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## **Bridgwater Tidal Barrier Scheme**

### **Short List of Options – Consultation Response**

FINAL

December 2016

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## **1 INTRODUCTION**

### **1.1 Background to the project**

This is a report on the feedback received to consultation on the short list of options for Bridgwater Tidal Barrier in September and October 2016.

Sedgemoor District Council (SDC) and the Environment Agency (EA) are promoting a Tidal Barrier Scheme to protect Bridgwater and surrounding areas from tidal flooding. The Scheme is a key component of The Somerset Levels & Moors Flood Action Plan, March 2014 which includes an objective of delivering the barrier by 2024. The barrier will be an important element of the flood risk infrastructure for Bridgwater and will help to build business confidence and support sustainable growth and development in the town.

The EA and SDC are working together on the project with support from the Somerset Rivers Authority and funding from the Heart of the South West Local Enterprise Partnership.

The tidal barrier would be constructed across the River Parrett north of Bridgwater and would consist of abutments on either side of the river, one or two gates and a control building. The barrier would normally be open, but would be closed when a very high tide was expected to prevent the tide travelling upstream and overtopping defences and flooding property and infrastructure. While the barrier was closed river flows would be stored in the river channel upstream. At times of high flows in the River Parrett, the barrier could be closed to keep out the tide and create more storage space for the river. Downstream of the barrier, existing flood defences either side of the River Parrett would be maintained or improved to ensure that the barrier is not bypassed by flows in the floodplain and that flood risk is not increased to property and infrastructure elsewhere. Flood defences upstream of the barrier would be maintained to store river flows.

### **1.2 Previous long list of options consultation**

The EA and SDC are undertaking an assessment of options for the barrier location and type and the flood defences downstream of the barrier. In the first stage of the assessment process, seven potential barrier locations were identified and the advantages and disadvantages of each location were considered. The assessment and our recommendation for locations to take forward to more detailed study was presented at a stakeholder workshop and a public exhibition at Bridgwater Arts Centre on 10 March 2016.

Following this consultation, it was decided to take five sites, Site 2, 4, 5, 6 and 7 forward to more detailed assessment. A report on the long list consultation is available at the project website at the address in Section 1.3 below.

### **1.3 Short list of options consultation**

Following the more detailed study of the five sites, a second stakeholder workshop and public exhibition was held at the Bridgwater Arts Centre on 15 September 2016. The assessment of the five sites was presented highlighting their advantages and disadvantages and the preferred sites (Site 4 and 5) were proposed.

The aim of the consultation events was to inform attendees about the project and the options being considered, discuss their views and receive feedback on the short list of options in order to inform the site selection process.

Invitations to the events were sent to approximately 30 stakeholder organisations with an interest in the project. The public exhibition was advertised locally on both the Sedgemoor District Council and the Somerset Rivers Authority websites, through the Bridgwater Town Council, local community groups and posted widely on social media. The Facebook and Twitter posts were 'seen' over 3700 times and a visualisation viewed 1700 times. The material used at the consultation events was also uploaded to the SDC website following the event, web link below. The consultation was open for 6 weeks after the 15 September.

<http://www.sedgemoor.gov.uk/bridgwaterbarrier>

A consultation event for local businesses was also held on 27 October 2016 at the Somerset Energy Innovation Centre.

Consultation with the public and stakeholders is key part of the assessment process and as the project moves forward further consultation events will be held.

## 2 Options assessment

### 2.1 Short list of options

The location of the 5 short list sites is shown on Figure 1 and the key advantages and disadvantages of each of the sites are summarised in the table below.

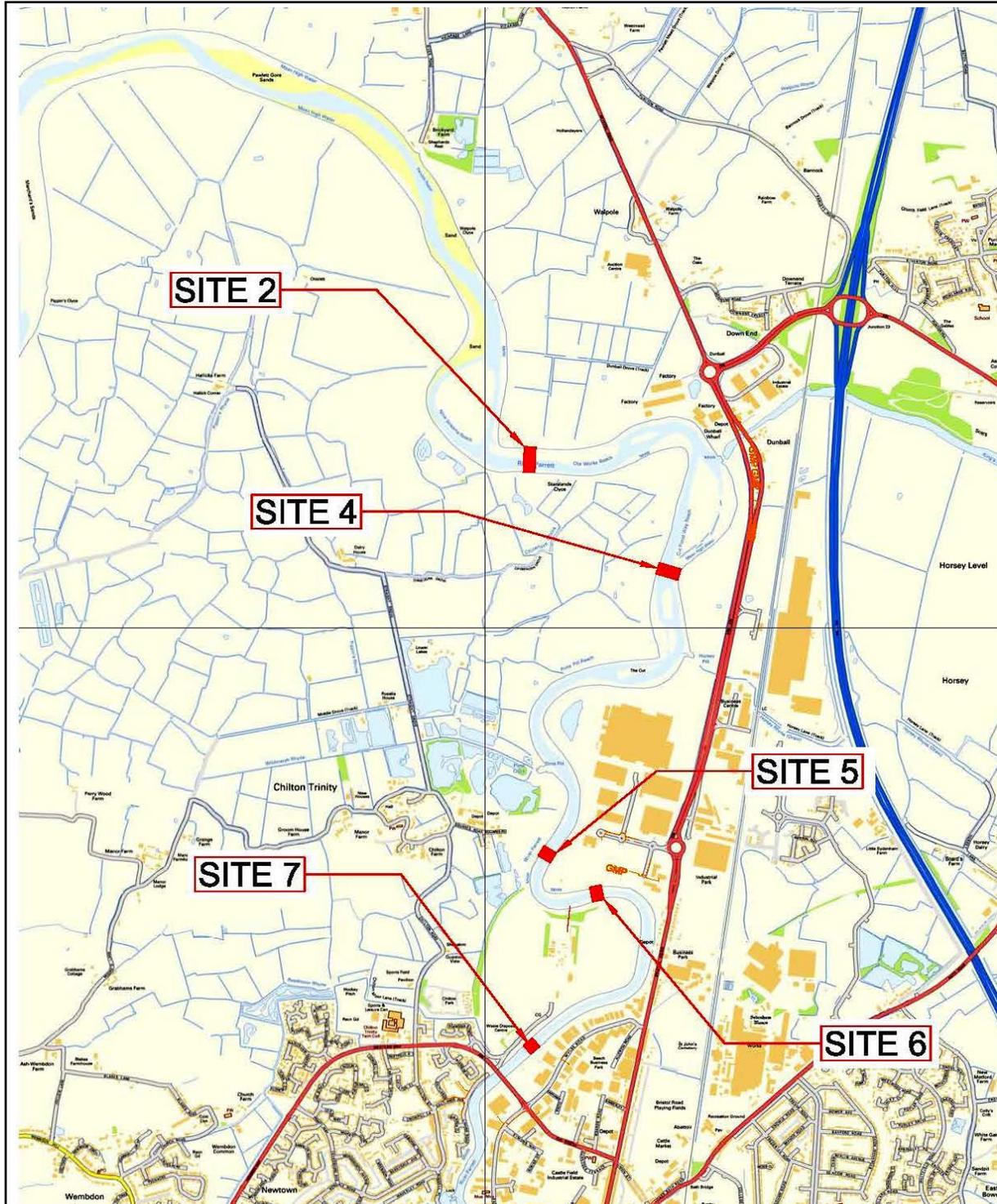


Figure 1 – Location of short listed barrier sites

	<b>Advantages</b>	<b>Disadvantages</b>
<b>Site 2</b>	<ul style="list-style-type: none"> <li>• Protects Bridgwater with the shortest length of improved downstream flood defences;</li> <li>• Can minimise flood risk to north Bridgwater, protecting existing development and maximising opportunities for future growth;</li> <li>• Provides the most space to store river flows upstream when the barrier is closed;</li> <li>• Could reduce tide locking of the Kings Sedgemoor Drain (KSD) outfall when the barrier is closed, so long as flows in both the Parrett and the KSD are not too high;</li> <li>• Furthest site, 850m, from residential property;</li> <li>• No space constraints to construction of the barrier or a temporary bypass channel;</li> <li>• Good access for construction to north bank off A38.</li> </ul>	<ul style="list-style-type: none"> <li>• Highest maintenance costs due to large size of barrier;</li> <li>• Would prevent navigation to Dunball Wharf when the barrier is closed and would make navigation much more difficult when the barrier is open.</li> <li>• Biggest overall impact on natural environmental;</li> <li>• The barrier could appear out of place in an open, flat, rural landscape;</li> <li>• Potential for impacts on bird population - the site is closest to the special conservation areas of Bridgwater Bay;</li> <li>• The river bed moves around at this site so there is a risk of problems at the barrier due to erosion and silt deposition;</li> <li>• Greatest risk of increasing siltation downstream which would affect navigation and the special conservation areas downstream;</li> <li>• Poor access for construction to south bank through Chilton Trinity.</li> </ul>
<b>Site 4</b>	<ul style="list-style-type: none"> <li>• Can minimise flood risk to north Bridgwater, protecting existing development and maximising opportunities for future growth;</li> <li>• Protects Bridgwater with a shorter length of improved downstream flood defences than sites further upstream;</li> <li>• Large space to store river flows upstream when the barrier is closed;</li> <li>• No space constraints to construction of the barrier or a temporary bypass channel;</li> <li>• No impact on navigation to Dunball Wharf;</li> <li>• 500m from the nearest residential property;</li> <li>• Good access for construction to east bank off A38.</li> </ul>	<ul style="list-style-type: none"> <li>• High maintenance costs due to large size of barrier;</li> <li>• The barrier could appear out of place in an open, flat, rural landscape, although east bank could be developed in the future;</li> <li>• The river channel bed moves around at this site so there is a risk of problems at the barrier due to erosion and silt deposition;</li> <li>• Risk of increasing siltation downstream which could affect navigation and the special conservation areas downstream;</li> <li>• Poor access for construction to west bank through Chilton Trinity.</li> </ul>

<p><b>Site 5</b></p>	<ul style="list-style-type: none"> <li>• Protects Bridgwater with a shorter length of improved downstream flood defences than Sites 6 and 7;</li> <li>• Adequate space to store river flows upstream when the barrier is closed;</li> <li>• No impact on navigation to Dunball Wharf;</li> <li>• Not out of character with local landscape that is already dominated by commercial buildings;</li> <li>• Farther from the special conservation areas of Bridgwater Bay than Sites 2 and 4;</li> <li>• No pier in the middle of the river channel, therefore less impact on sediment movement in the river than Sites 2 and 4;</li> <li>• Could utilise existing roads through Express Park for access.</li> </ul>	<ul style="list-style-type: none"> <li>• Longer length of downstream defence improvements required than Sites 2 and 4;</li> <li>• Less storage space in river channel upstream than for downstream sites;</li> <li>• 175m from nearest residential property and very close to commercial property at Express Park;</li> <li>• Space for construction very constrained on east bank, temporary bypass channel required on west bank;</li> <li>• Access for construction to west bank is difficult through Chilton Trinity, new access road would be required.</li> </ul>
<p><b>Site 6</b></p>	<ul style="list-style-type: none"> <li>• Protects Bridgwater with a shorter length of improved downstream flood defences compared to Site 7;</li> <li>• No impact on navigation to Dunball Wharf;</li> <li>• Not out of character with local landscape that is already dominated by commercial buildings;</li> <li>• Farther from the special conservation areas of Bridgwater Bay than Sites 2, 4 and 5;</li> <li>• No pier in the middle of the river channel, therefore less impact on sediment movement in the river than Sites 2 and 4;</li> <li>• Could utilise existing access through Express Park.</li> </ul>	<ul style="list-style-type: none"> <li>• Longer length of downstream defence improvements required than Sites 2, 4 and 5;</li> <li>• May not be enough space to store high river flows upstream when the barrier is closed;</li> <li>• Increased water levels downstream of the closed barrier could impact on Chilton Trinity Sewage Treatment Works;</li> <li>• 275m from nearest residential property and very close to commercial property at Express Park;</li> <li>• Space for construction very constrained on north bank, temporary bypass channel required on south bank;</li> <li>• Potential disturbance of former tip site on south bank.</li> </ul>
<p><b>Site 7</b></p>	<ul style="list-style-type: none"> <li>• No impact on navigation to Dunball Wharf;</li> <li>• Not out of character with local landscape that is already dominated by commercial buildings;</li> <li>• Site with the least overall impact on the natural environment;</li> <li>• Easiest site for access for construction and operation on west bank.</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequate space to store high river flows upstream when the barrier is closed;</li> <li>• Access for construction of the barrier and flood defences and raising flood defences on the east bank is very difficult;</li> <li>• Longest length of downstream flood defence improvements required;</li> <li>• Greatest overall impact on Bridgwater during construction phase: increased noise, disturbance and traffic;</li> <li>• Within 100m of residential property and very close to commercial</li> </ul>

		property; <ul style="list-style-type: none"> <li>• Space for construction is very constrained, a temporary bypass channel required on west bank.</li> </ul>
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## 2.2 Initial preferred option selection

The options appraisal process requires that options which appear unlikely to be beneficial, are not taken forward for more detailed assessment. Further assessment can concentrate on those options which are more likely to be practical and have significant benefit. In making the assessment about which options are taken forward we have to judge if the options are technically feasible, if they are likely to have significant environmental impacts and if they offer value for money and are affordable.

Our assessment is that although there are some advantages associated with Sites 2, 6 and 7, these are outweighed by the disadvantages and that overall, Sites 4 and 5 are preferred.

Site 2 is not taken forward largely because of the size and likely cost of the structure required and the potential impact on navigation to Dunball Wharf. It also has the greatest overall environmental impact of the short listed sites.

Site 6 could impact on discharge from Chilton Trinity sewage treatment works immediately downstream due to increased water levels potentially requiring modifications to the treatment works and could result in disturbance to a former tip site on the south bank requiring disposal of contaminated material. Site 6 is similar in nature to Site 5 but has the disadvantages described above which do not apply to Site 5 and it is therefore not taken forward.

Site 7 is close to the town and construction would have a significant local impact, it would be difficult to improve defences downstream and there is not sufficient storage volume in the channel upstream. It is therefore not taken forward.

Site 4 is a large barrier but could minimise overall flood risk to north Bridgwater, maximising opportunities for future growth. There are no space constraints to construction and there is a large storage volume in the channel upstream. The estimated total project costs are £65-80 million.

Site 5 has no major disadvantages except the proximity to commercial development at Express Park and residential development at Chilton Trinity. It would work effectively for flood risk management and we consider that the environmental impacts can be mitigated. The estimated total project costs are £45-60 million.

### 3 CONSULTATION RESPONSES

#### 3.1 Analysis of responses

The stakeholder workshop was attended by 26 people and 111 people attended the public exhibition. SDC and EA staff were available at the events to discuss the project and answer questions raised.

Feedback was provided to the project team via forms completed on the day or submitted later and via e-mails sent to the project e-mail address:

[bridgwater.barrier@environment-agency.gov.uk](mailto:bridgwater.barrier@environment-agency.gov.uk).

A total of 78 responses to the consultation were received.

The consultation sought an indication of support for a preferred barrier locations as well as comments on other issues that might impact the scheme. The responses were analysed and where support for a particular site(s) was indicated, the preference has been captured and collated below.

Barrier Location	Site 4	Site 5	Unsure/no preference	Other site
<b>No. Supporting</b>	44	13	19	2

All the feedback received has been compiled in the Short List Consultation Feedback Report, personal details, if present, have been redacted.

The key messages from the consultation were that the scheme has general support and that Site 4 was preferred over Site 5.

#### 3.2 Summary of the main comments and concerns

The overall feedback from attendees was that the construction of a barrier to reduce tidal flood risk to Bridgwater would be positive for the town and the surrounding area.

The main comments received from the feedback were:

##### Feedback supporting Site 4

- Would bring additional economic benefits to the town;
- Would provide more opportunities for development along Bristol Road and to the west of the river;
- Provides a better opportunity for a future road crossing;
- Provides the most storage capacity to avoid flooding upstream;
- Better for traffic flows in Bridgwater;

- More room for future ideas, visitor centre, lock, sports facilities;
- Least amount of disruption.

#### Feedback supporting Site 5

- A good balance between cost and benefits;
- Site 4 has the potential for silt build up at Dunball Wharf;
- Least impact on navigation;
- Less environmental impact, easier access routes for construction and less cost.

#### Other comments received

- The barrier structure should include a road crossing for a northern bypass for Bridgwater;
- Include a pedestrian / cycle crossing on the barrier structure;
- Bridgwater needs the confidence of local business to survive and thrive;
- Good to see a surge barrier is planned rather than a fixed sluice, will keep the character of the river;
- A vertical lift gate would be more visually intrusive than a rising sector gate;
- Site 5 would have less visual impact but Site 4 could be made a special feature in the landscape;
- Visual impact of raised flood banks downstream of barrier;
- The barrier will impact on navigation, it should include a lock and the possibility of access for pleasure boats and small craft;
- The barrier should allow for penning of water upstream to allow improved recreational navigation;
- Barrier is a costly exercise that will achieve little, dredging would be more effective;
- Concerned about impact on downstream communities when barrier is closed against a surge tide;
- Barrier should allow unfettered access to Dunball Wharf whilst maximising long term protection to the town;
- Water level management should be analysed in more detail, the barrier should be able to pen water upstream;
- The plans should not adversely impact on nature and the environment and in particular Natura 2000 sites;

- Focus on environmental enhancement rather than just mitigating loss;
- Site 2 would be better as it provides better protection to businesses at Dunball Wharf;
- Barrier should incorporate tidal power generation;
- Proposals lack any long term vision;
- Potential to impact on archaeology;
- Need to understand impact of Site 4 on operations at Dunball Wharf.

## 4 RESPONSE TO COMMENTS AND CONCERNS

### 4.1 Responses to the main comments and concerns raised by consultees

Below are responses to the most common comments and questions received.

- **The barrier should include a road bridge**

There are currently no firm proposals for a road crossing north of Bridgwater and this is not something SDC and the EA will be promoting as part of this project. However if firm proposals come forward from other parties within the timescales of this project we will consider them.

- **The barrier should include a pedestrian / cycle crossing**

We are considering whether such a public crossing could be safely incorporated on the barrier.

- **Visual impact of the barrier**

We are undertaking a visual impact assessment of the two barrier types at the two preferred sites to help inform the decision about location and type.

- **The barrier will have an impact on navigation, it should include a lock and the possibility of access for pleasure boats and small craft**

It is the intention that the impact on navigation will be as low as possible. When the barrier is open the gate will not obstruct the channel. The clearance of the gate above the channel is being considered in relation to the existing port constraints and usage.

- **The barrier should be able to pen water upstream to improve recreational navigation**

Penning water would add significant complexity and cost to the project due to the increased frequency of barrier operation and the type of gate that may be required for the dual purpose of penning water and excluding surge tides. Penning water may also have an impact on the existing drainage systems in Bridgwater which discharge to the river under gravity via low level outfalls. However, we are considering how the

two preferred gate types could be used to pen water so that this could be facilitated in the future if required.

- **The plans should not adversely impact on nature and the environment**

A key part of the assessment is the consideration of environmental impacts and opportunities. We will be seeking options which minimise the impacts and where impacts are unavoidable implementing suitable mitigation measures. We will also look for opportunities to enhance the environment through the project. We will assess potential impacts on the Natura 2000 sites on the Somerset Levels and Moors and the managed realignment site at Steart.

- **How often will the barrier be operated?**

Initial analysis indicates that the barrier could be operated around 30 times per year for all purposes including tidal and fluvial flood risk management and maintenance. In the future the barrier may be operated more frequently due to sea level rise.

- **How will the barrier and associated flood defences protect potential development sites?**

The Bristol Road North development site and the EDF park and ride site to the north of Dunball will be protected by the barrier and improved downstream flood defences. We will also consider how the scheme could protect a potential development site to the north of Chilton Trinity into the future. Whichever barrier location is chosen, the scheme will provide the same level of protection.

- **How will the barrier affect the flood risk to communities downstream?**

Improved flood defences downstream of the barrier will protect downstream communities and businesses to the same standard as the barrier provides to Bridgwater. It is not proposed to improve the standard of protection to agricultural land.

- **The proposals lack any long term vision**

We are forming a group to develop wider opportunities that could be implemented alongside the barrier project. The group will be open to any organisation that has ideas that can be supported by the barrier project and/or can bring funding or resource to implement the ideas.

- **The barrier structure should incorporate power generation**

The barrier will only operate infrequently and is therefore probably not suitable for power generation. However, we are in contact with specialists through the Somerset Energy Innovation Centre and will consult with them as the project progresses.

## 5 WHAT HAPPENS NEXT?

We are undertaking further work to help decide whether Site 4 or Site 5 would be the best location for a barrier and whether a rising sector gate or a vertical lift gate would be the best gate type.

This further work includes:

- Sources of funding;
- Geomorphological and ecological impacts of the sites;
- Water quality;
- Threshold and frequency of barrier operation;
- Cost;
- Residual flood hazard;
- Gate type.

Taking into account this further work and the feedback from the consultation, we will be making a decision about which barrier site to take forward in early 2017. We will then develop the detail of the barrier at the preferred site along with the associated defences and will hold a further consultation in May/June 2017 to seek feedback on the design and the impacts of the scheme.

In the meantime, if you have comments or questions about the project please e-mail them to [Bridgwater.Barrier@environment-agency.gov.uk](mailto:Bridgwater.Barrier@environment-agency.gov.uk)