



Norfolk County Council

GREAT YARMOUTH THIRD RIVER CROSSING

Preliminary Environmental Information Report -
Non-Technical Summary





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CONTENTS

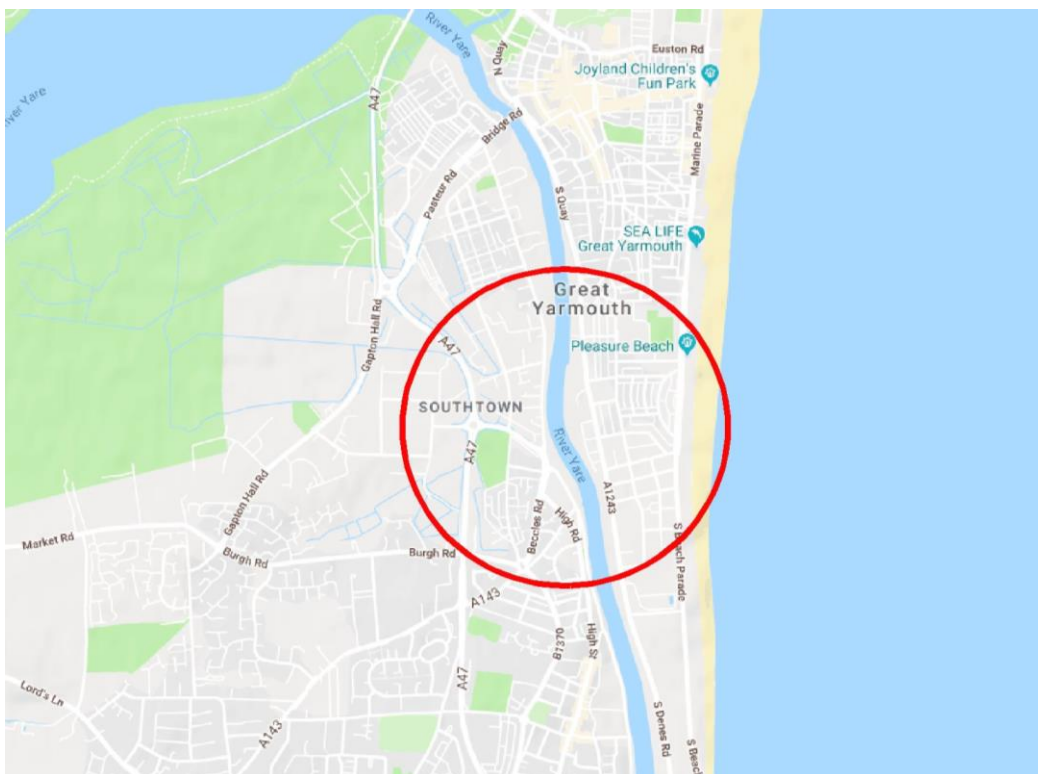
1	THE ROLE OF THE NON-TECHNICAL SUMMARY	1
2	LOCATION AND DESCRIPTION OF THE SCHEME	1
3	ASSESSMENT OF ALTERNATIVES	3
4	CONSULTATION	4
5	ASSESSMENT APPROACH	5
6	AIR QUALITY	5
7	ACOUSTICS	6
8	NATURE CONSERVATION	6
9	CULTURAL HERITAGE	8
10	TOWNSCAPE AND VISUAL IMPACTS	9
11	ROAD DRAINAGE AND THE WATER ENVIRONMENT	10
12	FLOOD RISK	10
13	CLIMATE CHANGE	11
14	PEOPLE AND COMMUNITIES	11
15	MATERIALS	12
16	GEOLOGY AND SOILS	13
17	TRAFFIC AND TRANSPORT	13
18	CUMULATIVE EFFECTS	14

1 THE ROLE OF THE NON-TECHNICAL SUMMARY

- 1.1.1. WSP has been appointed by Norfolk County Council (hereafter referred to as the Applicant) to prepare a Preliminary Environmental Information Report (PEIR) for the proposed Great Yarmouth Third River Crossing project (hereafter referred to as the Proposed Scheme). This document provides a Non-Technical Summary (NTS) of the PEIR.
- 1.1.2. The PEIR has been prepared in accordance with The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) to identify, on a preliminary basis, the potential significant effects of the Proposed Scheme on the environment during both construction and operation.
- 1.1.3. The purpose of this Non-Technical Summary (NTS) is to provide high-level information on the content and main findings of the PEIR, in a clear and concise manner. The PEIR is divided into separate chapters related to specific topics. In order that this NTS provides a helpful and accessible account of the PEIR, it focusses on the main findings that are likely to be of general relevance and interest. For greater detail on the project, the corresponding chapters of the PEIR should be read.
- 1.1.4. It is emphasised that the information presented within this PEIR is 'preliminary' and that the preferred design is evolving. Following the end of consultation, the applicant will take account of all comments that have been received on the PEIR and will undertake additional work, as appropriate, to finalise the Environmental Statement, which will form part of the application for the Development Consent Order (DCO).

2 LOCATION AND DESCRIPTION OF THE SCHEME

- 2.1.1. The Applicant is seeking authority to construct a Third River Crossing over the River Yare between Harfrey's roundabout on the A47 and South Denes road. The Proposed Scheme will create a direct link into the southern part of the peninsula. It will greatly improve access to the port, outer harbour, employment areas, the seafront and residential areas. It will connect the peninsula to the strategic road network via the A47. The location of the Proposed Scheme is circled in red on the map extract below.



2.1.2. The Proposed Scheme involves the construction, operation and maintenance of a new bascule bridge highway crossing over the River Yare in Great Yarmouth. For illustrative purposes, the main bridge crossing is shown on an extract from the draft highway arrangement drawing below. This drawing is presented in full as Figure 2.4 in PEIR Volume II.



Extract from Draft Highway General Arrangement Plan presented in fill as Figure 2.4 in PEIR Volume II

2.1.3. The Proposed Scheme will include the following:

- A double leaf bascule (i.e. counterweighted) bridge providing an opening span for vessel movement. This includes structures to support and accommodate operational requirements of the opening mechanism, including counterweights either at, above or below the bridge deck;
- New substructures to support the double leaf bascule bridge within the existing quays either side of the river and within the river itself, potentially requiring new temporary or permanent walls or cofferdams in the waterway to accommodate their construction;
- A new five-arm roundabout connecting the new crossing with Suffolk Road, William Adams Way and the western end of Queen Anne's Road;
- A single span bridge over Southtown Road, with either reinforced earth embankments or embankments retained by reinforced earth walls, or a combination of these, joining that bridge to the new roundabout at William Adams Way;

- Reinforced earth walls joining the new single span bridge over Southtown Road to the double leaf bascule bridge; and
- Either reinforced earth embankments or embankments retained by reinforced earth walls, or a combination of these, joining the new double leaf bascule bridge to South Denes Road.
- The closure of Queen Anne's Road at its junction with Suffolk Road, and the opening of a new priority junction onto Southtown Road providing access to the Queen Anne's Road residential area;
- Revised access arrangements for existing businesses onto the local highway network including, potentially, a new structure to allow vehicular access under the proposed crossing on the eastern bank subject to agreement with affected businesses and landowner;
- Dedicated provision for cyclists and pedestrians which tie into existing networks.
- A control tower structure located in proximity to the crossing on the western side of the river. The control tower will facilitate the 24/7 operation of the opening span of the new double leaf bascule bridge;
- The demolition of an existing pedestrian bridge on William Adams Way;
- Associated changes, modifications and/or improvements to the existing local highway network as informed by traffic modelling. This could include improvements within the existing highway boundary to some existing junctions within the red line boundary, in addition to amended parking arrangements.
- Additional signage to assist the movement of traffic in response to network conditions and the openings / closings of the double leaf bascule bridge;
- The relocation of existing allotments to compensate for an area to be lost because of the Proposed Scheme; and
- New public realm, landscape, ecology and sustainable drainage improvements.

3 ASSESSMENT OF ALTERNATIVES

3.1.1. This section summarises the alternative design solutions that have been considered for the proposed scheme and the process of option-selection that has been applied. The process can be divided into two stages: (i) Option Development; (ii) Option Selection.

Option Development

Option Development Stage 1:

3.1.2. A Stage 1 Options Assessment Report was commissioned in 2007 to understand existing constraints and potential engineering solutions available for the provision of a crossing of the River Yare in Great Yarmouth. A broad area of interest was identified, and within this area, potential crossing options were considered, including high and low-level bridge options as well as options for a tunnel.

3.1.3. An Environmental Assessment was undertaken at Stage 1 and considered potential environmental constraints associated with the crossing -options. It reported that the scheme would have numerous impacts on the local environment, some being beneficial and some adverse.

3.1.4. The Stage 1 Assessment showed that a third river crossing would be feasible using either a tunnel or a bridge. It concluded that a bridge would be less expensive than a tunnel.

Option Development Stage 2:

- 3.1.5. A Stage 2 Options Assessment Report was commissioned in 2009 to develop options further. Different types of crossing were considered, which included a fixed bridge, swing bridge, lifting bridge, bascule bridge and a tunnel.
- 3.1.6. The Stage 2 assessment also considered the alignment corridor, considering construction cost and number of bridge openings to allow vessel movements. The assessment concluded that the crossing should be located between Harfrey's Roundabout and South Denes Road. Based on this location, a list of 40 options were produced.

Option Selection

- 3.1.7. The 40 identified options were put through an initial sift to narrow down to a selection of nine options by removing those that did not make significant contributions to meeting the scheme objectives.
- 3.1.8. The nine options which successfully met the evaluation criteria were taken forward to the final stage of sifting. This assessment identified the high level economic, environmental and social impacts of all nine options. This reduced options down to the below final three options:
- Options 32 - Suffolk Road tie-in to the west (four lane high level bridge, roundabout as west tie in and traffic signals to the east at South Denes Road);
 - Option 33 - Suffolk Road tie-in to the west (three lane high level bridge, roundabout as west tie in and traffic signals to the east at South Denes Road); and
 - Option 37 - Southtown Road tie in to the west (Single Carriageway two lane low level bridge with traffic signal junctions to the west and the east at South Denes Road).
- 3.1.9. The final three options were compared in relation to the following: overall journey times, distance travelled, queuing and total trips on the road network, cost and environmental impact.
- 3.1.10. Overall, Option 32 per was found to perform marginally better than the other two options. Option 32 was taken forward as the preferred scheme option.

4 CONSULTATION

- 4.1.1. The purpose of the consultation process is to present details of the Proposed Scheme to date and understand views on it. Before a DCO application is accepted, the Secretary of State must be satisfied that the applicant has carried out effective pre-application consultation with both specified consultees and the local community. This pre-application consultation is a key part of the DCO process.
- 4.1.2. The Applicant has been undertaking consultations on the Proposed Scheme since 2009. More recently, the Applicant has adopted a three-stage consultation process as follows:
- Stage 1: Initial engagement non-statutory consultation (November 2016 – January 2017)
The purpose of this consultation was to invite and assess views on congestion within Great Yarmouth and the surrounding area, to share emerging proposals and to understand the level of support for the Proposed Scheme.
 - Stage 2: Scheme development non-statutory consultation (September – October 2017)
To invite and assess views on the Proposed Scheme development work so far.
 - Stage 3: Statutory pre-application consultation (Planned for August – October 2018)
This forms the upcoming consultation, for which the PEIR and this NTS have been prepared. The purpose of this consultation is to provide updated details on the Proposed Scheme and to invite and assess views on it, before an application for a DCO is submitted.

5 ASSESSMENT APPROACH

- 5.1.1. The PEIR presents preliminary information available at the time of writing. At this stage, detailed design continues to be refined and not all potential impacts associated with the Proposed Scheme have been identified and assessed. These assessments will continue to be progressed and will be presented within the Environmental Statement.
- 5.1.2. An overarching approach has been applied to the EIA work that is being undertaken. These assessments will aim to determine potential significant effects of the Proposed Scheme.
- 5.1.3. The significance of effects will be assessed using one or more of the following criteria:
- international, national and local standards;
 - relationship with planning policy;
 - sensitivity of receiving environment;
 - reversibility and duration of effect;
 - inter-relationship between effects and cumulative effects; and
 - the results of the consultations.
- 5.1.4. Using a level of sensitivity (value) and the magnitude of an impact, the significance of an effect can be determined.

6 AIR QUALITY

- 6.1.1. Studies are currently being carried out to consider potential effects of the proposed scheme on air quality. These studies are yet to be completed. Finalised versions will be reported within the Environmental Statement.
- 6.1.2. The air quality study shows that the proposed construction works could generate dust. This is likely to be caused by:
- vehicles transporting materials onto local surrounding roads;
 - site clearance;
 - landscaping;
 - demolition; and
 - temporary stockpiling of resources.
- 6.1.3. These construction activities could cause (i) dust plumes affecting visibility and amenity; (ii) dust deposition resulting in the soiling of surfaces and water; and (iii) higher concentrations of airborne particulate matter. Areas most likely to be affected include ecological sites, houses, schools, and public open spaces located down-wind of construction sites. Dust emissions can also affect human health.
- 6.1.4. Preliminary assessments indicate that measures will be required to control dust during construction. These measures are likely to include:
- installation of wheel washing facilities to minimise dust from vehicles;
 - using water as a dust suppressant;
 - covering skips;
 - turning off vehicle engines when not in use; and

- minimising dust-generating activities during dry weather.

6.1.5. The operational effects of the proposed scheme are yet to be assessed. The assessment will be presented within the Environmental Statement and will evaluate the impacts from vehicle emissions once the bridge is open.

7 ACOUSTICS

7.1.1. Studies are currently being carried out to consider potential effects of the proposed scheme in terms of noise and vibration impacts. Finalised versions will be reported within the Environmental Statement.

7.1.2. The acoustic study assesses the potential for construction noise, created by:

- demolition;
- road paving;
- bridge construction;
- compound construction; and
- site preparation.

7.1.3. Vibration during construction works are likely to be related to piling activities.

7.1.4. Noise and vibration from construction activities can cause disturbance to people living and working in the vicinity, as well as staff working on the construction site. Areas most likely to be affected by noise and vibration during the construction phase are houses, schools, hospitals and community facilities. Those closest to the construction activities will experience the most noise and vibration. These impacts are likely to be temporary and intermittent. These types of impacts could be controlled by using temporary screening (such as site hoardings) and locating static noise equipment at a greater distance from sensitive areas, also ensuring that site machinery is turned off when not in use. There will be communication with the public to inform them about operations likely to cause excess noise and vibration.

7.1.5. Once the Proposed Scheme is built and open to vehicles, traffic noise and vibration can cause disturbance to people living and working near the Proposed Scheme and the surrounding area. This work is currently being progressed and a full assessment of impacts during the operational phase will be undertaken in the Environmental Statement.

8 NATURE CONSERVATION

8.1.1. Studies are currently being carried out to consider the effects of the Proposed Scheme on the natural environment. This includes assessment of sites designated for their ecological importance, habitats and protected species. Some surveys are yet to be completed. All assessments will be finalised in the Environmental Statement.

Conservation Designations

8.1.2. The proposed scheme crossed the River Yare, which has been designated as part of the Outer Thames Estuary Special Protection Area (SPA). Studies are currently being undertaken to assess whether the Proposed Scheme will affect bird species associated with the SPA.

8.1.3. Breydon Water is located approximately 2.2km to the north west of the scheme, and has been designated as (i) a SPA; (ii) a Ramsar; and (iii) a Site of Special Scientific Interest (SSSI). Breydon water is an inland tidal estuary located 2.2km to the north of the Proposed Scheme, at the confluence of rivers Yare and Bure. It supports a variety of bird species including large numbers of wildfowl and waders.

- 8.1.4. Great Yarmouth North Denes SPA and SSSI is located 3.2km from the Proposed Scheme. The site consists of a dune system on the east coast of Norfolk between Great Yarmouth and Caister and is an important example of an accreting “ness” or promontory.
- 8.1.5. The Broads National Park is located 1km to the west of the Proposed Scheme at its closest point. The Norfolk and Suffolk Broads is Britain's largest protected wetland and third largest inland waterway, with the equivalent status of a National Park.
- 8.1.6. A Habitats Regulations Assessment Screening is due to be undertaken to assess the impact of the Proposed Scheme on the sites mentioned above. The Habitats Regulations Assessment is in its preliminary stages but will be produced to support the planning application for the Proposed Scheme.

Ecological Assessments

- 8.1.7. Studies and assessments are planned or have already been carried out for the following species or groups:

- birds;
- aquatic ecology
- Water voles
- bats;
- badgers;
- otters;
- amphibians;
- reptiles; and
- other mammals (which include hedgehogs)

Bird Species:

- 8.1.8. Breeding bird surveys have been ongoing throughout 2018. Trees, areas of scrub and several buildings within and adjacent to the Proposed Scheme are suitable for use by breeding birds.
- 8.1.9. Bird surveys undertaken to date have identified the presence of Black Redstarts within close proximity to the proposed scheme. Black Redstarts are a protected species. Ecological assessment work will be undertaken to identify the potential impacts upon this species and the need for mitigation.
- 8.1.10. Vantage point surveys have also been undertaken to look for bird species that might be using the River Yare, particularly those birds associated with the Outer Thames Estuary SPA. The results of these surveys will inform the Habitat Regulations Assessment.

Aquatic Ecology:

- 8.1.11. Aquatic ecological assessment work is planned for late summer. The River Yare has the potential to support a range of aquatic species and communities, including fish and aquatic invertebrates living on the riverbed.

Water Voles:

- 8.1.12. A water vole survey was undertaken in August 2017. Water vole droppings and feeding remains were found along the northern and western edges of Southtown Common. More water vole surveys are being undertaken this summer (2018). The findings of these surveys will be reported in full in the Environmental Statement.

Bats:

- 8.1.13. Bat activity surveys were undertaken in July and August 2017 and are currently being repeated. The 2017 survey recorded very low levels foraging activity. The surrounding habitat (surrounding gardens and allotments in the vicinity of the Proposed Scheme) were fragmented and unconnected, which makes it poor quality for foraging bat species. The results from the 2018 surveys will be reported in the Environmental Statement.
- 8.1.14. It is noted that the proposed scheme will likely require the demolition of built structures. Internal and external roost surveys are scheduled to be undertaken in late summer 2018 to confirm the presence or absence of bat roosts. The findings of these surveys will be reported within the Environmental Statement.

Reptiles:

- 8.1.15. Most of the habitats within the footprint of the Proposed Scheme comprise either short or open sward grassland, which is unsuitable for, or of little value to, reptiles. No further reptile surveys have been proposed.

Badgers

- 8.1.16. Initial surveys showed no evidence of badgers in the area, so no further badger surveys will be carried out for the Environmental Statement.

Otters:

- 8.1.17. The main channel of the River Yare is canalised with no suitable locations for otter holts, so otters also require no further surveys for the Environmental Statement.

Amphibians:

- 8.1.18. Several habitats surrounding the Proposed Scheme were identified, which could be suitable for amphibians, in particular, a small pond and ditch. However, assessments show that great-crested newts (which are protected) are unlikely to be present in these waterbodies, and therefore further surveys will not be undertaken for the Environmental Statement.

Other Mammals:

- 8.1.19. Although the habitats surrounding the Proposed Scheme could be suitable for hedgehogs, no evidence of hedgehogs was recorded during survey work. No further survey work will be done for the Environmental Statement.

9 CULTURAL HERITAGE

- 9.1.1. Studies are currently being carried out to consider potential effects of the Proposed Scheme on important buildings, conservation areas, buried archaeological remains and historic landscapes.
- 9.1.2. The following designated heritage assets within 1km of the Proposed Scheme:
- four Scheduled Monuments;
 - four Grade I Listed Buildings;
 - eight Grade II* Listed Buildings;
 - one hundred and two Grade II Listed Buildings; and
 - six Conservation Areas.

- 9.1.3. The Dolphin Public House is a Grade II listed building located within the Proposed Scheme Boundary. Assessments are currently being undertaken to determine the potential impacts upon the Dolphin Public House and its surrounding historic setting.
- 9.1.4. There are 119 non-designated heritage assets within 500 metres of the Proposed Scheme. Eight of these are within the Proposed Scheme Boundary. Most of these non-designated heritage assets relate to World War II structures, camps and bomb crater sites, with the rest being finds and structures related to the navel and shipping history of the town.
- 9.1.5. Most impacts upon cultural heritage assets are likely to occur during the construction phase. Construction activities can lead to:
- permanent or complete loss, or damage of an archaeological feature, because of ground excavation;
 - loss of the physical and/or visual integrity of a feature, monument, building or group of monuments; and
 - permanent or temporary impacts on the setting of heritage assets from construction works.
- 9.1.6. Further surveys and assessments are underway to better understand the potential impacts of the Proposed Scheme. The operational effects of the proposed scheme are yet to be assessed. The assessment will evaluate the impacts once the bridge is open. The findings of these assessments will be reported within the Environmental Statement.

10 TOWNSCAPE AND VISUAL IMPACTS

- 10.1.1. A preliminary assessment has been undertaken within the PEIR to consider the potential effects of the Proposed Scheme on townscape character and visual amenity once the bridge is open and fully functional. These studies are yet to be completed. Finalised versions will be reported within the Environmental Statement.
- 10.1.2. Townscape effects relate to the amount of change to characteristics or physical components of an urban area, whilst visual effects relate to the amount of change to an individual viewpoint of that townscape. Twelve viewpoints have been identified, from which to assess possible visual effects of the Proposed Scheme.
- 10.1.3. This assessment also considers the potential effects National Character Areas. The Proposed Scheme is located within two National Character Areas: (i) 79 (North-East Norfolk and Flegg); and (ii) 80 (The Broads). Additionally, within 500m is National Character Area 82 (Suffolk Coasts and Heaths).
- 10.1.4. The preliminary assessment has identified several possible impacts, in terms of townscape and visual effects:
- During construction, the demolition of homes and businesses, and the building of compounds and haul roads will result in a change in townscape features;
 - the demolition of homes and businesses will open up views to previously unseen buildings next to them;
 - the introduction of cranes, scaffolding and associated compounds will introduce new visual elements into existing views, during construction; and
 - the Proposed Scheme will result in a new prominent feature of a noticeably different scale and form within Great Yarmouth, resulting in noticeable impacts during the operational phase.
- 10.1.5. Control measures, such as the use of hoarding and screening, can be used to hide construction activity and storage of materials. Conclusions on the significant effects and ways to minimise such effects will be assessed and reported in the Environmental Statement.

11 ROAD DRAINAGE AND THE WATER ENVIRONMENT

- 11.1.1. Studies are currently being carried out to consider potential effects during construction and operation on the water environment (which includes surface water and groundwater).
- 11.1.2. The main surface water feature within the study area is the River Yare, which the Proposed Scheme will cross. As previously stated, River Yare is part of the Outer Thames Estuary SPA. The River Bure is a tributary of the River Yare and meets it approximately 2.1km upstream of the Proposed Site.
- 11.1.3. Potential effects of the Proposed Scheme on the water environment include:
- construction-related pollution;
 - surface water and groundwater pollution from road runoff;
 - pollution from accidental spillage;
 - changes to the patterns of erosion and deposition of sediments; and
 - groundwater flows.
- 11.1.4. The assessments have identified certain control measures that can be used to reduce impacts, for example:
- safety distances from watercourses for the storage of materials;
 - methods to reduce the discharge of sediment into the River Yare; and
 - the need for emergency response equipment to be available, should it be required.
- 11.1.5. Where works are taking place inside the watercourse, some construction effects are deemed significant, although they will be temporary.
- 11.1.6. Preliminary assessment work suggests that (at this stage) the Proposed Scheme is compliant with the requirements of the Water Framework Directive, which offers protection and management of river basins.
- 11.1.7. Further assessments, consultations and monitoring are due to take place, including consideration of effects on water once the bridge is open and fully functional.

12 FLOOD RISK

- 12.1.1. Studies are currently being carried out to consider potential effects of the Proposed Scheme upon flood risk. Once these studies are completed, a full Flood Risk Assessment report will be produced, as an appendix to the Environmental Statement.
- 12.1.2. The main source of flooding to the Proposed Scheme is tidal. The bridge will be inside Flood Zone 3 (which is land defined as having a 1 in 100 or greater annual probability of river flooding or land having a 1 in 200 or greater annual probability of sea flooding). This is the highest risk flood zone.
- 12.1.3. Further work is still to be undertaken to refine and develop a flood model for the Proposed Scheme. When the design of the Proposed Scheme is complete, a full Flood Risk Assessment will be carried out. Control measures to minimise the effects of the Proposed Scheme on flooding will also be suggested and surface water drainage will be assessed.

13 CLIMATE CHANGE

- 13.1.1. Studies are currently being carried out to consider potential effects of the Proposed Scheme on the climate and how vulnerable the Scheme itself is to climate change. These studies are yet to be completed. Finalised versions will be reported within the Environmental Statement.
- 13.1.2. The greenhouse gas assessment considers greenhouse gas emissions associated with both the construction and operational phases of the Proposed Scheme. The greenhouse gas assessment is not restricted by geographical area, but instead includes any increase or decrease in emissions because of the Proposed Scheme.
- 13.1.3. During construction, emissions can be associated with the transport of materials to site as well as from waste generated from the site. During the operational phase, emissions can come from the maintenance and replacement of original materials, electricity consumption from lighting, and emissions caused by traffic users of the bridge structure.
- 13.1.4. Assessment work will progress as details of the emerging design become available. This will consider the effect that the scheme will have on greenhouse gas emissions. A full assessment will be undertaken for the Environmental Statement. With control measures in place, no substantial impacts are expected, in terms of greenhouse gas emissions.
- 13.1.5. Areas of the design that might be vulnerable to the effects of climate change include the road, the bridge itself, as well as cycle paths and footways. An assessment of each of these was carried out, which looked at how the feature might respond to extreme climate changes, including:
- sea level rise and storm surges;
 - changes in yearly rainfall (including drought);
 - changes in temperature;
 - gales and high winds; and
 - changes in soil moisture and stability.
- 13.1.6. The preliminary assessment showed that the roads, bridge and cycle and footways could all be susceptible to all the above, except gales and high winds, while the bridge and road are vulnerable to all of the above.
- 13.1.7. Further details and assessment, and a discussion of control measures and lasting effects will be available in the Environmental Statement.

14 PEOPLE AND COMMUNITIES

- 14.1.1. Studies are currently being carried out to consider potential effects of the proposed scheme upon people and communities. An assessment looks at:
- employment opportunities because of the Proposed Scheme;
 - increased demand for accommodation, local services (education and healthcare) and recreational spaces/open space due to the influx of construction workers;
 - land take;
 - community severance (ease of access and connectivity between towns or villages);
 - amenity value of Public Rights of Way; and
 - driver stress and delay.

- 14.1.2. The preliminary assessment reported within the PEIR identified potential impacts during both (i) the construction phase; and (ii) once the bridge is open and fully functional. Construction impacts can include (but is not limited to) changes in access and amenity value of public routes, changes in driver stress and delay and an increase in employment opportunities. Operational impacts can include (but are not limited to) increased economic activity due to improved connectivity, changes in driver stress and delay and potential disruption to both land-based and marine businesses.
- 14.1.3. The preliminary assessments found that the construction of the Proposed Scheme is likely to have a mix of beneficial and adverse effects. Beneficial effects are likely to be associated with the generation of employment opportunities. However, adverse effects could arise from land take requirements and disturbance to local businesses. Changes and diversions to public routes could also have an adverse effect.
- 14.1.4. The preliminary assessment predicts that the operation of the proposed bridge crossing is likely to result in beneficial effects on economic activity, reduce driver stress and improved access across the River Yare for walkers and cyclists.
- 14.1.1. A more detailed assessment of these impacts will be undertaken and presented in the Environmental Statement. At this preliminary stage, measures for reducing adverse effects could include (but are not limited to):
- informing the public of closures and diversions to Public Rights of Way;
 - The Applicant working with contractors to provide local people with employment opportunities;
 - compliance with the Construction Environmental Management Plan;
 - provision of off-site housing or financial contributions to mitigate the loss of residential properties; and
 - providing clear diversion signs for drivers to reduce stress.

15 MATERIALS

- 15.1.1. Studies are currently being carried out to consider potential effects of the Proposed Scheme in terms of materials. These studies are yet to be completed. Finalised versions will be reported within the Environmental Statement.
- 15.1.2. The assessment of impacts on material resources focused on the use of non-renewable materials needed to construct the Proposed Scheme and the waste that is likely to be produced throughout the Scheme lifecycle (in construction, demolition and site preparation).
- 15.1.3. The Proposed Scheme will consume material resources, as well as produce waste during the demolition, site preparation and construction phases. Impacts during the operational phase are thought to be insignificant, and have not be included within the assessment.
- 15.1.4. There are a range of materials required to construct the Proposed Scheme. These include (but are not limited to): steel; concrete; road and pedestrian paving materials; bricks; sand; aggregate; and timber.
- 15.1.5. Wastes likely to be generated can include: vegetation and other above ground materials produced during site clearance; hazardous or contaminated material found on or beneath the Proposed Scheme; surplus cabling; and general construction wastes (e.g. packaging and damaged goods).
- 15.1.6. At this stage is considered likely that these effects can be address with the use of control measures, such as designing out waste and implementing a Construction Environmental Management Plan, Site Waste Management Plan and Materials Management Plan.
- 15.1.7. The use of construction materials is likely to have a negative effect on the regional and national material resources. However, due to the design not being complete, the amount of materials needed has not been finalised.

- 15.1.8. During demolition and site preparation, it is expected that the amount of waste generated will be suitable for recovery at an offsite facility, which is in line with Norfolk Waste Strategies.
- 15.1.9. As there is limited information regarding material resources at this stage, the preliminary assessment concluded that further assessment will be undertaken for the Environmental Statement.

16 GEOLOGY AND SOILS

- 16.1.1. Studies are currently being carried out to consider potential effects of the proposed scheme upon geology, soils and contamination. These studies are yet to be completed.
- 16.1.2. Desk-based assessments, identified the potential for contamination to be present across the site. The main areas of focus included (i) the potential for disturbance of existing contaminated land; (ii) the potential that construction could establish routes between pollution and nearby areas or their users; (iii) effects on buried infrastructure; and (iv) effects on controlled waters (from the movement of contaminants).
- 16.1.3. Drilling has been undertaken on site to take samples below ground material. This was undertaken between September 2017 and March 2018, gathered information on the ground conditions. Chemical testing has yet to be completed, the potential construction and operational impacts will be further assessed.
- 16.1.4. Construction will include works below ground, which may be potentially contaminated. If contamination is present, there is a risk that they could be disturbed during construction, potentially entering the ground or waters. Also, site users, users of nearby areas and construction workers could be affected through direct contact, taking in and breathing in contaminated soils.
- 16.1.5. Once the bridge is open and fully functional, it is predicted that all remediation work of contaminated land will have been undertaken during construction. However, in areas such as landscaping where humans could interact with the geology and soils, operational effects might include breathing or otherwise taking in contaminants from the land.
- 16.1.6. As this stage, no significant adverse effects are currently expected, but this will need to be confirmed once contamination testing has been completed. This will be reported in the Environmental Statement.

17 TRAFFIC AND TRANSPORT

- 17.1.1. In order to assess the potential impacts of the Proposed Scheme, the Traffic and Transport chapter looks at the following:
- re-distribution of traffic on the existing road network;
 - effects on public transport users,
 - severance (ease of access and connectivity between communities),
 - effects on pedestrians and cyclists,
 - driver stress and delay,
 - collisions and safety,
 - fear and intimidation and
 - hazardous loads.
- 17.1.2. To date, these assessments have been supported by a Preliminary Transport Assessment, which will be updated for the Environmental Statement.

- 17.1.3. Initial assessments have found that the Proposed Scheme will result in the re-distribution of traffic on the existing road network. The assessment concluded that this is likely to have a beneficial effect by easing congestion. The predicted impacts of the Proposed Scheme once the bridge is open and fully functional are likely to be positive, overall, by:
- shortening journey times;
 - reducing congestion;
 - providing provisions for pedestrians and cyclists;
 - reducing collisions and casualties; and
 - encouraging and increasing the use of most active modes of transport (walking and cycling).
- 17.1.4. However, there may also be negative effects during the construction phase, because of construction related disruption. These are predicted to be temporary and will be fully assessed within the Transport Assessment.
- 17.1.5. A full assessment of the effects of the Proposed Scheme in relation to traffic and transport will be included in the Transport Assessment and presented in the Environmental Statement.

18 CUMULATIVE EFFECTS

- 18.1.1. The assessment of cumulative effects considers how the impacts of the Proposed Scheme might be felt, when considering the different environmental topics in combination.
- 18.1.2. Cumulative effects also consider impacts when other projects are carried out at the same time but in different places. Individually, the impact of the Proposed Development may be small. However, in combination with another project, there may be significant effects on the environment.
- 18.1.3. Finally, cumulative effects also consider impacts when other projects are carried in a similar location but at another time, as this may bring significant effects on the environment.
- 18.1.4. An assessment of the potential cumulative effects of the Proposed Scheme with those mentioned above has yet to be undertaken. The significance of these cumulative effects will be assessed within the Environmental Statement.



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