

**A66 Northern Trans-Pennine Project  
TR010062**

**2.7 Environmental Management Plan  
Annex B7 Ground and Surface Water  
Management**

**APFP Regulations 5(2)(a)**

**Planning Act 2008**

**Infrastructure Planning (Applications: Prescribed Forms and  
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**2.7 ENVIRONMENTAL MANAGEMENT PLAN  
ANNEX B7 GROUND AND SURFACE WATER  
MANAGEMENT**

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## **B7 Ground and surface water management**

B7.1.1 This ground and surface water management plan should be read in conjunction with the Landscape and Ecological Management Plan (Annex B1), as they complement and interact with each other.

### **B7.2 Surface watercourses**

B7.2.1 The main hydrological features within or adjacent to each scheme are presented in ES Chapter 14: Road Drainage and the Water Environment (Application Document 3.2) and Appendix 14.1 to Appendix 14.4 (Application Document 3.4).

B7.2.2 A number of other minor ordinary watercourses (ditches) also run through the section. If they take overland flow they are regulated by the Internal Drainage Board, otherwise they are designated as highway ditches.

B7.2.3 Two Surface Water Protection Zones are located within the study area. These are Lowther (Lower) and Tees from River Greta to River Skerne.

B7.2.4 There are protected sites for which water features are a designating feature located across the Project, including the River Eden SAC and the River Eden and Tributaries SSSI. The River Eden SAC will require further mitigation during construction to reflect the sensitive nature of this receptor and functionally linked watercourses.

B7.2.5 Use of best practice and pollution prevention measures described in Section B7.17 of this document will minimise the risk of an incident that could lead to contamination of a surface water.

### **B7.3 Groundwater**

B7.3.1 The Water Resources Act 1991 and amendments prohibit the abstraction of water from any source of supply (e.g. groundwater and surface water) without an appropriate license granted by the Environment Agency and in accordance with the provisions of that license, unless the works are exempt from licensing.

B7.3.2 The Environmental Permitting Regulations (England and Wales 2010 and amends) prohibit the discharge of certain substances (List I and II) into groundwater. Groundwater is defined as “all water that is below the surface of the ground in the saturation zone and in direct contact with the soil or subsoil”.

B7.3.3 The route is primarily underlain by superficial deposits, although bedrock may be encountered in discrete areas within cuttings.

B7.3.4 The Penrith Sandstone underlying the western half of the A66 scheme is a Principal Aquifer utilised for public water supply. The M6 J40 to Kemplay Bank Roundabout scheme is underlain by a Zone III source protection zone, associated with public water supply boreholes in the north of Penrith (outside the study area).

B7.3.5 Two Zone I source protection areas are within the study area of the Stephen Bank to Carkin Moor study area (but not within the red line

boundary), associated with two agricultural boreholes abstracting from Carboniferous limestones (Secondary A aquifers).

- B7.3.6 The groundwater in the western end of the scheme (Penrith to Appleby) is designated in part as a nitrate vulnerable zone.
- B7.3.7 Karst/dissolution susceptible bedrock is located within the route study area; Gypsum/anhydrite deposits within the Eden Shale bedrock in the Kirby Thore to Appleby study area, and limestone bedrock in the eastern schemes (eastern edge of the Appleby to Brough scheme to A1(M) Scotch corner). No major cuttings are anticipated within the Eden Shales or Limestone Members.
- B7.3.8 Twelve licensed groundwater abstractions were identified within the study area of the scheme. In the west, abstractions were primarily from the Penrith Sandstone, and utilised for agriculture or industry. In the east, abstractions were from the Carboniferous limestone and primarily utilised for agriculture or industry
- B7.3.9 Unlicensed private water abstractions are also in the vicinity and the A66 IDT will endeavour to liaise with parties when identified and/or encountered (such as Sleastonhow Borehole).
- B7.3.10 Use of best practice and pollution prevention measures described in section 1.9 will minimise the risk of an incident that could lead to contamination of groundwater.

## **B7.4 Existing flood risk**

- B7.4.1 Environment Agency flood maps and modelling undertaken by the Project indicate that certain areas of the scheme are at risk of flooding. These areas are shown on Figures 14.2: Existing Flood Risk and Figure 14.10 Operational Flood Risk (Environmental Statement Volume 2, Application Document 3.3).

## **B7.5 Construction flood risk management**

- B7.5.1 To minimise the effect of the construction phase, the following flood management measures will be implemented.
- The A66 PC will seek consent from the relevant regulatory bodies regarding works over or within a controlled water course; including those noted in the Development Consent Order. The consultation process will include discussion of the measures that will be implemented to manage flood risks adequately and updated accordingly.
  - The specifics of the consents are documented within the Environmental Consents Register. A draft consents register is provided within the Environmental Management System.
  - The construction areas designated Flood Zones will have signage prominently displayed. Information on the signage will include;
    - A general arrangement drawing demarcating the extent of the flood zone.
    - Measures detailed in points below

- B7.5.2** Mandatory conditions for working within the Flood Zones will include:
- Where practicable, works will cease during flood flows.
  - The A66 PC will distribute suitable weather forecasts to the construction team.
- B7.5.3** The construction team will also utilise the Environmental Agency 5-day flood risk forecast and river level data and implement the following mitigation:
- Where practicable, there shall be no storage of materials, plant or hazardous materials within the Flood Zones
  - Where practicable, no refuelling or scheduled servicing of plant will take place within the Flood Zones
  - Concrete washout facilities will be contained and sited outside the Flood Zones.
  - All construction debris will be removed from any water course immediately.
  - Construction equipment that can be removed, will be removed from the Flood Zones at the end of the working day.
  - All plant will be checked for leakages, at least once a day.
  - All minor plant must be placed on plant nappies
  - Spill kits will be sited adjacent to work areas and on designated site vehicles.
  - Haul roads will be constructed at grade. If ground levels are elevated consent will be sought from the regulator and, potentially, flood compensation will be required.
  - The Project flood modelling outputs should be used to determine flood risk areas and areas where amendments to mitigation may be required.
- B7.5.4** As there is a known risk of flooding, the A66 has registered with the Environment Agency Floodline Warnings Direct service to receive automated telephone and text alerts.
- B7.5.5** The Environment Agency has three levels of flood risk severity:
- Flood Alert: Flooding is possible, the construction team must be prepared.
  - Flood Warning: Flooding is expected. Immediate action is required.
  - Severe Flood Warning: Severe flooding possible. Danger to life.
- B7.5.6** Alerts will be provided to designated persons in the positions detailed in Table 1. This table will be updated by the PC through the detailed design phase, prior to any construction works occurring on site.

Table 1: Template for flood alert responsibility table

Person	Position	Type of alert	Comment	Waterbody:	Postcode utilised for Environment Agency flood warning service
TBC	Section Works Manager	Phone call and text alert	PFEC	TBC	TBC

Person	Position	Type of alert	Comment	Waterbody:	Postcode utilised for Environment Agency flood warning service
TBC	Section Construction Manager	Telephone	SFEC		
TBC	Section Environmental Lead	Telephone			
TBC	Section General Foreman	Phone call and text alert	PFEC	TBC	TBC
TBC	Section Earthworks	Text alert	SFEC		
TBC	Section Environmental Lead	Text alert			
TBC	General Foreman	Phone call and text alert	PFEC	TBC	TBC
TBC	Section Construction Manager	Text alert	SFEC		
TBC	Section Environmental Lead	Text alert			

**B7.5.7** If an Environment Agency flood alert/warning is received the following will be implemented:

- If the alert is received between 0700 to 1900 Monday to Friday the Primary Flood Event Coordinator (PFEC) will alert the team working within the flood plain.
- If the alert is received outside this period the PFEC or designated responsible person will alert the On Call Duty Manager, who in turn will notify the site team.
- If a flood alert is received the construction team will monitor levels in the nearby watercourses and remove non-essential plant and materials from the Flood Zones.
- If a flood warning is received works will cease and all personnel will evacuate the flood zone. Materials and plant, where practicable, will be removed from the Flood Zones
- Works will only proceed on the advice of the PFEC.
- In the absence of the PFEC the Secondary Flood Event Coordinator (SFEC) will take responsibility for their actions.

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## **B7.6 Regulatory consent**

- B7.6.1 The A66 PC will seek authorisation from the relevant regulatory body where permanent or temporary works are:
- Within 9m of a main water course managed by the Environment Agency
  - Raise levels within a flood plain managed by the Environment Agency
  - Within 7m of a water course managed by the Internal Drainage Board
  - Within the confines of an ordinary water course recorded in the protected provisions noted in the Development Consent Order. These assets are managed by the appropriate local authority.
- B7.6.2 Consent specifics will be documented within the Environmental Consents Register. A draft consents register is provided within the Environmental Management System.

## **B7.7 Abstraction from/discharge to controlled waters**

- B7.7.1 Consent under the Water Resources Act 1991 will be obtained for any abstraction from controlled waters including groundwater greater than 20m<sup>3</sup> per day, unless exempt under The Water Abstraction and Impounding (Exemptions) Regulations 2017. Where abstractions are less than 20m<sup>3</sup>/day, abstraction locations will be agreed with the Section 2 Environmental Lead, prior to use and measure implemented to limit impact on ecology.
- B7.7.2 Consent under the Water Resources Act 1991 will be obtained for any discharge, including groundwater, unless otherwise permitted by the Highways Act 1980 or by a regulatory position statement.
- B7.7.3 For temporary discharges less than 3 months of water from excavations to watercourses the PC will comply with the Environment Agency regulatory position statement (<https://www.gov.uk/guidance/dewatering-building-sites-and-other-excavations-environmental-permits>) and the schemes permit to pump regime.
- B7.7.4 Temporary and permanent abstraction and discharges will be agreed with the Environment Agency.
- B7.7.5 Consent specifics will be documented within the Environmental Consents Register. A draft consents register is provided within the Environmental Management System.

## **B7.8 Abstraction from public water supply**

- B7.8.1 Any abstraction from public water supply will be agreed with the local utility provider as required by the Water Resources Act 1991.
- B7.8.2 Consent specifics will be documented within the Environmental Consents Register. A draft consents register is provided within the Environmental Management System

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## **B7.9 Sewage effluent**

B7.9.1 Where direct connection to sewer is not possible or practical, short-term, sewage effluent will be removed from site using a vacuum tanker and disposed in accordance with the Site Waste Management Plan (Annex B2).

## **B7.10 Dewatering excavations**

B7.10.1 Where practicable, water that has collected in excavations will be recovered and reused; otherwise, removed following one of the methods below.

B7.10.2 Pumped via appropriate silt sock to an area of open vegetated ground / excavation / soakaway away from the excavation. Water must be uncontaminated and depending on the location silt may need to be removed using a settlement tank, straw bales or a geotextile membrane / filter. The Environment Agency will be consulted to agree general principles for discharge to ground such as:

- Pumped into a newly created earthworks ditch which will flow into a newly formed attenuation pond prior to discharge to a surface watercourse. Consideration will be given to local groundwater and surface water catchments and flow regimes that may be affected by dewatering design, and discharging the abstracted water to the same groundwater and surface water catchment down gradient of the dewatered element.
- Pumped into the existing highways drainage system with consideration to the final discharge point. Water may need treatment as detailed in section 1.9
- Pumped to sewer. Consent will be required from the sewerage undertaker for discharge to sewer and conditions may be imposed on the water quality that is acceptable.
- Removed from site by vacuum tanker where water is contaminated and the methods above are not suitable. This will be carried out in accordance with the SWMP.

B7.10.3 For all above options, appropriate consents need to be obtained from the relevant stakeholders.

B7.10.4 The project will operate a permit to pump system for temporary discharge of water collected to ensure compliance with Environment Agency Pollution Prevention Guidelines and their regulatory position statement (<https://www.gov.uk/guidance/dewatering-building-sites-and-other-excavations-environmental-permits>). A full list of persons authorised to issue the permits shall be presented in Appendix A once appointed. Pumping rates should be controlled to avoid erosion or scouring of land downslope of the discharge point or watercourse banks/bed.

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## **B7.11 Dewatering underground ducts and chambers**

- B7.11.1 Water that has accumulated in underground ducts and chambers can contain contamination. Where water is heavily contaminated with silt or oil, discoloured or has an unusual odour it will be removed using a vacuum tanker and disposed off site.
- B7.11.2 Light contamination by oil can be removed from the surface using absorbent materials. Water can then be pumped to an open vegetated area away from the duct / chamber under the project permit to pump system.
- B7.11.3 Uncontaminated water will be pumped to an open vegetated area away from the duct / chamber or to surface water (via silt mitigation) under the project permit to pump system. Care will be taken to avoid disturbing silt settled in the base of the duct / chamber, which can be removed once the water has been removed. Appropriate consents will be obtained from the relevant stakeholders.
- B7.11.4 Guidance provided in the Environment Agency Pollution Prevention Guideline PPG20 “Dewatering of Underground Ducts and Chambers” will be followed as good industry practice.
- B7.11.5 The project will operate a permit to pump system for temporary discharge of water collected to ensure compliance with Environment Agency Pollution Prevention Guideline and their regulatory position statement (<https://www.gov.uk/guidance/dewatering-building-sites-and-other-excavations-environmental-permits>).

## **B7.12 Voids treatment protocol**

- B7.12.1 Voids treatment protocol shall be developed by the contractor. This shall set out procedures and measures allowing for targeted investigation and treatment of voids that will reduce impact on groundwater flows.
- B7.12.2 In some instances, grouting may be required to treat voids encountered during earthworks. Furthermore, cutting and slope stabilisation works may involve the use of soil nails, rock anchors and/or rock bolts, all of which involve the use of typically steel reinforcing elements drilled and grouted into the slopes or cutting faces. Appropriate grouting methodologies shall be developed by the contractor and adopted to reduce any risks to the water environment.
- B7.12.3 The results of intrusive and geophysical investigations, and tracer tests where available, shall be considered when developing design solutions.

## **B7.13 Borehole decommissioning**

- B7.13.1 Boreholes used for dewatering, monitoring and ground investigations may be decommissioned at different stages. The decommissioning of the boreholes should be done in a way that mimics the natural geology, or alternatively the entire well/borehole is backfilled with a low permeability material that will prevent significant movement of groundwater through/along the borehole.

B7.13.2 Backfill materials must be clean, inert and non-polluting, and appropriate to the ground and groundwater conditions.

B7.13.3 Decommissioning should be undertaken under the watching brief of a suitably qualified ECoW.

## **B7.14 Underground structures**

B7.14.1 A site-specific foundation works risk assessment for the construction of underground structures and ground improvement works will be conducted. This will be shared with the Environment Agency for consultation. This is also required with respect to land contamination risk management.

B7.14.2 Design of underground structures would require drainage provisions to relieve hydrostatic pressure. These would allow for groundwater flow around the structure.

## **B7.15 In channel working**

B7.15.1 Temporary works to divert watercourses during culvert construction, either by gravity flumes or over pumping will include suitable provisions to pass high flows.

B7.15.2 Appropriate sequencing and domaining of works within the channel, to reduce impacts to surface and groundwater flows to be temporarily diverted downstream of the works area will be sought.

B7.15.3 Species translocation and appropriate mitigation to avoid the injury or death of aquatic species during temporary watercourse diversion will be required. Works should be supervised by an appropriately qualified ECoW and be timed to avoid fish migration and spawning periods.

## **B7.16 Additional mitigation for relevant sensitive surface water and groundwater receptors**

### **River Eden SAC and functionally linked habitats**

#### *Introduction and/or spread of invasive non-native species*

B7.16.1 The introduction and/or spread of invasive non-native species, such as signal crayfish (*Pacifastacus leniusculus*), will be managed through the strict implementation of an Invasive Species Management Plan. Details are provided within the Landscape and Ecological Management Plan (LEMP) (Annex B1) and Working in and Near SAC Method Statement (Annex C1) and should be referred to.

#### *Sequencing of works*

B7.16.2 Appropriate sequencing and domaining of works to reduce impacts to surface and groundwater flows to be temporarily diverted downstream of the works area where required.

### *Protected species of the River Eden SAC*

B7.16.3 A number of the River Eden SAC designating features are protected species, these will require specialised Species Protection Plans and potentially licences to be obtained prior to works commencing. Full details of the mitigation required is outlined in the LEMP (Annex B1) and Working in and Near SAC Method Statement (Annex C1).

### *Maintaining functionality of the River Eden SAC*

B7.16.4 To maintain the processes of the River Eden SAC and its functionally linked habitats, any temporary infrastructure including haul roads and watercourse crossings will be constructed to ensure that the channel and its floodplain, where appropriate, are not adversely impacted. This may include the installation of cross drains under haul roads to allow the conveyance of flow and sediment in flood events, and watercourse crossings to have no interaction with the bed or banks of the watercourse. Any watercourse crossing designs should have appropriate checks conducted by a suitably qualified aquatic ecologist or hydrologist before installation and a watching brief by a suitably qualified ECoW will be required for the construction of these features.

## **B7.17 Pollution prevention measures**

### **General**

B7.17.1 This section details control measures to be adhered to minimise the risk of pollution of the ground or controlled water.

B7.17.2 Where appropriate it takes into account the following Environment Agency Pollution Prevention Guidelines

Table 2: Environment Agency Pollution Prevention Guidelines

Pollution Prevention Guideline Ref	Guide Name
PPG1	General Guide to the Prevention of Pollution
PPG2	Above Ground Storage Tanks
PPG3	Use and design of oil separators in surface water drainage systems
PPG 4	Treatment and disposal of sewage where no foul sewer is available
PPG5	Works and maintenance in or near water
PPG6	Working at construction and demolition sites
PPG7	Refuelling facilities
PPG8	Safe storage and disposal of used oils
PPG10	Highways depots
PPG13	Vehicle washing and cleaning
PPG18	Managing fire-water and major spillages
PPG20	Dewatering underground ducts and chambers
PPG21	Pollution Incident Response Planning

Pollution Prevention Guideline Ref	Guide Name
PPG22	Dealing with spillages on highways
PPG26	Storage and handling of drums and intermediate bulk containers (IBCs)
PPG27	Installation, decommissioning and removal of underground storage tanks (USTs)

B7.17.3 Although these PPGs were withdrawn by the Environment Agency in April 2016 they will still be considered as best practice until suitable replacements are published.

B7.17.4 Relevant CIRIA publications for consideration include:

- Control of Water Pollution from Construction Sites. Guidance for consultants and contractors (C532)
- Control of water pollution from linear construction projects. Technical guidance (C648)
- Groundwater control: design and practice (C750)
- Site guide (C649)
- Site handbook for construction of SUDS (C698).

### Fuel handling and COSHH materials

B7.17.5 Fuel and oil (including mould oil) will be stored in accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001 and fuels and oil will be handled in such a way that risk of pollution is minimised, specifically:

- Fuel and / or oil storage tanks will comply with the Control of Pollution (Oil Storage) (England) Regulations 2001 and will be locked when not in use i.e. outside working hours;
- Storage areas will not be located within 50m of a spring, well or borehole, 20m of site drainage or within Flood Zones or on a gradient;
- Refuelling of mobile plant will not be permitted within 50m of a spring, well or borehole 20m of a watercourse, within 20m of a highway drainage gully or within a Flood Zone;
- Mobile bowsers will be bunded/double skinned and will comply with the Control of Pollution (Oil Storage) (England) Regulations 2001 and will be secured when not in use i.e. outside working hours;
- Trained operatives will carry out refuelling of plant and equipment;
- Plant nappies will be used during refuelling;
- Drums will be stored in bunded areas with a minimum capacity of 25% of the total volume contained within the bund, or 110% of the largest container, whichever is the greater. Where possible these bunds will be fitted with roofs to prevent the collection of rainwater. Individual drums in use will be stored on a drip tray sufficient to contain 25% of the full capacity of the drum;
- Drums will be maintained in a good condition, fitted with lids and labelled to indicate the contents;
- Static combustion engine plant (e.g. compressors, lighting sets) will be integrally bunded or placed on plant nappies;

- Plant will be regularly checked for leaks and will be regularly maintained; and
- Spill kits will be provided;
  - within close proximity to fuel and oil storage areas
  - with plant that is operating in isolated areas
  - welfare facilities.
- In accordance with the Control of Substances Hazardous to Health Regulations 2002, including:
- Storage of COSHH Materials and waste should be in secure, bunded and sheltered area. Waste should be segregated;
- COSHH liquids will not be stored in Flood Zone areas 2 and 3;
- Areas must be supervised and records of materials and waste stored and removed from the area recorded;
- Handling, storage and disposal should be undertaken as described in the Material Safety Data Sheets; and.
- Where possible materials which contain substances from the PC Restricted Substance list should not be used and alternatives sought.

### Sediment management

- B7.17.6 Contamination by sediment from site run off into receiving watercourses is a key risk if not properly controlled throughout the construction of the project.
- B7.17.7 Site run off is made up of two components and are the direct results of heavy rain.
- B7.17.8 The first component is run off from adjoining land that is not affected by the works. Run off from adjoining land will be intercepted by early construction of pre earthwork drained ditches (PED). Where the new road is in a cutting then the PED would be located at the top of the cut. Any water entering this ditch would not require treatment.
- B7.17.9 The second component is run off across the works once topsoil has been stripped. The following control measures will be implemented, where practicable, prior to works to minimise silty runoff entering the surface water systems.
- In accordance with BS6031:1981 Code of Practice for Earthworks, land disturbance will be kept to a minimum and disturbed areas will be stabilised as soon as possible. Soil handling will be undertaken with reference to best practice guidelines.
  - All roads will be kept free from dust and mud deposits.
  - The amount of exposed ground will be kept to a minimum. Where practical stripped areas will be reseeded as soon as possible
  - Retention ponds, forming part of any permanent SUDS, will be dug first where possible and used during the construction period to deal with any surface water and act as sediment control. Additional ponds may also be required following the construction drainage design.
  - Earthworks ditches will be dug, where required, to channel any surface from haul roads into the retention ponds. These will be

minimum gradients and, where required, straw bales or clean stone will be installed to act as check dams. Retention ponds will be constructed, where practicable to allow solids to settle.

- Cut-off drains will be installed around the working areas to intercept uncontaminated surface run off and divert it around and away from the works.
- Earthworks will be programmed to take place during the spring/summer periods, where practicable; particularly in the vicinity of watercourses.
- Run off from excavations will not be pumped directly into watercourses. The Project Permit to Pump system will be adhered to and silt mitigation measures, if required, will be implemented.
- Every effort will be made to prevent water from entering excavations
- Stockpiling of materials will be minimised and essential stockpiles will be located as far away as possible from watercourses.
- No stockpiles should be within floodplains or 10m of watercourses.
- Stockpiles of soil and vegetation should be covered to reduce risk of sediment being washed into surrounding watercourses.
- Surface water management mitigation measures, such as ditches with check dams and silt fencing should be installed at appropriate locations around stockpiles.
- Short term stockpiles will be sealed; further measures will be implemented if necessary.
- Any stockpile in place for an extended period of time will be allowed to re-vegetate naturally.
- Cut off trenches will be installed uphill of soil management areas to divert flows away from potential sources of silt pollution.
- Silt fencing, cut-off ditches and soil bunds will be constructed downslope of excavations, to retain and convey water to adequately sized treatment areas to prevent the ingress of sediment contaminated water.
- Flocculants may be used in conjunction with other mitigation measures. The Environment Agency will be consulted prior to their use.

### Concrete washout

B7.17.10 The A66 PC will instruct concrete suppliers that where practicable, concrete washout activities should be undertaken off site. If required, in emergency circumstances, designated areas will be provided for washing out concrete delivery lorries, concrete pumps and grout lines. These will be located at least 20m away from any ditch or watercourse and will consist of a small skip lined with an impermeable membrane. Concrete will be allowed to harden in the skip before being removed for recycling.

B7.17.11 The washout liquid will be treated to allow safe reuse or discharge.

B7.17.12 Loose cement and/or concrete will be cleared as quickly as possible.

## Maintenance of plant

- B7.17.13 Maintenance of plant, vehicles and equipment will be carried out at least 20m from a watercourse or a drain. Spill kits will be available during all plant maintenance operations and a drip tray will be used to contain any leakage of oil. Where emergency repair is necessary within 10m of a drain, a drain seal will be used to ensure that no contamination enters the drainage system.
- B7.17.14 Any plant, equipment or other vehicle considered a pollution risk will be either repaired or removed from site.
- B7.17.15 The wash down of tools and plant is not permitted within or 20m from a watercourse or drainage cover.
- B7.17.16 Plant will be regularly inspected, serviced and maintained to minimise the risk of leaks/spills. At the end of each working day, driveable plant will be removed from any areas of floodplain.

## Pumping works

- B7.17.17 Pumping works will be controlled to prevent pollution of drainage systems and surface watercourses. In general, small volumes of localised pumping to dewater excavations will be discharged to an area of vegetated ground close to the excavation under the permit to pump system (with appropriate permits/consents obtained, as required) or to surface water (via silt mitigation measures). Measures for prevention of pollution during larger dewatering activities will be agreed with the Environment Agency, refer to Section 11.10 and 11.11.
- B7.17.18 Water with a higher risk of contamination which requires discharge, including groundwater pumped out of pilings during concrete pouring, would be contained and treated using appropriate measures such as coagulation of sediments, dewatering and pH neutralisation prior to discharge.
- B7.17.19 The project will operate a permit to pump system for temporary discharge of water collected to ensure compliance with Environment Agency Pollution Prevention Guidelines and their regulatory position statement <https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-surface-water>

## Mud and dust control

- B7.17.20 Measures for control of mud and dust are described in The Air Quality and Dust Management Plan (Annex B4).

## Protection of water supply boreholes

- B7.17.21 Control measures will be implemented to protect licensed and unlicensed abstractions within the study area of the scheme from water quality or quantity impacts. Exact control measures will be determined based on the geology and hydrogeology in different scheme areas, but will include task specific risk assessments (e.g. piling) and more intensive monitoring (pre, during and post construction).

B7.17.22 Where abstractions are directly impacted by construction operations (Such as British Gypsum abstractions and the Fillybrook spring), appropriate alternative supply will be supplied, in agreement with local stakeholders.

B7.17.23 Use of best practice and pollution prevention measures described in section 1.9 will minimise the risk of an incident that could lead to contamination of groundwater.

## **B7.18 Monitoring**

B7.18.1 The Section Environmental Lead and site team are responsible for ensuring that checks are carried out during the construction phase to ensure works are carried out in accordance with requirements of the environmental good practice, legislation and the requirements of this EMP.

B7.18.2 Visual inspections may be supplemented with quantitative monitoring at sensitive locations. Onsite in-situ monitoring may include the following using visual observation or field measurement devices and should be carried out by a suitably qualified EcoW:

- Oil/fuel
- pH
- Turbidity/ suspended solids

B7.18.3 When required water samples may be sent to an accredited testing laboratory for more detailed analysis. Determinants may include, but not limited to:

- Suspended solids
- Ammoniacal nitrogen
- Electrical conductivity
- Heavy metals
- Petroleum hydrocarbons
- Polyaromatic hydrocarbons
- Volatile organic carbons
- Biological or chemical oxygen demand.

B7.18.4 There are two approaches that may be employed to ensure that mitigation appropriate and maintaining compliance: the methods are:

- Temporal: Baseline water quality monitoring shall be conducted across the project study area prior to construction works to capture seasonal and spatial baseline data. Baseline data and the relevant Environmental Quality Standards (EQS) will be used to create trigger values for construction. The duration of the sampling program and frequency of data collection and the trigger values to be used during construction are to be agreed with the Environment Agency.
- Spatial: Upstream control locations and locations downstream of the construction area will be sampled at the same time so that any change between the two locations can be determined. Frequency of monitoring is dependent upon risk of works and should be agreed with the Environment Agency.

- B7.18.5 The decision of which method will be used is to be decided through consultation with the Environment Agency. All water quality monitoring records will be managed in accordance with the control of records requirements of Environmental management system.
- B7.18.6 Monitoring data collected during construction will be compared to the baseline/control data set to identify any impacts of the development on the surface water environment and to identify any requirement for further remedial measures.

## **B7.19 Emergency measures**

- B7.19.1 Emergency measures are detailed in the Incident Response Plan (Annex D).
- B7.19.2 An emergency response plan would be developed in accordance with Pollution Prevention Guideline (PPG) 21: Pollution Incidence Response Planning<sup>1</sup>. That plan would be communicated to all personnel. Emergency spill control equipment such as spill kits, oil booms and absorbent materials, would be held at appropriate locations on site and within site compounds.

## **B7.20 Water minimisation measures**

- B7.20.1 Water minimisation is to be implemented by utilising the water hierarchy approach to the management of water on site as set in order of preference; the highest options will be adopted where reasonably practicable, but usually a combination of options will be appropriate.
- Eliminate - eliminate water use by identifying if the water-using process or activity is really necessary and/or if there is a cost effective alternative to using water.
  - Substitute – identify and use alternative ‘non-potable’ sources and eliminate inappropriate use of drinking (potable) water. Assess whether rainwater or grey water can be used for the activity/process.
  - Reduce - explore options that improves efficiency, e.g. by regular maintenance of water using equipment (to ensure they are working to maximum efficiency), metering and monitoring supplies, updating fittings and/or processes.
  - Reuse – identify whether water (including grey water) can be treated/filtered for reuse in a process or activity, e.g. wheel washing.
  - Recycle – identify if and where water can be recycled for use offsite
  - Disposal - dispose of excess water legally and responsibly to ensure there is no flooding, pollution or inconvenience to stakeholders.
- B7.20.2 Examples of water conservation measures that will be implemented include:
- Connections to mains water to be metered
  - Construction of attenuation ponds as early as possible to capture run off for re-use.

<sup>1</sup> Although the PPGs were revoked by the EA, they still maintain relevant as best practice guidance until updates are made available.

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- Utilise groundwater that is dewatered from excavations (with appropriate licences obtained)
  - Utilise non-potable water where practicable, i.e. dust suppression
  - Circulate and treat water used for tunnelling and drilling operations
  - Utilise push taps within all welfare facilities
  - Capture and reuse rainwater.

B7.20.3 The aim of the measures is to minimise potable water use and increase non-potable water use where practical.

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## **Appendix A Permit to pump authorised persons**

This appendix will contain a list of the personnel permitted by the PC to issue permits to pump once these have received the required training and approval to issue permits.