

Southampton to London Pipeline Project

Deadline 6

Appendix B: Outline Water Management Plan
(tracked change)

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Acronyms and Abbreviations

Acronym	Definition
AEP	Annual Exceedance Probability
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
CoCP	Code of Construction Practice
DCO	Development Consent Order
ECoW	Environmental Clerk of Works
ES	Environmental Statement
FZ	Flood Zone
GDTE	Groundwater Dependent Terrestrial Ecosystem
GWSA	Groundwater Study Area
LEMP	Landscape and Ecological Management Plan
LLFA	Lead Local Flood Authority
PWS	Private Water Supply
REAC	Register of Environmental Actions and Commitments
RoFSW	Risk of Flooding from Surface Water
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
WMP	Water Management Plan



1 Introduction

1.1 Overview of the Project

- 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. The replacement pipeline is 97km long taking into account that it cannot follow the line of the existing pipeline along its whole length due to new developments and environmental constraints.
- 1.1.2 Esso has already replaced 10km of pipeline between Hamble and Boorley Green in Hampshire. The replacement pipeline starts near Boorley Green at the end point of the previously replaced pipeline. The route runs generally in a northeast direction via Esso's Pumping Station in Alton. It terminates at the Esso West London Terminal storage facility. The areas of land to be permanently or temporarily used for the project are known as the Order Limits.
- 1.1.3 Works to install and commission the pipeline are expected to start from grant of Development Consent Order (DCO) and be completed by early 2023. Certain advance works may take place prior to development consent where consented under alternative regimes, for example, the Town and Country Planning Act 1990.
- 1.1.4 The development authorised by the DCO must be undertaken in accordance with the Construction Environmental Management Plan (CEMP) pursuant to Requirement 6 of the DCO.

1.2 Purpose of the Water Management Plan

- 1.2.1 This Outline Water Management Plan (WMP) has been produced as Appendix B to the Outline Construction Environmental Management Plan ~~(Document Reference 8-51)~~. The final WMP would be in accordance with the Outline WMP. The final CEMP and appendices will be produced prior to construction and will be submitted and approved by the relevant planning authorities in accordance with Requirement 6 in the DCO after consultation with the Environment Agency and Lead Local Flood Authorities (LLFAs). Esso and its supply chain of contractor(s) would adopt the control measures set out in the final WMP when undertaking the construction of the project.
- 1.2.2 The Outline WMP should be read alongside the generic methodology for watercourse crossings which can be found within the section 2.79 of the Code of Construction Practice (CoCP) ~~(Document Reference 6.4 Appendix 16.1 (3))~~. This contains details about how watercourses would be crossed during construction and how they would be reinstated. It should also be read alongside the Outline Landscape and Ecological Management Plan (LEMP) ~~(REF)~~ which will contain further details about how watercourses would be reinstated including vegetation type.
- 1.2.3 The Outline WMP should also be read alongside the Outline Emergency Action Plan (CEMP Appendix A ~~(Document Reference 8-51))~~ which contains information about the processes and measures that would occur during an emergency such as an extreme flood event or a significant pollution incident.



- 1.2.4 Crossing watercourses is a permitted activity (a “flood risk activity”) under the Environmental Permitting Regulation but consent may also be deemed, in accordance with the protective provisions set out at Schedule 9 of the DCO and agreed with the Environment Agency and the Lead Local Flood Authorities (LLFAs). As per commitment G44, the project would be run in compliance with all consents and permits. Also, Commitment G123 states that ‘*all works within or adjacent to watercourses would be carried out in accordance with the requirements of permits and licences agreed with either the Environment Agency or relevant Lead Local Flood Authority or in accordance with the provisions of the DCO*’.
- 1.2.5 Appropriate procedures would be followed for surrendering permits, consents and licences following the end of the construction phase.

1.3 Aims and Objectives

- 1.3.1 The overarching aim of the WMP is to set out the good practice measures that would be employed to reduce impacts on water during the construction of the pipeline and to maintain positive working relationships with local communities, the relevant planning authorities, the Environment Agency and the LLFA.
- 1.3.2 Water includes surface water systems such as rivers and watercourses, and groundwater resources such as aquifers. The WMP covers measures in relation to flood risk, water quality (including pollution prevention) and geomorphology (and other considerations in line with the Water Framework Directive).
- 1.3.3 The objectives of the Outline WMP are to define:
- the contents and scope of the final WMP;
 - the existing good practice measures in relation to water, ~~as set out within the Register of Environmental Actions and Commitments (REAC) in ES Chapter 16 (Application Document APP-056)~~; and
 - where details will be set out in the final WMP.
- 1.3.4 The Outline WMP relates only to the construction of the project, as there are no significant effects during operation.

1.4 Roles and Responsibilities

- 1.4.1 Overall roles and responsibilities for the project will be presented in the final CEMP. The main roles and responsibilities specific to the Outline WMP are set out in Table 1.1 along with the specification for the roles where applicable. The final WMP will include further details in relation to organisational structure and the individuals with specific responsibilities.

Table 1.1: Roles and Responsibilities

Roles and specification	Responsibilities
Environmental Manager	Responsible for producing the final WMP and for producing the methodologies for water management on the project. Also responsible for obtaining the approval of the relevant planning authority.



Roles and specification	Responsibilities
Environmental Clerk of Works	Responsible for ensuring the mitigation set out in the final WMP is implemented, for undertaking periodic checks on site, and for investigating dust issues or complaints.

1.5 Structure of the Water Management Plan

1.5.1 The Outline WMP includes:

- Section 2: This contains a summary of the geographical context based on the details set out in Environmental Statement (ES) Chapter 8 (**Application Document [APP-048](#)**) and associated appendices (**Application Documents [APP-102](#) and [APP-107](#)**);
- Section 3: This includes the main body of the WMP, with the good practice ~~commitments, as set out within the REAC in ES Chapter 16 (**Application Document [APP-056](#)**)~~commitments) and details about methods that would be employed to reduce impacts to water during construction;
- Section 4: This outlines the commitments relating to specific aspects of the water environment: abstractions, dewatering and discharges; pollution and erosion prevention measures and flood risk reduction; and
- Section 5: This outlines the site checks and reporting that would be undertaken in respect of water.

2 Geographical Context

2.1 Geographical context and features

2.1.1 The Order Limits pass through different environments including predominantly rural areas to the south of the study area in Hampshire and in the South Downs National Park. The northern parts of the study area are generally more suburban and urban with the Order Limits passing through Farnborough, Frimley, Lightwater and Chertsey.

Surface Water Features

2.1.2 The Order Limits cross a number of watercourses including 16 main rivers, 76 ordinary watercourses including the Basingstoke Canal and Queen Mary Reservoir Intake Canal. Some of these features are crossed using trenchless methods (see [Appendix Annex B](#) in the CoCP ~~(Document Reference 6.4 Appendix 16.1 (3))~~₁, which is in accordance with overarching project commitment O4. The major rivers and water features within the Order Limits that are crossed by trenchless methods (indicated by TC reference) comprise:

- Ford Lake Stream (TC001);
- River Wey (north of Alton) (TC008);
- Basingstoke Canal (TC013);
- Cove Brook (TC016);
- River Blackwater (in Frimley) (TC020);
- Hale Bourne (near Chertsey) (TC022);
- The River Thames (near Chertsey) (TC034);
- Queen Mary Reservoir Intake Canal (TC037); and
- Staines Reservoir Aqueduct (TC038).

2.1.3 Further details on the baseline surface water environment can be found within ES Chapter 8 (**Application Document [APP-048](#)**), ES Appendix 8.6 (**Application Document [APP-107](#)**) and the Flood Risk Assessment (**Application Document [APP-134](#)**).

Groundwater Features

2.1.4 ES Chapter 8 (**Application Document [APP-048](#)**) identified four groundwater study areas (GWSA) which are based on underlying geology and the associated groundwater environment:

- GWSA-A (Boorley Green to Bishop's Waltham) – Within this area there are superficial Secondary A aquifers situated north of Boorley Green. At the northern edge of GWSA-A, the Chalk bedrock is overlain only by Lambeth Group deposits, which if sufficiently permeable could provide a groundwater connection between the Lambeth Group and Chalk.
- GWSA-B (Bishop's Waltham to Crondall) – This area crosses two principal aquifers, the first from Bishop's Waltham to Crondall and the second near Alton. There is also



a Secondary A alluvium aquifer in the vicinity of Alton. Undifferentiated Secondary aquifers are widespread over much of the Chalk south of Alton.

- GWSA-C (Crandall to Chertsey South) – Within this area there are numerous Secondary A aquifers. Beneath this section the depth of the confined Chalk aquifer is considerable and excavations for the pipeline even at the deepest river crossings, would not encounter the confined Chalk.
- GWSA-D (Chertsey South to Esso's West London Terminal Storage Facility) – This area passes over Principal aquifers associated with the Kempton Park Gravel Member and Shepperton Gravel Member. There are Secondary A aquifers associated with the Bagshot Formation and Claygate Member. Several flooded gravel pits are present within GWSA-D, indicating the groundwater is at a relatively shallow depth.

2.1.5 The Order Limits also cross a number of source protection zones (SPZ), mainly in the south of the overall study area. The Order Limits avoid SPZ1 areas associated with licensed abstractions, in accordance with overarching project commitment O6. The Order Limits intercept several other SPZs including as shown on the figure A8.1.6 in ES Appendix 8.1 (**Application Document [APP-102](#)**):

- to the north of Bishop's Waltham (SPZ2 and SPZ3);
- around Ropley and East Tisted (SPZ2 and SPZ3);
- to the south of Crandall (SPZ2); and
- around Chertsey (SPZ 2 & SPZ 3).

2.1.6 Further details on the baseline groundwater environment can be found within ES Chapter 8 (**Application Document [APP-048](#)**) and Appendix 8.3 (**Application Document [APP-104](#)**).

3 Water Management Plan

3.1 Introduction

3.1.1 The project description is set out within ES Chapter 3 (**Application Document APP-043**). This describes the main works that would be undertaken before, during and after installation. In addition, a generic construction methodology has been developed for watercourses and can be found in Section 2.9 of the CoCP (~~Document Reference 6.4 Appendix 16.1 (3)~~). This sets out the methodology for open cut watercourse crossings and installation of vehicle crossing points.

3.2 Good Practice Measures

3.3.1 Esso has made a number of good practice commitments which would reduce impacts on the water environment. ~~These were set out in the REAC in ES Chapter 16 (Application Document APP-056)~~. The commitments are indicated by a reference number, for example (G11). All commitments would be included in the final WMP.

3.3.2 The purpose of the WMP is to provide more information as to how and when the commitments made within the CoCP would apply to the various aspects of the water environment. Many of the measures will apply to more than one aspect, such as the requirement to create buffer zones alongside watercourses which would reduce the risk of sediment entering the watercourse and also reduce the risk of flooding to the works areas. The project commitments that relate to a number of aspects of the water environment are listed in Table 3.1. Commitments relating to a specific aspect, for example managing flood risk, are contained within the following sections.

Table 3.1: Project Commitments Relevant to the Whole Water Environment

Commitment number	Commitment
O1	Commitment to only utilise a 10m width when crossing through boundaries between fields where these include hedgerows, trees or watercourses.
O4	Trenchless crossing technology to be used for crossings of waterways over 30m wide.
G12	There would be no intentional discharge of site runoff to ditches, watercourses, drains or sewers without appropriate treatment and agreement of the appropriate authority (except in the case of emergency).
G28	Construction workers would undergo training to increase their awareness of environmental issues. Topics would include but not be limited to... location and protection of sensitive environmental sites and features; adherence to environmental buffer zones; and flood risk response actions.
G39	Appropriate buffer zones would be established within Order Limits adjacent to identified watercourses.
G122	For open cut watercourse crossings and installation of vehicle crossing points, mitigation measures would include to: <ul style="list-style-type: none"> only use a 10m working width for open cut crossings of a main or ordinary watercourse whilst still ensuring safe working; install a pollution boom downstream of the works; use and maintain temporary lagoons, tanks, bunds, silt fences or silt screens as required; have spill kits and straw bales readily available at all crossing points for downstream emergency use in the event of a pollution incident; place all static plant such as pumps in appropriately sized spill trays; prevent re-fuelling of any plant or vehicle within 15m of a watercourse;

Commitment number	Commitment
	<ul style="list-style-type: none"> inspect all plant prior to work adjacent to watercourses for leaks of fuel or hydraulic fluids; and reinstate the riparian vegetation and natural bed of the watercourse using the material removed when appropriate on completion of the works and compact as necessary. If additional material is required, appropriately sized material of similar composition would be used.
G130	<p>The CEMP would follow the principles set out in the Outline CEMP and would set out the water mitigation and management measures and where they would need to be used. These measures would include, but not be restricted to, the following:</p> <ul style="list-style-type: none"> details of when dewatering would be likely; measures to segregate construction site runoff from natural catchment runoff; details of measures to attenuate runoff rates before discharging at controlled rates to receiving watercourses; design of any holding or settlement lagoons or other treatment system required prior to discharge to the environment; details of mitigation measures for all work or compound areas located within flood risk areas; where construction activities would be located, preferably outside of the floodplain; and details of any water abstraction and discharge points relating to the works.

3.3.3 Commitments O1 and O4 form part of the guiding principles set out at the inception of the project and have been incorporated into the design and construction methodologies. Commitments G12 and G122 relate to construction measures designed to protect the surface water environment from sedimentation, erosion, pollution effects and increasing flood risk.

3.3 Construction Programme

3.3.1 The construction schedule has yet to be developed in detail, as this would be undertaken during the detailed design stage. Details in relation to water management will be added to this section in the final WMP. The following commitments would be factored in when developing the construction programme:

- W5: Topsoil and subsoil would be stockpiled for as short a duration as practicable within Flood Zone 3 and areas of High and Medium Risk of Flooding from Surface Water (RoFSW); and
- W8: Works in the Cove Brook flood storage area would be scheduled taking advantage of long-term forecasts making use of dry weather conditions.

3.3.2 There would also be flexibility built into the programme to allow for unplanned events such as heavy rain. Areas of particular susceptibility to flooding would be highlighted here in the final WMP.

3.4 Pre-construction Commitments

3.4.1 Licences and Consents: Several activities and measures would take place prior to the main construction works commencing. These include applying for consents and licences (or approvals as per the DCO protective provisions for flood risk activities) prior to the works to which those licences apply commencing. The contractor(s) would comply with all relevant consent conditions or DCO provisions regarding flood risk

activities, de-watering and other discharge activities. This would particularly be with regard to volumes and discharge rates and would include discharges to land, waterbodies or third-party drains/sewers (G128). Many such licences would require drainage to be set up prior to commencement of the main construction works. How the different types of licences would be managed would be outlined within this section of the final WMP although the full detail of the proposed licences and consents may not be available.

3.4.1 The preferred construction method for crossing the Blackwater Valley would be a trenchless crossing, however, the method cannot be confirmed until further investigations and detailed design have been concluded. Therefore, both options (Open Cut / Auger bore or Horizontal Directional Drilling) were assessed within the ES and included within the scope of the project.

3.4.2 Appendix B1 to the Water Management Plan has been produced in order to provide an outline methodology if the Open Cut/Auger bore option was chosen at this location. A more detailed methodology would be provided as an appendix to the final Water Management Plan. Esso will implement protection measures set out in the methodology if it adopts the Open Cut/Auger bore option.

3.5 Site Planning and Set Up

3.5.1 There would also be planning of the construction site layout. This will include identifying the buffer zones around at watercourses outside the 10m working width (O1) to a distance from the bank appropriate to the location (G39). The buffer zones would be dependent on factors such as avoiding areas of floodplain and sensitive bank or instream features. Measures to protect and delineate the buffer zones would be set out in the final WMP.

3.5.2 This section of the final WMP will also set out how the contractor proposes to set out the works, including temporary construction compounds and logistics hubs, taking into account the following commitments. These commitments are explained in greater detail under the relevant headings in ~~section~~Section 3.3:

- G184: ~~Stockpiles would not be located within 10m of any main rivers or ordinary watercourse~~ crossings~~crossings~~;
- W1: ~~The extent of Flood Zone 3 and areas of RoFSW would be identified and marked where~~ appropriate~~appropriate~~;
- W2: ~~Screening and fencing within logistics hubs and construction compounds would be designed to reduce the impedance of flood water. This would be subject to any commitments regarding Great Crested~~ Newts~~Newts~~;
- ~~W3: Temporary buildings within Flood Zone 3 and areas of High and Medium RoFSW would be elevated above the 1 in 10 (10%) annual exceedance probability event peak water level, or a minimum of 300mm if this is not practicable~~;
- W15: ~~Construction Compound 33 (DCO Works No 5A) would be sized and located so that it does not sit within FZ3 or within 8m of the top of bank of the~~ watercourse~~watercourse~~;



- W16: 'The project would raise temporary buildings to a maximum of 1m above ground level which is above the 1%AEP (1:100 year) event at the Mead Lane Construction Compound (DCO Works No 5N) and
- W17: 'The project would locate any temporary buildings outside of FZ3 at the Shepperton Road North Construction Compound (DCO Works No 5P) and

3.5.3 In addition, the final WMP would include how the bullets under Commitment G130 would be implemented for the project. These include providing details on:

- design of any holding or settlement lagoons or other treatment system required prior to discharge to the environment;
- details of mitigation measures for all work or compound areas located within flood risk areas;
- where construction activities would be located, preferably outside of the floodplain; and
- details of any water abstraction and discharge points relating to the works.

3.5.4 As part of the site planning, construction activities would be located outside of the floodplain unless necessary. Locations of water sources and discharge locations would be identified and set out within this section of the final WMP. Activities that are likely to require water during construction include general water consumption in the use of site cabins and for general cleaning and dust suppression and also during hydrostatic testing of the pipeline prior to commissioning. This section will set out how water would be sourced (mains or tankers) and also how any water would be discharged from the site, for example to the local sewer network. Good practice measures for water conservation would be identified, such as using water-efficient taps, assessing whether water can be reused, and regular checks to hoses for water leaks.

3.5.5 As part of the pre-construction activities, there will also be negotiations with landowners to identify active private water supplies within the Order Limits (G144). This section of the final WMP would set out the procedure for identifying and managing private water supplies within the Order Limits including the procedure for contacting landowners and tenants and arrangements for providing an alternative water supply as appropriate if the private water supply is affected in accordance with Commitment W12.

3.6 Training for Construction Staff

3.6.1 The final WMP will contain details of training and toolbox talks for staff in relation to reducing dust impacts during works. This would be in accordance with Commitment G28: 'Construction workers would undergo training to increase their awareness of environmental issues. Topics would include [...] location and protection of sensitive environmental sites and features; adherence to environmental buffer zones and flood risk response actions.'

4 Specific Aspects of the Water Environment

4.1 Introduction

4.1.1 This section outlines the commitments and actions relevant to the different aspect of the water environment. The good practice commitments are outlined upfront in each section and then further information is presented about how these would be implemented. It is split into the following three aspects:

- abstractions, dewatering and discharges;
- pollution and erosion prevention measures; and
- flood risk reduction.

4.2 Abstractions, Dewatering and Discharges

4.2.1 This section of the final WMP would set out any requirements for abstraction, dewatering and discharges. The project commitments relevant to abstractions, dewatering and discharges are presented in Table 4.1.

Table 4.1: Project Commitments Relevant to Abstractions, Dewatering and Discharges

Commitment number	Commitment
O7	Where required, water stops (or “stanks”) would be installed at intervals through the pipe bedding and side fill.
G118	The detailed design for Horizontal Direct Directional Drilling would include depth and profile and consider methods to reduce the risk of groundwater breakout during Horizontal Direct Directional Drilling.
G128	The contractor(s) would comply with all relevant consent conditions or DCO provisions regarding dewatering and other discharge activities. This would particularly be with regard to volumes and discharge rates and would include discharges to land, waterbodies or third-party drains/sewers.
G132	The contractor(s) would ensure that the time the trench is open in the vicinity of certain features would only be as long as necessary for the installation of the pipeline. The required dewatering of the trench would be undertaken only as and when necessary to enable safe working and preparation for pipe installation.
G134	Temporary stanks would be installed within the trench prior to undertaking dewatering/draining activities, to prevent migration of water within the trench.
G135	Where localised water abstraction is required, assessments would be carried out to investigate impact. Appropriate working and suitable mitigation would be implemented.
G138	Water levels would be monitored immediately prior to and as dewatering takes place. This would be in the potentially affected abstraction or watercourse as appropriate.
G143	The quality of water generated by dewatering would be tested prior to discharge.
G144	As part of negotiations with landowners within the Order Limits which are affected by the project, active private water supplies (PWSs) would be identified with the landowner. Appropriate mitigation would be considered during construction.
G199	Specific areas in the vicinity of GWDTes would be identified where increased frequency of stanks would be required to safeguard sensitive habitats which depend on groundwater.
W11	Dewatering would be limited in areas in the vicinity of GWDTes where abstraction/drainage of shallow groundwater may lead to a fall in groundwater levels or adversely affect surface water quality.
W12	For private water supplies (PWS) the following would be put in place: <ul style="list-style-type: none"> • In the event of a landowner or tenant complaining that installation activities have affected their PWS, an initial response would be provided within 24 hours.

Commitment number	Commitment
	<ul style="list-style-type: none"> Where the installation works have affected a PWS, an alternative water supply would be provided, as appropriate. In the event of a significant spill during construction: <ul style="list-style-type: none"> all landowners/tenants would be contacted within 24 hours, within 250m of the spill, to determine if there are any PWS that might be affected; an assessment of the likelihood of groundwater contamination supplying identified PWS would be undertaken; where requested by the relevant landowner, monitoring of well water would be undertaken for a determined period of time, taking into account pollution travel time in groundwater, to determine whether pollution has occurred; and where a PWS is affected, an alternative water supply would be provided, as appropriate.
W13	Temporary sheet piling or similar for control of groundwater would be put in place at the following trenchless crossings: TC 014, TC 015, TC 020, TC 023, TC 031, TC 032, TC 036, TC 037, TC 040 and TC 042, unless a detailed assessment is undertaken which demonstrates that no building or infrastructure is at risk of differential settlement.
W14	<p>Temporary sheet piling or similar for control of groundwater would be put in place at the following locations unless a detailed assessment is undertaken which demonstrates that no building or infrastructure is at risk of differential settlement:</p> <ul style="list-style-type: none"> Near the junction of Roakes Avenue and Canford Drive, Chertsey (TQ048657). Southeast of Jubilee Church, Chertsey (TQ049658). Junction of Chesterfield Road and Woodthorpe Road, Ashford (TQ059716). To the southwest of the Esso West London Terminal storage facility, West Bedfont (TQ068733).

4.2.2 At the present time, dewatering is anticipated:

- in areas where groundwater levels mean that the trench may contain water during excavation;
- following periods of heavy rainfall; and
- during shaft construction at trenchless crossings.

4.2.3 Appendix 8.2 of the ES (**Application Document APP-107APP-103**) identifies shafts which will potentially require dewatering and open cut sections running parallel to rivers. The final WMP will identify where dewatering is likely to be required. Dewater licence applications to the relevant authorities will set out the volumes anticipated based on the detailed design and construction methods.

4.2.4 This section of the final WMP would also set out details regarding when and where additional dewatering measures would be put in place to reduce the risk of dewatering affecting the surrounding environment.

4.2.5 Dewatering of watercourses for the purposes of open cut crossings is not covered in this section as it is not expected to be required. Fluming or similar techniques would be used to maintain water flow during installation which will be presented within the CEMP. This is discussed further in the ES in Chapter 8 (**Application Document APP-043 and Appendix 8.2 (Application Document APP-107).APP-048 and Appendix 8.2 (Application Document APP-103).**

4.2.6 Commitments O7 and G134 relate to the installation of water stops (or stanks) along the route which are designed to reduce the flow of groundwater along the pipeline once

it has been backfilled. Such locations could include where the trench crosses a GWDTE such as at Bourley and Long Valley Site of Special Scientific Interest (SSSI) or in areas expected to have shallow groundwater such as in GWSA-D. A table of proposed locations would be presented in the final WMP. These commitments also link into the location-specific G199 and W11 discussed below. Commitment G118 commits the project to incorporate groundwater control into the detailed design of horizontal directional drilling thus reducing the reliance on further measures during construction. Reference would be made here to the methodologies incorporated.

- 4.2.7 Commitments G12, G128, G132, G135, F138, G143 and G199 are all general good practice measures to be followed during construction and would be incorporated into dewatering methodologies. There are certain features (as mentioned in commitment G132) that would be particularly vulnerable to changes in groundwater levels such as:
- groundwater dependent terrestrial ecosystems;
 - shallow groundwater abstractions;
 - watercourses running parallel to the pipeline; and
 - unconfined chalk principal aquifers.
- 4.2.8 Commitments G144 and W12 relate to the safeguarding of private water supplies from possible changes in groundwater during dewatering activities. In the case of mitigation being required, measures that could be implemented to meet the commitments could include the installation of temporary sheet piling or similar barriers to reduce the flow of groundwater.
- 4.2.9 Commitment G199 and W11 are very specific measures designed to limit the effects of alterations in groundwater levels within groundwater dependent terrestrial ecosystems such as Bourley and Long Valley SSSI.
- 4.2.10 Several areas have been identified that may have a higher risk of differential settlement. These comprise:
- near the junction of Roakes Avenue and Canford Drive, Chertsey (TQ048657);
 - southeast of Jubilee Church, Chertsey (TQ049658);
 - junction of Chesterfield Road and Woodthorpe Road, Ashford (TQ059716); and
 - to the southwest of the Esso West London Terminal storage facility, West Bedfont (TQ068733).
- 4.2.11 Commitment W14 highlights a possible need for further investigation or mitigation in these locations during construction. Typical measures to be used would be presented in the final WMP.

4.3 Pollution and Erosion Prevention Measures

- 4.3.1 This section of the final WMP would set out any requirements for pollution and erosion prevention. As pollution prevention and erosion control measures are often the same or very similar, the Erosion and Sediment Control Plan, described as Appendix B in the Outline CEMP submitted at application, is incorporated into this section of the WMP

~~(Document Reference 8.51)~~. The project commitments relevant to pollution and erosion prevention are presented in Table 4.2:

Table 4.2: Project Commitments Relevant to Pollution and Erosion Prevention Measures

Commitment number	Commitment
G11	Runoff across the site would be controlled by the use of a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding.
G12	There would be no intentional discharge of site runoff to ditches, watercourses, drains or sewers without appropriate treatment and agreement of the appropriate authority (except in the case of emergency).
G15	Wheel washing would be provided at all logistics hubs and large compound access points on to the highway. An adequate supply of water would be made available at these locations at all times.
G16	Compound access points to the public highway would be constructed with temporary hard surfacing.
G20	Water assisted road cleaners would be deployed on public roads where necessary to prevent excessive dust or mud deposits.
G117	Wash down of vehicles and equipment would take place in designated areas within construction compounds. Wash water would be prevented from passing untreated into watercourses and groundwater. Appropriate measures would include use of sediment traps.
G119	Potentially hazardous materials used during construction would be safely and securely stored including use of secondary containment where appropriate.
G121	All refuelling, oiling and greasing of construction plant and equipment, would take place above drip trays and also away from drains as far as is reasonably practicable. Vehicles and plant would not be left unattended during refuelling. Appropriate spill kits would be made easily accessible for these activities.
G122	For open cut watercourse crossings and installation of vehicle crossing points, mitigation measures would include to: <ul style="list-style-type: none"> only use a 10m working width for open cut crossings of a main or ordinary watercourse whilst still ensuring safe working; install a pollution boom downstream of the works; use and maintain temporary lagoons, tanks, bunds, silt fences or silt screens as required; have spill kits and straw bales readily available at all crossing points for downstream emergency use in the event of a pollution incident; place all static plant such as pumps in appropriately sized spill trays; prevent re-fuelling of any plant or vehicle within 15m of a watercourse; inspect all plant prior to work adjacent to watercourses for leaks of fuel or hydraulic fluids; and reinstate the riparian vegetation and natural bed of the watercourse using the material removed when appropriate on completion of the works and compact as necessary. If additional material is required, appropriately sized material of similar composition would be used.
G142	Fuels, oils and chemicals would be stored responsibly, away from sensitive water receptors. They would be stored >15m from watercourses, ponds and GWDTE.
G183	Natural substrate would be provided through temporary watercourse crossings box culverts.
G186	Where appropriate, cross-fall would be installed on access and haul roads to direct runoff away from the pipeline trench. Runoff would be collected at the side of the haul road and discharged to ground if relevant or to an appropriate nearby watercourse or sewer in accordance with the provisions of the DCO.
G195	Stored flammable liquids such as diesel would be protected either by double-walled tanks or stored in a bunded area with a capacity of 110% of the maximum stored volume. Spill kits would be located nearby.

- 4.3.2 An Outline Emergency Action Plan is included in Outline CEMP Appendix A (~~Document Reference 8.51~~). This would set out procedures to follow should a pollution event occur. The measures set in the final EAP would not be reiterated in the final WMP which deals with prevention.
- 4.3.3 The contractor would prepare method statements that set out how pollution and sediment risk would be managed during construction including pro-active actions and measures to control pollution risks. This could be either directly from the construction works or due to external factors such as extreme weather. Measures would include appropriate storage and handling of fuels and other substances hazardous to the environment in accordance with Commitment G8.
- 4.3.4 These method statements will take account the requirements of the EA and LLFAs as per the protective provisions of the DCO. Details would be included within this section of the final WMP. When developing this section of the final WMP, the contractor(s) will consider the advice set out in the following guidance documents:
- Former guidance for Pollution Prevention (Environment Agency, 2017), various publication dates (accessed via <http://www.netregs.gov.uk>);
 - C650 Environmental Good Practice on Site (Construction Industry Research and Information Association (CIRIA) 2005);
 - C532 Control of Water Pollution from Construction Sites (CIRIA 2001).
- 4.3.5 A construction methodology for watercourses has been produced and is presented within the CoCP at section 2.7 (~~Document Reference 6.4 Appendix 16.1 (3)~~). This outlines how works would be undertaken at watercourse crossings where open cut methods are proposed. It also sets out how works would be managed to reduce the risk of erosion and sediment mobilisation and how watercourses, in general, would be reinstated.
- 4.3.6 Commitments G11, G12 and G186 would be implemented to control water flow and discharge across all construction areas. The methods used to control flows, scour and erosion would be decided by the contractor to be the most appropriate for the location with reference to any relevant licence conditions. Many of these measures would be installed during the initial set up of the construction area, such as the header drains. However, additional measures may also be used during construction for example at times of heavy rainfall. Commitment G186 is important to prevent runoff entering the pipeline trench. Without this commitment, water and associated sediment could potentially flow unimpeded for large distances. If holding or settlement lagoons or other treatment measures were needed during construction then details would be provided within this section of the final WMP.
- 4.3.7 Commitment G122 affords particular protection to watercourses during open cut crossings. During open cut crossing, there is potential for runoff from the main construction strip, river banks and the trench itself and pollutants from onsite activities to enter the watercourse. The measures outlined within commitment G122 aim to capture runoff and pollutants to prevent their entry into the watercourse. In addition, measures are presented to mitigate a spill event such as the positioning of spill kits, booms and other containment devices downstream of the crossing.

- 4.3.8 As part of good site practices, vehicles would be maintained and inspected on a regular basis to prevent and identify any leaks, and refuelling undertaken at designated locations. This would limit any drips and spills from vehicles throughout the project.
- 4.3.9 This section of the final WMP would set out any additional measures to those set out in the CoCP, that would be taken to reduce the risk of erosion. This would include measures incorporated into the design and those implemented during construction.
- 4.3.10 Commitments G15, G16, G20 and G117 are all measures to reduce the effects of vehicles transporting mud and dust from the construction areas and compounds to where it could enter into watercourses. Designated vehicle washing areas would be designed to prevent the release of sediment and other pollutants. Static wheel washers are likely to be used at the larger compounds, but in areas with more limited space, pressure washers could be used, dependent on the ground conditions and whether there is potential to transport mud or dust onto the road. Hard surfacing would be used at compound access points onto the public highway, to prevent muddy areas developing in areas of heavy construction traffic, and road cleaners used to reduce the build-up of mud on nearby roads.
- 4.3.11 Further measures are set out within the Outline Soil Management Plan (**Document Reference 8.51**) and the Outline Dust Management Plan (**Document Reference 8.51**) to avoid the creation of airborne dust or runoff from stockpiles to reduce the risk of silt and soil entering watercourses.
- Soil Management Plan: Outlines the methods for managing earthworks and exposed areas or soil stockpiles to prevent windborne dust, which could end up in watercourses. For example, covering, seeding or using water suppression and considering weather conditions when programming the work; and
 - Dust Management Plan: Outlines methods for wheel washing and road cleaning to reduce the risk of dust.
- 4.3.12 Commitments G119, G121, G142 and G195 all relate to the safe storage and use of potentially hazardous materials and chemicals such as fuel, oils and lubricants. Drip trays and containment measures would be used extensively across the project to capture potential leakages. Storage of flammable liquids would be within double-walled tanks or surrounded by a containment area of 110% capacity which would capture any spillage/leakage in the event of a breach of containment. Operations such as refuelling would be located away from potentially sensitive features.

4.4 Flood Risk Reduction

- 4.4.1 This section of the final WMP would set out any requirements for flood risk management. The project commitments relevant to flood risk are presented in Table 4.3.

Table 4.3: Project Commitments Relevant to Flood Risk

Commitment number	Commitment
G11	Runoff across the site would be controlled by the use of a variety of methods including header drains, buffer zones around watercourses, on-site ditches, silt traps and bunding.



Commitment number	Commitment
G12	There would be no intentional discharge of site runoff to ditches, watercourses, drains or sewers without appropriate treatment and agreement of the appropriate authority (except in the case of emergency).
G123	All works within or adjacent to watercourses would be carried out in accordance with the requirements of permits and licences agreed with either the Environment Agency or relevant Lead Local Flood Authority or in accordance with the provisions of the DCO.
G124	All construction activities within Flood Zone 3 would be undertaken in a manner that reduces any significant increase in flood risk. This may include providing suitable breaks within spoil piles.
G125	With the exception of the Thames floodplain, all construction compounds and logistics hubs would be located outside of Flood Zone 3.
G126	Where new or additional surfacing is required on any access tracks and compound areas, these would be permeable surfaces where ground conditions allow.
G127	The contractor(s) would subscribe to the Environment Agency's Floodline service which provides advance warning of potential local flooding events and subscribe to the Met Office's Weather Warnings email alerts system and any other relevant flood warning information. The contractor(s) would implement a suitable flood risk action plan which would include appropriate evacuation procedures should a flood occur or be forecast.
G130	<p>The CEMP would follow the principles set out in the Outline CEMP and would set out the water mitigation and management measures and where they would need to be used. These measures would include, but not be restricted to, the following:</p> <ul style="list-style-type: none"> • details of when dewatering would be likely; • measures to segregate construction site runoff from natural catchment runoff; • details of measures to attenuate runoff rates before discharging at controlled rates to receiving watercourses; • design of any holding or settlement lagoons or other treatment system required prior to discharge to the environment; • details of mitigation measures for all work or compound areas located within flood risk areas; • where construction activities would be located, preferably outside of the floodplain; and • details of any water abstraction and discharge points relating to the works.
G182	Headwalls to temporary circular culverts would be constructed to the appropriate standard.
G184	Stockpiles would not be located within 10m of any main rivers or ordinary watercourse crossings.
G185	Temporary haul and access road construction material within Flood Zone 3 and areas of High and Medium RoFSW would be removed at the end of the construction phase and the ground surface would be reinstated to pre-project levels.
G186	Where appropriate, cross-fall would be installed on access and haul roads to direct runoff away from the pipeline trench. Runoff would be collected at the side of the haul road and discharged to ground if relevant or to an appropriate nearby watercourse or sewer in accordance with the provisions of the DCO.
G198	The project would incorporate appropriate surface water drainage measures into its final design for the haul roads and access tracks so that they do not lead to a significant increase in flood risk.
W1	The extent of Flood Zone 3 and areas of RoFSW would be identified and marked where appropriate.
W2	Screening and fencing within logistics hubs and construction compounds would be designed to reduce the impedance of flood water. This would be subject to any commitments regarding great crested newts.

Commitment number	Commitment
<u>W3</u>	Temporary buildings within Flood Zone 3 and areas of High and Medium RoFSW would be elevated above the 1 in 10 (10%) annual exceedance probability event peak water level, or a minimum of 300mm if this is not practicable.
W4	Afflux at temporary main rivers and ordinary watercourse crossings would be maintained at less than 100mm.
W5	Topsoil and subsoil would be stockpiled for as short a duration as practicable within Flood Zone 3 and areas of High and Medium RoFSW.
W6	Stockpiles in Flood Zone 3 or areas of High or Medium RoFSW would not exceed 10m between breaks. Breaks in between stockpiles would be at least 1m. Breaks would be located opposite each other on either side of the excavation where practicable.
W7	Stockpiles would not be stored within Ively Brook Flood Zone 3, east of A327
W8	Works in the Cove Brook flood storage area would be scheduled taking advantage of long-term forecasts making use of dry weather conditions.
W15	Construction Compound 33 (DCO Works No 5A) would be sized and located so that it does not sit within FZ3 or within 8m of the top of bank of the watercourse.
W16	The project would raise temporary buildings to a maximum of 1m above ground level which is above the 1%AEP (1:100 year) event at the Mead Lane Construction Compound (DCO Works No 5N).
W17	The project would locate any temporary buildings outside of FZ3 at the Shepperton Road North Construction Compound (DCO Works No 5P).
W18	At WCX007 (as referred to in sheet 4 of the General Arrangement Plans) the watercourse will be crossed using a temporary bridge and there will be no reduction in channel capacity.
W19	There would be no land raising undertaken in locations identified as Flood Zone 3.
<u>W20</u>	<u>No excavated material will be stored within the Cove Brook Flood Storage Area.</u>

- 4.4.2 An Outline Emergency Action Plan is included in CEMP Appendix A ~~(Document Reference 8.51)~~. This sets out procedures and methods to be implemented in the case of unplanned events such as an extreme flood event and would not be duplicated in the final WMP. As part of this, the project has committed to subscribe to flood and weather warnings as outlined in commitment G127. Weather reports will also feature in the prestart brief for each worksite on a daily basis.
- 4.4.3 This section of the final WMP would set out the measures that would be taken to reduce flood risk across the project. It would also outline how the commitments would be implemented during construction and the measures that the contractor would take at specific sites at risk of flooding to avoid storing equipment and materials within the floodplain. The final WMP would contain figures showing the flood outlines where applicable, for temporary construction compounds and logistics hubs and how the site layout has been arranged to avoid flood zone 3.
- 4.4.4 Many of the commitments within this section have been developed during discussions held with the Environment Agency and the LLFAs. As stated within commitment G123, the project would work in compliance with permits and licences issued by those bodies.
- 4.4.5 Many of the measures designed to prevent pollution events and erosion, and presented within the general measures section, are also relevant to the reduction in flood risk. Measures such as commitment G11, G12, G130 and G186 aim to control the movement of water across construction areas. Commitment G130 in particular sets out what water mitigation and management measures would be included within the CEMP and aims to allow for those measures to be captured within the CEMP and hence be

implemented on site. It is the intention of the final WMP to incorporate and expand upon these measures.

- 4.4.6 Commitment G39 states that a buffer zone should be maintained along watercourses which would allow for unimpeded rises in water levels during high water events. Commitments specific to flood risk also seek to use good design to reduce the creation of runoff. Commitment G126 states that permeable surfaces should be used for new surfacing on site so that water permeates into the ground, if it is not already saturated, rather than running off into watercourses. At open cut watercourse crossings, commitment W4 seeks to limit the difference in height between water levels above and below the open cut section to less than 100mm to limit the rate of flow downstream of the works. Commitment G182 controls the design of header walls to limit the build-up of water upstream of culverts during high water events.
- 4.4.7 Commitments G184, W5, W6 and W7 are specifically targeted at controlling the locations of stockpiles across the site but particularly near watercourses, within Flood Zone 3 and areas of high or medium RoFSW. These measures are proposed to reduce the risk that stockpiles inhibit the flow of flood waters or reduce flood storage capacity. To this end, heights of stockpiles and breaks in between are specified. In addition, while installing the open cut pipe through the Cove Brook Flood Storage Area (FSA) excavated topsoil would not be stored within the FSA boundary.
- 4.4.8 Activities within Flood Zone 3 and areas of high and medium RoFSW are controlled by commitments G124, G125, G185, W1, ~~W3~~, W8 and W15. This is to locate activities and storage outside those areas with a greater annual probability of river flooding. The exception to these commitments is the presence of the River Thames Flood Zone 3. This area is considered too large to completely restrict construction compounds but the activities therein would be restricted and outlined in the final WMP. Specific locations such as Meade Mead Lane and Shepperton Lane North construction compounds which have individual flood risk commitments (W16 and W17) and would be detailed more fully in the final WMP.
- 4.4.9 Commitment W15 includes a very specific restriction on size and location for construction compound 33 (Work No. CO-5A). This is located on the edge of Flood Zone 3 near to a watercourse, so the commitment controls its location closely to prevent an increase in flood risk by avoiding works within flood zone 3. Commitment W8 is another specific commitment relating to works in the Cove Brook flood storage area, an area specifically designed to flood. Works would be carefully timed in this area to limit the risk of works in the storage area during a flood event. W20 is also a specific commitment in the Cove Brook Flood Storage Area (FSA) to say that no excavated material would be stored in the FSA
- 4.4.10 Positioning and specification of screening and fencing across the project would be such that flood waters would not be impeded in line with commitment W2.



5 Site Checks and Reporting

5.1 Site Checks

- 5.1.1 The contractor(s) will be responsible for record keeping and site checks during the construction period. The contractor will undertake regular audits and inspection as part of the compliance with the requirements of the final WMP. This will be in addition to the regular environmental inspections undertaken by the Environmental Clerk of Works (ECoW).
- 5.1.2 Table 5.1 in the final WMP will set out the site checks that would be undertaken during construction. Examples are provided in Table 4.1.

Table 5.1: Proposed Checks (for Illustration)

Action	Responsibility	Frequency
<i>Visual inspections to monitor storage of materials, Conformance with the WMP, monitoring weather conditions during soil works and identifying problems and undertaking corrective actions.</i>	<i>Contractor</i>	<i>Once a month and after rainfall exceeding 10mm in 24h.</i>
<i>Checking conformance with the WMP including checking maintenance records for machinery, inspections of refuelling areas and storage of materials.</i>	<i>ECoW</i>	<i>Typically once a week</i>

5.2 Complaints Procedure

- 5.2.1 The complaints procedure would follow the process set out within the final CEMP. A record would be made of the incident for audit purposes. Further details will also be set out within the final Community Engagement Plan.

Appendix B1: Blackwater Valley – Measures Specific to Open Cut Installation

- 1.1.1- Should the open cut option be chosen, then protection measures would include forming a temporary ‘floating’ haul road and work platform across the valley using timber planks and track matting system. The haul road and track matting would be placed directly on top of the topsoil and used to support tracked construction vehicles. This work platform would be used for the welding of the pipe into long lengths and would stretch across from one side of the landfill to the other.
- 1.1.2- Further protection measures would include installing two lines of sheet piles across the landfill from the work platform. In the very wet areas, self-propelled hydraulic sheet pile installation machine units would be used. The sheet piles would have sealed interlocks to create a cofferdam. Once the two rows of sheet piles have been completed and a sealed perimeter created, this would prevent movement of groundwater from the line of the trench to other areas of the valley.
- 1.1.3- The area within the cofferdam would be pumped out and de-watered and the groundwater removed by tanker off-site for disposal at a suitable waste receiving facility. The Applicant would not discharge into any of the local watercourses from the excavation.
- 1.1.4- The trench excavation would then be undertaken from within the sheet pile cofferdam. A pre-arranged bunded area would be created for the excavated trench arising which would then be removed from site using haulage tippers. The work would be undertaken following good practice measures relevant to areas of potential contamination, as stated in items G71, G72 and G74 of Table 4.5 in the Code of Construction Practice.
- 1.1.5- The pre-assembled pipe string on the work platform would then be lowered into the trench. The trench would be backfilled and the sheet piles would be cut down to ground level. The work platform would be dismantled/removed and the material recycled.
- 1.1.6- At either end of the open cut trenched section, would be two shafts for the trenchless techniques that would be created beneath each of the railways and the highway to the west and east. These would be constructed as sealed shafts to reduce the amount of groundwater to be managed.
- 1.1.7- A geological barrier would be installed below ground at the western end of the trench to protect the River Blackwater from any contamination that may exist.