

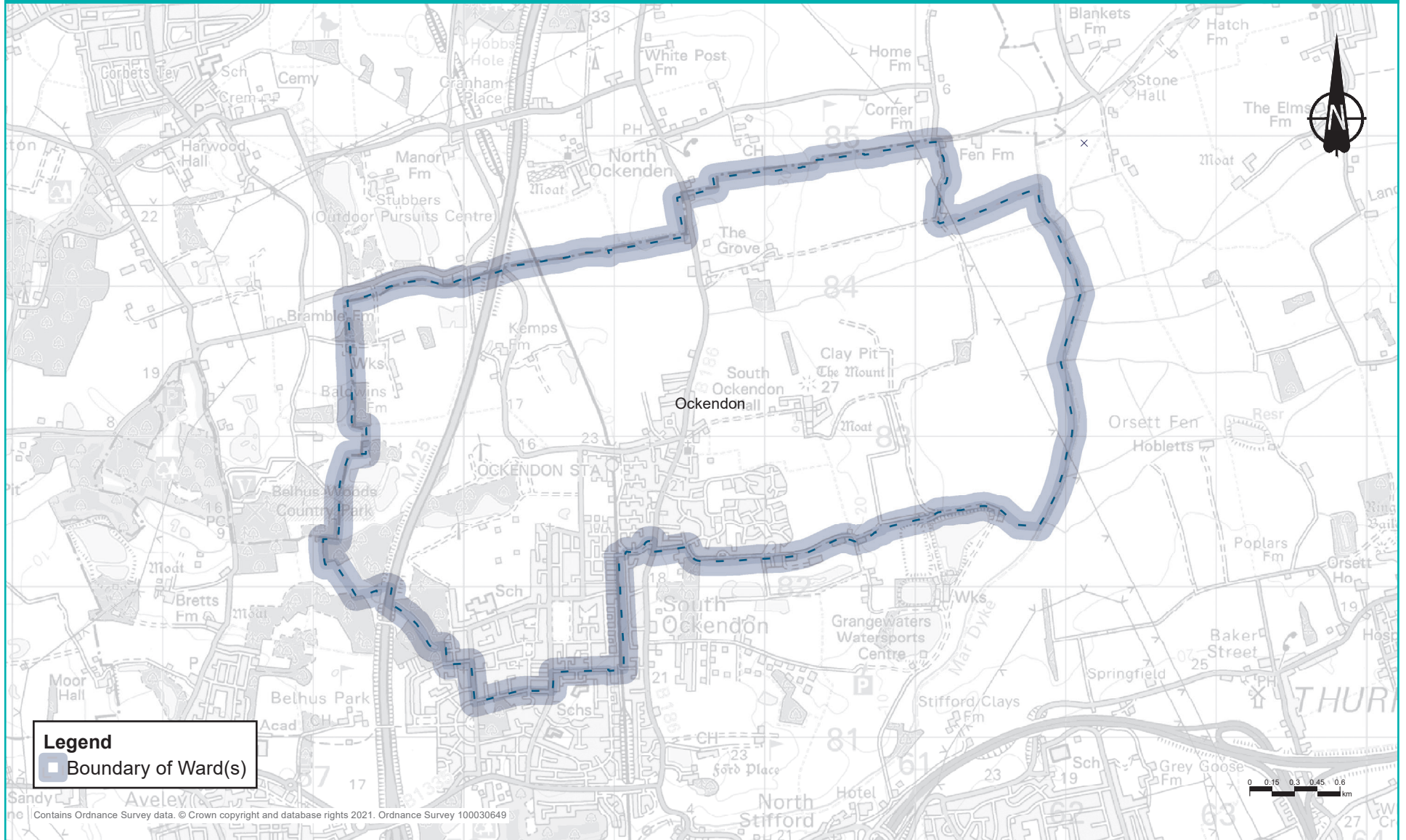
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Chapter 20: Ockendon ward

This chapter summarises the activities in Ockendon ward relating to the project's construction and its operational phase (when the new road is open). It also explains the measures intended to reduce the project's impacts on local communities. For more information about the assessments in this chapter and other information available during this consultation, see chapter 1, which also includes a map showing all the wards described in this document.

Within this document, we sometimes advise where additional information can be found in other consultation documents, including the Construction update, Operations update, You said, we did, Register of Environmental Actions and Commitments (REAC), Code of Construction Practice (CoCP), Outline Traffic Management Plan for Construction (OTMPfC) and Design principles. To find out more about these documents, see chapter 1. References to these documents provide an indication as to how our proposals to reduce the project's impacts will be secured within our application for development consent.

Figure 20.1: Ward boundary map for Ockendon ward



20.1 Overview

20.1.1 About this ward

Ockendon ward is located north of Belhus and west of Orsett. The ward has an area of around 11.5km² hectares and an estimated population of 11,467¹. The ward is residential in the south, and is predominantly agricultural, with the M25 running north-south in the west. The Upminster to Grays railway line runs through the centre of the ward north to south. Ockendon station is located to the west of Tamarisk Road. South Ockendon Quarry is sited in the east of the ward with an approved planning application to build a solar farm and associated infrastructure. There is a high-voltage overhead power line in the east of the ward, which is crossed by the proposed new road.

¹ Office for National Statistics, 2018 ward-level population estimate.

20.1.2 Summary of impacts

Table 20.1: Summary of impacts during the project’s construction and operation

Topic	Construction	Operations
<p>Traffic</p>	<p>Impacts</p> <p>It is predicted that the traffic impacts in the ward during the construction period will be in areas where there are traffic management measures. There may, however, be additional construction traffic on the roads for the first 12 months of construction.</p> <p>Mitigation</p> <p>There are several mitigation measures to reduce the impact of the construction process on local residents, including reducing the use of local roads by construction vehicles. Further details on the mitigation measures can be found in the Traffic section of this chapter.</p>	<p>Impacts</p> <p>It is predicted that there will be minor changes to traffic flows within the ward once the project is operational. Only South Road and a small section of the M25 is predicted to see any changes. Further details can be found in the Traffic section of this chapter.</p> <p>Mitigation</p> <p>Regular monitoring would take place once the project is operational. Further details about the mitigation measures for Ockendon ward can be found in the Traffic section of this chapter.</p>
<p>Public transport</p>	<p>Buses</p> <p>There would be increases to journey times for some local buses within the ward, associated with the traffic management works and, in the early stages of the project construction, with additional traffic on the local roads. While Ockendon Road is closed, the 370 bus would have to be diverted.</p> <p>Rail</p> <p>There may be some increases in journey times to Ockendon station, also associated with increased traffic through the area and traffic management on the local roads.</p>	<p>Buses</p> <p>Bus journeys would not be affected.</p> <p>Rail</p> <p>There would be no discernible changes to access times to local train stations, nor to rail services from these stations.</p>

Topic	Construction	Operations
<p>Footpaths, bridleways and cycle routes</p>	<p>Impacts</p> <p>Four footpaths and two bridleways would need to be closed for between five months and five-and-a-half years to allow for utilities works, main works alignment and for the M25 construction compound.</p> <p>Mitigation</p> <p>Where closures of footpaths and bridleways are necessary to allow for construction works, these closures will be reduced as much as possible, and in one case diverted while closed.</p>	<p>Impacts</p> <p>Footpaths affected during construction would be resurfaced and upgraded to bridleways once the project is operational and diverted along new alignments into the existing public right of way network, opening up new local connections. The one existing bridleway affected would be upgraded and resurfaced via a new route and bridge prior to reopening.</p> <p>Mitigation</p> <p>Where footpaths or bridleways need to be diverted permanently, these new alignments would be as close to the existing routes as practicable and would open up new local connections in the existing public rights of way network.</p>

Topic	Construction	Operations
<p>Visual</p>	<p>Impacts</p> <p>Views towards construction activities from residential properties on the northern edge of South Ockendon and Cheelson Road are likely to include the excavation of the cutting for the new road, construction of the false cutting and North Road green bridge. From footpaths on the north-east outskirts of South Ockendon, views across arable fields are likely to include road and bridge construction. From the east-west aligned footpath, there would be views of Medebridge Compound, and road and bridge construction to the south. The overhead line diversion east of Footpath 136 overbridge would be visible from the footpath which connects to the Mardyke Way, as well the associated Utility Logistics Hub and road construction.</p> <p>Mitigation</p> <p>The visual impacts would be controlled through the good practice measures set out in the CoCP and REAC.</p>	<p>Impacts</p> <p>The North Road green bridge, the new road and traffic would be visible from residential properties on the northern edge of South Ockendon. The new road would be visible where it emerges from cutting approaching the Footpath 136 overbridge. The new road and associated traffic would be visible from the footpath connecting to the Mardyke Way. The diverted overhead line would not be noticeably different to the existing overhead line.</p> <p>Mitigation</p> <p>False cuttings and landscape planting along the new road corridor would help to screen views of the new road and traffic. The North Road green bridge would visually link the landscape north and south of the new road.</p>

Topic	Construction	Operations
<p>Noise and vibration</p>	<p>Impacts</p> <p>The construction activity associated with the M25 upgrade works, the project entrance/exit slips on to the M25 and the new road and utilities works is expected to create noise in this ward. There would also be two main work compounds and one Utility Logistics Hub within this ward. There would also be 24-hour, seven-day construction working in some locations. There would be negligible changes in noise from road traffic for a majority of roads within this ward during the construction period, except along Dennis Road and the Veolia Track access where increases in road traffic noise are predicted.</p> <p>There is one proposed structure expected to be constructed using vibratory or percussive piling, however these works are not within 100 metres of any sensitive receptors, so no vibration impacts are expected.</p> <p>Mitigation</p> <p>Construction noise levels would be controlled through the mitigation measures set out in the REAC. There are also measures presented in the CoCP.</p>	<p>Impacts</p> <p>Once the project is built, there would be direct noise impacts from the new road and the proposed improvements to the M25 in the west of this ward. There would be an indirect noise impact from the changes in traffic flow and speed on the existing road network.</p> <p>Mitigation</p> <p>Low-noise road surfaces would be installed on all new and resurfaced roads, and noise barriers would be installed.</p>

Topic	Construction	Operations
<p>Air quality</p>	<p>Impacts</p> <p>There is likely to be dust and emissions from construction equipment and traffic during the construction phase.</p> <p>Analysis of the construction phase traffic flows associated with the project indicate a minor improvement in air quality in the area around the M25 between 2025 and 2028 and on the B1421 in 2025, 2027 and 2028. These changes would be temporary.</p> <p>Mitigation</p> <p>The contractor would follow good practice construction measures which are presented in the CoCP and REAC to minimise the dust. Construction vehicles would need to comply with emission standards. An Air Quality Management Plan would be designed in consultation with the relevant local authorities. The plan would include details of monitoring, which would ensure measures are effectively controlling dust and exhaust emissions.</p>	<p>Impacts</p> <p>There would be no exceedance of NO₂ and PM₁₀ in this ward as a result of the project.</p> <p>Mitigation</p> <p>No mitigation is required.</p>

Topic	Construction	Operations
<p>Health</p>	<p>Impacts</p> <p>The construction phase of the project would present opportunities to access work and training.</p> <p>There are likely to be changes in the area that may result in negative impacts on health, including mental health and wellbeing. There is likely to be perceivable changes in the levels of noise from construction activities and construction traffic. There would also be changes in accessibility.</p> <p>Mitigation</p> <p>The negative impacts would be mitigated through the good practice construction measures presented in the CoCP and REAC relating to dust emissions, working hours, noise and visual screening, traffic management measures and community engagement. This includes the establishment of Community Liaison Groups.</p>	<p>Impacts</p> <p>The project would improve access to work and training.</p> <p>There would be an increase in noise from traffic in the west of the ward once construction is complete. There would also be visual effects.</p> <p>Mitigation</p> <p>No essential mitigation is required for health other than those measures described in the Noise and vibration and Visual sections.</p>

Topic	Construction	Operations
<p>Biodiversity</p>	<p>Impacts</p> <p>The construction of the project would involve the removal of areas of habitat, both temporarily and permanently for the new road.</p> <p>This includes arable fields, scrub, rough grassland and woodland.</p> <p>Species within these habitats would be disturbed through habitat loss and fragmentation.</p> <p>Mitigation</p> <p>Vegetation clearance would be carried out in winter to avoid impacting breeding birds. Protected species would be relocated, carried out under a Natural England licence. Boxes to support bats, birds and barn owls would be erected. Habitat lost temporarily for construction works would be reinstated.</p> <p>A green bridge would be built over North Road to provide habitat connectivity. New areas of grassland, scrub and bare earth habitats would be created as well as new ponds.</p> <p>Impacts would also be controlled through the range of good practice measures set out in the CoCP and REAC.</p>	<p>Impacts</p> <p>There is the potential to cause mortality of species by encountering road traffic as well as habitat fragmentation and disturbance from traffic.</p> <p>Mitigation</p> <p>Landscape planting has been designed to enable animals to move to forage, and guide them to safe crossing points over the new road.</p> <p>Newly created areas of habitat would be managed to ensure they provide high-quality habitat to support a broad range of plant and animal species.</p> <p>Impacts would also be managed through the range of good practice measures set out in the CoCP and REAC.</p>

Topic	Construction	Operations
<p>Built heritage</p>	<p>Impacts</p> <p>There would be no direct impact to built heritage assets. Grade II listed Former Gateway at Groves Barns would experience temporary changes to its setting through the noise, lighting and visible construction machinery. Grade II listed Kemps and Kemps Cottage would experience a slight temporary impact to their setting as a result of construction activity along the M25.</p> <p>Mitigation</p> <p>The design and layout of Medebridge and M25 Compounds would seek to avoid or minimise light pollution during night-time construction. Good practice measures are detailed within the REAC, refer to the Air quality, Noise and Heritage sections.</p>	<p>Impacts</p> <p>Grade II listed Kemps and Kemps Cottage would experience slight impacts to their setting due to the likely increase of noise along the M25 once the new road opens.</p> <p>Mitigation</p> <p>Road lighting would be minimised where it is safe and practical to do so. Medebridge and M25 Compounds would be reinstated on completion of construction to reflect the existing field patterns and surrounding landscape character.</p>
<p>Contamination</p>	<p>Impacts</p> <p>There is one potential source of contamination, Ockenden Grays Areas II & III landfill within this ward. During construction, there is a risk that existing contamination could be mobilised. There is also a risk of accidental spills of oil, cement or fuel.</p> <p>Mitigation</p> <p>Contamination would be controlled through a range of good practice measures that are detailed within the REAC.</p>	<p>Impacts</p> <p>None identified.</p> <p>Mitigation</p> <p>During the operation of the road, should an incident occur for example, a traffic accident resulting in localised contamination, significantly affected soils would be assessed and if necessary removed to reduce the risk of contamination migrating across a wider area or entering controlled waters. For more information on these controls, see the REAC.</p>

20.2 Project description

20.2.1 Construction

Construction activities

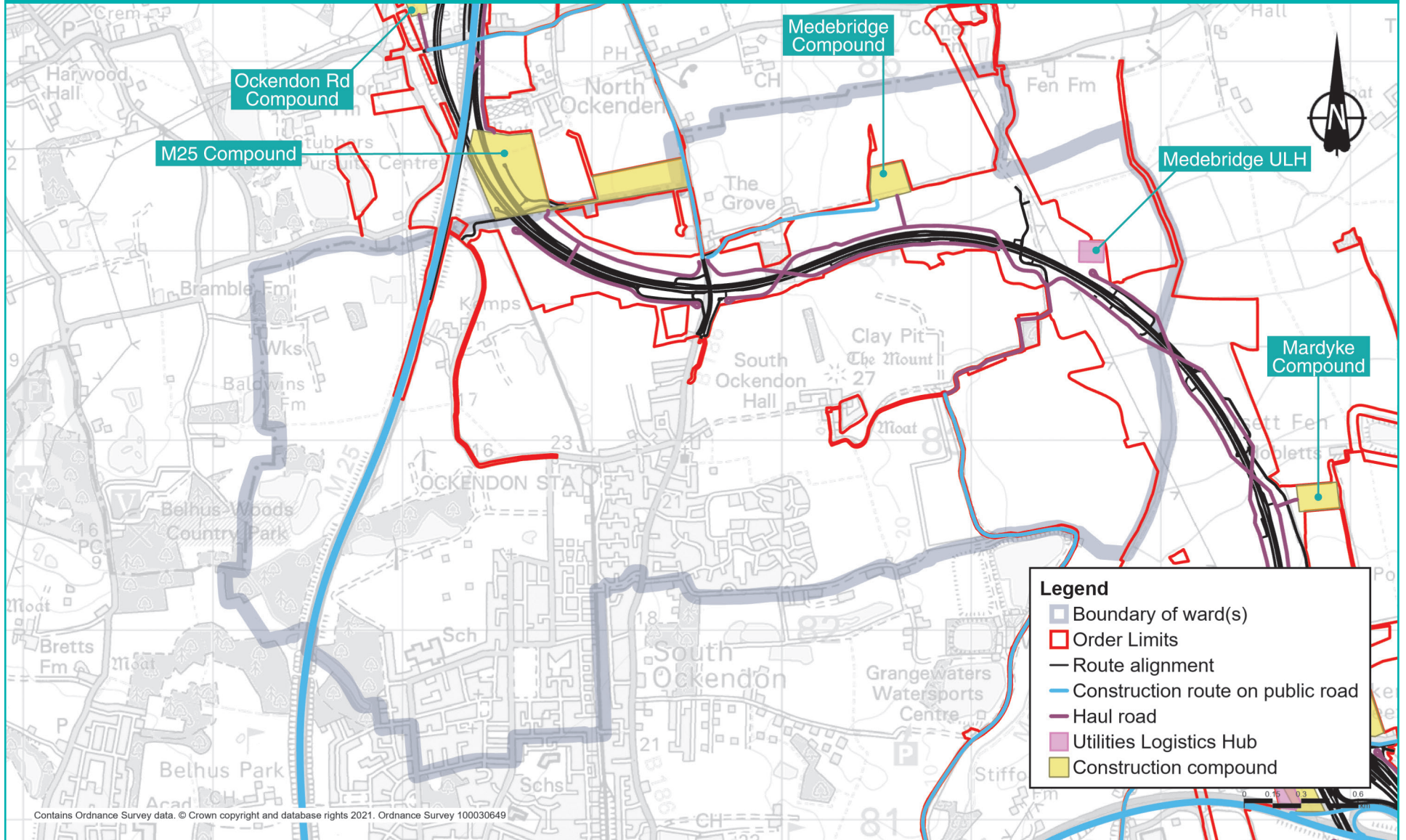
More information about how the area would look during construction, including visualisations, can be found in the Construction update.

Ockendon ward would contain a substantial section of the finished road, including the section over the Mardyke Viaduct. East of the M25, the new Mardyke Viaduct would take the Lower Thames Crossing over the Mardyke River southwards towards Green Lane. All works would take place away from public roads and are expected to take approximately three years. Major earthworks would involve taking excavated material from the west of the M25 to the east of the motorway to create the embankments that support the viaduct. A haul road would be built to transport the excavated material.

The haul road would be built early on in the construction period between Green Lane, near Orsett and the London, Tilbury and Southend railway line in Upminster ward. Once in place, the haul road would allow heavy machinery, equipment and other materials to be transported around the worksite away from public roads. This would reduce the number of HGV journeys and lessen the impact on road users and local communities. The haul road would cross North Road and traffic management would be necessary to manage the construction traffic at this point.

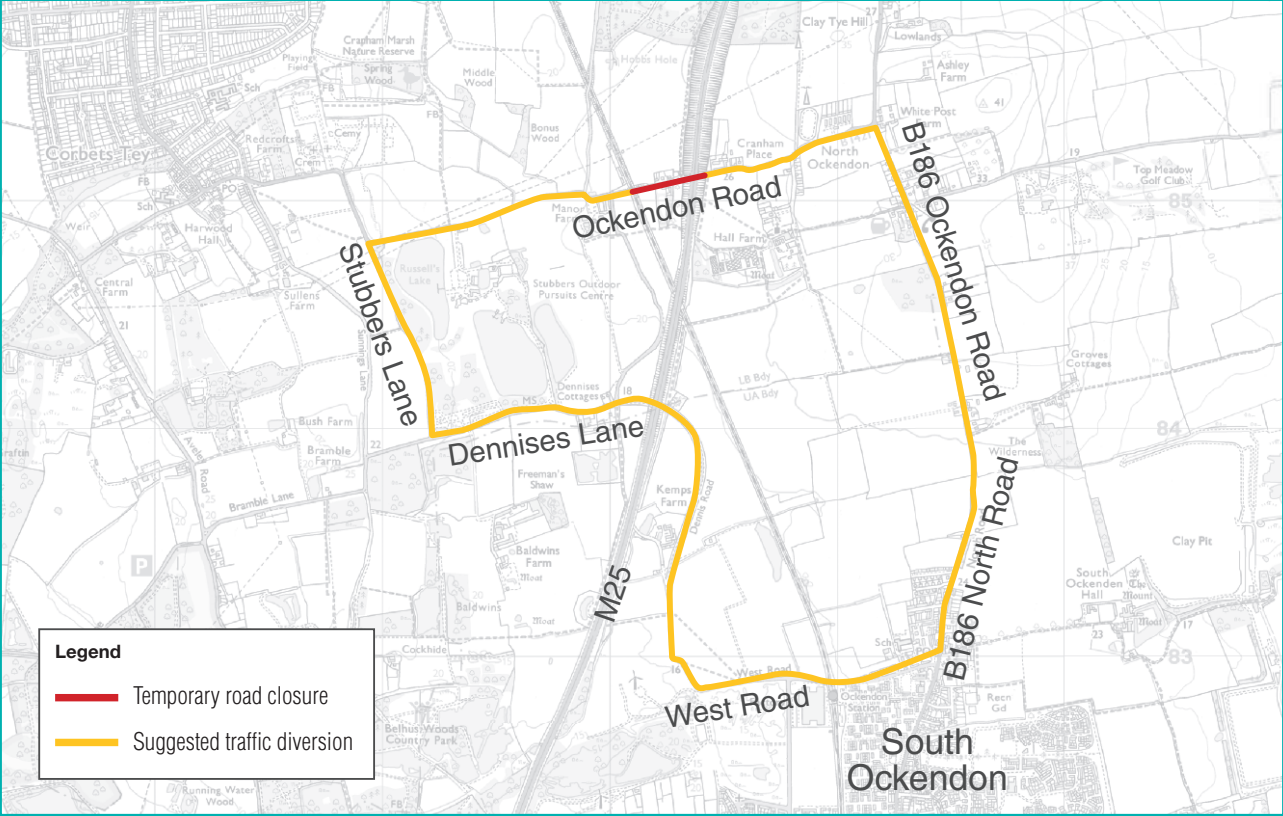
Ockendon Road would be closed for 19 months to facilitate the construction of the new Ockendon Road bridge, during which time we would create the connection from the west of the M25 to the east of the motorway so excavated material could be moved efficiently. The road closure would also allow the construction of major structures around the M25 and facilitate utility diversions in this area. The closure would affect local communities, including bus routes, and a suggested diversion is shown below via Dennis Road. Diverted traffic using Dennis Lane or St Mary's Lane to cross the M25 would experience an increase in journey length of around 10km.

Figure 20.2: Main construction areas in Ockendon ward



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Figure 20.3: Proposed diversion for traffic during temporary Ockendon Road closure



Works to construct a new bridge to carry North Road over the new road would largely take place without affecting the road network, taking around 18 to 22 months to complete. North Road would remain open for most of the works, although some short-term overnight or weekend closures would be necessary to join the new bridge to the existing road network. Any road closures would be agreed with local authorities and suitable diversions would be put in place.

Construction compounds

Construction compounds are fenced-off areas, accessible to construction traffic, which provide facilities to allow the project to be built efficiently. For example, compounds would provide parking, storage for machinery and materials, offices, welfare facilities, refuelling, and vehicle and wheel-washing facilities. These would make sure vehicles leaving the compound do not dirty local roads.

In Ockendon, the Medebridge Compound would be located close to Fen Lane and North Road. It would be used for the construction of the new road between the proposed Mardyke Viaduct and the M25. Access to this site would be mainly via the haul road, away from public roads. The initial access, while the haul road is being constructed, would be via the A127 on to the B186 (Warley Street, Clay Tye Road and North Road), and then via a private access track close to the proposed route of the Lower Thames Crossing. Medebridge Compound and Medebridge ULH would use the same access on public roads. Construction traffic movements for both can be found in table 20.2.

On the northern boundary of Ockendon ward, the M25 Compound would be located to the east of North Road, mostly in Upminster ward. More information about construction can be found in chapter 6 of the Construction update.

The daily average number of vehicles going to the Medebridge, M25 and Ockendon Road Compounds are shown in Table 20.2. Less than 20 HGVs a day are expected at the hub when it is being used. The table shows the number of vehicles going to each compound and there would be the same number of vehicles, on an average weekday, leaving each compound.

Table 20.2: A daily average number of vehicles going to Medebridge, the M25 and Ockendon Road Compounds and the Medebridge ULH

Time period	Medebridge Compound and Medebridge ULH		M25 Compound		Ockendon Road Compound	
	HGVs	Cars	HGVs	Cars	HGVs	Cars
January to August 2024	30	60	42	138	0	32
September 2024 to February 2025	23	111	41	201	60	52
March to May 2025	30	137	51	241	65	59
June to October 2025	32	137	54	254	180	42
November 2025 to March 2026	23	137	42	240	213	33
April to August 2026	34	136	58	240	219	44
September 2026 to March 2027	25	132	44	240	219	44
April to November 2027	41	126	74	217	35	38
December 2027 to March 2028	41	126	73	180	32	16
April to July 2028	32	82	58	150	0	0
August 2028 to December 2029	9	55	10	108	0	0

The access route for HGVs and most staff vehicles to the Medebridge Compound would be via the A127, Warley Street (B186), St Mary Lane (B187), Clay Tye Road (B186) and North Road (B186) for the first 9 to 12 months of the construction programme. For the remainder of the time, the access to the Medebridge Compounds, M25 and Ockendon Road Compounds would be via haul roads constructed from the A13 and the M25 instead of these public roads.

Utilities

The Medebridge Utility Logistics Hub would be located in the east of Ockendon ward, required for the realignment of the overhead power lines running north-south. The modifications to the existing overhead power lines include removal of one pylon and its replacement with one around 16 metres taller. A temporary overhead line diversion would be needed, along with the associated re-stringing works. This ULH shares an access route with Medebridge Compound.

There would other significant utility works within this ward, including the diversion of gas pipelines along the alignment of the new road. We would also divert or seal off the existing high-pressure gas pipeline that was used for the operation of Barking Power Station. There would be diversions of multiple utility networks along the B186 North Road, including gas, water, power and communications. Installation of temporary utilities (water, waste, communications and power) for the Medebridge and M25 Compounds would also take place within Ockendon ward.

Chapter 2 of the Construction update provides an overview of how the existing utilities would be affected by our plans to build the new road, with further detail including maps in chapter 6. Chapter 2 of the Operations update also describes the project's impacts on utilities, including a map showing the utilities that would be repositioned to accommodate the new road.

Construction routes on public roads

We would use Medebridge Road and Mollands Lane for construction traffic. Where these roads are currently part of the public road network, they would remain open to traffic, except at specific times when we would put traffic management measures in place (see chapter 18). A substantial section of Medebridge Road is privately owned. The B186 North Road would also be used for construction traffic.

Construction schedule

Construction of the whole project is scheduled to last for six years from 2024 to 2029. To deliver the construction programme efficiently, we would divide activities into packages of work, delivered in a coordinated way. Maps and programmes for our work packages can be found in chapter 6 of the Construction update.

Construction working hours

Most construction activities in this ward would take place during core hours, from 7am to 7pm on weekdays and 7am to 4pm on Saturdays. However, there would be circumstances when our working hours would need to be extended. For example, diverting overhead power lines, works near railway lines, and connecting new roads to existing ones would be carried out when there is less traffic, so it is safer for both construction workers and road users. Working outside of the core hours can also benefit road users by reducing the need for traffic management measures during peak times. More information about working hours is set out in the Noise and vibration section below and in the CoCP.

Traffic management

The main traffic management measures for Ockendon ward are listed below.

Table 20.3: Main traffic management measures in Ockendon ward

Road(s) affected	Traffic management	Purpose	Duration
B186 North Road	Lane closure and traffic lights	Access works, utility diversions, and construction of utility connections for the M25 and Medebridge Compounds	4 weeks between January and August 2024
B186 North Road	Closure	Bridge works, utility diversions, and construction of utility connections for the M25 and Medebridge Compounds	Occasional nights and weekends for specific construction tasks
B186 North Road	Traffic lights	To allow construction vehicles to cross	Until access under overbridge between January 2024 and November 2027
B186 North Road	Closure	Creating a temporary bridge alignment	Weekend only
B186 North Road	Closure	Connecting existing roads to the new bridge permanently	Weekend only

There would be contraflow traffic management on the B186 during the early stages of the construction programme to carry out construction access works, modifications to local utility networks, and installation of temporary connections to the Medebridge Compound and the M25 Compound. The works would take around 12 months to complete. Two kilometres of the road will be affected but the contraflow in place would only cover 300 metres at any one time.

A new bridge is proposed for the B186 North Road, which would cross over the new project alignment. This new bridge would largely be constructed offline without disrupting the existing road. During its construction, a temporary localised realignment of North Road would be required to facilitate the completion of the bridge and associated embankment.

Before the opening of the overbridge, a crossing point of North Road would be required to allow construction vehicles to travel along the alignment. Traffic signals or similar would be required to manage the construction traffic crossing the alignment prior to completion and opening of the overbridge. Once the overbridge is complete and open, construction traffic would pass under it and the temporary traffic signals could be removed.

There would be night-time and weekend temporary closures on the B186 for bridge works, modifications to local utility networks, and the installation of temporary connections to the Medebridge Compound and the M25 Compound.

A switchover to new permanent alignment on the B186 is planned for June 2027. The works would take place over a weekend.

A short section of Ockendon Road approximately between the rail bridge and the existing properties, as shown in red in figure 20.3 above, would be required to be closed for approximately 19 months. The closure is needed to allow for the construction of the new Ockendon Road bridge and for the safe management of significant earthworks in the area. The diversionary route would be via the B186, West Road, Dennis Road, Dennises Lane and Stubbers Lane.

Measures required across the project would include narrow lanes, reduced speed limits, lane closures and temporary traffic lights. We have sought to minimise traffic management measures wherever practical. However, they would be necessary in some places to allow construction traffic and local communities to travel safely, while providing construction workers with sufficient space to operate.

An overview of the traffic management required across the project can be found in the Outline Traffic Management Plan for Construction (OTMPfC). All traffic management measures are based on an indicative construction programme, which would be finalised by the appointed contractor. The contractor's final traffic management plans would be subject to final approval by the Secretary of State for Transport, following consultation with the local highways authority.

20.2.2 Operations

The completed project

For more information about the completed project, see the Operations update, as well as the figures in Map Book 1: General Arrangements. Below, we outline the main features of the project in Ockendon ward once the new road opens:

- The Lower Thames Crossing would pass through the ward, passing over the Mardyke Valley on two viaducts.
- A new green bridge, which includes walking, cycling and horse-riding provision, would carry North Road over the new road, linking South Ockendon to North Ockendon.
- Two flood mitigation ponds would be dug west of South Ockendon parallel to the northbound carriageway. A watercourse would be diverted parallel to the northbound carriageway, running under the North Road green bridge before joining up with the existing watercourse running to the north-west of South Ockendon.
- Some footpaths and bridleways would be rerouted permanently. For more information, please see the Footpaths, bridleways and cycle routes section below.
- New grassland area would be planted to host species moved as part of the project's environmental mitigation.

Changes to the project since our Design Refinement Consultation

As part of our continuing design development and discussions with utility companies, we have made the following changes to the project and its Order Limits, (the area of land required to construct and operate the project, formerly known as the development boundary), within Ockendon since our Design Refinement Consultation in July 2020. More information about our proposed changes, including maps showing changes to the Order Limits, can be found in chapter 3 of the Operations update:

- Following discussions with the utility companies, we have removed the following land from the Order Limits as it is no longer needed for utility diversions.
 - Two areas of land west of Mardyke River and north-east of South Ockendon
 - An area of land north of Redcroft Forge
- A previously proposed construction compound north-west of South Ockendon is no longer necessary.

Impacts on open space and common land

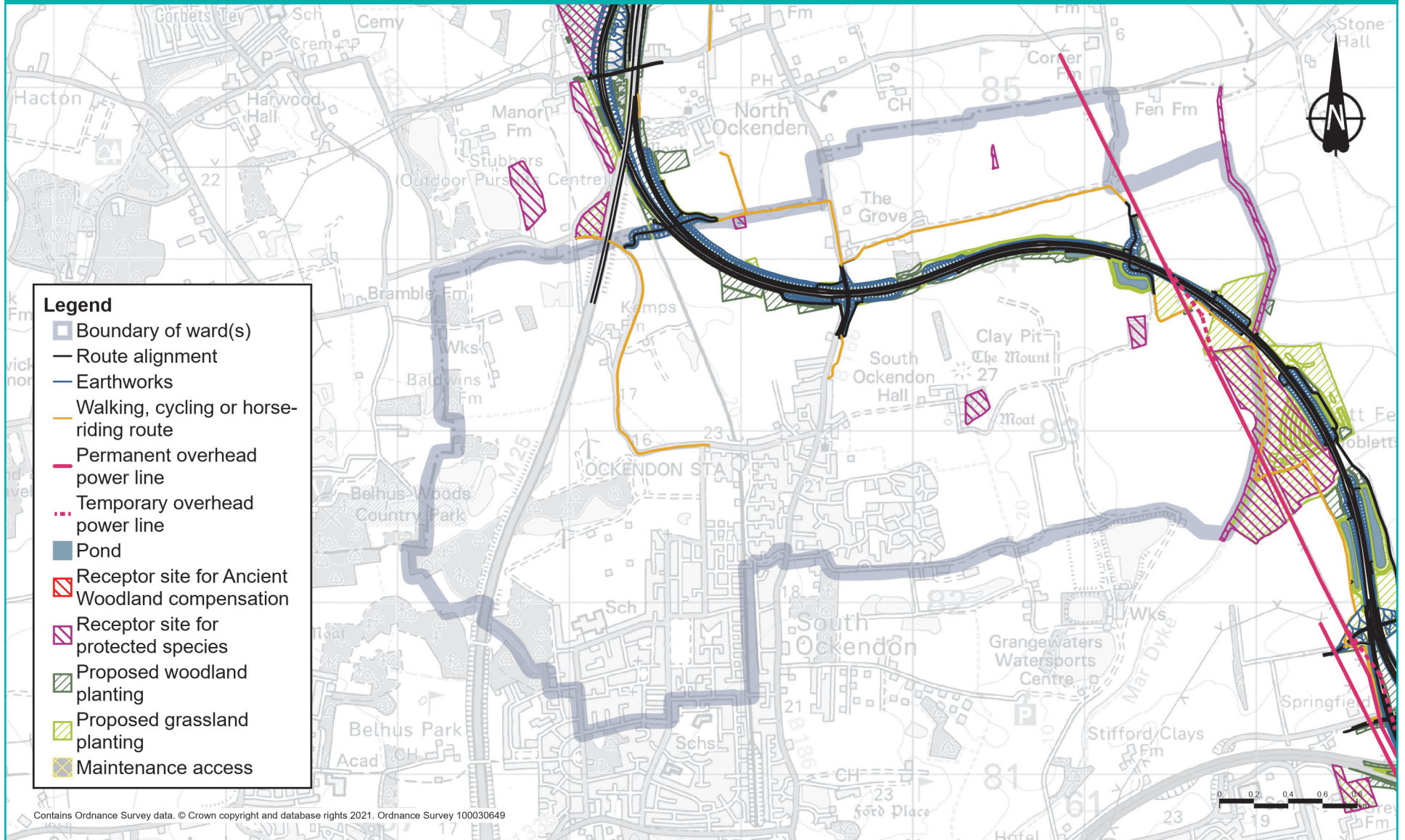
Within Ockendon ward, there are no proposals to remove or replace open space land. More information about our proposals for compensating for impacts on open space land (which includes special category and recreational land), including proposals we have consulted on previously, can be found in chapter 3 of our Operations update.

Impacts on private recreational facilities

Within Ockendon ward, it is proposed to use part of the Top Meadow Golf Club for access to carry out works on the existing overhead electricity pylon and cables above the golf course. Permanent rights would be acquired for the operation and maintenance of those cables. We do not expect these works to impact the use of the golf club.

More information on how the project impacts private recreational facilities can be found in chapter 3 of our Operations update.

Figure 20.4: The main features of the project in Ockendon ward once the new road opens



20.3 Traffic

We carried out traffic assessments to understand how construction and operation would affect nearby roads, compared with the situation if the project was not implemented. For more information, see chapter 4 of the Operations update.

20.3.1 Construction

The traffic impacts in the ward would be restricted to the sections of road where there are traffic management measures. There would be some additional construction traffic on the roads, mainly in the very north of the ward for the first 12 months, until the haul road from the A13 is available for use.

Measures to reduce construction traffic impacts

Our approach to construction has been refined after further investigations and feedback. A summary of our proposed measures to reduce the amount of construction materials transported by road can be found in chapter 2 of the Construction update. The following measures are proposed to reduce construction traffic impacts on local communities:

- Minimise the use of the local road network, as far as reasonably practicable, through the construction of temporary slip roads from the M25, to provide direct access between the construction site and strategic road network. To maximise the benefit, we would construct these temporary slip roads at the earliest opportunity.
- Our proposals allow for re-use of excavated materials, and would substantially reduce the need to dispose of excavated material via the road network, thereby reducing the number of HGV movements from the public road network during the construction phase.
- Construction of temporary haul roads within the Order Limits, at the earliest opportunity, to provide improved access to the strategic road network for construction traffic and allow materials to be moved offline.
- The use of design options, construction methods and construction phasing to allow a larger proportion of the M25 capacity improvement works to be constructed either without or with less disruptive traffic management measures.
- Where practical, new bridge structures have been designed so that they can be built offline to avoid the need to close local roads for extended periods. Where offline construction is not possible and space is available to do so, the existing road would be temporarily realigned to allow construction of new bridges.
- Stockpiling of material within the Order Limits to allow material to be managed on-site, reducing the number of HGV journeys to move materials around.

20.3.2 Operations

Operational impacts

Traffic modelling has been carried out to predict the change in traffic flows on roads in the area, including those within or on the boundary with this ward for the first year of operation (2029).

Figures 20.6, 20.8 and 20.10 below show the predicted changes in traffic in the morning peak (7am to 8am), interpeak (an average hour between 9am and 3pm) and evening peak (5pm to 6pm) measured in Passenger Car Units (PCUs per hour), where 1 PCU is equivalent to a car, and 2.5 PCUs is equivalent to an HGV. Figures 20.7, 20.9 and 20.11 show the predicted percentage changes in traffic flow during the morning, interpeak and evening peak. For information about how we assessed operational traffic impacts, see chapter 1. For more information about how we carried out our traffic modelling, see chapter 4 of the Operations update.

In Ockendon, there would only be a very slight change in traffic flows on the local road network as a result of the new road opening. Only on South Road, south of the junction with West Road is the change greater than 50 PCUs an hour. Here, there is decrease in traffic of between 50 and PCUs northbound in the morning peak hour. This is a decrease of between 10% and 20%.

On the M25 north of junction 30, the decrease in flows northbound would be over 1,000 PCUs per hour in the morning peak period, the interpeak hours and the evening peak hour. In the morning peak period and an average interpeak hour, this is a decrease of between 20% and 40%. In the evening peak hour, the decrease is between 10% and 20%. Southbound, the decrease in traffic flows would be between 500 and 1,000 PCUs (between 10% and 20%) in the morning peak hour and a decrease of over 1,000 PCUs (between 20% and 40%) in each average interpeak hour and in the evening peak hour.

Traffic flows on the project northbound are predicted to be 4,000 PCUs in the morning peak hour, 2,700 PCUs per hour in the interpeak period, and 2,500 PCUs in the evening peak hour. Southbound, the traffic flow would be 2,200 PCUs in the morning peak hour, 2,100 PCUs per hour in the interpeak period, and 2,700 PCUs in the evening peak hour.

Figure 20.5: Predicted change in traffic flows (PCUs) with the new road during the morning peak in 2029

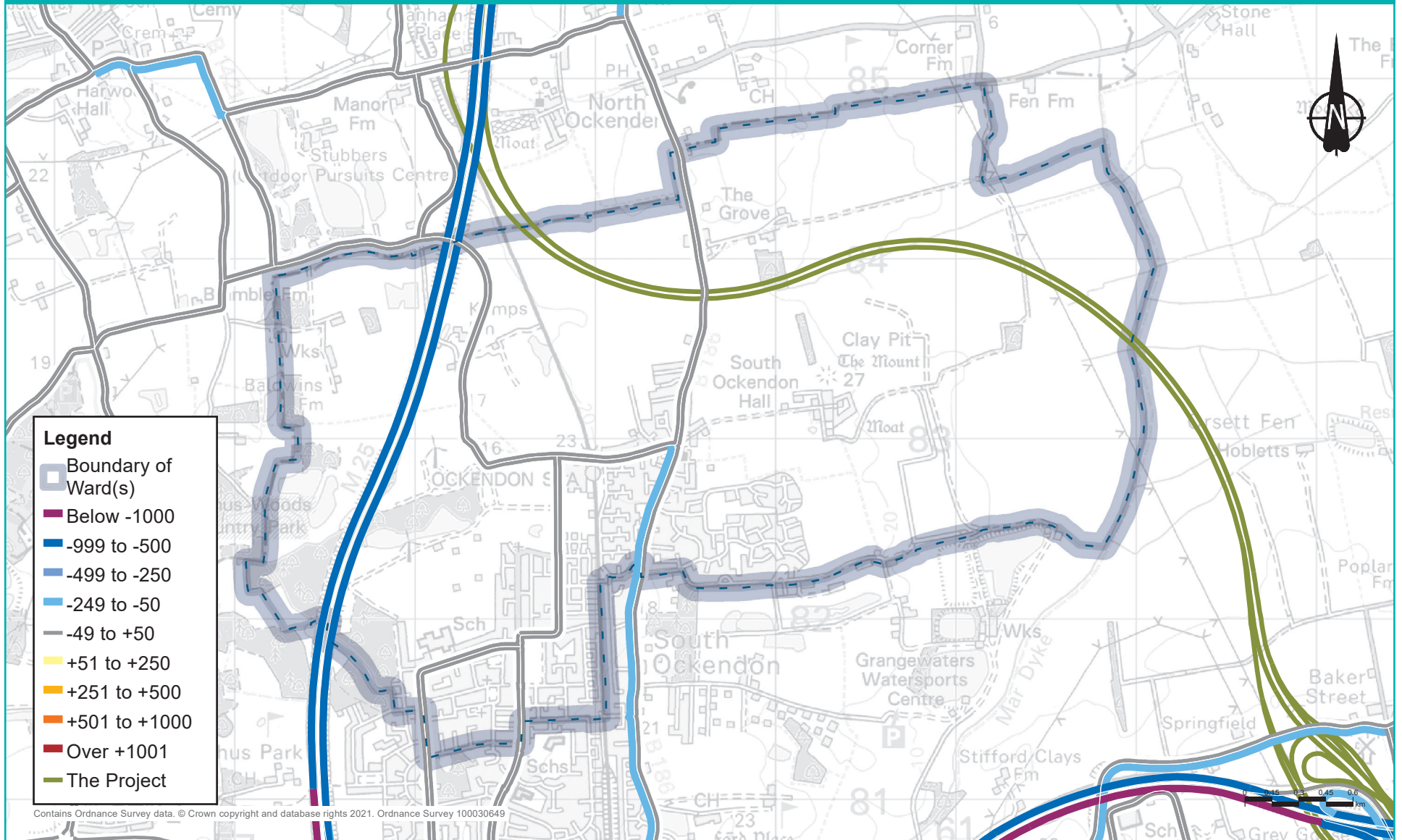


Figure 20.6: Predicted percentage change in traffic flows with the new road during the morning peak in 2029

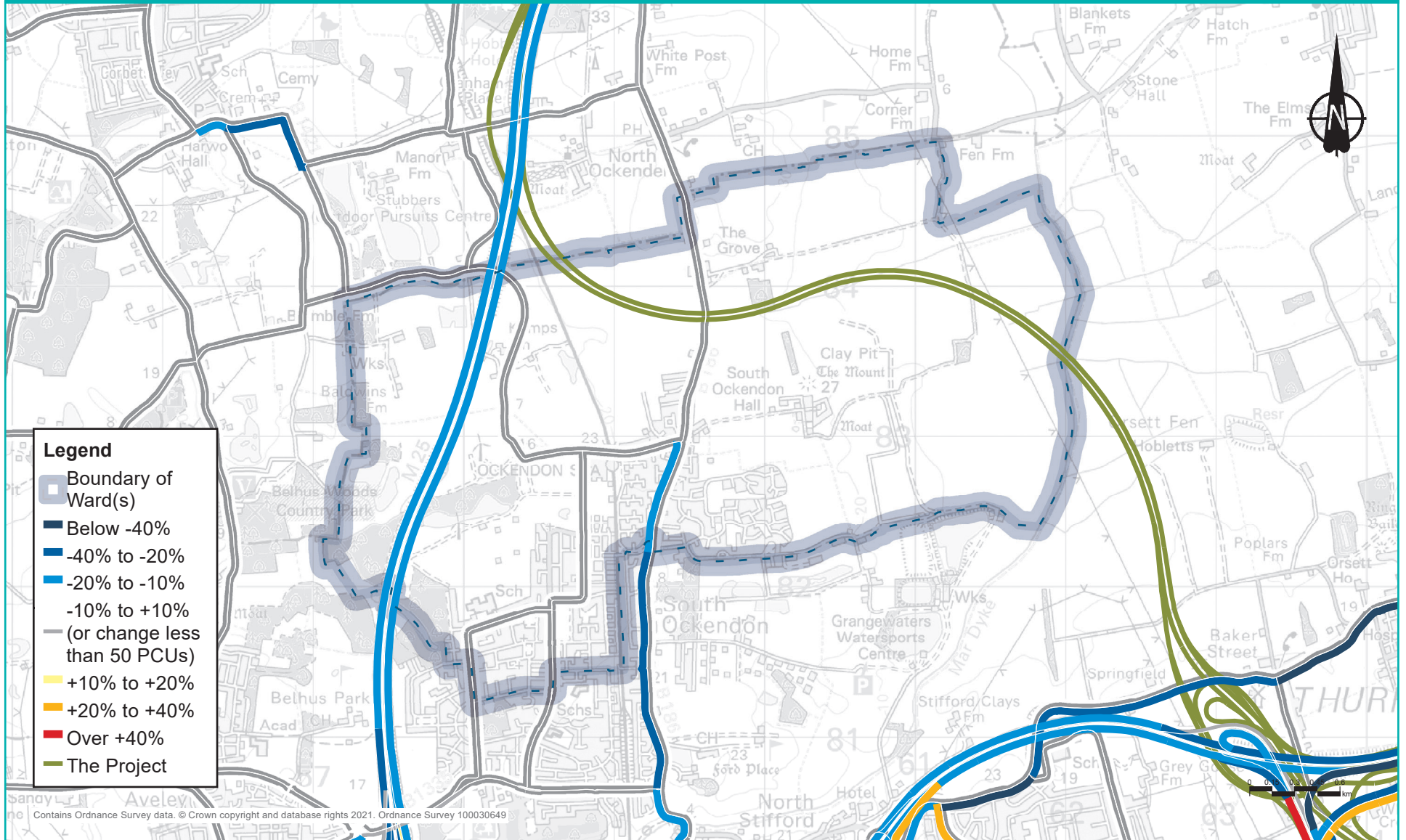


Figure 20.7: Predicted change in traffic flows (PCUs) with the new road during the interpeak in 2029

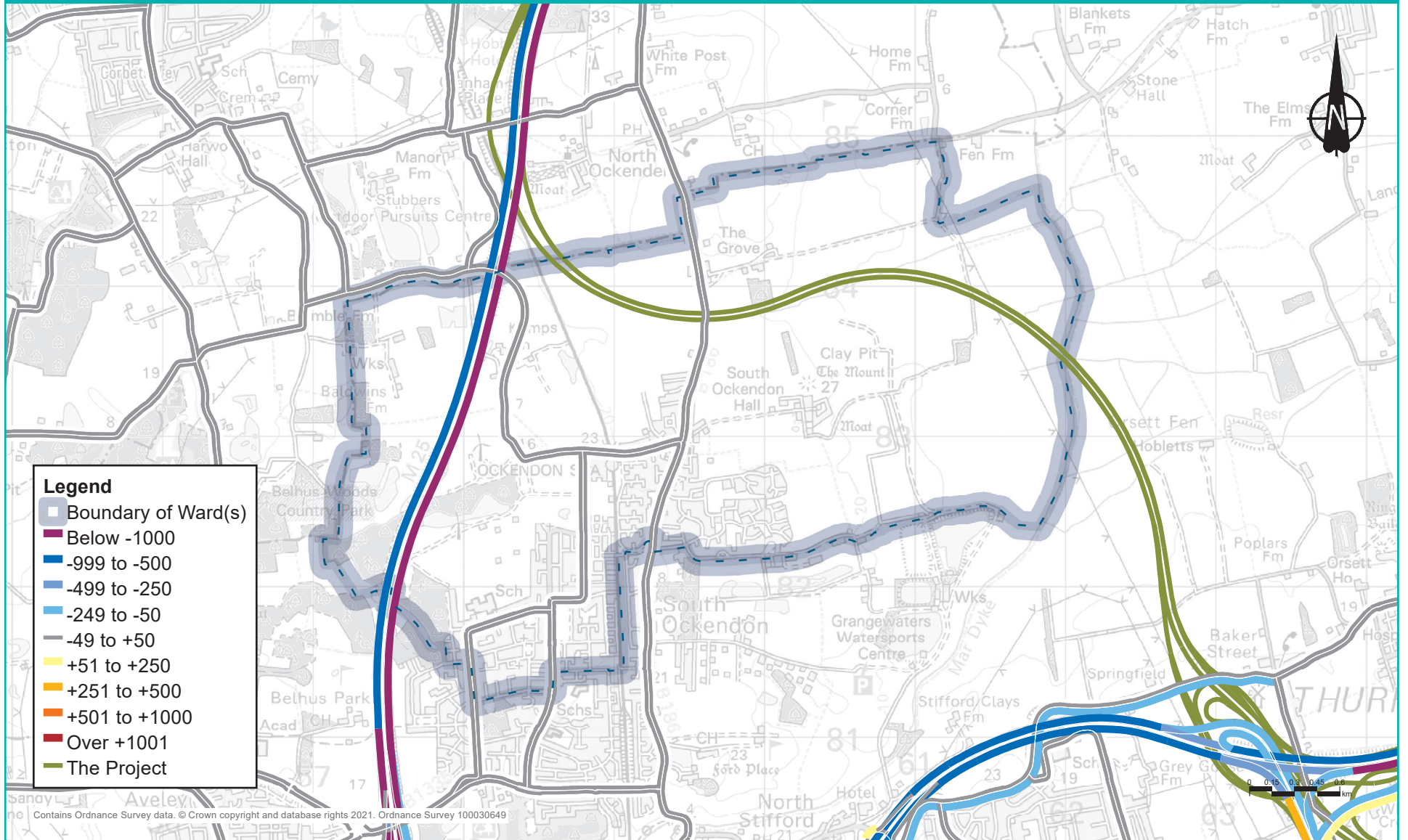


Figure 20.8: Predicted percentage change in traffic flows with the new road during the interpeak in 2029

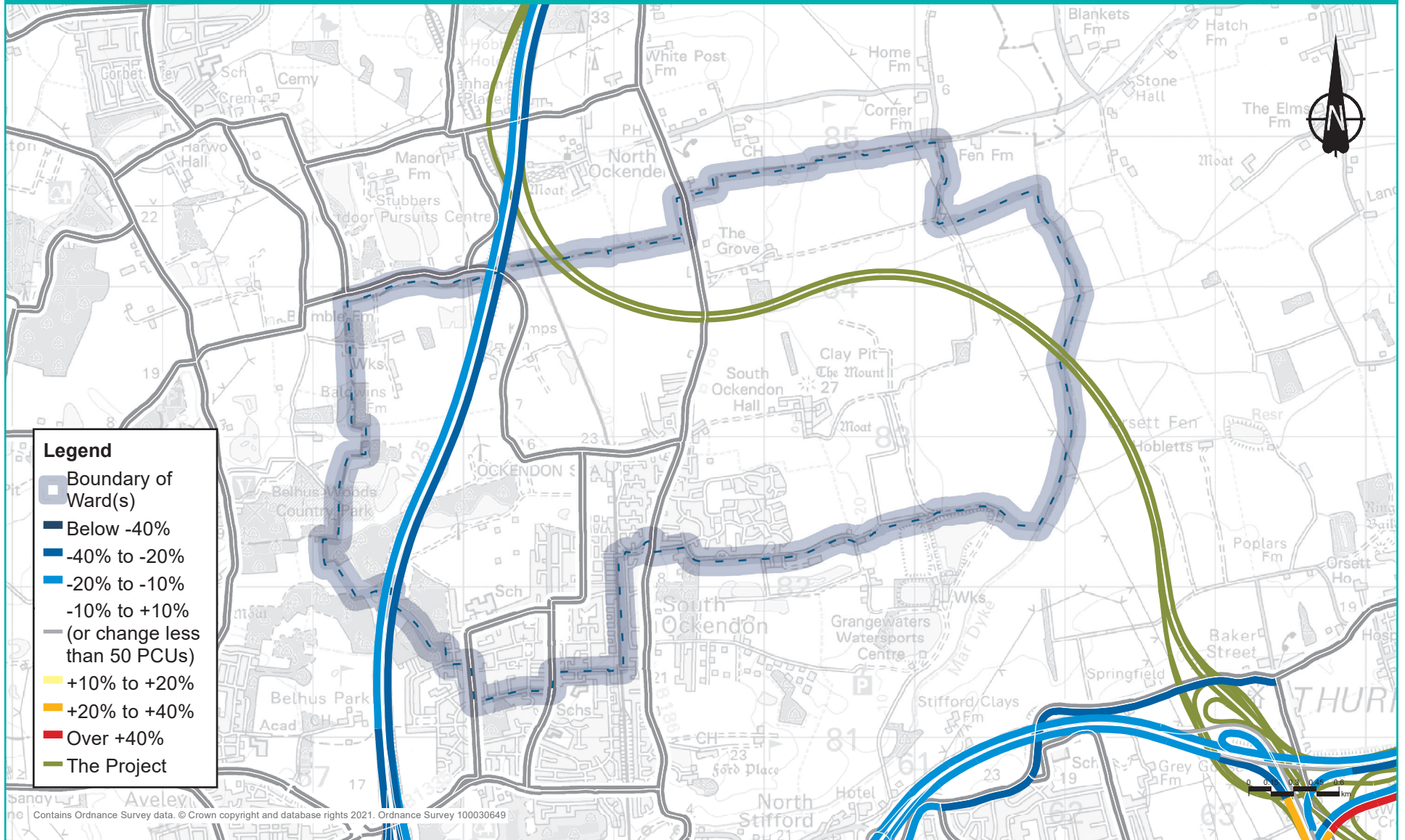


Figure 20.9: Predicted change in traffic flows (PCUs) with the new road during the evening peak in 2029

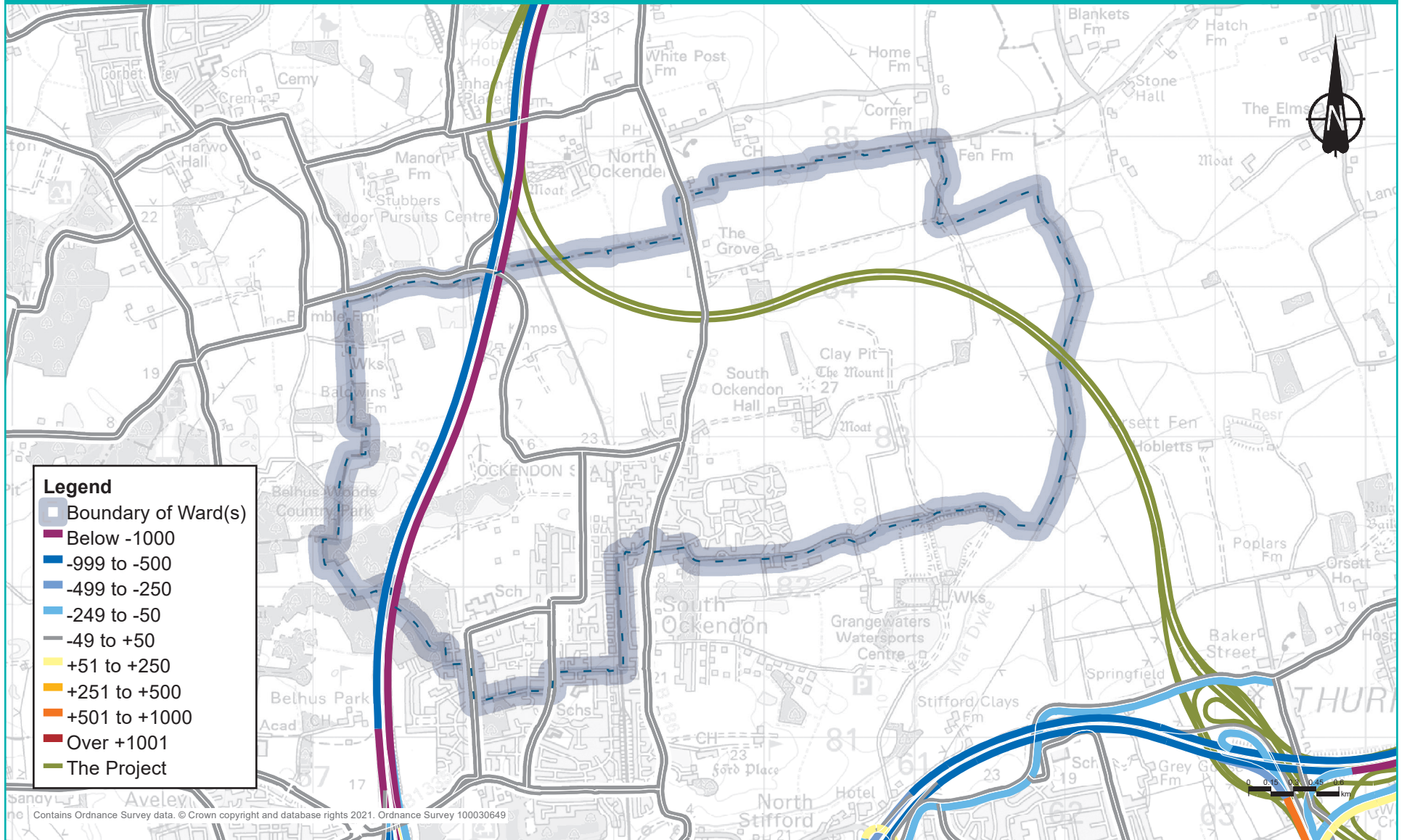


Figure 20.10: Predicted percentage change in traffic flows with the new road during the evening peak in 2029

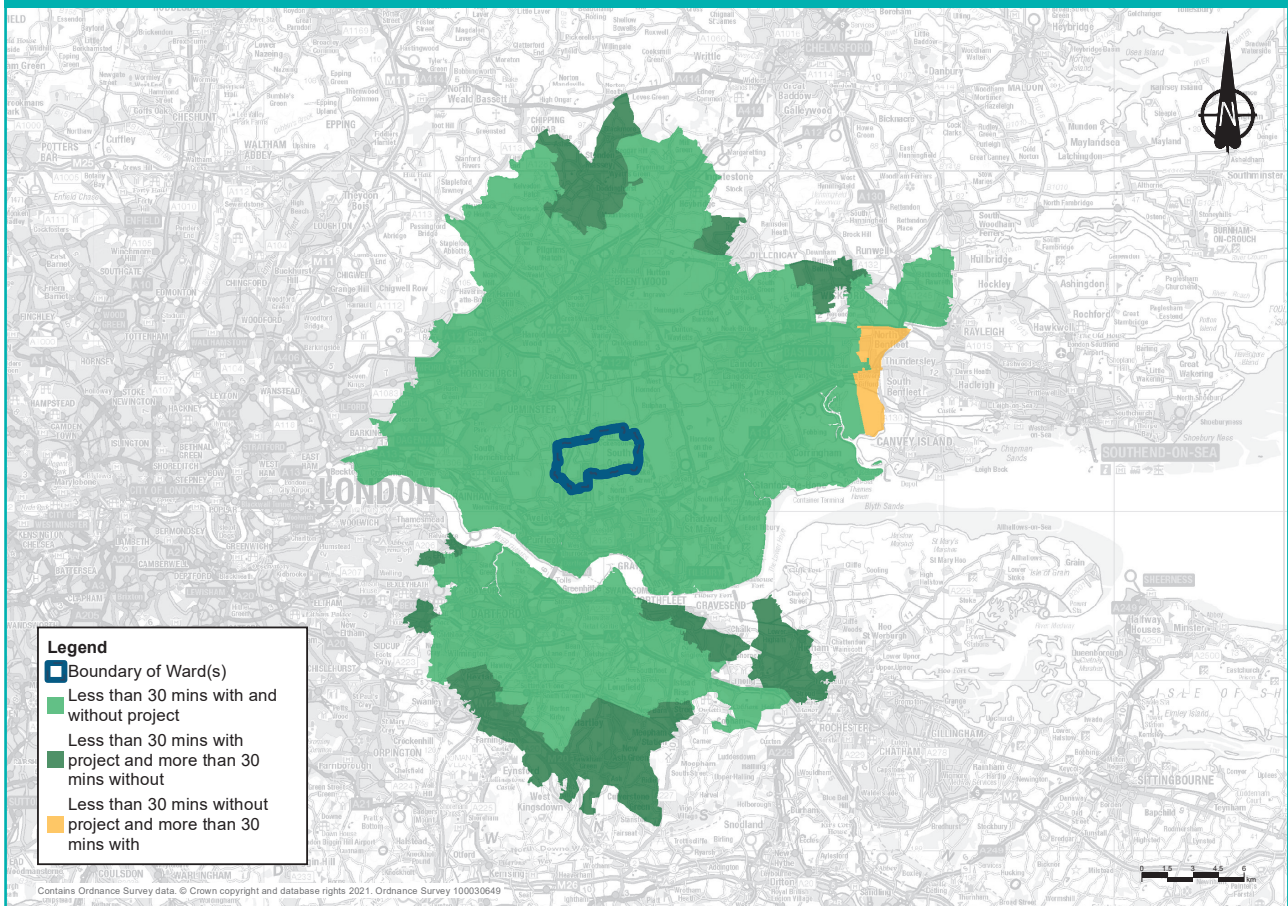


Changes to journey times

Figure 20.11 below shows the change in the area that could be reached within a 30-minute drive from the centre of the ward both with and without the project. Figure 20.12 shows the change in area that can be reached within a 60-minute drive. The areas have been calculated for the morning peak hour (7am-8am). The number of jobs within a 30-minute catchment area would increase by 50% with the project, providing access to an additional 43,200 jobs. The number within a 60-minute drive would increase by 22%, providing access to an additional 550,000 jobs.

In addition, despite the project providing a net gain in access for motorists within Ockendon ward, there are areas (shown in orange) that would no longer be accessible by car within 30 or 60 minutes because of changes to traffic flows on the wider road network.

Figure 20.11: Change in the area that motorists could drive to within 30 minutes from Ockendon ward

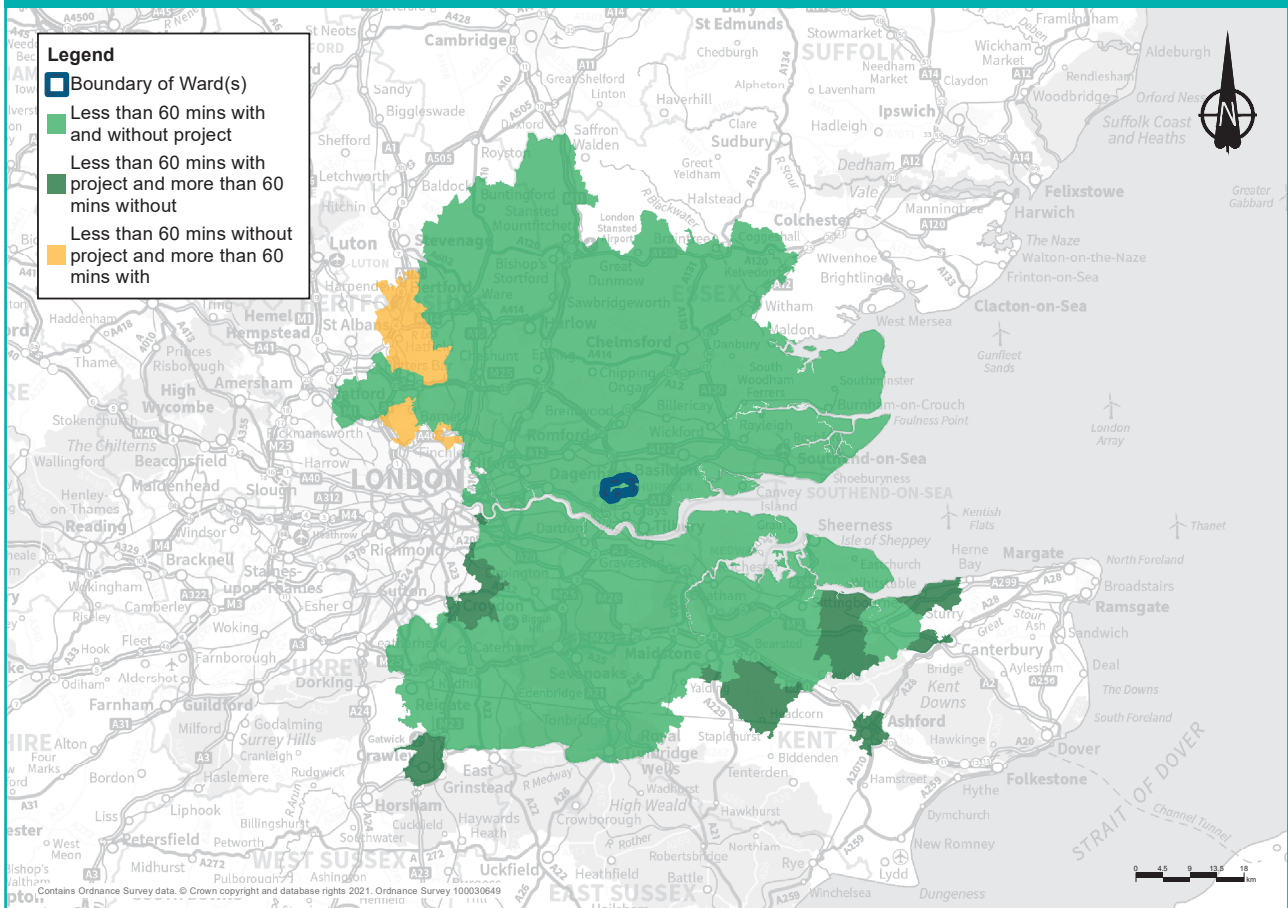


Operational traffic flows

Once the project is operational, traffic impacts on the affected road network would be monitored, including local roads.

Where appropriate, we would work with the relevant highway authority to seek funding from the Department for Transport for further interventions.

Figure 20.12: Change in the area that motorists could drive to within 60 minutes from Ockendon ward



20.4 Public transport

Existing situation

The London, Tilbury and Southend railway line runs north-south through Ockendon ward, with Ockendon station location roughly centrally within the ward.

The ward is served by several bus routes including: 11, 22, 269, 347, 370, 77, 77A, and the Z1.

20.4.1 Construction

Buses

There would be increases to journey times for some local buses within the ward, including the 269, 347 and the 370. This would be associated with the traffic management works and, in the early stages of the project construction, with additional traffic on the local roads.

While the Ockendon Road is closed in the adjacent Upminster ward, the 370 bus would have to be diverted. The diversion would be agreed with the bus operator.

Rail

There would be a night-time rail closures of the London, Tilbury and Southend railway while a new footbridge is constructed. This closure would be agreed with the network operator. It is intended that the works will take place outside train operational times, and so services would not be disrupted.

There may be some increases in journey times to Ockendon station in the early stages of project construction, associated with increased traffic through the area and traffic management on the local roads.

20.4.2 Operational

Buses

There would be no changes to bus routes through the ward once the new road opens and no discernible change to bus journey times.

Rail

There would be no discernible change in local access times to Ockendon station and no change to the rail services at that station.

20.5 Footpaths, bridleways and cycle routes

Existing situation

Ockendon ward is a part-suburban, part-rural ward with a network of footpaths connecting to Chafford Hundred, South Ockendon, North Ockendon and Bulphan. The following sections set out how these routes would be affected by the project's construction and the routes that would be in place once the new road is completed. For other potential impacts, see the other sections in this chapter, such as Visual, and Noise and vibration.

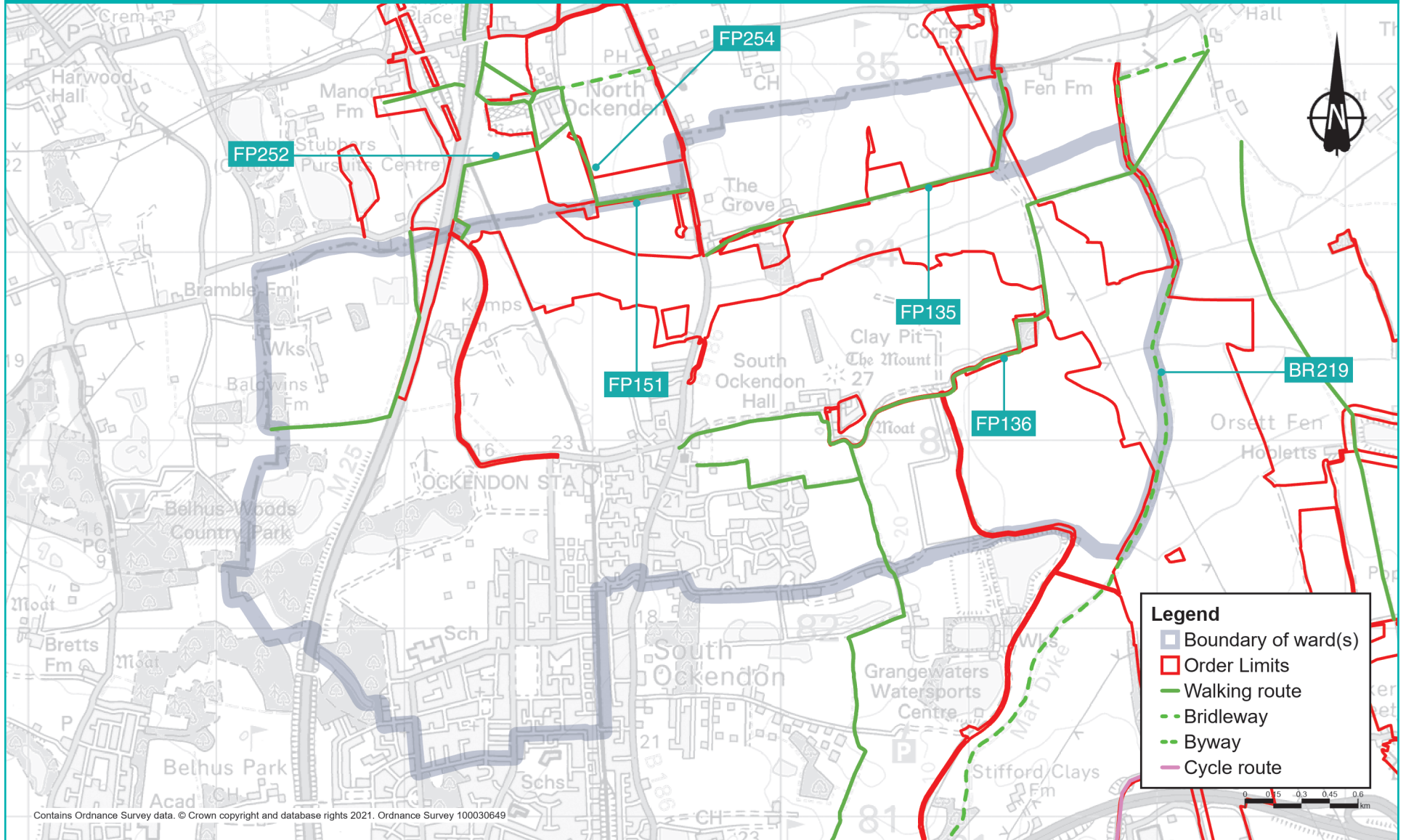
20.5.1 Construction

Construction impacts

Due to the project route running through Ockendon ward, there would be a number of closures during construction. More information about the proposed network of footpaths, bridleways and cycle routes after completion of the project can be found in the Operational impacts section.

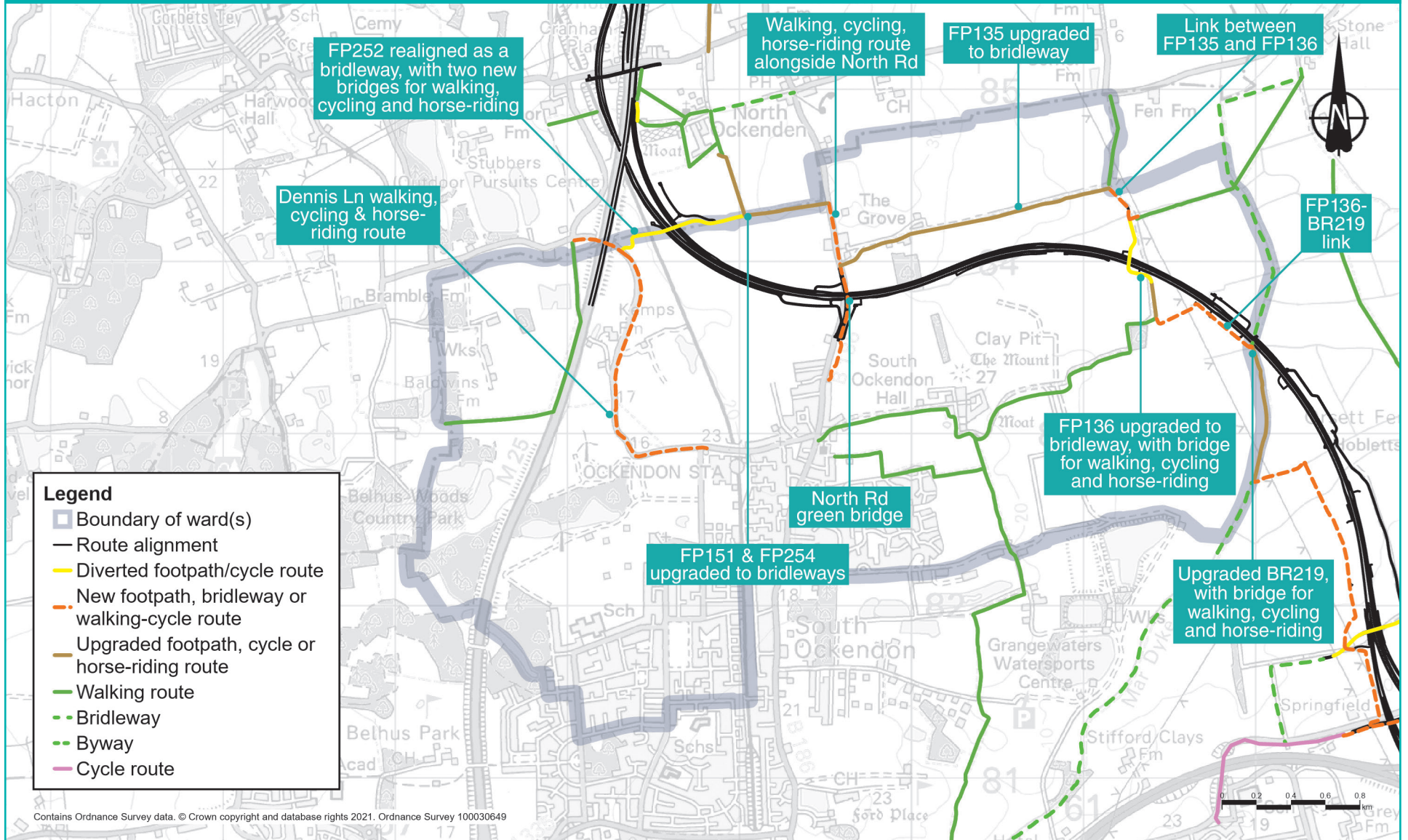
- Footpath FP135 would need to be closed for nine months to allow for utilities works.
- The section of FP136 within the Order Limits would need to be closed initially for five months for utility works. Later in the construction period, this footpath would need to be closed for an additional two and half years to allow the new road and a footbridge to be built.
- Footpath FP151 crosses the proposed location of the M25 Compound and would need to be closed for five-and-a-half years for the duration of compound operations.
- Footpath FP252 would need to be closed for three years for main works construction and the construction of a new footbridge over the Upminster to Grays railway line.
- Footpath FP254 crosses the proposed location of the M25 Compound and would need to be closed for five and a half years while the compound is used for construction of the new road.
- A section of Bridleway BR219 within the Order Limits (north-west of Orsett Fen) would need to be closed for five years to allow utilities works and construction of the Mardyke Viaduct.

Figure 20.13: Existing footpaths, bridleways and cycle routes near the project in Ockendon ward



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Figure 20.14: Proposed footpaths, bridleways and cycle routes



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20.5.2 Operations

Operational impacts

Overall, the proposals for walkers, cyclists, and horse riders include more than 46km of new, diverted, extended or upgraded footpaths, bridleways and cycleways. These would provide much improved connectivity. The proposals were developed following consultation with local communities and stakeholders. For an overview of the proposed improvements to footpaths and bridleways across the project, see chapter 2 of the Operations update.

- A section of FP135 would be upgraded to bridleway. There would also be a new bridleway connection between the upgraded FP135 and FP136.
- A section of FP136 would be upgraded to bridleway, including a new footbridge suitable for walkers, cyclists and horse-riders carrying the route over the new road.
- Footpath FP151 would be resurfaced and redesignated as a bridleway.
- Footpath FP252 would be realigned to cross the rail line and the new road further south via new equestrian standard bridges and would be redesignated as a bridleway.
- Footpath FP254 would be resurfaced and redesignated as a bridleway.
- A section of bridleway BR219 would be upgraded and resurfaced. The bridleway would include a new bridge over the Mardyke River suitable for walking, cycling and horse-riding. To the north, it would connect to a new bridleway linking to FP136 (a section of which would be upgraded to bridleway). To the south, the upgraded section of BR219 would link to Green Lane and Stifford Clays Road.
- There would be a new roadside walking, cycling and horse-riding route parallel to Dennis Lane from the junction with Pea Lane to South Ockendon.
- There would be a new roadside walking, cycling and horse-riding route from the junction of footpath FP151 and North Road, connecting to the upgraded footpath FP135 and continuing over a new green bridge carrying North Road over the new road. The green bridge would include walking, cycling and horse-riding provision. The new route would continue south as far as the junction of North Road and Wilsman Road.

20.6 Visual

Existing situation

More information about how the area would look during construction, including visualisations, can be found in the Construction update.

Of the main populated areas, only the northern edge of South Ockendon would have views towards the land on which the project would be built. Other views would come from the local footpath network to the north-east of South Ockendon and in the northern part of the ward.

Existing views from homes on the northern edge of South Ockendon are limited by vegetation and adjoining fields, including woodland blocks and tree belts. However, properties on the north side of Cheelson Road have relatively open northward views over the flat arable landscape towards the project.

Views towards the land on which the project would be built from public rights of way on the northern outskirts of South Ockendon overlook flat arable landscape, interspersed with woodland blocks and tree belts, limiting views. From the east-west aligned footpath, skirting The Wilderness woodland to the north, there are views south towards the project over open arable land. There are also southerly views from the footpath connecting to Mardyke Way in the north-east part of the ward. From this footpath, there is a stretch of open view over flat arable land towards the new road. Views from the Mardyke Way, the route of which falls along the eastern boundary of the ward, are described within the Stifford Clays ward summary, chapter 18.

20.6.1 Construction

The main construction activities likely to be seen from this ward are:

- Establishing and operating the Medebridge Compound and M25 Compound.
- Establishing and operating the Medebridge Utility Logistics Hub.
- Utilities diversions, including overhead power lines.
- Road construction and construction of associated overbridges.

More information about construction activities can be found in the Project description of this ward summary and the adjacent Orsett ward summary.

Construction impacts

Views of construction activities from homes on the northern edge of South Ockendon, on Cheelson Road, are likely to include the excavation of the cutting for the project route, and construction of the associated false cutting and North Road green bridge. There may also be distant glimpsed views towards the project from first-floor windows of some homes on the northern edge of the ward, through gaps in intervening buildings and vegetation.

Views from public rights of way on the north-east outskirts of South Ockendon are likely to include road and bridge construction seen across arable fields. Views from the east-west aligned footpath, skirting The Wilderness to the north, would include views of the Medebridge Compound, as well as road and bridge construction to the south. From the footpath connecting with Mardyke Way, there would be views of overhead line diversion east of Footpath 136 overbridge and the associated Medebridge Utility Logistics Hub, as well as road construction.

Measures to reduce visual impacts during construction

No specific mitigation measures are proposed for this ward. The visual impacts of the project would be controlled through good practice measures set out in the CoCP and the REAC. See chapter 1 of the Construction update for more information about this and the project's other control documents.

20.6.2 Operations

Once the project is complete, former construction compounds, outside the boundary of the new road, and Utility Logistics Hubs would be restored to agricultural use or returned to the landowner. Part of the M25 Compound would be restored to woodland.

Further information about the completed project is provided in the Project description section above.

Operational impacts

The visual impacts from homes on the northern edge of South Ockendon are likely to include views towards North Road green bridge, with views of the Lower Thames Crossing and traffic screened by a combination of false cutting and woodland planting.

From footpaths on the north-east outskirts of South Ockendon, views of the project and associated traffic would be largely screened by a combination of cutting and planting. In southerly views from footpaths, the deep cutting and a grassed false cutting east of The Wilderness would prevent views of traffic using the Lower Thames Crossing. However, where the new road emerges from cutting approaching the Footpath 136 overbridge, the road would become visible together with the prominent footbridge structure. Beyond the Footpath 136 overbridge, views of the road and associated traffic on an embankment would be clearly visible from the footpath connecting with Mardyke Way. The short section of diverted overhead line, including a new marginally taller pylon, would not appear noticeably different to the existing alignment.

Measures to reduce visual impacts during operation

Our primary mitigation in this ward would be false cuttings and landscape treatment along the Lower Thames Crossing corridor. This would help to screen views of the new road and traffic and integrate it into the surrounding landscape. The North Road green bridge would help visually link the landscape north and south of the route.

20.7 Noise and vibration

We have carried out noise and vibration assessments for both the construction and operational phases of the project. As explained in chapter 1, some of the assessments set out below are based on earlier versions of the project. The information provided still presents a reasonable representation of the likely effects from the proposals presented during this consultation.

Existing situation

The existing noise environment in Ockendon is mainly traffic noise from the M25 in the east of the ward, coupled with the B186 running centrally through the ward. There is also noise from other roads, railways and human activity.

As part of our environmental assessment process, we carried out surveys of existing background noise at four locations in the ward, which were agreed with the local authority. The levels monitored at these locations recorded average existing noise levels in the range of 50 to 60dB(A)² during the day and 50 to 51 dB(A) during the night.

To understand how noise levels would vary with and without the project, we use noise modelling to predict what noise levels would be like in the project's proposed opening year if the project was not built. We model this because we cannot assume that noise levels when the project opens would be the same as they are now. For example, our assessment of the opening year noise levels take into account predicted changes in traffic levels.

We also model the predicted noise levels for the opening year with the project in place. This provides a useful comparison as to how the new road would change the noise levels in the project's opening year if it were implemented.

2 Decibel (dB) is the unit used to measure noise levels, with dB(A) being a standardised way of averaging noise levels that accounts for how humans hear sounds. The typical level of sounds in the environment ranges from 30 dB(A), which is a quiet night-time level in a bedroom, to 90 dB(A), which is how it would sound by a busy road. See chapter 1 for more information about what decibel levels mean.

In the opening year, noise levels without the project are predicted to range, on average, from 39 to 78 dB(A) during the day and from 28 to 64 dB(A) during the night at the identified locations within the ward. As such, our noise assessments predict that by opening year, noise levels would increase compared with the existing situation even if the road is not built. Information about noise levels with the project, during its construction and operation, are below.

20.7.1 Construction

Daytime construction noise impacts

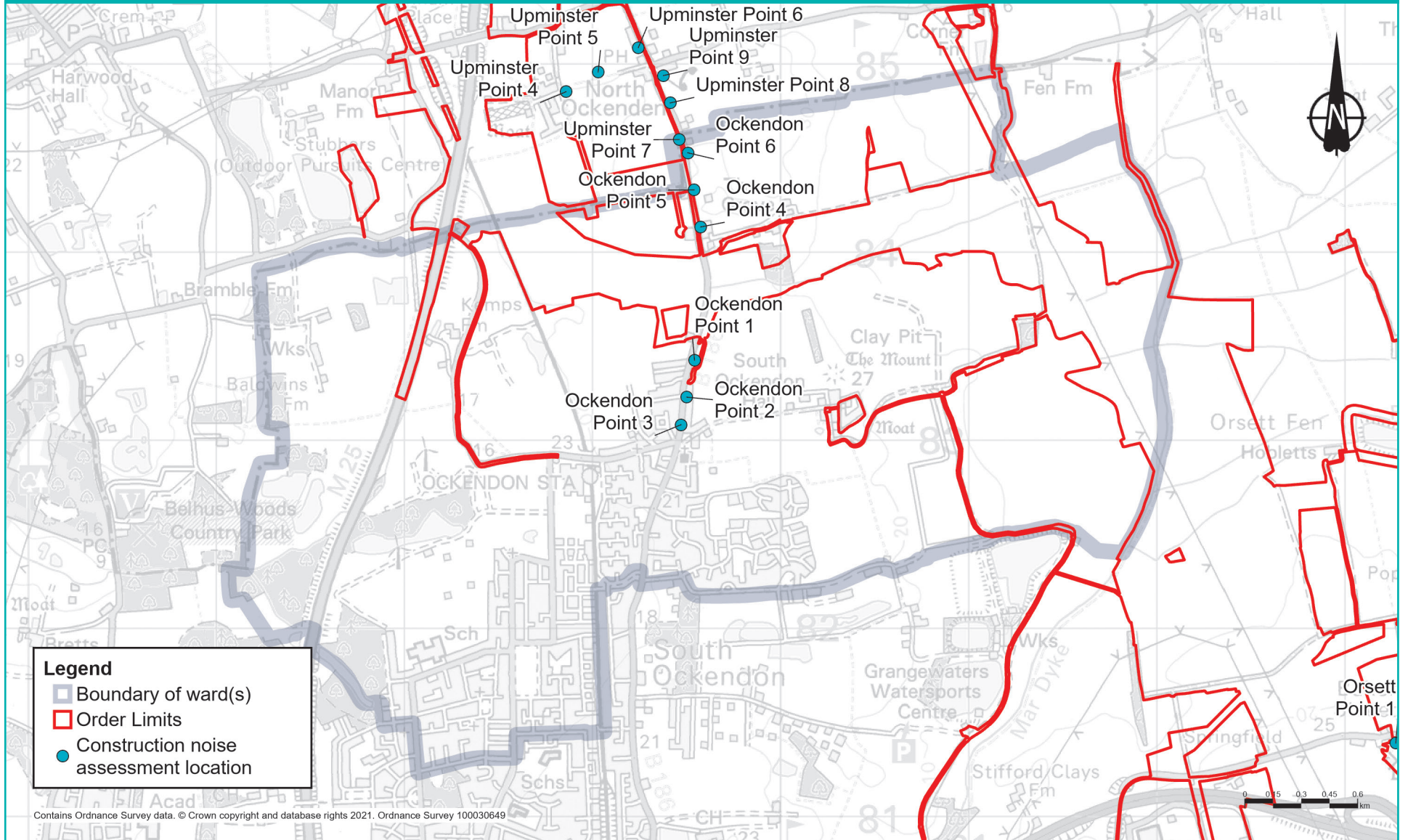
The main construction activities expected to make noise and vibration in this ward are those associated with M25 upgrade works, project entrance/exit slips on to the M25, project main route works and utilities works.

There are two main works compounds and one Utility Logistics Hub proposed to be located in Ockendon. These are described in the Project description section above.

There would also be haul roads built and used during the construction period, these are presented in the Project description.

Within the ward, there is one proposed structure expected to be constructed using vibratory or percussive piling, but these works would not be within 100 metres of any sensitive receptor, and so no vibration impacts during the construction works are predicted.

Figure 20.15: Construction noise assessment locations in Ockendon ward



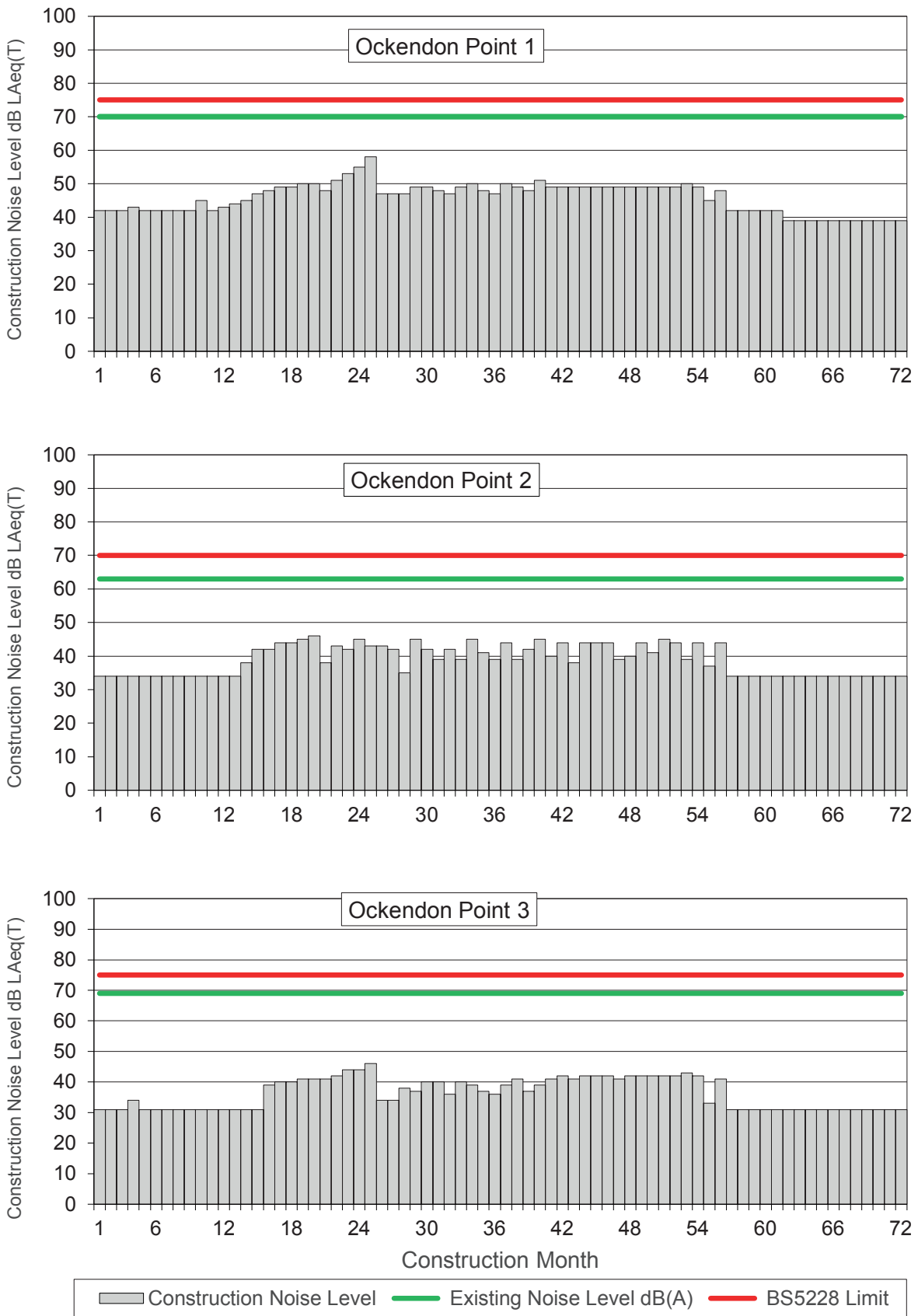
Construction noise levels have been predicted at six locations across the ward, chosen to provide a representation of the level of noise communities are expected to experience during construction. For more information about how we carried out these assessments, see chapter 1.

Noise levels are shown using the standard units for major projects, dB LAeq (12-hour), which represent the average noise level for the assessed 12-hour daytime period. While there might be short-term noises that are louder than the noise level shown during the assessed period, the averaged figure provides a fair representation of what the overall noise impacts would be. Figure 20.15 above shows the locations at which we have predicted the daytime construction noise levels.

Each vertical bar in figures 20.16 and 20.17 shows the predicted noise levels for that month of the construction period (months 1 to 72). The horizontal green line in each chart represents the existing background noise level at each assessment point without the project. The horizontal red line shows the level at which construction noise would exceed acceptable thresholds (see chapter 1 for more information about these thresholds). If noise is predicted to exceed acceptable levels, then specific measures would be implemented to reduce the noise.

The predicted construction noise levels show that higher noise levels and disturbance would be experienced closer to construction activity. Levels gradually diminish as a result of increased distance and additional buildings and other features screening the noise from more-distant residential areas.

Figure 20.16: Construction noise by month for points 1-3 in Ockendon ward



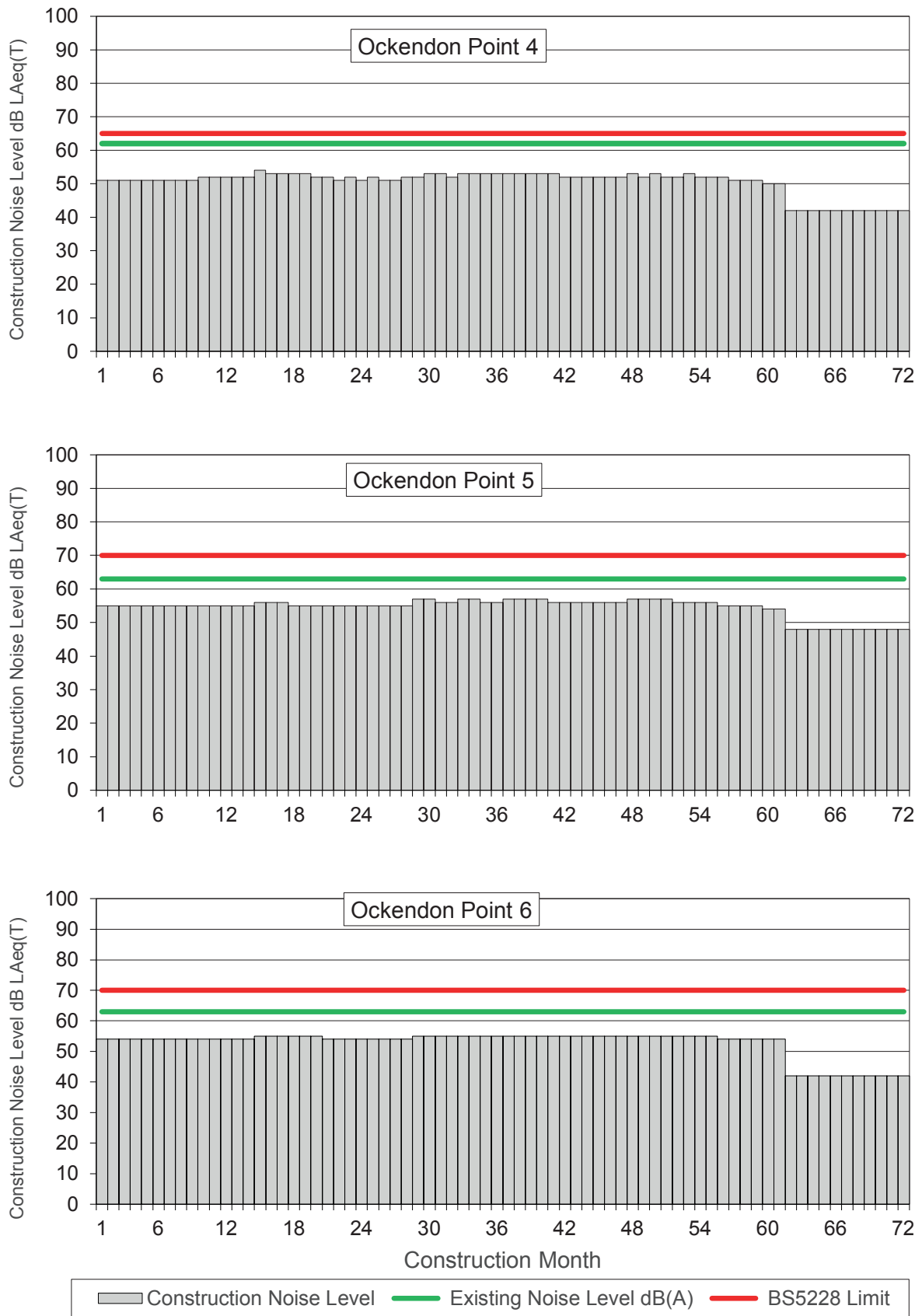
With reference to figure 20.16 the following summarises the noise level changes over the construction period for points 1 to 3:

- At point 1, construction noise levels are predicted to range from 39 to 58dB LAeq (12-hour) during the six-year construction. Construction noise levels are not expected to exceed the existing background noise levels.
- At point 2, construction noise levels are predicted to range from 34 to 46dB LAeq (12-hour) during the six-year construction programme. Construction noise levels are not expected to exceed the existing background noise levels.
- At point 3, construction noise levels are predicted to range from 31 to 46dB LAeq (12-hour) during the six-year construction programme. Construction noise levels are not expected to exceed the existing background noise levels.

With reference to figure 20.17. on the right, the following summarises the noise level changes over the construction period for points 4 to 6:

- At point 4, construction noise levels are predicted to range from 42 to 54dB LAeq (12-hour) during the six-year construction programme. Construction noise levels are not expected to exceed the existing background noise levels.
- At point 5, construction noise levels are predicted to range from 48 to 57dB LAeq (12-hour) during the six-year construction programme. Construction noise levels are not expected to exceed the existing background noise levels.
- At point 6, construction noise levels are predicted to range from 42 to 55dB LAeq (12-hour) during the six-year construction programme. Construction noise levels are not expected to exceed the existing background noise levels.

Figure 20.17: Construction noise by month for points 4-6 in Ockendon ward



24/7 construction working

In addition to the changes to the daytime noise impacts presented in the section above, 24-hour, seven-day construction working is proposed at the locations shown in figure 20.18 below.

These locations are where works may need to be carried out at night to maintain safety and reduce disruption to road and utility networks. The works in this area are expected to be night-time or weekend highways works. These works could have an impact on local communities, and we would work with the local authority to manage these impacts.

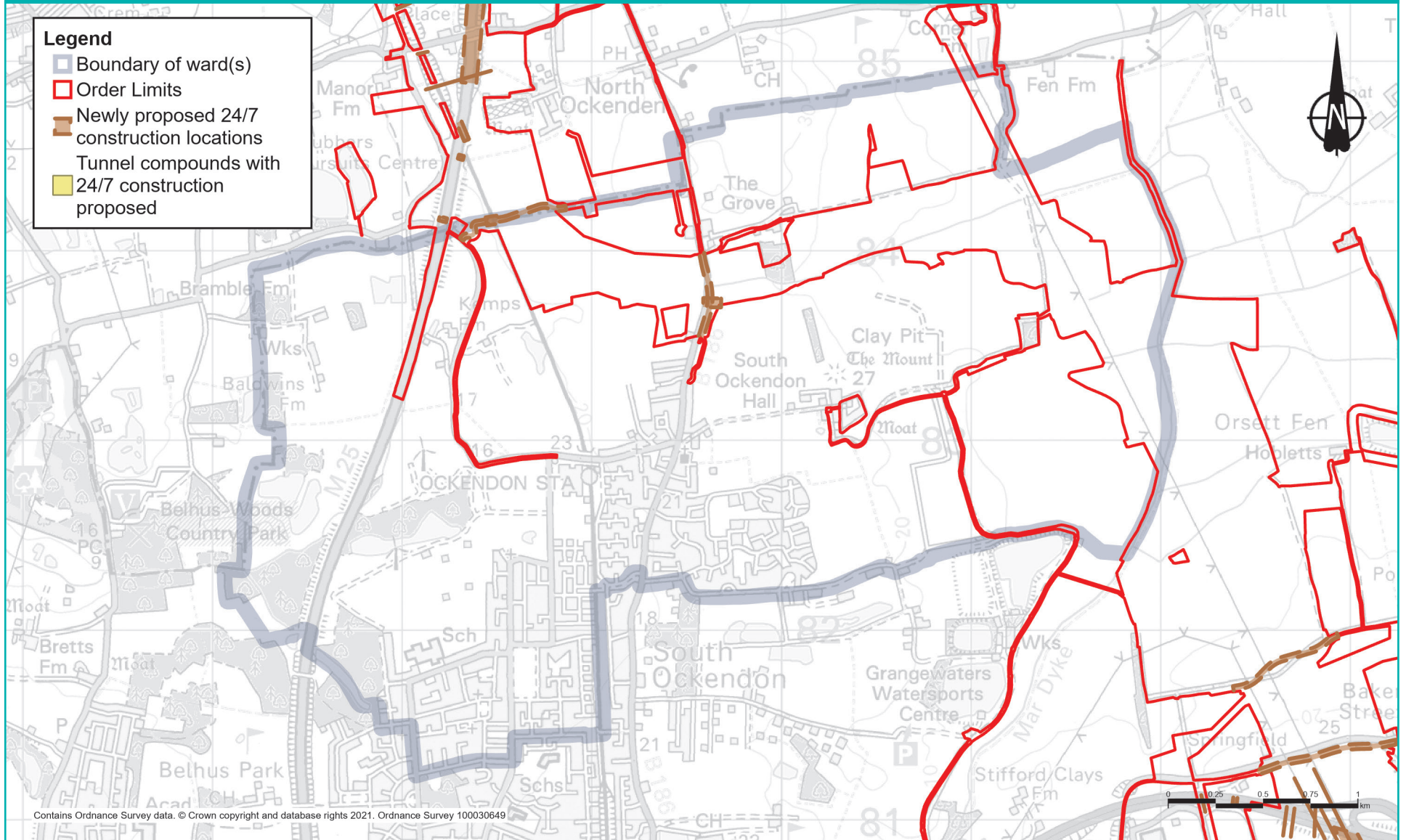
Construction traffic noise impacts

Maps showing the predicted change in road traffic noise on roads within Ockendon ward during each year of the construction can be found in chapter 7 of the Construction update. Based on the currently available traffic data (which offers a representative picture of what receptors within the ward are likely to experience), during the construction period there would be negligible changes in road traffic noise (less than 1dB change in noise levels) during all construction years, except along the roads where increases in noise levels been predicted (see table below). For more information about how we define noise impacts such as negligible, minor, moderate and major, see chapter 1.

Table 20.4: Construction traffic noise impacts in Ockendon ward

Affected road(s)	Predicted noise impact	Construction year(s)
Dennis Road	Moderate increase in noise levels	2
Veolia Track access track	Moderate increase in noise levels	1
Veolia Track access track	Major increase in noise levels	2, 3, 4, 5 and 6

Figure 20.18: Newly proposed and tunnel 24/7 working locations in Ockendon ward



Measures to reduce construction noise and vibration

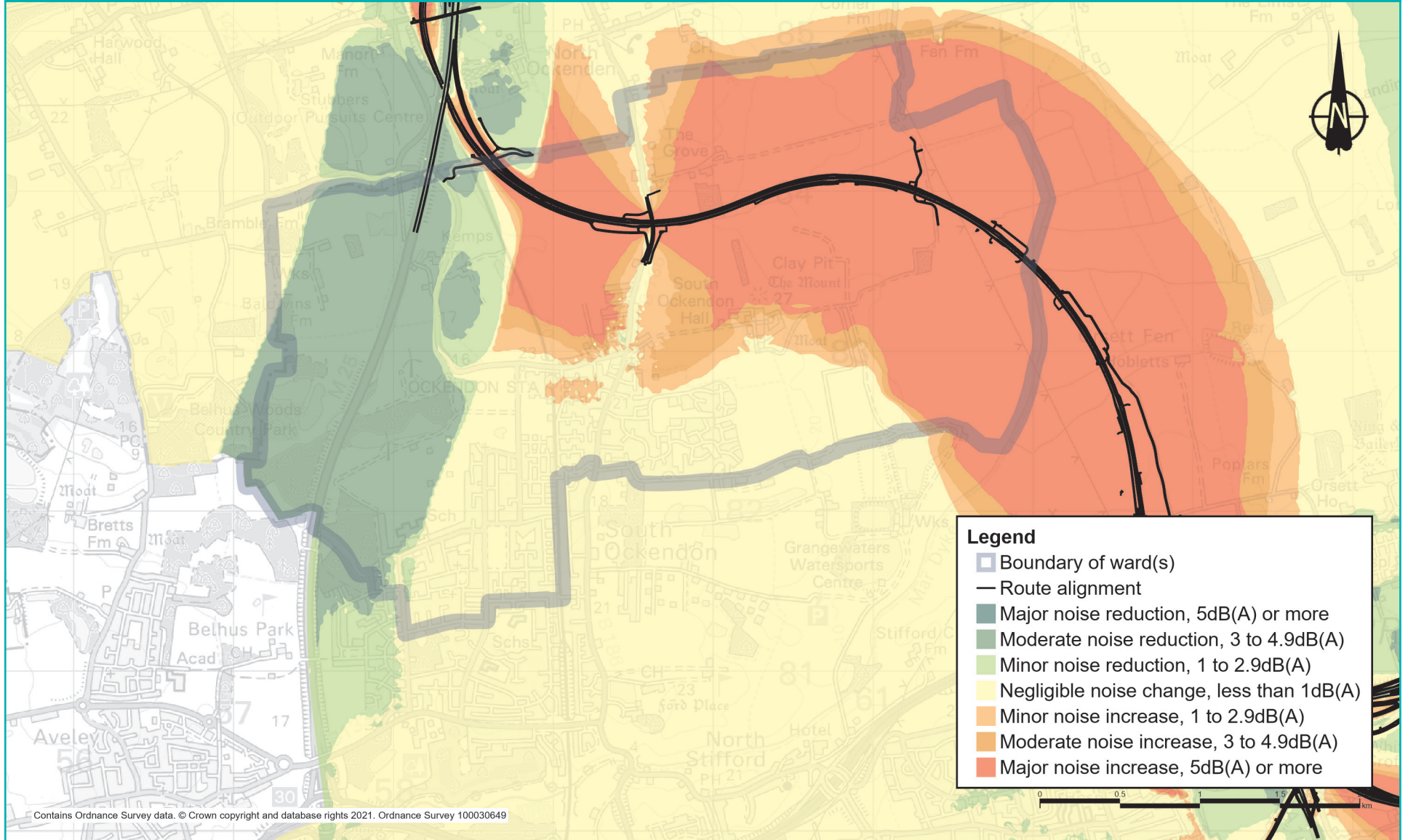
Construction noise levels would be controlled by using Best Available Techniques (BAT), with specific measures used at certain locations such as:

- Installing and maintaining hoarding around the construction compounds.
- Installing temporary acoustic screening around the construction areas likely to generate noise.
- Keeping site access routes in good condition with condition assessments onsite to inspect for defects such as potholes.
- Turning off plant and machinery when not in use.
- Maintaining all vehicles and mobile plant so that loose body fittings or exhausts do not rattle or vibrate.
- Using silenced equipment where available, in particular power generators and pumps.
- No music or radios would be played for entertainment purposes outdoors onsite.
- Site layout would be planned to ensure that reversing is kept to a practicable minimum. Required reversing manoeuvres would be managed by a trained banksman/vehicle marshal to ensure they are conducted safely and concluded quickly to reduce the noise from vehicle reversing warnings.
- Non-percussive demolition techniques would be adopted where reasonably practicable to reduce noise and vibration impact.
- Careful consideration of the location and layout of compounds to separate noise-generating equipment from sensitive receptors, and the use of mains electricity as opposed to generators, where possible.
- Minimisation of construction vehicle traffic by, where practicable, selection of local suppliers along the project route, using local workforces and by minimising material transportation for earthworks construction along the project.

All control measures, including those above, fall under the principles of BAT and are outlined in the REAC. For more information, see the sections NV001 to NV010, which set out how we would work under the supervision of the relevant local authorities to implement noise-reduction measures where appropriate.

The CoCP details additional measures that would be implemented to reduce noise and vibration during the construction period.

Figure 20.19: Noise impacts during operation in Ockendon ward



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20.7.2 Operations

Operational noise impacts

The main project route runs across the north-east of the ward, and the proposed improvements to the existing M25 are located on the western side of Ockendon.

Direct noise from the route and the proposed improvements to the M25 would be experienced in the western section of the ward. There would also be indirect noise as a result of changes in traffic flow and speed on the existing road network in the ward.

Figure 20.19 above shows the predicted changes in traffic noise in the opening year of the project. Within the ward, changes in road traffic noise at identified noise sensitive locations (such as nearby properties) are predicted to range from a moderate decrease in noise levels of between 3.0 and 4.9dB to a major increase in noise levels of greater than 5dB. For more information about how we define noise impacts (negligible, minor, moderate and major), see chapter 1.

Measures to reduce traffic noise and vibration during operation

The main methods of controlling noise would be, where practical, to design the road within landscaped features such as cuttings and bunds (walls of earth). The use of low-noise surfacing would also reduce the traffic noise once the road is in use.

For more information about the proposed measures to reduce operational noise, see the REAC (including references NV011 and NV013).

20.8 Air quality

We have carried out air quality assessments for both the construction and operational phases of the project. As explained in chapter 1, some of the assessments set out here are based on earlier versions of the project. The information provided here still presents a reasonable representation of the likely effects from the proposals presented during this consultation.

Existing situation

Ockendon ward, is not located within an Air Quality Management Area (AQMA). AQMAs are areas that have been identified by local authorities as areas of poor air quality that require additional monitoring and controls.

20.8.1 Construction

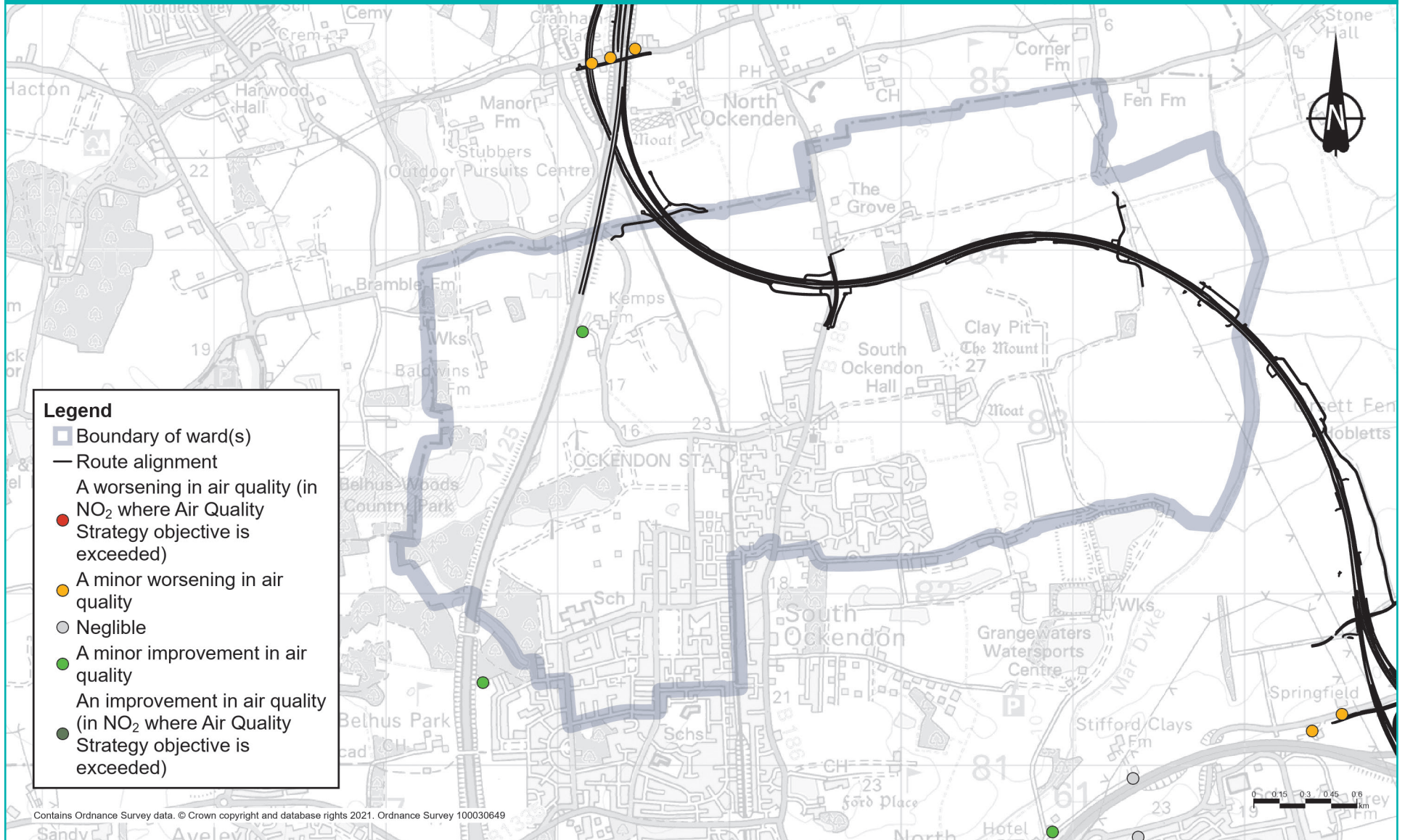
Construction impacts

Construction activities have the potential to affect nearby air quality through the release of dust and emissions from construction equipment and traffic. The areas most likely to be affected are those close to haul roads, compounds and soil storage areas.

Properties more than 200 metres from the worksite, which is the majority of properties within this ward, are outside the area likely to be affected by construction dust or emissions from the worksite. In this ward, there are only a few properties within 200 metres of the worksite, the north of the ward on North Road and Dennis Road. Air quality impacts on these properties during construction would be temporary and we would put in place measures to minimise the dust impacts (see below). The proposed measures to reduce dust and emissions are ones that have been proven to be effective when used on similar construction projects in the past. The change in air quality during the construction phase would be negligible, and there would be no discernible effect on health.

Our analysis of construction traffic predicts that the impact on most roads in this ward would be negligible, although there would be a temporary minor improvement in air quality in the area around the M25 (from 2025 to 2028) and on the B1421 (2025, 2027 and 2028) as a result of traffic management in place. More information about construction traffic impacts on air quality can be found in chapter 7 of the Construction update.

Figure 20.20: Predicted changes in NO₂ levels within Ockendon ward once the new road is open



Measures to reduce air quality impacts during construction

The impact of construction machinery and traffic on air quality would be controlled through the range of good practice measures set out in the CoCP and the REAC. For example, there would be measures to suppress dust, such as damping down dry haul roads and spoil heaps, as well as the use of low-emission machinery and vehicles. We would put in place an Air Quality Management Plan to ensure the measures set out in the CoCP and the REAC would effectively monitor and control dust and exhaust emissions. The location and type of monitoring would be submitted in advance to Thurrock Council for consultation (see REAC entry AQ006).

20.8.2 Operations

Operational impacts

We have carried out an assessment of the operational impacts of the new road on air quality. The assessment area includes a 200-metre buffer around the roads within the affected road network, with this area being the most likely to experience changes to air quality as a result of the new road. More information about air quality impacts once the road is open can be found in chapter 5 of the Operations update.

There are receptors (properties or habitats that are sensitive to changes in air quality) within the ward, close to the east of the M25 that are predicted to experience a minor improvement in the air quality for nitrogen dioxide (NO₂), the main traffic-related pollutant³. The highest modelled yearly average NO₂ concentration within this ward is 23.8 µg/m³, which is well below the yearly average threshold of 40µg/m³. Our assessment is based on our opening year model, which represents a worst-case scenario, without accounting for the increase in less-polluting vehicles on our roads over time.

Measures to reduce air quality impacts during operation.

The assessed air quality impacts in this area as a result of the project would not trigger the need for additional monitoring or other mitigation measures once the road is open.

³ NO₂ levels are measured in 'micrograms per cubic metre', or µg/m³, where a microgram is one millionth of a gram.

20.9 Health

Existing situation

A range of personal, social, economic and environmental factors influence our health, and different groups may be more sensitive to these – for example, children, older people or those with pre-existing health conditions.

Ockendon has a younger population than Thurrock as a whole and nationally, with a higher proportion of children aged under 16 (24.8% compared with 24.2% for Thurrock and 20.3% for England). Ockendon has a high BAME population, with a high proportion of black and Asian residents, 7.8% and 3.8% respectively.

Rates of deprivation vary significantly across Ockendon. For example, an area to the south of the ward is in the top 20% most deprived across England, while an area to the east is in the bottom 30% most deprived across England. Economic activity rates are relatively low in Ockendon compared with Thurrock as a whole – 71.9% and 79.1% respectively. In addition, the number of people claiming benefits is slightly higher compared with Thurrock and England as a whole, 3.2%, 3.0% and 2.7% respectively. Ockendon has a slightly lower proportion of residents in social grade AB (13.5%) than Thurrock as a whole (15.0%). The area has a significantly lower proportion of households owned outright, compared with Thurrock and England as a whole, 61.1% and 63.3% respectively. Ockendon has a relatively high proportion of households with no car or van in a household, compared with Thurrock as a whole, 24.2% and 20.1% respectively.

Ockendon residents generally have lower rates of self-reported very good health compared with Thurrock and England as a whole, 45.5%, 48.2% and 47.2% respectively. In addition, Ockendon has a relatively high proportion of residents who report that their day-to-day activities are 'limited a lot' compared with Thurrock as a whole – 9.1% and 7.2% respectively.

Regarding life expectancy and causes of death, with the exception of deaths from all cancer and coronary heart disease, Ockendon performs significantly better than Thurrock across a range of measures, including life expectancy at birth for both males and females, deaths from all causes and deaths from respiratory diseases.

20.9.1 Construction

Construction impacts

Construction activities affecting Ockendon are presented in the Project description section, and primarily relate to:

- construction of the Mardyke Viaduct
- north road bridge
- temporary construction of haul roads
- Medebridge Compound
- construction routes on public roads

Elements of these activities have the potential to impact human health (including mental health and wellbeing), whether this is through noise associated with construction activities or construction traffic, air quality (as a result of dust emissions), severance caused by construction traffic, or road or footpath closures.

There could be both positive and negative potential impacts on people's health and wellbeing. With good communication and engagement, any stress or anxiety caused by construction would be reduced. Equally, some residents would see health and wellbeing benefits from improved access to work and training opportunities (see the Traffic section). The relationship between mental health and unemployment is two-way. Good mental health is a key influence on employability and finding and keeping a job. Unemployment causes stress, which ultimately has long-term physiological effects and can lead to depression, anxiety and lower self-esteem.

As highlighted at the start of this section, different groups of people may be more sensitive to factors that potentially affect their health. Some of the impacts of our construction activities may, therefore, only affect a small proportion of the population. Potential impacts may include:

- Temporary adverse effects from construction traffic noise are predicted to occur in Ockendon, particularly along North Road.
- Temporary adverse noise effects have been identified as a result of construction activities, including from construction noise, construction traffic and percussive piling activities. Ockendon has slightly higher proportions of people with disabilities/life-limiting conditions, groups who are likely to be more susceptible to increases in noise levels.

- There are few properties in the Ockenden ward within 200 metres of the project and they are therefore unlikely to be affected by dust or emissions from construction. Those that are within 200 metres could experience air quality impacts from increased dust and emissions from nearby construction activities. Analysis of the construction phase traffic flows on the existing road network associated with the build-out of the Lower Thames Crossing indicates the change in flow and emissions between 2025 and 2028 along the M25 corridor could lead to a temporary beneficial impact on air quality at those receptors located closest to the M25 in western Ockenden.
- The local community would be impacted by construction activities – noise, dust, vibration and severance during the proposed closure of Ockendon Road. Diverted traffic would use Dennis Lane or St Mary’s Lane to cross the M25, representing a change in journey length of nearly 10km.
- Bus routes would be impacted during construction. Traffic management measures implemented during the construction works are likely to result in significant journey time delays for those services, which may continue for more than two years.
- Potential impacts during construction relate to the loss of private property and the change of social capital or sense of community associated with this loss. This would affect 10 properties clustered along Ockendon Road immediately adjacent to the M25. Relocation of people as a result of the project causes disturbance to people’s lives, which can create stress and anxiety.
- People who live in rural areas such as Ockendon are likely to be part of long-standing and well-established community networks. As such, given these networks, relocation may have a disproportionately negative impact on such communities, given the relatively high rates of social cohesion. In addition, negative effects are likely to be heightened by uncertainty.
- Residential areas on the north and east edges of South Ockendon are likely to see the construction activities. Individual properties along the B186 and the local footpath network in the east of the ward would also have views of the project. Temporary significant adverse visual effects have been identified in Ockendon.

The main construction activities expected to cause noise and vibration impacts in this ward are:

- Works during core daytime hours to establish the construction of the project alignment and utilities works.
- Core hours impacts from activities in the Medebridge Compound.
- Use of construction machinery to construct the new road and the Mardyke Viaduct. These works would be limited to daytime core construction hours, outside of emergency works.

Most of the existing road traffic links in this ward would experience negligible noise level changes of less than 1dB(A). The exception would be Dennis Road, which would experience an increase in road traffic noise during the construction phase. There are likely to be mental health and wellbeing impacts associated with stress and anxiety relating to construction.

Negative health outcomes may be experienced by some groups as a result of changes to:

- accessibility (for example, people who are more dependent on public transport and have less choice about how they travel and the route they take)
- severance (where road and footpath closures may affect some people's ability to access services or facilities)
- access to open space (people without access to private cars may have fewer alternatives within a reasonable travel time)
- the noise environment

Measures to reduce construction health impacts

Proposed measures relating to health and wellbeing (including good practice for dust emissions, hours of working and visual screening) are described in the Visual, Noise and vibration and Air quality sections. Further information relating to mitigation measures for these areas is set out in the CoCP and REAC and the package of traffic management plans. The commitments in the REAC include adhering to Best Practicable Means to reduce noise impacts (see NV007 in the REAC) and dust-management good practice (see AQ005 in the REAC). For more information about these documents, see chapter 1 of the Construction update.

Engagement and effective two-way communication with communities before and during construction, including sharing information about the programme and impact of works, is important to reduce mental health and wellbeing impacts associated with uncertainty, stress and anxiety. The CoCP sets out proposals for how we would make sure communities, stakeholders and any affected parties are updated about the construction works, their progress and the associated programme of works.

20.9.2 Operations

Operational impacts

Information about the operations in this ward can be found in the Project description.

Both positive and negative health outcomes may be experienced by residents of Ockendon:

- Ockendon is predicted to experience increases in access to employment as a result of the project, with the number of jobs within a 30-minute catchment area up by 50% and within a 60-minute drive up by 22%.
- In terms of active travel, all minor roads within this ward that would be severed during construction would be relinked once the project is complete, either along their original alignment or with very little deviation from it. There would, however, be a slight increase in road length (less than 50 metres). There would be an increase in journey time for pedestrians as a result of minor changes to the alignment of Ockendon Road.
- Once the new road opens, our forecasts show that Ockendon would be subject to increase in noise levels greater than 3dB. Increases can result in adverse health effects within the population, ranging from annoyance and sleep disturbance to more serious effects.
- Temporary significant adverse visual effects have been identified in Ockendon.
- Those properties modelled in the Ockendon ward are predicted to be well below the air quality thresholds for nitrogen dioxide and particulate matter, the key traffic-related pollutants.
- Incorporating noise-mitigation measures (such as earthworks, noise barriers and low-noise surfacing) into our project design in Ockendon would reduce adverse health outcomes associated with increased noise levels.

Measures to reduce operational health impacts

False cutting and landscape treatment along the project's main route would be the primary mitigation measures. They would help to screen views of the new road and traffic and would integrate the Lower Thames Crossing into the surrounding landscape. The North Road green bridge would also help to visually link the landscape north and south of the route.

20.10 Biodiversity

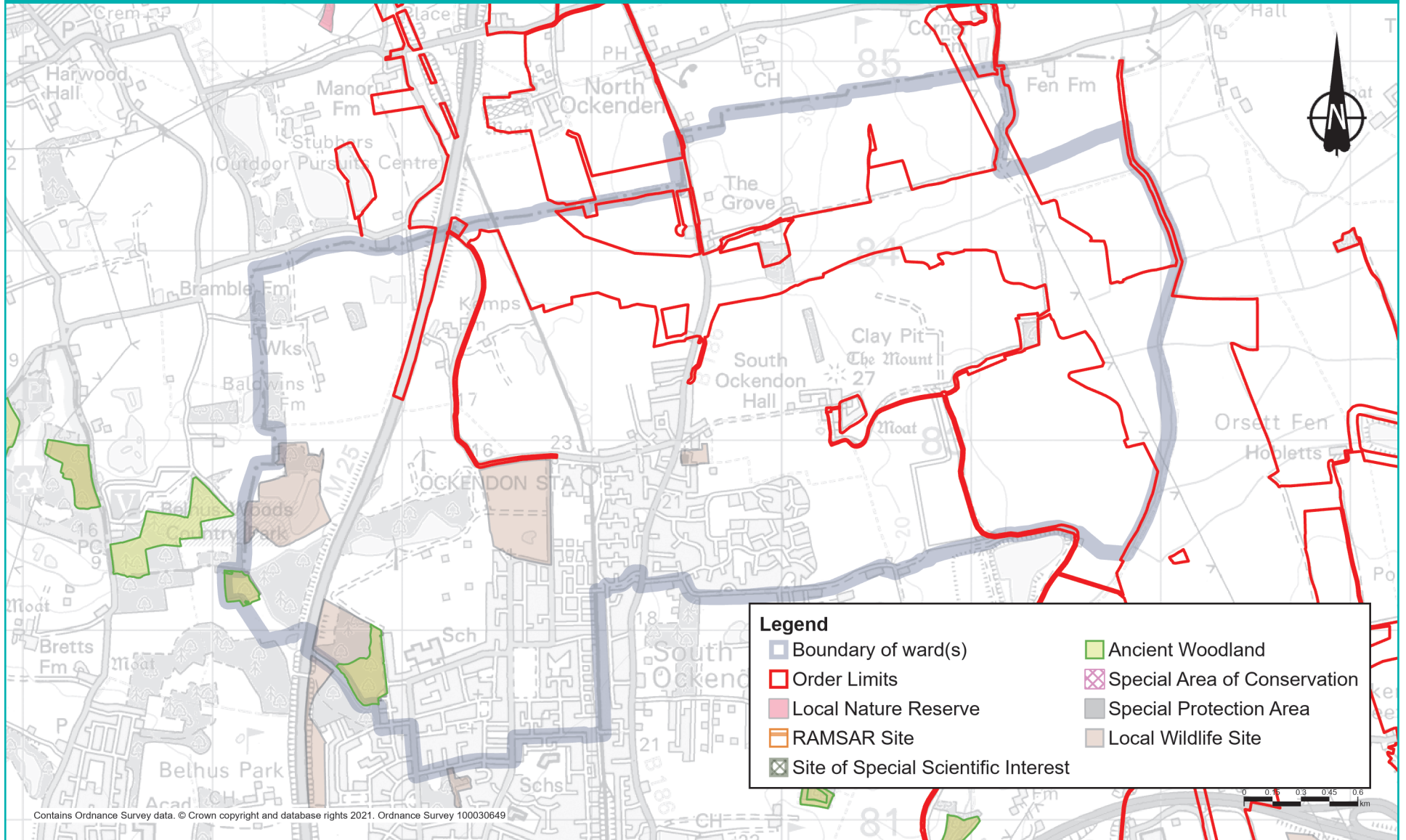
Existing situation

The main habitats within the Order Limits in the Ockendon ward are areas of arable, with some areas of rough grassland, which contain a number of watercourses. In addition, there are areas of pasture, scrub and woodland.

There are no designated sites within 2km of the Order Limits in the Ockendon ward. However, there are non-designated sites within 500 metres of the Order Limits including St Nicholas Church Local Wildlife Site (LWS), West of Arisdale Avenue LWS, Belhus Lakes, Belhus Wood Country Park LWS and North Ockendon Pit Site of Importance for Nature Conservation.

We carried out surveys across the project to set a baseline for assessment, and these identified the presence of a range of protected and notable species. These included bats, badgers, water voles, otters, terrestrial invertebrate species, great crested newts, barn owls and reptiles.

Figure 20.21: Designated and non-designated biodiversity sites in Ockendon ward



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20.10.1 Construction

Construction impacts

We would need to remove areas of habitat both temporarily and permanently, from the route alignment. This habitat would include arable fields, scrub, rough grassland and woodland which support a range species. These would be disturbed by habitat loss and fragmentation.

Measures to reduce biodiversity impacts during construction

Vegetation clearance would be cleared during the winter where possible to avoid any impact on breeding birds. Where this is not practicable, clearance would be supervised to ensure no nests are disturbed or destroyed. Where protected species are present, they would be moved from the site before any construction activities take place, either through habitat manipulation (for example, strimming to reduce the height of vegetation and displace reptiles), or translocation. Where required, works affecting protected species would be carried out under a Natural England licence. Boxes to support bats, birds and barn owls would be installed within retained habitat.

We would create areas of open mosaic habitat consisting of grassland, scrub and bare earth, and larger areas of species-rich grassland to provide good quality habitat for a number of species, particularly invertebrates, reptiles and amphibians including great crested newts. This habitat would also be suitable for the breeding birds in this area. Ponds would be included to further diversify the habitats and provide areas for breeding great crested newts. These are shown in Map Book 1: General Arrangements.

To provide habitat connectivity within this area, we would build a green bridge over North Road. In addition, the new road would be on a viaduct over the Mardyke Valley to allow movement of species under the route alignment. For more information about green bridges, see the chapter 2 of the Operational update.

The impact of construction on biodiversity would be controlled through the range of good practice measures set out in the CoCP and REAC. See chapter 1 of the Construction update for more information about this and the project's other control documents.

20.10.2 Operations

Operational impacts

The project's operation has the potential to cause species mortality through breakup of habitats as well as exposure to, and noise disturbance from, road traffic.

Measures to reduce biodiversity impacts during operation

Landscape planting has been designed to allow animals to move and forage and would guide them to safe crossing points over the new road, specifically the green bridge and viaduct. To mitigate traffic disturbance, the new road would be in a cutting east of North Road, reducing noise and visual impacts.

We would manage newly created areas to make sure that they provide high-quality habitats to support a broad range of different plant and animal species.

The impact of operation on biodiversity would be controlled through good practice measures set out in the CoCP and REAC. See chapter 1 of the Construction update for more information about this and the project's other control documents.

20.11 Built heritage

Please refer to the Cultural heritage section of the project-wide summary for information about impacts on archaeology.

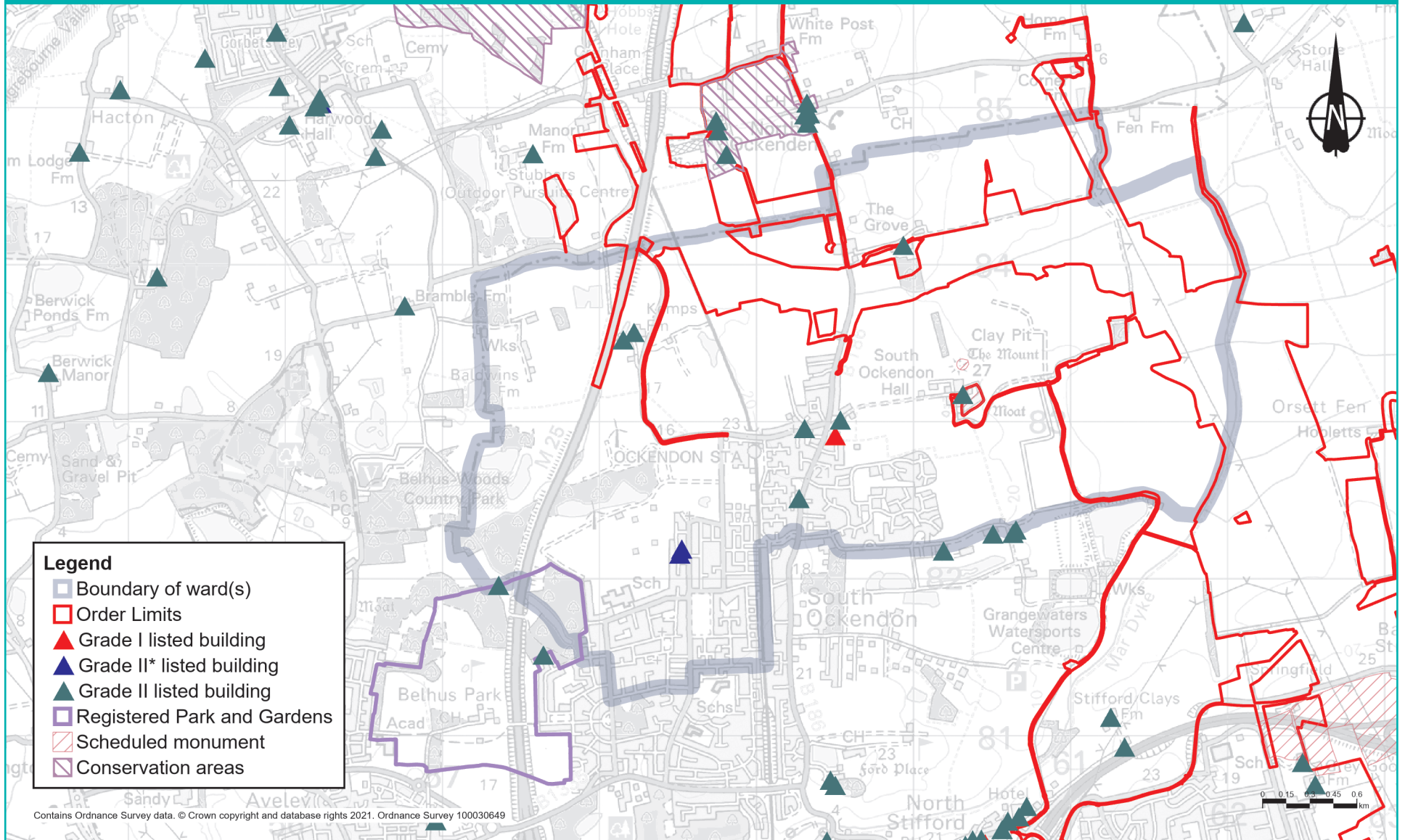
Existing situation

Two scheduled monuments and 10 listed buildings have been identified in Ockendon ward in relation to the project. Of the listed buildings, one is Grade I listed, two are Grade II* listed, and seven are Grade II listed.

Scheduled monuments

- Gatehouse and Moat of South Ockendon Hall is a scheduled monument of high heritage value. It is located to the east of Hall Lane and in an area of construction activity associated with the Ockendon link section of the project. The monument includes a listed gatehouse and bridge, earthwork remains of medieval fish/mill ponds and moat, as well as below-ground archaeological remains. A large part of the moat is still water-filled today.
- Roman barrow 260 metres north-east of South Ockendon Hall is a scheduled monument of high heritage value and located around 130 metres north of the project activities. The monument is a second century AD Roman burial mound. It is oval in shape with a flat top and stands about five metres tall. The mound is surrounded by a ditch which is now mostly buried. It was originally one of three burial mounds but the other two have been destroyed.

Figure 20.22: Built heritage in Ockendon ward



Listed buildings

- Church of St Nicholas (Grade I) is of high heritage value. It is located to the south of The Green, about 390 metres south from the project. The church originally dates to the 15th century with some earlier 12th and 13th century features remaining, as well as later 19th century restorations.
- Little Belhus (Grade II*) including Garden Walls and Gateway (Grade II*) are of high heritage value. These listed buildings are located on Little Belhus Close, around 700 metres south from the project. Little Belhus is a mid-16th century house and retains several notable original features including a central belfry tower. The house is thought to be of high status based on these features. The garden walls and gateway are the same age as the house and are also listed.
- Quince Tree Farmhouse (Grade II)
- Street Farmhouse (Grade II)
- Kemps (Grade II)
- Kemps Cottage (Grade II)
- Moat Bridge and Gatehouse at South Ockendon Hall (Grade II)
- Royal Oak Inn (Grade II)
- Former Gateway at Groves Barns (Grade II)

20.11.1 Construction

Construction activities affecting the ward relate to establishment of the main project route and the Ockendon link section of the project. Activities would also include establishing and operating the Medebridge Compound and M25 Compound, and creating construction access routes along Mollands Lane and the M25.

Construction impacts

There are no physical construction impacts to the listed building and scheduled monument at South Ockendon Hall. Major construction activity would be more than 600 metres away from these structures and some distance from the earthwork remains. Construction activities would not impact the setting (the surroundings in which heritage assets are 'located') of the scheduled monument or listed building. However, due to its close proximity to the main project route, the Former Gateway at Groves Barns would experience temporary changes to its setting through additional noise, lighting and visible construction machinery, although this would be separated from the listed building by the retained area of woodland in The Wilderness. Kemps and Kemps Cottage would also experience a slight impact to their setting as a result of construction activity along the M25.

Measures to reduce impacts during construction

Our design and layout of Medebridge Compound and M25 Compound would take into account the setting of heritage assets, and we would seek to avoid or/minimise light glare, light spill and light pollution during night-time construction. More information can be found in the Design principles (section S326). Good practice measures including dust and noise reduction are also relevant in mitigating the setting of heritage assets. Please refer to Air quality, Noise and vibration and Heritage sections of the REAC.

20.11.2 Operations

Refer to the Project description section of this chapter for more information.

Operational impacts

Kemps and Kemps Cottage would experience a slight impact to their setting as a result of increased traffic noise along the M25 once the Lower Thames Crossing opens. There are no other operational impacts to built heritage in this ward.

Measures to reduce the impacts during operation

Our engineering and landscape design seeks to avoid or reduce negative impacts to heritage assets. These can be physical or result from changes in their surroundings, which also contribute to the value of the heritage asset. To preserve the rural and historic character of the landscape, we would minimise road lighting where it is safe and practical to do so, and remain in accordance with relevant standards (see the Design principles, sections LST.02 and LST.03). We would make sure that Medebridge Compound and M25 Compound are reinstated after construction to reflect existing field patterns and the surrounding landscape character as outlined in the Design principles, section S3.05.

20.12 Contamination

Existing situation

There is one potential source of contamination identified based on land uses from a desk-based review of historical maps and environmental data:

- Ockendon Grays Areas II & III landfill, an active Veolia non-hazardous and inert landfill (filled 1974 to present)

The overall impact from these contamination sources is considered to be low, given the mitigation proposed.

20.12.1 Construction

Construction activities in this ward could include utility diversions, topsoil stripping, earthworks movements and excavations, which could cause the mobilisation of contamination if present.

There are a number of construction compounds within the ward and stockpiling of soils may occur, as well as storage of materials/chemicals within compounds.

Construction impacts

During construction, there is the possibility for existing contamination within the ground to become mobilised. There is also a potential risk of accidental oil, cement and fuel spills from construction traffic and the storage of materials. Utility diversions are taking place and some are in close proximity to areas identified as potential sources of contamination. The utility trenches may create preferential pathways for existing contamination to migrate into the wider area.

Measures to reduce contamination risk

To reduce the impact to an acceptable level, good practice measures include appropriate storing of equipment, clear soil handling and storage of chemicals. Re-use guidance would be followed during construction to reduce the risk of spreading contamination and spillage or pollution.

To reduce the risk of accidental spillages, procedures would be in place, such as designated areas to re-fuel plant. Tanks would be bunded, spill kits would be available and incidents would be recorded and managed, with impacted soils being assessed and removed if necessary.

Essential mitigation, such as the development of site-specific remediation where contamination was identified during ground investigation work, would be carried out following consultation with the local authority. During the earthworks, workers would remain vigilant and any suspected contamination would be recorded and assessed accordingly via a watching brief protocol. To reduce the risk of existing contaminant migration, the design of utility works would use the findings of the ground investigation data to guide any specific remediation.

Contamination would be controlled through the range of good practice measures set out in the CoCP and REAC. See chapter 1 of the Construction update for more information about this and the project's other control documents.

20.12.2 Operations

Verification reports would be prepared for the remediation carried out in site-specific areas and this would be provided to the local authority. During the operation of the road, should an incident occur, for example, a traffic accident resulting in localised contamination, significantly affected soils would be assessed and if necessary removed to reduce the risk of contamination migrating across a wider area or entering controlled waters. For more information on these controls, see the REAC.