Chapter 23
Route Window SE4
North Woolwich portal and Thames tunnel
### Introduction

23.1 The works within this route window comprise the construction of the North Woolwich portal, the twin-bore tunnel under the River Thames and a shaft at Warren Lane south of the river. Overhead electrification equipment will be installed throughout the route window.

23.2 There are three Crossrail sites in this route window:
- the North Woolwich worksite, located north of the River Thames;
- the North Woolwich Sewer Diversion worksites;
- the Warren Lane site, located south of the River Thames.
These worksite locations are shown on Map SE4 (iv).

23.3 The construction of North Woolwich portal is estimated to take four years and the Warren Lane shaft is also expected to take about four years.

23.4 It is expected that excavated material from the North Woolwich Portal Worksites will be removed by road to a landfill site to the east. Excavated material from the Warren Lane worksite will be taken by road to Manor Wharf, Belvedere, where it will be transferred to barges. The drawings provided at the end of this chapter present the main features of the route window and the assessed construction lorry routes.

### Baseline conditions

23.5 The route window lies within the London Boroughs of Newham and Greenwich.

23.6 In this assessment it is assumed that, before the Crossrail works start, the North London Line services south of Stratford will have been withdrawn and Silvertown and North Woolwich stations closed after the opening of the DLR extension to the Stratford low-level station (see Baseline section in Volume 8a). London City Airport and King George V stations on the DLR, with a high-frequency service, will be near by and provide suitable alternatives to Silvertown and North Woolwich stations respectively.

#### North Woolwich portal

23.7 Residential areas lie to the north of the site and industrial buildings to the south, while further south lies the River Thames.

23.8 Between Silvertown and North Woolwich stations the NLL lies between the A112 Albert Road to the north and Factory Road to the south (see Figure 23.1). Albert Road links to Connaught Bridge and routes to the A13 to the west and connects to A406 North Circular Road to the east.

23.9 Factory Road is an access road to the large riverside industrial area which includes Tate & Lyle. Tate & Lyle owns a footbridge over the railway line, which used to connect the factory to a social club on the other side. It provides links to North Woolwich Road and Connaught Bridge to the west, and Woolwich Ferry and A406 North Circular Road to the east.

23.10 Albert Road, Pier Road and part of Factory Road are bus routes.

#### Warren Lane shaft

23.11 The Warren Lane shaft will be located at the corner of the A206 Beresford Street and Warren Lane, north of Woolwich town centre.

23.12 To the north of the worksite are the River Thames and Royal Arsenal Gardens (formerly a power station site); to the east, a corridor of land once used by the London Electricity Board; to the
23.13 Warren Lane is a cul-de-sac providing access to light industrial premises, though it is understood that its use could change as a result of planned local redevelopment. The A206 links Woolwich and Erith and connects into the Thamesmead road network.

23.14 At its junction with Warren Lane, Beresford Street is a four-lane road and forms part of several bus routes. The London Borough of Greenwich is the local highway authority.

23.15 There is on-street parking for up to nine cars on the northern side of Warren Lane in the vicinity of the worksite.

**The permanent works**

23.16 North of the river, the Crossrail line will follow the route of the existing Silverlink/North London Line to a point just east of its former terminus at North Woolwich, descending into a new twin-bore tunnel to be constructed beneath the Thames between portals at North Woolwich and Plumstead. Beneath the Thames, the tunnel will follow an alignment east of the route taken by the Woolwich Ferry.

**North Woolwich portal**

23.17 The North Woolwich portal will be located within the existing railway corridor at a point about 100 m east of Store Road, between Factory Road and A112 Albert Road, from where it will descend an open ramp to a point opposite Store Road. From this point a cut-and-cover box will be constructed as far as the portal. The portal will include emergency intervention point (EIP) and escape facilities with equipment housed in a single-storey structure at the surface.

23.18 The North London Line will have been terminated short of Custom House before Crossrail is built, so North Woolwich station will be closed. The site will be used to construct the North Woolwich portal of the tunnel under the River Thames, and the ramp down to it from surface level.

23.19 A considerable amount of excavated material will require removal from the site. This is likely to occur over a six month period and, at its peak, will generate a significant number of lorry movements as all excavated material is to be removed by road. The number of daily lorry movements is expected to be 280 during the 26 week peak construction period and about 100 at other times. Factory Road will provide the main access to the worksites.

**Utilities**

23.20 Building the North Woolwich portal will necessitate the following modifications to three sewers:
- reconstruction of a sewer at Albert Road (north of the Thames Water pumping station not shown on map);
- diversion of a sewer under Factory Road (diversion from Store Road westward);
- diversion of a sewer at Albert Road (in the vicinity of the portal).

23.21 The first Albert Road sewer runs under the railway tracks and must be exposed by digging open-cut to a depth of 5 m. Access will be from adjacent highways and traffic flow on Albert Road will be maintained through the use of shuttle working.

23.22 The Factory Road sewer must be diverted south of its present route by tunnelling under the existing BT tracking station. A new route will be tunnelled outwards from a central shaft in the North Woolwich worksite. Access will be from the Factory Road (from the west), and temporary traffic management will be required to maintain traffic flow. Because one end of the tunnel will be at the junction of Factory Road and Store Road, a road closure will be necessary, which is likely to affect a local bus service.

23.23 The second Albert Road sewer to be diverted is a relatively short length. Traffic movement on Albert Road will be maintained by means of appropriate traffic management.

**Warren Lane shaft**

23.24 To satisfy the requirement of Her Majesty’s Railway Inspectorate that a sub-surface railway shall have intervention shafts at a maximum interval of 1000 m, Crossrail will have to construct two shafts for the 2390 m long tunnel between Plumstead and North Woolwich Portals. One shaft will be at the corner of Warren Lane and Beresford Street. The other will be at Arsenal Way in Route Window SE5.

23.25 The site of the Warren Lane is within the Royal Arsenal Gardens, in an area proposed for redevelopment. Part of the land is occupied by a warehouse building at the entrance to Royal Arsenal Gardens.

23.26 The shaft will be 13.5 m in diameter and will provide ventilation for the tunnel in addition to intervention facilities. A building 10 m tall and 18 m in diameter will be constructed on the surface to house emergency intervention and ventilation equipment.

23.27 At the Warren Lane shaft on the south bank of the River Thames, the eastbound and westbound tracks will lie at a depth of about 36 m below.

23.28 As mentioned, the shaft will provide ventilation to the Thames Crossing Tunnels between North Woolwich portal and Plumstead portal. It will also provide access for emergency intervention but emergency escape will not be provided at this location. Passenger evacuation will be facilitated at North Woolwich portal, Arsenal Way shaft and Plumstead portal.

23.29 The surface-level structure has been designed to form part of the access to the Royal Arsenal Gardens. In order to reduce the size of the surface structure, as much of the accommodation as possible will be underground.

23.30 A disused building currently occupies the site. It will be demolished to facilitate construction of the shaft.

**Worksite assessment (group 1)**

**North Woolwich worksite**

23.31 The worksite associated with the North Woolwich portal will facilitate a number of construction activities. The first worksite is located south of the railway line on a rectangular piece of land on
which 10 industrial units currently stand (see Figure 23.2). These units will be demolished to make room for the worksite and access road. The site is immediately west of Henley Road and constitutes approximately half the existing frontage to this road on its west side.

Figure 23.2 Industrial units on Factory Road, to be demolished to create the North Woolwich worksite

23.32 On the northern boundary of the worksite the whole width of the existing carriageway of Factory Road will be consumed within the worksite, effectively severing the existing through route for general traffic. However, a route through the site for construction traffic will be maintained, allowing such traffic to enter the site from either direction, and to pass through it in both directions.

23.33 The access points will be located at the north-west and south-east corners of the site. A temporary realignment of part of Factory Road will be undertaken to facilitate lorry access to the proposed entrance/exit on the north-west corner. In order to achieve efficient and safe movement between the two worksites the existing one-way system in Store Road and Henley Road will be retained.

23.34 The eastern end of the worksite, near the North Woolwich portal, will occupy an area of land adjacent to the Thames Water pumping station. It is connected to the rest of the North Woolwich worksite. This area will abut the pumping station on the south, the east and the north sides. The main access to this part of the worksite will be from Store Road to the west and Pier Road to the south and east, via a two-way entry/exit gate located just south of the Thames Water site.

23.35 To facilitate the track works and the construction of the ramp and portal, it will be necessary to use existing areas of adjacent highways (Albert Road and Factory Road) for designated periods of time. Approximately half the carriageway width on both roads will be closed to vehicular and pedestrian traffic to enable lorries and other plant to operate within these areas. The affected parts of carriageway will become temporary work areas and relevant traffic management, (including shuttle working with signals), will be put in place to assist the safe movement of general traffic. The location of these temporary work areas will change as the work progresses. Although it is likely temporary work areas will be set up on Albert Road and Factory Road at the same time, there will only be one temporary work area on each road at any given time.

Figure 23.3 Access to the eastern part of the worksite on Store Road

23.36 The temporary work areas may necessitate the relocation of some bus stops from their existing positions on the north and south sides of Albert Road. Some additional civil engineering work such as the provision of temporary footways may be necessary to ensure that the temporary bus stops are safe for the public to use.

23.37 The traffic management implications of the works have been discussed with Transport for London and the London Borough of Newham. Tate and Lyle, which generates substantial volumes of heavy goods vehicles traffic and is located in close proximity to the site has also been consulted. The final traffic management arrangements will be discussed further and any necessary consents obtained prior to the commencement of construction. No significant residual impacts in association with the worksites are anticipated.

Lorry routes assessment

23.38 North Woolwich Worksite is south of the railway line and most of the construction traffic to these sites will approach from Factory Road. Given the proximity of the Woolwich Ferry Pier to both worksites, construction traffic will enter and leave both sites from the western end of Factory Road unless operational factors dictate otherwise. From here the construction traffic will travel to
and from the A13 via North Woolwich Road, Connaught Bridge, Royal Albert Way and the A406. The proposed lorry routes for the North Woolwich worksites are shown on Map SE4 (iv).

23.39 Although this means that the construction traffic is not joining the TLRN at the nearest connection point to the sites, ie the A117 at the Albert Road/Pier Road junction, this route will ensure that any disruption to the operation of the ferry is kept to a minimum. All construction traffic will approach and leave from the west via Factory Road, so it will be possible to distribute traffic from this point to the various working areas within the site. For example, lorries serving the temporary work areas along Albert Road could be directed from this worksite but would leave via Albert Road heading west, and then go to A13 via the Connaught Bridge.

23.40 These arrangements have been discussed with Transport for London, the London Borough of Newham and Tate & Lyle and no significant impacts on road users, pedestrians or cyclists are expected.

Worksite assessment (group 2)

Warren Lane worksite

23.41 The land-take required for the worksite will include the disused building (requiring demolition), the site of the old (demolished) London Electricity Board substation area, and the oval area belonging to the Royal Arsenal Gardens.

23.42 Construction activities on this worksite will result in a variety of construction traffic, including that associated with site establishment and the removal of excavated material. Materials, including ready-mix concrete and excavated material, will be delivered and removed by road.

23.43 Preliminary estimates indicate that there will be about 26 lorry movements a day during the peak construction period of around 72 weeks.

23.44 Access into the worksite will be from Warren Lane. To provide safe access for construction traffic, it will be necessary to remove some or all of the six parking bays along the frontage of the site. Since they are for general use, there will be no significant impact. In any event, given the probable future amendments to the local road network, associated with redevelopments, it is believed that there may be scope to mitigate this temporary loss.

Lorry routes assessment

23.45 Following consultation with the London Borough of Greenwich and Transport for London, it is proposed that lorries associated with general construction will gain access to the TLRN at the A205 South Circular Road, by way of A206 Woolwich High Street since the South Circular Road is only 250 m west of the Warren Lane/Beresford Road/Woolwich High Street junction. When excessive queuing occurs at the Woolwich Ferry approach road due to unusual local traffic conditions, lorries will approach from the east, along Beresford Road.

23.46 Excavated material will be transported to Manor Wharf (see Route Window SE6A) for onward transport to the disposal site by barge. The excavated material will account for around 17 of the 26 daily lorry movements during the peak construction period. At other times, the total number of lorry movements will be in the region of 18 a day.

Mitigation and temporary impacts

23.47 There will be no significant adverse traffic impact in Route Window SE4, however for the North Woolwich worksite temporary possessions of sections of the carriageways will be also required to facilitate vehicle access and egress and plant operation. Traffic management measures, including shuttle working, will be used in consultation with the highway authority and Police to minimise delays to traffic.

23.48 The section of Factory Road that will be closed will sever the through route. Access points will be located at the northwest and the southeast corners of the worksite and provision will be made for a haul route for construction traffic across the site. The current one-way clockwise operation in Henley Road and Store Road to the east of the worksite will be maintained. An additional access will be constructed to the west of the portal for use by lorries to access Tate & Lyle sugar refinery under emergency traffic conditions.

Mitigation and permanent impacts

23.49 There will be no significant adverse traffic impact in Route Window SE4, so no mitigation is necessary.