



Great Eastern Line

Service Improvements

- New and more frequent trains
- Faster journeys to parts of the City, West End and west London with no need to change trains
- Improved links to Heathrow Airport, Docklands and south-east London
- Additional capacity and reduced crowding

Crossrail will generally operate as an “all stations” service with up to 12 trains per hour during peak periods and up to eight at other times.

Most of the existing “Metro” services will be replaced, although some will continue to operate between Gidea Park and Liverpool Street. Services from further afield such as Ipswich, Chelmsford and Southend will be able to continue to operate as they do today.

The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.

Other major benefits of Crossrail include reduced crowding on the Central and District lines and the release of platform capacity at Liverpool Street station which will facilitate additional train services from places such as Stansted Airport.



Liverpool Street Station at present



Possible Crossrail Train



Pudding Mill Lane (1)

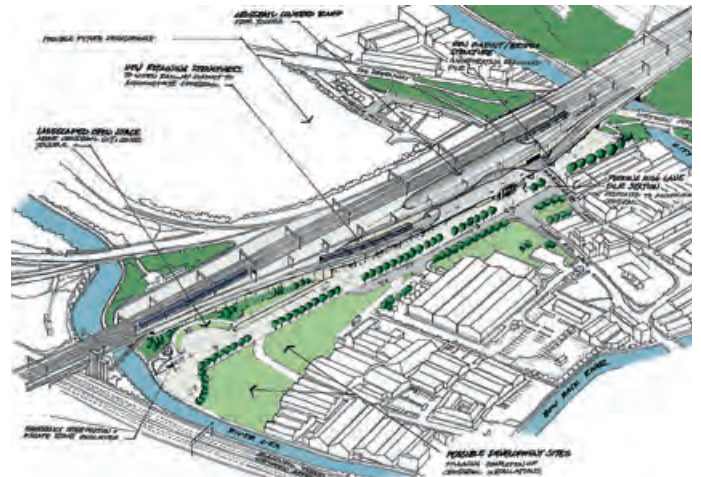
Tunnel Portal

A portal for the Crossrail tunnels will be constructed at Pudding Mill Lane. The tunnel portal will be used as the entrance/exit for Crossrail trains to operate between the Great Eastern Line and two new tunnels through central London.

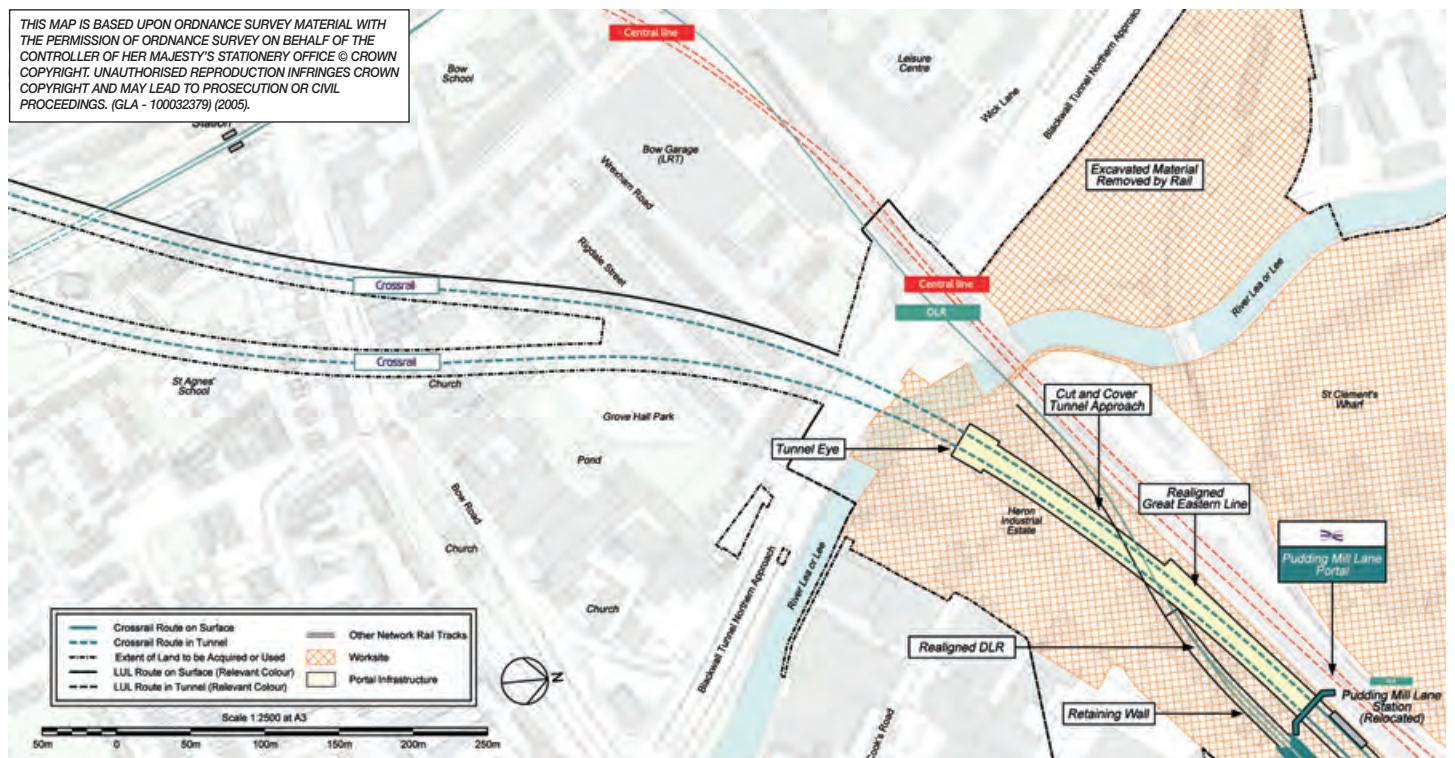
In order to accommodate Crossrail, the existing railway viaduct will be widened. The Docklands Light Railway (DLR) viaduct and station at Pudding Mill Lane will be relocated to the south. Space will be provided for the DLR to construct a second line and serve the station with longer trains if required.

The tunnel boring machines will be launched from the site and pass under the River Lea towards central London. The River Lea bed will be protected during construction of the Crossrail tunnels. The river will continue to be navigable.

Bow Midland Yard, an existing depot facility and rail sidings, will be used for the transport of materials for construction and the removal of material excavated from tunnel construction by rail. An area currently used as a waste transfer site will need to be relocated.



Artist's Impression – Pudding Mill Lane Portal



Pudding Mill Lane Portal



Pudding Mill Lane (2)

Tunnel Portal

The existing underpass at Pudding Mill Lane will be closed to vehicular traffic and a new road connection to Marshgate Lane will be provided.

A number of utilities, including local water pipes and sewers, will be diverted.

Construction of the portal will require some commercial premises to be relocated. These issues are being considered on a site by site basis with the relevant property owners.

A shaft used to launch tunnel boring machines will also be used for emergency escape and access to and from the tunnels. Upon completion of construction, this area could be integrated with local development to provide a new public open space.

Construction of the portal will take approximately 5-6 years.

Crossrail have identified a likely environmental impact on the River Lea and City Mills River, both of which are sites of Nature Conservation Importance. Surveys are currently being undertaken in these locations and discussions are being held with the Environment Agency.

Crossrail and the Olympic bid team have been working together since last year to ensure that both projects complement each other. The projects will work closely together at the detailed planning stage to ensure that both schemes can be delivered. Although Crossrail will be completed after 2012, the projects add value to each other because they will both bring long term significant regeneration to east London.



Pudding Mill Lane aerial photograph of existing site

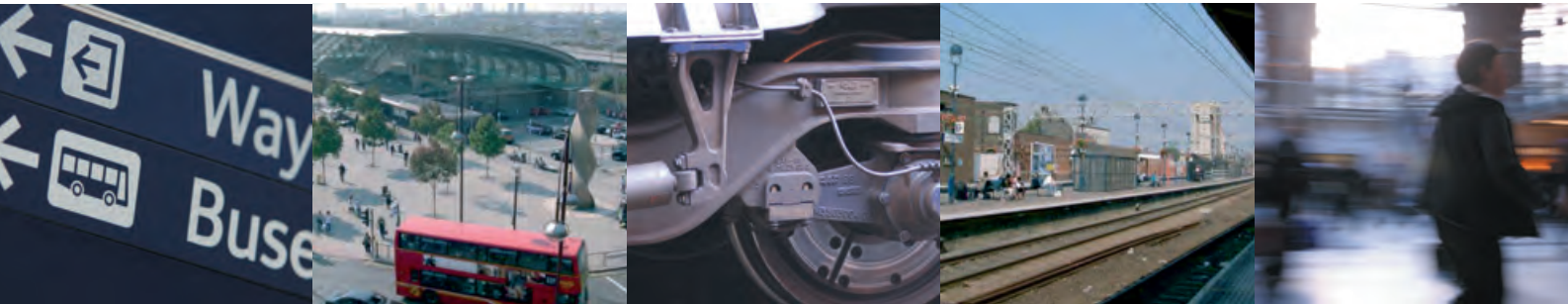


Existing Pudding Mill Lane DLR station



Stratford (1)

Station Improvements

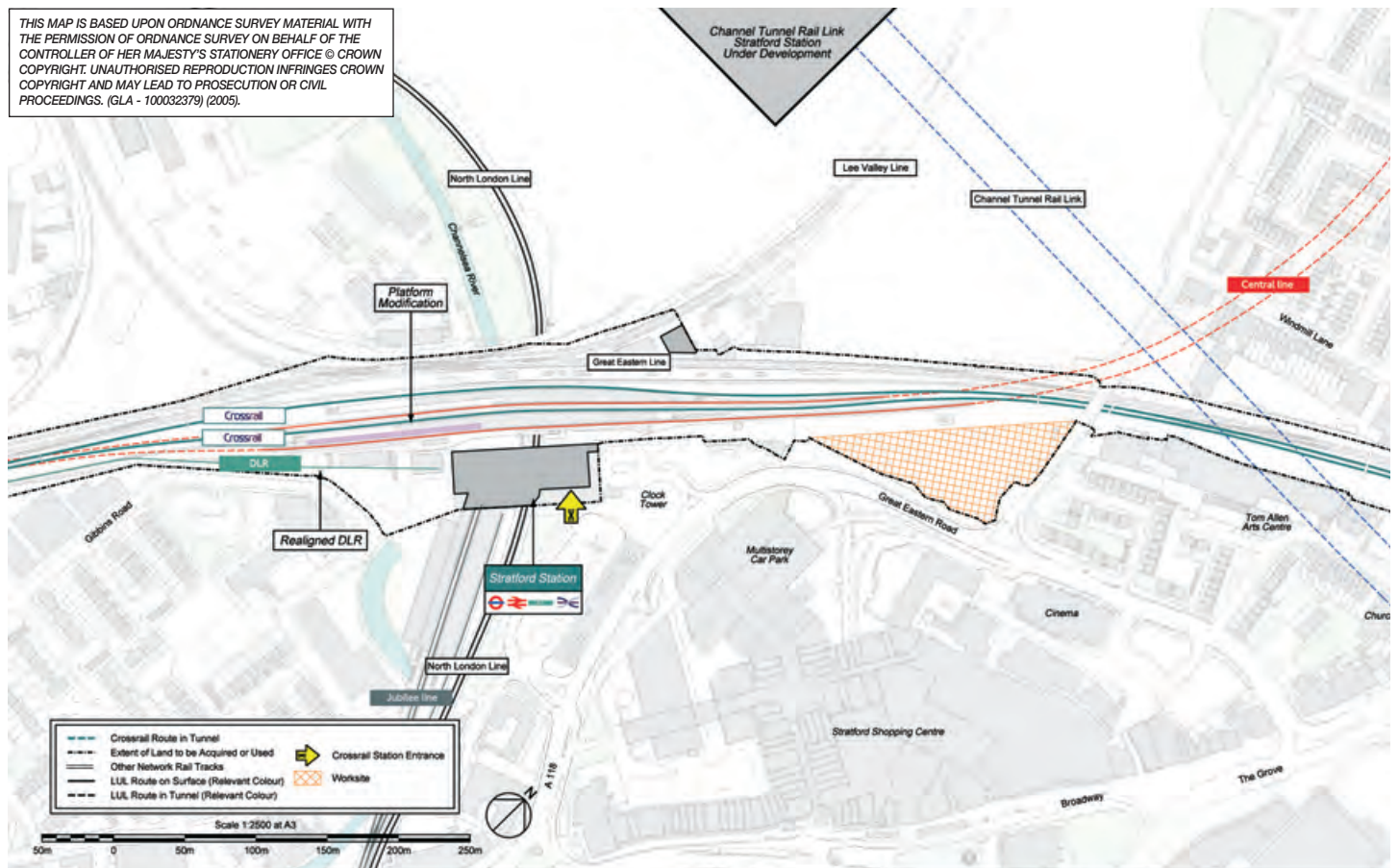


A review of the design and layout of Stratford station is currently being carried out alongside a number of major local development proposals, including the Channel Tunnel Rail Link, proposed DLR extension and the London 2012 Olympic bid. This process is being led by Transport for London. It is expected that a number of station improvements will be carried out over the next few years.

Any station improvements will be agreed with the relevant railway bodies, Transport for London, the London Borough of Newham and the local community.

The DLR Station will be moved south prior to the opening of Crossrail. This will enable the existing DLR bay (platform 4) to be filled in to provide for a wider platform for Crossrail trains using platform 5. Work on the station platforms will be co-ordinated from a temporary worksite at the intersection of Great Eastern Road and Angel Lane.

The platform modifications will be carried out over approximately four months.



Stratford Station



Stratford (2)

Service Improvements

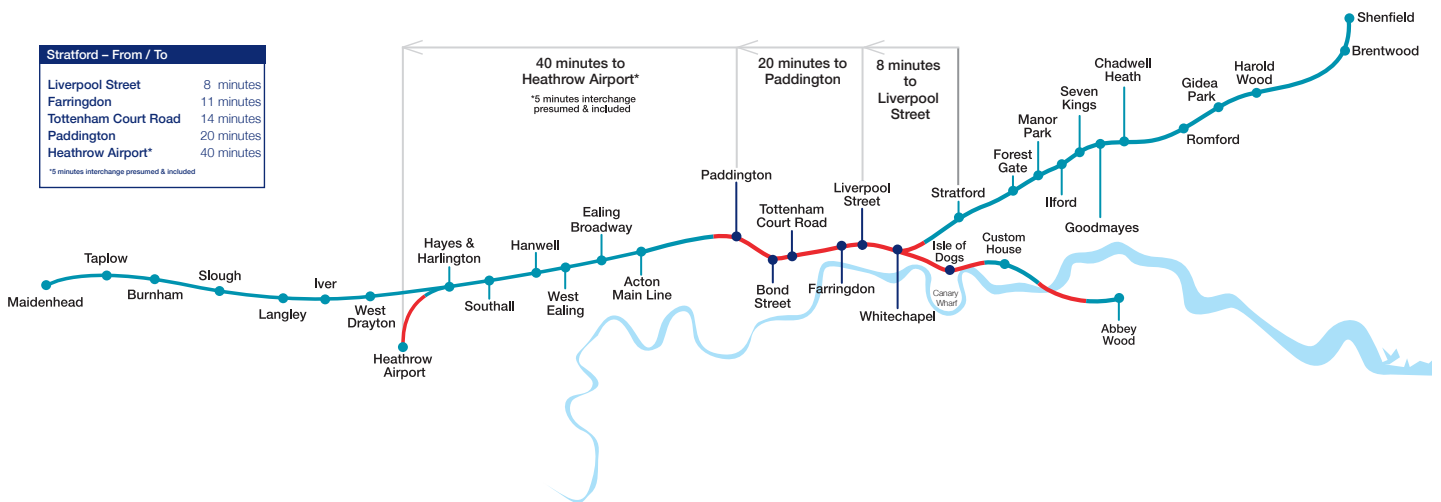
Crossrail will improve train services to and from Stratford by providing journey time savings and a greater variety of journey opportunities.

During peak periods Crossrail will have up to two additional train services per hour to and from Stratford.

The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Stratford Station at present



Typical Crossrail journey times from Stratford



Maryland

Service Changes

Crossrail services will not stop at Maryland station.

It is felt that the benefits of Crossrail trains stopping there are far outweighed by the disruption that extending the platforms would cause. Owing to the current positioning of the bridges at each end of the station, the platforms cannot be extended for 10-car trains. The construction work involved would generate significant local traffic problems for a number of years and would also involve the closure of the Great Eastern Line during certain periods.

Although Crossrail will not stop at Maryland, the station will continue to be served by other train services to/from Liverpool Street station. However, based upon current timetables, train services may only serve Maryland during peak periods:

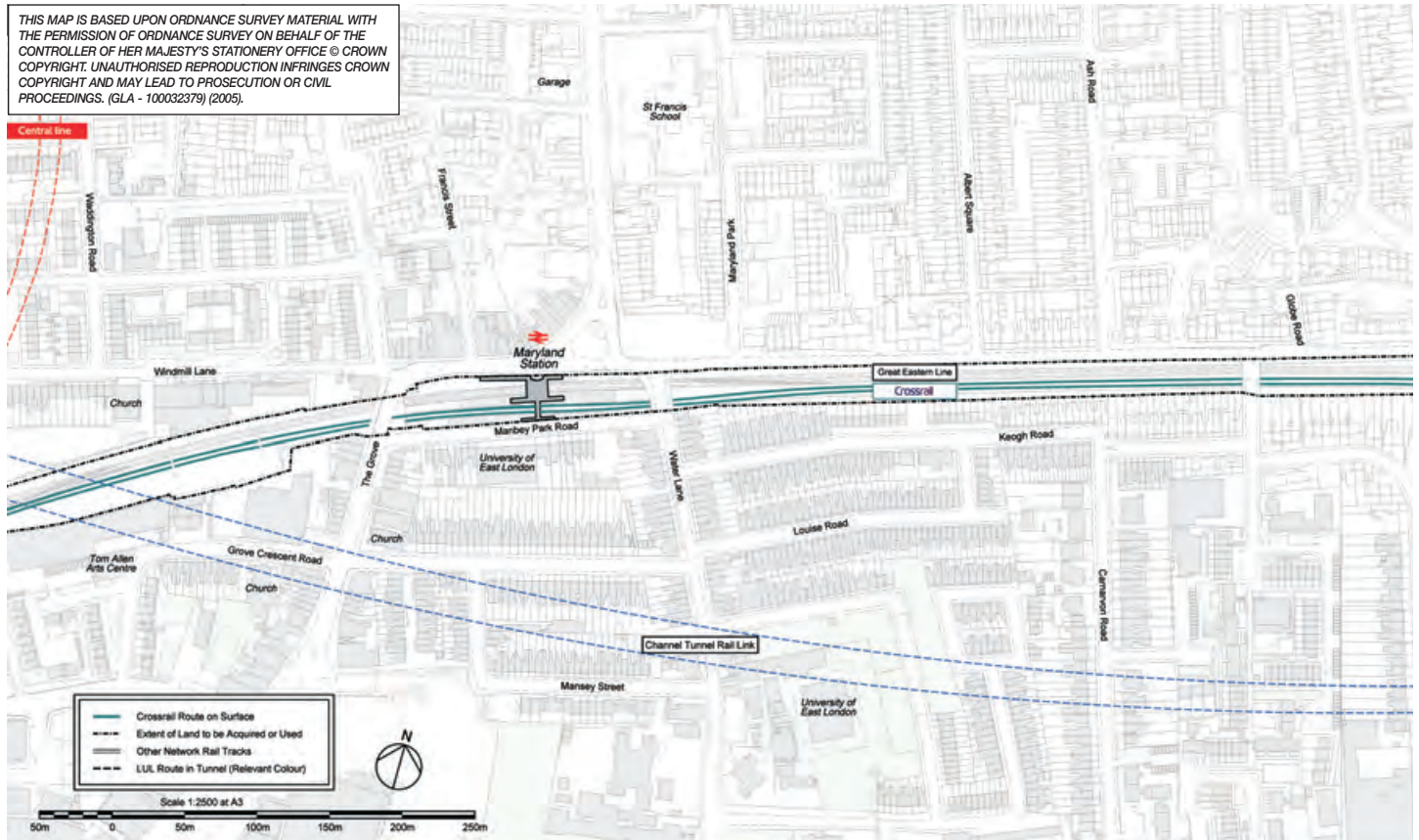
- To London between approximately 7.30am and 9am
- From London between approximately 5pm and 6.30pm

The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.

Improved transport links between Maryland and Stratford, including pedestrian access, are being considered as part of a number of major local development proposals and a review of the design and layout of Stratford station.



Maryland station at present



Maryland Station



Forest Gate (1)

Station Improvements



Platform extensions at Forest Gate will provide for new 10-car trains.

Work on the station platforms (platform 1 & 2/3) will be co-ordinated from a temporary worksite next to the station. Some minor track work will be required to enable the platform extensions to the western end.

This work will be carried out over approximately 10 months.

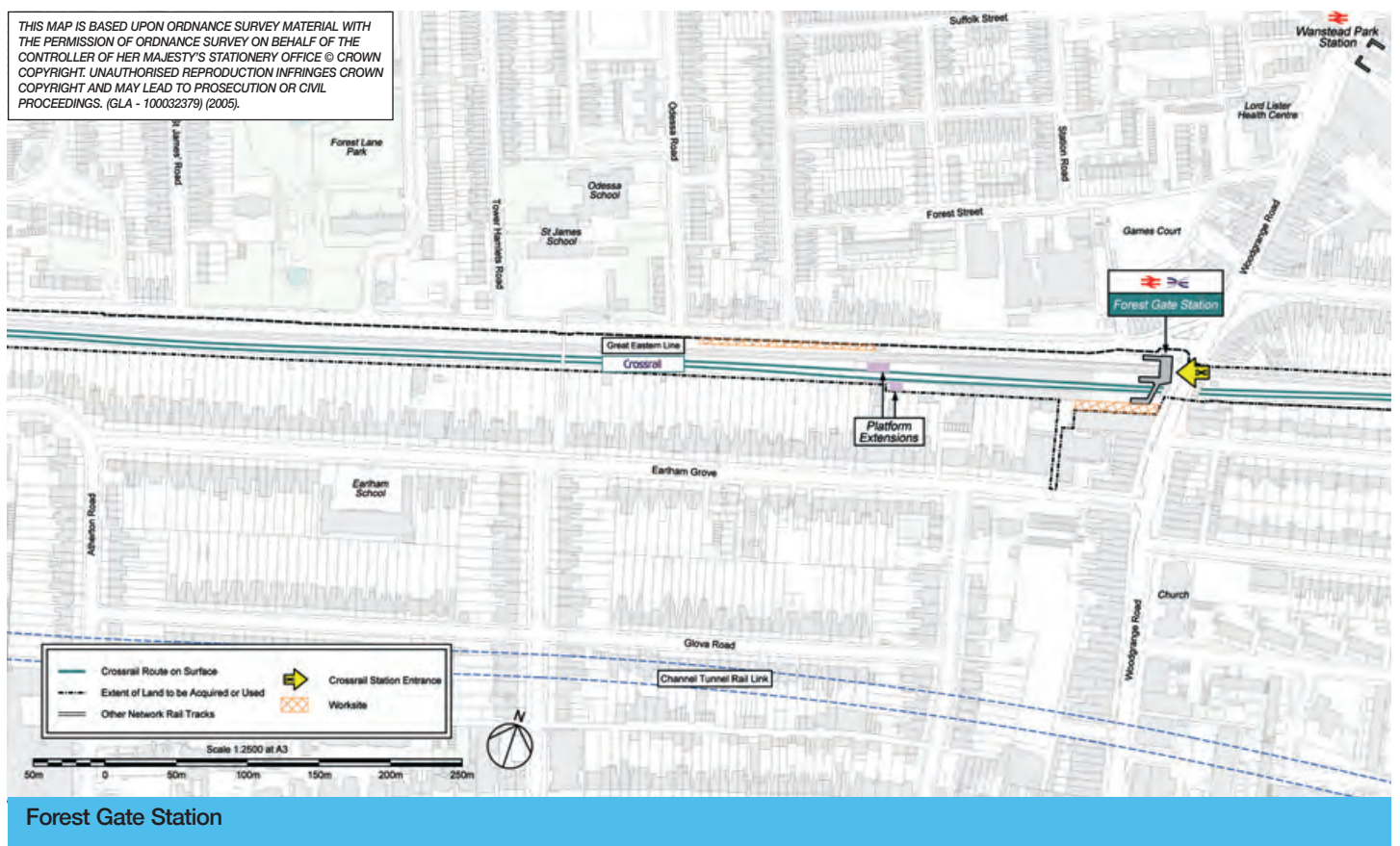
The likely environmental effect of the proposals will be noise from construction will be managed by applying appropriate mitigation measures.

A number of minor improvements will take place:

- Improved cycle storage facilities
- Better links with bus services
- Passenger facilities
- New information systems

No major alterations to the station will take place.

Any improvements will be discussed with the relevant railway bodies, Transport for London, the London Borough of Newham and the local community.





Forest Gate (2)

Service Improvements

Crossrail will improve train services to and from Forest Gate by providing journey time savings and a greater variety of journey opportunities.

With Crossrail operational, four times as many seats will be available on trains to central London from Forest Gate as a result of longer, more frequent trains.

During peak periods Crossrail will provide up to 12 additional train services per hour to central London from Forest Gate.

The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Forest Gate Station a present

Forest Gate – From / To	
Liverpool Street	10 minutes
Farringdon	13 minutes
Tottenham Court Road	16 minutes
Paddington	22 minutes
Heathrow Airport	43 minutes

*5 minutes interchange presumed & included



Typical Crossrail journey times from Forest Gate



Manor Park (1)

Station Improvements



Platform extensions at Manor Park will provide for new 10-car Crossrail trains. This will require the existing freight loop to be removed.

Work on the station platforms (platform 1, 2 and 3) will be co-ordinated from a temporary worksite at the eastern end of the station. Some minor track work and modification of the existing footbridge to Platform 1 will be required as part of the platform extensions.

The work will be carried out over approximately 12 months.

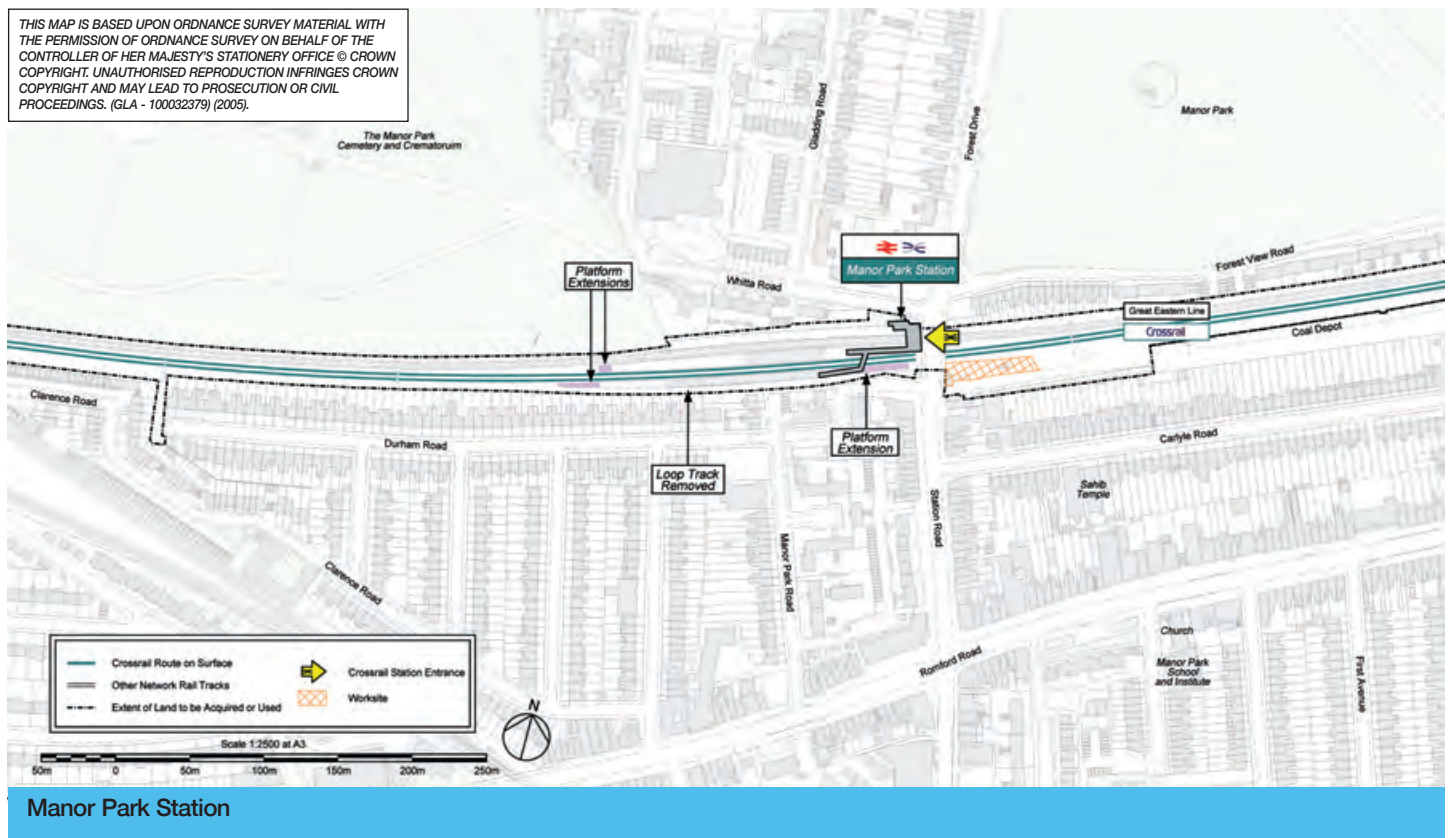
The likely environmental effect is noise impact from construction. This will be mitigated to reduce noise at source.

A number of improvements will take place:

- Pedestrian access improvements
- Improved facilities for taxis
- Better links with bus services
- Passenger facility improvements
- New information systems

No major alterations will take place.

Any improvements will be discussed with the relevant railway bodies, Transport for London, the London Borough of Newham and the local community.





Manor Park (2)

Service Improvements

Crossrail will improve train services to and from Manor Park by providing journey time savings and a greater variety of journey opportunities.

With Crossrail operational, four times as more seats will be available on trains to central London from Manor Park as a result of longer, more frequent trains.

During peak periods, Crossrail will provide up to 12 additional train services per hour to central London from Manor Park.

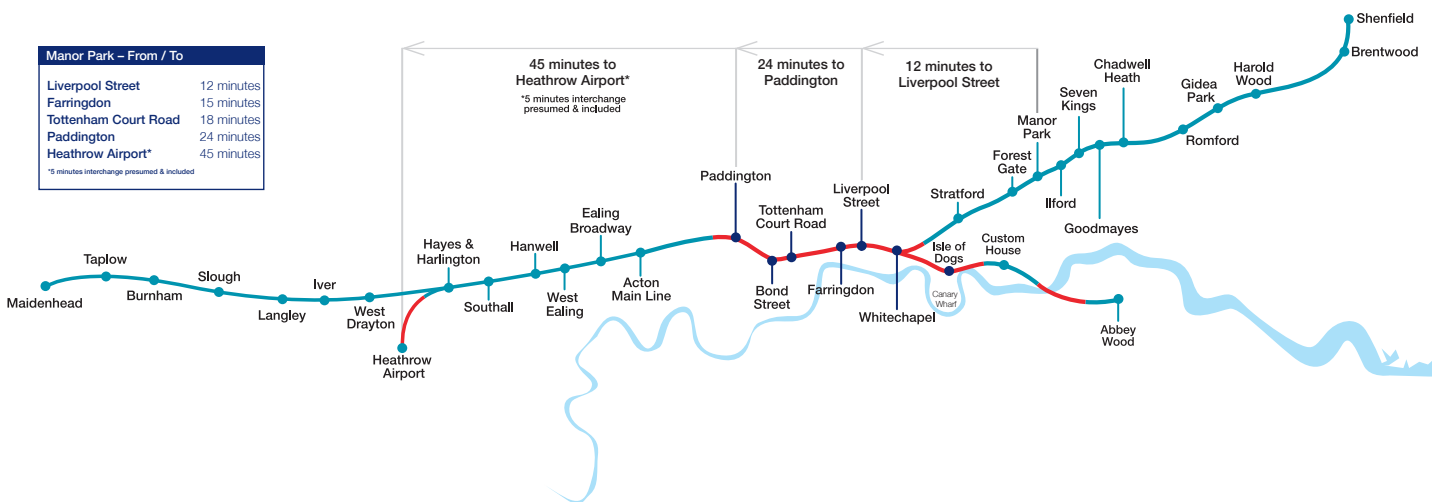
The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Manor Park station at present

Manor Park – From / To	
Liverpool Street	12 minutes
Farringdon	15 minutes
Tottenham Court Road	18 minutes
Paddington	24 minutes
Heathrow Airport*	45 minutes

*5 minutes interchange presumed & included



Typical Crossrail journey times from Manor Park



Iford (2)

Service Improvements

Crossrail will improve train services between Iford and central London by improving journey times and by providing a greater variety of connection opportunities.

During peak periods Crossrail will provide up to six additional trains per hour from Iford to central London and beyond to Heathrow with longer trains giving greater passenger capacity.

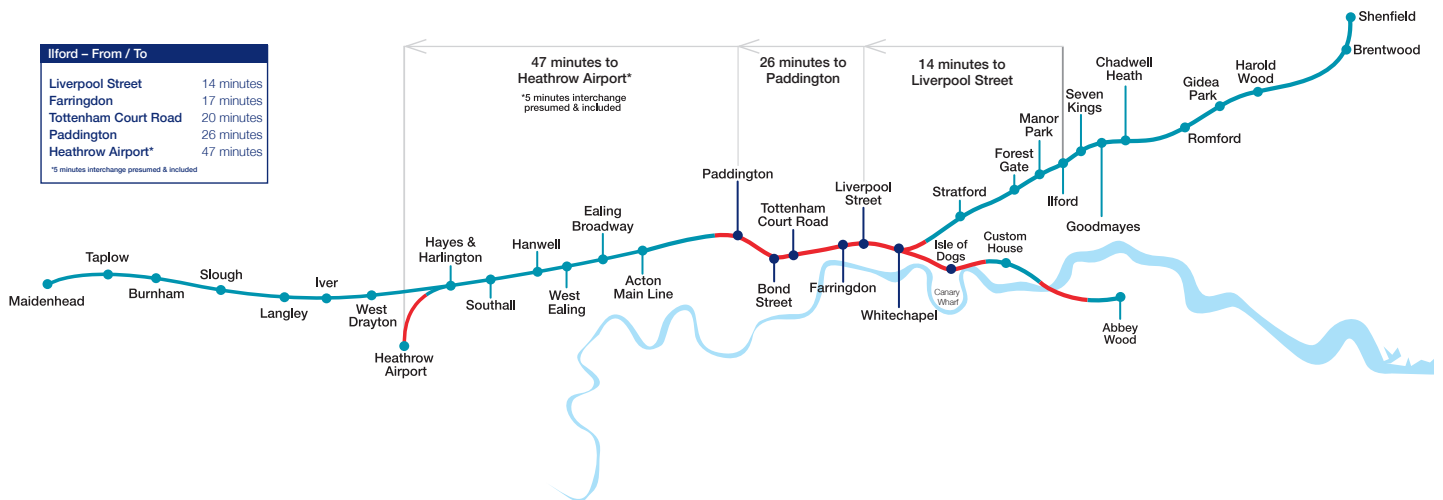
The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Iford Station at present

Iford - From / To	
Liverpool Street	14 minutes
Farringdon	17 minutes
Tottenham Court Road	20 minutes
Paddington	26 minutes
Heathrow Airport*	47 minutes

*5 minutes interchange presumed & included



Typical Crossrail journey times from Iford



Iford

Works Train & Logistics Site

Aldersbrook sidings, near Iford, will be used as a logistics site to accommodate works trains that will be used during the fitting out of the Crossrail tunnels.

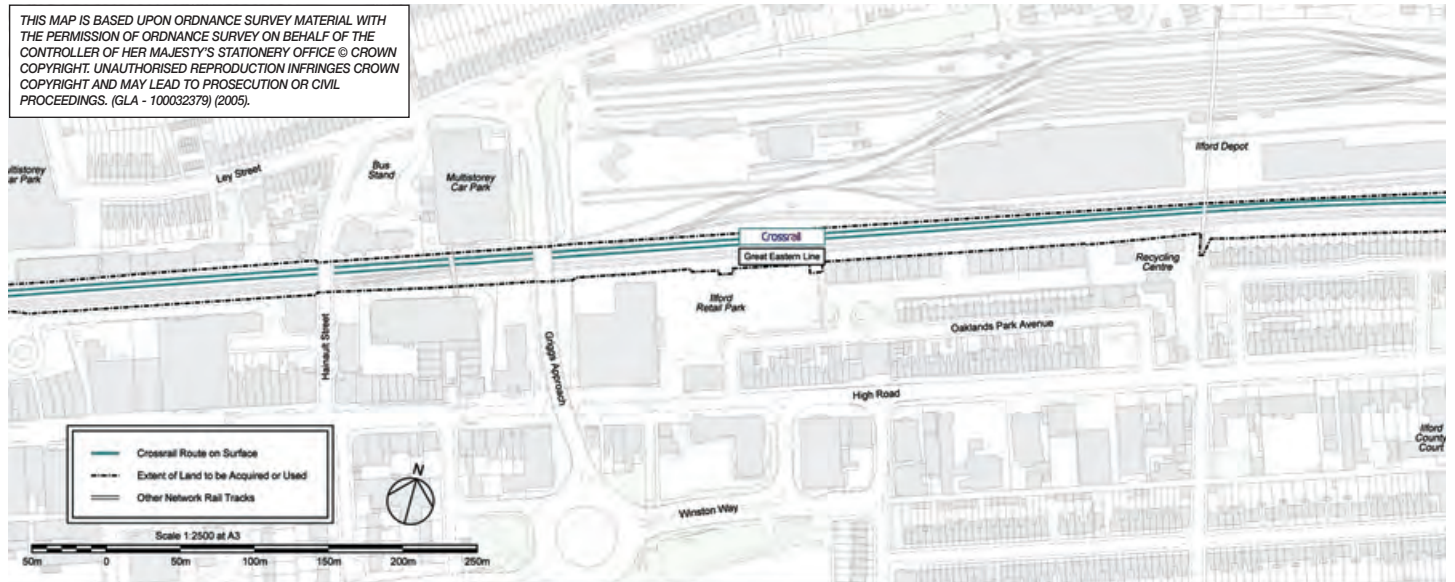
The existing sidings on the site will be refurbished and part of the old railway training school will be used to store material such as railway track and cabling.

The site will be required by Crossrail for approximately 5-6 years.

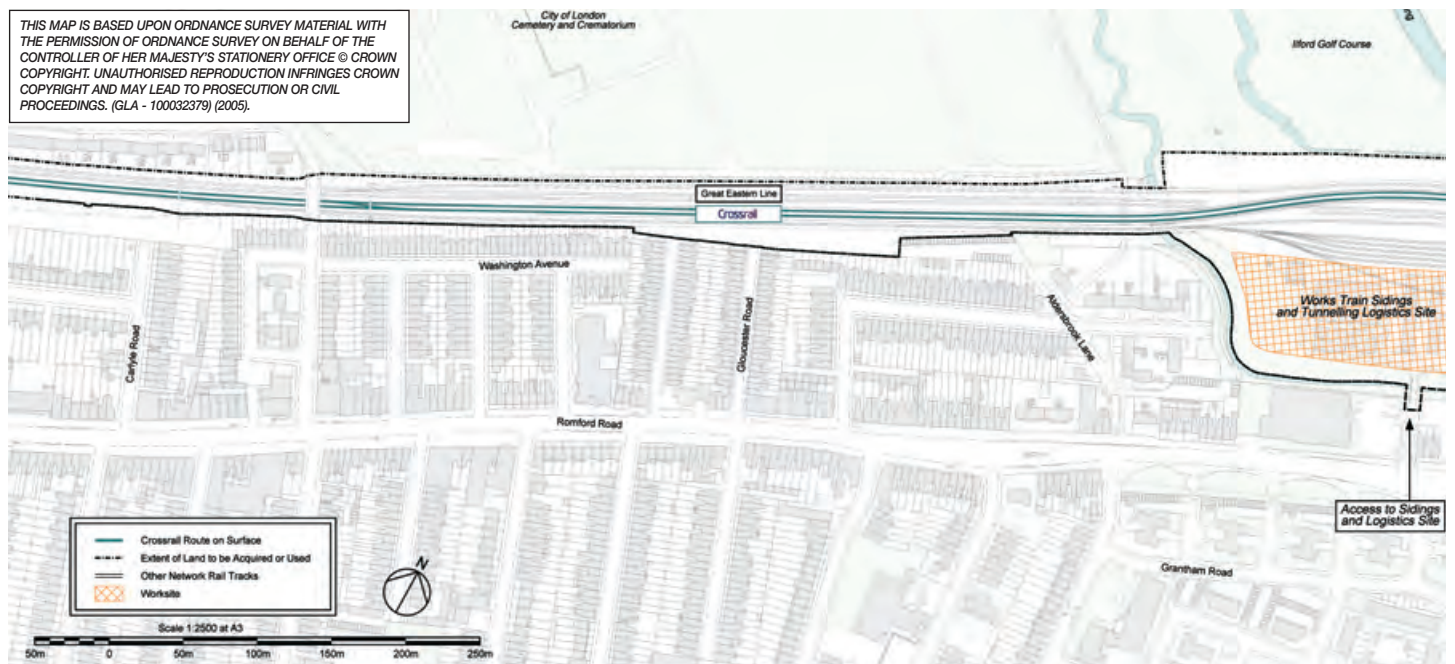
Access for vehicles will be off the Romford Road (A118).

The likely environmental effect of the proposals will include noise from construction.

Potential impacts will be managed by applying appropriate mitigation measures.



Iford Train Depot



Aldersbrook Sidings



Seven Kings (1)

Station Improvements



Platform extensions will be constructed at Seven Kings to provide for new 10-car Crossrail trains.

Work on the station platforms (3 & 4) will be co-ordinated from a temporary worksite to the west of the station. The existing track will need to be moved to accommodate the platform extensions.

The work will be carried out over approximately six months.

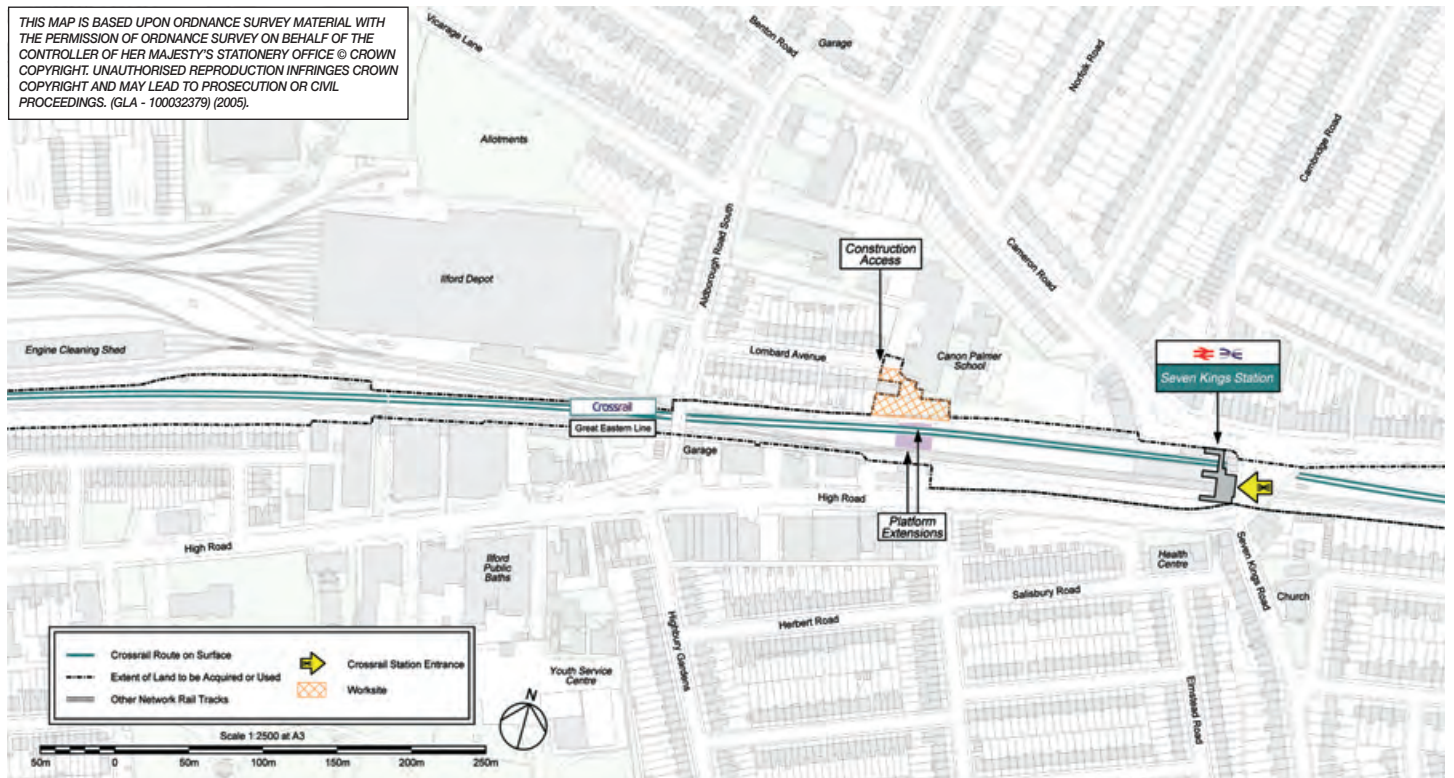
The likely environmental effect of the proposals will be noise from construction. Potential impacts will be minimised by applying appropriate mitigation measures.

As part of the development of Crossrail at Seven Kings, there will be a number of minor improvements including:

- Pedestrian access improvements
- Improved cycle storage facilities
- Better links with bus services
- Improved taxi and passenger drop off facilities
- Passenger facility improvements
- New information systems

There will be no major alterations to the station.

Any improvements will be discussed with the relevant railway bodies, Transport for London, the London Borough of Redbridge and the local community.



Seven Kings Station



Seven Kings (2)

Service Improvements

Crossrail will improve train services to and from Seven Kings by providing journey time savings and a greater variety of journey opportunities.

During peak periods Crossrail will provide up to nine additional train services per hour from Seven Kings to central London.

The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Seven Kings Station at present

Seven Kings – From / To	
Liverpool Street	18 minutes
Farringdon	20 minutes
Tottenham Court Road	23 minutes
Paddington	29 minutes
Heathrow Airport*	50 minutes

*5 minutes interchange presumed & included



Typical Crossrail journey times from Seven Kings



Goodmayes (1)

Station Improvements



The platforms at Goodmayes will be extended eastwards to provide for new 10-car Crossrail trains.

Work on the station platforms (3 & 4) will be co-ordinated from a temporary worksite to the east of Chadwell Heath station.

The work will be carried out over approximately four months.

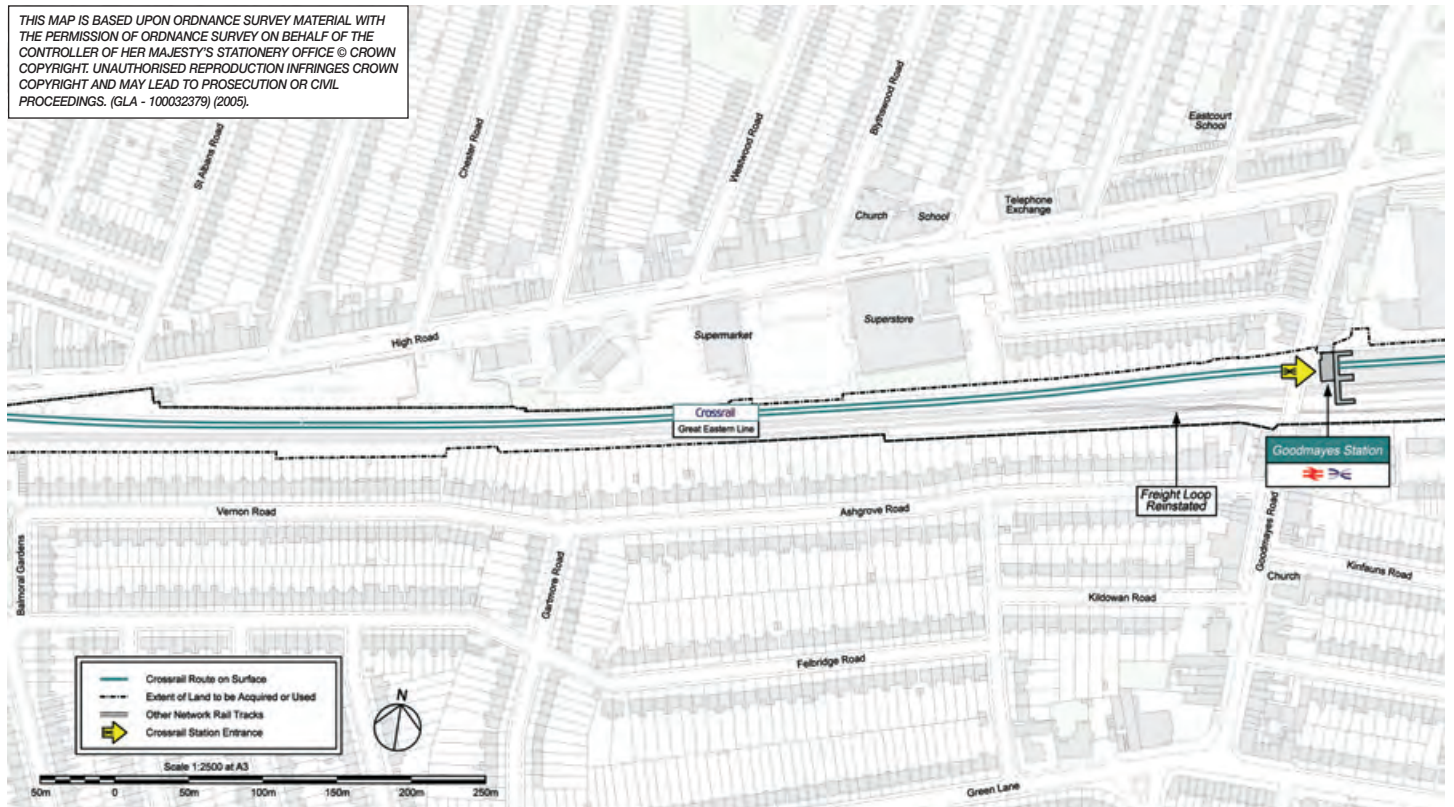
The likely environmental effect of the proposals will be noise impact from construction. Potential impacts will be managed by applying appropriate mitigation measures.

As part of the development of Crossrail at Goodmayes, a number of minor improvements will take place:

- Improved cycle storage facilities
- Pedestrian access improvements
- Passenger facilities improvements
- New information systems

No major alterations to the station will take place.

Any improvements will be discussed with the relevant railway bodies, Transport for London, the London Borough of Redbridge and the local community.



Goodmayes Station



Goodmayes (2)

Service Improvements

Crossrail will improve train services to and from Goodmayes by providing journey time savings and a greater variety of journey opportunities.

During peak periods Crossrail will provide up to nine additional train services per hour from Goodmayes to central London.

The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Goodmayes station at present

Goodmayes – From / To	
Liverpool Street	20 minutes
Farringdon	22 minutes
Tottenham Court Road	25 minutes
Paddington	31 minutes
Heathrow Airport*	52 minutes

*5 minutes interchange presumed & included



Typical Crossrail journey times from Goodmayes



Goodmayes to Chadwell Heath

Freight Service

Crossrail will reinstate an old freight loop between Goodmayes and Chadwell Heath stations to increase capacity for freight services. The proposed loop will permit freight trains to be overtaken by passenger trains between Shenfield and Stratford. This new facility will be constructed within the railway boundary. The existing disused sidings will be removed and new track installed.

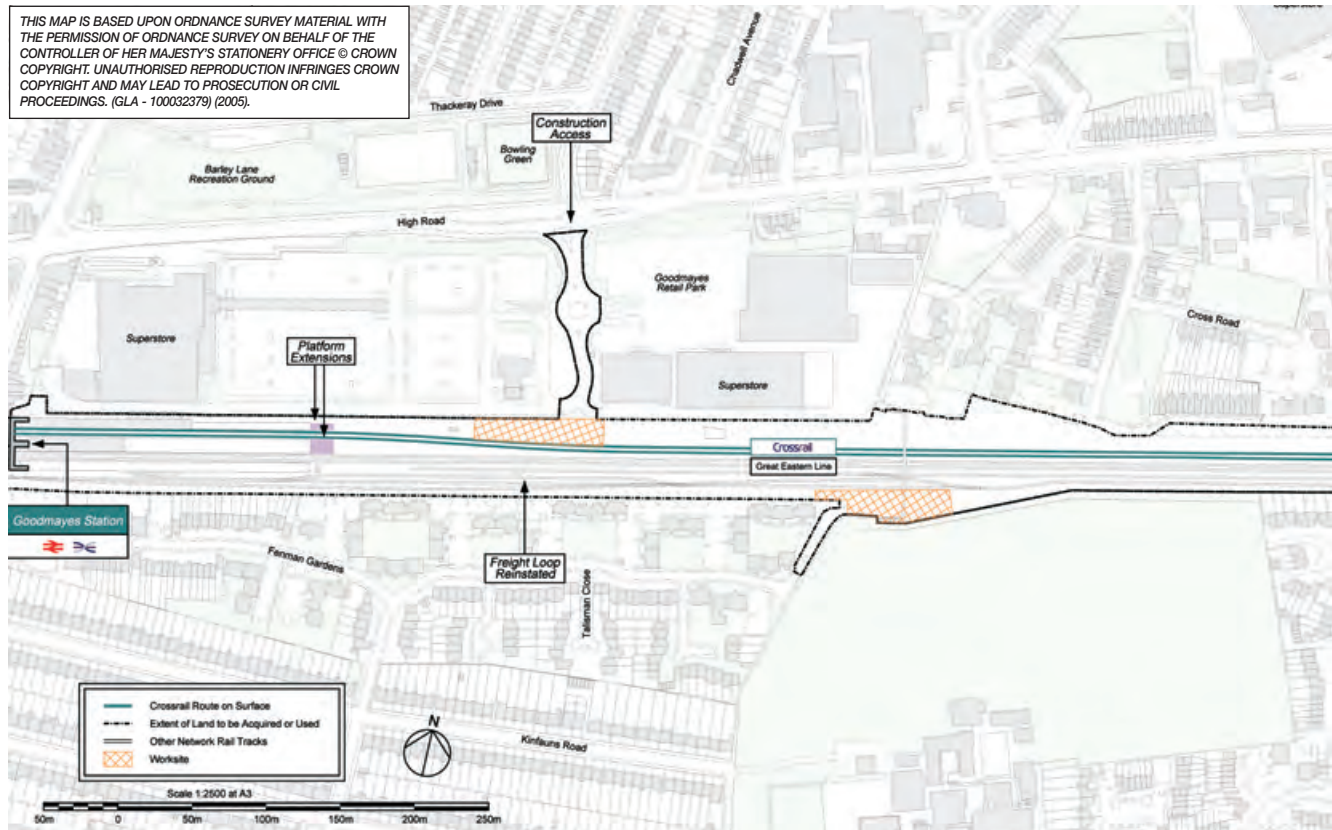
Construction will be co-ordinated from temporary worksites at either end of the proposed loop and off Express Drive. The worksite compounds will be surrounded by hoardings.

The work will be carried out over approximately 12 to 18 months.

Potential impacts will be managed by applying appropriate mitigation measures.



Goodmayes – Chadwell Heath at present





Chadwell Heath (1)

Station Improvements



Platform extensions will be constructed at Chadwell Heath to provide for new 10-car Crossrail trains.

Work on the station platforms (3 & 4) will be co-ordinated from a temporary worksite to the east of Chadwell Heath Station.

The work will be carried out over approximately four months.

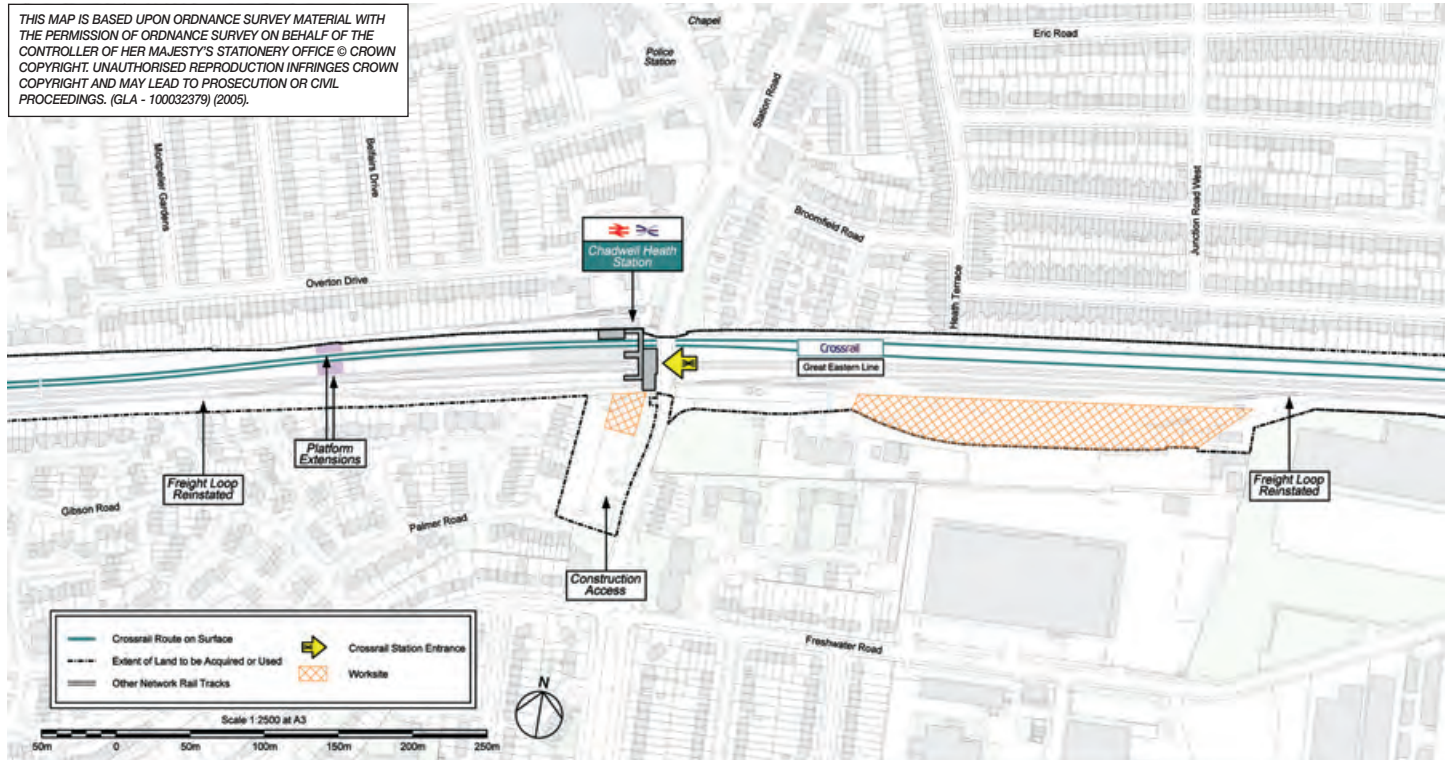
The likely environmental effect of the proposals will be noise from construction. This will be mitigated by controlling noise at source.

As part of the development of Crossrail at Chadwell Heath, there will be a number of minor improvements will take place, including:

- Pedestrian access improvements
- Improved cycle storage facilities
- Parking improvements
- Improved taxi and passenger drop off
- Passenger facility improvements
- New information systems

No major alterations to the station are currently being considered.

Any improvements will be discussed with the relevant railway bodies, Transport for London, the London Borough of Redbridge and the local community.



Chadwell Heath Station



Chadwell Heath (2)

Service Improvements

Crossrail will improve train services to and from Chadwell Heath by providing journey time savings and a greater variety of journey opportunities.

During peak periods, up to eight additional train services per hour will be provided from Chadwell Heath to central London.

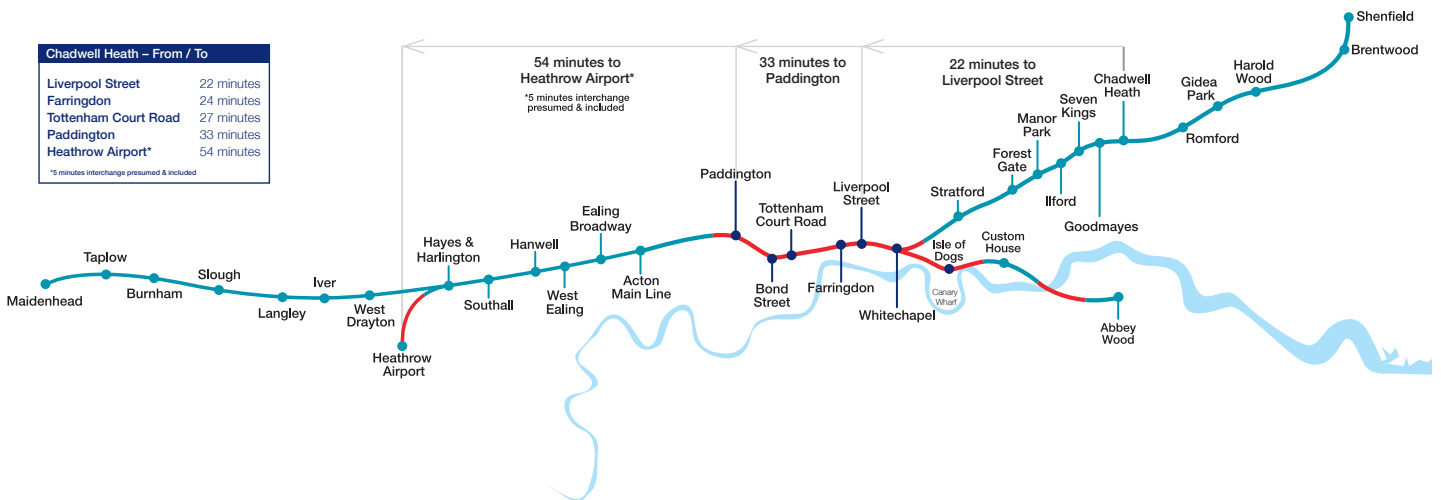
The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Chadwell Heath Station at present

Chadwell Heath – From / To	
Liverpool Street	22 minutes
Farringdon	24 minutes
Tottenham Court Road	27 minutes
Paddington	33 minutes
Heathrow Airport*	54 minutes

*5 minutes interchange presumed & included



Typical Crossrail journey times from Chadwell Heath



Romford (1)

Station Improvements



Located within the existing railway viaduct, the redevelopment of Romford station is technically challenging. Consequently, a new ticket hall will be developed on the site immediately adjacent to the existing ticket hall.

The improved station will provide:

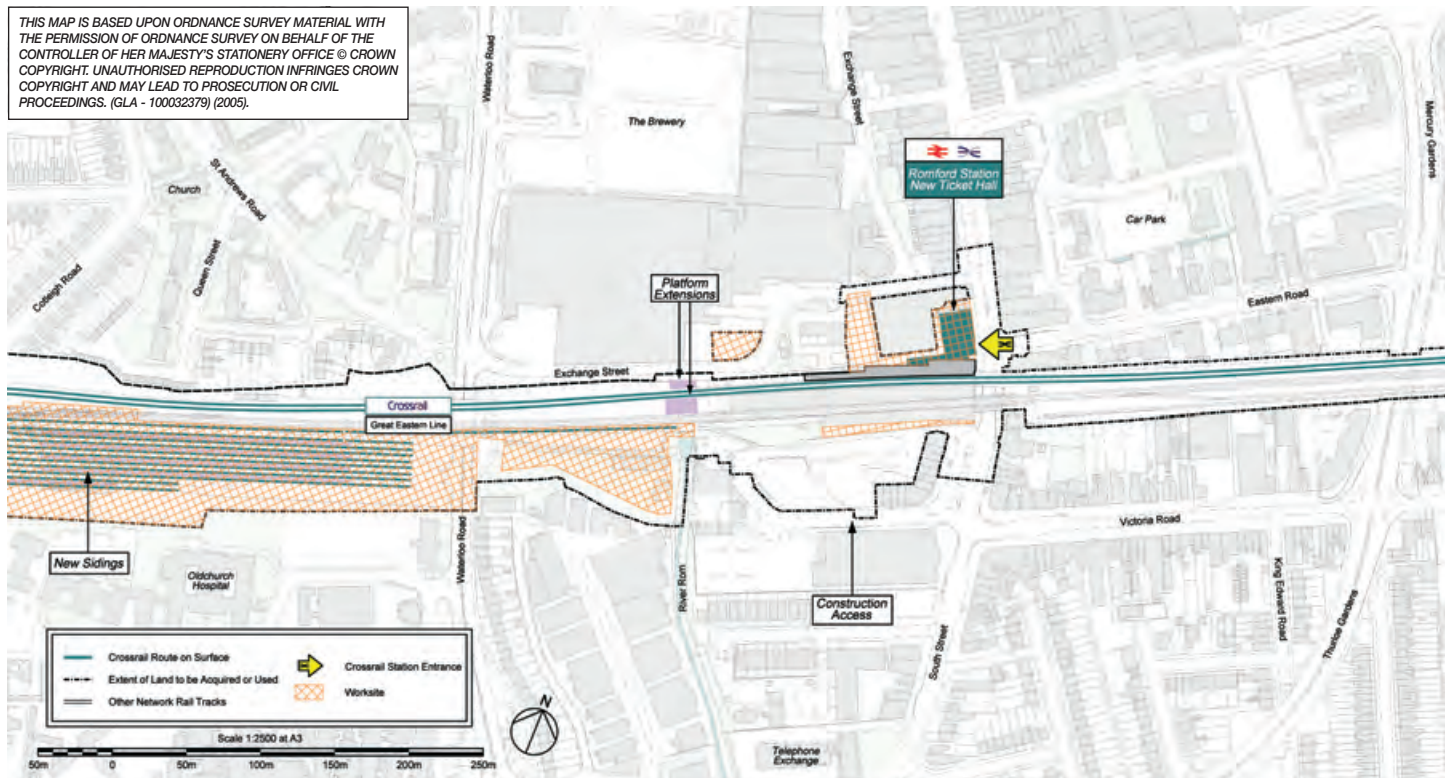
- A new ticket hall at ground level with generous circulation areas and a strong urban presence
- Ticketing facilities at ground floor level with clear sight lines and large naturally-lit spaces
- Escalators from ground floor directly to platforms 3, 4 and 5
- Lifts from ground floor level to platforms 3, 4 and 5

- An upgraded station forecourt with secure cycle storage

The existing ramps and stairs from mezzanine level to platform level will remain.

Other works include extending the platforms to accommodate the proposed 10-car Crossrail trains. New canopies, seating, lighting, fixtures and fittings will be provided to platforms 3, 4 and 5.

The existing station will remain closed for the duration of the works. Temporary ticketing facilities will be provided to the south side of the viaduct adjacent to the bus stop with access to the station via the existing external ramp.



Romford Station



Romford (3)

Service Improvements

Crossrail will improve train services to and from Romford by providing some journey time savings and a greater variety of new journey opportunities.

This is a result of longer, more frequent trains.

During peak periods, Crossrail will provide up to six additional train services per hour from Romford to central London.

The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



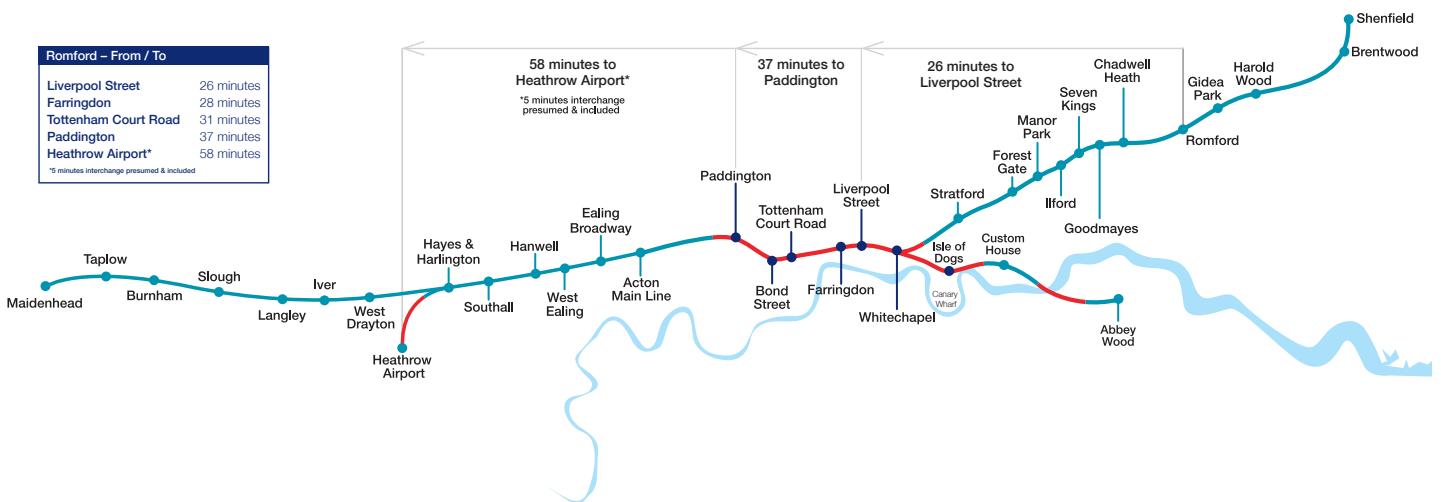
Romford station at present



Romford station at present

Romford - From / To	
Liverpool Street	26 minutes
Farringdon	28 minutes
Tottenham Court Road	31 minutes
Paddington	37 minutes
Heathrow Airport*	58 minutes

*5 minutes interchange presumed & included



Typical Crossrail journey times from Romford



Romford Depot (1)



Romford Depot – Artist's impression



Romford Depot (2)

Selection Process

A depot is essential for maintenance and operation of the new railway.

In 2003, Crossrail carried out a study to identify a site that will be suitable for a train maintenance depot.

Initially, 42 possible sites in London and surrounding areas were identified. These sites were subjected to a selection process in line with Government guidelines.

Following further examination, it became evident that all of the sites presented likely environmental and community issues, but that it would not be feasible to construct a depot at many of the locations.

The only viable location for a depot will be along the Great Eastern Line because this is where Crossrail will start operating services during the staged construction and opening of the railway.

A number of options were discarded for a variety of factors including:

- Lack of space
- Safety and operational conflict with existing services
- Environmental and community impact
- Practical difficulties involved with construction
- Poor accessibility
- Construction and operational cost
- Conflict with planning policy
- Property impact

The options of using existing railway land at Ilford and Stratford were ruled out because the locations considered are required for other railway and development purposes.

To select a preferred location, the remaining options were assessed against the following criteria:

- Safety
- Cost
- Accessibility
- Environment
- Integration

Following a series of reviews, the long list of options was reduced to two options:

- “green field” site between Harold Wood and Brentwood (Brentwood M25)
- “brown field” site near Romford (Romford Railway Goods Yard and Gasworks)

One of the advantages of the site at Romford is that a large part of it is already used for railway and industrial purposes. It has been concluded that the depot site near Romford would be preferred on planning and environmental grounds compared with other options.



Potential Depot Locations Studied



Romford Depot (3)

Crossrail will build a train maintenance depot and control centre at Romford Railway Goods Yard and Gasworks. Although the depot will be situated on existing railway and industrial land, rail access will be required through the extension of the railway boundary on adjacent green belt land.

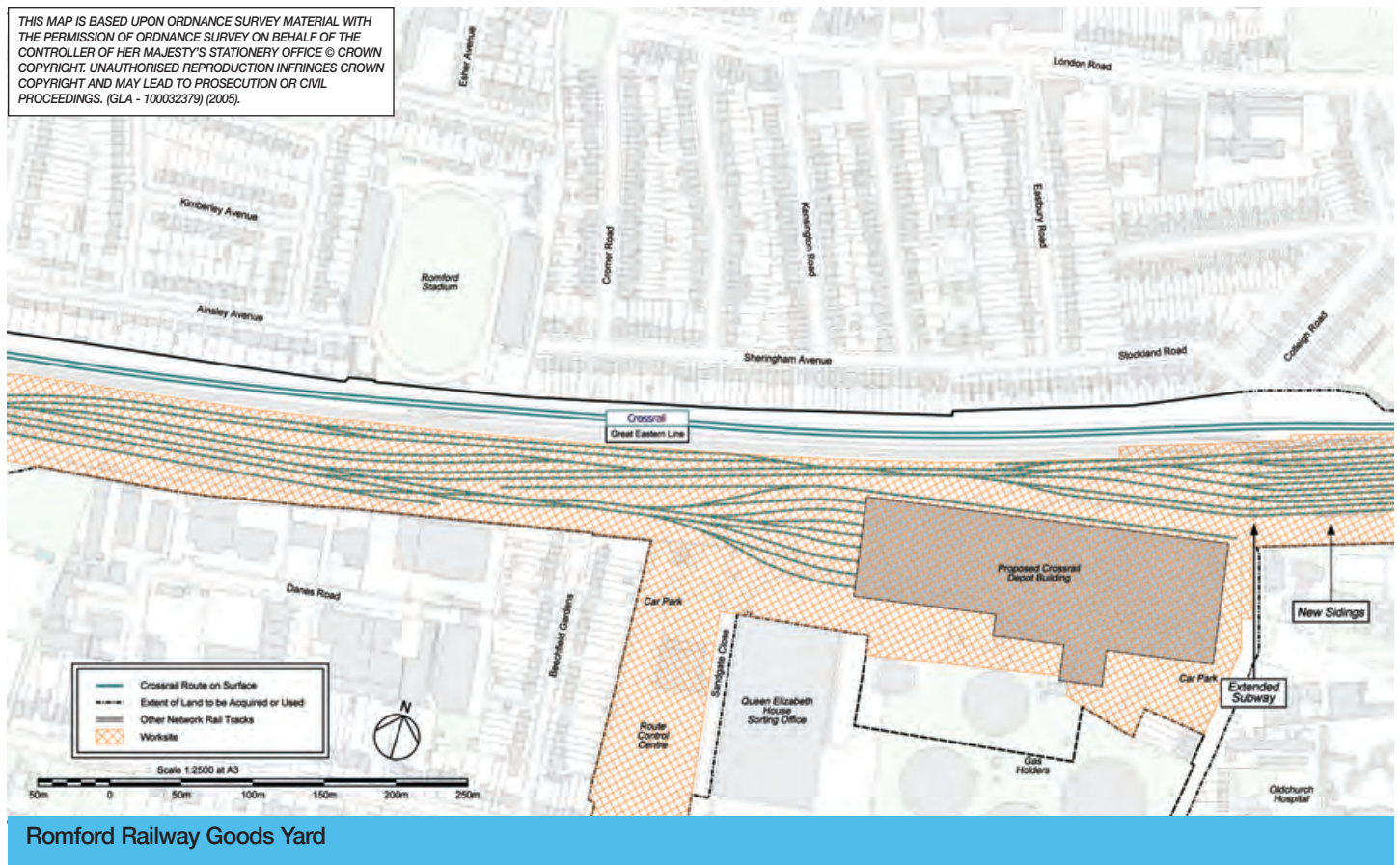
It will have the capacity to maintain the proposed Crossrail fleet including an area for trains to be cleaned, a maintenance building for up to eight trains and sidings for up to 15 trains.

Key Construction Issues

The depot will be constructed over approximately 5-6 years. In practice, construction will be focused in different areas for a period of months at a time.

Crossrail services will use the two tracks on the northern side of the Great Eastern Line. As a result, a rail underpass (dive-under) will need to be constructed for Crossrail trains to access the depot and avoid operational conflicts with rail services on the other two tracks.

Construction will be co-ordinated from temporary worksites at Westlands Playfields and industrial land off Crow Lane.





Romford Depot (4)

The rail underpass linking Crossrail tracks with the depot will be constructed along the southern edge of Westlands Playing Fields. This will affect land immediately to the north of the railway and will require the relocation of the West Ham United training gymnasium.

During construction of the rail underpass, the playing fields will contain a worksite in the south eastern corner and a haul route to London Road.

Prior to this construction, a water main will be diverted away from the site of the underpass to the west, requiring a temporary strip of land across the railway approximately eight metres wide.

This advanced work will take around 20 weeks and, on completion of the diversion, will be reinstated to its current use. Following construction of the rail underpass, the playing fields will be restored.

A new bridge to carry the Crossrail lines to the main depot facilities will be required over Jutsums Lane. To give clearance for vehicles under the bridge, the road levels will be altered, although the height restriction for heavy goods vehicles will remain.

The main depot facilities will be constructed on derelict land next to the gasworks. The main depot building will be approximately 260m long, 70m wide and 14 metres high.

To make the site level, the land on which the main depot building stands will be raised by 3-4m.



Romford Gasworks current site



Depot Building – Section



Romford Depot (5)

Associated Implications

The depot site is approximately 2.5 kilometres in length.

The existing railway maintenance and works trains facility will be relocated to another site location along the Great Eastern Line.

There will be office and operational facilities situated within the main depot building. A Crossrail control centre will be located within the depot grounds.

A number of utilities, particularly a water pipe on Westlands and a gas mains to the south of the railway, will need to be diverted.

It will be necessary to relocate one of the gasholders and some of the high-pressure equipment. This will be accommodated on existing gasworks land.

Landscaping will be used to screen the depot and reduce the impact of the depot development upon surrounding areas including the Oldchurch Hospital grounds and properties at Beechfield Gardens.

The depot will be operational 24 hours a day.

The depot will provide new jobs for approximately 400 people including drivers, technicians, cleaners and management.

Highway Issues

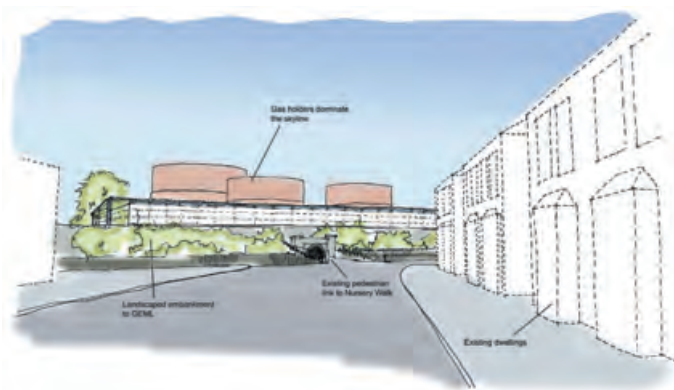
The main access route to the depot will be provided along Sandgate Close. Alternative access will be provided off Jutsums Lane and Nursery Walk.

London Road (A118) and Crow Lane will be used as the main routes for construction traffic.

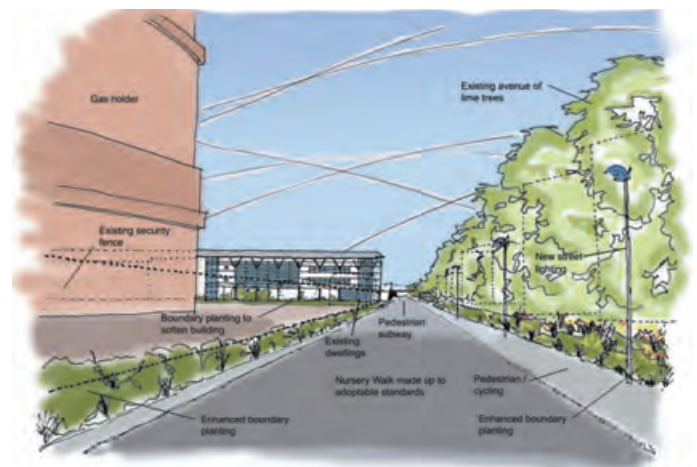
Up to 250 permanent car parking spaces will be provided. Overflow parking will be provided on derelict gasworks land to the west of Sandgate Close.

Footpath 123 that runs along the southern side of the railway will need to be diverted between Sandgate Close and Nursery Walk.

The Nursery Walk subway for pedestrians and cyclists will be extended.



Artist's Impression of Depot Building from Cotleigh Road



Artist's Impression of Depot Building from Nursery Walk



Romford Depot (6)

Environmental

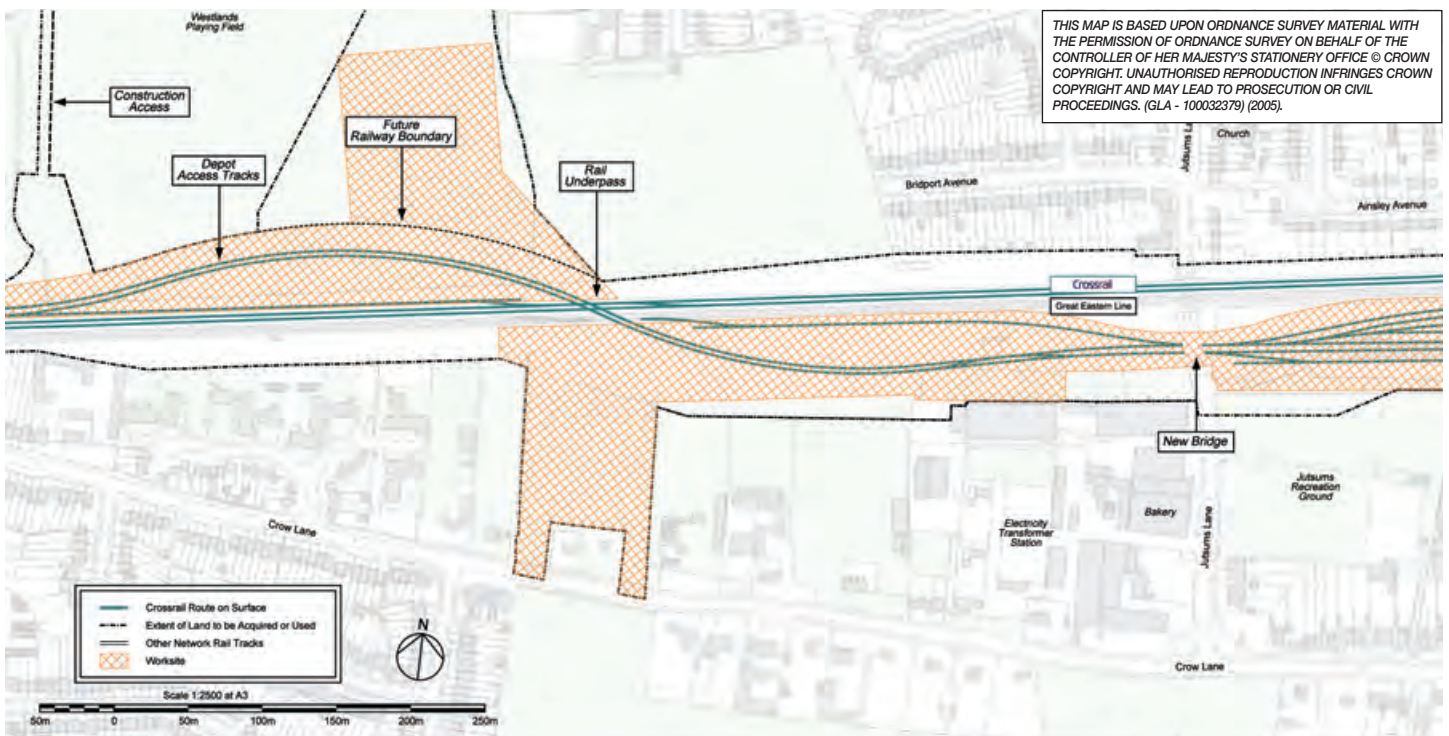
The following summarises the likely environmental effects and mitigation measures:

- Development of Green Belt land and resultant loss of recreational space
- Noise from construction. This will be reduced at source and controlled by the Crossrail Construction Code with which all contractors will be required to comply, and which will be agreed with the local authorities
- Noise from the operation of the depot. If the noise impacts prove to be excessive it may be possible to mitigate them using measures such as noise barriers
- Dust impacts on nearby buildings during construction. Appropriate dust mitigation techniques will be incorporated within the Crossrail Construction Code
- Treatment of contaminated land at the gasworks will be required
- Loss of habitat within a Site of Importance for Nature Conservation. Upon the works completion, replacement vegetation will be planted where appropriate
- A listed coal tax marker may need to be relocated to accommodate the new railway
- Visual impact of the depot building, which can be reduced using measures such as planting

- Artificial lighting will be required at the site, which will be designed and directed according to best practice guidelines, to reduce impact upon the surrounding area



Westlands Playing Fields at present



Westlands



Gidea Park (1)

Station Improvements



Platform extensions will be constructed at Gidea Park for new 10-car Crossrail trains.

Work on the station platforms (3 & 4) will be co-ordinated from a temporary worksite on the station car park.

The work will be carried out over approximately four months.

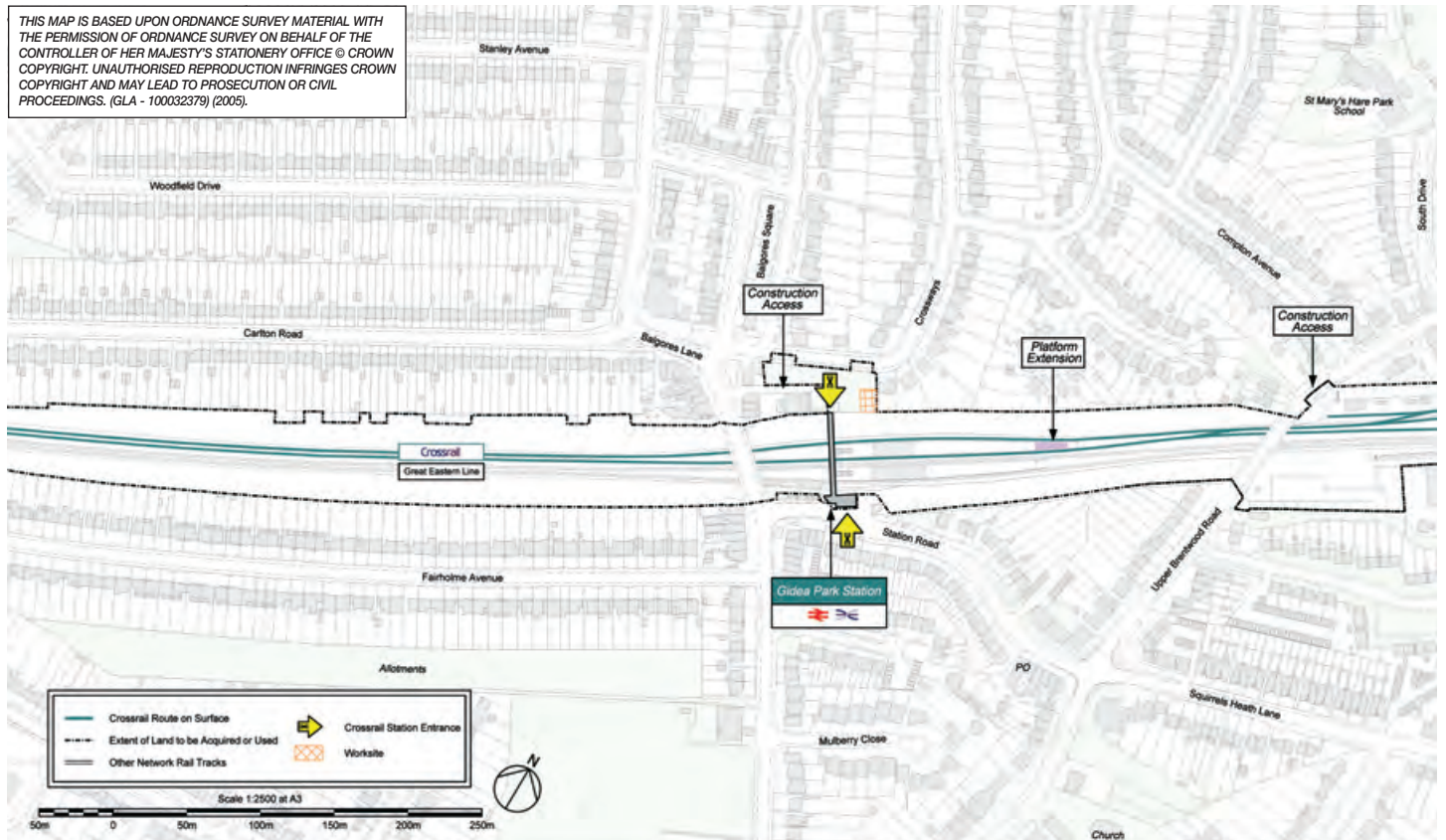
The likely environmental effect of the proposals will be noise from construction. Potential impacts will be minimised by applying appropriate mitigation measures.

As part of the development of Crossrail at Gidea Park, there will be a number of minor improvements will take place, including:

- Pedestrian access improvements
- Improved cycle storage facilities
- Improved passenger drop off facilities
- Passenger facility improvements
- New information systems

There will be no major alterations to the station.

Any improvements will be discussed with the relevant railway bodies, Transport for London, the London Borough of Havering and the local community.



Gidea Park Station



Gidea Park (2)

Service Improvements

Crossrail will improve train services to and from Gidea Park by providing journey time savings and a greater variety of journey opportunities.

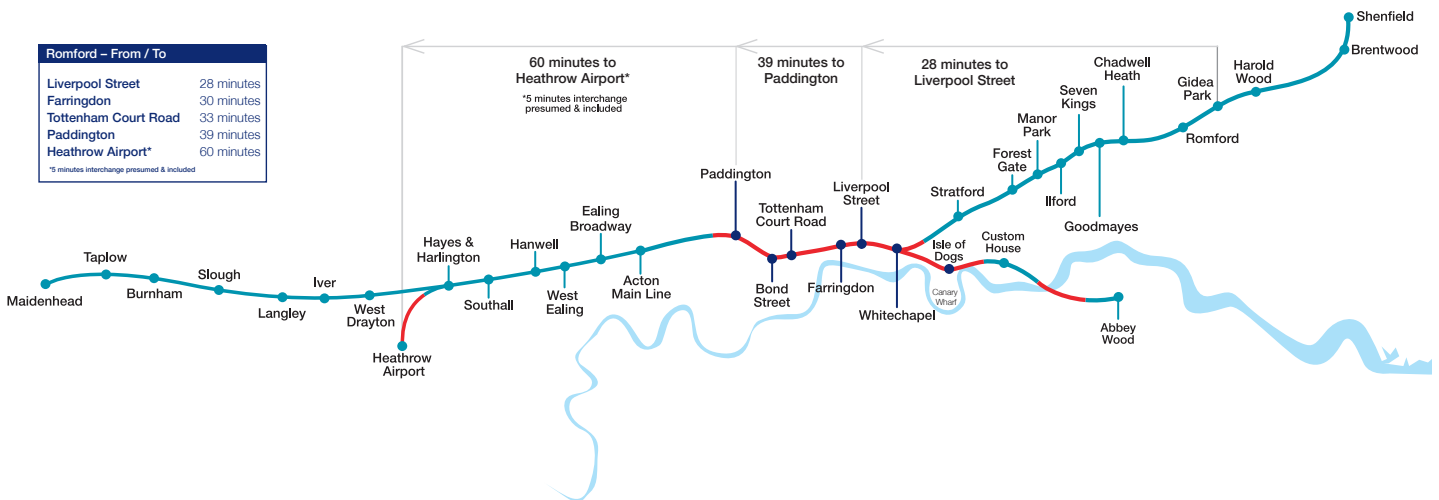
With Crossrail operational, the total number of seats available on trains to central London from Gidea Park will increase by two thirds. This is a result of longer, more frequent trains.

During peak periods Crossrail will provide up to seven additional train services per hour from Gidea Park to central London.

The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Gidea Park station at present



Typical Crossrail journey times from Gidea Park



Gidea Park (3)

Alterations to Sidings

Crossrail will alter the existing train stabling sidings at Gidea Park to accommodate up to nine, 10-car trains during off-peak hours and overnight. The existing train sidings accommodate nine, 8-car trains.

Construction will be co-ordinated from a temporary worksite next to the existing train sidings. Work will take place over different periods within a two year timeframe.

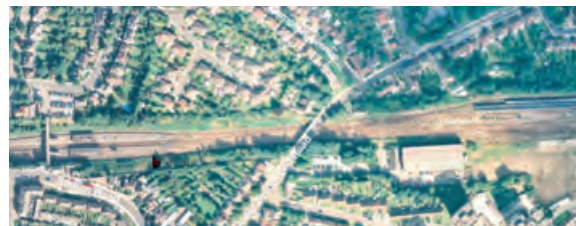
There will be a temporary access road for the modifications to the sidings off Southend Arterial Road.

New retaining walls will be constructed within the site.

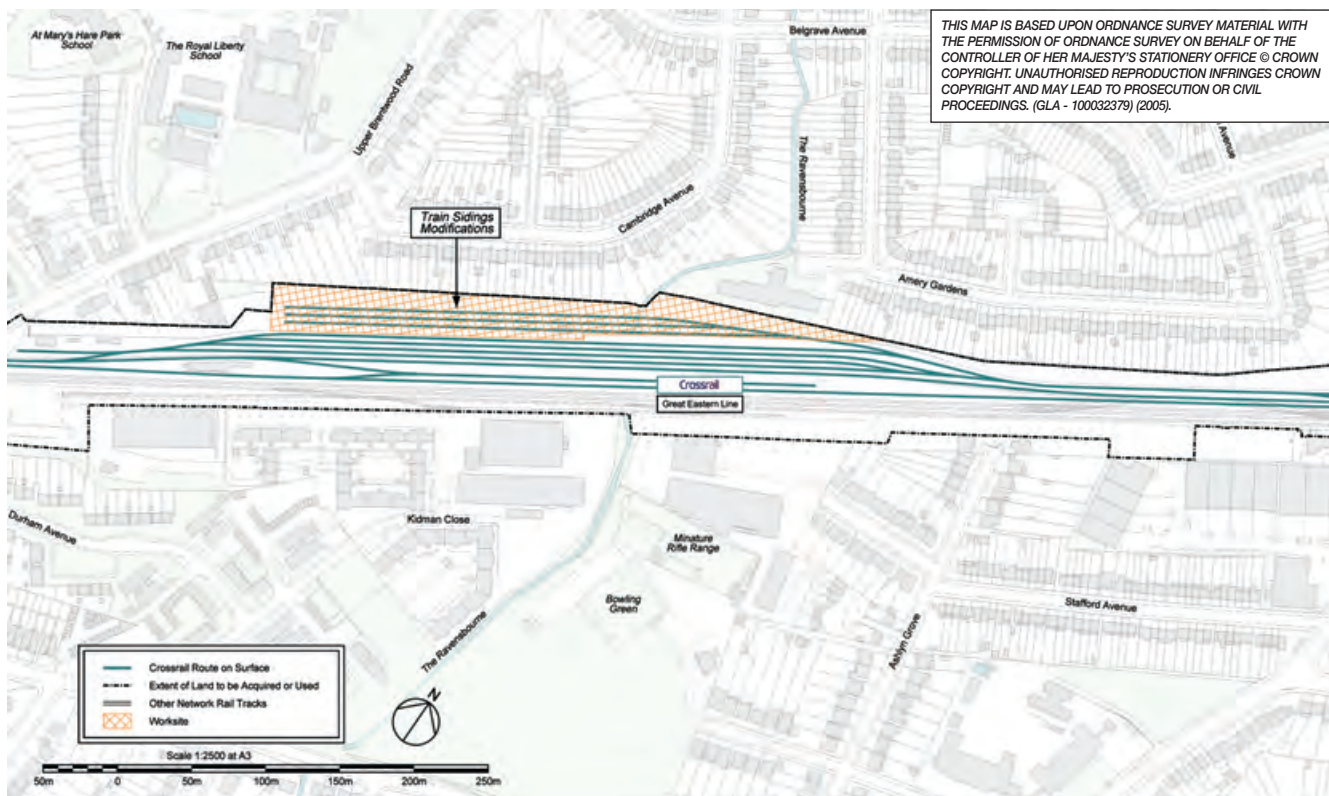
During construction the site will be enclosed by site hoardings. The operational lighting of the stabling area will be designed to control the light going into the sky or upon buildings in accordance with best practice.



Gidea Park Sidings at present



Gidea Park station and sidings at present



Gidea Park Sidings



Harold Wood (1)

Station Improvements



Platform extensions will be constructed at Harold Wood to provide for new 10-car Crossrail trains.

Work on the station platforms (3 & 4) will be co-ordinated from a temporary worksite at the station car park.

The work will be carried out over approximately five months.

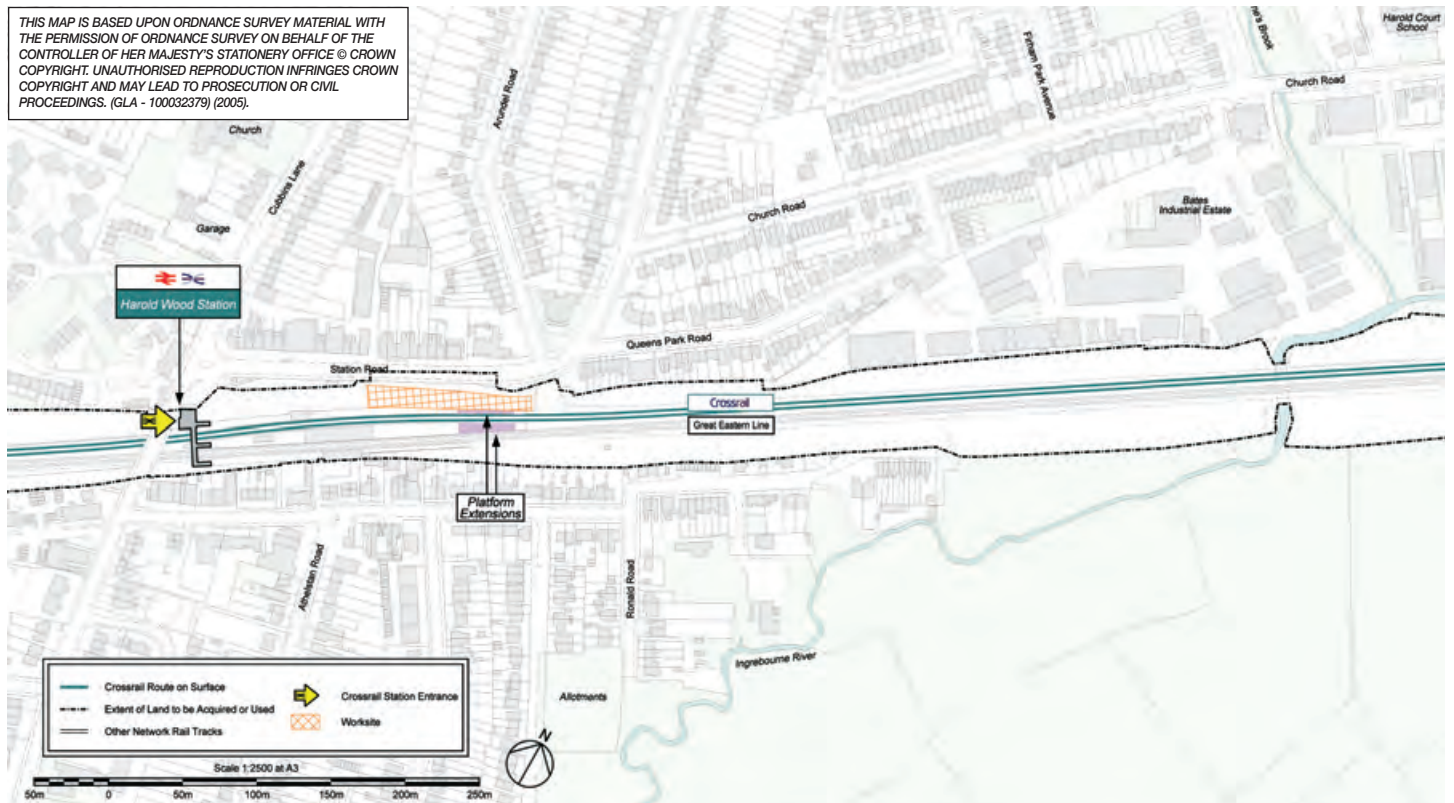
The likely environmental effect of the proposals will be noise from construction. Potential impacts will be minimised by applying appropriate mitigation measures.

As part of the development of Crossrail at Harold Wood, there will be a number of minor improvements including:

- Pedestrian access improvements
- Improved cycle storage facilities
- Better links with bus services
- Improved passenger drop off facilities
- Passenger facility improvements
- New information systems

There will be no major alterations to the station.

Any improvements will be discussed with the relevant railway bodies, Transport for London, the London Borough of Havering and the local community.





Harold Wood (2)

Service Improvements

Crossrail will improve train services to and from Harold Wood by providing journey time savings and a greater variety of journey opportunities.

With Crossrail operational, the total number of seats available on trains to central London from Harold Wood will almost double as a result of longer, more frequent trains.

During peak periods, Crossrail will provide up to five additional train services per hour from Harold Wood to central London.

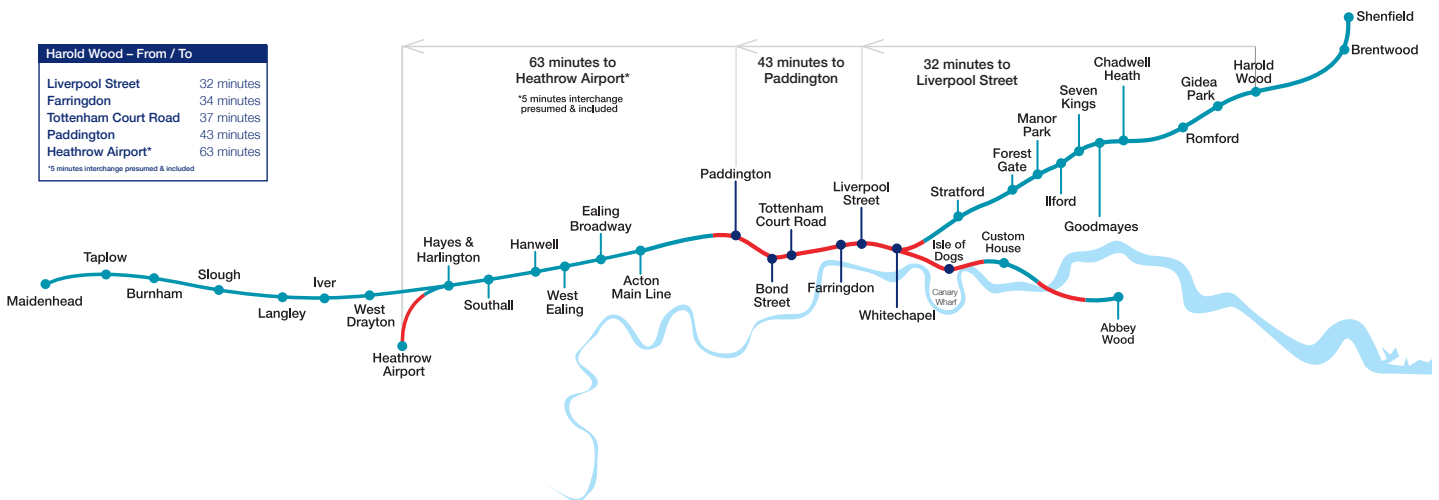
The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Harold Wood station at present

Harold Wood – From / To	
Liverpool Street	32 minutes
Farringdon	34 minutes
Tottenham Court Road	37 minutes
Paddington	43 minutes
Heathrow Airport*	63 minutes

*5 minutes interchange presumed & included



Typical Crossrail journey times from Harold Wood



Brentwood (1)

Station Improvements



Platform extensions will be constructed at Brentwood to provide for new 10-car Crossrail trains.

Work on the station platforms (3 & 4) will be co-ordinated from a temporary worksite on the station car park.

The work will be carried out over approximately five months.

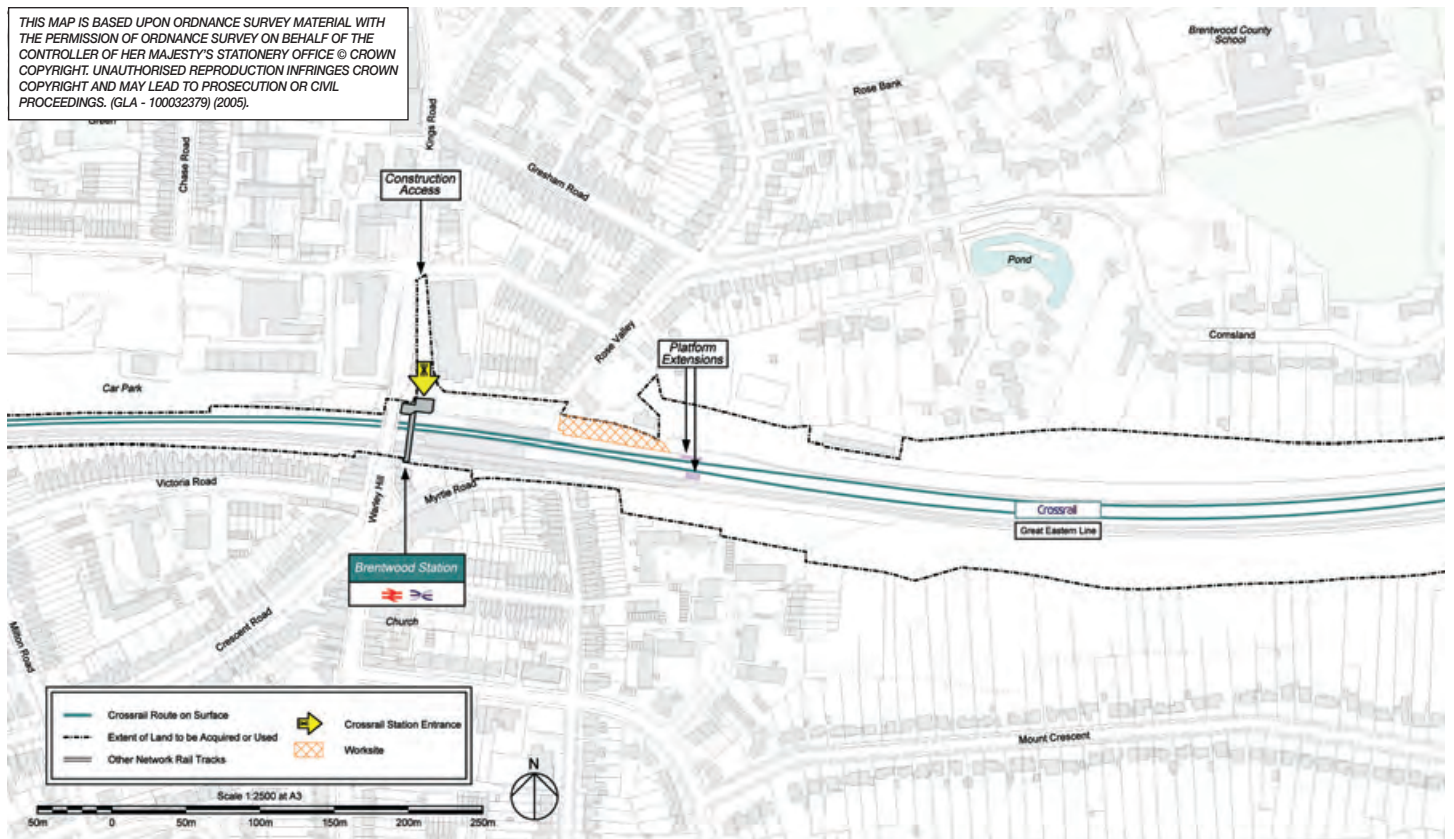
The likely environmental effect of the proposals will be noise from construction. Potential impacts will be minimised by applying appropriate mitigation measures.

As part of the development of Crossrail at Brentwood, there will be a number of minor improvements will including:

- Pedestrian access improvements
- Improved cycle storage facilities
- Passenger facility improvements
- New information systems

There will be no major alterations to the station.

Any improvements will be discussed with the relevant railway bodies, Essex County Council, Brentwood Borough Council and the local community.



Brentwood Station



Brentwood

Service Improvements

Crossrail will improve train services to and from Brentwood by providing journey time savings and a greater variety of journey opportunities.

With Crossrail operational, the total number of seats available on trains to central London from Brentwood will increase by almost double as a result of longer, more frequent trains.

During peak periods, Crossrail will provide up to five additional train services per hour to and from Brentwood.

The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Brentwood station at present

Brentwood – From / To	
Liverpool Street	36 minutes
Farringdon	38 minutes
Tottenham Court Road	41 minutes
Paddington	47 minutes
Heathrow Airport*	70 minutes

*15 minutes interchange presumed & included



Typical Crossrail journey times from Brentwood



Shenfield (1)

Station Improvements and Turnback Sidings

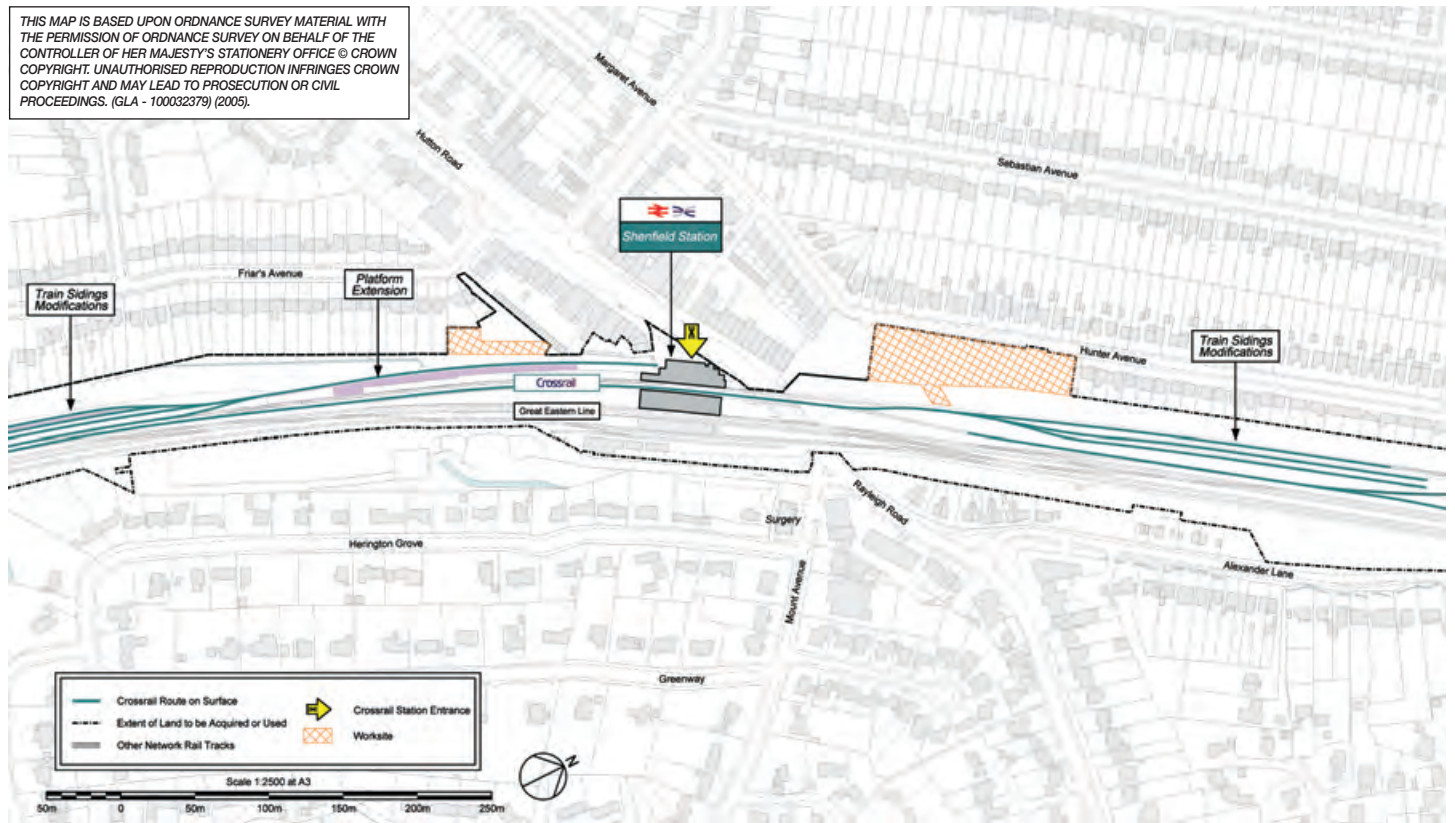


An additional bay platform will accommodate the new Crossrail service on the north side of the layout at Shenfield. A new retaining wall will be constructed to support the additional platform. The work will be carried out within the railway boundary but a temporary worksite will be set up off Friar's Avenue.

There will be modifications to the track layout and additional sidings to the east of the station will enable Crossrail trains to be reversed.

Work to the tracks and sidings will be carried out within the railway boundary but a temporary worksite will be set up off Hunter Avenue.

Other minor improvements will include better pedestrian access and cycle storage facilities. Any modifications will be discussed with relevant railway bodies, Essex County Council, Brentwood Borough Council and the local community.





Shenfield (2)

Service Improvements

Crossrail will improve train services to and from Shenfield by providing journey time savings and a greater variety of journey opportunities.

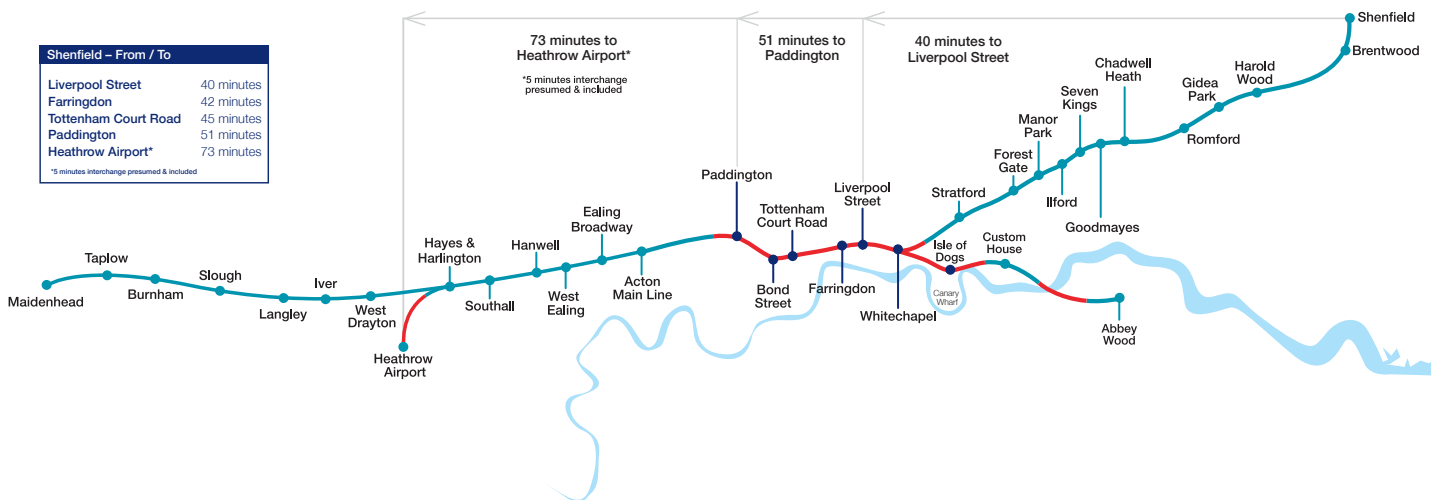
With Crossrail operational, the total number of seats available on trains to central London from Shenfield will increase as result of longer, more frequent trains.

During peak periods, Crossrail will provide up to five additional train services per hour from Shenfield to central London.

The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Shenfield station at present



Typical Crossrail journey times from Shenfield



Docklands and North Kent Line Service Improvements

Crossrail will to improve rail services with:

- New and more frequent trains from Abbey Wood
- Faster journeys to Docklands, the City, West End and west London
- Improved links to Heathrow Airport and Essex
- Additional capacity and reduced crowding

Crossrail will operate up to 12 trains an hour to and from Abbey Wood Station where cross platform interchange will give access to existing North Kent Line Services.

There are no proposals to reduce the level of service on the North Kent Line. Crossrail will operate in addition to existing services to London terminals. Existing users of the North Kent Line will experience significant crowding relief because of the customers who transfer to Crossrail.

Prior to the opening of Crossrail, the timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.

Overhead electrification will be installed along the route between Victoria Dock Portal and Abbey Wood.



North Kent Line at present



Overhead electrification



Limmo Peninsula (1)

Shaft

A shaft will be situated at the Limmo Peninsula. The shaft will provide ventilation, emergency access and evacuation from the two Crossrail tunnels.

The Limmo Peninsula will be used as a worksite for up to six years to construct the shaft and launch the tunnel boring machines for the tunnel drive to and from the Isle of Dogs station and Victoria Dock Portal.

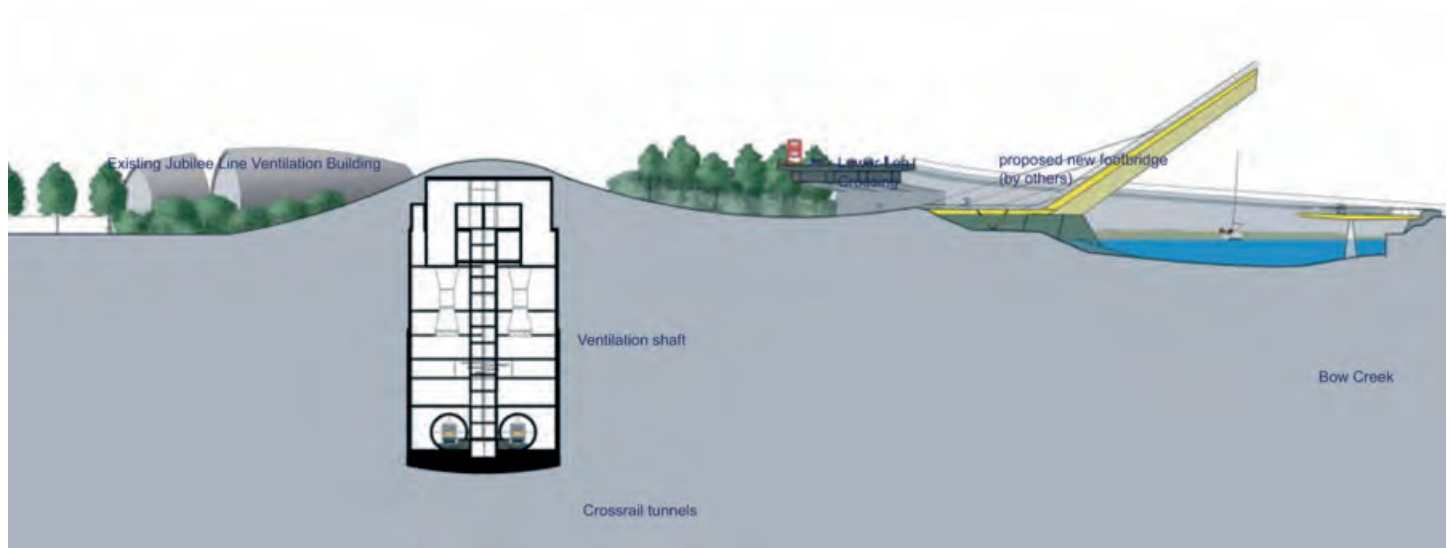
Construction of the shaft will be combined with a new building to accommodate ventilation fans and emergency access and escape facilities.

An open area at surface level will be designated for emergency evacuation.

The shaft has been designed to be in keeping with its surroundings and in consultation with master planners who are proposing future uses for the site.



Artist's Impression – Limmo Shaft



Limmo Peninsula Shaft – Section



Limmo Peninsula (2)

Shaft

Limmo Peninsula is currently being used to construct the new DLR extension to London City Airport. The DLR works include a new slip road from the eastbound carriageway of the Lower Lea Crossing which will provide permanent access to the Peninsula, the Crossrail shaft and any future development.

The London Borough of Newham is considering proposals for the future development of the Limmo Peninsula that could include residential and commercial development.

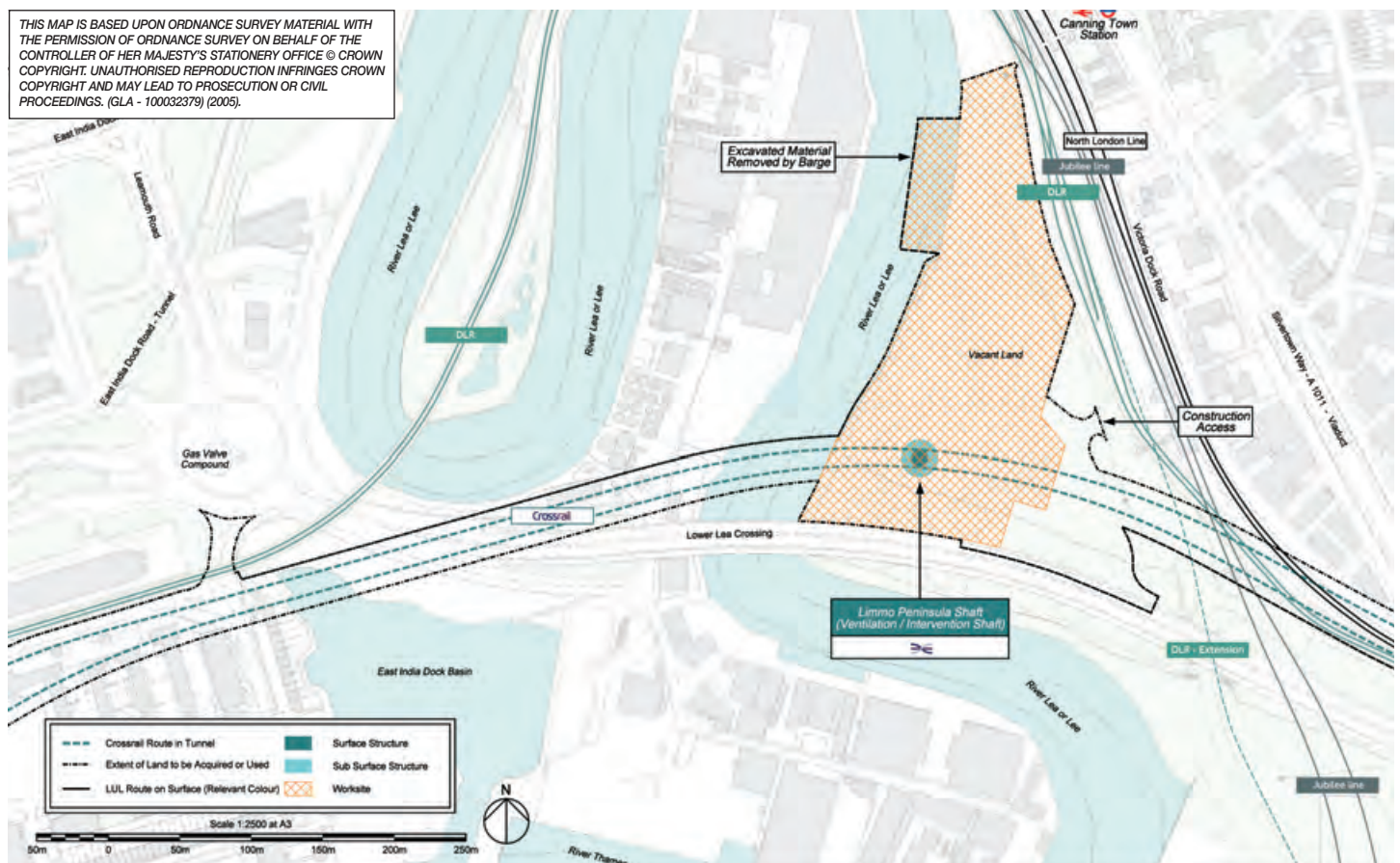
A new bridge for pedestrians and cyclists, known as the Leamouth Footbridge, is proposed by other parties over the River Lea.

The Crossrail shaft has been designed to take account of this new connection and other developments in the local area.

Some of the excavated material from Crossrail tunnelling will be transported by barge along the River Lea to landfill sites outside London for use in restoration.



Limmo Peninsula - aerial photograph as existing



Limmo Peninsula Shaft



Victoria Dock

Tunnel Portal

An exit and entrance for the Crossrail tunnels, known as a portal, will be located at Victoria Dock, between Royal Victoria and Custom House stations.

The tunnel portal will allow the Crossrail trains to operate between Docklands and central London. The Crossrail trains will emerge from the tunnels within the existing railway boundary.

The alignment of the DLR will be modified to accommodate the tunnel approaches.

During construction of the Crossrail portal, Silverlink Metro services will terminate at Stratford. DLR services will remain open.

Construction of the portal will be co-ordinated from a worksite at the ExCel lorry park over approximately two years.

Following completion, part of the site will be retained as an area for emergency evacuation and access to tunnels along Victoria Dock Road.

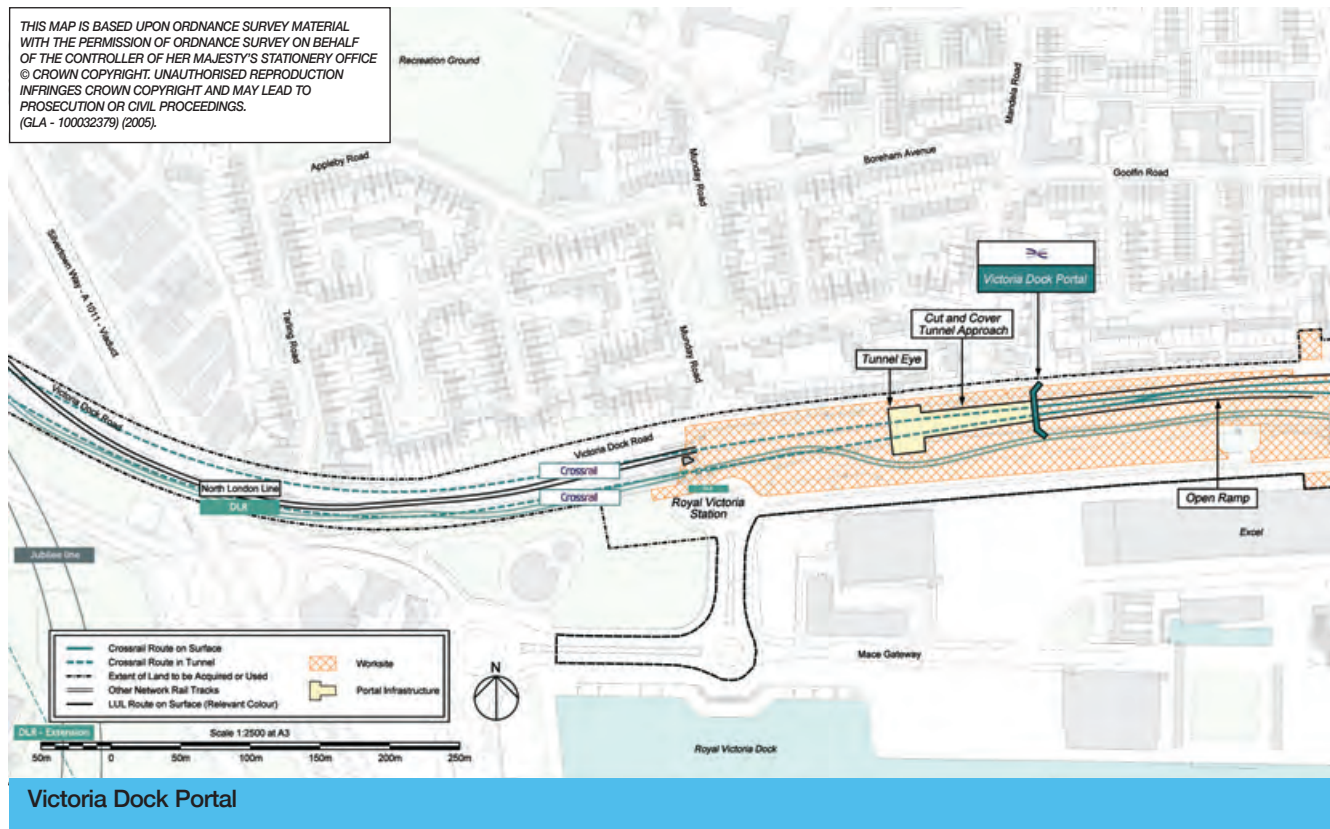
Crossrail's tunnel boring machine will be retrieved at Victoria Dock Portal following its drive from the Limmo Peninsula.



Artist's Impression – Victoria Dock Portal



Site of Victoria Dock Portal





Custom House (1)

Station Improvements



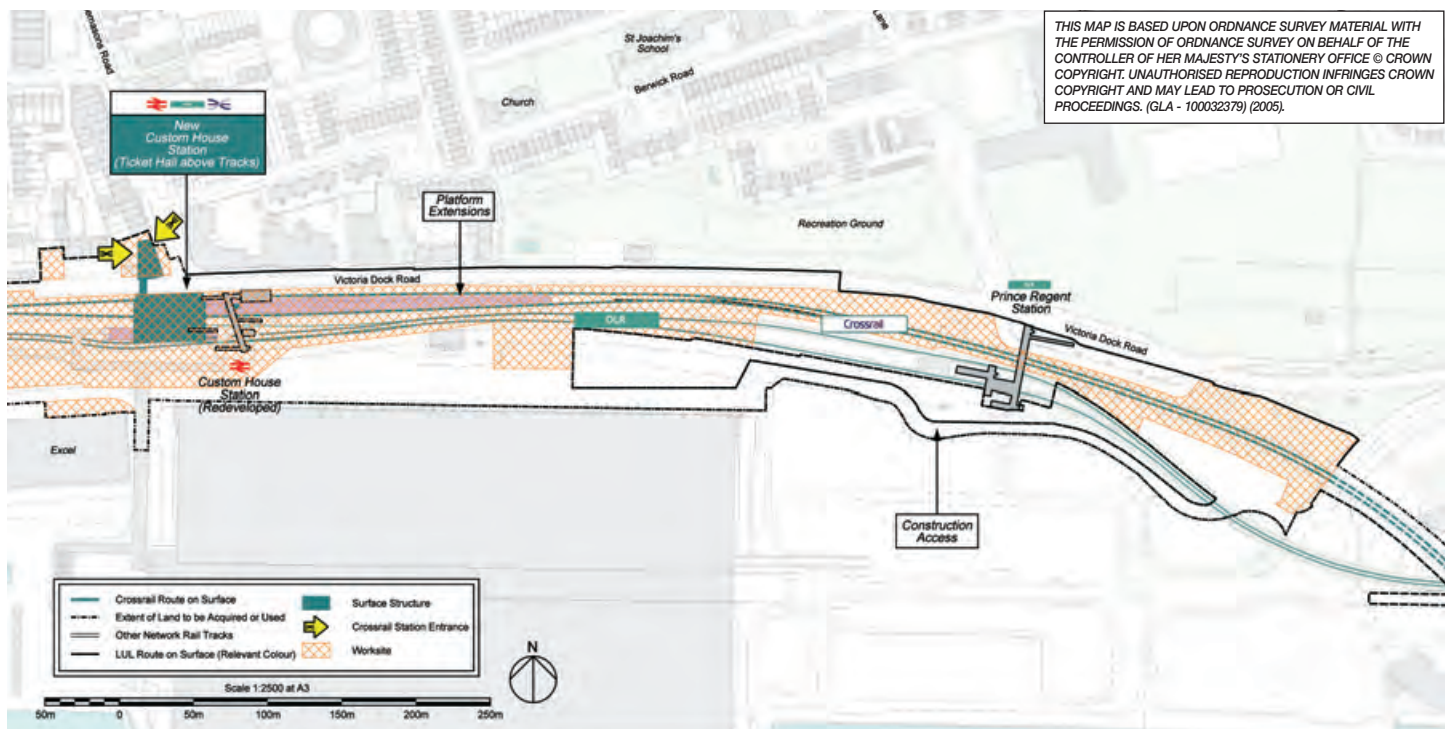
Crossrail will redevelop Custom House station to provide a new ticket hall and interchange with the DLR. The design will exploit the current ExCeL deck access to provide a pedestrian link between the station and the exhibition centre. The access deck will also extend to provide mobility-impaired access from ground level on the north side of Victoria Dock Road. The proposals include:

- A new ticket hall and staff accommodation
- Controlled access and security to both Crossrail and DLR platforms
- Lift and escalator access across Victoria Dock Road to the new station
- Step free access between ground level, platforms and the ExCeL centre

- An upgraded station forecourt with secure cycle storage
- Improved links to buses on Victoria Dock Road
- Clear and identifiable circulation routes within the station

The design solution will ensure that the existing DLR station remains fully operational throughout the works period.

Works will also include extending the platforms to accommodate the proposed 10-car Crossrail trains, new canopies, new seating, lighting, fixtures and fittings. There will also be some minor track realignment to accommodate the platform modifications.



Custom House Station



Custom House (2)

Station Improvements

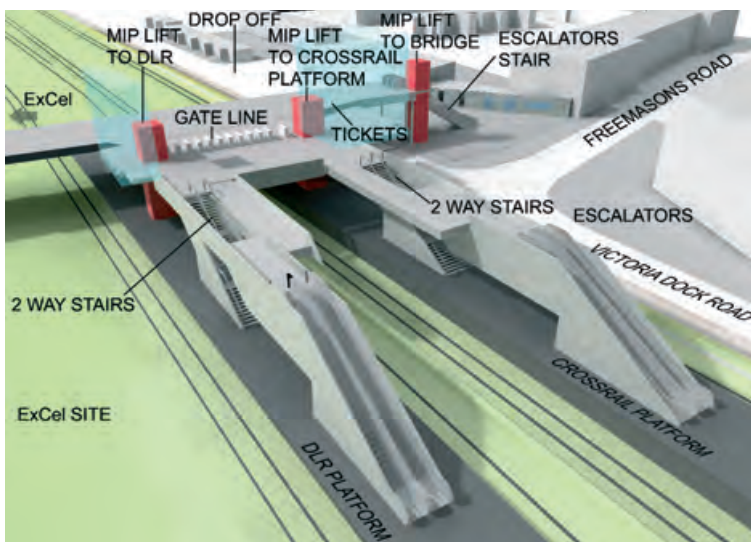


Any improvements will be discussed with the relevant railway bodies, Transport for London, the London Borough of Newham and the local community.

The redevelopment of Custom House station will temporarily require the use of part of ExCeL's lorry park for construction and development purposes.

During tunnel portal construction, the DLR tracks will be realigned, but remain open.

The work will be carried out over approximately 18 months.



Custom House Station



Custom House (3)

Service Improvements

Crossrail will improve train services to and from Custom House station by providing journey time saving, direct services to central London for the first time, and a greater variety of journey opportunities.

Approximately 1,100 passengers currently use Custom House station in the morning peak period. By 2016, following the introduction of Crossrail and other transport improvements, it is expected that the number of people using Custom House station will have doubled.

During peak periods, there will be 12 Crossrail trains per hour to and from Custom House station.

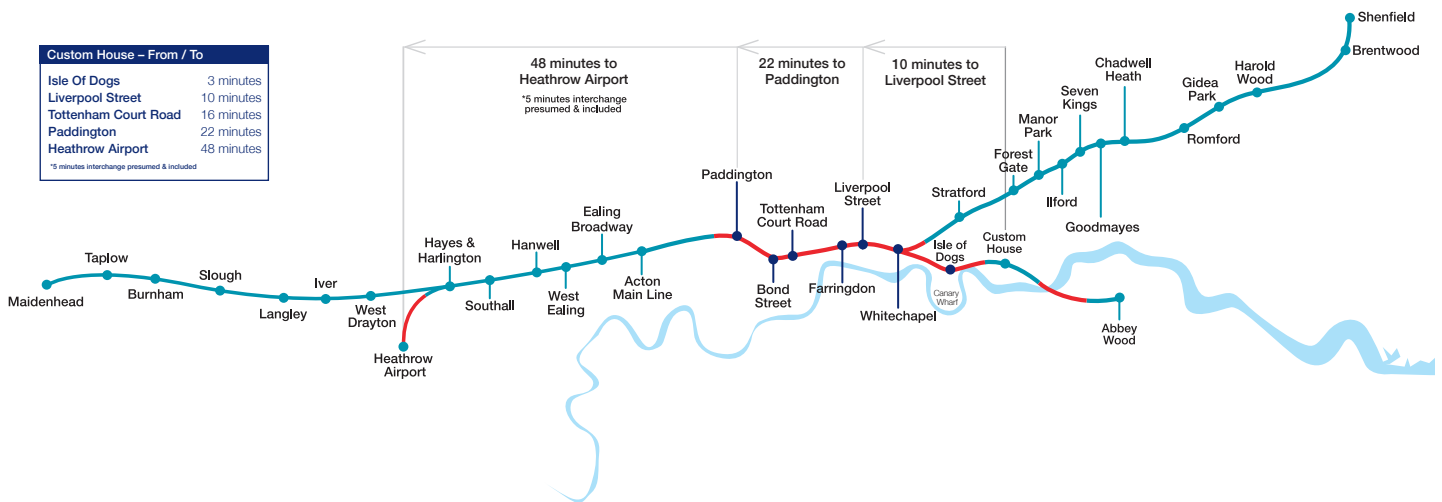
The Crossrail timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.

Docklands Light Railway is currently planning to convert the North London Line to DLR between Stratford and Canning Town. The closure of this part of the North London Line means that Silverlink Metro services will terminate at Stratford rather than North Woolwich. Existing users of this service will be able to use bus and alternative services provided by the DLR.

The design of the new Crossrail station at Custom House will allow for interchange with buses that could include a direct bus service to London City Airport.



Custom House station at present



Typical Crossrail journey times from Custom House



Custom House to Silvertown

Track Improvements

Following improvements to the existing track, Crossrail will use the North London Line between Custom House and North Woolwich before travelling under the River Thames in new tunnels.

Crossrail services will pass through the existing Connaught Tunnel. The tunnel will be significantly refurbished to accommodate Crossrail trains.

With the closure of the North London Line south of Stratford, Silvertown station will be closed in advance of the Crossrail works.

Passengers that currently use the station will be able to use services from new DLR stations at West Silvertown (Silvertown Way) or Pontoon Dock (North Woolwich Road).

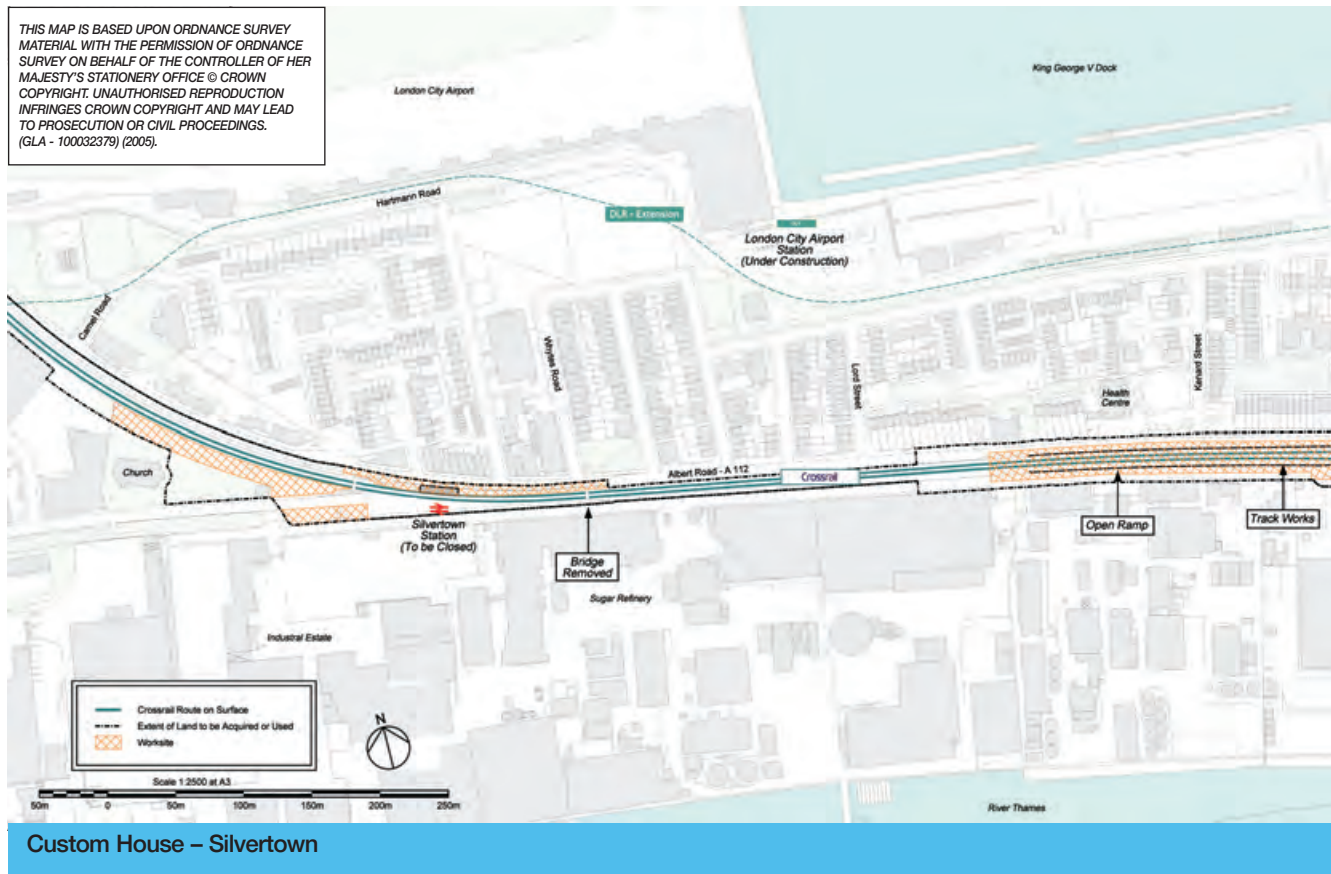
The work will be carried out over approximately four years.



Custom House station at present



Connaught Tunnel at present





Thames Tunnel

Tunnel Development

A new rail connection between central London and Abbey Wood via Docklands will be constructed.

This will require track improvements along the route of the North London Line and the development of new tunnels under the River Thames between North Woolwich and Plumstead.



River Thames



Thames Tunnel



North Woolwich

Tunnel Portal

The Portal is between Factory Road and Albert Road predominantly on railway land.

East of Silvertown, the Crossrail trains will gradually descend along the existing rail corridor (North London Line) to North Woolwich where a tunnel under the River Thames will be constructed.

The tunnel entrance/exit (portal) will be constructed on vacant land next to North Woolwich station.

North Woolwich Station will be closed. Existing Silverlink Metro passengers will be able to use the services from a new DLR station being constructed nearby at King George V station (Pier Rd).

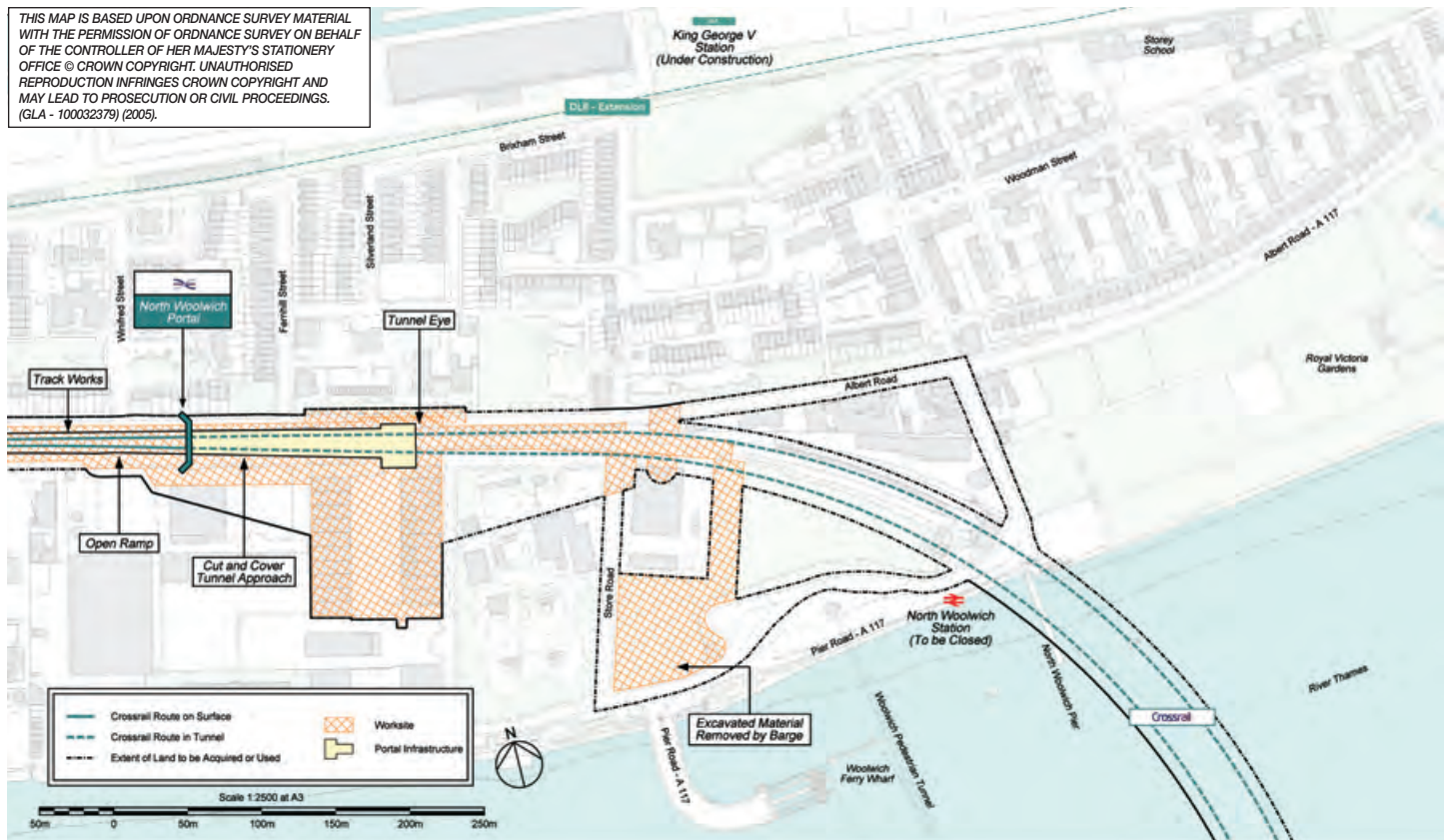
Crossrail's tunnel boring machine will be retrieved at North Woolwich following its drive from Plumstead.

Part of Albert Road and Factory Road will be required for temporary construction purposes to enable improvements to the railway line.

The excavated material from the Crossrail Tunnel Portal will be taken away by road to landfill sites outside London.



North Woolwich at present



Entrance to Thames Tunnel – Artist's impression



Woolwich (Warren Lane)

Shaft

A shaft will be constructed at Warren Lane will provide ventilation, emergency escape and access to the Crossrail tunnels.

The shaft will be constructed from a temporary worksite off Warren Lane including part of the Royal Arsenal Gardens.

Construction of the shaft will require the demolition of a derelict warehouse building.

To reduce the impact on the area, most of the required equipment rooms will be contained underground.

Warren Lane Shaft design will take account of its setting including the River Thames, Royal Arsenal Gardens and local development.

The work will be carried out over approximately two years.

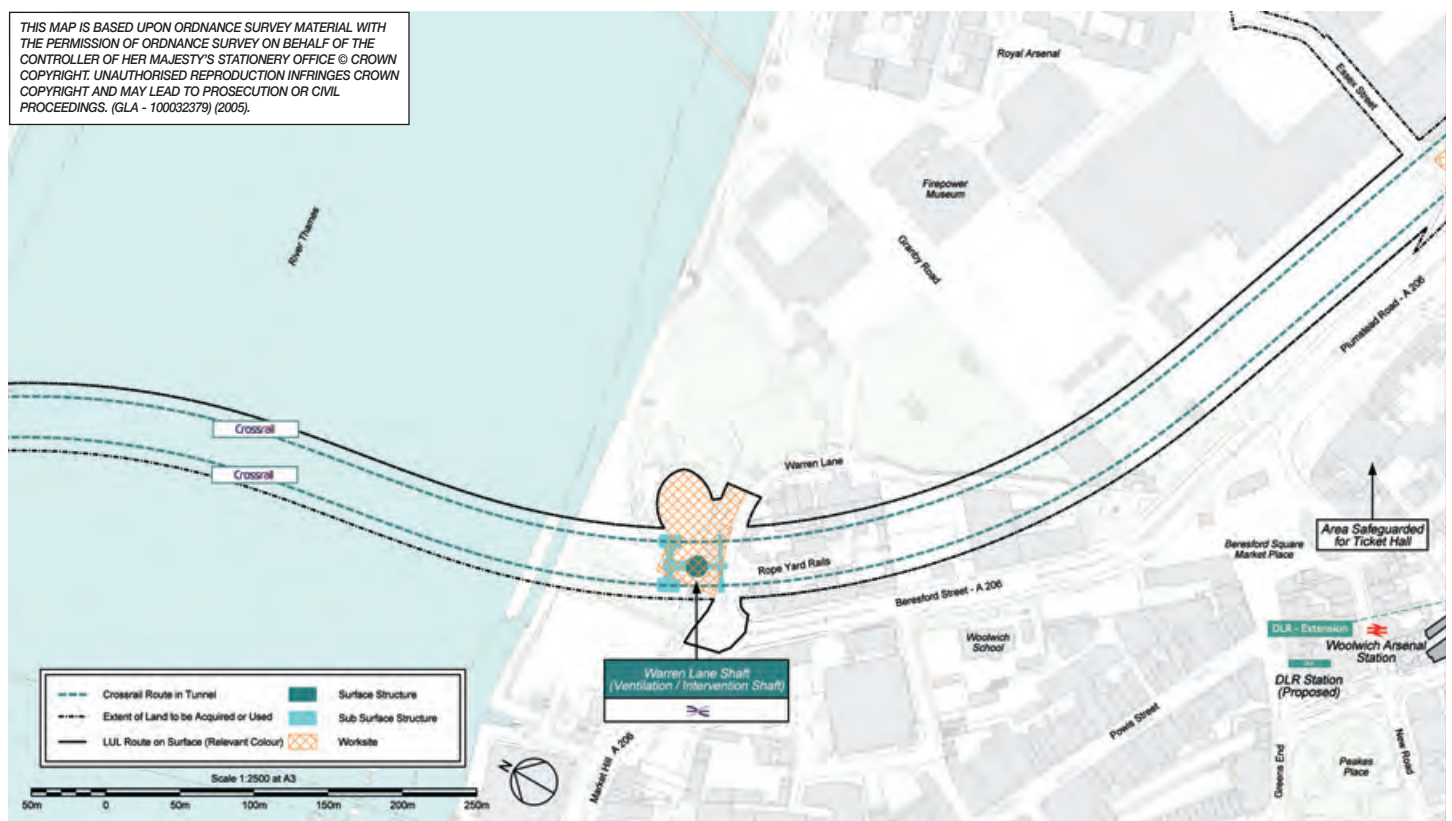


Warren Lane Shaft Site



Warren Lane Shaft Site – Artist's Impression

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Warren Lane Shaft



Woolwich (Arsenal Way) Shaft

A shaft will be built at Arsenal Way which will provide ventilation, emergency escape and access to the Crossrail tunnels.

The shaft will be constructed from a temporary worksite at the existing car park off Arsenal Way/Plumstead Road.

Two buildings will be constructed at surface to contain the ventilation equipment and the stairs for access to and from the Crossrail tunnels. Between the two structures, an area will be provided for passengers in the event of a train evacuation. The development of the shaft structures will be combined with landscaping.

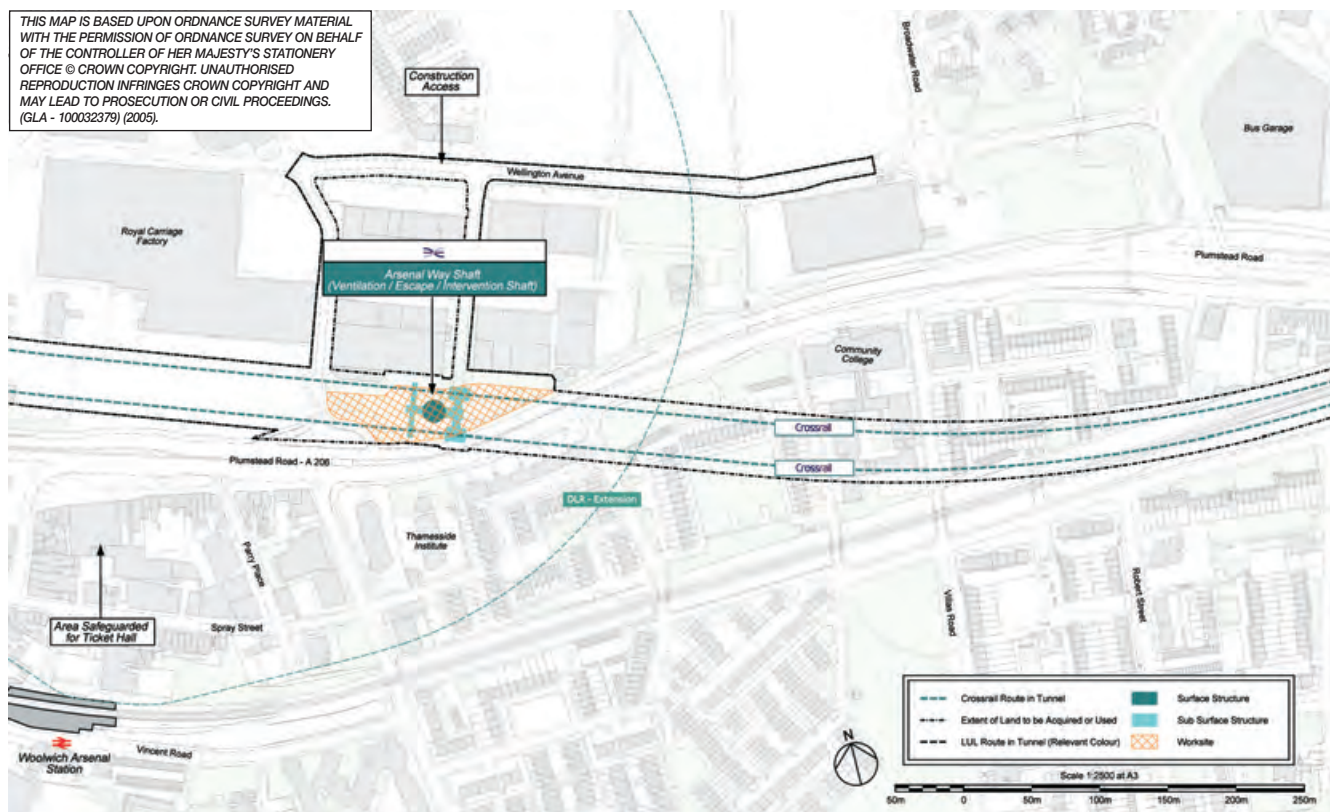
Most of the required equipment rooms will be contained underground and the shaft design will take account of its setting, including any local development. The work will be carried out over approximately two years.



Arsenal Way Shaft Site



Arsenal Way Shaft – Artist's Impression



Arsenal Way Shaft



Woolwich

Safeguarded Station Box

As the Crossrail tunnels will pass under Woolwich at a depth of approximately 20-25 metres, the cost of constructing an underground station will be expensive.

Furthermore, local bus improvements and the proposed extension of the DLR to Woolwich Arsenal should deliver many of the potential transport benefits that a Crossrail station could provide.

Therefore, a Crossrail station at Woolwich will not be in the Parliamentary Bill.

However tunnel design allows for the possible provision of an underground station and ticket hall at some point in the future.



Woolwich at present



Plumstead (1)

Tunnel Portal

A tunnel entrance and exit, or portal, for the Crossrail tunnels will be built at Plumstead.

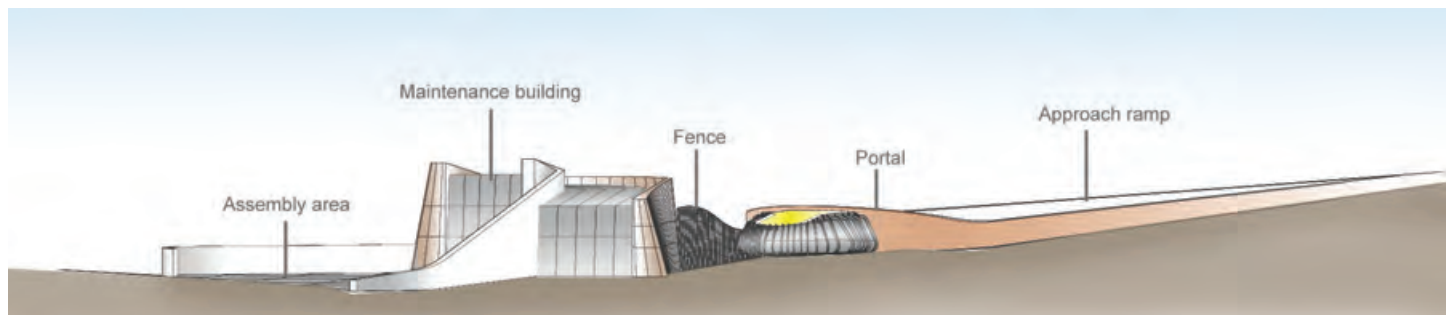
The tunnel portal will be used as the entrance/exit for Crossrail trains to operate between the North Kent Line and the centre of London via Docklands. The Crossrail trains will surface from the tunnels within the existing railway boundary.

Existing North Kent Line services will be diverted to either side of the proposed

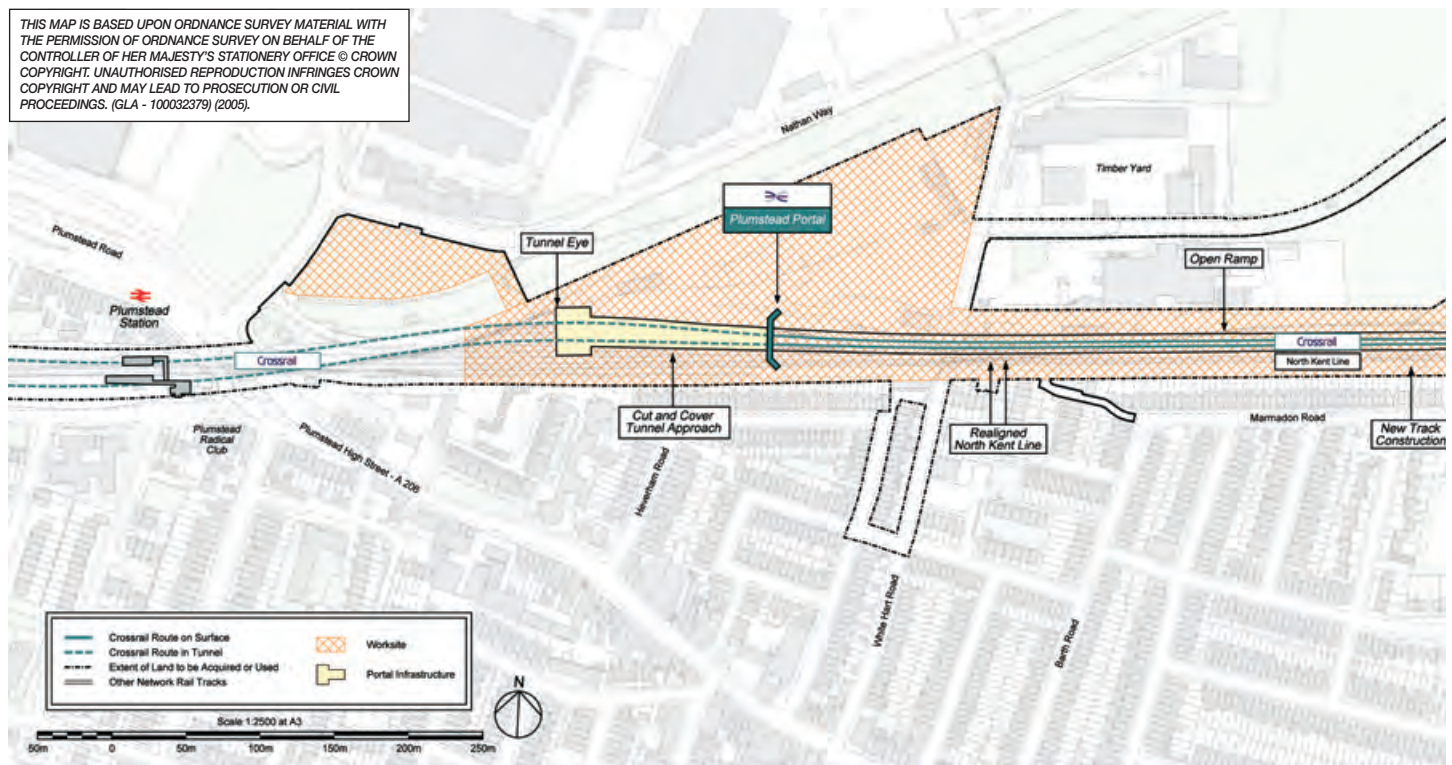
Crossrail lines through the development of new track between Plumstead and Abbey Wood.

Construction will be phased to allow continued operation of services along the North Kent Line.

White Hart Road will be closed during construction to allow Crossrail tracks to pass beneath it and North Kent Lines to pass above it. Traffic will be temporarily diverted.



Plumstead Portal – Section



Plumstead Portal



Plumstead (2)

Tunnel Portal

A tunnel boring machine will be launched at Plumstead for its drive under the River Thames to North Woolwich.

Excavated material from Crossrail tunnelling will be transported to landfill sites outside London for use in restoration.

The work will be carried out over approximately three years.



White Hart Road



Plumstead Sidings



Plumstead Portal Worksite



Plumstead to Abbey Wood

Track Improvements

A new track will be constructed either side of the North Kent Line between the portal at Plumstead and Abbey Wood station. Crossrail services will operate on the inner pair of tracks and North Kent Line services on the outer tracks.

Construction of the new track will be carried out largely within the railway boundary. However, some temporary and permanent land take will be required including 2-3m of the rear garden at a number of properties. These property issues are being addressed on a site-by-site basis.

A noise and visual barrier will be constructed along the railway to reduce the possible effect of construction and operation of the railway.

As part of the construction of the new track the bridge piers at Eynsham Drive will be strengthened.

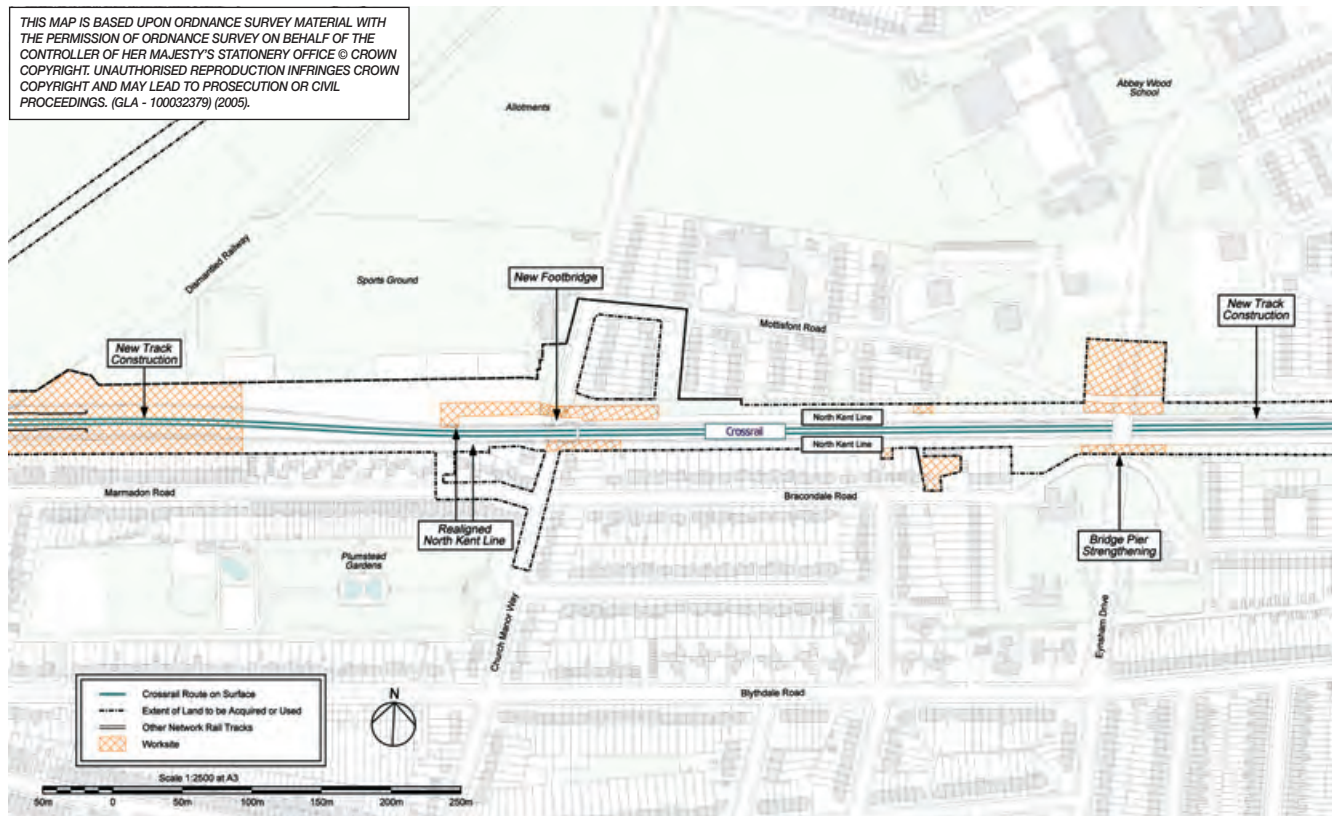
The existing footbridges over the railway at Bostall Manor Way and Church Manor Way will be demolished to make room for the new track, subject to agreement with local authorities and overhead electrification. The footbridges will be replaced with new structures that provide access, including approach ramps for those with mobility difficulties.



Plumstead Sidings



North Kent Lane



Track improvements at Plumstead – Abbey Wood



Abbey Wood (1)

Station Improvements



Crossrail will redevelop Abbey Wood Station to provide a new high quality interchange between Crossrail, the North Kent Line, Greenwich Waterfront Transit and local bus services.

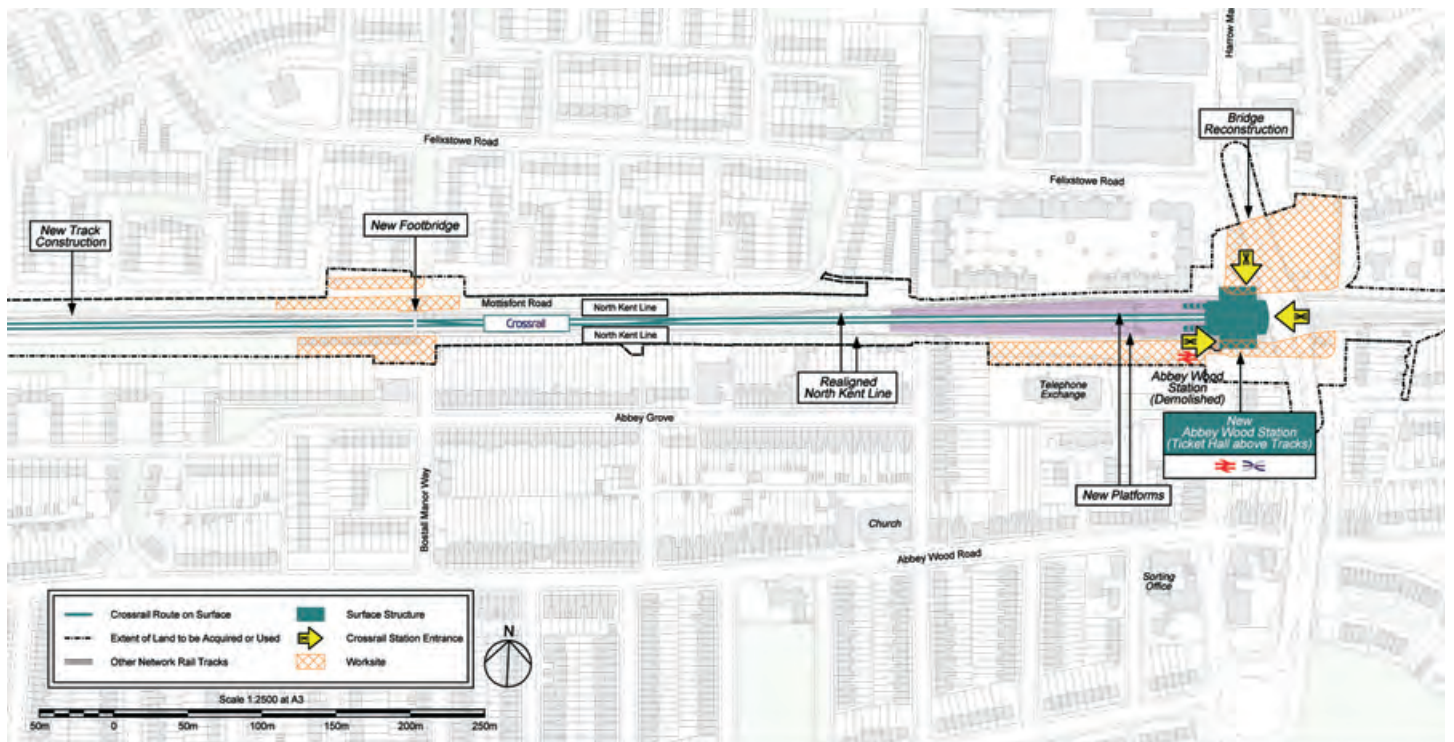
The existing two-platform station will be replaced by a new larger station elevated above the tracks with two new island platforms serving both Crossrail and North Kent train services. A ticket hall will be built above the tracks.

To the east of the station, sidings to reverse Crossrail trains will be developed within the existing railway boundary.

As part of the development of Crossrail at Abbey Wood, there will be a number of improvements including:

- Access for those with mobility difficulties, including lift provision

- New ticket hall and staff accommodation
- Ticket hall enhancements
- Pedestrian access improvements
- Improved cycle storage facilities
- Improved taxi and passenger drop-off facilities
- Direct interchange from the ticket hall to Greenwich Waterfront Transit and local bus services
- Passenger facility improvements
- New information systems
- Cross-platform interchange between Crossrail and North Kent Line



Abbey Wood Station



Abbey Wood (2)

Station Improvements



Any improvements will be discussed with the relevant railway bodies, Transport for London, the London Borough of Greenwich, the London Borough of Bexley and the local community.

To accommodate the new track and station facilities, part of Harrow Manor Way Bridge will be reconstructed. It will be reduced to a single carriageway, two-way road for the duration of the bridge works.

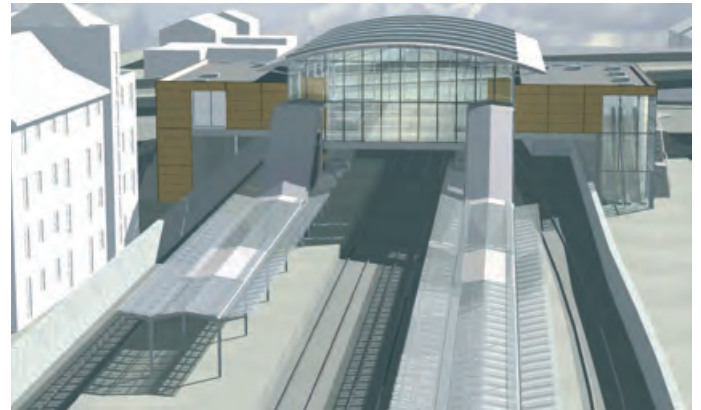
Reconstruction of the bridge will be carried out in stages so that the bridge could remain open to traffic at all times.

The new station and track layout will require two properties to be demolished. A section of land at the back of a number of residential properties will be required for construction work.

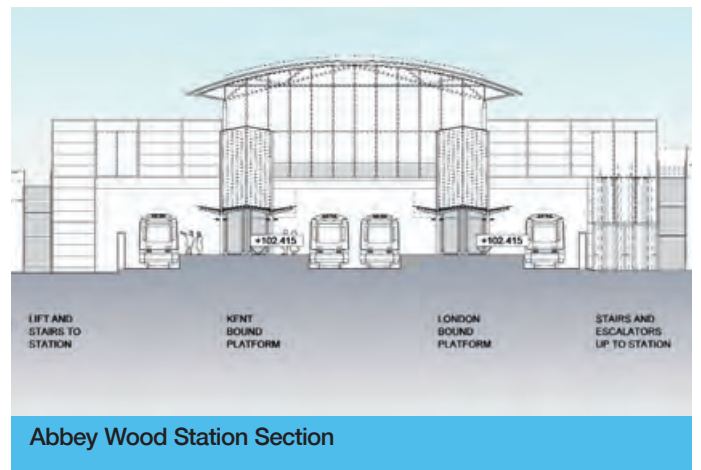
These property issues are being addressed on a site-by-site basis.

Construction of the station redevelopment will be co-ordinated from a temporary worksite at the station car park off Felixstowe Road and Wilton Road.

It will take approximately two years to complete the station redevelopment. Construction will be phased to allow continued operation of services along the North Kent Line.



Abbey Wood Station – Artist's Impression



Abbey Wood Station Section



Abbey Wood (3)

Service Improvements

Crossrail will improve train services to and from Abbey Wood Station by providing journey time savings and a greater variety of journey opportunities.

With Crossrail operational, the total number of seats available on trains to central London from Abbey Wood will almost double as a result of longer, more frequent trains.

During peak periods, Crossrail will run up to 12 additional train services per hour.

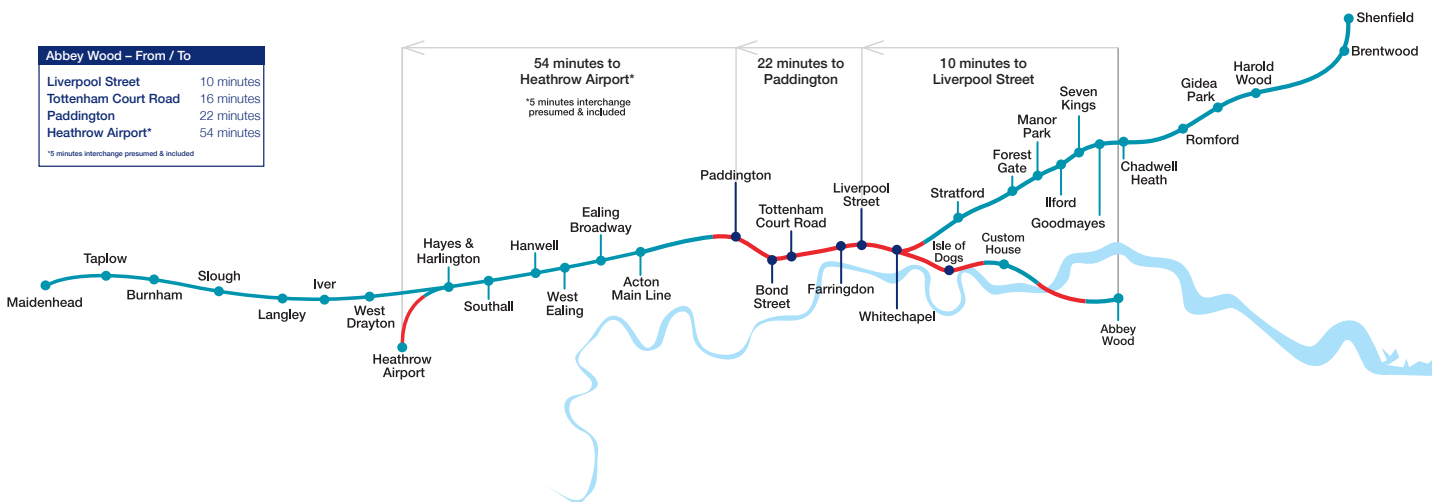
Prior to the opening of Crossrail, the timetable and service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating Crossrail services.



Abbey Wood Station at present

Abbey Wood – From / To	
Liverpool Street	10 minutes
Tottenham Court Road	16 minutes
Paddington	22 minutes
Heathrow Airport*	54 minutes

*5 minutes interchange presumed & included



Typical Crossrail journey times from Abbey Wood



Iford (2)

Station Improvements



Every effort has been made to limit land take. Where practicable existing trees will be protected during construction works. Openings have been designed into the north edge of the forecourt deck to accommodate the existing mature trees on the northern embankment.

It is envisaged that there will be three work site access points during construction. They are:

- From York Road - this will require demolition of the existing station building and will result in the closure of the existing secondary station access off York Road.
- Off Iford Hill - this will result in demolition of the existing Taxi Cab office.
- Cranbrook Road - this will result in the removal of 27-29 Cranbrook Road and will become operational only after the new forecourt deck has been constructed.

The works will be carried out in consultation with the local authority to ensure suitable traffic management measures are in place to limit disruption during construction.



Iford Station – Ticket Hall



Iford Station – Architect's Impression

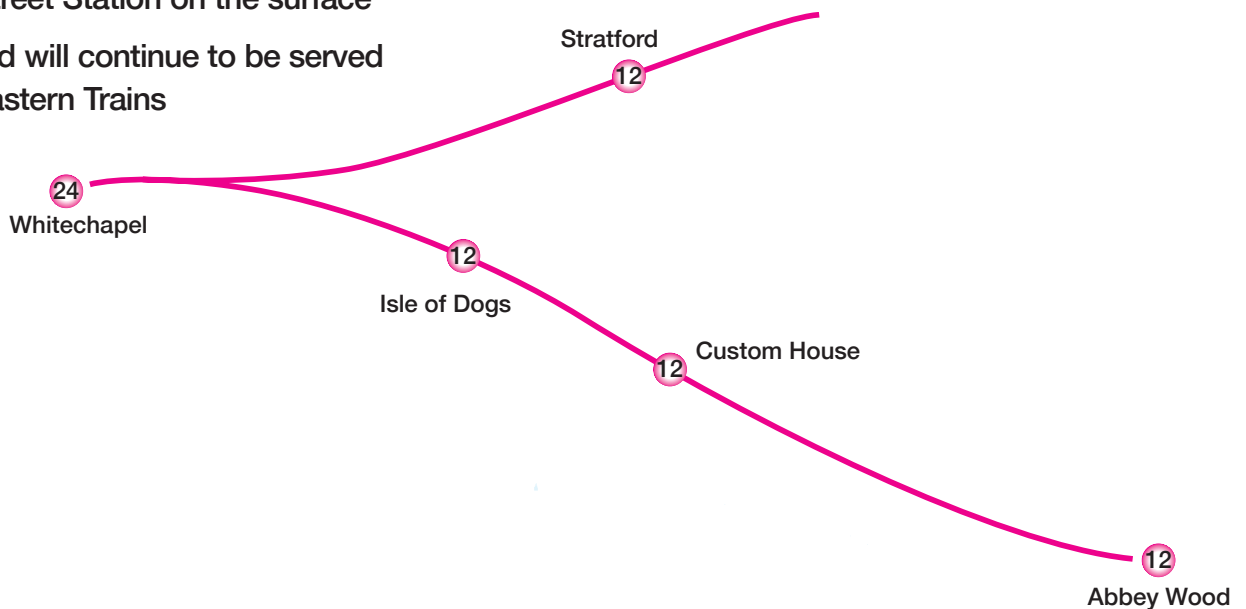


Great Eastern Line, Docklands and North Kent Line

Service Improvements

Crossrail services to Central London

- 12 trains per hour from Shenfield
- 12 trains per hour from Abbey Wood
- 'One' Metro services will continue to Liverpool Street Station on the surface
- Abbey Wood will continue to be served by South Eastern Trains



Summary of services to central London per hour:

Station	Peak	Off Peak
	Crossrail	Crossrail
Isle of Dogs	12	8
Custom House	12	8
Abbey Wood	12	8

The Crossrail service pattern will be set by the relevant railway bodies in consultation with the train operating company responsible for operating service Crossrail services.

Crossrail hopes to provide a consistent service with a 7-days a week service at all stations it serves.

The number of existing services between Abbey Wood and Central London will not be directly affected by the operation of Crossrail.



Pudding Mill Lane

Utility Diversion

The alignment of the Crossrail tunnels crosses two Thames Water sewers located in Wick Lane: the Hackney to Abbey Mills Sewer and the Wick Lane Sewer.

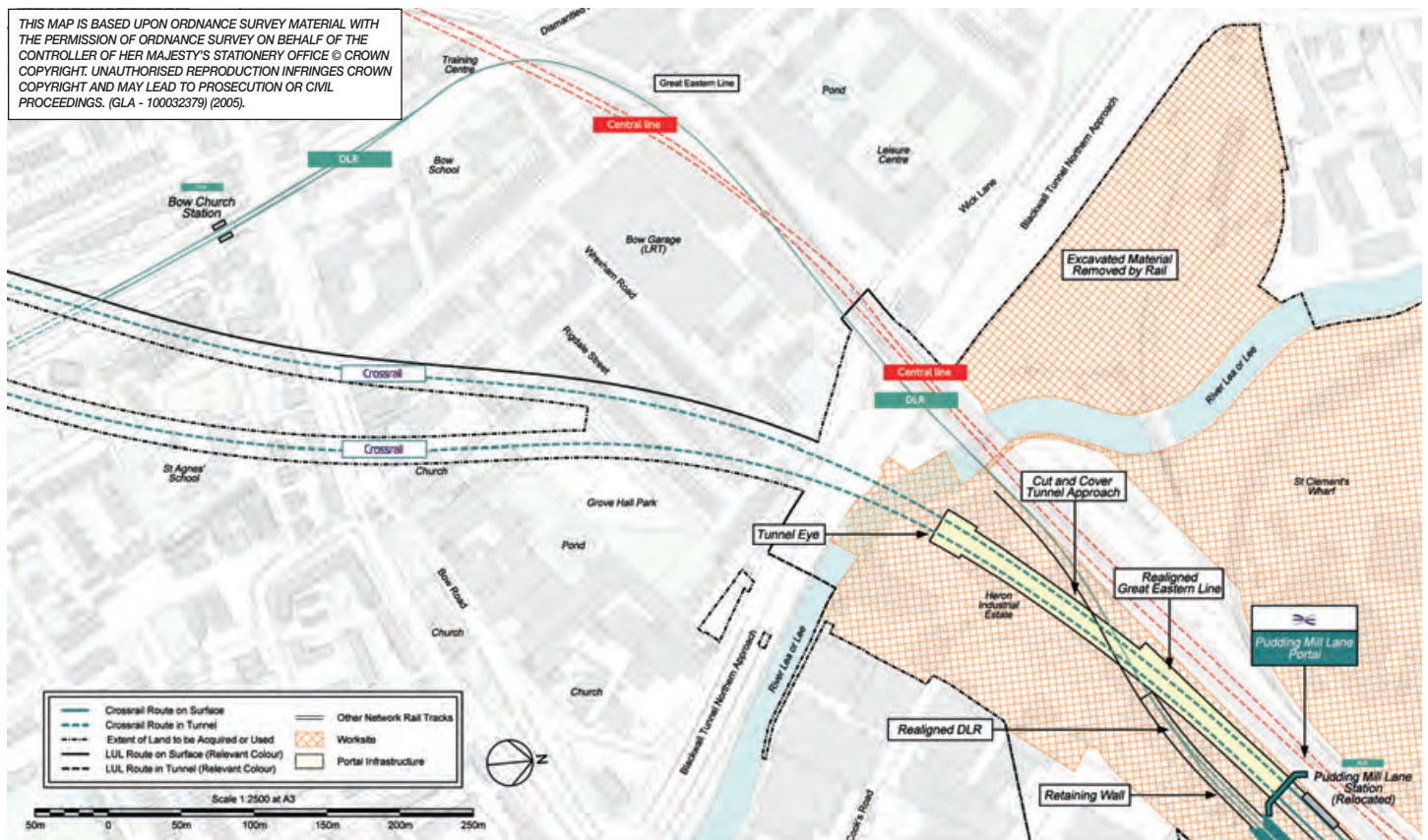
The solution is to construct a new sewer tunnel, which will create a diversion for these sewers prior to the construction of the Crossrail tunnel.

This new sewer tunnel will connect into the existing sewers in Wick Lane and divert their flows to the existing Thames Water site at Abbey Mills.

At Abbey Mills a new pumping station will be constructed to raise the flows to the required height, enabling them to discharge into the existing Thames Water sewage network.

This will require the construction of a number of below ground shafts along the route of the new sewer tunnel. When completed, these shafts will have only a manhole on the surface, to enable future access.

Further underground shafts and chambers will also be constructed on the existing sewers to facilitate the alterations to the existing network.



Pudding Mill Lane Sewer Diversion

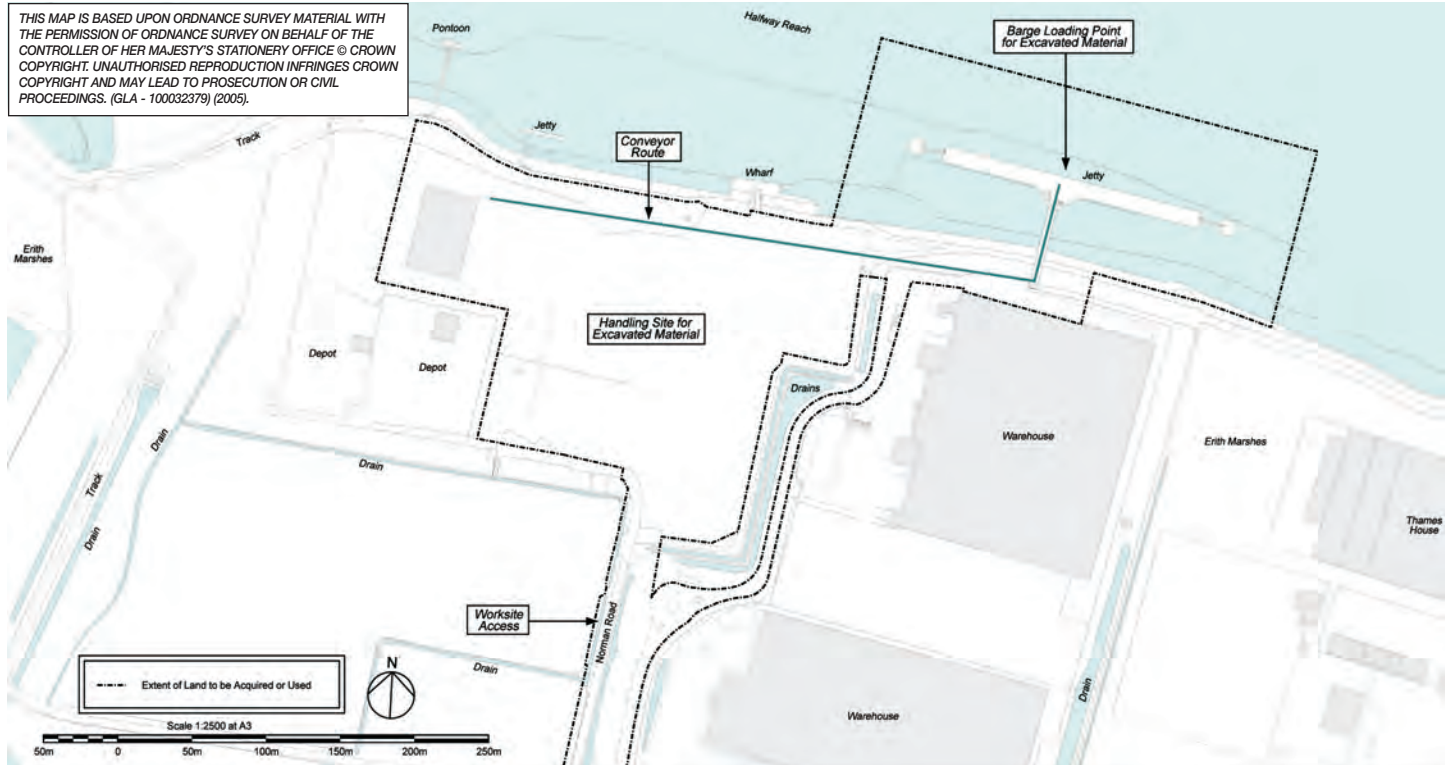


Manor Wharf

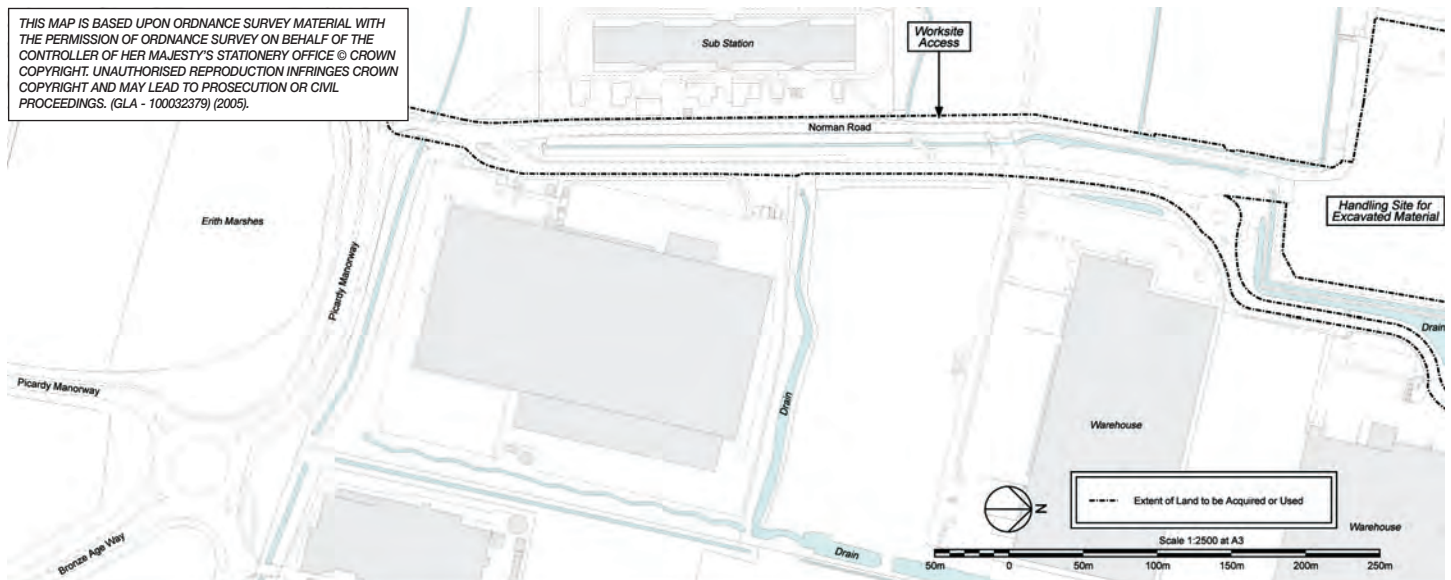
Tunnelling for Crossrail will produce a large amount of inert (uncontaminated) excavated material, mainly London clay, which will need to be transported to convenient sites for disposal.

Crossrail intends to limit the amount of excavated material transported by road. Barge and, particularly, rail will be used wherever possible.

One proposal for the disposal of excavated material is for it to be loaded onto barges at Manor Wharf. This will require excavated material to be delivered by road from the tunnelling worksite at Plumstead sidings. It may be necessary for Norman Road to be widened to allow two-way use by lorry.



Manor Wharf



Norman Road



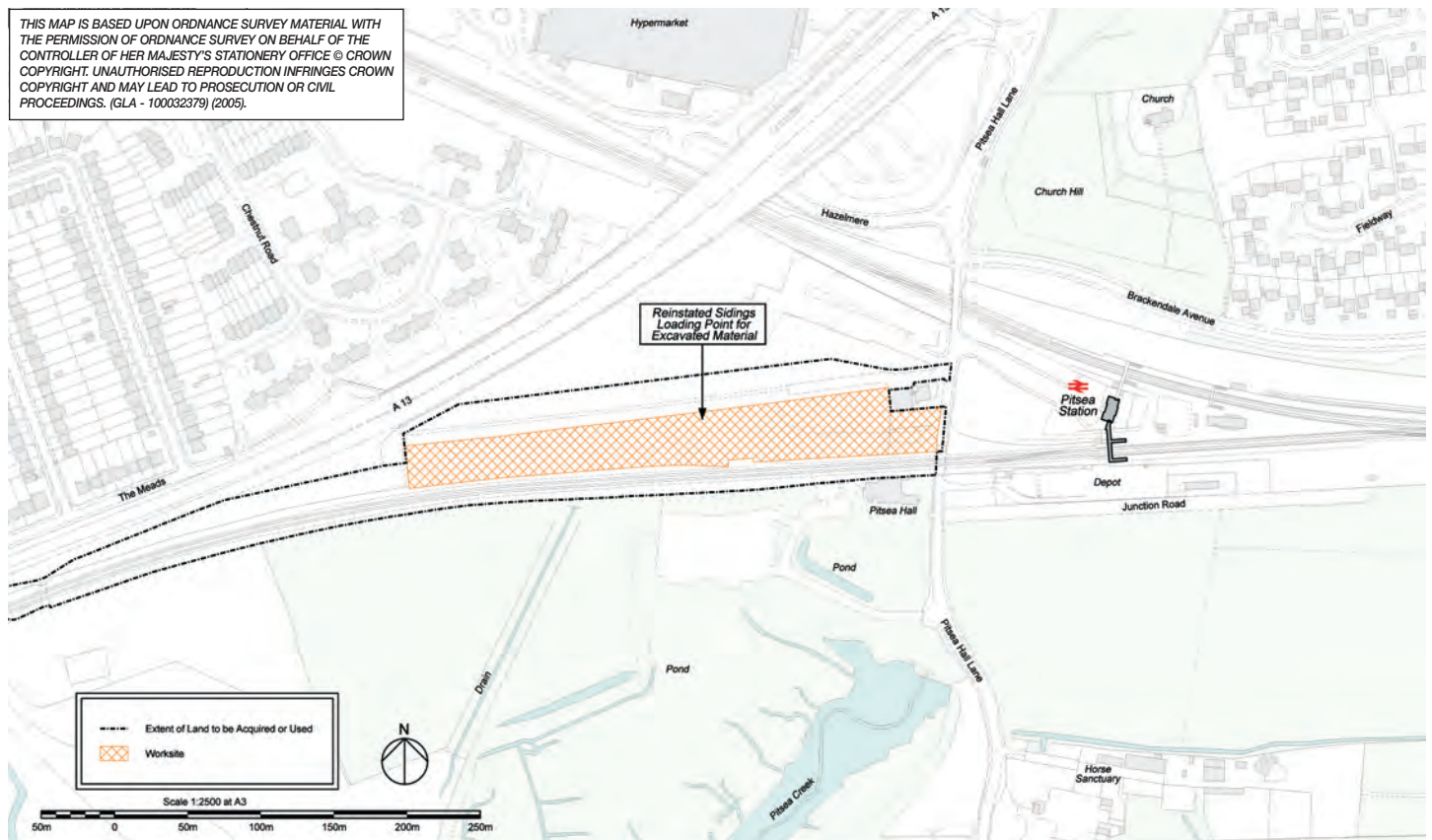
Pitsea

Tunnelling for Crossrail will produce a large amount of inert (uncontaminated) excavated material, mainly London clay, which will need to be transported to convenient sites for disposal.

Crossrail intends to limit the amount of excavated material transported away from the works by road. Barge and, particularly, rail will be used wherever possible.

One proposal for the disposal of excavated material is for it to be used as capping material at the landfill site in Pitsea.

To enable delivery to the site by rail we are investigating the possibility of temporarily reinstating the disused railway sidings located between the A13 flyover and the Tilbury loop of the London, Tilbury and Southend (c2c) railway. This would enable excavated material to be taken from trains and loaded into lorries for delivery to the landfill site.



Pitsea sidings



Romford (1)

Station Improvements



Located within the existing railway viaduct, the redevelopment of Romford station is technically challenging. Consequently, a new ticket hall will be developed on the site immediately adjacent to the existing ticket hall.

The improved station will provide:

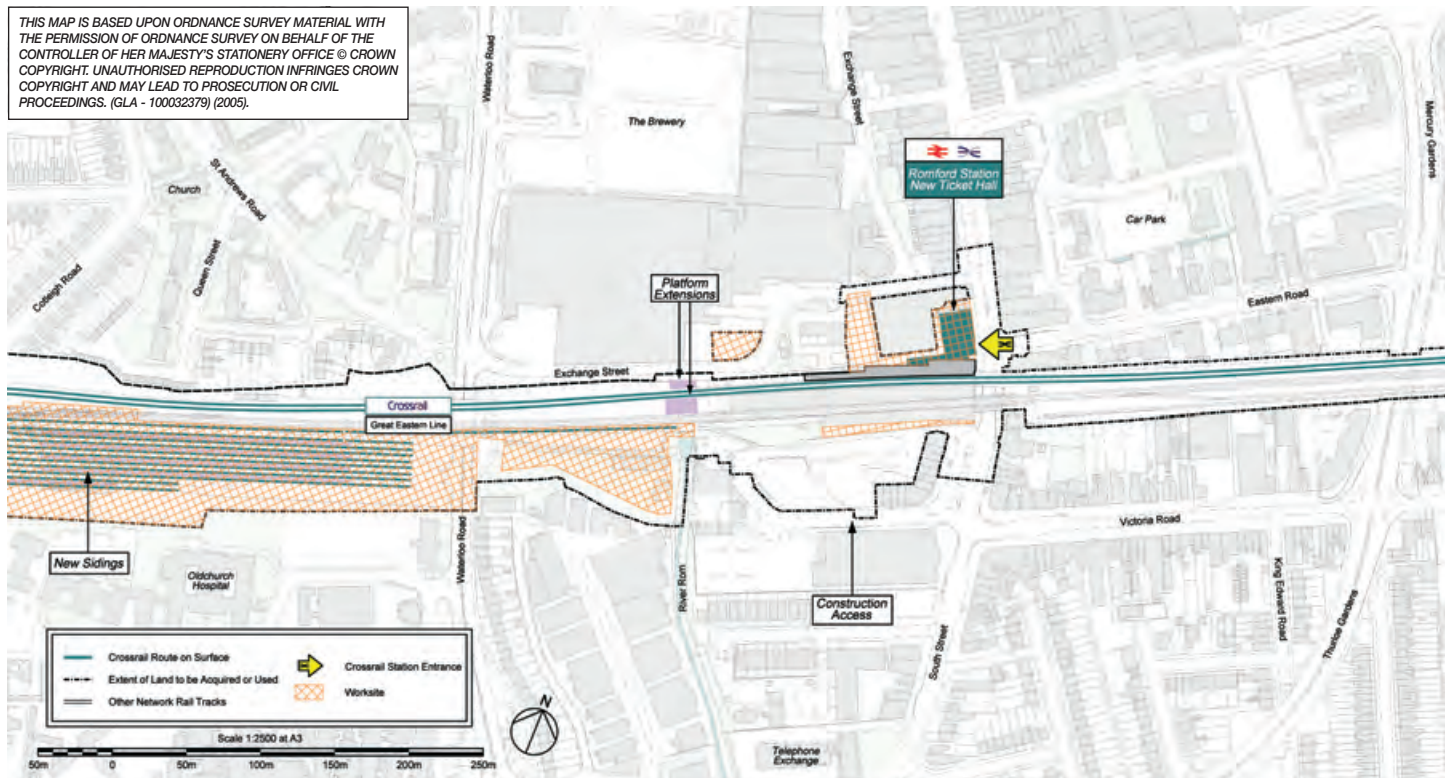
- A new ticket hall at ground level with generous circulation areas and a strong urban presence
- Ticketing facilities at ground floor level with clear sight lines and large naturally-lit spaces
- Escalators from ground floor directly to platforms 3, 4 and 5
- Lifts from ground floor level to platforms 3, 4 and 5

- An upgraded station forecourt with secure cycle storage

The existing ramps and stairs from mezzanine level to platform level will remain.

Other works include extending the platforms to accommodate the proposed 10-car Crossrail trains. New canopies, seating, lighting, fixtures and fittings will be provided to platforms 3, 4 and 5.

The existing station will remain closed for the duration of the works. Temporary ticketing facilities will be provided to the south side of the viaduct adjacent to the bus stop with access to the station via the existing external ramp.



Romford Station