operation.



5.6 Land Use

Baseline

- 5.6.1 This section considers land use within the Order Limits, including residential and commercial property, community land and facilities, farmland, and land identified for development.
- 5.6.2 The southern part of the route from Boorley Green up to Crondall in Hampshire crosses agricultural land, supporting a range of livestock, arable and horticulture-based systems. The northern parts of the route pass through the urban areas of Farnborough, Frimley and Ashford, including alongside 120 residential properties, mostly in Farnborough and Frimley.
- 5.6.3 Where community facilities (such as schools, community centres and places of worship) within the Order Limits, these are mostly located between Crondall and the Esso West London Terminal storage facility. Important areas of community land include Queen Elizabeth Park in Farnborough, Chobham Common, and Fordbridge Park in Ashford.
- 5.6.4 Areas allocated to commercial land include land used for utilities (such as electrical or water infrastructure), industrial businesses, commercially run sports grounds and centres, including golf courses.
- 5.6.5 The Order Limits pass through areas allocated for development. One major development, the River Thames (flood alleviation) Scheme, would cross the Order Limits on the north side of the River Thames in Ashford. Other major planning applications include a mix of housing and commercial interests, and sand and gravel extraction at Manor Farm, Laleham.

Approach to the Assessment

- 5.6.6 Existing information was collected for the study area, which included the Order Limits and where a landholding lies partially within the Order Limits. The existing baseline was established using information such as Ordnance Survey maps, aerial photography, information from land agents, questionnaires, and online searches.
- 5.6.7 Once the project has been built, there would be no further effects on land use, so effects during operation were not considered.

Embedded Design and Good Practice Measures

- 5.6.8 The project has been designed to avoid settlements where practicable and the route avoids demolition of houses.
- 5.6.9 Good practice measures to reduce the impact of construction on land use and landowners, are set out in the REAC and include measures such as maintaining pedestrian and vehicle access to land and property where practicable, fencing off working areas, and reinstatement of land and assets where affected.

Potential Impacts (Without Mitigation)

- 5.6.10 No significant effects on land use are anticipated. There would be no demolition of houses, community facilities, commercial property or agricultural buildings. Of the 426.57 hectares of temporary land required to build the project, only 2% is classed as residential, with 18% as community land; 19% as commercial; 58% as agricultural; and 3% as other land use.



- 5.6.11 A small number of single-storey garages would need to be removed at Stake Lane to the west of Farnborough Station to facilitate installation of the replacement pipeline. It is also possible that removal of garden sheds/greenhouses, temporary loss of land such as a garden and/or parking area, and the temporary loss of access and boundary features may be required.
- 5.6.12 Over half of the land temporarily required to build the project is agricultural, and a quarter of that land includes the best and most versatile land in Agricultural Land Classification Grades 1 and 2. This land would be returned to agricultural use after construction resulting in no significant impact.
- 5.6.13 There would be short term disruption to some property access during construction and some land and boundary features would be temporarily removed or altered and reinstated after construction. Parts of the route cross community land (18%) including play areas and parkland, where use would be reduced during construction. However, the project is working with landowners to reduce impacts during construction.
- 5.6.14 The project crosses 30 agricultural land interests that currently have land management agreements administered by Defra and Natural England to make environmental improvements. Following completion of construction, all areas subject to environmental agreements would be reinstated, wherever practical, to their former condition resulting in no significant impact.

Mitigation

- 5.6.15 With the identified design measures and good practice, there are no significant effects predicted for land use. Therefore, no further mitigation is proposed in the ES.

Residual Impacts (With Mitigation)

- 5.6.16 No significant residual impacts are predicted to existing or future land use during construction and operation.



5.7 People and Communities

Baseline

- 5.7.1 The people and communities assessment includes residential and commercial properties, community facilities (such as schools, hospitals, community centres, places of worship and golf courses) and recreational and amenity facilities (such as greenspaces, playing fields, play areas, country parks, open access land, common land, public rights of way and cycleways). It also includes tourism attractions, tourism accommodation, events, and associated changes in visitor behaviour and the tourism sector.
- 5.7.2 The project would be situated within the counties of Hampshire and Surrey, except for a short section (up to 125m) within the London Borough of Hounslow and the administrative area of the Greater London Authority. The population density is almost twice as high in Surrey as in Hampshire, reflecting the higher level of urbanisation.
- 5.7.3 The southern part of the route between Boorley Green and Crondall is largely rural and mostly crosses agricultural land, bypassing nearby settlements such as Boorley Green, Lower and Upper Farringdon, Alton, Upper Froyle and Crondall. The route also crosses several minor roads, numerous public rights of way and the Four Marks Golf Course.
- 5.7.4 The northern part of the route between Crondall and the Esso West London Terminal storage facility is largely urban, albeit with notable areas of open space. The route passes through more urban landscapes and large residential areas such as Church Crookham, Southwood, Farnborough, Frimley, Chertsey and Ashford. It passes less than 500m from Farnborough Airport. Community and recreational facilities within the Order Limits include sports grounds, play areas, golf courses, school grounds, parks, Chobham Common SSSI/NNR and Brentmoor Heath Local Nature Reserve, numerous public rights of way and cycleways.
- 5.7.5 The tourism sector in southeast England was worth £2,707 million in 2017, just over 1% of the total value of the economy of the region, in which the South Downs National Park is a valuable attraction. Visitors to the National Park come to walk, watch wildlife or cycle. Three-quarters of visitors are day visitors or residents, only 5% stayed overnight in the National Park, while 20% stayed overnight elsewhere.
- 5.7.6 Eight tourism attractions and accommodation sites have been identified within the Order Limits between Boorley Green and Crondall, including the Stable Farm Caravan and Campsite and the South Downs Way.
- 5.7.7 A total of 22 tourism and accommodation facilities have been identified within the Order Limits between Crondall and the Esso West London Terminal storage facility, including the Tweseldown Race Course, Foxhills Golf Club and Resort, the Thames Path, the Chertsey Agricultural Show, and the Dover to Middleton in Teesdale Long Distance Walking Route.
- ### Approach to the Assessment
- 5.7.8 The study area for the assessment of effects on community and tourism facilities was taken to include the Order Limits and a 500m buffer zone on either side. The study area for the tourism sector covers Hampshire and Surrey.



- 5.7.9 A desktop study was undertaken to characterise the current environmental, social and economic conditions in the study area. This involved the review of maps, aerial photographs, and statistical data and consultation and engagement with stakeholders, in particular Hampshire and Surrey County Councils.
- 5.7.10 The assessment considers disruption to individual community receptors and tourism facilities along the route and then assesses whether the disruption to groups of receptors collectively would be significant.
- 5.7.11 In rural areas, the assessment considers the combined effects of construction noise and vibration, and changes in views. The effects of construction dust, traffic and transport, community severance and changes in access are not anticipated to be significant due to the short duration of construction activity and the dispersed nature of receptors, and have not been assessed.
- 5.7.12 In urban areas, the combined effects of noise and vibration, visual and traffic effects, community severance and changes in access that may occur during construction are all considered.
- 5.7.13 Once the project has been built, there would be no further effects on people and communities, so effects during operation were not considered.

Embedded Design and Good Practice Measures

- 5.7.14 The project has been designed to avoid settlements where practicable and the route avoid demolition of houses.

Potential Impacts (Without Mitigation)

- 5.7.15 No significant effects on people and communities are predicted during the construction phase, given the limited area subject to construction activity at any one time and the temporary nature of the works.

People and Communities

- 5.7.16 In the southern section of the route, there would be temporary visual impacts from some residential properties close to the works. The Four Marks Golf Course would be directly affected by the installation of the pipeline, parts of which may have to close temporarily while construction works are ongoing. Some visual impacts on viewpoints would occur, for example where public rights of way cross the project, but these would be experienced fleetingly by visitors as they pass by.
- 5.7.17 In the more urban areas between Crondall and the Esso West London Terminal storage facility, there may be significant visual effects for various residential and recreational areas, such as Church Crookham and residential properties at Quetta Park, along Chobham Common and residential properties near Heatherside and Lightwater.
- 5.7.18 While the construction works would generate noise and to some individual properties this would be significant, the impacts of this would be short term as the construction works progress along the route and there would be no significant disruption at a community level. A Noise and Vibration Management Plan would be produced to outline measures for reducing the impacts during construction.



- 5.7.19 Installation of the project in urban areas would be undertaken in short sections at a time, which would reduce the impact of severance on local communities. Two longer-term traffic diversions are proposed, along Balmoral Drive and St Catherine's Road in Frimley. However, these diversions are localised and not anticipated to contribute to wider disruption within the study area. Pipeline installation is not predicted to result in significant effects on severance.
- 5.7.20 There is potential for significant disruption to facilities located within the Order Limits during construction. Facilities likely to be particularly affected include: the Peter Driver Sports Ground, Oak Park Golf Course, and Quetta Park; the Farnborough Gate Recreation Ground and Queen Elizabeth Park in Farnborough; the Abbey Rangers Football Club; and users of the Chertsey Meads Local Nature Reserve car park. Several other facilities including school playing fields, golf courses, and parks may be temporarily affected.
- Tourism
- 5.7.21 There would be short term disruption to some tourism facilities across the study area, as summarised below.
- 5.7.22 The use of Stable Farm Caravan and Campsite is likely to be affected whilst the pipe is laid across the field adjacent to the camping area, and as a result of the location of a construction compound next to it. Significant temporary disruption is expected at this location during these works.
- 5.7.23 Construction may also cause temporary disruption to West End House B&B, as the Order Limits cross the B&B access, which could affect passing trade. However, noise and visual impacts are not predicted to be significant.
- 5.7.24 Froyle Park, the Anchor Inn, the Premier Inn on the Ively Road Farnborough and the Ship Inn may be affected by construction noise and visual impacts during pipeline installation, but the effects would be temporary and not significant.
- 5.7.25 Visitors to Chawton Park Farm would drive past the proposed logistics hub, but would not otherwise be affected, and Chawton House and the Jane Austen House Museum are too distant from the works to be significantly affected.
- 5.7.26 Tweseldown Racecourse would be directly affected, but given the relatively low number of events, construction is only expected to cause marginal disruption. Golf courses along the route may be directly affected, with temporary closure of at least part of the course, and visual, traffic and noise effects.
- 5.7.27 The Farnborough Air Show is a week-long event that takes place every two years. The airfield is about 500m from the Order Limits at the nearest point and trenchless crossing of the A327 would prevent traffic congestion. No significant effects are anticipated.
- 5.7.28 The Chertsey Agricultural Show is an annual two-day event held on Chertsey Meads, attracting an estimated 20,000 visitors. Without mitigation, there is potential for significant effects if the Chertsey Agricultural Show takes place at the same time as the construction works at this site.
- 5.7.29 Visitors along the South Downs Way and the Thames Path would only experience construction disturbance for a short



period as they pass near to construction works. Similarly, users of the Dover to Middleton in Teesdale Long Distance Walking Route would be expected to pass by quickly and would not be significantly affected.

- 5.7.30 As no significant disruption to local tourism receptors or to visitor numbers have been identified, the project would not significantly affect the wider tourism sector.

Mitigation

- 5.7.31 The project would work with the Chertsey Agricultural Show organisers to limit impacts at Chertsey Meads and along Mead Lane.
- 5.7.32 While the construction works would generate noise, this would be short term as the construction works progress along the route. Noise-reducing measures would be implemented through a Noise and Vibration Management Plan.

Residual Impacts (With Mitigation)

- 5.7.33 The assessment has concluded that there would be no significant residual effects on people and communities, tourism attractions and the tourism sector.

5.8 Major Accidents

Baseline

- 5.8.1 This assessment considers the potential for a major accident or disaster to affect the project, or for the project to cause a major accident affecting the environment. It considers extreme events that would not be covered by the other chapters of the ES.
- 5.8.2 The baseline for this assessment is mainly the existing environmental conditions described in the preceding sections, plus climate and weather, and any major accident hazard sites nearby.

Approach to the Assessment

- 5.8.3 The assessment of major accidents and disasters is different to the other chapters as it considers environmental risk. This is assessed based on the potential severity of harm, how likely it is to occur, and how long it might take the environment to recover. A significant effect would be an extreme event resulting in serious harm to human populations and/or the environment.
- 5.8.4 The assessment considered risks from natural events such as earthquakes, and the risk of major accidents from nearby hazardous sites such as existing high pressure gas pipelines.
- 5.8.5 The assessment also considered the potential for the project to cause a major accident due to:
- diesel spills/releases (during pipeline installation);
 - methane release from landfills (during pipeline installation);
 - release of aviation fuel (during pipeline operation); and

- fire, explosions or smoke (during pipeline operation).

Embedded Design and Good Practice Measures

Design Measures

- 5.8.6 The project design includes measures to reduce risk and effects on sensitive human and environmental receptors.
- 5.8.7 The pipeline would be buried, which reduces the risk of damage, and an anti-corrosion pipe coating would protect it underground. The design includes remotely operated valves that can shut down sections of pipeline during operation in the unlikely event of a major accident, limiting release of fuel.

Installation

- 5.8.8 During manufacture, the components would be subjected to rigorous testing. A range of tests would also be employed to check the integrity of the pipeline as part of the commissioning process, including testing of all welds.
- 5.8.9 Existing buried pipelines crossing or in close proximity to where the proposed replacement pipeline have been taken into account in the design.
- 5.8.10 A range of measures as set out in the REAC would also be followed during pipeline installation in relation to diesel storage and use, and potential gas release from landfills.

Operation and Maintenance

- 5.8.11 Pipelines are one of the safest modes of transport for conveying hazardous substances. The likelihood of failure in a UK fuel



pipeline is extremely low, and it would be operated in accordance with strict and comprehensive procedures.

- 5.8.12 Marker posts would be installed to show the pipeline location, and an 'easement strip' 3m to either side of the pipeline would prohibit any building or below ground activity in this area without approval. During operation the pipeline and valves would also have regular inspections, cleaning and maintenance.

Assessment of Environmental Risk

Project Vulnerability

- 5.8.13 The pipeline would be located underground for its entire length, reducing the risk of damage. Above ground features such as the valves are fully enclosed and would have a low risk to fire. They have also been sited where possible to avoid flood risk areas and are designed to operate safely if submerged.
- 5.8.14 The project is located in an area with a very low ground instability, due to generally gentle topography and low earthquake potential. The risk of land instability affecting the project is minimal.

Potential for Project to Cause Effects

- 5.8.15 Diesel fuel for on-site plant and equipment would be stored in relatively low volumes during installation of the pipeline. With good practice measures in the REAC, the probability of a large diesel spill occurring is very low.

- 5.8.16 Disturbance of landfills can result in release of methane. The route crosses some landfill sites, but there is a low likelihood of encountering major sources of methane-rich landfill gas.

- 5.8.17 In the unlikely event of a leak of aviation fuel, a decrease in pressure would be identified and the valves would be remotely closed to limit fuel release.

- 5.8.18 Aviation fuel is relatively difficult to ignite under UK ambient conditions, and the risk of fire from a release of aviation fuel is very low. There are no instances of fires reported from any aviation fuel cross-country pipelines across Europe.

Potential Effects on Receptors

- 5.8.19 Diesel is biodegradable and does not bioaccumulate within living tissue. Whilst diesel can be toxic to aquatic organisms if it reaches watercourses, no major accident threat to the environment is predicted with the implementation of the REAC.

- 5.8.20 In the event of a loss of aviation fuel, the recovery duration of land and soils would vary depending on the land habitat, for example agricultural land would generally recover more quickly than bog. Water quality and aquatic life could be affected, however, aviation fuel is kerosene-based and biodegrades naturally in the environment over time.

- 5.8.21 As protected species are mobile, the risk to the species overall is low, and it is not likely they would be significantly harmed.



Mitigation

- 5.8.22 No threat of major accident to the environment was identified, and therefore no further mitigation measures are proposed.

Summary

- 5.8.23 The assessment indicates that the majority of major accident sources or natural disasters have very limited potential to affect the project, and the project has low potential to cause environmental harm. No major accident to the environment threat was identified, and no significant effects are therefore predicted.

5.9 Cumulative Effects

Baseline

- 5.9.1 Two types of cumulative effects were considered within the ES:
- intra-project effects, where a single receptor is affected by multiple aspects, for example noise and traffic, causing a cumulative effect together on people and communities; and
 - inter-project effects, where different projects cause effects that add together making a larger effect.
- 5.9.2 The existing baseline from the other topic chapters was used to inform the cumulative effects baseline. This was supported by a review of planning documents to understand other proposed projects which could result in a cumulative effect.

Approach to the Assessment

Intra-project Effects

- 5.9.3 The intra-project assessment identified sensitive receptors or groups of receptors subject to multiple effects. Where cumulative effects were assessed within the chapters, such as People and Communities, these were not taken forward for further study.

Inter-project Effects

- 5.9.4 The inter-project assessment involved identifying other proposed projects within a 1km study area from the Order Limits which could interact with the project resulting in cumulative

effects on biodiversity, water, heritage, landscape and views, soils and geology, land use, and people and communities.

- 5.9.5 A total of 36 development projects were taken forward for assessment. These comprised of two DCO and one significant development project (Heathrow Expansion, Southern Rail Link to Heathrow and the River Thames Scheme), and 33 major planning applications.
- 5.9.6 No assessment of effects was undertaken for pipeline operation, as the scale of operational activities would be small and not anticipated to result in significant effects.

Potential Impacts (Without Mitigation)

Intra-project Effects

- 5.9.7 No intra-project effects have been identified in the assessment.

Inter-project Effects

- 5.9.8 The assessment showed that there was limited potential for inter-project cumulative effects, due to the distance between projects and the relatively localised zone of influence of the impacts from the SLP project.

Mitigation

- 5.9.9 As no significant intra-project or inter-project cumulative effects have been identified, no mitigation is proposed.



Residual Impacts (With Mitigation)

- 5.9.10 No significant residual intra-project or inter-project cumulative impacts are predicted during construction or operation.

6 Summary of Effects

Environmental Management

- 6.1.1 The REAC identifies all of the measures that have been included within the project to reduce the effects on the environment. This includes embedded design measures, good practice, and mitigation identified to reduce significant effects.
- 6.1.2 The commitments in the REAC are implemented through a variety of mechanisms such as the DCO requirements. Many of the measures and standards of work that would be applied by the contractor throughout the construction period are set out in the CoCP and other documents such as the Construction Environmental Management Plan (CEMP).

Significant Potential Effects

Construction

- 6.1.3 Potentially significant effects identified for the project (those classed as moderate or high) and confirmed mitigation in relation to these are as follows:
- The pipeline trench could intercept groundwater and affect wetland-based habitats during installation. Where required, the introduction of temporary stanks (water stops) along the trench would reduce groundwater movement.
 - In the event that construction activities affect licensed and unlicensed private water supplies, such as by dewatering or accidental spills, alternative water supplies would be provided, as appropriate.
 - Poor quality groundwater at Wintershill could flow into the trench and cause pollution risks to the adjacent watercourse. Dewatering would be limited in this area. With this measure in place.
 - Dewatering at trenchless crossings could lead to a subsidence risk for buildings including the Grade II Listed Building at Steep Acre Farm. Temporary sheet piling or similar would be used at the trenchless crossing to reduce the risk of settlement.
 - Some receptors may experience noise impacts during installation, even with the application of noise-reducing measures. However, these will be temporary and short term, and within the normal working hours unless by exception. A Noise and Vibration Management Plan will establish appropriate noise and vibration mitigation to be implemented during the works.
 - Construction activities are required within the floodplain, which without mitigation could cause significant effects on flood risk receptors. This would be mitigated by limiting works (including storage of materials) within Flood Zone 3 where appropriate and reinstatement of the embankment dam at Cove Brook as soon as practicable after installation.
 - There could be significant disruption to visitors to the Chertsey Agricultural Show if works in this area were to coincide. The timetable of the event would be considered as part of the construction programme with the objective of avoiding the event.
 - The loss of trees and hedgerows would be mitigated by providing additional native trees and hedgerows as part of the project to reduce the effect. However, for Tree



Preservation Order (TPO) trees, a precautionary approach to assessment indicates that replanting would not be able to fully mitigate the permanent loss of TPO trees.

Operation

- 6.1.4 No potential significant effects were identified for any environmental topic of this ES during operation of the pipeline.

Significant Residual Effects

Construction

- 6.1.5 With design measures, good practice, and proposed mitigation, significant residual effects arising from the construction phase

are only predicted in relation to the loss of Tree Preservation Order (TPO) trees, and in relation to temporary noise disturbance. No significant residual effects are predicted for any other environmental topics of this ES during the construction phase.

Operation

- 6.1.6 No significant residual effects are predicted for operation of the pipeline.



7 Next Steps in the DCO Application

- 7.1.1 Esso has submitted the ES to the Planning Inspectorate as part of an application for development consent. The Planning Inspectorate has been appointed by the Secretary of State to examine the application. Granting of a Development Consent Order (DCO) would allow Esso to proceed with the project.
- 7.1.2 On receipt of the application, the Planning Inspectorate has 28 days to determine if it is ready for examination (the acceptance phase). If the Planning Inspectorate accepts the application as adequate, the pre-examination phase would begin. At this point, Esso would publish a notice saying where application documents can be viewed. During the registration period of the pre-examination phase, members of the public can register as interested parties. This would entitle them to make “relevant representations” to the Planning Inspectorate. Information on how to register can be found on the Planning Inspectorate’s website: <http://infrastructure.planningportal.gov.uk/projects/>.
- 7.1.3 The pre-examination phase ends just prior to the preliminary meeting, which registered interested parties are invited to attend. At the preliminary meeting, the Planning Inspectorate would decide the key issues to take into account when examining the application.
- 7.1.4 The preliminary meeting marks the start of the examination phase during which any necessary hearings would be held to address key issues identified at the preliminary meeting. Registered interested parties can send written representations to the Planning Inspectorate and can ask to speak at a public hearing. The examination would last a maximum of six months.
- 7.1.5 The Planning Inspectorate then has three months to consider the recommendations from the examination. The recommendations and a supporting report are passed to the Secretary of State, who would have three months to decide whether or not to grant development consent.
- 7.1.6 When the Secretary of State’s decision is published, there is a High Court challenge period. Once the DCO is issued, the decision is final.

