

Thames Tideway Tunnel  
Thames Water Utilities Limited



# Application for Development Consent

Application Reference Number: WWO10001

## Design and Access Statement

Doc Ref: **7.04**

### Part 3

#### Beckton Sewage Treatment Works

APFP Regulations 2009: Regulation **5(2)(a)**

Hard copy available in  
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January 2013

Thames  
Tideway Tunnel   
Creating a cleaner, healthier River Thames

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# Section 28

# Beckton Sewage Treatment Works

## 28.1 Introduction

28.1.1 A worksite is required to install new infrastructure to transfer combined sewage from the main tunnel system (including the Lee Tunnel) to Beckton Sewage Treatment Works (STW) for treatment, and to connect a new siphon tunnel to the proposed Lee Tunnel overflow shaft. The proposed development site is at Beckton STW, which is located in the Beckton ward of the London Borough of Newham.

28.1.2 The Lee Tunnel and Beckton Sewage Treatment Works Extension scheme is currently under construction at the STW. In order to ensure that the project works are compatible with this scheme and any associated final design amendments, the images and plans in this section are for illustrative purposes only, except for the Site works parameter plan, which is for approval. Some elements of the detailed design proposals would be drawn up at a later stage. The detailed design would be submitted to the local authority for approval in the form of a DCO requirement.



Figure 28.1: Aerial photograph of the existing Beckton Sewage Treatment Plant site with LLAU indicated



### 28.2 Existing site context

28.2.1 The site itself comprises two areas within the southern and western sections of the operational Beckton STW compound. The western section of the site comprises land under development for the Lee Tunnel and Beckton Sewage Treatment Works Extension scheme. The southern section comprises an area of hardstanding and operational infrastructure associated with the STW bounded by internal access roads. A Grade II listed chimney on the southern section of the site, constructed by Sir Joseph Bazalgette as part of the STW in 1887/89, was dismantled to mitigate the Lee Tunnel works and will be reinstated by the Lee Tunnel project on completion.

28.2.2 The site falls within the Beckton Lands South Site of Importance Nature Conservation (SINC) and The Greenway and Old Fort Nature Reserve SINC and lies adjacent to the River Thames and Tidal Tributaries SINC. The site also falls within the Roding Valley Archaeology Priority Area.

28.2.3 Beckton STW is bounded by the Alfred's Way trunk road to the north, Barking Creek to the east, the River Thames to the south, and by Royal Docks Road, Horne Way and Armada Way to the west.

28.2.4 Jenkins Lane waste transfer station, a cinema and a retail complex lie to the north of the STW. To the east of Barking Creek are a large timber yard and various warehouses. The Ripple Local Nature Reserve lies less than 2km to the east of the site. An area of vacant land lies on the opposite bank of the River Thames to the south. The area to the west comprises a mixture of business and retail parks and Royal Docks Road. There are no residential properties in close proximity to the site.

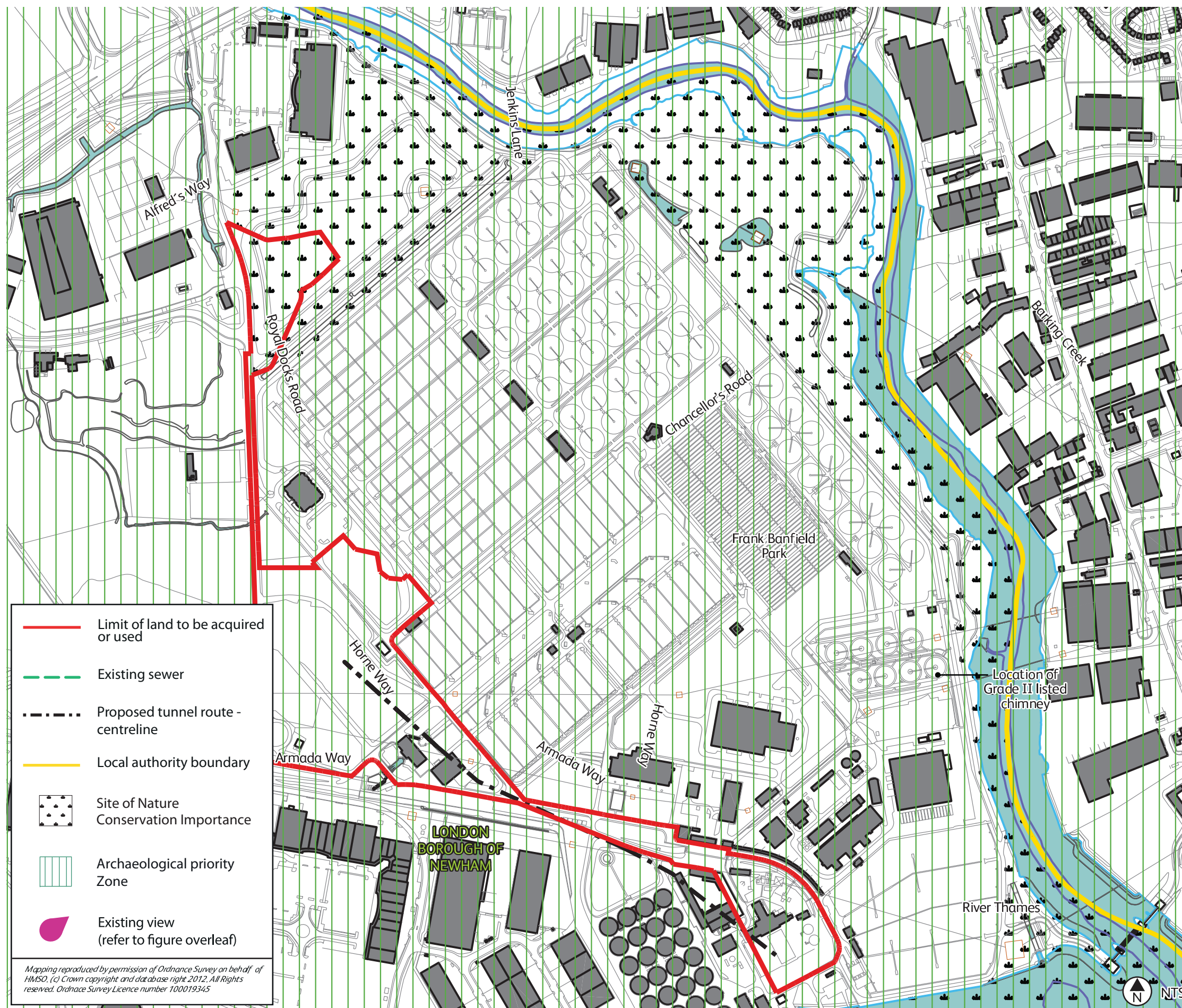


Figure 28.2: Existing site plan





Figure 28.3: Aerial view of proposed site from East



Figure 28.4: Aerial view of proposed site from North West



Figure 28.5: Aerial view of proposed site from South East



Figure 28.6: Aerial view of proposed site from North



Figure 28.7: Existing grit channels and gantries

28.2.5 The main flood risk to the site is from the tidal Barking Creek and the River Thames. The site lies within a 'high probability' flood zone, although it is protected by flood defences.

28.2.6 A number of planning applications applicable to the site have been submitted in the last five years. The Lee Tunnel and Beckton Sewage Treatment Works Extension scheme comprises a storage and transfer tunnel for combined sewage between Abbey Mills Pumping Station and Beckton Sewage Treatment Works (the 'Lee Tunnel'). It also comprises an extension to the STW, which is being upgraded to handle additional combined sewage flows from the Thames Tideway Tunnel and the Lee Tunnel and to prepare for future population growth. The scheme (and its subsequent amendments, detailed applications and associated listed building consent applications) is currently being implemented under planning permission 08/01159/LTGDC at Beckton STW.

28.2.7 Planning application 10/01713/LTGDC for an enhanced sewage sludge digestion facility at the site was approved in March 2011 but will not be implemented. A new application (12/01573/FUL) for a revised facility was submitted in August 2012 and has not yet been determined.



## Existing site access and movement

28.2.8 The existing access to the site is from Alfred's Way via Jenkins Lane and operational access roads within the site.

28.2.9 For safety and security reasons, Beckton STW is only accessible to Thames Water personnel and contractors involved in operating the works or routine maintenance. Thames Water's health and safety requirements govern access and movement around the site.

## Highways

28.2.10 Alfred's Way (A13) is a dual carriageway that runs from west to east and forms part of the Transport for London Road Network.

28.2.11 Jenkins Lane is a two way road with a 30mph speed limit. It connects North Circular Road (A406) in the north to a number of small industrial units and the Beckton STW compound in the south.

## Car parking

28.2.12 There is no formal on-street car parking available along Jenkins Lane. Parking is provided for Thames Water operations within the STW compound.

## Public transport

28.2.13 Gallions Reach Docklands Light Railway Station lies approximately 1.3km to the southwest of the site.

28.2.14 Barking Station, which is served by National Rail services, the London Overground and the Hammersmith and City, and District Underground lines is located approximately 2.4km to the north of the site.

28.2.15 There is one bus stop within 640m of the site on Jenkins Lane. The stop serves two daytime bus routes to local destinations.

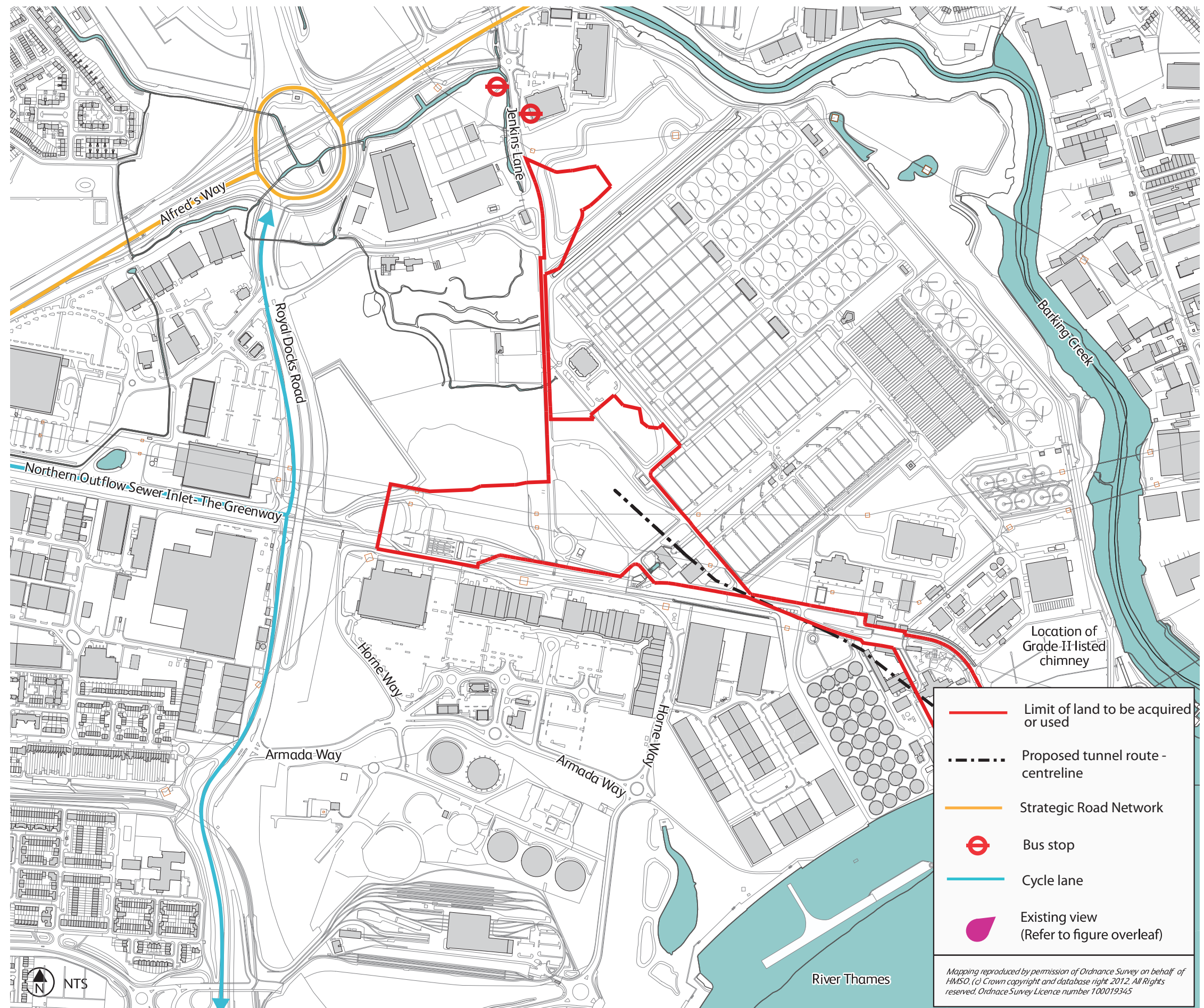


Figure 28.8: Existing site analysis





Figure 28.9: Outfall reservoir detail



Figure 28.10: Inlet to the treatment works from the northern outfall sewers



Figure 28.11: Aerial view of proposed site



Figure 28.12: Aerial view of proposed site from South

**Cycle routes**

28.2.16 The closest cycle route to the site links Royal Albert Dock to Victoria Park. The route traverses the London Borough of Newham between Beckton and Victoria Park via The Greenway, which runs along the top of the Northern Outfall Sewer embankment. At Beckton, the cycle route runs off-road parallel to Royal Docks Road (A1020).

28.2.17 The closest Cycle Superhighway to the site is CS3, which runs between Barking and Tower Gateway. The route begins to the east of the site at the junction of Alfred's Way and River Road.

**Pedestrian routes**

28.2.18 Footpaths are in place along both sides of Jenkins Lane. There are no strategic pedestrian routes adjacent to the site.

28.2.19 A green chain route and a recreational permissive footpath run along Barking Creek to the east. The Greenway is a Public Right of Way located to the west of the site.



### Historical context

28.2.20 The site lies entirely on the River Thames alluvial floodplain over gravel. During the prehistoric period (700,000 BC to AD 43), the site lay in a changing landscape of marshland, dry land and the river channel and became increasingly subject to flooding following a rise in river levels during the late prehistoric period. Several isolated Neolithic and Bronze Age artefacts discovered to the north and south/southwest of the site suggest some activity in the area during this period. In the early Iron Age, the area became tidal mudflats and salt marshland due to rising sea levels. Deposits laid down by successive rises have buried earlier land surfaces at considerable depth.

28.2.21 During the Roman period (AD 43 to 410), the site variously lay in open marshland, on the foreshore of the River Thames, or even partly within the river channel and remained prone to flooding.

28.2.22 Throughout the medieval period (AD 410 to 1485), the site probably comprised intertidal marshland used for pasture. The ground level was raised artificially by several metres when the marsh was drained and reclaimed in the medieval and post-medieval periods. The closest main settlement, the village of East Ham, lay 1.6km to the west of the site. A map from 1805 shows a number of linear north-south trackways across the former marshland from the higher gravel terrace to the north.

28.2.23 Some elements of the sewage infrastructure were built on the site in the early 1860s. In the 1880s, the complex changed from a simple reservoir for storing and releasing raw sewage into the River Thames to a sewage treatment works. This entailed a significant amount of construction, including extensive reservoir tanks and aeration lanes.

28.2.24 By the end of the 19th century, the completed sewage works covered the site, which is now the largest of its kind in Europe. It includes substantial areas of plant, machinery, tanks and buildings. It is a dominant historical land use in the area.

28.2.25 The largest gasworks in Europe, owned by the Gas Light and Coke Company, was constructed nearby to the southwest. The gasworks included riverside piers and a railway, with huge by-products works that produced tar, ammonia, fertilizers and dyes. This complex closed in 1967, although a storage and distribution plant remained into the late 1990s.

28.2.26 Alterations to the sewage treatment works since the 1950s have been relatively minor until the recent commencement of the Thames Tideway Improvements Programme works, including the Lee Tunnel and Beckton Sewage Works Extension scheme.

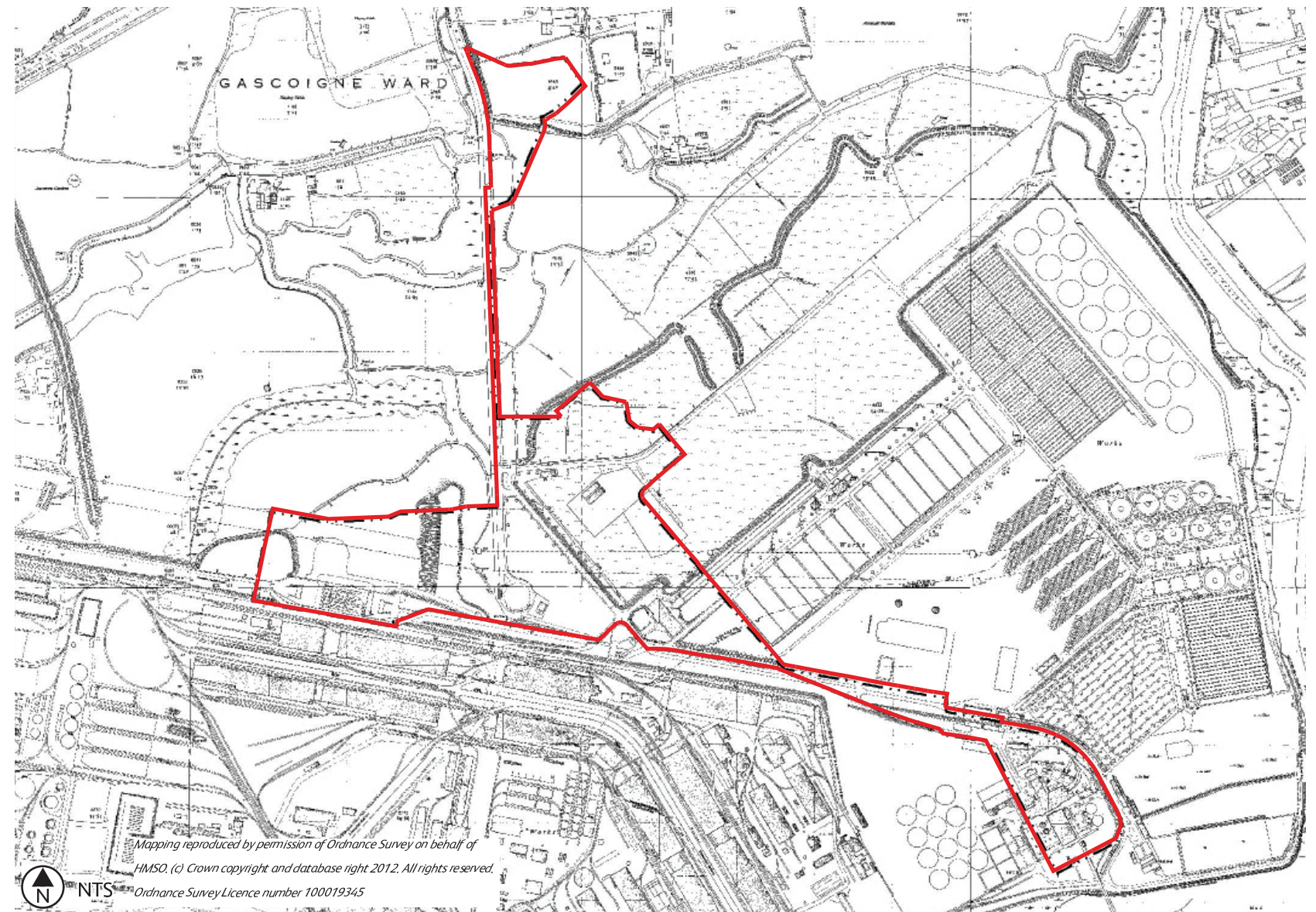


Figure 28.13: Historic map of proposed Beckton site(1962)



## Site analysis: Opportunities and constraints

### The site-specific design opportunities included:

- Preserve and contribute to the use of the site as a strategic STW.
- Design the project works to be in keeping with the existing STW.
- Enhance the setting of the listed chimney.

### The site-specific design constraints included:

- The site lies within a large Thames Water operational STW that is inaccessible to the public.
- The site is located partially within a Site of Importance for Nature Conservation.
- The listed chimney will be reinstated on the southern section of the site.
- The layout of the works is constrained by existing operational infrastructure.
- The Lee Tunnel and Beckton Sewage Treatment Works Extension scheme and sludge digestion works are currently under construction at the site.
- The nature and volume of the combined sewage flows to be handled present engineering constraints.

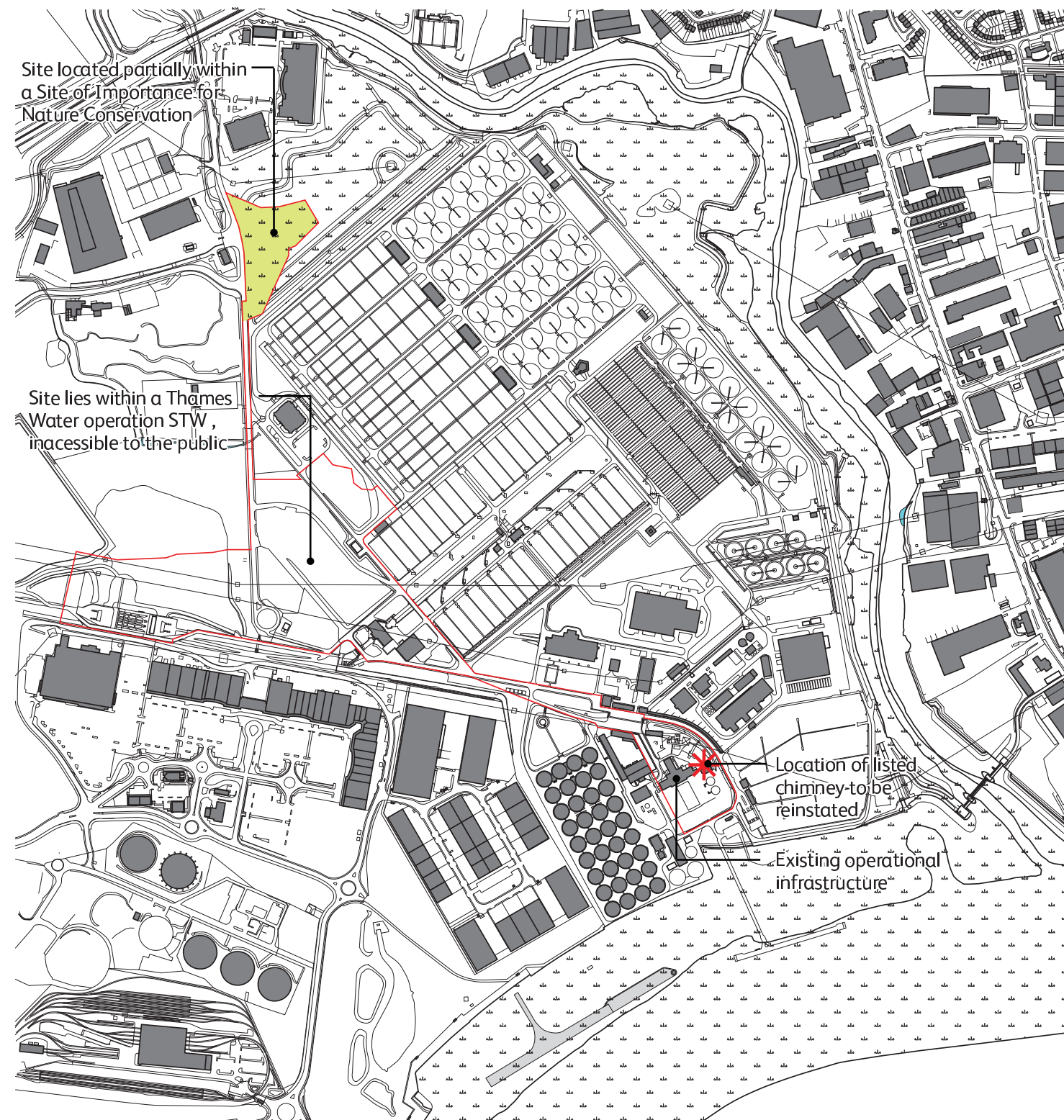


Figure 28.14: Existing site opportunities and constraints sketch



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### 28.3 Design evolution and alternatives

28.3.1 As the majority of the infrastructure for the project would be below ground, the key design objective for the permanent above-ground works was to integrate the functional components into the surroundings. The site-specific design objective at Beckton STW was to successfully integrate the works into the Thames Water operational site while respecting the surroundings.

28.3.2 The design of our proposals at Beckton STW was also significantly influenced by an extensive process of stakeholder engagement and design review. We held various pre-application meetings with the London Borough of Newham and other strategic stakeholders. More information on our public consultation process is provided in the *Consultation Report*, which accompanies the application.



Figure 28.15: Photo of Site

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### 28.4 Proposed design

28.4.1 This section describes the amount, layout and scale of the proposed development and how the functional components would be integrated into the existing site. Details of the proposed landscaping and appearance of the site are also embedded in the description where relevant.

#### Fixed principles

28.4.2 The Site works parameter plan defines the zones in which the proposed works would take place. The plan indicates the general location of the siphon tunnel shafts and other above-ground structures.

28.4.3 The site-specific design principles are included in the *Design Principles* document which accompanies this application. These principles establish the parameters for the above ground structures and landscaping on the site and have, where possible, been developed in consultation with the local authority. The site-specific principles should be read in conjunction with the project-wide design principles.

#### Design objectives

28.4.4 The works would be entirely located within the boundary of the STW. Our main objectives in developing the design were to enable the on-going operation and development of the site and to respect its functional setting.

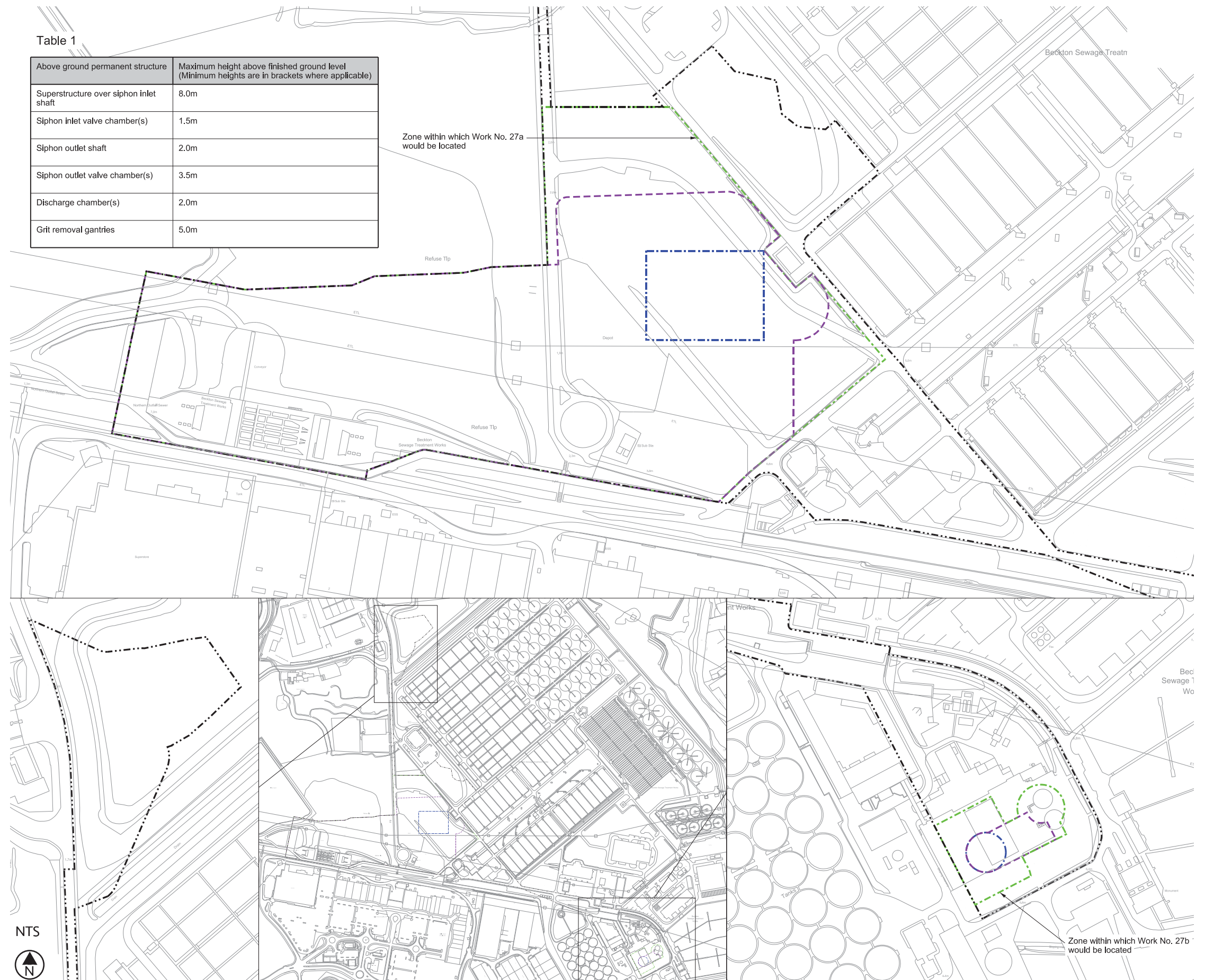


Figure 28.16: Site works parameter plan - refer to Site works parameter plan in the *Book of Plans*



## Integration of the functional components

28.4.5 The majority of the proposed works are below-ground structures, including:

- a. two siphon tunnel shafts (inlet and outlet)
- b. a siphon tunnel
- c. two additional pumps in the Tideway Pumping Station
- d. a transfer pipeline.

28.4.6 Post construction, the following structures would be visible on the site:

- a. a single-storey building
- b. additional grit removal gantries in the STW inlet works
- c. two new valve chambers
- d. the transfer pipeline
- e. a siphon outlet shaft and discharge chamber.

28.4.7 The project works at Beckton STW would be constructed and operated on land owned solely by Thames Water in operational wastewater use, which would be consistent with the existing use.

28.4.8 The siphon tunnel and associated infrastructure would act as a relief structure to enable combined sewage flows to bypass the STW and discharge directly into the River Thames from the Lee Tunnel overflow shaft when the tunnel system reaches capacity. The inlet shaft would sit near the Lee Tunnel connection shaft in the western section of the site and the outlet shaft near the Lee Tunnel overflow shaft in the southern section.

28.4.9 A single story building would be constructed in the western section of the site to provide access to the siphon tunnel inlet shaft and to house associated equipment.

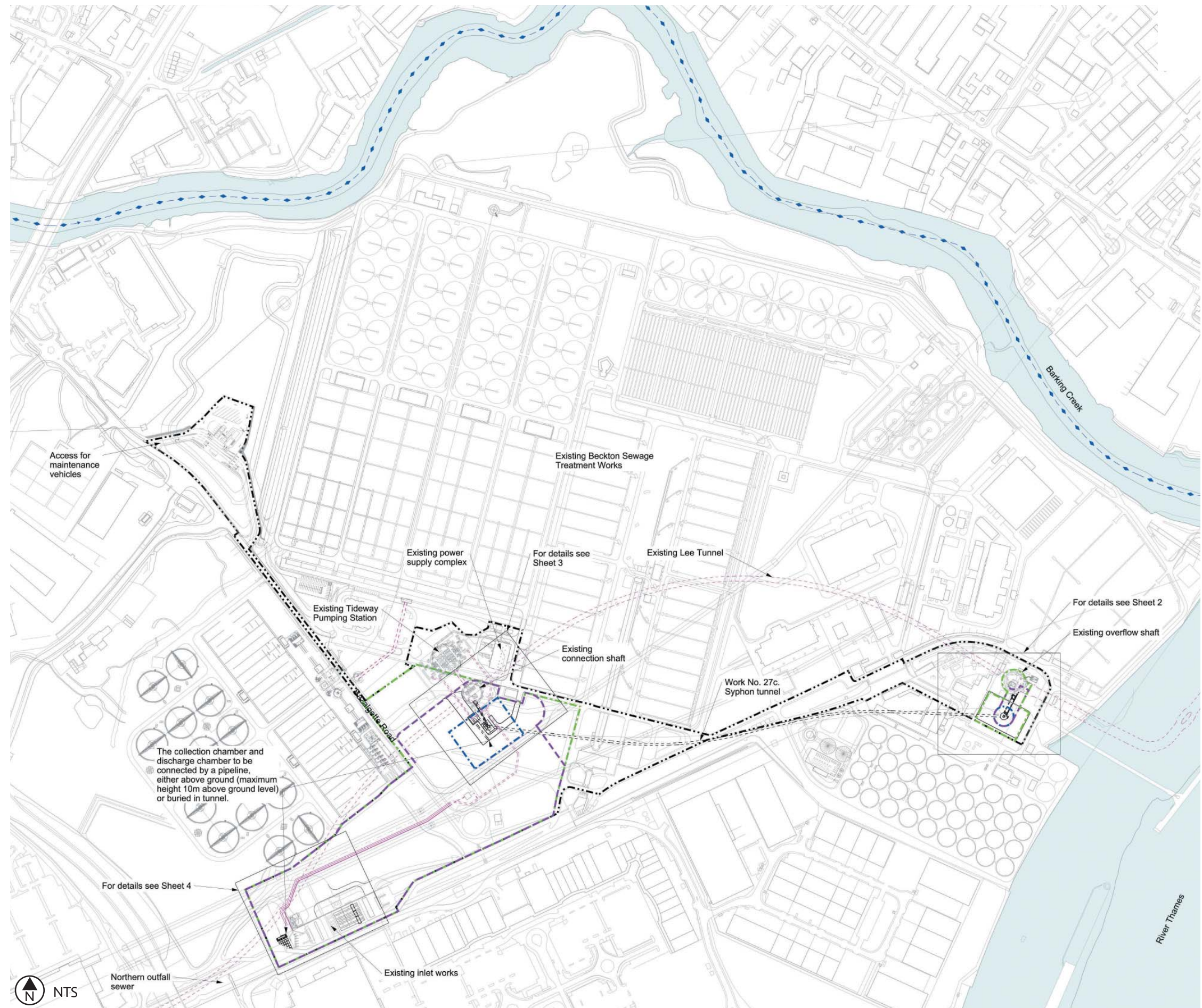


Figure 28.17: Permanent works layout - refer to Permanent works layout in the *Book of Plans* (Sheet 1 of 4)





28.4.10 The two valve chambers to serve the siphon tunnel would be raised slightly above ground level. One chamber would sit near the Lee Tunnel connection shaft in the western section of the site and the other near the Lee Tunnel overflow shaft in the southern section.

28.4.11 The additional grit removal gantries would be used to remove grit from the STW inlet channels and would support the existing gantries.

28.4.12 The transfer pipeline could be at least partially raised above-ground for hydraulic and topographical reasons. The pipeline and the associated chambers and structures would be used to direct combined sewage flows from the future Tideway Pumping Station to the STW inlet works. The pumping station will be constructed on the western section of the site as part of the Lee Tunnel).

28.4.13 The footprint, location and amount of new infrastructure are constrained by the functional requirements of transferring combined sewage flows through the site. They are also influenced by the need to carry out routine maintenance of plant and to meet the requirements of health and safety legislation.

28.4.14 The scale of the proposed above-ground structures is determined by the functional requirements. The structures are expected to be modest in comparison to the below-ground works and the existing and approved new structures at the STW. The appearance of the project structures would be in keeping with existing structures, plant and buildings at the site and would be agreed at a later stage.

28.4.15 Areas of hardstanding would be included to facilitate maintenance vehicle access and incorporate ground-level access covers to the below-ground infrastructure.

28.4.16 The proposed above-ground structures would be integrated around the existing vehicular and pedestrian routes within the site. We do not propose to carry out any additional landscaping works.



Figure 28.18: Permanent works layout - refer to Permanent works layout in the *Book of Plans*(Sheet 2 of 4)

28.5 Access and movement

28.5.1 For safety and security reasons, Beckton STW would remain accessible only to Thames Water personnel and contractors. Thames Water's health and safety requirements would continue to govern access and movement around the site.

28.5.2 Maintenance and servicing of the project infrastructure would be undertaken in accordance with normal site operating procedures and health and safety policy.

28.5.3 Pedestrian access and movement around the Beckton STW compound would not be affected by the proposals.

Thames Water access requirements

28.5.4 The permanent access would remain as existing, off Alfred's Way, via Jenkins Lane and operational access roads within the site.

28.5.5 Once the project is operational, it is anticipated that Thames Water personnel would visit the site approximately every three to six months to inspect and carry out maintenance of the ventilation and below-ground equipment. This would likely involve a visit by personnel in a small van during normal working hours and may take several hours.

28.5.6 It is anticipated that a major internal inspection of the tunnel system and underground structures would be required once every ten years. This process would likely involve a small team of inspection staff and support crew and two mobile cranes to lower the team into the siphon tunnel outlet shaft. The inspection would be carried out during normal working hours and would likely take several weeks.

28.5.7 Thames Water may also need to visit the site for unplanned maintenance or repairs, for example, in the event of a blockage or an equipment failure. Such a visit may require the use of mobile cranes and vans.

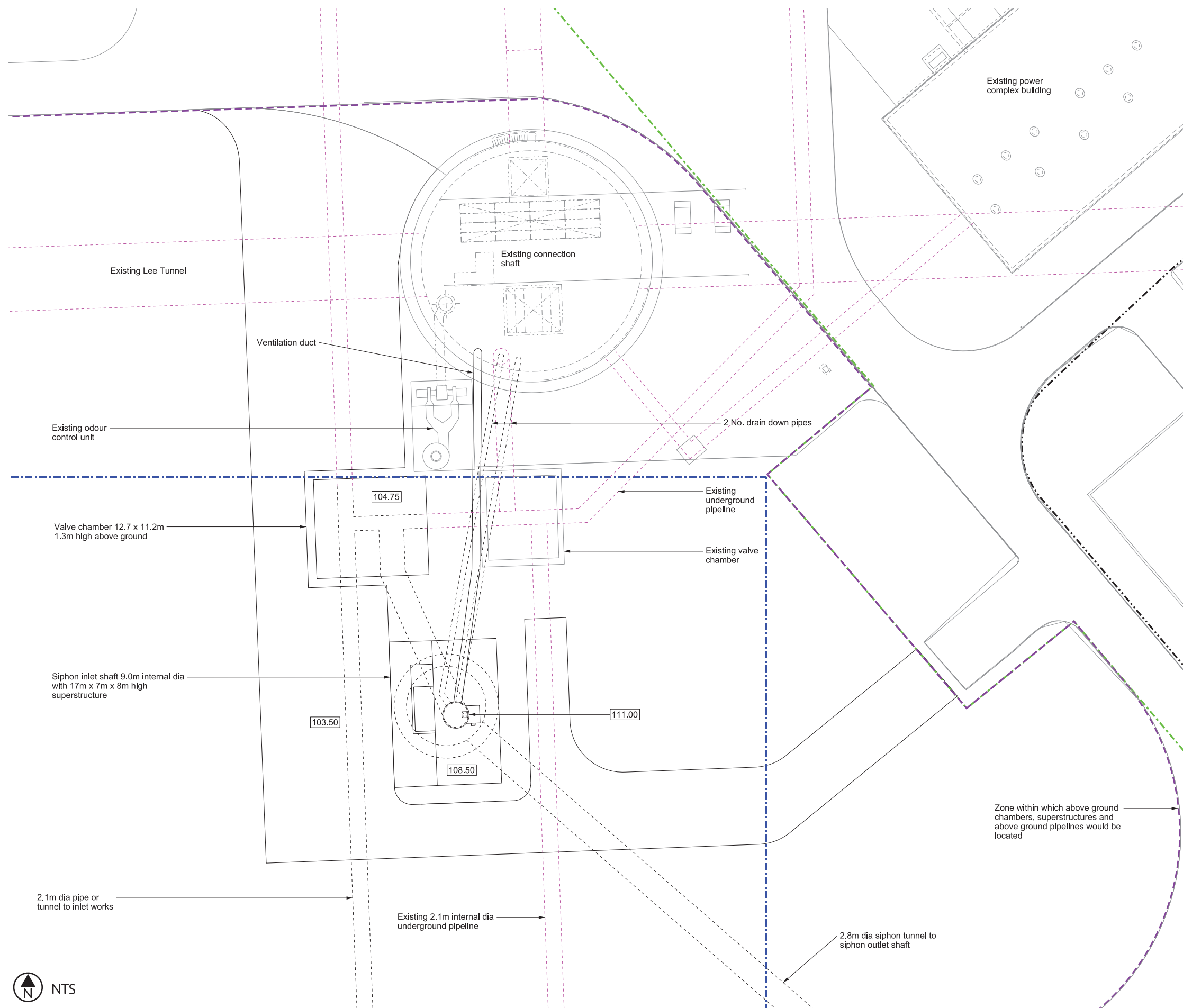


Figure 28.19: Permanent works layout - refer to Permanent works layout in the *Book of Plans*(Sheet 3 of 4)



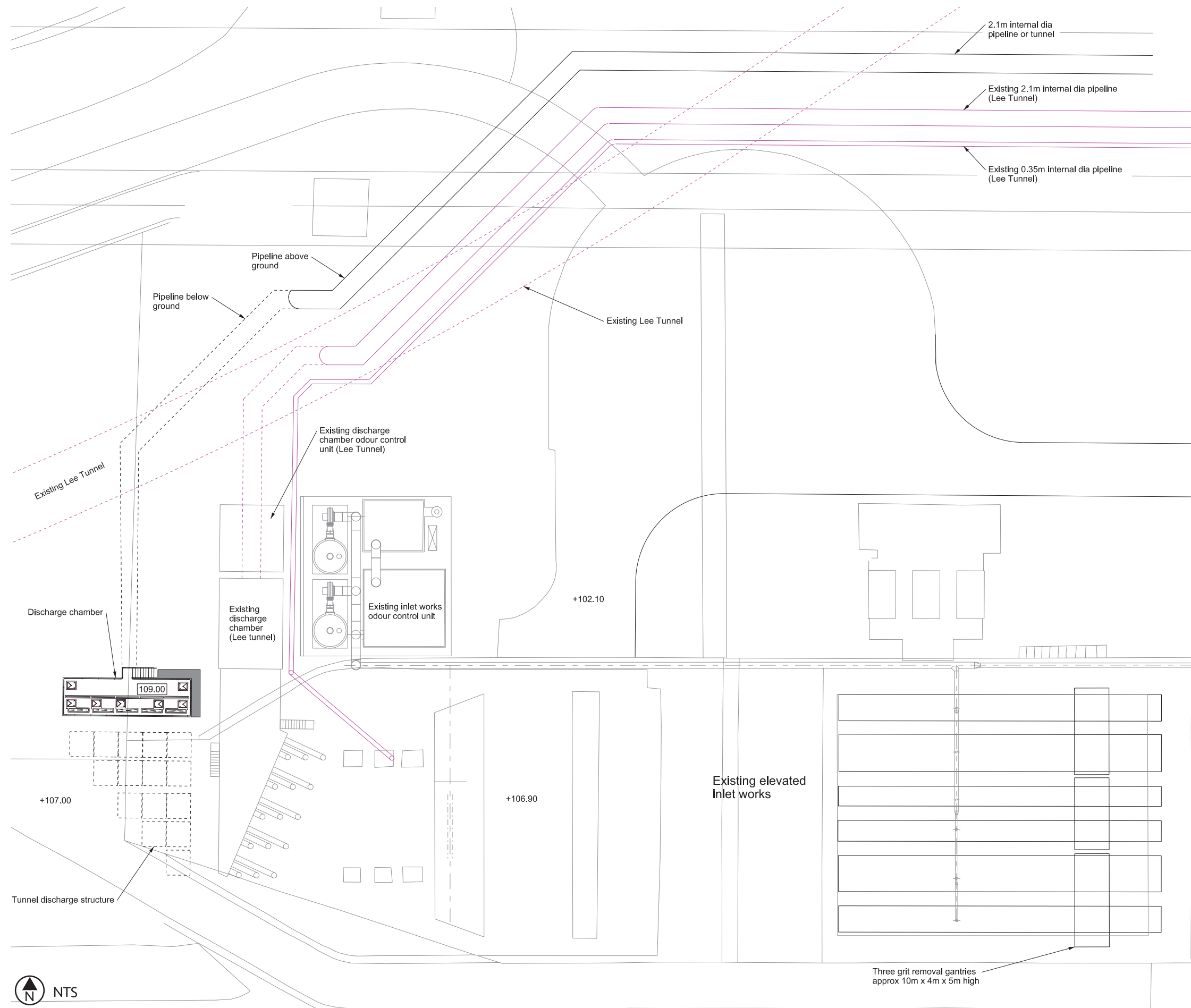


Figure 28.20: Permanent works layout - refer to Permanent works layout in the *Book of Plans*(Sheet 4 of 4)

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