



# Boston Barrier Tidal Project

Navigational Management Plan - DRAFT

March 2017

Environment Agency





# Boston Barrier Tidal Project

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Environment Agency

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# 1 Introduction and background

## 1.1 General

This Navigation Management Plan sets out the procedures to be followed and aids to navigation to be provided to mitigate the risks to navigation arising from the construction and operation of the Boston Barrier. The responsibilities for installing, maintaining and operating the aids to navigation, and procedures are also defined.

The location of the Boston Barrier is shown in the figure below and on drawings issued with the TWAO application. The tidal and fluvial currents, tidal levels and operation of the upstream drainage sluices are described in the Navigational Impact Assessment (sections 5.2.10, 5.5, 5.6 Fig 6.2 and Fig 7.3).



This document will be updated to reflect the detailed design and construction phase programme and also after consultations and feedback from the principal stakeholders.

## 1.2 Scope

The area where changes to navigation procedures and aids to navigation will be constructed and implemented are from immediately upstream of Grand Sluice lock and Black Sluice lock, through the Haven and at the entrance to New Cut from the Wash.

### **1.3 Consultation**

This Navigation Management Plan has been developed through consultation and agreement with the Port of Boston.

### **1.4 Limitations**

This Navigation Management Plan deals with navigation measures specifically related to the Boston Barrier and is therefore supplementary to, and should be read in conjunction with, all other regulations and guidelines relevant to navigating the Haven, River Witham and South Forty Foot Drain.

### **1.5 Abbreviations**

BBC	Boston Borough Council
BDFA	Boston District Fisherman's Association
BMYC	Boston Motor Yacht Club
CRT	Canal and River Trust
EA	Environment Agency
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IWA	Inland Waterways Association
PoB	Port of Boston
TWAO	Transport and Works Act Order
UKHO	United Kingdom Hydrographic Office
WSC	Witham Sailing Club

## 2 Existing Regulations

### 2.1 General

This Section identifies existing regulations relevant and applicable to the Haven and vessels navigating the Haven that are affected by the change to navigation procedures and aids to navigation required by the introduction of the Boston Barrier.

### 2.2 Port Regulations

#### 2.2.1 Boston Harbour Revision Order 1989

The Harbour Revision Order gives statutory powers from the BBC to the PoB.

The PoB are responsible for making by-laws and have power to regulate navigation within their jurisdiction (from Grand Sluice down through the Haven and New Cut to the harbour boundary in the Wash).

The PoB have powers to erect navigation lights and buoys with the consent of Trinity House.

No change to the Harbour Revision Order is required by the construction of the Barrier.

#### 2.2.2 Port of Boston Notice to Mariners

The PoB issue standing annual Notices to Mariners for all vessels navigating the Haven. These require all mariners to comply with the Prevention of Collisions at Seas regulations unless instructed by the PoB. All vessels are required to communicate on VHF 12.

Any changes to the PoB by-laws and Notices to Mariners required by the construction of the barrier are discussed in subsequent sections.

## 3 Navigation Management – Barrier Construction

### 3.1 General

This Section sets out the procedures for managing navigation in the Haven during construction of the Boston Barrier and associated works.

### 3.2 Construction Phase Works

The phasing of the construction is defined in the Environmental Statement (Table 2). It has been developed to mitigate the risks to navigation, and the impact on existing operations, during the works. The navigation mitigations, which are described further below are:

1. Provision for the relocation of fishing fleet to below the barrier works site before commencing barrier works;
2. Providing an 18m minimum width navigable by-pass to the barrier works site for craft transiting to or from moorings above the barrier or transiting to or from the Grand Sluice lock (River Witham) or Black Sluice lock (South Forty Foot Drain);
3. Providing temporary, launching and retrieval facilities and berthing pontoon for the Witham Sailing Club downstream of the barrier so they do not need to navigate past the site during construction;
4. Enabling dredging works carried out prior to any other river works;
5. Final dredging works after all other river works.

### 3.3 Responsibilities

#### 3.3.1 Environment Agency

The EA are responsible for procuring, financing and managing the construction of the works. The EA will provide site supervision to ensure compliance with the construction contract. The contract places navigation obligations on the contractor as described in 0

After substantial completion of the works the EA will provide experienced trained personnel to assist the PoB with managing navigation through the barrier, during the PoB operational times, for a period of 12 months. The training and experience will be similar to the contractor's personnel managing the navigation during construction described below.

#### 3.3.2 Port of Boston

The PoB retains statutory authority over navigation in the Haven. They will issue Notices to Mariners during the course of the works to manage navigation around the contractor's works. The PoB have the authority to place constraints on construction activities being carried out that may have an unacceptable impact on navigation depending on prevailing conditions and

vessel movements planned. There are no new or varied obligations placed on the PoB by the construction works.

### **3.3.3 Contractor**

The contractor is responsible for constructing the barrier works as defined by the contract with the EA. With respect to mitigating hazards to navigation the contract obligations include:

1. complying with the principles of the phasing described in 3.2;
2. notifying the PoB of planned activities affecting navigation;
3. notifying the PoB of any unplanned activities or incidents affecting navigation;
4. complying with any restrictions placed on them for the safety of navigation by the PoB.
5. complying with the conditions of the Marine Licence(s)

The contractor is required by the contract with the EA to:

1. Monitor VHF 12 at all times;
2. Provide an all-weather safety vessel with two crew members for the duration of the construction works;
3. Provide, maintain and remove temporary aids to navigation; and
4. Provide and train personnel to manage navigation through the temporary by-pass and the barrier at all times until substantial completion of the works, communicating with the vessels on VHF 12 (The PoB retain overall jurisdiction over navigation.).

A second trained person is to be available on stand-by on site during the operational times of the Grand Sluice lock, as defined by the notices published on the CRT website or advised by the lock keeper. Sufficient persons are to be trained to cover illness and unexpected absences.

The personnel will need suitable experience and training such that they hold a ship radio license, understand safe navigation principles, are familiar with navigation in the Haven and understand the priority system in operation during the works.

### **3.4 Dredging Works**

Dredging works are planned before and after the main construction works.

Before the works dredging is to remove silt in the works areas, deepen the by-pass channel and prepare the area within the coffer dam. The contractor can choose the method of dredging. It is anticipated that the silt will be removed by a trailer suction hopper dredger as used by the PoB for maintenance dredging. Dredging close to existing structures or in harder bed materials is anticipated to be with a back-actor mounted on a jack-up barge with spoil removed by barge.

After the works the dredging is to deepen the bed to install scour protection and to create the final design profile of the Haven channel. The preparation for the scour protection will require some dredging in harder material than the silt and it is anticipated that this will be carried out by a back-actor mounted on a jack-up barge with spoil removed by barge. The final dredging by the contractor will be to provide the agreed dredged depth by removing any siltation that occurs during construction. It is anticipated that this dredging will be with a trailer suction hopper dredger.

There is at present a procedure for the port's maintenance dredging. Most of the dredging required is similar, though more extensive, to the maintenance dredging. This dredging can be carried out safely in the port. The contractor will follow the requirements of the PoB during dredging operations which will be similar to the present procedures. For dredging from a jack-up barge a procedure will need to be developed to manage navigation around this relatively static plant.

### **3.5 Left Bank Works**

The left bank works are scheduled before the barrier construction. These works consist of construction of a sheet piled wall with berthing and mooring equipment, a concrete capping beam and quayside apron. The contractor will require plant in the Haven to construct these works. The contractor will require temporary aids to navigation to delineate an exclusion zone around the works. For some activities this may reduce the Haven width such that one way navigation is required. The personnel provided by the contractor to control navigation at the bypass will be also be required to control the navigation for these works.

### **3.6 Wet Dock Entrance Works**

The wet dock entrance works are localised to the entrance and at the turning circle in the Haven. The contractor will require temporary aids to navigation to delineate his exclusion

zone for the works. This zone will not significantly affect the available navigation width in the Haven.

### **3.7 Right Bank Works**

The right bank works will be constructed whilst the bypass channel is being used. These works consist of construction of a sheet piled wall with berthing and mooring equipment, a concrete capping beam. The contractor will require plant in the Haven to construct these works. The contractor will require temporary aids to navigation to delineate his exclusion zone for the works. The restriction at the bypass will be more onerous to navigation than the right bank works. Navigation will be controlled by the contractor during these works.

### **3.8 Cofferdam and Bypass**

#### **3.8.1 Cofferdam Features**

The cofferdam will be built with the following safety features in accordance with standard practice for quay walls from the Docks Regulations:

- Grab chains;
- Safety ladders, and
- Rubbing strips on riverward faces.

#### **3.8.2 Vessel management through the Bypass, or other one way navigation during the works**

24 hour control will be provided by the contractor to direct and manage all craft requiring transit through the bypass channel, and craft affected by the works. A vessel needing to transit the bypass channel, or any area of one way operation past the contractors works, will be required to contact the contractor's vessel controller on VHF 12 and request permission. The contractor's vessel controller will either agree to the transit or require the vessel to hold station until a vessel has passed in the opposite direction.

One-way traffic only through the by-pass and the swing bridge with priority to vessels transiting with a following current will be required and notified by a Notice to Mariners issued by the PoB.

If transit is not permitted, vessels will need to hold station if stemming the tide, or, exceptionally, the priority vessel travelling with the tide will need to turn and hold station by stemming the tide. This manoeuvre, if required, will be directed by the contractor through

VHF 12. If holding station is not possible, contingency facilities set out in 3.8.4 will be also available.

### **3.8.3 Temporary Aids to Navigation**

Refer to the following diagrams included in Annex B to this document:

- Aids to Navigation – Key Plan
- Aids to Navigation – Temporary Construction Scenario
- Temporary Matrix Message Boards – Upriver Approach
- Temporary Matrix Message Boards – Downriver Approach
- Temporary Matrix Message Boards – Environment Agency locks

The temporary aids to navigation shown on the diagrams will be provided maintained and removed by the contractor.

The EA will apply for and obtain permission from Trinity House for the temporary aids to navigation. Trinity House will consult on the suitability of the proposed aids to navigation with PoB.

The PoB will issue a Notice to Mariners describing the temporary aids to navigation and the procedure for transiting the bypass being managed by the contractor.

### **3.8.4 Contingency Measures**

A safe haven for craft to lay-up temporarily either side of the barrier is provided. Upstream of the cofferdam the existing lay-by pontoon below Black Sluice can be used. Downstream of the cofferdam the temporary WSC pontoon facility will be available.

## 4 Navigation Management – Barrier Operation

### 4.1 Responsibilities

#### 4.1.1 Environment Agency

The EA are responsible for the operation and maintenance of the barrier and barrier specific aids to navigation and message boards.

The EA are responsible for providing advance closure warnings to PoB for storm surge or maintenance.

#### 4.1.2 Port of Boston

The PoB continues to have statutory authority over vessels navigating the Haven, and therefore the vessels transiting the barrier.

The PoB will issue a Notice to Mariners describing the aids to navigation and the procedure for transiting the barrier. This will subsequently be incorporated into the annual standing Notices to Mariners issued by the PoB.

A no overtaking zone will be introduced through PoB by-laws between Isola point and the upstream end of the swing bridge. This will be between the matrix boards and is shown on drawing 'Aids to Navigation – Operational Barrier'.

All VHF 12 communications will be recorded at all times by the PoB and provided to the EA upon request.

CCTV coverage of the barrier (viewing both upstream and downstream) will be recorded at all times by the PoB and provided to the EA on request.

The PoB will issue Notices to Mariners giving prior warning of barrier closure, for surge or maintenance of the barrier, and for maintenance work on or near the barrier, as advised by the EA.

#### 4.1.3 River users

All river users will retain current responsibilities and comply with navigation regulations and the annual standing Notices to Mariners and any other Notices to Mariners issued by the PoB.

There will be a priority passage system for traffic through the barrier as defined in a Notice to Mariners. Priority will be to the vessel travelling with the current. All vessels are to announce their intent to transit the barrier on VHF 12 on approaching the first information board. The

responsibility to agree priorities for transit through the barrier will be with the vessel masters using VHF 12. Masters may agree to two way traffic for their vessels.

It is recommended by IWA, CRT and the standing Notices to Mariners that all vessels in the Haven have VHF radios. Where a vessel does not have a radio then they will need to exercise prudent seamanship and be prepared to avoid a vessel with priority coming from the opposite direction.

**4.2 Barrier navigational Safety Features**

**4.2.1 Aids to Navigation**

Aids to navigation will be installed at the barrier, and on the approaches. Information on the barrier will be provided at key decision points in the vicinity on matrix message boards in the following locations:

Entrance to New Cut	Information, a key decision point	Adjacent to existing port channel mark <i>South Bank</i> near the end of the New Cut at 0°05'06"E 52°55'48"N
Church Point	Downstream of Barrier	Adjacent to an existing navigation mark
Geest Point	Downstream of Barrier	Adjacent to an existing navigation mark
Old grain berth	Downstream of Barrier	
Isola Point	Upstream of Barrier	On north side of Black Sluice
London Road	Upstream of Barrier	On railway boundary fence
High Street	Upstream of Barrier	Adjacent to electricity sub-station
Black Sluice	Above the lock, a key decision point	
Grand Sluice	Above the lock, a key decision point	

The locations and messages displayed upstream and downstream of the barrier for flood tide, ebb tide and barrier raised scenarios are shown in the diagrams listed below. The boards will give information on the status of the barrier, the tidal current at the barrier, and vessel priorities dependent on the state of the tide.

A matrix message board at the entrance to New Cut will show the status of the barrier and is intended to allow vessels to change their plans if the barrier is raised.

Matrix message boards above Black Sluice lock and Grand Sluice lock will show the status of the barrier and the tidal current at the barrier and are intended to allow vessels to change their plans before navigating the locks if the barrier is raised.

At the barrier, there are port and starboard beacons marking the sides of the channel. A short range RACON beacon will be positioned on the left bank pier of the barrier to assist navigation in poor visibility. There are also port traffic signals complying with IALA recommendation E-111 with minor modifications. The modifications reflect that priority is agreed between the masters of the vessels in the Haven rather than being set by the navigation authority. At other barriers and ports these lights have been introduced with minor modifications from the IALA recommendations, for instance at East Port and the Ipswich Barrier.

The aids to navigation are shown on the following diagrams included in Annex B to this document:

- Aids to Navigation – Key Plan
- Aids to Navigation – Operational Barrier
- Aids to Navigation – New Cut Entrance, South Bank
- IALA Traffic Signals at Barrier – Upriver and Downriver Approach
- Matrix Message Boards – Upriver Approach
- Matrix Message Boards – Downriver Approach
- Matrix Message Boards – New Cut Entrance
- Matrix Message Boards – Environment Agency locks

#### **4.2.2 Protective fendering and physical safety features**

Protective rubbing strips will be provided at the barrier.

Grab chains and safety ladders will be provided adjacent to the barrier in accordance with standard practice for quay walls in 'Safety in Ports'.

#### **4.2.3 Lighting**

Area lighting is provided at the barrier during hours of darkness with automatic control. These lights will be arranged to minimise glare for mariners navigating the river, to highlight the profile of the barrier piers and mitigate any light pollution.

#### **4.2.4 Contingency Measures**

A safe haven for leisure craft to moor temporarily either side of the barrier is provided. Upstream of the barrier grab chains, mooring rings and rubbing strips will be installed at the on the new right bank sheet pile wall a length of 35m. Downstream of the barrier grab chains, mooring rings and rubbing strips will be installed at the downstream end of the new right bank sheet pile wall at the old grain berth over a length of 35m. The depth at these moorings will be maintained at the dredge depths specified in the works.

#### **4.2.5 VHF radio coverage**

Good VHF radio coverage of the Haven, New Cut, River Witham 0.5km upstream of Grand Sluice and the South Forty Foot Drain 0.5km upstream of Black Sluice will be provided. It is understood that there is poor coverage in some of this area at present. A survey will be carried out of the VHF coverage and additional transceivers will be introduced where necessary.

### **4.3 Barrier operation**

The EA is responsible for maintenance and operation of the barrier. The EA will comply with the following notification times to PoB. PoB will issue the necessary Notices to Mariners as they retain responsibility for safety of navigation. The EA will stop operating the lock at Black Sluice and request that the CRT stop operating the Grand Sluice lock when the barrier is raised.

Operation to protect against storm surge:

1. Initial advance warning 24 hours before the barrier is expected to be raised.
2. Notice cancelling initial advance warning if required.

3. Final warning 12 hours before the barrier is expected to be raised.
4. The barrier will be raised 6 hours before predicted high surge tide depending on fluvial flows in Lower Witham and South Forty Foot Drain.

Planned barrier maintenance requiring raising the barrier:

1. Advance warning notice of closure for maintenance 1 month before expected closure time.
2. Confirmation or cancellation of closure 24 hours before maintenance works.

When practicable barrier maintenance will be carried out at low tide.

Planned barrier maintenance work without raising the barrier:

1. Advance warning of works 1 month before commencing work.
2. Confirmation or cancellation of works 24 hours before planned commencement.

Unplanned barrier maintenance:

1. Advance warning notice of closure for maintenance 7 days before expected closure time.
2. Confirmation or cancellation of closure 24 hours before maintenance works.

In an accidental or emergency situation as much warning as practicable will be given of the closure of the barrier.

# 5 Implementation of the Navigation Management Plan

## 5.1 General

This section describes the various methods that will be used to disseminate the information in the management plan. The stakeholders are divided into three groups: users of the Haven, national 'umbrella' organisations and official or statutory bodies with an interest in the navigation on the Haven.

Various publications need to be updated with information on the revised arrangements. How the publishers of these documents will be informed is also described.

## 5.2 Dissemination of the NMP

A poster style 'Navigating the Boston Barrier' easy reference leaflet will be produced and disseminated at the meetings and to the stakeholders.

There will initially be meetings with the operators and statutory bodies:

- PoB
- EA
- EA Waterways
- BBC
- Emergency Services

The revised arrangements for navigation in the Haven will be presented and the draft by-laws and Notices to Mariners developed or presented. Any interfaces between these bodies will be discussed and clarified so that they can develop any detailed protocols that they require.

A workshop will be held with user's umbrella organisations such as:

- ILWA
- RYA
- CRT

The revised arrangements will be presented along with the draft by-laws and Notices to Mariners. These organisations collectively have a wide experience of navigational issues and

will be able to constructively add to the drafting of the documents before they are presented to the public. The Environment Agency will lead the meeting though it may be necessary for the Port of Boston to be present to address any comments on their arrangements.

It is proposed to inform key stakeholders and general river users through workshops. The general river using public will be invited to the meeting through:

- BDFA
- WSC
- BMYC
- Maritime Leisure Cruises
- Boston Gateway Marina
- Local press advert or article
- Leaflets in local information centres, libraries, Town Hall etc..
- Local information websites

The workshops will present the new arrangements in the Haven including the revised by-laws, Notices to Mariners and the leaflet. The workshop will be led by the Environment agency but Port of Boston will need to be present to respond to any questions on their operating arrangements. The character of the fisherman's workshop and the leisure boat users workshop is expected to be different and two workshops are therefore proposed.

### **5.3 Update Navigation Guidance**

The following publications and information sources which provide advice and guidance to navigation on the Haven will be updated:

- UKHO Admiralty - Chart 1200
- UKHO Admiralty Sailing Directions - North Sea (West) Pilot
- Port of Boston standing Notices to Mariners
- Port of Boston website

- Canal River Trust website and relevant publications and notices
- The Boating Association website
- The Inland Waterways association website and publications

The plans of the aids to navigation provided to Trinity House for consent will also be sent to the UKHO. The Port of Boston will send their by-laws and Notices to Mariners to the UKHO. All of this information will be incorporated onto the next revision of the UKHO charts and sailing directions. The Notices to Mariners are intended to cover any changes in requirements from the published requirements.

The Port of Boston will be sent copies of plans of the aids to navigation provided to Trinity House which they will use for their own by-laws, Notices to Mariners and other publications.

The other organisations depend on the UKHO and Port of Boston publications for their information. They monitor the most recent publications for any changes but will be part of the dissemination exercise described above and will therefore be aware of the changes.

Private organisations and their publications are based on the UKHO and Port of Boston publications and notices and are responsible for keeping the information they publish up to date.

## A. Draft text for Notices to Mariners

This Annex provides draft Notices to Mariners for the circumstances described in the main text. Text in square brackets [xxx] is commentary on the notice.

## **Construction Stage**

### **BB1: Boston Barrier Construction – General**

[Issued three months before start of the works]

Construction works are being undertaken in the Haven for the Boston Tidal Surge Barrier and associated structures (planned start date November 2017, planned completion December 2019). Mariners are advised that navigation restrictions will apply in the Haven during this period and vessel movements will be regulated by the contractor by communicating on VHF 12. Mariners are advised to take note of periodic Notices giving details of the work as it progresses. Temporary aids to navigation will be erected during the works and will be notified separately.

### **BB2 Boston Barrier Construction – Periodic [November 2017 assume monthly issued 1 month in advance]**

[Description of the present construction activities for instance:

Dredging works in preparation for the construction of the Boston Barrier are taking place in the Haven between the Wet Dock entrance and the Swing Bridge. Work is expected to continue up to January 2018. One way traffic is required past the dredger with priority to vessels travelling with the current. Mariners are to contact the contractor on VHF12 and follow any directions given.]

### **BB3 Boston Barrier Construction – Temporary Aids to Navigation**

[issued 1 month before the temporary matrix boards are activated]

Mariners are advised that temporary aids to navigation related to changes in navigation requirements will be installed and activated on 1 October 2018 [when the coffer dam construction starts]. These consist of matrix message boards located as shown on the attached plans [as included with the NMP]. One way traffic is required past the cofferdam through the temporary by-pass channel. The clear navigable width of the by-pass is 18m. Priority is given to vessels travelling with the current. Vessels should not overtake between Geest Point and the Swing Bridge.

Mariners are to contact the contractor on VHF 12 and follow any directions given. The contractors call sign is [bypass control]

The matrix message boards advise whether the by-pass is open or closed, the priority direction, and remind mariners to communicate their intentions on VHF 12. The messages are shown on the attached diagrams.

### **Operational Barrier**

An additional Notice to Mariners is to be included in the Annual Standing Notice to Mariners continuing the numbering from the current list of 21:

#### **No. 22: Boston Barrier**

[Issued 3 months before navigation aids are activated]

Mariners are advised that there are navigational restrictions at the Boston Tidal Surge Barrier.

This notice comes in to force on 1 December 2019 [when substantial completion is expected] and supersedes the Notices to Mariners BB1 to BBx issued for the construction of the barrier. [This clause will be deleted when the notice is repeated in subsequent years.]

Under surge tide conditions the barrier will be raised by the Environment Agency. A separate series of notices will be issued to warn when the barrier is to be raised or when maintenance work further restricts navigation.

Vessels should not overtake between Geest Point and the Swing Bridge.

One way traffic is required through the barrier. Priority is given to vessels travelling with the current. Vessels should communicate their position and intentions on VHF 12. Mariners must agree priority at the barrier on VHF 12; the Port of Boston do not manage navigation through the barrier.

Aids to navigation are installed as shown on the attached plan and diagrams. The matrix message boards display whether the barrier is raised, the priority direction and remind mariners to advise of transit on VHF 12. At the barrier, there are IALA traffic signals indicating the priority traffic direction and when the barrier is raised.

Inland waterway vessels and other vessels not normally used in tidal waters may be in the Haven and may not be equipped with VHF (notwithstanding Notice No. 17). Caution must be exercised when passing through the barrier to avoid collision with vessels that cannot advise of their location.

### **Raising the Barrier**

#### **BBR1: Boston Barrier Raising – 48 hours**

Mariners are advised that the Boston Barrier may be raised 6 hours before high tide on DD/MMM/YYYY at HHHH hrs [at least 48 hours in advance].

This is a precautionary warning due to a forecast surge tide and will be confirmed or retracted by further notices.

#### **BBR2: Boston Barrier Raising – 12 hours**

Mariners are advised that the Boston Barrier will be raised 6 hours before high tide on DD/MMM/YYYY at HHHH hrs [at least 12 hours in advance but not more than 18].

This is due to a forecast surge tide and confirms the previous notice No Rxx.

#### **BBR3: Boston Barrier Raising – Cancelled**

The previous notice No Rxx warning that the Boston Barrier may be raised is withdrawn.

#### **BBR4: Boston Barrier – Lowering**

The Boston Barrier raised to protect against a forecast surge tide will be lowered before the low tide on DD/MMM/YYYY at HHHH hrs [not more than 24 hours in advance].

Notice Rxx is superseded.

### **Barrier Maintenance**

#### **BBM1: Boston Barrier – Planned Maintenance**

Mariners are advised that the Boston barrier will be raised for planned maintenance on DD/MMM/YYYY between HHHH hrs and HHHH hrs [more than 1 month in advance]

#### **BBM2: Boston Barrier – Unplanned Maintenance**

Mariners are advised that due to unforeseen circumstances the Boston Barrier will be closed for maintenance on DD/MMM/YYYY between HHHH hrs and HHHH hrs [more than 7 days in advance]



## B. Aids to Navigation

This Annex includes diagrams showing the proposed aids to navigation.

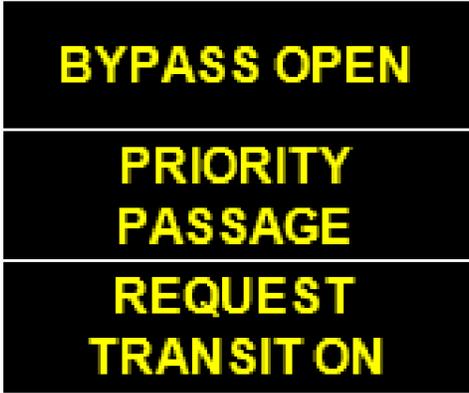
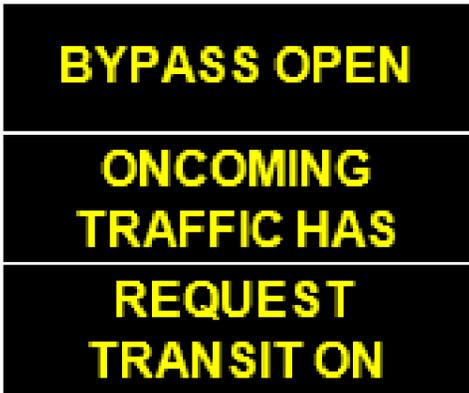
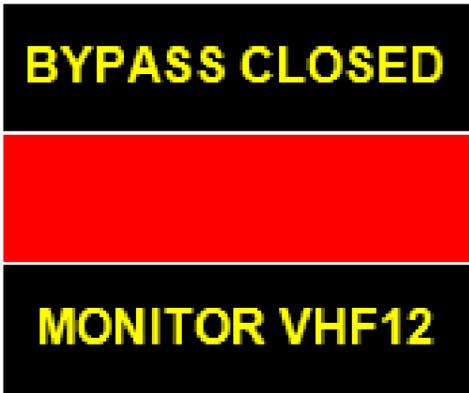
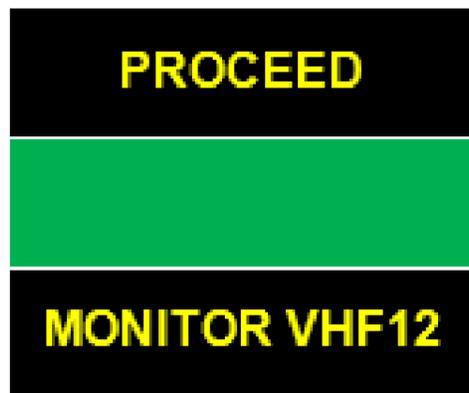
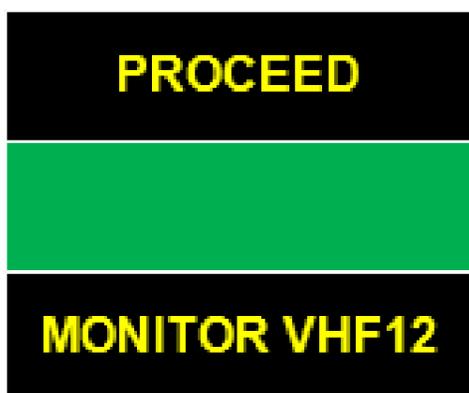


**Aids to Navigation – Key Plan**

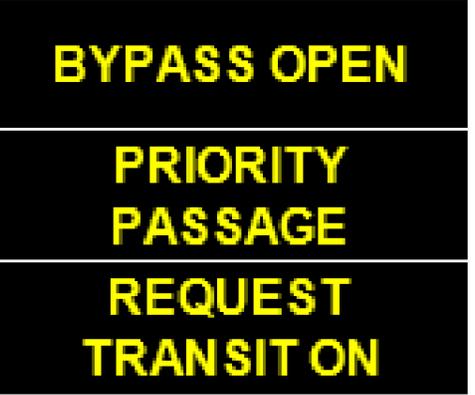
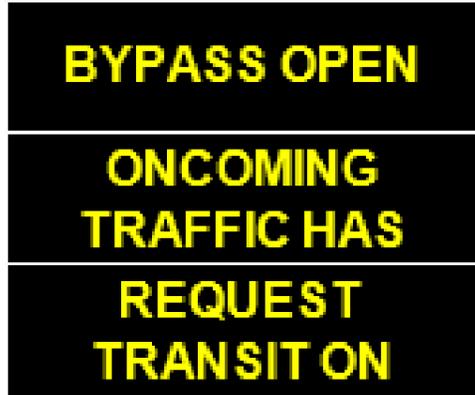
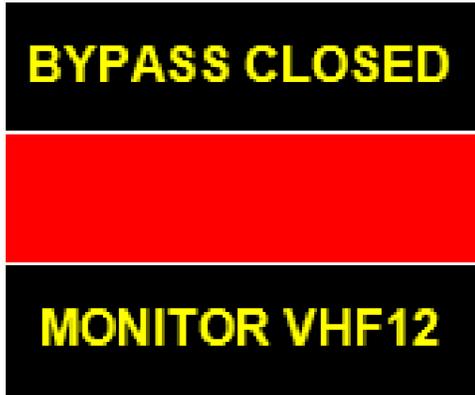
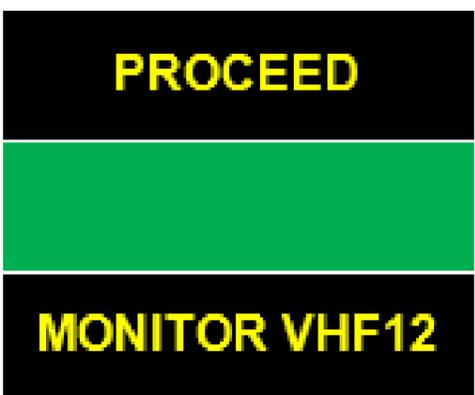
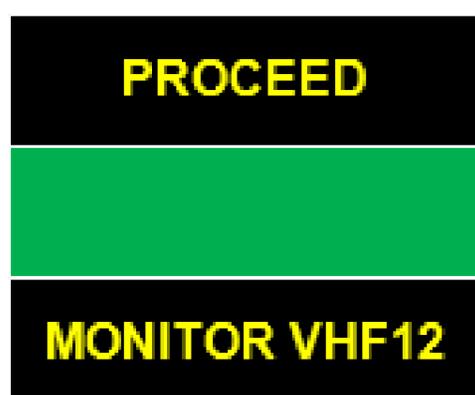


**Aids to Navigation – Temporary Construction Scenario**

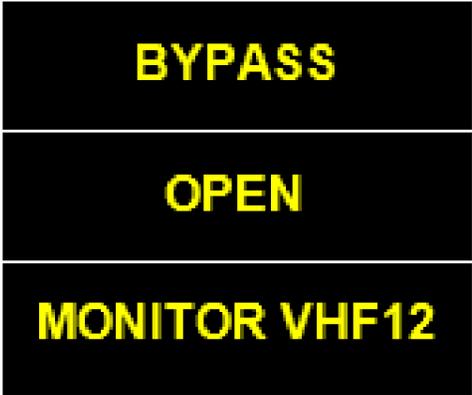
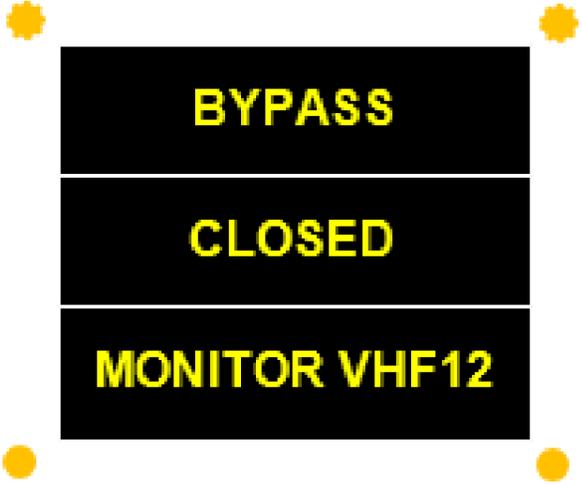
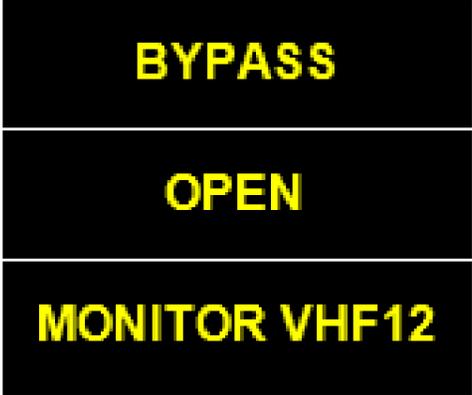
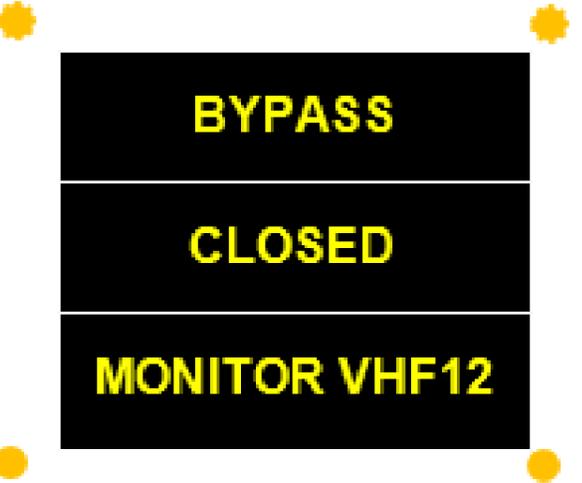
### Temporary Matrix Message Boards – Upriver Approach

LOCATION	PRIORITY PASSAGE (FLOOD TIDE)	GIVE WAY PASSAGE (EBB TIDE)	BYPASS CLOSED
<b>CHURCH POINT</b> 750m down river of the Barrier Adjacent to existing navigation mark 4 minutes to barrier at 8 knots			
<b>OLD GRAIN BERTH POINT</b> 180m down river of the Barrier 1.5 minutes to barrier at 4 knots			
			

### Temporary Matrix Message Boards – Downriver Approach

LOCATION	PRIORITY PASSAGE (EBB TIDE)	GIVE WAY PASSAGE (FLOOD TIDE)	BYPASS CLOSED
<b>HIGH STREET</b> 600m up river of the Barrier On fence line of railway 3.5 minutes to barrier at 6 knots			
<b>ISOLA POINT</b> 150m up river of the Barrier On north side of Black Sluice 1 minute to barrier at 4 knots			
			

### Temporary Matrix Message Boards – Environment Agency Locks

LOCATION	BARRIER OPEN	BARRIER CLOSED
<b>ABOVE BLACK SLUICE</b> At Lay-by above the lock		
<b>ABOVE GRAND SLUICE</b> At Lay-by above the lock		



**Aids to Navigation – Operational Barrier**

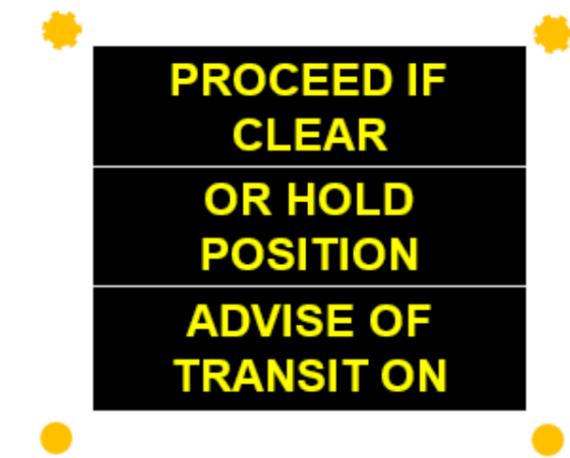


**Aids to Navigation – New Cut Entrance, *South Bank***

### IALA Traffic Signals at Barrier – Upriver and Downriver Approach

<p>GREEN </p> <p>GREEN </p> <p>GREEN </p>	<p>Barrier Open – Vessel has priority passage, proceed with caution when transiting barrier. Maintain VHF 12 communications and announce intent to transit barrier and position and listen for advance warning of oncoming vessels and their position.</p>
<p>GREEN </p> <p>WHITE </p> <p>GREEN </p>	<p>Barrier Open – Vessel may proceed noting oncoming vessels have priority passage. Give way to oncoming vessels at barrier. Maintain VHF 12 communications and announce intent to transit barrier and position and listen for advance warning of oncoming vessels and their position.</p>
<p>RED </p> <p>RED </p> <p>RED </p>	<p>Barrier Closed – Planned barrier closure, transit through barrier not possible.</p>
<p>RED FLASHING </p> <p>RED FLASHING </p> <p>RED FLASHING </p>	<p>Barrier Closed – Emergency barrier closure or incident, transit through barrier not permitted.</p>

### Matrix Message Boards – Upriver Approach

LOCATION	PRIORITY PASSAGE (FLOOD TIDE)	GIVE WAY PASSAGE (EBB TIDE)	BARRIER CLOSED
<b>CHURCH POINT</b> 750m down river of the Barrier Adjacent to existing navigation mark 4 minutes to barrier at 6 knots	 <p><b>BARRIER OPEN</b></p> <hr/> <p><b>PRIORITY PASSAGE</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	 <p><b>BARRIER OPEN</b></p> <hr/> <p><b>ONCOMING TRAFFIC HAS</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	 <p><b>BARRIER RAISED</b></p> <hr/> <p><b>MONITOR VHF12</b></p>
<b>GEEST POINT</b> 400m down river of the Barrier Adjacent to existing navigation mark 2 minutes to barrier at 6 knots	 <p><b>PROCEED</b></p> <hr/> <p><b>WITH CAUTION</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	 <p><b>GIVE WAY</b></p> <hr/> <p><b>AT BARRIER</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	 <p><b>BARRIER RAISED</b></p> <hr/> <p><b>MONITOR VHF12</b></p>
<b>OLD GRAIN BERTH POINT</b> 180m down river of the Barrier 1.5 minutes to barrier at 4 knots	 <p><b>PROCEED</b></p> <hr/> <p><b>IF CLEAR</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	 <p><b>PROCEED IF CLEAR</b></p> <hr/> <p><b>OR HOLD POSITION</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	 <p><b>BARRIER RAISED</b></p> <hr/> <p><b>MONITOR VHF12</b></p>

### Matrix Message Boards – Downriver Approach

LOCATION	PRIORITY PASSAGE (EBB TIDE)	GIVE WAY PASSAGE (FLOOD TIDE)	BARRIER CLOSED
<b>HIGH STREET</b> 600m up river of the Barrier On fence line of railway 3.5 minutes to barrier at 6 knots	<p><b>BARRIER OPEN</b></p> <hr/> <p><b>PRIORITY PASSAGE</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	<p><b>BARRIER OPEN</b></p> <hr/> <p><b>ONCOMING TRAFFIC HAS</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	<p><b>BARRIER RAISED</b></p> <hr/> <hr/> <p><b>MONITOR VHF12</b></p>
<b>LONDON ROAD</b> 325m up river of the Barrier at Swing Bridge Adjacent to electricity sub-station 2 minutes to barrier at 6 knots	<p><b>PROCEED</b></p> <hr/> <p><b>WITH CAUTION</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	<p><b>GIVE WAY</b></p> <hr/> <p><b>AT BARRIER</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	<p><b>BARRIER RAISED</b></p> <hr/> <hr/> <p><b>MONITOR VHF12</b></p>
<b>ISOLA POINT</b> 150m up river of the Barrier On north side of Black Sluice 1 minute to barrier at 4 knots	<p><b>PROCEED</b></p> <hr/> <p><b>IF CLEAR</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	<p><b>PROCEED IF CLEAR</b></p> <hr/> <p><b>OR HOLD POSITION</b></p> <hr/> <p><b>ADVISE OF TRANSIT ON</b></p>	<p><b>BARRIER RAISED</b></p> <hr/> <hr/> <p><b>MONITOR VHF12</b></p>

### Matrix Message Boards – New Cut Entrance

LOCATION	BARRIER OPEN	BARRIER CLOSED
<b>NEW CUT</b> 9km down river of the Barrier 50 minutes to barrier at 6 knots	 <p><b>BARRIER 5nm</b></p> <hr/> <p><b>OPEN</b></p> <hr/> <p><b>MONITOR VHF12</b></p>	 <p><b>BARRIER 5nm</b></p> <hr/> <p><b>RAISED</b></p> <hr/> <p><b>MONITOR VHF12</b></p>

### Matrix Message Boards – Environment Agency locks

LOCATION	BARRIER OPEN	BARRIER CLOSED
<b>ABOVE BLACK SLUICE</b> At Lay-by above the lock	<div style="text-align: center;"> <div style="background-color: black; color: yellow; padding: 5px; margin-bottom: 5px;"><b>BOSTON BARRIER</b></div> <div style="background-color: black; color: yellow; padding: 5px; margin-bottom: 5px;"><b>OPEN</b></div> <div style="background-color: black; color: yellow; padding: 5px;"><b>MONITOR VHF12</b></div> </div>	<div style="text-align: center;"> <div style="background-color: black; color: yellow; padding: 5px; margin-bottom: 5px;"><b>BOSTON BARRIER</b></div> <div style="background-color: black; color: yellow; padding: 5px; margin-bottom: 5px;"><b>RAISED</b></div> <div style="background-color: black; color: yellow; padding: 5px;"><b>MONITOR VHF12</b></div> </div>
<b>ABOVE GRAND SLUICE</b> At Lay-by above the lock	<div style="text-align: center;"> <div style="background-color: black; color: yellow; padding: 5px; margin-bottom: 5px;"><b>BOSTON BARRIER</b></div> <div style="background-color: black; color: yellow; padding: 5px; margin-bottom: 5px;"><b>OPEN</b></div> <div style="background-color: black; color: yellow; padding: 5px;"><b>MONITOR VHF12</b></div> </div>	<div style="text-align: center;"> <div style="background-color: black; color: yellow; padding: 5px; margin-bottom: 5px;"><b>BOSTON BARRIER</b></div> <div style="background-color: black; color: yellow; padding: 5px; margin-bottom: 5px;"><b>RAISED</b></div> <div style="background-color: black; color: yellow; padding: 5px;"><b>MONITOR VHF12</b></div> </div>