

**LOWESTOFT
FLOOD
PROTECTION**



LOWESTOFT TIDAL BARRIER CONSULTATION

MONDAY 5 JUNE – MONDAY 3 JULY 2023

INTRODUCTION

Lowestoft Flood Protection, known previously as the Lowestoft Flood Risk Management Project, is about developing a way forward to reduce the risk of flooding from the sea, rivers and from extreme rainfall. The Lowestoft tidal barrier, alongside flood walls which will be complete in the autumn, are to make up the town’s permanent flood defences.

The main risk from tidal flooding is caused by a tidal surge that develops in the North Sea along

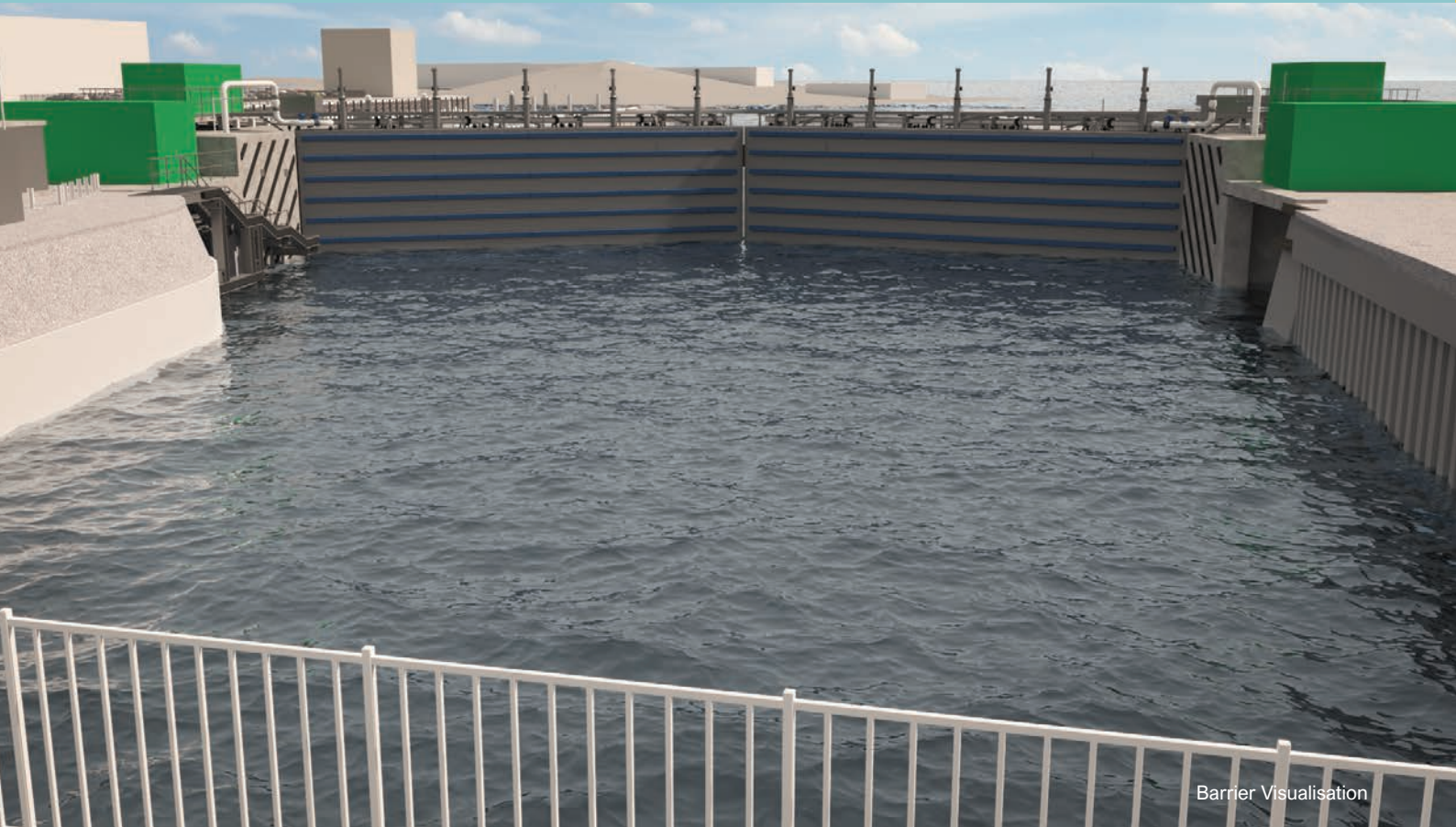
the eastern coastline of the United Kingdom as was demonstrated by the events in 1953 and most recently in December 2013. Lowestoft has very limited existing tidal flood defences and without further investment, the town will remain at significant risk.

When complete, the Lowestoft Flood Protection scheme will reduce the risk of flooding to more than 1,500 homes and 825 businesses in the town.



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LOWESTOFT TIDAL BARRIER CONSULTATION



Barrier Visualisation

The Lowestoft Tidal Barrier will be built across the channel entrance to Lake Lothing on the seaward side of the Bascule Bridge. Taking the form of a 40m mitre flood gate, the Tidal Barrier will be the second largest of its kind in the UK.

The Tidal Barrier requires a Transport and Works Act Order (TWAO), which is granted by the Secretary of State and is needed when construction can change or affect navigation. This consultation will help inform the TWAO application and details scheme changes since

the most recent public consultation in late 2022. This includes a change to the Order Limits, changes to the proposed duration of channel closures, and further detail of proposed mitigation for disruption identified in the Environmental Impact Assessment (EIA).

This booklet provides an overview of the consultation materials which follows the structure of the accompanying feedback form, offering the opportunity to respond to each element.




CONSTRUCTION PHASE

Order Limits







As plans for the Tidal Barrier have progressed, we have moved our site compound to Colin Law Way. This is different to the original location presented during the November 2022 consultation. In addition, there will be an office compound in Belvedere Road.

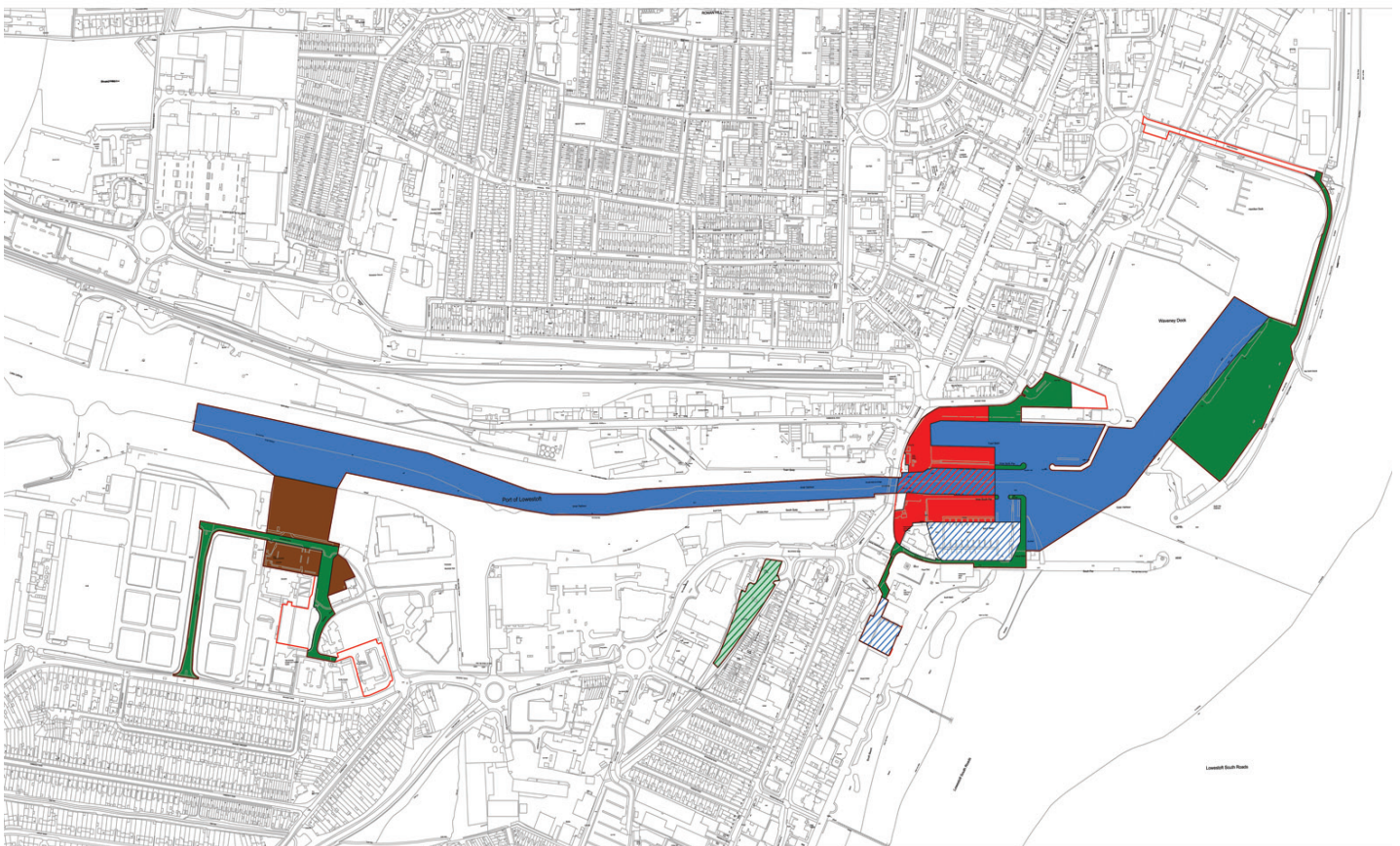
People may be affected by this site change and we need to consult with them about any impacts. The change to the red line boundary has been made to reflect the revised construction methodology, the most significant of which is a proposed new site compound located at Colin Law Way. The siting of the compound is included in the TWAO and its location is marked by a 'Red Line Drawing'. It is important that we understand any impacts this will have on people and businesses in this area so that we can consider any mitigation needed. The Order Limits have been amended to include the compound and the new Order Limits are indicated in the below plan.

LEGEND:

-  Order Limits
-  National grid reference point:
ST 654833.018 E
292711.103 N
-  Access point

LEGEND:

-  National grid reference point:
ST 654833.018 E
292711.103 N
-  Access point
-  Site compound
-  Potential site compound overflow/storage area
-  Occasional and planned access across water
-  Land based site access
-  Permanent occupation during construction
(subject to access provision for ABP, National Highways, and RNSYC)
-  Planned and scheduled occupancy of channel
-  Reconfiguration of yacht basin as agreed with RNSYC
-  Extent of Gull Wing Project (indicative)



INTRODUCTION TO THE ENVIRONMENTAL IMPACT ASSESSMENT

An EIA is required to help protect the environment by ensuring any significant impacts the Tidal Barrier may cause are identified and taken into account as part of any decision making.

We have considered impacts from the Tidal Barrier in relation to the following:

- **Noise and Vibration**
- **Traffic**
- **Navigation Channel**
- **Water Quality**
- **Ecology**

Noise and Vibration

It is not possible to complete a project of this nature and magnitude without times when noise levels are significant. There will be piling during the course of the project, and this will cause noise and vibration. However, we will let people know well in advance when those periods of noise will be. We anticipate that this will be limited to a non-consecutive period of approximately 60 days, spread out over a nine-month period. We will be monitoring both the noise and vibration throughout the construction period.

The EIA has identified residential properties to the north and south of the scheme, the closest being on Waveney Road, Station Square and Pier Terrace. The Royal Norfolk and Suffolk Yacht Club (RNSYC) is also considered to be sensitive to noise and vibration and some Port structures could be sensitive to vibration. Background noise in the area comes from traffic on the A47 and also seabirds.

Construction of the Tidal Barrier is planned to last for approximately two years, during which there would be numerous noisy activities as follows:

- **Daytime noise for receptors along Waveney Road, Commercial Road and Station Square during piling.**
- **Night-time noise for receptors along Waveney Road, Commercial Road, Station Square, Pier Terrace, The Harbour public house, and the RNSYC during concrete pours or if piling activity over-runs.**
- **Vibration during piling for some Port structures within 20m of the piling activity.**

NOISE AND VIBRATION

Assessment Findings

*significances are given pre-mitigation

Construction

- Significant day-time noise exceedances at several locations including: Waveney Road, Commercial Road and Railway Station, 7 Station Square, Yacht Club.
- Significant night-time noise (overruns on concrete pours/piling) at several locations including: those listed above, Pier Terrace dwellings and the Harbour.
- Significant vibration exceedances of port infrastructure including: North and South Quay, Trawl Basin Suspended Quay, North and South Inner Piers, and Anglian Water Sewers on the North and South Quay.

Operation

- No significant exceedances are expected during operation.

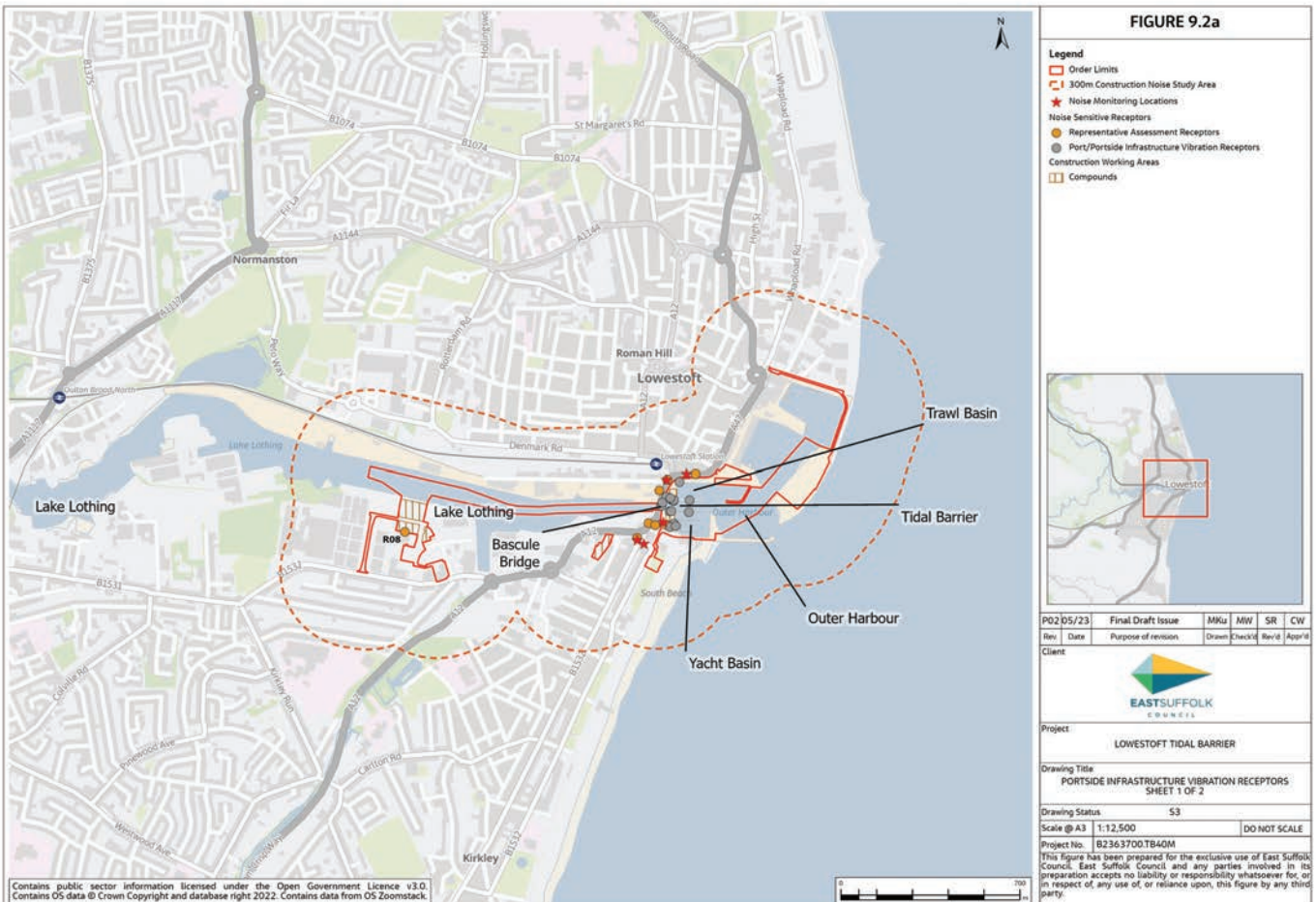
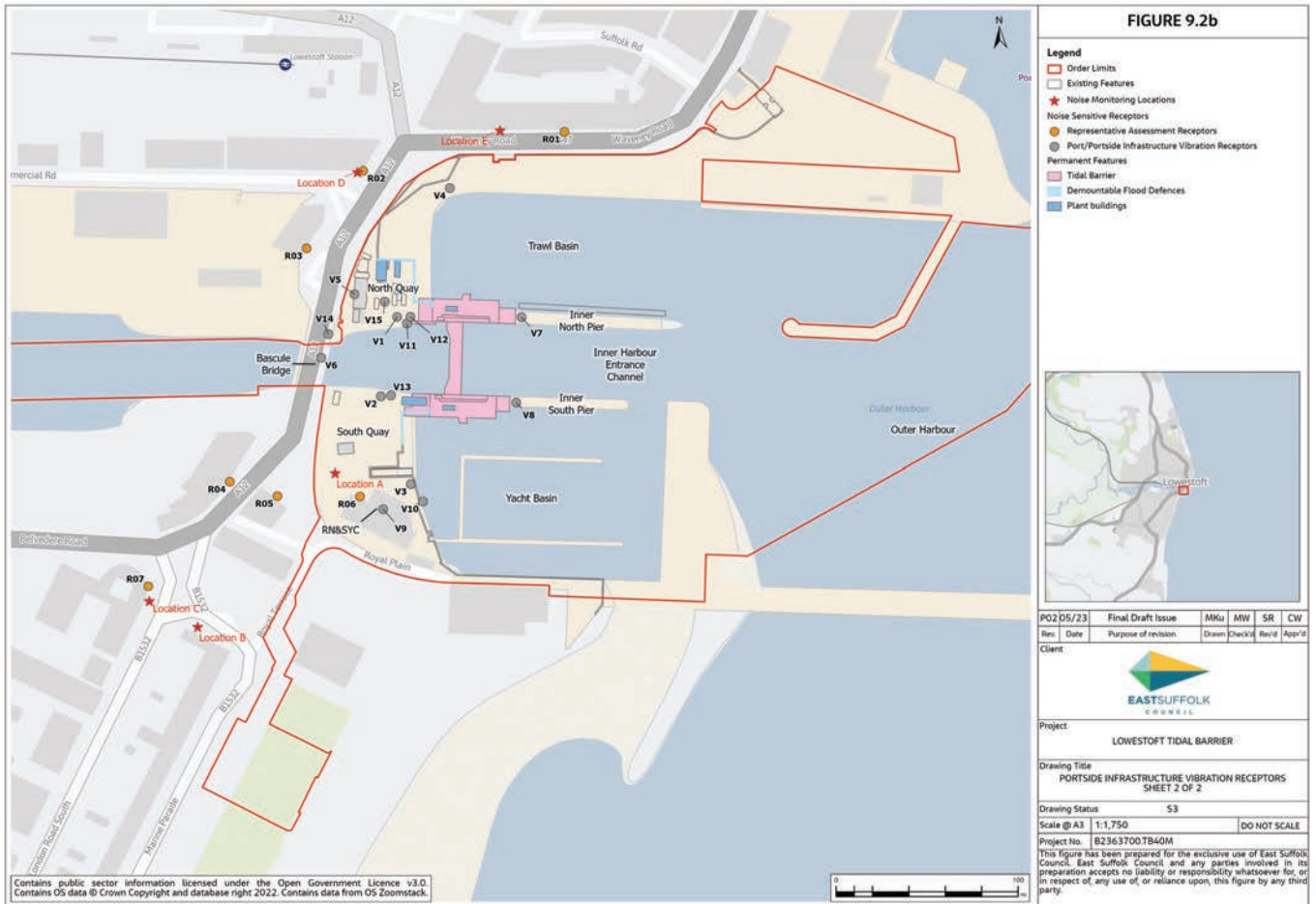
Mitigation

Mitigation

- Measures on notification, programming and phasing, signage, equipment used, and screening of piling equipment.
- Erection of noise barrier at static construction sites and use of additional temporary noise barriers around noisy activity.
- Planning to minimise overrun of noisy activity into the evening and night time.
- Use of less vibratory piling methods (impact piling).
- Pre-construction structural surveys and noise and vibration monitoring during construction.

Significant effects post-mitigation

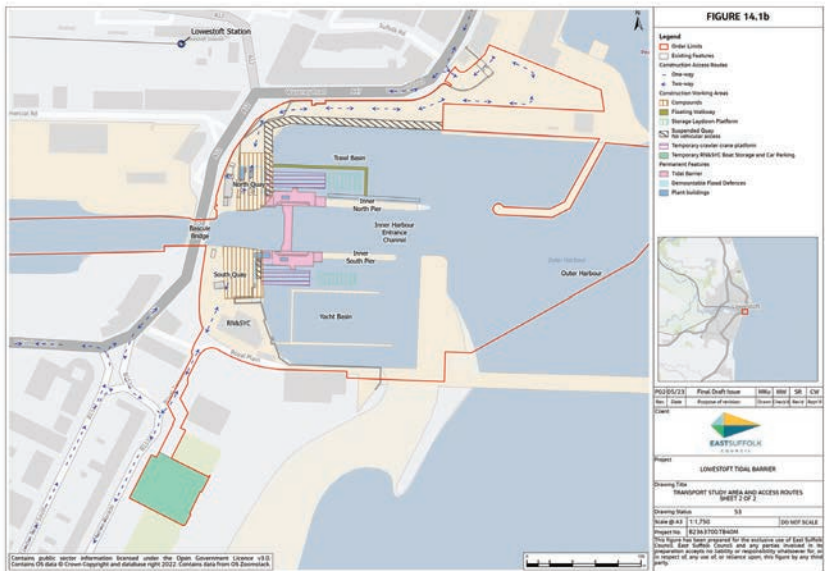
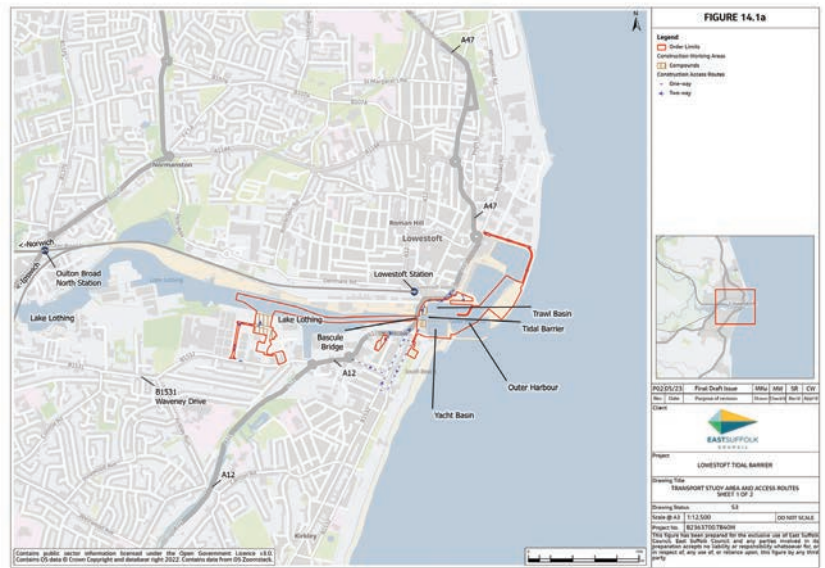
- Night-time noise at all residential locations.
- Vibration exceedances of port infrastructure likely to remain significant.



Traffic

During construction, we are pleased to say that we are not anticipating the need for additional traffic management such as lane closures and diversions. There will be times when an increase in traffic is noticeable, such as when the project is ready for delivery of concrete. We will provide advance notice of this. As much as we can, we will be using Lake Lothing to move material to site to reduce additional traffic.

Construction activity would also impact on parking due to the displacement of vehicles which would normally park within Associated British Ports (ABP) and RNSYC, particularly during the summer months when the town experiences high demand for tourist parking.



TRANSPORT

Mitigation

Assessment Findings *significances are given pre-mitigation

- Construction
 - Adverse effects include: Severance | Driver delay | Pedestrian / cyclist delay | Pedestrian / cyclist amenity | Accidents and safety. Effecting*:
 - Users of A47/Commercial Road/Station Square Junction up to moderate significance.
 - Users of A12 Belvedere Road / B1532 London Road Junction up to moderate significance.
 - Users of A12 / A47 Bascule Bridge up to minor significance.
 - *Provided the new compound location off Waveney Drive, the affected junctions & assessment will differ.
 - Moderate adverse impact from displaced parking.

No significant adverse effects during operation.

Mitigation

- Construction related vehicle movements, where practical, will avoid peak congestion times in the Bascule Bridge area, in order to minimise additional traffic congestion and abnormal load movements will be programmed to take place at off-peak times.
- Traffic management to provide diverted pedestrian and cycling route around working areas.
- Provision of alternative parking for ABP and their tenants during construction.
- Provision of alternative parking for Yacht Club at the Royal Green. This will displace disabled parking bays, therefore other parking bays within the car park will need to be remarked as disabled parking bays to mitigate this loss.

Significant effects post-mitigation

- No significant adverse effects during construction or operation post-mitigation.
- Significant benefit of reduced flood risk.

NAVIGATION CHANNEL IMPACT

As part of the navigation impact assessment, we have considered impacts from the Tidal Barrier in relation to the following:

How navigation interfaces with construction

- Inner Harbour Entrance Channel

- Channel width reduced for temporary works;
- Working alongside channel within cofferdams and on completed abutments;
- Working within channel – during normal windows when bascule bridge down;
- Working within channel – channel closures.

- **Outer Harbour** - use of quayside to prepare gates for installation.

- **Trawl Basin and Yacht Basin** – reduction in operational space and facilities within the basins.

- **Inner Harbour and Lake Lothing** - loading and offloading materials from site compound quaysides and transporting to and from Tidal Barrier works site by barge.

- **Outer Harbour** - use of quayside to prepare gates for installation.

- **Oulton Broad** - access to Outer Harbour and North Sea constrained.

Navigation Impact During Construction

- Temporary time constraints to access through Inner Harbour Entrance Channel;
- Delay to normal navigation activities – short and longer duration channel closures;
- Safety risks of construction fixed plant (cranes, etc) clashing with navigation;
- Safety risks of vessels striking the cofferdam (day and night);
- Safety risks of water-based plant (eg barges) interfering with navigation;
- Additional and/or longer duration raising of Bascule Bridge to facilitate key in-channel works.

Placement of concrete sill structure Nieuwpoort Barrier in Belgium.
Photo courtesy of Department MOW Vlaanderen



Indicative channel closures

As with any project of this size, the design, and how we will build the tidal barrier, develops and gives us greater clarity and certainty of the impacts to people and businesses. The development of the construction methodology has shown that there are going to be channel closures for harbour users which could last up to four weeks to complete specific elements of construction.

However, we are working hard to understand and, where possible mitigate, the impacts of these closures to people and businesses. For example, we will not be closing the channel during July and August as people have explained that this is the busiest period. There

will be closures for longer periods of time than consulted on during the previous consultation in late 2022 and we are keen to understand how this will affect those who use the channel.

Full details of proposed closures as follows:

- **Four to five three-week closures** (possibly four-week duration in the winter period due to weather delays during possessions) – cofferdam installation and removal, cross channel piling and installation of sill beam and pipe crossing (minimum four weeks between possessions);
- **Four to five five-day closures** – gate installation, initial cofferdam piling installation prep (minimum one week between possessions);

NAVIGATION

Mitigation

Assessment Findings

*significances are given pre-mitigation

Construction

Adverse impact on navigation from:

- Eastern access to and from Lake Lothing blocked by Inner Harbour Entrance Channel closures of up to 4 weeks for construction work possessions | Constriction of navigable channel width | Disruption caused by waterborne construction activities and occupation of water and quayside space.

Adverse impact on Port operations

- Small permanent loss of water space in Trawl Basin | Temporary displacement of Port operations within Trawl Basin including temporary loss of southern floating pontoon and western and northern quayside | Temporary loss of Inner North Pier landing stage | Disruption to the port and their tenants operations within Lake Lothing due to channel closures preventing vessel movement to and from their respective operational quaysides | Temporary loss of quayside space in Outer Harbour to accommodate vessels from the Inner Harbour during channel closures.

Adverse impact to recreational navigation users

- Loss of ability to access the North Sea during channel closures | Disruption to planned events such as regattas | Reduction in navigation users visiting Lowestoft and Oulton Broads from elsewhere in the UK and abroad.

Assessment Findings

*significances are given pre-mitigation

Construction (continued)

Adverse impact to Yacht Club & other Yacht Basin users

- Temporary reduction in available water space within basin for movement and mooring of vessels. | Temporary loss of yacht club moorings | Mooring pontoon layout changes | Temporary loss of yacht club boatyard facility and car parking | Small permanent loss of water space in Yacht Basin north west corner | Displacement of yacht club crane/launching, refuelling, and pump out facilities | Disruption to planned events such as regattas | Reduced ability to accommodate navigation users visiting from elsewhere in the UK and abroad | Disruption to boat trips out to North Sea | Reduction in visitors to Mincarlo heritage vessel.

Operation & maintenance

- Non-significant impact from routine two-weekly barrier operational closures whilst Bascule Bridge is normally down.
- Up to 12 hour channel closures during barrier deployment for tidal flood event or during planned quarterly test closures.
- Impacts from planned intermittent major maintenance interventions similar to those for construction but only those that relate to closure of the Inner Harbour Entrance Channel for up to 1 week | Disruption caused by waterborne construction activities and occupation of water and quayside space in Trawl and Yacht Basins | Temporary loss of quayside space in Outer Harbour to accommodate barrier gate and hydraulic cylinder replacement/refurbishment.

Mitigation

Mitigation for navigation during construction include:

- Proposed advanced notification procedures for channel possessions/closures as follows :
 - For channel closures >4 days long – 3 month advanced notification with closure period confirmed 4 weeks prior
 - For channel closures of 1 to 2 day duration - 1 month advanced notification with closure period confirmed 1 week prior
- Mitigation for commercial operations include:
 - Alternative moorings in Outer Harbour during channel closures | Navigational aids for night-time approaches | Temporary cofferdam protection piles for inbound vessels | Training for ABP Pilots and crews that regularly navigate through the inner channel.
- Mitigation for recreational users include:
 - Yacht Club temporary relocation of boat launching, refuelling, and pump out facilities | Temporary boat storage yard and car parking provided on land and existing car park at Royal Green Car Park | Temporary layby berths provided for vessels unable to continue into Lake Lothing during closure.

Mitigation

Navigation Management Plan and Construction Management Plan to be regularly reviewed during construction to reduce navigational impacts where practicable.

Mitigation for navigation during operation include:

- 8 to 12 hour advanced notification for closure for tidal flood event.
- Advanced notification via rolling 6 month programme of proposed dates for routine operational closure. Date confirmed 1 week prior.

Mitigation for navigation during maintenance include:

- Similar notification procedures for channel possessions as for construction.
- Similar mitigation to construction for intermittent major maintenance interventions but only related to impacts from channel closure of Inner Harbour Entrance Channel and use of quayside space in Trawl and Yacht Basins.
- Temporary layby berths provided for vessels unable to continue into Lake Lothing during channel closure.

- **Periodic one or two-day closures** – main concrete pours, ram installation, diver checks, gate commissioning (minimum two days between possessions).

The closures allow these elements of the work to be completed in one go, preventing the need to close the channel multiple times to complete single elements of construction. This will allow for a more cost and time efficient construction programme.

Year-round construction working

From October 2022, with the development of the detailed design and construction methodology, it became clear after working with the harbour authority that this would need to change to year-round working. The development of ABP’s LEEF project has provided a greater opportunity to mitigate against the navigational impact of year-round working, while the economic climate, including inflationary costs, means year-round working is the most cost-efficient option.

Please note the channel will not be closed between July and August.

Water Quality

The River Waveney discharges into the North Sea at Lowestoft and to the south of the Tidal Barrier is South Beach, which is used for sea bathing.

During construction there could be impacts on the water environment such as:

- Potential changes in tidal flow due to channel narrowing from cofferdams used for construction;
- Disturbance to the seabed resulting in increased suspended sediment;
- Potential for pollution incidents from works taking place next to the water, resulting from accidental spillages or surface water run-off.



WATER, GEOMORPHOLOGY AND GROUND CONDITIONS

Assessment Findings *significances are given pre-mitigation

Construction

- Potential for moderate adverse effects:
 - Geomorphology and coastal processes may be impacted by changes in tidal flows.
 - Water quality may be impacted from: Disposal of dredged material | Seabed disturbance | Accidental spillage or runoff of pollutants | Mobilisation of contaminated soil.
 - Of note: demolition of inner piers and concrete pour events.
 - Groundwater may be impacted by excavation and piling.
 - Increased surface flood risk from site working areas.

Operation

- No significant effects on geomorphology, coastal processes, water quality, groundwater, and ground conditions.
- A significant reduction in tidal flood risk to Lowestoft.

Mitigation

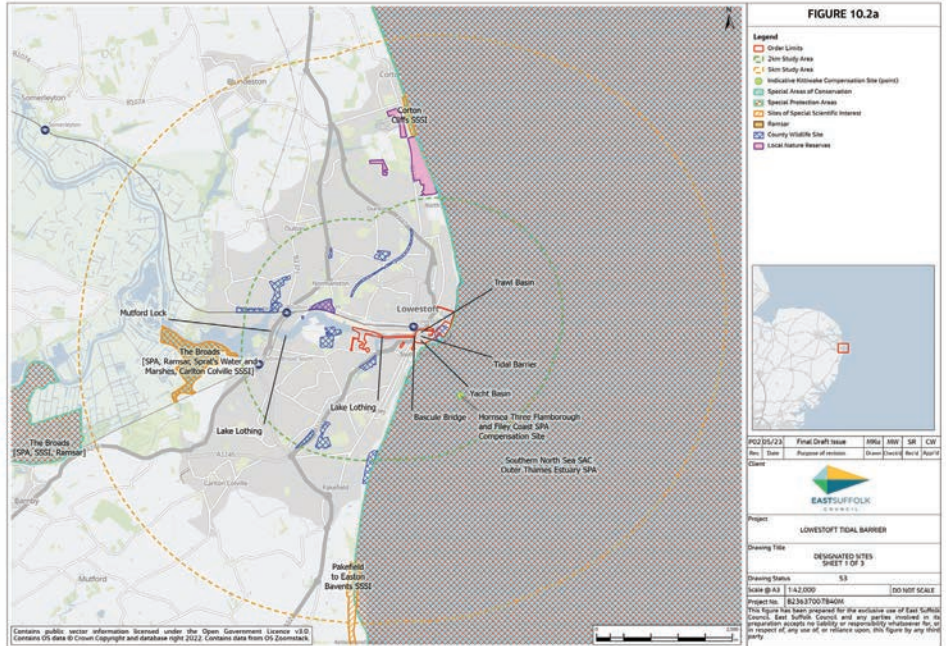
- Six monthly bathymetric surveys to monitor changes in sedimentation and tidal flows.
- Best practice measures contained in a Construction Environmental Management Plan, including a surface water management plan, with the aim of managing drainage during construction and a materials management plan to reduce the risk of pollution to the water environment.
- Management of the risk of contaminants and of introducing new contaminants will be addressed through the marine licencing process and will inform the materials management plan and any remediation strategies.
- Monitor weather and tidal forecasts and adjust in-channel works accordingly to reduce risk of altering conveyance.
- Monitoring of surface and groundwater during construction.

Significant effects post-mitigation

- Construction impacts are temporary and with mitigation adopted and implemented no significant effects will result on the surrounding water environment.
- No significant adverse effects.

LOCAL ECOLOGY

Key designated ecological sites near the Tidal Barrier include the Southern North Sea Special Area of Conservation (SAC), Outer Thames Estuary Special Protection Area (SPA), The Broads Ramsar, SPA, SAC and Site of Special Scientific Interest (SSSI), Sprat's Water and Marshes and Carlton Colville SSSI, Leathes Ham Local Nature Reserve and Harbour Kittiwake Colony County Wildlife Site.



These sites support a number of habitats and/or protected species, including harbour porpoise, fish species and various bird species.



During construction there could be impacts on the local ecology as a result of:

- Disturbance and loss of potential Kittiwake habitat;
- Disturbance to fish and other marine species as a result of underwater noise from activities such as piling;
- Potential for the introduction or spread of invasive species.

BIODIVERSITY, FLORA AND FAUNA

Mitigation

Assessment Findings *significances are given pre-mitigation

Construction

- A major adverse effect of noise and vibration on Harbour Porpoise.
- No significant effects on any Internationally Designated sites as assessed in Habitat Regulations Assessment.
- No significant effects on: Nationally or locally designated sites | Bats | Otter | Peregrine falcon | Black redstart | Benthic habitats | Fish | Seals.
- Significant effect on Kittiwake resulting from loss of nesting habitat and disturbance.

Operation

- No significant effects on biodiversity during operation.

Mitigation

- The presence of an experienced marine mammal observer on site during piling operations through the water column.
- A 30-minute pre-piling search within a 500m radius of the impact piling works to detect the presence of marine mammals with works delayed until 30 minutes has elapsed with no sightings within the 500m zone.
- Soft start protocols to be agreed with the MMO for all impact piling operations through the water column.
- Anti bird nesting measures on structures to be demolished which provide suitable nesting locations and ledges to be incorporated into design to compensate for loss of nesting habitat.
- Preconstruction surveys to reconfirm presence/absence of protected species.
- Selection piling methods which minimise noise and vibration, where practicable.

Significant effects post-mitigation

- No significant effects.

OTHER ENVIRONMENTAL TOPICS

The Tidal Barrier would have impacts on a range of other environmental topics, including:

- Beneficial impacts on health and wellbeing as a result of the reduction in flood risk during operation of the Tidal Barrier;
- Impacts on tourism and recreation through disturbance and loss of amenity, including some restrictions to access during construction;
- Socio-economic impacts during construction as a result of disruption and in relation to navigational impacts;
- Impacts on the character of the area as a result of large machinery, which would be visible for the duration of the works;
- Impacts on setting for listed buildings, including the RNSYC Grade II* Listed building and the potential for impact on previously unknown marine archaeology during excavations and demolition of existing structures.

LANDSCAPE AND VISUAL AMENITY

Mitigation

Assessment Findings *significances are given pre-mitigation

Construction

- Adverse landscape effects due to large scale construction machinery introduced into the local landscape.
- Views of taller construction machinery will be visible over existing features.

Operation

- New feature in the local landscape – more prominent when closed.
- Effects on views are relatively constrained by adjacent buildings.
 - During operation much of the scheme will not be visible in the wider landscape.
 - Localised long views from Lake Lothing and Outer Harbour

Mitigation

- Limited opportunities for mitigation during construction
 - Good site management practise during construction.
- Embedded mitigation in the scheme design:
 - Selection of a mitre gate option (least intrusive barrier design).
 - Selection of materials and colour finishes appropriate to the port landscape.

Significant effects post-mitigation

- Adverse landscape effects during construction
 - Large adverse: Yacht Club | Site landscape character (Harbour).
 - Moderate adverse: Lowestoft Conservation Area | 2 Listed Buildings (Statue of Triton and Lowestoft War Memorial).
- Moderate adverse landscape effect on RNSYC during operation.

HISTORIC ENVIRONMENT

Mitigation

Assessment Findings *significances are given pre-mitigation

Construction

- Moderate adverse effect on Yacht Club (Grade II* Listed Building) and South Lowestoft Conservation Area.
- Non-significant impacts on several other listed buildings and non-designated assets.

Operation

- Moderate adverse effect on the setting of the Yacht Club .
- Major positive effect on Yacht Club, South Lowestoft Conservation Area and other Listed Buildings of increased flood protection.

Mitigation

- The design of the structures should be sympathetic to the requirements set out for new development in the South Lowestoft and Kirkley Conservation Area.
- A Written Scheme of Investigation (WSI) to be agreed with SCC prior to start to mitigate potential impacts on buried archaeology.
- Machinery used for excavation, dredging, piling and transport of material should be selected and operated to reduce ground-borne vibration, noise and sediment proliferation.

Significant effects post-mitigation

- Moderate adverse effect on South Lowestoft Conservation Area during construction.
- No significant adverse effects during operation.

POPULATION AND HUMAN HEALTH

Mitigation

Assessment Findings *significances are given pre-mitigation

Construction

- Minor adverse effect on the local economy due to impacted recreation and tourism.
 - Short periods of impeded access to local businesses.
- Major adverse effect on the operation of the Yacht Club, Users of the Yacht Basin, Trawl Basin and the Inner Harbour Entrance Channel.
- Major adverse effect on the operation of Lowestoft Port.
- Moderate adverse effect on the users of local car parking.

Operation

- Major benefit effect on health and wellbeing of local communities.
- Minor adverse effects on navigation users during operational barrier closures.

Mitigation

- Traffic management to facilitate safe access to and along bandstand pier.
- Provision of alternative parking for ABP and their tenants during construction.
- Minimising use of the Royal Green area and reinstatement of facilities on completion of construction.
- Appointment of the community liaison manager.

Significant effects post-mitigation

- (TBC) adverse effect on the operation of Lowestoft Port during construction.
- (TBC) adverse effect on the Yacht Club during construction.
- Major benefit on health and wellbeing.

BARRIER OPERATION AND MAINTENANCE

Once the Lowestoft Tidal Barrier has been constructed, an operation and maintenance plan will be in place to detail the operational procedure in the event of a tidal surge and to ensure the barrier remains in working order.

Barrier Operation for Tidal Flood Event

In the event of a tidal surge, the Tidal Barrier will be closed on the preceding low tide. The Tidal Barrier will re-open on the falling tide when the water levels in Lake Lothing and the Outer Harbour are the same. It is likely the closure will last eight to 12 hours.

The estimated frequency of closures is once every two years, increasing to two to three times a year by 2120.

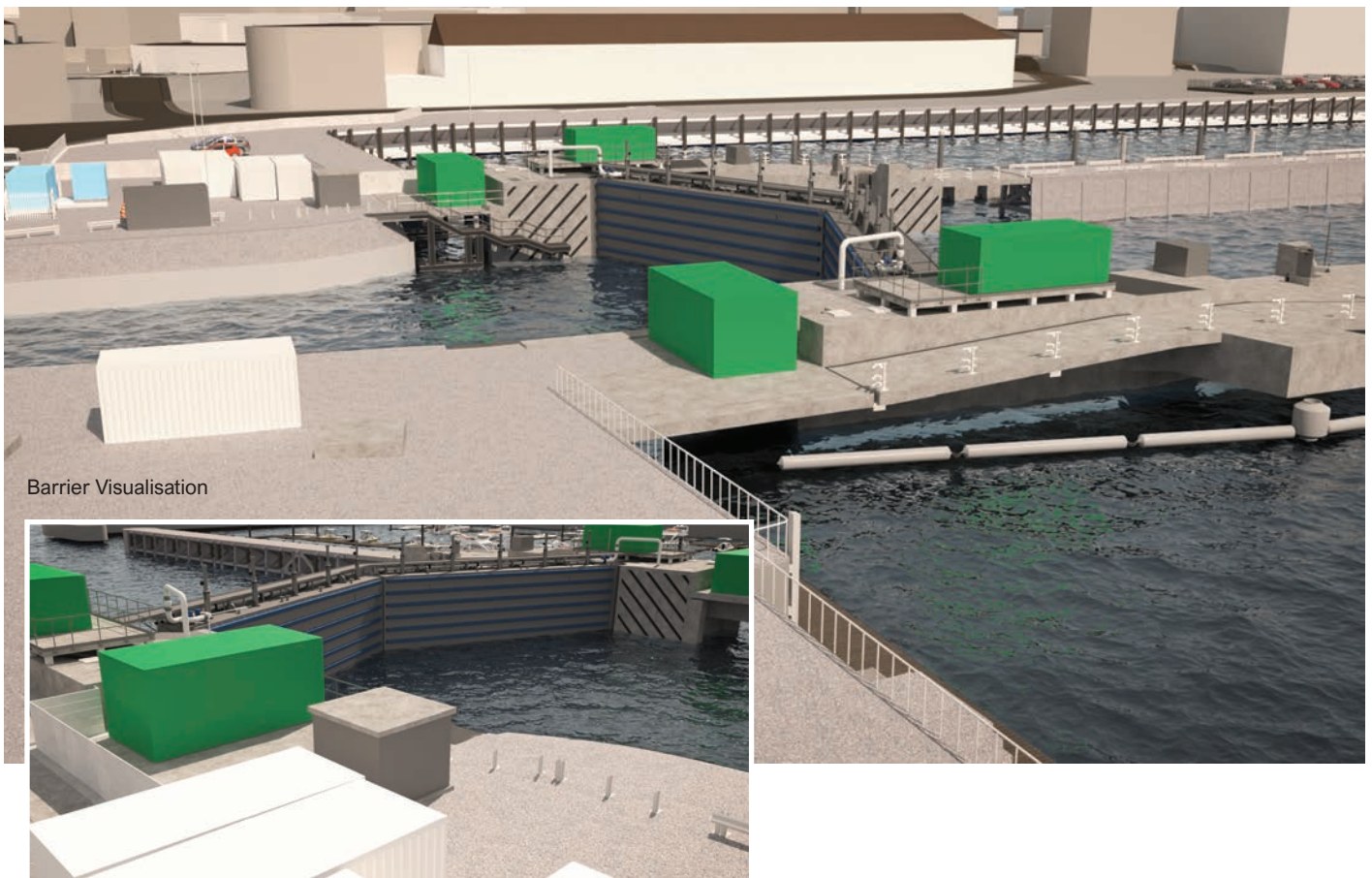
Barrier Operation for Routine Maintenance

The Tidal Barrier and its associated plant and equipment will be operated regularly to disperse the build-up of silt. The gates will be closed and re-opened over a 30-minute period once every two weeks at high tide. Once a month this closure will extend to 50 minutes to include the closure and re-opening of the associated secondary radial gates. These closures will be planned operations, timed with a slack tide, and when the Bascule Bridge is down. Advance notice will be given.

A full test closure will take place annually in the autumn and will follow the same procedure as a flood event.

Barrier Maintenance

Unless an emergency, maintenance works will be planned in advance that will seek to minimise the impacts.



Barrier Visualisation



Maintenance dredging

- Co-ordinated with ABP's twice-yearly maintenance dredging of the channel;
- Will involve channel closures;
- Methodology likely to change to water injection dredging adjacent to barrier structure.

Major maintenance

- Working area can be similar to that for the Tidal Barrier construction;
- Will involve channel closures (gate refurbishment, diver inspections, etc);
- Frequency related to asset life and reliability of components;
- Frequency expected to increase over time as assets age.

Navigation notification and control procedures

- Co-ordinated by Port Control/Harbour Master;
- Comply with Port procedures & protocols;
- Notification by Notice to Mariners;
- Notification to Broads Authority at Mutford Lock;
- Seek to notify wider commercial and recreational navigation interests in Lake Lothing and Oulton Broad who are potentially affected.

Closure Deployment Notification

Notification timeline for barrier closure for a flood event will be similar to the existing protocol for the temporary flood defence deployment.

OPERATION AND MAINTENANCE

ENVIRONMENTAL IMPACT ASSESSMENT

Water, Geomorphology and Ground Conditions

Operational Impacts

When operational, the Tidal Barrier will close when there is a risk of a peak tidal flood event. Closure of the Tidal Barrier has the potential to cause the following effects:

- Changes in tidal flows resulting from the Tidal Barrier structures such as the abutments;
- This could lead to changes in the tidal regime across the North Sea and extreme water levels at the Inner and Outer Harbours, and Pakefield and Lowestoft North Denes Beach;
- Periodic sediment management has the potential to increase suspended sediment concentrations and create a plume of sediments which could be transported offshore. This is dependent on the amount of sediment deposited over the period and the stage of the tides when this occurs;
- Tidal Barrier operation has the potential to result in changes to sediment deposition, which may lead to changes in the volume of dredging required within the Inner Harbour entrance as storm surges carry sediment into the harbour. Tidal flows will not be allowed into the Inner Harbour and Lake Lothing and less sediment will reach these areas during the closure. Reductions in tidal flows within the Inner and Outer Harbours will also see an increase in deposition rates;
- Dewatering of the abutments will be required periodically; this has the potential to affect physico-chemical indicators and increase concentrations of pollutants, if the water becomes stagnant. Discharge into the channel has the potential to impact water quality;
- Land contamination remaining after construction has been completed may present a risk to future land users. Exposure pathways may include accidental ingestion, skin contact, or inhalation;
- New flow pathways resulting from the Tidal Barrier have the potential to contaminate groundwater. Spillages during maintenance may also contribute to contamination of surface water or groundwater.

Flood risk will be greatly reduced by operation of the barrier, as the largest risk to Lowestoft is tidal flooding. The Tidal Barrier will be deployed to protect against tidal surges. There is unlikely to be any adverse impacts on any other forms of flood risk.

The significance of the effects of the operational impacts are small, with the following exceptions:

- Dewatering of abutments, impacting water quality;
- Contamination of groundwater;
- The beneficial effect of reduced flood risk.

The mitigation below will reduce all adverse effects.

Mitigation

- Sediment management plan: Efforts will be made to contain dredged material from spilling into the water bodies. Dredging will be carried out in calm conditions and avoid surges;
- Management of dewatering from abutments: Dewatering from abutments during operation will need to be monitored and analysed to identify the level of contamination. Should there be elevated concentrations of contaminants, this will require to be pumped out and taken off site for disposal;
- Silt screen/boom: Silt screens or booms will be deployed during dredging to prevent the spread of dredged material;
- Ground conditions: Any material that is identified to present a risk to future site users during construction should be managed to ensure exposure risk will be minimised, for example through the use of cover systems or removal off site to landfill.

Noise and Vibration

Noticeable levels of noise and vibration are not expected to occur once the Tidal Barrier is constructed as the barrier will be in operation only during flood events, with monthly testing that will typically be of a one-hour duration. On this basis operational noise and vibration have been scoped out of this assessment.

BIODIVERSITY, FLORA AND FAUNA

Operational Impacts

Operation of the Tidal Barrier has the potential to affect the passage of migratory fish due to barrier closure for flood risk management purposes and for operational and maintenance checks. Overall, the closures will be intermittent and short in duration, during which time migratory fish species are expected to temporarily hold in adjacent coastal waters or utilise alternative egress points into the catchment (for example the attractant flow from the Yare). The resulting effect is considered not significant.

Mitigation

None required owing to the frequency of barrier closures through operation and maintenance.

FEEDBACK

We would like to hear from you to understand how you may be impacted by the Lowestoft Tidal Barrier and your thoughts on proposed mitigations.

Please complete the online survey here <https://www.surveymonkey.co.uk/r/TWAO2023> or complete the attached form and return to East Suffolk Council by **Monday 3 July 2023**.

If you have a question, please email lowestoftfrmp@eastsoffolk.gov.uk

