

Cambridge Waste Water Treatment Plant Relocation Project
Anglian Water Services Limited

Environmental Statement Non Technical Summary

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1 Introduction

1.1 What is this document?

- 1.1.1 This is the Non-Technical Summary (NTS) of the Environmental Impact Assessment (EIA) that has been undertaken for the Cambridge Waste Water Treatment Plant Relocation Project (hereafter referred to as the 'Proposed Development'). It is provided as a stand-alone document with the full report of the assessment available in the Environmental Statement (ES).
- 1.1.2 The ES provides the environmental information which has been gathered to carry out an assessment of the likely significant environmental effects of the Proposed Development. This NTS presents a summary of the main findings of the EIA undertaken for the Proposed Development, in non-technical language.



Figure 1.1: Architect's sketch of Cambridge WWTP with proposed landscaping

1.2 The Applicant

- 1.2.1 The relocation of the Cambridge Waste Water Treatment Plant is being developed by Anglian Water Services Limited (the 'Applicant').
- 1.2.2 The Applicant is the largest water and water recycling company in England and Wales by geographic area, supplying water and water recycling services to almost seven million people in the East of England and Hartlepool.
- 1.2.3 The Applicant is committed to bringing environmental and social prosperity to the region they serve, through their commitment to Love Every Drop. As a purpose-led business, the Applicant seeks to contribute to the environmental and social wellbeing of the communities within which they operate. As one of the largest energy users in the East of England, they are also committed to reaching net zero carbon emissions by 2030.

1.3 Why is the relocation needed?

- 1.3.1 The relocation of the Cambridge Waste Water Treatment Plant to a new location is needed to enable delivery of housing and other development in North East Cambridge. This area has long been identified as a highly sustainable location for housing and as one of the most suitable sites within Cambridge for redevelopment.
- 1.3.2 The proposed WWTP will treat all waste water from the Cambridge catchment and wet sludge from the wider region as the existing Cambridge WWTP currently does. It will also have the capacity to treat the waste water from the Waterbeach catchment and all anticipated housing growth in the combined Cambridge and Waterbeach catchment area. This is as identified in the housing trajectory included in the First Proposals version of the Greater Cambridge Local Plan (which identifies all anticipated delivery to 2041), with the ability to accommodate further growth to the 2080s and beyond, including the homes within this catchment that will continue to be built at strategic sites (including Waterbeach, North East Cambridge and Cambridge East) beyond 2041.

2 Overview of Proposed Development

2.1 Location of the Proposed Development

Location

- 2.1.1 The main development site for the proposed WWTP is located to the north-east of Cambridge and 2km to the east of the existing Cambridge WWTP. It is situated on farmland immediately north of the A14 and east of the B1047 Horningsea Road in the Green Belt between the villages of Horningsea to the north, Stow cum Quy to the east and Fen Ditton to the south west.
- 2.1.2 A new waste water transfer tunnel would be constructed to transfer flows from the existing Cambridge WWTP to the proposed WWTP and a new final effluent and storm pipeline would be installed from the western side of the proposed WWTP, crossing under B1047 Horningsea Road and arable farmland before discharging via the outfall into the River Cam upstream of Baits Bite Lock.
- 2.1.3 A twin rising main would be installed to transfer waste water to the proposed WWTP from Waterbeach (referred to as the Waterbeach Pipeline), either via the existing works, or direct, depending on the rate of construction of new housing at Waterbeach. This would pass beneath open arable farmland with large fields bordered by farmland tracks, tree belts and hedgerows with mature trees, crossing under the railway and River Cam east of Waterbeach, and the river again east of the existing Cambridge WWTP as well as the A14.

Site Location

- 2.1.4 Figure 2.1 shows the location of the Proposed Development, based on the Scheme Order Limits.

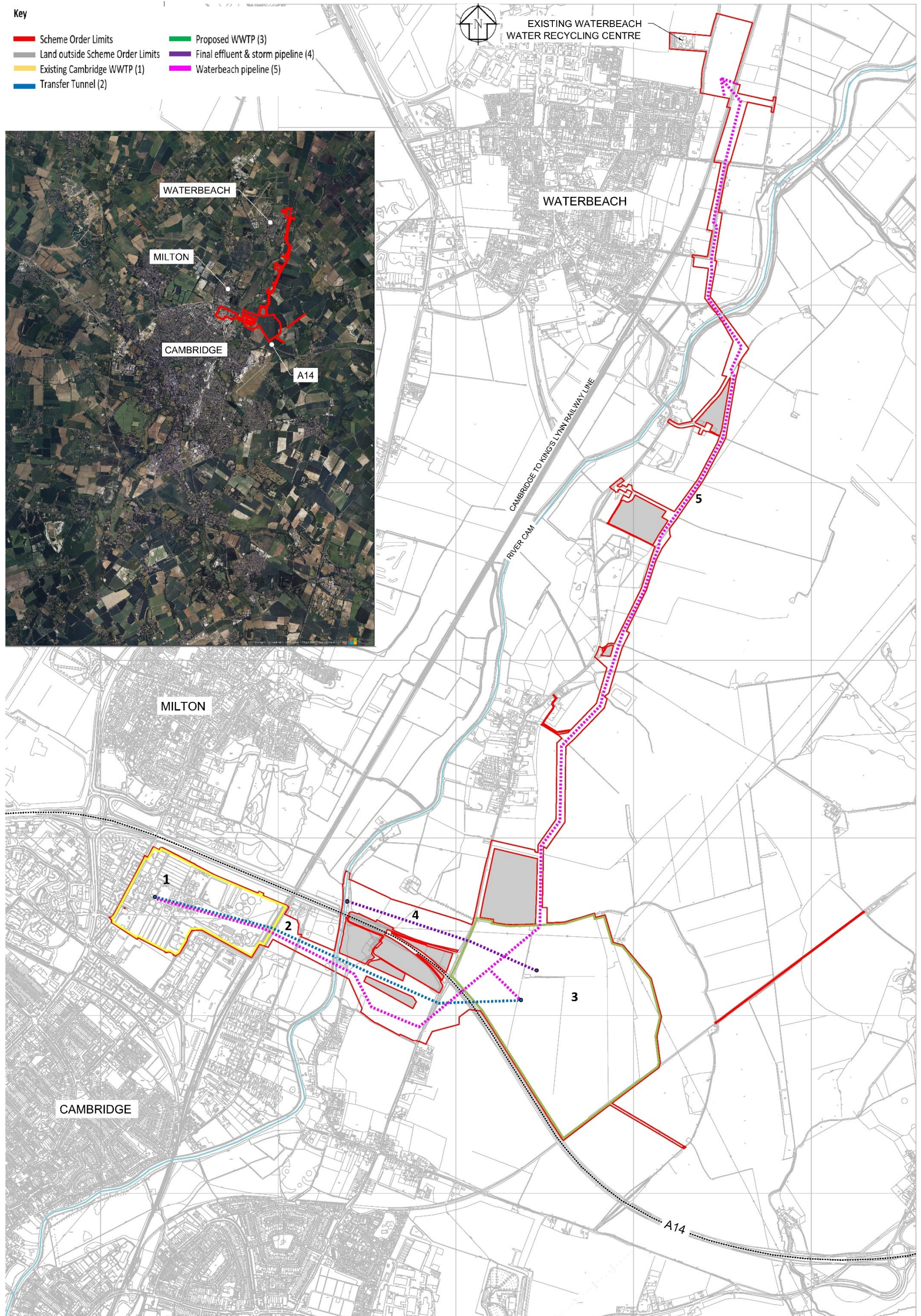


Figure 2.1: Site Location Plan

2.2 What will be constructed and operated?

Overview

2.2.1 A high-level summary of the Proposed Development is provided below:

- an integrated waste water and sludge treatment plant.
- a shaft to intercept waste water at the existing Cambridge WWTP on Cowley Road and a tunnel/ pipeline to transfer it to the proposed WWTP and terminal pumping station. Temporary intermediate shafts to launch and recover the micro-tunnel boring machine.
- a gravity pipeline transferring treated waste water from the proposed WWTP to a discharge point on the River Cam and a pipeline for storm water overflows.
- a twin pipeline transferring waste water from Waterbeach to the existing Cambridge WWTP, with the option of a connection direct in to the proposed WWTP when the existing works is decommissioned.
- on-site buildings, including - a Gateway Building with incorporated Discovery Centre, substation building, workshop, vehicle parking including electrical vehicle charging points, fencing and lighting.
- environmental mitigation and enhancements including substantial biodiversity net gain, improved habitats for wildlife, extensive landscaping, a landscaped earth bank enclosing the proposed WWTP, climate resilient drainage system and improved recreational access and connectivity.
- renewable energy generation via anaerobic digestion which is part of the sludge treatment process that produces biogas designed to be able to feed directly into the local gas network to heat homes, or as an alternative potential future option burnt in combined heat and power engines.
- renewable energy generation via solar photovoltaic and associated battery energy storage system.
- other ancillary development such as internal site access, utilities, including gas, electricity and communications and connection to the site drainage system.
- a new vehicle access from Horningsea Road including for Heavy Goods Vehicles (HGV's) bringing sludge onto the site for treatment and other site traffic.
- temporary construction works including compounds, temporary highway controls, accesses and signage, fencing and gates, security and safety measures, lighting, welfare facilities, communication control and telemetry infrastructure.

- decommissioning works to the existing Cambridge WWTP to cease its existing operational function and to facilitate the surrender of its operational permits including removal of pumps, isolation of plant, electrical connections and pipework, filling and capping of pipework, cleaning of tanks, pipes, screens and other structures, plant and machinery, works to decommission the potable water supply and works to restrict access to walkways, plant and machinery.

Proposed WWTP

- 2.2.2 Figure 2.2 shows the proposed WWTP, with labels and numbers to show the relevant parts of the works and includes a series of arrows which indicate the general flow of plant processes. The numbers on Figure 2.2 below have also been used throughout Section 2 to help with understanding the proposed WWTPs layout.

- Key**
- Direction of Flow**
- Transfer Tunnel
 - Waterbeach Pipeline
 - FE and Storm Pipeline
 - Water Recycling Route
 - Storm Water Route
 - Sludge Treatment Route
 - Gas to Grid Route*
- Water Recycling Centre**
- 1 Terminal Pumping Station
 - 2 Inlet Works
 - 3 Stormwater Management
 - 4 Primary Settlement Tanks
 - 5 Secondary Treatment (ASP)
 - 6 Final Settlement Tanks (FSTs)
 - 7 Tertiary Treatment
 - 8 Final Effluent Chamber
 - 9 Electric Substation & Generators
 - 10 Future Expansion
- Sludge Treatment Centre**
- 11 Sludge Imports
 - 12 Odour Control
 - 13 Cake Storage Barn & Sludge Dewatering
 - 14 Liquor Treatment/ Nutrient Recovery
 - 15 Digesters
 - 16 Post Digesters
 - 17 Flare Stack
 - 18 Gas Holder/Gas Bag
 - 19 Gas to Grid*
 - 20 Boiler Building
 - 21 Heating Pasturisation & Hydrolysis (HpH)
 - 22 Pre-digestion Thickening Plant

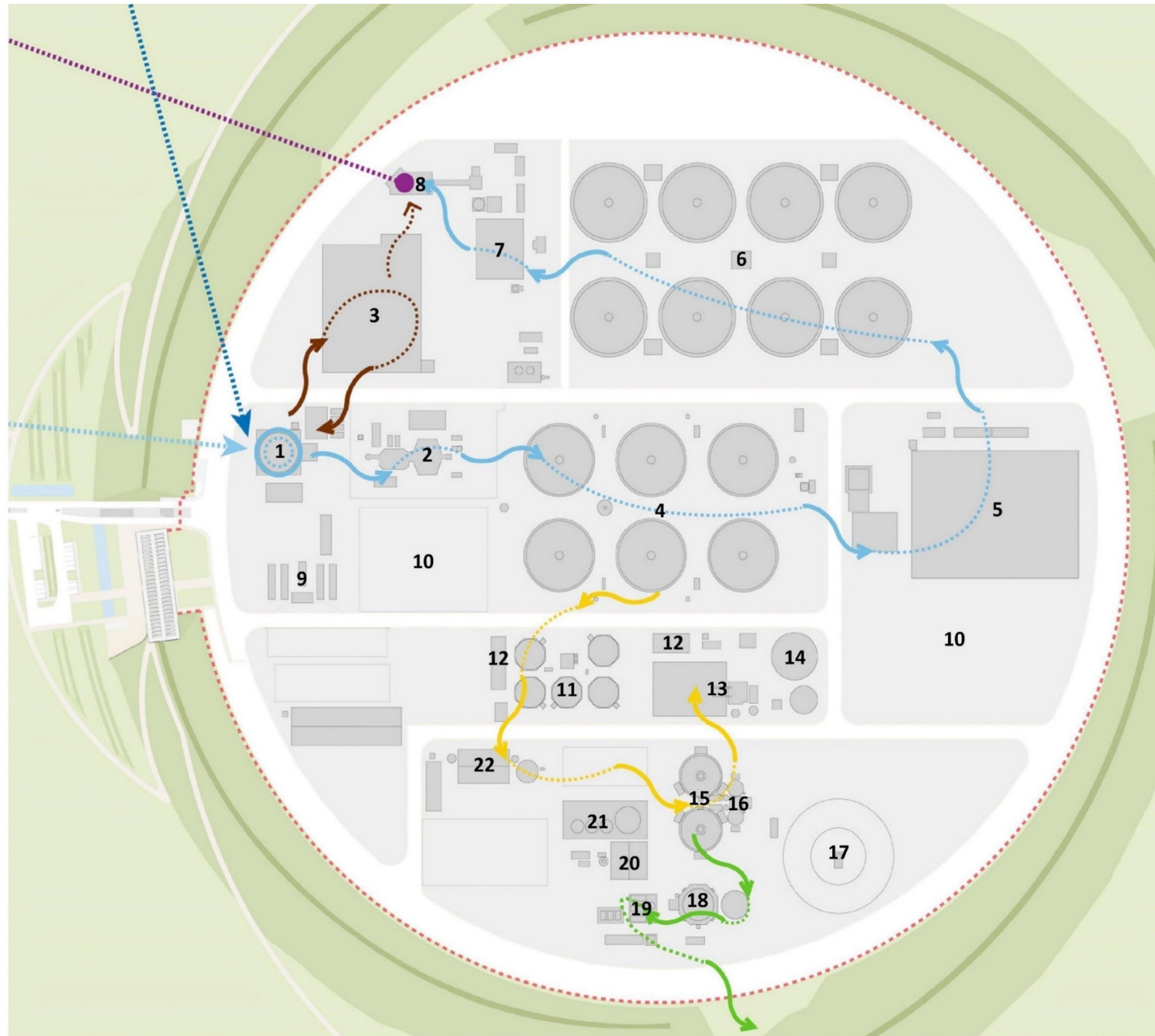


Figure 2.2: Indicative layout of the proposed WWTP showing direction of key process flows (* optionality has been retained in respect of the gas-to-grid elements) proposed WWTP

- 2.2.3 As shown, an on-site terminal pumping station (TPS) (**No.1**) at the end of the waste water transfer tunnel will receive untreated waste water. The TPS will have the capacity to handle both dry weather and storm water flows. Under storm flow conditions some of the flows will discharge into a stormwater management system (**No.3**).
- 2.2.4 The Inlet Works (**No.2**) are often referred to as preliminary treatment. The Inlet Works typically consists of a concrete structure with flow channels, within which the mechanical plant will be installed to screen out solids (such as nappies, face wipes and plastic bags) and remove grit (which results from road runoff) from incoming flows to protect downstream plant and equipment.
- 2.2.5 The purpose of primary treatment is to reduce the suspended solids and organics loads to be forwarded to the secondary treatment. At the primary treatment stage, a large proportion of the solid organic matter is separated from the water by allowing it to gravitate to the base of the primary settlement tanks (**No.4**). The settled solids, referred to as primary sludge, are removed from the tanks by mechanical scrapers directing the sludge to central wells within the tanks, from where it is withdrawn and pumped to the Sludge Treatment Centre (STC) for further treatment.
- 2.2.6 Secondary treatment (**No.5**) is the biological treatment process in which bacteria remove the soluble and poorly settling organic and inorganic fractions of the primary treated sewage effluent.
- 2.2.7 The purpose of the tertiary treatment stage (**No.7**) is to provide the final, finest grade of treatment to ensure the effluent complies with the discharge consent proposed for discharge to the River Cam.
- 2.2.8 As part of discharge consent requirements, the flow is required to enter a treated waste water collection chamber (**No.8**) where it can be sampled for compliance. From there, the flow is conveyed via the final effluent pipeline for discharge to the River Cam.

Final effluent and storm pipeline

- 2.2.9 A final effluent (FE) pipeline and a storm overflow pipe (referred to in combination as the FE and storm Pipeline) will extend from the proposed WWTP to the new outfall located on the east bank of the River Cam, close to the existing outfall location of the existing Cambridge WWTP. These pipelines will be delivered in an open cut method of construction.
- 2.2.10 The FE and storm pipeline corridor extends west from the boundary of the site area crossing Horningsea Road and running parallel to the A14 to a section of the River Cam directly north of the A14 bridge and upstream of Baits Bite Lock. The proposed corridor is in the field to the south of the driveway to Biggin Abbey.

Transfer pipelines

- 2.2.11 Waste water will be transferred from the existing Cambridge WWTP using a new tunnel constructed from an interception point at the existing Cambridge WWTP to the proposed WWTP. The tunnel will have an approximate length of 2.4km
- 2.2.12 The waste water transfer tunnel, from the existing Cambridge WWTP to the proposed WWTP crosses below the existing railway line, the River Cam, B1047 Horningsea Road and the A14 along its route.
- 2.2.13 The tunnel is a gravity system that would be constructed using a micro tunnel boring machine and will require six shafts, sited at connections and changes of tunnel direction and otherwise approximately at 600m intervals, at the following locations:
- interception shaft 1, located at the Cambridge WWTP to intercept the existing incoming 2.12m (internal diameter) tunnel;
 - intermediate shaft 2, located adjacent to the Cambridge WWTP interception shaft and linking to the new tunnel (temporary shaft);
 - intermediate shaft 3, located adjacent to the eastern boundary of the existing Cambridge WWTP, on the west side of the railway (temporary shaft);
 - intermediate shaft 4, located on the eastern side of the River Cam (temporary shaft);
 - intermediate shaft 5, located on the west side of Horningsea Road (the B1047) (temporary shaft); and
 - reception shaft 6, which will accommodate the TPS located at the proposed WWTP.

Waterbeach pipelines

- 2.2.14 Two new pipelines (rising mains) are required from Waterbeach to the proposed WWTP in order to support the development of Waterbeach New Town as there is insufficient capacity within the current Waterbeach WWTP and network to accommodate these new flows. The new town development when built out will comprise some 11,000 new homes along with associated business, retail, community and leisure uses. The new rising mains will also accommodate flows from the existing Waterbeach catchment.
- 2.2.15 A new pumping station will be required within the Waterbeach New Town development area, to pump flows into the new rising mains.

Decommissioning of the existing Cambridge WWTP

- 2.2.16 As part of the relocation process, the existing Cambridge WWTP will be decommissioned once the proposed WWTP is fully operational.
- 2.2.17 Decommissioning will include the draining down and cleaning of existing tanks (including the disposal/treatment of any waste), making the plant mechanically and

electrically safe, preventing heat generating equipment from being operated and prevention of rainwater storage in open top tanks. However, demolition and redevelopment of the existing WWTP site is outside the scope of this DCO application.

- 2.2.18 Following decommissioning, the site of the existing plant will be made available in accordance with agreements already in place with Homes England and with the master developer appointed to deliver the redevelopment of North East Cambridge and will be consented under a separate and future planning permission, by master developers, U+I and TOWN, appointed under the agreements described above.

Utilities connection

Water

- 2.2.19 The potable water supply to the proposed WWTP will be supplied by Cambridge Water. The current proposal is for a new connection from Horningsea Road running adjacent to the new access road.

Gas

- 2.2.20 The STC will require a new gas connection to the national grid network in order to fuel the boilers in case of plant failure. In addition to this, should Gas-to-Grid technology be adopted (**No.19**), the same connection point will be used to inject biomethane to the grid.
- 2.2.21 It is expected that the new gas connection will extend from the STC to the existing intermediate pressure gas pipeline that runs along the north side of the disused railway to the south east of the proposed WWTP.

Electricity

- 2.2.22 The proposed WWTP will be powered by a new electrical supply from UK Power Networks. A new dual 11kV connection from Fulbourn sub-station is proposed. These cables will be buried from the relevant sub-station to the site, following a route that will be defined by the network operator.

Landscape masterplan

- 2.2.23 The proposed WWTP will be surrounded by a new landform from raised embankments forming a circle around the facility, inspired by local hillforts and long linear features such as dykes. This new landform (referred to as the earth bank) aims to screen the majority of the taller structures from all directions. The landscape design aims to integrate the proposed WWTP into its landscape setting and screen the structures of the proposed WWTP in views from the west and south, where it will be most visible. The earth bank and planting are an integral component of the design, following consultation feedback from the early stages of the project, delivering substantial amounts of biodiversity net gain and recreational opportunities, as well as the landscape mitigation which is their primary purpose.

- 2.2.24 The project also includes proposals to create an extension to the ditch network adjacent to the River Cam for the purpose of water vole habitat mitigation and biodiversity unit gain towards the overall project commitment to achieve 20% biodiversity net gain.

2.3 Access

Construction

Access to the proposed WWTP

- 2.3.1 The proposed WWTP is located east of junction 34 of the A14 and north-west of Junction 35 of the A14. The local roads in the vicinity of the site include Horningsea Road to the west, High Ditch Road to the south and Low Fen Drove Way to the north and east.
- 2.3.2 For a limited period of time (approximately three to six months) temporary access to the proposed WWTP site will be required to carry out preparatory works, including the delivery of a permanent access ahead of the main construction activities. This temporary access will use the existing Horningsea Road and Low Fen Drove Way in part. A temporary diversion of the public right of way along Low Fen Drove Way will be required during this period to segregate non-motorised users.
- 2.3.3 There may be a requirement for short term road closures (and associated diversion routing) on Horningsea Road for some limited construction activities, although these would be kept to a minimum.
- 2.3.4 The permanent access off Horningsea Road to the proposed WWTP will incorporate a reconfiguration of the existing junction between the A14 eastbound exit slip road and Horningsea Road into a 4-arm signalised junction, also connecting to a new road to the facility. This is shown in Figure 2.3 below.



Figure 2.3: New four-way signalised junction to access the proposed WWTP

- 2.3.5 Extensive mitigation measures have been established in consultation with the highways authorities and local community which will restrict the route taken by construction traffic and operational HGVs. HGV traffic serving the WWTP will be prohibited from travelling through Horningsea or Fen Ditton villages.

Main access during construction and operation

Access to the proposed WWTP

- 2.3.6 Following the establishment of the access, both main construction traffic and operational traffic will access the proposed WWTP via the reconfigured junction, a two-way access road and a main entrance gateway.
- 2.3.7 A separate entrance for pedestrians and cyclists is located slightly to the north of the vehicle entrance, to segregate pedestrians and cyclists visiting the proposed WWTP from operational vehicle traffic.

Changes to recreational access

- 2.3.8 The green space around the proposed WWTP is not intended as a recreational destination in its own right, and no additional parking is being provided for public access. However, providing pedestrian access to the landscaped area will provide an access to open green space, thereby mitigating impacts of the proposed WWTP on recreational amenity. The Proposed Development's paths will be connected to the wider network of public rights of way, and a new bridleway will formalise access to Quy Fen and Anglesey Abbey.

2.4 Temporary structures

Compounds

- 2.4.1 The main construction compound and project administration building will be located on the main site and adjacent to Horningsea Road. As well as providing accommodation and car parking for project operational, administrative and welfare functions, this compound will provide supplier and material storage and workshop compounds for plant and equipment maintenance areas.
- 2.4.2 For the construction of the main site, the land identified for the proposed WWTP is of sufficient area to accommodate the construction of the proposed WWTP including construction laydown within the permanent footprint of the plant and landscaping.
- 2.4.3 Other components of the Proposed Development, including tunnel development, pipe laying and the new outfall to the River Cam will also require separate construction compounds. Other components of the Proposed Development, including tunnel development, pipe laying and the new outfall to the River Cam will also require separate construction compounds.

River works

- 2.4.4 The new outfall structure will be constructed on the eastern bank of the River Cam. The structure will be built within a sheet pile cofferdam, which is a temporary

watertight enclosure from which water is pumped to expose the bed of a body of water in order to permit construction of this type.

- 2.4.5 Works likely to generate significant sediment, such as the removal of bed material and placement of scour protection within the river, will be carried out behind the cofferdam using appropriate silt and sediment removal techniques to achieve a compliant water quality standard prior to any discharge back to the watercourse.
- 2.4.6 During construction the public right of way along the river will need to be diverted; it is proposed to divert the footpath from the east bank within the adjacent field. Pedestrians will then be diverted back to the river footpath close to where it joins Green End.

2.5 Carbon and climate resilience

- 2.5.1 The Proposed Development has been designed to be energy neutral and be net zero for operational carbon emissions. Significant efforts have been made during the design process to reduce carbon associated with the construction of the proposed WWTP.
- 2.5.2 While flexibility in the design has been retained to allow for changes in energy policy or regulation the preferred design would convert biogas produced by the treatment process and inject it into the local gas network, helping to decarbonise the UK's domestic gas supply.
- 2.5.3 The proposed WWTP has been assessed against climate change scenarios for the 2090s and designed to be resilient to extremes of weather, including storm events. There is flexibility and capacity within the layout of the Proposed Development to respond to both population growth and climate change.

2.6 Programme and phasing

Construction and decommissioning

- 2.6.1 An indicative construction programme has been provided in Figure 2.4 below. The construction of the Proposed Development will be organised into a number of phases, which comprise:
- proposed WWTP site set up and enabling works, including construction of permanent access;
 - laying the Waterbeach Pipeline connection;
 - progressive establishment of landscaping in phases during each planting season;
 - construction and assembly, including all buildings and structures, solar panel installation on roof and inner sides of the earth bank;
 - laying transfer pipelines;

- wet and dry commissioning of the proposed WWTP;
- decommissioning of the existing Cambridge WWTP; and
- laying the diversion of the Waterbeach connection direct to the proposed WWTP and decommission the connection to the existing Cambridge WWTP.

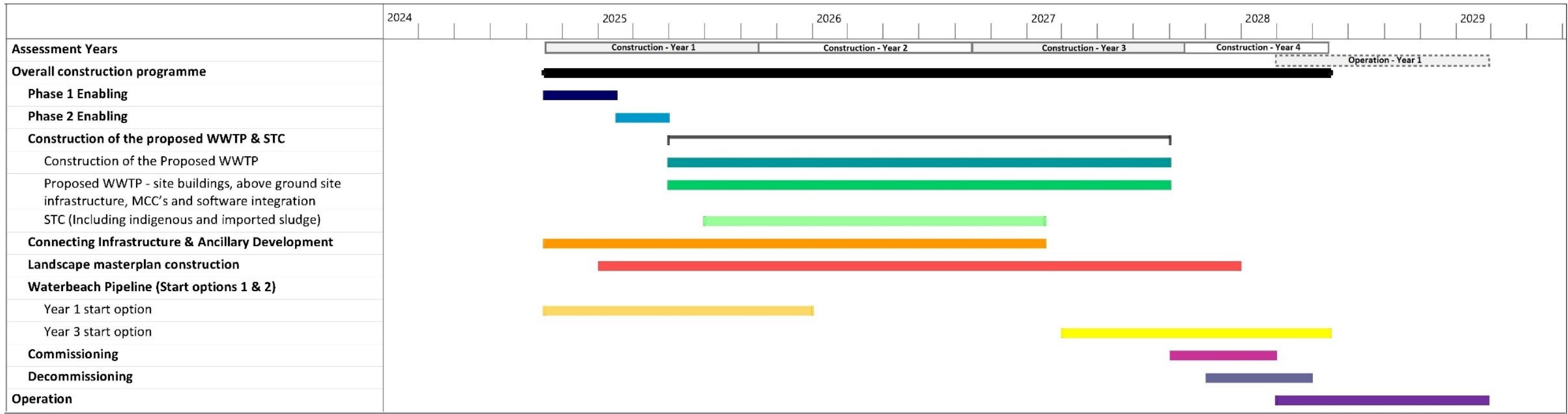


Figure 2.4: Indicative construction programme portraying the Real Worst Case (RWC) scenario of works with assessment years included

Phasing and growth scenarios

- 2.6.2 The Proposed Development is designed for a population equivalent of 300,000, which will be delivered in two phases, and which is consistent with the new Greater Cambridge Local Development Plan growth forecast to 2041.
- 2.6.3 Phase One of the Proposed Development will deliver the replacement for the existing Cambridge facility, providing treatment of flows equivalent to a population of c. 275,000, enough to meet growth predicted in the Greater Cambridge Local Plan to the mid-2030s.
- 2.6.4 Phase Two comprises the installation of an additional primary settlement tank and final settlement tank. These elements of work would be undertaken within a 12-month period, between 2036 and 2050 (and likely before 2041), and would not give rise to significant adverse effects, being broadly similar to the asset replacement activities described in the operation and maintenance section of the Project Description chapter of the Environmental Statement.
- 2.6.5 The proposed WWTP also includes sufficient space to accommodate for expansion beyond the 2041 horizon for housing and population growth covered by the local plan period. This growth would be planned, consented and funded through the usual regulated business processes of Anglian Water Services Limited.
- 2.6.6 Additionally, as described above the proposed WWTP has been designed to be resilient under the UKCIP 2018 extreme weather scenarios, including those under the 2090s scenarios for storm events.
- 2.6.7 The proposed WWTP is therefore designed for a lifespan well into the 2090s is deemed appropriate for the long-term (to beyond 2080) under a spectrum of future climate, effluent quality, and growth scenarios. This expansion could all be accommodated within the earth bank without the need for additional land take.

2.7 Operation and maintenance

- 2.7.1 The Environmental Statement and Development Consent Order set out a broad range of maintenance and operational activities, ranging from minor day-to-day activities to capital asset replacement.
- 2.7.2 The operational working patterns for the proposed WWTP follow a shift pattern to ensure the site is continuously manned, with a skeleton crew present overnight.
- 2.7.3 As described below, the majority of these operational activities will take place within the earth bank and will not give rise to significant environmental effects. Operational traffic will be managed through an Operational Traffic Management Scheme and site lighting will be managed through a Lighting Strategy, both of which will be agreed with the local planning authority.
- 2.7.4 A significant amount of design work has been carried out to ensure that operational odour is minimised as much as possible. An Odour Management Plan will be developed and agreed with the local planning authority to ensure that the good

practice measures on odour management are followed during the operation and management of the proposed WWTP.

3 Environmental Impact Assessment Process

3.1 Site selection and alternatives

3.1.1 The Environmental Statement outlines at Chapter 3 the main alternatives considered by the Applicant during the design process the explains the main reasons for the choice between alternative options. The alternatives to the project which were considered during development and consultation included:

- The need to relocate the existing works
 - A "do nothing" alternative was considered, which would result in the failure to deliver required housing numbers in Greater Cambridgeshire. A co-location option, whereby the existing Cambridge WWTP would be consolidated, was also considered but similarly concluded not to be viable given the need to incorporate odour buffers around any consolidated works.
- Site selection
 - Alternative sites were identified and considered through a four-stage site selection process which included public consultation on a short list of three sites, all located in the Green Belt.
- Site refinement
 - Having selected a preferred site, refinement of the proposed WWTP's location on that site took place, with the preferred siting being that set out on Sheet 2 of the Works Plans (Application Document Reference 4.3.3)
- Landscape design
 - The design and layout of the preferred site was refined further. As described in the Design and Access Statement (App Doc Ref 7.6) a design vision and environmental objectives informed the development of a "rotunda" design, utilising retained excavation spoil to construct a landscaped feature (round bund) in the local environment, inspired by local dykes and hillforts
- Tunnelling and pipeline routeing and construction
 - The site selection process was based on an indicative route corridor for the Waterbeach pipeline, the transfer tunnel from the existing Cambridge WWTP to the proposed WWTP and the final effluent and storm pipelines to the outfall on the River Cam. Following the more detailed siting of the proposed WWTP outlined above the location of the infrastructure within this corridor was refined, drawing on further studies including ground investigations.

- Treatment technology selection including odour management
 - The preliminary site selection process assumed that the proposed WWTP would utilise a treatment process which balanced energy use, carbon emissions, footprint size and reliability, giving rise to around a 22ha footprint for a new treatment plant of the required capacity. Following site selection this assumption was backchecked and the choice of broad treatment approach and 22ha footprint was confirmed.
 - The detailed selection of treatment processes was carried out through a series of “Risk, Opportunity and Value” (ROV) studies and workshops which considered the options available for the main elements of the treatment works to take forward for assessment as part of the EIA process. The odour management features and measures incorporated into the project are discussed in more detail at Section 4.13 below.
- Traffic access arrangement
 - The access arrangements for the selected site considered during site selection utilised either an access from the north of Low Fen Drove Way or via the south-west, from junction 35 of the A14.
 - Following site selection further highways assessment and design was carried out and three options for the construction and permanent access were presented at the second stage of public consultation, including an additional option of the construction of an entirely new junction on the north side of the A14 only, between the current junctions 34 and 35.
 - At the second stage of consultation, National Highways and Cambridgeshire County Council confirmed that allowing access directly from the A14 would be contrary to Department for Transport policy, stating that Option 3 would only be acceptable where there were no viable alternatives and a need for a new junction off the Strategic Road network could be evidenced. The Applicant carried out a traffic assessment and undertook a detailed, wider appraisal, assessing the 3 options against numerous criteria and concluded that providing access off Junction 34 represented the optimal solution. This option was refined further to develop the access arrangements outlined at Section 2.3.4 above.
- Landscape evolution, building heights and finishes
 - Following the second stage of consultation, the landscape design, building heights and building finishes were evolved further to minimise potential landscape and visual impacts. Alternatives considered included increasing the height of the earth bank, the use of an engineered screen on the top of the bank, compared with a

planted screen, and different colour palettes for the treatment of the finishes of buildings and structures.

- The Applicant, in response to consultation responses and other factors, including cost, adopted a design incorporating a 5m tall earth bank with a planted screen and a palette and selection of materials was established in reference to the surrounding landscape. This is discussed further in the Design and Access Statement (App Doc Ref 7.6).

3.2 Consultation

3.2.1 The Proposed Development has a wide range of stakeholders (including landowners, statutory consultees, non-governmental organisations, local communities and specialist interest groups) with differing interests that require varied levels of engagement.

3.2.2 Stakeholder engagement for the Proposed Development has been based on the following principles:

- early, collaborative and ongoing engagement to inform and influence the design process;
- seeking an appropriate level of feedback in the iterative design process and ensuring that comments received are taken into consideration;
- building of long-term relationships with key stakeholders to help better understand their views;
- where possible and practicable ensuring concerns are addressed; and
- ensuring appropriate statutory consultation is undertaken in compliance with requirements of the Planning Act, EIA Regulations and associated guidance.

3.2.3 There were three phases of consultation, namely:

- Phase One Consultation: non-statutory community consultation on site selection between 8 July and 14 September 2020;
- Phase Two Consultation: to seek views on the emerging proposals for the new site, including mitigation measures over eight weeks between 23 June and 18 August 2021; and
- Phase Three Consultation: to seek feedback on the final design and mitigation proposals for the Proposed Development as well as publishing and inviting comment on the Preliminary Environmental Impact Report between 24 February and 27 April 2022.

3.2.4 A fourth, supplemental and targeted, phase of consultation took place in July 2022 on small amendments to the project's order limits but this was not material to the EIA process.

- 3.2.5 In addition, Technical Working Groups covering topics such as Traffic and Access, Biodiversity and Ecology, Water Resources, Landscape and Heritage, Public Rights of Way and Environmental Health were established to discuss key impacts, constraints and design changes. The dialogue created between the Applicant and technical consultees enabled the Applicant to consider feedback on the iterative design of the Proposed Development.
- 3.2.6 Community Working Groups were also established to engage with and provide updated information with representatives of the community on an ongoing basis. Matters discussed included the siting, design and impacts associated with the Proposed Development within and around the chosen site area (including mitigation and enhancement measures). In addition, the decommissioning of the existing Cambridge WWTP and the routing of the transfer tunnel from Milton to the proposed WWTP were discussed, focusing on specific issues raised during consultation regarding construction works required for this, such as tunnelling, traffic and access.

3.3 Design Envelope

- 3.3.1 The Applicant is seeking a level of flexibility in the design and delivery of the proposed WWTP. This flexibility is provided by the use of a design envelope. Seeking design flexibility within an assessment envelope reduces commercial risk (by allowing final detailed design solutions to be explored once consent has been obtained) and is intended to avoid future, time-intensive, formal variations to the DCO which might otherwise be needed to accommodate differing designs.
- 3.3.2 The approach of assessing a design envelope (also known as a “Rochdale envelope”) is common practice, as set out in PINS Advice Note Nine.
- 3.3.3 The flexibility provided by the Rochdale Envelope approach enables optimisation through detailed design whilst providing the level of information sufficient to enable the likely significant effects on the environment to be assessed, and the mitigation measures to be developed and described, in accordance with the EIA Regulations.
- 3.3.4 The approach to the Design Envelope is described in detail in Chapter 2: Project Description of the Environmental Statement (App Doc Ref 5.2.2.). A summary of the main areas in which flexibility is sought is set out in Table 3-1 below

Table 3-1: Main elements of the project where flexibility is sought

Item	Flexibility sought
Numbers, heights, appearance and location of buildings and structures within the proposed WWTP	<p>Flexibility of the location of buildings and structures is sought through the application of limits of deviation shown in the Works Plans (App Doc Ref 4.3).</p> <p>Flexibility of the number, height and depth of buildings and structures and their materials and finishes is sought through the Development Consent Order. The relevant parameters set out in Schedule 14 of the DCO have been assessed under the Rochdale principles; these are also set out below in this chapter from Table 1-4 onwards.</p> <p>The DCO requires that layout, scale, design, and external appearance, as well as the materials and finishes are approved by the local planning authority.</p>
Construction sequence and timing	<p>The project will be delivered in sequential construction phases, described in more detail below. Except for the first enabling phases, the flexible sequencing of these construction phases is sought. The draft DCO regulates this sequencing through the requirement for a written scheme of phasing to be approved by the local planning authority prior to the commencement of construction.</p> <p>Flexibility is also sought in the timing of construction activities. Indicative and maximum durations of these activities and the assessment year assumptions adopted in this Environmental Statement.</p>
Construction techniques and methods	<p>The project description below outlines a variety of construction techniques and methods which could be adopted by the project. These have been assessed in accordance with the Rochdale principles, as outlined in each technical chapter. For each element of the project a construction method statement must be agreed, within the limits of the EIA assessment, before construction can commence. The construction process will be managed through Code(s) of Construction Practice (CoCP) and Construction Environmental Management Plans (CEMP).</p>
Process optionality	<p>Optionality is sought in respect of several processes. A decision will only be reached on the optionality after grant of DCO, through the written scheme of phasing described above. Optionality has been assessed in this ES on the following processes:</p> <ul style="list-style-type: none"> • Selection of gas-handling technology - gas-to-grid or combined heat and power (CHP) • Inclusion of solar photovoltaic (PV) generation and extent of PV panels • Inclusion of nutrient recovery facility - see paragraph Selection of secondary and tertiary treatment technology
Waste water transfer tunnel, effluent and storm pipeline, outfall, Waterbeach pipeline	<p>Flexibility is sought for the placement of pipes and tunnels and the outfall, together with associated shafts and compounds, within the order limits shown in the Works Plans (App Doc Ref 4.3). Vertical limits of deviation for these works are set in Article 6 of the Development Consent Order (App Doc Ref 2.1). The outfall and tunnel "Rochdale" parameters are set out in Schedule 14 of the Development Consent Order, at Part 20 and 21 respectively.</p>

3.4 How have the environmental impacts been identified and assessed?

3.4.1 The potential environmental impacts have been identified and assessed in accordance with the EIA Methodology chapter of the Environmental Statement (App

Doc Ref 5.2.5) and any topic specific methodology identified in the relevant technical chapters (Chapters 6 - 22, App Doc Ref 5.2.6 - 5.2.21).

- 3.4.2 An EIA scoping request was submitted to the Planning Inspectorate on 19 October 2021. A response to this (the 'Scoping Opinion') was received from the Planning Inspectorate on 29 November 2021 which included comments from a range of stakeholders. The Scoping Opinion has formed the basis of the EIA by identifying and confirming what topics require assessment and providing observations on the scope of that assessment. Summaries of how the issues raised in the scoping opinion have been addressed in the ES is set out in the Project Description chapter (App Doc Ref 5.2.2) and each technical chapter (Chapters 6 - 22, App Doc Ref 5.2.6 - 5.2.22).
- 3.4.3 Consultation with landowners, statutory consultees, non-governmental organisations, local communities and specialist interest groups has also been undertaken throughout the EIA process to inform the approach to each assessment, as described in Section 3.2.
- 3.4.4 For each topic, a description of the current environmental conditions (the "environmental baseline") has been identified through a combination of desk-based study, environmental surveys and consultation. All potential significant impacts of the Proposed Development have been identified for each topic, with an assessment then being made on the severity of each potential impact and where significant environmental impacts are predicted, mitigation measures are proposed to reduce impacts to acceptable levels where possible.
- 3.4.5 The Proposed Development has taken a proactive approach to avoid or minimise environmental impacts. Each technical chapter presents the mitigation measures which have been identified by the project team as being necessary to remove, reduce or minimise potential impacts.

4 Summary of Effects

4.1 Agricultural land and soil resources

- 4.1.1 Potential impacts on agricultural land, soil resources and farm businesses have been assessed within Chapter 6 of the Environmental Statement, the Agricultural Land and Soils Chapter (App Doc Ref 5.2.6).
- 4.1.2 The majority of the land permanently required for the construction of the proposed Waste Water Treatment Plant (WWTP) and landscape masterplan (within Appendix 8.14: Landscape Ecology and Recreation Management Plan (LERMP), App Doc Ref 5.4.8.14) is grade 2 and grade 3a agricultural land, deemed best and most versatile (BMV). The effect of the permanent loss of BMV land is moderate adverse and is significant.
- 4.1.3 The large prevalence of BMV land within a 2km radius of the selected development location means that there is no alternative to the use of BMV land for the Proposed Development within this location.
- 4.1.4 There are 23 individual farm holdings identified within the study area, with the dominant activity being arable farming. The effect of permanent and temporary acquisition of land for the proposed WWTP was found to have a moderately significant effect on 11 farm businesses, a major/moderate significant effect on 1 farm business and minor or negligible non-significant effect on 10 farm businesses.
- 4.1.5 During construction, there will be a requirement for mitigation measures to be implemented through the application of management plans which include a Code of Construction Practice (Appendices 2.1 and 2.2, App Doc Ref 5.4.2.1 and 5.4.2.2) and an Outline Soil Management Plan (SMP) (for the appropriate handling of soils) (Appendix 6.3, App Doc Ref 5.4.6.3).
- 4.1.6 With the implementation of mitigation measures, the construction effects on soil resources during construction would not be significant in areas of temporary or permanent land acquisition.
- 4.1.7 The effect of permanent and temporary land acquisition on soil resources was found to be non-significant due to reuse and reinstatement as well as to adherence to the Appendix 2.1: Code of Construction Practice (CoCP) Part A (App Doc Ref 5.4.2.1) and the Appendix 6.3: Outline Soil Management Plan (App Doc Ref 5.4.6.3).

4.2 Air quality

- 4.2.1 Air Quality is assessed in Chapter 7 of the Environmental Statement (App Doc Ref 5.2.7).
- 4.2.2 Cambridge Air Quality Management Area (which encompasses the Cambridge inner ring road) is located 2.9km to the south-west of the Scheme Order Limits at its closest point and was declared in 2005 for exceedances of the annual mean NO₂ objective and is the only relevant Air Quality Management Area in this instance.

- 4.2.3 South Cambridgeshire District Council undertakes automatic monitoring at three locations and non-automatic monitoring at 35 locations. The closest automatic monitors are located 5.3km west and 4.5km east of the Scheme Order Limits. There is one diffusion tube within 2km of the proposed WWTP. Automatic and diffusion tube monitored concentrations are well below the air quality objectives.
- 4.2.4 The air quality assessment was carried out using dispersion modelling to assess the potential impact of on-site construction/operational sources of air quality, predicted traffic generation for the construction of the Proposed Development, and predicted re-distribution of traffic during operation of the Proposed Development. The effects of dust from construction activities were also assessed.
- 4.2.5 Impacts on air quality during the construction phase of the Proposed Development will be associated with dust generation, and emissions from construction plant and vehicle movements. These impacts will be temporary and will be subject to mitigation measures detailed within the Appendix 2.1: Code of Construction Practice (CoCP) & Appendix 2.2: CoCP Part B (App Doc Ref 5.4.2.1 & 2, Air Quality Management Plan and Appendix 19.7: Construction Transport Management Plan (CTMP) (App Doc Ref 5.4.19.7). Following the implementation of these measures, impacts on air quality would not be significant. Predicted impacts and effects on air quality associated with vehicle movements and plant used during the decommissioning of the existing Cambridge WWTP are included as part this assessment.
- 4.2.6 Once operational, the proposed WWTP will include two boilers (one standby) to generate heat for the waste water treatment process. Biogas produced from the treatment process will either be exported to the local gas network following appropriate treatment, this is the preferred option, or combusted within a combined heat and power plant (CHP) to produce heat and power. The operational effects on air quality for the design that produces the largest emissions to air, will include two boilers, two CHP engines and the emergency use of a flare would not be significant. These emissions would be regulated through an Environmental Permit issued by the Environment Agency, as described in the Consents and Other Permits Register (App Doc Ref 7.1)
- 4.2.7 The reassignment of vehicles moving to and from the existing Cambridge WWTP to the proposed WWTP during operation would lead to a reduction in traffic flows in Cambridge including HGVs. The air quality effects associated with this would not be significant.

4.3 Biodiversity

- 4.3.1 Biodiversity is assessed in Chapter 8 of the Environmental Statement (App Doc Ref 5.2.8)
- 4.3.2 The design of the project has been informed by a series of environmental objectives (see Chapter 3: Site Selection and Alternatives, App Doc Ref 5.2.3) which has included a requirement to deliver at least a 20% Biodiversity Net Gain (BNG) across the project, making a significant contribution to Nature Recovery in Cambridgeshire.

- 4.3.3 A Biodiversity Net Gain Assessment Report has been produced in support of the DCO application (Appendix 8.13, App Doc Ref 5.4.8.13).
- 4.3.4 Assessments have been completed to support a Habitats Regulation Assessment (HRA) in respect of potential impacts on Special Protection Areas, Special Areas of Conservation and Ramsar sites, which form a network that across Europe is known as Natura 2000, and domestically also known collectively (since December 2019) as the National Site Network. Such sites are referred to within the relevant legislation and are known as "European sites", designated for their international importance. The assessments completed support the Appropriate Assessment ('AA') stage of the HRA process. The findings of the assessments are reported in the Appendix 8.16: Habitats Regulation Assessment Report (App Doc Ref 5.4.8.16).
- 4.3.5 The report concluded that with adherence to the proposed mitigation, including regulatory requirements, the construction works associated with the Proposed Development and the operational activity associated with the proposed WWTP the AA stage assessments would not give rise to any adverse effects on the overall integrity of the European sites and their features either alone, or in-combination with other plans, policies or projects.
- 4.3.6 A total of 32 nationally designated statutory sites for nature conservation are present within a 10km study area around the proposed WWTP.
- 4.3.7 There are 55 non-statutory designated sites within 5km of the proposed WWTP. This includes 21 County Wildlife Sites, 33 City Wildlife Sites and one Protected Road Verge. The proposed WWTP is adjacent to the Low Fen Drove Way Grassland and Hedges CWS and the proposed treated effluent discharge outfall to the River Cam is located in the River Cam County Wildlife Site.
- 4.3.8 A series of baseline surveys and studies for designated sites, habitats, breeding birds, great crested newt, bats, water vole, otter, terrestrial invertebrates, reptiles, badger, aquatic macrophytes, macroinvertebrates, fish, hedgerows and botany were carried out, as well as an assessment to assess the potential for Biodiversity Net Gain (BNG).
- 4.3.9 Construction effects will be largely mitigated by avoidance or best practice mitigation measures, resulting in no significant biodiversity effects, although impacts are likely to arise from the following:
- Removal of habitats in relation to temporary and permanent use of the land ((such as for laydown areas, open cut trenching, HDD drilling, construction compounds, proposed WWTP and associated access) resulting in habitat loss, fragmentation and severance of wildlife corridors.
 - The construction of the proposed footpaths within the landscaped area which will sever hedgerows used by bats and temporarily disturb one common pipistrelle day roost. Additionally, the construction of the proposed WWTP will increase lighting levels in the local area.
 - Impacts on badger setts.

- Impact to and removal of ditch habitats (priority habitats) during construction of the final effluent pipeline.
- Impact to and removal of river aquatic habitats during construction of the proposed outfall.
- Construction of the proposed outfall and associated protection structures anticipated to result in direct and indirect impacts upon water vole populations within this area.
- The construction of the Waterbeach transfer pipeline will result in temporary disturbance to bats at three known day roosts.

4.3.10 Operational effects will similarly be largely mitigated by avoidance or best practice mitigation measures, resulting in no significant biodiversity effects, although impacts are likely to arise from the following:

- Operational lighting will spill onto Low Fen Drove Way Grassland and Hedges CWS until landscaping vegetation establishes between the CWS and the lights present in the proposed WWTP. Lighting is also likely to act as a barrier to bat species commuting and foraging within the proposed WWTP and may negatively impact upon invertebrate populations. The design has been progressed to minimise lighting including no lighting of the permanent access road and the Lighting Design Strategy requires the use of wildlife sensitive lighting to minimise impacts to wildlife.
- Operation of the proposed WWTP has the potential to affect the River Cam CWS and aquatic species through changes to surface water quality via intermittent storm flow discharges, water temperature changes, and water level changes.
- The inspection, maintenance and groundwater protection measures should also reduce the potential impact on Black Ditch due to the possibility of contamination of the sub-surface drainage network in the proposed WWTP. However, a low risk of infiltration of contaminants to the drainage network, which could then transfer rapidly to the pond and drain linked to Black Ditch, would remain. Monitoring for leaks and management plans will be in place to mitigate for this.
- Noise levels from the operation of the proposed WWTP may impact upon bats and badgers using the local landscape, leading to these species possibly avoiding areas that are frequently used now. Embedded design to minimise noise produced will be incorporated into operational machinery.
- Planting of new habitats around the proposed WWTP including woodland, hedgerows and the creation of seasonal ponds will provide additional foraging, commuting and resting resources for bats, other small mammals, birds, invertebrates and reptiles. This planting will also result in an overall greater connectivity across the local landscape, supporting the Cambridge Nature Recovery Network.

- Scour of the River Cam riverbed and banks causing sediment mobilisation could occur close to the outfall as a result of final effluent and intermittent storm discharges. Monitoring will be in place to see if there has been scour of the river bank, this will allow measures to be put in place if required to minimise the effects of scour.
- Decreased stormwater discharge to the River Cam from the proposed WWTP, as compared to the existing Cambridge WWTP, will also improve water quality in periods when these stormwater discharges currently occur.
- Water vole is likely to benefit during the operation of the proposed WWTP due to the improvements in water quality and associated habitats at the outfall location and downstream. This includes the creation of new ditch habitat which will support a robust and resilient population within the local context.

4.3.11 Ecological mitigation will be secured through plans required under the Development Consent Order. These are the Construction Environmental Management Plan (CEMP), Code of Construction Practice (CoCP) (Appendix 2.1 & 2.2, App Doc Ref 5.4.2.1 & 5.4.2.2), LERMP (Appendix 8.14, App Doc Ref 5.4.8.14), Construction Traffic Management Plan (CTMP) (Appendix 19.7, App Doc Ref 5.4.19.7), Outline Soil Management Plan (Outline SMP) (Appendix 6.3, App Doc Ref 5.4.6.3) and Decommissioning Plan (Appendix 2.3, App Doc Ref 5.4.2.3).

4.3.12 During the construction phase, the LERMP (Appendix 8.14, App Doc Ref 5.4.8.14), Outline SMP (Appendix 6.3, App Doc Ref 5.4.6.3) and CTMP (Appendix 19.7, App Doc Ref 5.4.19.7) and the CoCP Part A and Part B (Appendix 2.1 and 2.2, App Doc Ref 5.4.2.1 and 5.4.2.2) and associated management plans will govern the range of measures to avoid and minimise impacts that may arise.

4.3.13 During the operational phase mitigation would be secured through the Lighting Design Strategy (Appendix 2.5, App Doc Ref 5.4.2.5), the LERMP (Appendix 8.14, App Doc Ref 5.4.8.14), the conditions of the relevant Environmental Permits (see Consents and Other Permits Register, App Doc Ref 7.1)

4.3.14 The outline Decommissioning Plan (Appendix 2.3, App Doc Ref 5.4.2.3) would apply to the decommissioning phase at the existing Cambridge WWTP.

4.4 Carbon

4.4.1 The water industry in the United Kingdom has committed to being operationally net zero for greenhouse gas emissions by 2030. To deliver on this commitment, Anglian Water has designed the project to be both energy neutral and operationally carbon neutral. The design has also been developed to reduce the levels of greenhouse gas emissions associated with its construction.

4.4.2 Carbon impacts are considered in Chapter 10 of the Environmental Statement (App Doc Ref 5.2.10).

4.4.3 The assessment considers the following aspects of the proposed WWTP:

- Construction: capital carbon emissions associated with construction materials, transport of materials to the Proposed Development, and construction activities, with a 2010 construction practice baseline model
 - Land use change: carbon sequestration impacts from proposed landscaping plans.
 - Operation: carbon emissions associated with operational energy use and other operational processes over the opening year of the Proposed Development. Two different scenarios are presented for operation:
 - Preferred Option: where biogas generated by the Proposed Development is exported to the UK gas grid (known as ‘gas to grid’). The export of gas to grid has been estimated to result in avoided carbon emissions through displacement of other sources of gas supply to the UK grid.
 - CHP Option: where biogas generated by the Proposed Development is used in efficient combined heat and power engines (CHP). This reduces the requirement for grid electricity to operate the Proposed Development. This has been modelled as an alternative scenario as a worst case, should gas to grid be unviable at point of construction.
 - Whole assessment life: carbon emissions associated with all the above aspects presented for the whole assessment lifetime.
- 4.4.4 The estimated carbon emissions have been presented as gross and net emissions. Net emissions show the impacts when avoided emissions are accounted for.
- 4.4.5 Under the Preferred Option scenario, the assessment lifetime impact has been calculated as net negative carbon emissions (-20,260 tCO₂e) based on the anticipated export of gas to grid during operation.
- 4.4.6 The alternative Proposed Development scenario of using biogas in CHP is estimated to have overall net carbon emissions over the assessment life of 86,490 tCO₂e. The net operational carbon emissions under this scenario would be offset through a Carbon Management Plan (Requirement 22 in Schedule 2 of the Development Consent Order, App Doc Ref 2.1), to ensure that Anglian Water's commitment to an operationally net zero project would be met under all circumstances.
- 4.4.7 Reductions in construction emissions of just under 50% have been made between the assessment of the baseline design when compared to the Proposed Development. Further design optimisation opportunities are being investigated by the Applicant to meet its committed target of 55% reduction (with an aspirational target of 70% reduction) that will continue during detailed design of the Proposed Development.
- 4.4.8 Under certain design scenarios, there is the potential for the Proposed Development to result in net positive operational carbon emissions. In order to be operationally net zero, an Operational Carbon Management Plan will be developed and implemented to set out how operational net zero will be achieved.

4.5 Climate resilience

- 4.5.1 Climate resilience is assessed at Chapter 9 of the Environmental Statement (App Doc Ref 5.2.9)
- 4.5.2 Climate change will exacerbate existing issues affecting waste water treatment infrastructure such as structural damage to buildings and infrastructure, odour, flooding and storm flow volumes. In the future climate change will result in:
- warmer, wetter winters;
 - hotter, drier summers: and
 - more extreme weather events.
- 4.5.3 The present-day baseline is defined as the average climate over the 20-year time period 1981-2000 that has been used in the UKCP18 climate models. The assessment considers the effects of climate change under the latest available UK projections (UKCP18), up to the 2090s, using the highest emissions scenario available (RCP8.5).
- 4.5.4 The Proposed Development includes various elements of design that will provide resilience to the effects of climate change. There is flexibility and capacity within the layout of the Proposed Development, ensuring that in the future, as the climate continues to change, additional infrastructure or waste water treatment solutions can be introduced to further enhance resilience. This includes the ability for the Proposed Development to manage higher storm flows in the future, and to continuously meet evolving permitting requirements even in the case of low flow and future drought conditions. There is also capacity to add additional infrastructure including more storm storage, additional heat recovery and cooling, and additional treatment infrastructure.
- 4.5.5 In addition, the design of equipment and welfare facilities allow the future workforce include the ability to access the proposed WWTP remotely using digital technology which will facilitate continuing operations during storms and floods, and also allow the workforce to shelter from future high temperature events within cool buildings.
- 4.5.6 Climate resilience effects have not been identified for the construction phase as the climate will not have significantly changed within the timescales of construction.
- 4.5.7 During operation, the risks associated with higher temperatures, increased frequency and intensity of heavy rainfall and extreme weather events, and greater seasonal range between wetter winters and drier summers are all considered to be not significant following the implementation of mitigation measures.

4.6 Community

- 4.6.1 The Community chapter of the Environmental Statement (Chapter 11, App Doc Ref 5.2.11) assess how the surrounding communities may be affected by the relocation of the existing Cambridge WWTP.
- 4.6.2 The likely construction effects are assessed as including:

- Temporary requirement for land to install the Waterbeach pipeline which:
 - Affects access to existing public rights of way or how people enjoy public spaces through the combination of impacts affecting air, noise, landscape, and amenity.
 - The construction of the proposed Waterbeach pipeline would potentially temporarily require land from a business. Access to the business will be maintained and the temporary use of land will not inhibit it from being able to continue to operate.
- Temporary changes to recreational resources and open spaces
 - Recreational users of the River Cam will experience temporary changes due to the construction of the outfall structure to the River Cam. This will temporarily reduce the width of the navigation for river users such as rowers, punters, boaters, and canoers. This has been minimised by reducing construction widths as much as possible and planning the work to avoid busier term time period.
 - The public right of way (PRoW) 85/6 along the east bank of the River Cam would be temporarily diverted for a period of up to 11 months for approximately 770m around the land temporarily required for construction of the outfall. This diversion is to provide continued access and will be facilitated by measures within the CoCP Part A (App Doc Ref 5.4.2.1) that require the provision of safe gated access across works areas away from river bank.
 - Recreational users of Low Fen Drove Way, including byway 85/14 and PRoW 130/17, will experience temporary disruption during the construction of the temporary access road from Low Fen Drove Way into the land required for the construction of the permanent access to the proposed WWTP. The construction of the permanent access to the proposed WWTP has been scheduled at the start of the construction programme so that it can be used for the remainder of the construction period to minimise the time that Low Fen Drove Way is used to access land required for the construction of the proposed WWTP.
 - Recreational users of Horningsea Road to the south of Horningsea to Fen Ditton will experience temporary disruption during construction of the proposed WWTP, the construction of the final effluent pipeline across Horningsea Road, the construction of the improved shared cyclist / pedestrian footway section and the new ghost island, the construction of the new arm to the existing signalised junction between Horningsea Road and the A14, and use of Horningsea Road by construction vehicles to access land required for the construction of the proposed WWTP.

- Construction impacts on recreational receptors are also associated with the use of land required for the construction of the Waterbeach pipeline. Recreational users of PRoW (130/16, 130/10, 130/12, 130/30, 247/10 and 130/13) to the east of Waterbeach may experience temporary disruption to use of these routes which provide access to a wider network of PRoW to the north and south. The Scheme Order Limits have been modified to avoid interface with footpath 130/10 Horningsea. There are six PRoW which would be temporarily affected during construction of the Waterbeach pipeline.
- 4.6.3 Mitigation for the construction stage impacts which may affect how people use and enjoy recreational resources, public spaces and access business will be provided by various management plans secured by DCO Requirement. These include the requirement for a Code of Construction Practice, CoCP Part A and B (Appendix 2.1 & 2.2, App Doc Ref 5.4.2.1 & 2), and Construction Environmental Management Plan and within the CTMP (Appendix 19.7, App Doc Ref 5.4.19.7).
- 4.6.4 It is also understood that ongoing communication with the community is an important way to minimise disruption and to inform local communities on upcoming activities associated with the construction stage. A draft Community Liaison Plan (CLP) (App Doc Ref 7.8) sets out the approach to ongoing communication with residents, the community, and businesses including how the public and businesses can communicate with the Proposed Development in the construction stage.
- 4.6.5 No adverse community effects are anticipated during the operation of the proposed WWTP.
- 4.6.6 As discussed below in Section 4.13, potential odour impacts have been assessed as negligible, both on residential properties and on users of public rights of way.
- 4.6.7 The effects of the Proposed Development on community receptors during operation are slight beneficial, as a result of new recreational opportunities.
- 4.6.8 A publicly accessible permissive path will run through the new landscaped area, which will be of a suitable width to be shared by pedestrians and recreational cyclists. Within the new space for the landscaping proposals, interpretation boards, finger posts and scattered informal bench seating will be provided as part of the new setting.
- 4.6.9 People residing and working in the community study area will experience permanent minor beneficial effects from the provision of the Discovery Centre, which will be accessible by appointment to community and educational groups. The Discovery Centre, housed in the Gateway Building, will provide a multi-use space which will provide awareness and educational opportunities on the topics such as the circular economy, the water life cycle and wider environment and sustainability issues.
- 4.6.10 Mitigation for the construction stage impacts will be provided by various management plans secured by DCO Requirement. These include the requirement for a Code of Construction Practice and Construction Environmental Management Plan. The positive operational benefits will be delivered through the requirements of the

Landscape, Ecological and Recreational Masterplan (LERMP) (Appendix 8.14, App Doc Ref 5.4.8.14).

4.7 Health

- 4.7.1 Potential impacts on human health are considered at Chapter 12 of the Environmental Statement (App Doc Ref 5.2.12).
- 4.7.2 Analysis of baseline population health shows that overall, Cambridgeshire is a healthy place to live and one that compares generally well with national health and wellbeing determinants and outcomes. While this is the case, there are some very small areas, often with relatively high levels of disadvantage and deprivation, which have correspondingly adverse health and wellbeing determinants and outcomes.
- 4.7.3 The health assessment is dependent on a range of other technical assessments which have a link to health and wellbeing. The results of these assessments have been analysed to assess the potential resultant impact on health and wellbeing.
- 4.7.4 During construction, taking into account mitigation measures implemented through the application of management plans as specified by the Code of Construction Practice, potential health effects associated with the following impacts have been considered and are not anticipated to be significant:
- potential increases in local employment;
 - changes to social cohesion from the presence of a construction workforce;
 - potential risks from water pollution;
 - potential risks from hazardous waste and substances;
 - changes to environmental conditions impacting health and wellbeing in Fen Road and Milton, Horningsea, Waterbeach and Clayhithe and Fen Ditton;
 - changes to recreational routes impacting rates of physical activity and the ability to live active lifestyles in Chesterton and communities on the eastern end of Fen Road and Milton, Horningsea, Waterbeach and Clayhithe;
 - rates of physical activity and the ability to live active lifestyles from restrictions to access to the River Cam;
 - changes to environmental conditions impacting health and wellbeing on Fen Road; and
 - changes in access to local services (Fen Ditton School).
- 4.7.5 Mitigation during the operational phase will be secured through the Development Consent Order Requirements and through the WWTP's Environmental Permit (See Consents and Other Permits Register, App Doc Ref 7.1). The DCO Requirements include an obligation to agree and implement an operational outfall management and monitoring plan, an operational workers travel plan, a scheme of operational lighting and an odour management plan (Schedule 2 of DCO, App Doc Ref 2.1).

- 4.7.6 During operation, taking into account relevant mitigation measures, potential health effects associated with the following have been considered and are not anticipated to be significant:
- potential risks from water pollution;
 - potential risks from hazardous waste and substances;
 - potential risks from pests;
 - changes to environmental conditions impacting health and wellbeing in Fen Road and Milton, Horningsea, Waterbeach and Clayhithe and Fen Ditton; and
 - changes to how local people feel about their community, in particular their sense of place and wellbeing.
- 4.7.7 Two new paths created as part of the Proposed Development will deliver formal recreational routes for nearby communities and promote outdoor physical activity for local people which are anticipated to be slight beneficial health effects associated with changes in access to recreational areas impacting rates of physical activity and the ability to live active lifestyles in the study area. These benefits are not assessed as significant and are to be secured under the LERMP (Appendix 8.14, App Doc Ref 5.4.8.14).
- 4.7.8 The potential impacts as a result of decommissioning the existing Cambridge WWTP for the purpose of rescinding the existing Environmental Permit would result in neutral health effects.

4.8 Historic environment

- 4.8.1 Potential impacts to built heritage, archaeological remains and historic landscape associated with construction, operation and maintenance of the Proposed Development are considered within the Historic environment chapter of the Environmental Statement (Chapter 16, App Doc Ref 5.2.13)
- 4.8.2 In addition to existing information, non-intrusive and intrusive surveys were completed to gather site specific information on archaeological resource potential within the area of land required for the Proposed Development, the setting of heritage assets and nature of the historic landscape.
- 4.8.3 The assessment of historic environment relates to how the Proposed Development contributes to the loss or alteration to a heritage asset's significance and/or setting.
- 4.8.4 During construction, mitigation measures would be implemented through the application of management plans as specified by the Code of Construction Practice. In addition, there will be controls on vehicle movements so that no construction traffic will be permitted to travel through Horningsea or Fen Ditton.
- 4.8.5 Following the implementation of mitigation measures, the majority of temporary construction effects on the historic environment would not be significant. The exceptions are Baits Bite Lock Conservation Area, Biggin Abbey and Poplar Hall

where temporary moderate adverse effects that would be significant are predicted as result of a change within their settings.

- 4.8.6 Regarding permanent construction effects on archaeological remains during construction, the knowledge gained from recording, post-excavation assessment and reporting will be disseminated for public benefit. However, it is anticipated that the remains will still be lost as excavation and recording can be a destructive process. Therefore, moderate adverse significant effects will persist from the partial or complete removal of archaeological remains in the case of four areas of prehistoric settlement activity and possible further remains relating to two excavated cremations. The loss of archaeological remains through the construction of the Proposed Development will be mitigated through an Archaeological Investigation and Mitigation Strategy (AIMS) agreed with key stakeholders. There will be a residual effect due to the removal of archaeological remains.
- 4.8.7 Following the implementation of mitigation measures during construction, the permanent construction effects of the Proposed Development on built heritage and historic landscape assets would not be significant for all receptors except Biggin Abbey (Grade II* listed) where a moderate adverse effect is predicted, which is significant.
- 4.8.8 No significant effects on the historic environment have been identified from the operation and maintenance of the Proposed Development, including the proposed WWTP, associated pipelines and Waterbeach Pipeline. Furthermore, no potential impacts on the historic environment are anticipated as a result of decommissioning the existing Cambridge WWTP.

4.9 Landscape and visual amenity

- 4.9.1 Potential impacts to landscape and visual amenity associated with construction, operation and maintenance of the Proposed Development are considered within the Landscape and visual amenity chapter of the Environmental Statement (Chapter 15, App Doc Ref 5.2.15), and within a Landscape and Visual Impact Assessment Methodology (Appendix 15.5, App Doc Ref 5.4.15.5)
- 4.9.2 The Proposed Development will be situated partly in the Green Belt and on arable farmland between Fen Ditton and Waterbeach. This is an open landscape of large fields, separated by low hedgerows, drainage ditches and woodland belts along field boundaries and around settlement edges. The area is almost flat but slopes gently down towards the River Cam in the west. The A14 detracts from the openness of the landscape where it rises to cross the River Cam but generally it has a fairly discreet presence. Pylons and powerlines are prominent features of the landscape. The River Cam towpath, Fen Rivers Way, Harcamlow Way and the cycle path along Horningsea Road provide important recreational walking and cycling routes between Cambridge and the landscape to the north-east.
- 4.9.3 Baseline conditions for landscape and visual amenity were established through site surveys, the use of aerial photography and Ordnance Survey mapping, and informed by the Greater Cambridge Landscape Character Assessment (Chris Blandford

Associates 2021) and the Greater Cambridge Green Infrastructure Opportunity Mapping report (LUC,2021).

- 4.9.4 The study area includes parts of three National Character Areas. A total of seven Landscape Character Areas were identified. The assessment of impacts on landscape character is based on how the Proposed Development alters the features and elements within existing landscape character areas.
- 4.9.5 Representative viewpoints are identified to inform the visual amenity assessment and represent the views of people living, engaged in recreation or travelling in the study area likely to be affected by the Proposed Development.
- 4.9.6 The construction phase will have temporary large adverse significant effects on the Eastern Fen Edge Chalklands Landscape Character Area. There will be slight adverse non-significant effects on the River Cam Corridor and on the Waterbeach-Lode Fen LCA. There will be no effects on the other LCA in the study area.
- 4.9.7 The construction works will have temporary large adverse significant effects on the following visual receptors:
- residential receptors at Poplar Hall, Poplar Hall Farmhouse, Red House Close, at Biggin Abbey House and associated cottages, at Parsonage Farm on Low Fen Drove Way and at The Cottage on Burgess Drove; and
 - recreational receptors on Low Fen Drove Way, Horningsea Road and the public rights of way in the area west of Horningsea Road and road users on Horningsea Road. recreational receptors on Low Fen Drove Way, Horningsea Road, the public rights of way close to Biggin Abbey and Bridleway Waterbeach 247/14; and
 - road users on Horningsea Road.
- 4.9.8 The construction works will have temporary moderate adverse significant effects on the following visual receptors:
- residential receptors on High Ditch Road, Horningsea Road and on Burgess Road and at the Gate House on Low Fen Drove Way, at Northern Bridge Farm and at Mulberry House Farm; and
 - recreational receptors using the public right of way and towpath along the River Cam, the public rights of way west of Horningsea Road, the public rights of way between Horningsea and Waterbeach, the Cambridge Motorboat Club and the Cam Sailing Club.
- 4.9.9 Construction lighting will have temporary moderate adverse significant effects on the night-time views of residential receptors on High Ditch Road, Horningsea Road and Burgess Road and at Poplar Hall, Poplar Hall Farmhouse, Red House Close, Biggin Abbey House and associated cottages, Parsonage Farm and the Gate House.
- 4.9.10 The operational assessment assesses effects during year 1 and year 15 (once mitigation planting has matured).

- 4.9.11 During year 1 of operation, there will be moderate adverse significant effects on the Eastern Fen Edge Chalklands LCA. While the River Cam Corridor LCA and Waterbeach-Lode Fen LCA will experience effects, these will be minor and will not be significant. There will be no effects on the other LCAs in the study area. By year 15 of operation, maturing woodland, tree and hedgerow planting will screen the new infrastructure from the majority of the Eastern Fen Edge Chalklands LCA and integrate the earth bank into the landscape, but effects will remain moderate adverse and significant. There will be no significant effects on the other LCAs in the study area.
- 4.9.12 There will be large adverse significant effects on the following visual receptors close to the Proposed Development in year 1 of operation:
- residential receptors at Parsonage Farm; and
 - recreational receptors and road users on Horningsea Road and recreational receptors on Low Fen Drove Way.
- 4.9.13 There will be moderate adverse significant effects on the following visual receptors close to the Proposed Development in year 1 of operation:
- residential receptors on High Ditch Road and Horningsea Road and at Biggin Abbey House and associated cottages and the Gate House: and
 - recreational receptors using public rights of way along the River Cam and west of Horningsea Road.
- 4.9.14 Operational lighting in year 1 of operation will have moderate adverse significant effects on the night-time views of residential receptors at Parsonage Farm.
- 4.9.15 By year 15, maturing woodland, hedgerow and tree planting of the landscape masterplan will gradually screen the majority of the structures within the proposed WWTP but they will remain visible from a small number of locations close to the Proposed Development. There will be moderate adverse significant effects on the following visual receptors:
- residential receptors at Parsonage Farm; and
 - recreational receptors and road users on Horningsea Road and recreational receptors on Low Fen Drove Way.
- 4.9.16 Mitigation for the landscape and visual impacts have been identified and are secured through the Development Consent Order (App Doc Ref 2.1). These include the primary (in-built) mitigation inherent in the design, most notably the earth bank screening the proposed WWTP, and the requirement to implement and maintain the landscaping detailed in the Landscape, Ecological and Recreational Masterplan (LERMP, Appendix 8.14, App Doc Ref 5.4.8.14). Mitigation is also provided by the requirement to agree a scheme of operational lighting for each phase of the development in accordance with the Lighting Design Strategy (Appendix 2.5, App Doc Ref 5.4.2.5)

4.10 Land Quality

- 4.10.1 Potential impacts on soils and geology (including impacts arising from land contamination); human health (including land users and surrounding land users); and mineral resources (such as minerals safeguarding areas from the construction), operation and maintenance of the Proposed Development are considered in the Land Quality chapter of the Environmental Statement (Chapter 14, App Doc Ref 5.2.14)
- 4.10.2 The majority of the study area comprises rural agricultural land in arable production. There are two historical landfills within the study area, which are located near the Waterbeach Pipeline. The underlying geology comprises local deposits of river terrace deposits and alluvium overlying the Grey Chalk Subgroup and, in turn, the Greensand and Gault Formations. Two Mineral Safeguarding Areas (MSA) are present within the study area related to the River Terrace Deposits and Chalk.
- 4.10.3 The methodology for assessing land contamination effects is based around the change in land contamination risks between the situation at baseline and those estimated to exist during the construction and operational stages.
- 4.10.4 The likely construction effects are assessed as:
- Impacts to MSA through removal of materials:
 - the MSA for both River Terrace Deposits and Chalk were assessed and the Proposed Development does not have a significant effect on the MSA.
 - Potential land contamination effects related to:
 - Risks to surrounding land users from inhalation of contaminated soils which were deemed to be very low with significance of effect being assessed as negligible.
 - Risks to controlled waters (rivers, streams, ditches and groundwater) from migration of existing contamination through environmental pathways (termed preferential pathways) as a result of piling, pipeline construction, tunnelling and construction of shafts) were assessed as low to low/moderate with a negligible effect which is not significant.
- 4.10.5 During construction, measures within the Code of Construction Practice (CoCP) Part A (Appendix 2.1, App Doc Ref 5.4.2.1) sets out measures to manage incidences of contamination that may be encountered during construction not previously anticipated. These measures accord with the Land Contamination Risk Management (LCRM) guidance.
- 4.10.6 The reuse of material excavated during construction (primarily from tunnelling) would be managed through the application of CL:AIRE Definition of Waste: Development Industry Code of Practice (CL:AIRE, 2011, referenced in Chapter 14) for the reuse of excavated waste materials.

4.10.7 The likely effects from operation and maintenance are assessed as:

- those arising from risks to site users from inhalation, ingestion and direct contact of dusts (and surrounding land users from inhalation only) from site won soils being reused within landscaping areas. This was deemed to be very low risk with negligible effect which is not significant.

4.10.8 Those arising from risks to controlled waters as a result of the migration of contamination or leachate from reused soils used at the Proposed Development, which were assessed as low to low/moderate with a negligible effect which is not significant. Design measures to prevent contamination, such as from run off, include the provision of impermeable hard surfaces in areas where there may be potential for contamination and a segregated drainage system. Requirement 16 of the draft Development Consent Order (App Doc Ref 2.1) requires the details of permanent drainage to be agreed with the local planning authority prior to the commencement of construction.

4.10.9 The design of sub-surface structures is informed by surveys to understand ground conditions so that the design is appropriate to the conditions within the land required for the Proposed Development.

4.11 Material Resources and Waste

4.11.1 Potential impacts related to resource use and the generation of waste associated with the construction, operation and maintenance of the Proposed Development are considered at the Material Resources and Waste chapter of the Environmental Statement (Chapter 16, App Doc Ref 5.2.16)

4.11.2 The construction of the Proposed Development will require the primary raw materials of concrete, cement, steel and aggregates. Baseline data has been collected in relation to the availability of raw materials and these indicate that there are no issues with the supply of these materials for the assumed construction years.

4.11.3 The strategy for the construction of the Proposed Development includes the re-use of materials excavated during the construction phase (these materials are termed 'site won') within the landscaping proposals. The re-use of site won materials seeks to reduce impact on the availability of materials, minimise the depletion of natural resources, minimise the volumes of waste generated, minimise the temporary occupation of waste infrastructure, and avoid permanent reduction of landfill void capacities. Re-use also minimises the need for the delivery of off-site materials.

4.11.4 During the construction phase industry best practices in relation to materials use, waste management and the handling of soils would be applied through the implementation of measures within the Code of Construction Practice Part A (Appendix 2.1, App Doc Ref 5.4.2.1), the Outline Soil Management Plan (Appendix 6.3, App Doc Ref 5.4.6.3) and a Site Waste Management Plan (required under Construction Environmental Management Plan (CEMP) pursuant to DCO Requirement 9).

- 4.11.5 The likely construction effects in terms of material resource use and the generation and management of waste would not be significant.
- 4.11.6 The operation of the proposed WWTP would be similar to that of the existing Cambridge WWTP, requiring similar types and quantities of materials and would generate biosolids and other solid waste. The design of the Sludge Treatment Centre within the WWTP will produce an 'Enhanced Treated Biosolids' product for spreading on agricultural land, this will generate an anticipated 80,391 wet tonnes/annum which is diverted from landfill. An alternative presented in the Project Description chapter of the Environmental Statement (App Doc Ref 5.2.2) is to recover nutrients through a nutrient recovery plant.
- 4.11.7 No significant material resources and waste effects have been identified in relation to the operation and maintenance of the proposed WWTP.
- 4.11.8 The operation and maintenance of the proposed WWTP will be similar to the existing WWTP, including management to accord with the requirements of the Environmental Permit required to operate, to appropriately manage wastes generated during the treatment process (see Consents and Other Permits Register, App Doc Ref 7.1) The permit requires the operator to have a written management system which includes a set of plans and procedures describing measures to avoid, reduce and eliminate potential environmental impacts associated with the activities covered by the permit. These would include plans and procedures would include waste minimisation and waste management practice to meet regulatory requirements.
- 4.11.9 The decommissioning of the existing Cambridge WWTP would involve the draining down of tanks and pipelines, removal of sludge and the completion of cleaning activities. The decommissioning activities will generate some waste materials that may require landfilling, the quantities are small and the effect for the decommissioning phase is assessed as **not significant**.
- 4.11.10 As discussed in the Project Description chapter (App Doc Ref 5.2.2), demolition activities and the re-development of the existing WWTP do not form part of the DCO application; they are not included within this project description and are not assessed as part of the Proposed Development, other than as potential cumulative effects in Chapter 22: Cumulative Effects Assessment (App Doc Ref 5.2.21).

4.12 Noise and Vibration

- 4.12.1 Potential impacts related to noise and vibration during the construction, operation and maintenance of the Proposed Development are considered within the Noise and Vibration chapter of the Environmental Statement (Chapter 17, App Doc Ref 5.2.17)
- 4.12.2 The Proposed Development is located within a primarily rural area. The nearest residential receptors are located within communities at Milton, Horningsea, Chesterton in North Cambridge and Fen Ditton. The nearest sensitive receptors to the land required for the construction of the proposed WWTP are isolated properties located off Horningsea Road and Low Fen Drove Way. Residential receptors adjacent

to the proposed new pipeline route section from Waterbeach to the proposed WWTP include those within Waterbeach, Clayhithe and Horningsea.

- 4.12.3 Existing noise levels in the area immediately surrounding the proposed WWTP are dominated by road traffic from the A14. Surveys were completed to understand baseline noise levels (Appendix 17.2, App Doc Ref 5.4.17.1).
- 4.12.4 The construction noise assessment concluded that impacts would predominantly result in negligible or minor adverse impacts that would not be significant, however, in a few instances would be major or moderate adverse and result in significant adverse effects.
- 4.12.5 In response to this assessment, one of the tunnelling shafts (Shaft 4 as shown on the waste water transfer tunnel design plan, App Doc Ref 4.12) was relocated to increase the distance to work site from the nearest noise sensitive receptors and minimise adverse noise and vibration impacts during construction.
- 4.12.6 Additional secondary mitigation measures will also be implemented, including the provision of solid site hoarding/acoustic barriers around construction compounds in select areas close to receptors, restriction of working hours to avoid sensitive times of the day and application of measures and Best Practicable Means (BPM) in accordance with BS 5228. These measures are reflected in the Code of Construction Practice (CoCP Part A and B, Appendix 2.1 and 2.2, App Doc Ref 5.4.2.1 and 5.4.2.2).
- 4.12.7 With implementation of mitigation measures the construction noise and vibration major and moderate adverse impacts would be avoided or reduced and the resulting effects would be not significant. Assessment results for noise impacts during operation indicate that noise impacts at the closest noise sensitive receptor locations are not significant. Operational traffic associated with the proposed WWTP also shows that noise impacts due to changes in road traffic would be limited and **not significant** as a result of high existing traffic flows, particularly on the A14.
- 4.12.8 The noise effects from decommissioning activities at the existing WWTP would be limited and are **not significant**.

4.13 Odour

- 4.13.1 Potential impacts related to odour emissions during the construction, operation and maintenance of the Proposed Development are considered within the Odour chapter of the Environmental Statement (Chapter 18, App Doc Ref 5.2.18)
- 4.13.2 Odour impacts are determined by using factors such as frequency, intensity, duration, odour unpleasantness and sensitivity of receptors determined by location.
- 4.13.3 To assess odour impacts of the Proposed Development, dispersion modelling has used five years of meteorological data to account for variability in weather conditions, with the worst-case year results used for assessment. As the proposed WWTP does not currently exist, the odour predictions apply estimated emission rates from measurements taken at the existing Cambridge WWTP based on values during the summer months, when odour emissions are expected to be highest.

- 4.13.4 The Proposed Development is located in a semi-rural location where existing agricultural practices and other intermittent sources are expected to cause intermittent odours. In the context of the rural environment, odour is generally not considered a nuisance by people living and working in the area. The River Cam also has the potential to produce odour through the natural decomposition of organic matter.
- 4.13.5 Guidance states that for concentrations below 3 ouE/m^3 , complaints are unlikely to occur and exposure below this level is unlikely to constitute significant pollution or significant detriment to amenity unless the locality is highly sensitive or the odour highly unpleasant in nature.
- 4.13.6 Following implementation of mitigation measures outlined in the Code of Construction Practice Part A and B (Appendix 2.1, App Doc Ref 5.4.2.1 and Appendix 2.2, App Doc Ref 5.4.2.2), odour impacts during the construction of the Proposed Development, which includes connecting new pipelines to the existing sewerage network, are predicted to be of short duration and not significant. This is also the case for decommissioning of the existing Cambridge WWTP.
- 4.13.7 The results of odour modelling reported in this assessment for the normal operation of the proposed WWTP indicate that the modelled odour exposure levels with a Medium impact on sensitive receptors (3 ouE/m^3 to 5 ouE/m^3) are within 200m of the outer perimeter of the proposed WWTP. The magnitudes of odour impacts at all modelled discrete receptors range from Negligible to Very Small (up to 1.5 ouE/m^3). Based on the modelled odour impacts, the sensitivity of receptors and the incorporation of the embedded design features within the proposed WWTP, the effect of the proposed WWTP on odour at all modelled sensitive receptor locations during normal operation would be negligible and not significant.
- 4.13.8 Figure 4.1 below presents the predicted operational odour contours from Chapter 18.

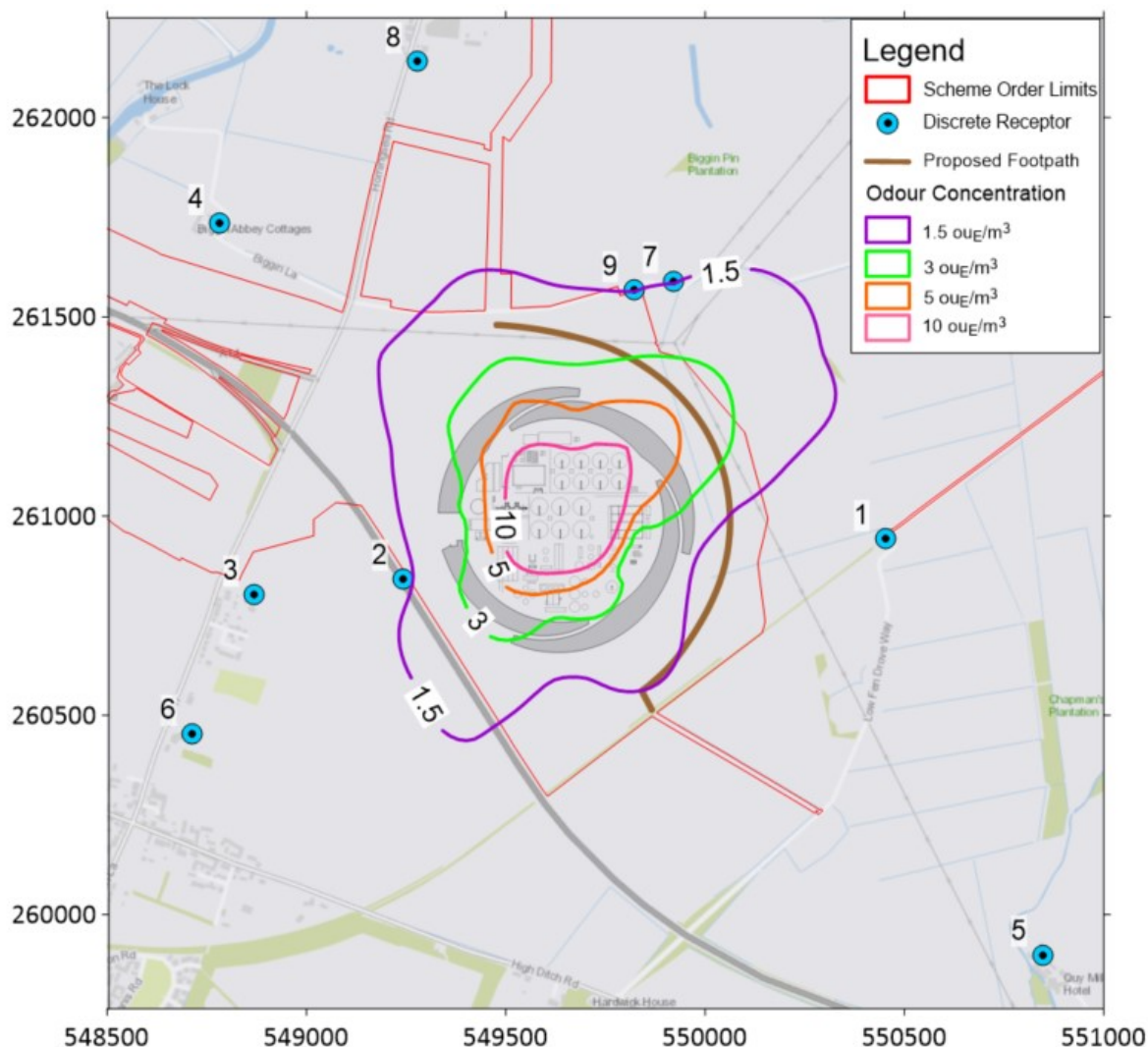


Figure 4.1: Contour plot of one-hour 98th percentile odour concentrations (ou_E/m³)

Note: Results presented for the worst case meteorological year of 2016. The worst case meteorological year is determined by calculating the year with the maximum offsite concentration modelled across the gridded receptors. Minimum contour = 1.5 ou_E/m³, maximum contour = 10 ou_E/m³. X and Y axis show British National Grid coordinates.

- 4.13.9 Further information on the odour modelling is provided in Chapter 18 and in the Odour Assessment Method & Effect Summary (Appendix 18.1, App Doc Ref 5.4.18.1) and the Odour Impact Assessment (Appendix 18.2, App Doc Ref 5.4.18.2).
- 4.13.10 Operational odour will be controlled through the Environmental Permit for the proposed WWTP (see Other Consents and Permits Register, App Doc Ref 7.1) and the requirement in the DCO to agree an odour management plan with the local planning authority in line with the Preliminary Odour Management Plan (Appendix 18.4, App Doc Ref 5.4.18.4) and operate the WWTP in accordance with that plan (draft DCO requirement 21, App Doc Ref 2.1).

4.14 Traffic and Transport

- 4.14.1 Potential traffic and transport impacts related the construction, operation and maintenance of the Proposed Development are considered within the Traffic and Transport chapter of the Environmental Statement (Chapter 19, App Doc Ref 5.2.19)
- 4.14.2 The Transport Assessment (Appendix 19.3, App Doc Ref 5.4.19.3) has considered the effects of the Proposed Development on the local transport infrastructure during the peak of construction which would be in year 3 (assumed to be 2026), in year 4 of construction for decommissioning of the existing WWTP (assumed to be 2028) and for year 1, 5 and 10 of operation assumed to be 2028, 2033 and 2038 respectively). The assessment of the operational phase has considered the permanent access to the proposed WWTP connecting to Horningsea Road.
- 4.14.3 The assessment identifies the effects of severance, delay (to motorised and non-motorised users), fear and intimidation, accidents and road safety, and hazardous loads on users across the study area. The study area incorporates all road links affected by the construction and operation phases.
- 4.14.4 The expected construction programme means that the peak construction vehicle movements associated with the construction of the Waterbeach pipeline would not occur at the same time as the construction of the proposed WWTP (including construction of the permanent access and the landscape masterplan) or the waste water transfer tunnel. By including the typical daily construction flows an allowance is made for a delay to the Waterbeach programme in order to consider a worst case. This equates to a daily peak of 627 movements on Horningsea Road and Junction 34 of the A14.
- 4.14.5 For construction of the proposed WWTP and waste water transfer tunnel, no significant effects on severance, pedestrian delay, fear and intimidation, accidents and road safety, and the delivery of hazardous loads have been determined. Impacts on driver delay are mitigated through the implementation of measures outlined in the Construction Traffic Management Plan (Appendix 19.7: CTMP, App Doc Ref 5.4.19.7) which restrict the peak period construction movements, meaning that the effect on driver delay would also be not significant.
- 4.14.6 The CTMP includes specific measures in relation to Horningsea and Horningsea Road. These include~:
- the use traffic marshalling during peak hours in the area of the off and on slip of the A14 and for works crossing Horningsea Road,
 - a commitment that no construction deliveries (including site won material) over 3.5 tonnes will access or egress the site during the agreed peak hours (08:00-09:00, 15:00-16:00, and 17:00-18:00 from Monday to Friday) unless it is a time critical delivery or it is determined to be essential that the delivery is to be completed during peak hours or specific alternative restrictions are agreed with the local highway authority,

- the use of temporary signal controls and maintaining use of the existing footway / cycleway to the west of the Horningsea Road carriageway with suitable barriers separating the footway from the works; and
 - the use of speed restrictions to Horningsea Road for the duration of the works in accordance with the Temporary Traffic Regulation Order (TRO).
- 4.14.7 There will also be a system for monitoring the movement of vehicles associated with the construction of the Proposed Development, which includes the use of ANPR cameras along Horningsea Road.
- 4.14.8 The safe construction of the outfall requires the temporary diversion of the PRoW 85/6 which passes along the east bank of the River Cam. The effect of temporary severance to users is avoided through a temporary diversion via PRoW 85/8. Although severance is avoided there would be a residual temporary major effect on pedestrian delay owing to the additional journey time associated with the diversion which would be in place for up to 11 months.
- 4.14.9 For construction of the Waterbeach Pipeline, there would be no significant effects on severance, pedestrian delay, driver delay, fear and intimidation, accidents and road safety, and the delivery of hazardous loads. Following the application of mitigation measures within the CTMP (Appendix 19.7: CTMP, App Doc Ref 5.4.19.7) to restrict peak period construction movements, the effect on driver delay would also not be significant.
- 4.14.10 The CTMP also includes specific measures in relation to traffic management in Waterbeach including a requirement for speed restrictions to Burgess's Drove, Bannold Drove and Bannold Road as well as Clayhithe Road through the use of a Temporary TRO set out within the DCO, a requirement to avoid HGV movements through Waterbeach during school drop-off and pick-up hours throughout term time; and a temporary parking restriction on Bannold Road junction with Denny End Road / High Street.
- 4.14.11 Some time-critical activities (such concrete pours or directional drilling activities) may require traffic movements to occur during peak hours. However, these activities would not all occur simultaneously and would be limited in duration, and therefore are unlikely to generate a significant effect.
- 4.14.12 The assessment assumes that decommissioning of the existing Cambridge WWTP would be in Year 4 (assumed to be 2028) and requires up to 150 daily vehicle movements on Milton Road and Cowley Road. The contribution of this temporary addition to the network would not result in significant delay effects.
- 4.14.13 Once the proposed WWTP is operational vehicle movements to and from the existing Cambridge WWTP would redistribute to the proposed WWTP. The assessment has considered the vehicle movements required to operate the proposed WWTP at full development capacity. The daily peak during year 10 of operation equates to 238 vehicle movements.

- 4.14.14 In the future the growth of all network traffic is predicted to result in a major driver delay impact at Horningsea Road / A14 on-slip southbound during the peak which would be significant. The operational vehicle movements associated with the proposed WWTP would contribute to these future traffic movements. The projected future growth and subsequent changes to traffic volumes as a result of committed developments would be managed through the policy objectives outlined within the Local Transport and Connectivity Plan (LTCP) (Cambridgeshire & Peterborough Combined Authority, 2020), with reference to the 'decide and provide' approach. In order to minimise the effect from operation of the proposed WWTP the application of an Operational Logistics Traffic Plan (OTLP) and Operational Workers Travel Plan (OWTP) (for approval under DCO Requirements 13 and 20, App Doc Ref 2.1) could be used to manage peak period movements in these circumstances to reduce the level of impact.
- 4.14.15 The proposals include improvements along Horningsea Road which include:
- A pedestrian island crossing on Horningsea Road which would improve the ability for pedestrians to safely cross Horningsea Road allowing access to other walking routes.
 - Provision of a new footway section on the east side of Horningsea Road, south of the junction with Low Fen Drove Way to improve walking and cycling connectivity and provide a safer walking and cycling environment.
 - speed control of the Horningsea Road between Fen Ditton and Horningsea which would result in a safer and more welcoming environment for non-motorised users (NMUs).
 - Extension of the shared pedestrian / cycle path to the west of Horningsea Road.
- 4.14.16 Collectively these measures decrease the effects of severance and fear and intimidation as well as improving road safety and are assessed as resulting in a minor beneficial effect to users of the footway. The detailed design of these measures would be approved by the local planning authority.

4.15 Water Resources

- 4.15.1 The assessment of water resources considers the potential impacts of the proposed WWTP on surface water features, groundwater features and flood risk. These are assessed in Chapter 20 of the Environmental Statement (App Doc Ref 5.2.20). The assessment is supported by a separate Flood Risk Assessment (FRA) (Appendix 20.1, App Doc Ref 5.4.20.1)
- 4.15.2 Impacts to water resources during construction would be temporary. In many cases, these impacts would be mitigated by rigorous surface water and groundwater protection measures, which are standard practice in the construction industry, resulting in no significant residual effects. The following impacts have been identified

for construction which could have significant, temporary adverse effects and will be closely monitored. These effects relate to:

- the potential for a short term increase in sediment content of water in the River Cam due to impacts on the riverbed from installation, use and removal of the cofferdam;
- a temporary localised increase in fluvial flood risk due to temporary restriction in the River Cam for the outfall construction behind a cofferdam;
- lowering of groundwater levels in the local area during dewatering for the deepest below-ground structure (the TPS shaft); and
- lowering of groundwater levels in the local area during dewatering for groundworks associated with other below-ground structures within the land required for the proposed WWTP.

4.15.3 Activities involving abstraction, impounding or discharge of water during the construction or commissioning of the proposed WWTP will be regulated through the permits detailed in the Consents and other Permits Register (App Doc Ref 7.1) including Construction Water Discharge Activity Permit, Flood Risk Activities consent, a water impounding licence and a water abstraction licence issued by the Environment Agency.

4.15.4 During operation of the Proposed Development there would be impacts resulting from changes in final effluent and stormwater discharges which are expected to have a significant beneficial effect on water quality in the River Cam.

4.15.5 The quality of the final effluent and stormwater discharges entering the Cam will be subject to regulation under the Water Discharge (Final Effluent) permit issued by the Environment Agency as described in the Consents and other Permits Register (App Doc Ref 7.1)

4.15.6 The sizing of the storm tanks has been agreed with the Environment Agency as part of the environmental permitting discussions. As discussed in the Environmental Statement at Chapter 9: Climate Resilience (App Doc Ref 5.2.9), the plant has been designed to be resilient under the UKCIP climate projections for the 2090s. Changes in catchment management (including the requirement for SuDs on future developments) means that the required storm capacity for the 2090s has a high degree of uncertainty and so cannot currently be assessed.

4.15.7 A storm model was run to simulate storm flows for ten consecutive years, during which the maximum simulated storm experienced was 13,873m³ (compared to the 20,400m³ capacity) which would result in no storm water discharge incidents to the River Cam. The transfer tunnel provides an element of storm attenuation and additional storage which contributed in the model towards the management of the flows.

4.15.8 There is, therefore, at present, sufficient capacity to accommodate both anticipated population growth and climate change. It is possible that additional storm storage capacity would be required into the 2050s-2070s in response to changes in the

frequency or magnitude of storm events or in response to changes in the environmental permitting regime. The design of the plant provides sufficient space to accommodate the need for additional storm storage in the future, if required. Any requirement for additional storage capacity will be established through the environmental permitting regime and discharge consent for the Proposed Development.

- 4.15.9 Decommissioning of the existing Cambridge WWTP involves the diversion of rising mains and gravity sewers and cessation of flow at the existing outfall. It is assumed that rigorous groundwater protection measures, which are standard practice to prevent contamination, will be implemented during the diversion works. As a result, potential impacts on water resources resulting from decommissioning activities should not give rise to any effects which are significant.

4.16 Major Accidents and Disasters

- 4.16.1 The assessment of major accidents and disasters considers the vulnerability of the Proposed Development to risks of relevant major accidents and/or disasters and any residual effects. Major accidents or natural disasters are rare events or situations that have the potential to affect the Proposed Development and have a direct or indirect impact upon human health, welfare and/or the environment.

- 4.16.2 The risk events that have been assessed in relation to the Proposed Development are:

- Tunnel / excavation or ground collapse (including land slip of the earth bank)
- Storm events - result in river flooding / surface water inundation of the Proposed Development during construction, decommissioning and operations.
- Changes to avian population alters bird strike potential - operation and construction
- Presence of tall structures and lighting in construction and operation results in aviation risk
- Fire and explosion - decommissioning
- Fire and explosion - battery storage
- Fire and explosion - anaerobic digestion
- Fire and explosion - LNG storage
- Major air emission during decommissioning of the existing Cambridge WWTP
- Cyber security - attack compromises normal operations of the Proposed WWTP

- Malicious damage or vandalism - deliberate damage or trespass compromise the Proposed Development during construction, decommissioning and operations.

4.16.3 An assessment has been provided in Chapter 21 of the ES (App Doc Ref 5.2.21), identifying the risk associated with the Proposed Development and sets out the embedded and additional measures to demonstrate that the risks will be mitigated.

4.16.4 Some of the events listed above fall within the scope of other topics which were scoped in for assessment as part of the ES. The risk assessment still considers these but signposts to the topic chapters where the assessment details can be found. These are as follows:

- Chapter 9: Climate Resilience (Application Document Ref 5.2.9) assesses the vulnerability of the Proposed Development in relation to climate change related natural events. It considers predicted future changes to the climate and how the Proposed Development is designed to withstand the effects of future extreme events in particular drought, storm and rainfall. Where necessary it sets out further mitigation to minimise the effects of climate related events on the Proposed Development
- Flood risk and extreme rainfall and flood defence failure is addressed in Chapter 20: Water Resources and further assessed within the Flood Risk Assessment (Appendix 20.1, App Doc Ref 5.4.20.1);
- Aviation risks such as lighting during construction and operation and glint and glare is addressed in Chapter 15: Landscape and Visual and the Glint and Glare Assessment (Appendix 15.4, App Doc Ref 5.4.15.4);
- Aviation risks associated with potential changes in bird assemblages as a result of the Proposed Development is addressed in Chapter 8: Biodiversity, with a standalone Wildlife Hazard Management Plan appended to the ES (Appendix 8.18, App Doc Ref 5.4.8.18). Section 4 of this document includes and assessment of potential risks and the documents sets out the management controls to reduce any residual risks; and
- An assessment in relation to traffic and transport accidents is provided in Chapter 19: Traffic and Transport (Ap Doc Ref 5.2.19).

4.17 Cumulative effects

4.17.1 Cumulative effects are those arising from impacts of the Proposed Development in combination with impacts of other proposed or consented development projects that are not yet built or operational. These are assessed in Chapter 22 of the Environmental Statement (App Doc Ref 5.2.22).

4.17.2 The chapter assesses the cumulative impact of the proposed WWTP with a number of planned or consented other developments including:

- Waterbeach New Town East (including the decommissioning and demolition of the Waterbeach Water Recycling Centre);
- Waterbeach Station Relocation;
- Waterbeach New Town;
- Cambridge North Residential Quarter;
- Cambridge East Area Action Plan (AAP); and
- North East Cambridge Area Action Plan (NECAAP) (including the demolition of the existing Cambridge WWTP).

4.17.3 Potentially significant cumulative effects are identified for biodiversity and traffic and transport.

4.17.4 In relation to traffic and transport the construction of the Proposed Development has the potential to overlap with construction of Waterbeach New Town East and Waterbeach Station Relocation and may cause cumulative effects to users of the A10, Denny End Road and Bannold Road.

4.17.5 The cumulative assessment concludes that these potentially significantly cumulative impacts would be mitigated through the use of each project's respective schemes for construction traffic management, which could manage the unlikely risk of simultaneous development. Overall, it is considered that the impacts of the Proposed Development can be mitigated through the proposed management of the transport network during construction and therefore would not be significant.

4.17.6 Mitigation for this impact is provided by the requirement for a Construction Traffic Management Plan (Appendix 19.7: CTMP, App Doc Ref 5.4.19.7) and the CoCP Part B (Appendix 2.2, App Doc Ref 5.4.2.2) required under Requirement 9 of the draft DCO (App Doc Ref 2.1).

4.17.7 In relation to Biodiversity potential cumulative effects are associated with future population growth and an resultant increase in recreational use of green infrastructure, including Stow cum Quy SSSI, which could be accessed from the south via the bridleway as part of the Proposed Development.

4.17.8 The cumulative assessment concludes that these potentially significant cumulative effects would be mitigation delivered through planning activities, (including EIA prepared for specific developments). These are expected to include measures to minimise impacts from recreational usage within the wider area such as the provision of greenspace as part of the development. It has however been identified that strategic monitoring and management should also be delivered through a Combined Recreation Group (CRG). This group would comprise representatives from relevant local authorities, Natural England, Wildlife Trust, National Trust, the Applicant, and other future parties including developers as identified by the relevant local authority. This group would act to strategically consider future development proposals and potential collective impacts to the wider area. The future adaptive mitigation and monitoring would be supported by developer contributions secured

through the relevant local authorities. This includes a contribution by the Applicant through a s106 agreement.

- 4.17.9 Overall, it is considered that the impacts of the Proposed Development can be mitigated through the proposed strategic management of the public right of way network during and therefore would not be significant.

Get in touch

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You can view all our DCO application documents and updates on the application on The Planning Inspectorate website:

<https://infrastructure.planninginspectorate.gov.uk/projects/eastern/cambridge-waste-water-treatment-plant-relocation/>