

REPORT

Boston Alternative Energy Facility

Worst Case Assessment for Land Raising (Clean)

Client: Alternative Use Boston Projects Ltd

Planning Inspectorate
Reference: EN010095

Document Reference: 9.77 (1)

Pursuant to: APFP Regulation: N/A

Reference: PB6934-RHD-ZZ-XX-NT-Z-4101

Status: Final/1.0

Date: 24 March 2022



Technical Note

HaskoningDHV UK Ltd.
Industry & Buildings

To: National Infrastructure Planning
From: Alternative Use Boston Projects Limited
Date: 24 March 2022
Our reference: PB6934-RHD-ZZ-XX-NT-Z-4101
Reference: 9.77 (1)
Planning Inspectorate: EN010095
Reference:
Classification: Project related
Checked by: Sophie Reese
Approved by: Paul Salmon

Subject: Boston Alternative Energy Facility: Deadline 9 - Worst Case Assessment for Land Raising

1 Introduction

- 1.1.1 In the Environment Agency's Deadline 2 submission for the Boston Alternative Energy Facility examination, dated 11 November 2021 (REP2-038), it was noted that the Environment Agency's position in relation to flood risk issues remained the same as that set out in its Deadline 1 Written Representations document, dated 19 October 2021 (REP1-051).
- 1.1.2 At Deadline 3, the Applicant provided clarification with regard to a number of flood risk items within Document 9.40 Response to Environment Agency's queries on Critical Infrastructure and Levels across the Application Site (REP3-016) aimed at addressing the comments set out by the Environment Agency in its Deadline 1 Written Representations document (REP1-051).

2 Summary of Remaining Flood Risk Concerns

- 2.1.1 At Deadline 3, the Applicant confirmed the following (REP3-016):

"With regard to the issues set out in Paragraph 3.3 of the Environment Agency's Written Representations (REP1-051), the finished site ground levels will be subject to minor variations across the Application Site. Existing ground levels to the riverward side of the Roman Bank / secondary defence (but landward of the primary flood defence) are between approximately +3.2m AOD and +3.5m AOD, whilst ground levels across the Principal Application Site to the rear of the Roman Bank / secondary defence are approximately +2.5m AOD.

As noted by the Environment Agency, the Applicant has confirmed the need to remove approximately 0.5m of surface material and replace this with approximately 0.8m of surcharged material during construction. This will aid in the levelling of the site and setting out of the buildings. This approach is in accordance with that adopted for the adjacent Boston Biomass No. 3 site....

... Details related to site levelling, access roads and slabs for buildings will be confirmed during the detailed design process, post-consent."

- 2.1.2 During a Statement of Common Ground (SoCG) meeting with the Environment Agency on 27 January 2022 and subsequent technical flood risk specific meeting on 3 February 2022 it was noted by the Environment Agency that a number of flood risk items had been addressed. However, the following item from the Deadline 1 Written Representations document (REP1-051) remains an area of concern, in relation to flood risk:

“Paragraph 3.3 We require details of finished site levels including assessment of any impact on the flow of water over the site. The Applicant has indicated to us that approximately 0.5 m of surface material will be removed and replaced with 0.8 m of surcharged material across the main site. This gives a net gain of 0.3m over the whole site. We require further assessment of the impact on flood risk to third parties through the displacement of flood waters.”

- 2.1.3 During the 3 February 2022 meeting it was discussed and agreed with the Environment Agency that a conservative assessment related to land raising would be undertaken, to understand the potential for wider impacts as a result of the Facility.

- 2.1.4 Following the submission of this Technical Note at Deadline 7, the Environment Agency provided further clarification regarding the remaining flood risk concern in their Deadline 8 submission (REP8-019) as follows:

“Flood Risk (EA 1.1)

2.4. We have reviewed document ref REP7-009 (Worst Case Assessment for Land Raising). We consider the document is a reasonable assessment of the possible impacts on flood flows as a result of land raising and has addressed some of our concerns. However, the assessment does not include an assessment of works taking place in the area between the proposed wharf and Roman Bank. The assessment must be updated to see what impact (if any) may arise as a result of works in this area.”

- 2.1.5 This Technical Note provides a summary of the review undertaken and presents the conclusions in relation to the potential for off-site flood risk to be increased as a result of the Facility. It has been updated to provide clarification with regard to the flood risk comment raised by the Environment Agency at Deadline 8 (REP8-019).

3 Review of Ground Levels

3.1 Existing Site Levels

3.1.1 As noted in the Deadline 3 submission (REP3-016) and Paragraph 13.1.22 of the Flood Risk Assessment (APP-106, Document 6.4.13, Environmental Statement Appendix 13.2) a review of the 0.25m resolution LiDAR data found that ground levels to the rear of the Roman Bank are approximately 2.5m AOD. However, the Applicant notes that this is subject to localised variation across the Principal Application Site, with greater elevations towards the northern end and lower elevations towards the southern end.

3.2 Boston Biomass No. 3 Site Levels

3.2.1 At Deadline 3, it was noted by the Applicant that the levelling exercise to be carried out across the Principal Application Site will be undertaken in accordance with the approach adopted for the adjacent Boston Biomass No. 3 site. Information with regard to ground levels across the Boston Biomass No. 3 site have been obtained from the planning documentation relevant to its development.

3.2.2 As part of Planning Application PL/0008/17 to Lincolnshire County Council for the Boston Biomass No. 3 site, correspondence with the Environment Agency was reviewed in relation to flood risk concerns for that development. In addition, information on flood risk and ground levels across the Boston Biomass No. 3 site were identified within the Flood Risk Assessment (Version 4), dated December 2009, and the subsequent Addendum to the Flood Risk Assessment, (Reference 02), dated October 2015.

3.2.3 An extract of the Addendum to the Flood Risk Assessment (Reference 02), dated October 2015, has been reproduced as follows in **Plate 3.1**, which sets out the general ground levels for the Boston Biomass No. 3 site.

<p>2. <u>AMENDMENTS TO THE SITE SPECIFIC FLOOD RISK ASSESSMENT.</u></p> <p>2.1 Following consultation and advice provided by the Environment Agency in their letter dated 7th May 2015 - Ref: AN?2015/121494/02-L01 the Boston Gasification Power Plant will provide the following facilities at the specified finished floor levels as follows:-</p> <ul style="list-style-type: none">• The general ground level of the application site is 2.40metres AOD.• Security Building - FFL = 3.10metres AOD.• 2 Storey Office Block - FFL = 3.05metres AOD.• Wood Store - FFL = 3.00metres AOD.• Workshop - FFL = 3.05metres AOD.• Turbine and Water House - FFL = 2.95metres AOD.• Transformer/Switch Room - FFL = 4.50metres AOD.
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Plate 3.1: Extract of Section 2, Addendum to the Flood Risk Assessment, Reference 02 (dated October 2015) from Planning Application PL/0008/17
(Source: <https://lincolnshire.planning-register.co.uk/Planning/Display?applicationNumber=PL%2F0008%2F17>)

- 3.2.4 This indicates that the general ground level of the Boston Biomass No. 3 site is approximately 2.4m AOD.
- 3.2.5 Furthermore, a review of the 2019 0.25m resolution LiDAR data for the Boston Biomass No. 3 site has confirmed that whilst there are minor variations in ground level this value appears to be correct for the general ground levels across the site.

3.3 Proposed Ground Levels

- 3.3.1 On the basis of the information presented in the preceding sections, the Applicant advises that a ground level of approximately 2.4m AOD is to be adopted for the Principal Application Site following the levelling of the site during construction.

4 Variation in Ground Levels

- 4.1.1 Based on the information presented in **Section 3**, the Applicant has undertaken a review of the existing ground levels across the Principal Application Site utilising the 0.25m resolution LiDAR data and compared this with the proposed finished ground level of approximately 2.4m AOD.
- 4.1.2 As can be seen in **Figure 1**, the land subject to levelling is focused on the Principal Application Site. The land proposed for the construction car parks and laydown areas, to the west and north west of Nursery Road will not be subject to ground levelling. Therefore, these areas have been excluded from the assessment.
- 4.1.3 Furthermore, it is noted that, in their Deadline 8 submission (REP8-019), the Environment Agency requested the same assessment be undertaken for the land between the proposed wharf and the Roman Bank. However, the Applicant notes that this part of the site has also been omitted from the assessment on the basis that the land in this location will not be subject to the same cut and fill exercise as the Principal Application Site.
- 4.1.4 Whilst it is acknowledged that the undeveloped site, comprising mainly agricultural land, may have some minor localised variations in topography (noting it is currently a relatively flat site) there is no proposal for a comprehensive cut and fill exercise to adjust the level of the land either up or down between the proposed wharf and the Roman Bank.
- 4.1.5 In addition, the proposed wharf is to be located to the riverward side and in line with the footprint of the existing defence extending inland only as far as the rear of the existing embankment. After this point there will be a drop in the level from the proposed wharf to the development behind so that it matches the existing ground levels to the rear of the existing defence.
- 4.1.6 It is on the basis of the above that the land between the proposed wharf and Roman Bank has been omitted from the assessment as no change in ground levels means there will be no reduction in flood storage in this location post-development compared with the existing scenario.
- 4.1.7 As would be expected for an undeveloped site currently comprising mainly agricultural land, there are localised variations in the topography and gradients across the Principal Application Site. As noted previously, the greater elevations are towards the northern end of the Principal Application Site and lower elevations towards the southern end of the Principal Application Site. **Figure 1** shows where this will result in minor lowering of ground levels compared with the locations where this will result in minor raising of ground levels.
- 4.1.8 A review of the volumes associated with this levelling exercise has been undertaken. For the areas where there will be a raising of ground levels this has been calculated based on the difference between the existing ground level and the proposed ground level, resulting in a decrease in the volume of flood water storage available.
- 4.1.9 Likewise, where there will be a lowering of ground levels this has been calculated based on the difference between the existing and proposed ground levels, resulting in an increase in the volume of flood water storage available. **Table 1** presents the difference in storage volume identified as part of this assessment.

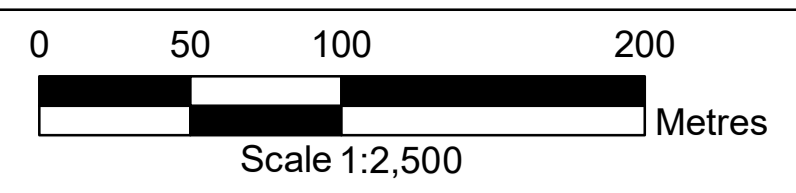
- 4.1.10 The results of this assessment confirm that overall the gains in flood storage volume as a result of the decrease in ground levels are likely to be greater than any loss of flood storage volume as a result of increased ground levels. Therefore, it is not expected that there will be any reduction in the volume of flood storage.
- 4.1.11 Any additional material produced as part of the cut and fill exercise will be utilised during the construction phase as part of the flattening and compaction exercise. As such, it is not anticipated that there will be any surplus material to be removed from the site following completion of this exercise.

Table 1: Comparison of the change in storage volume as a result of the Facility

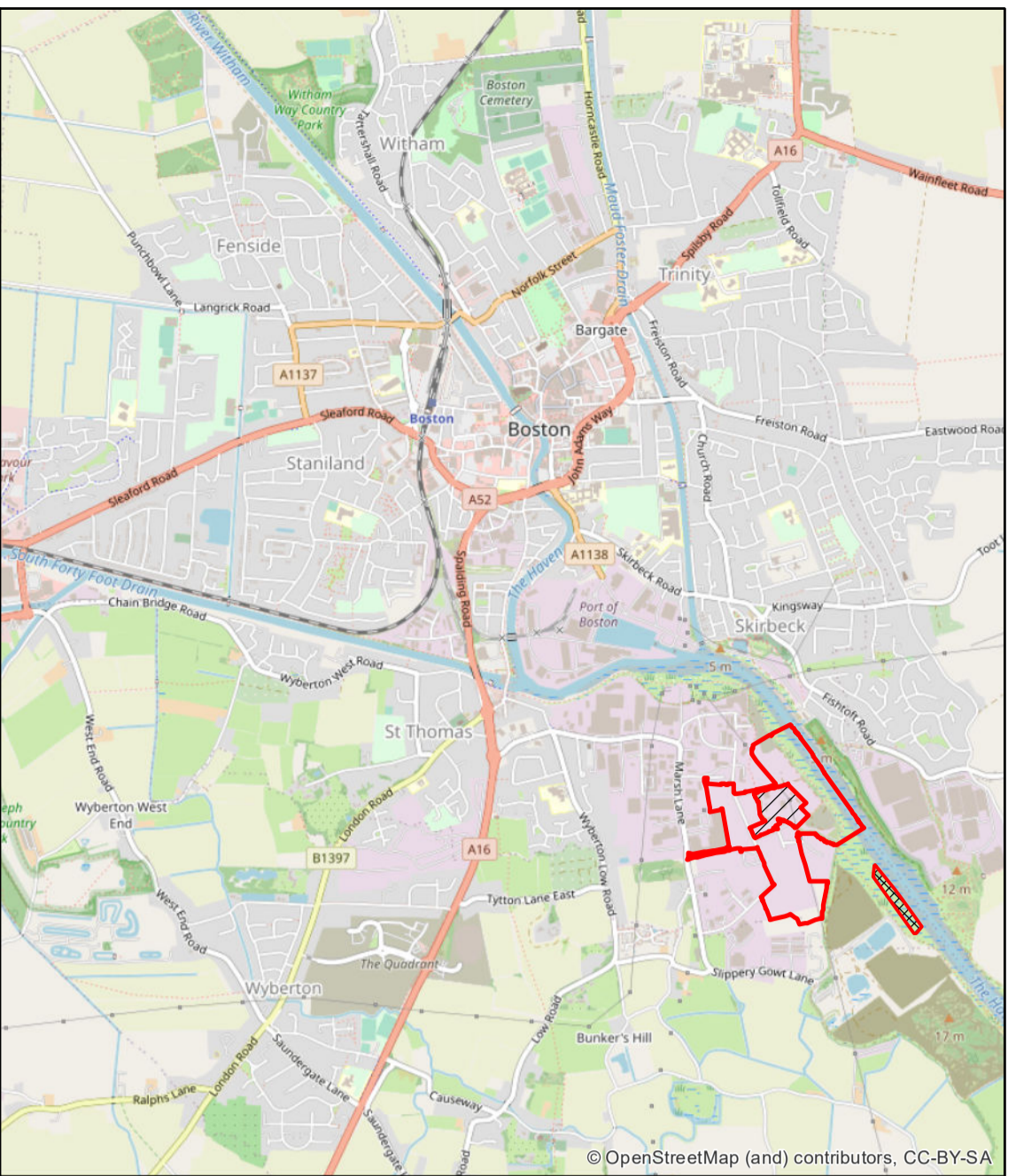
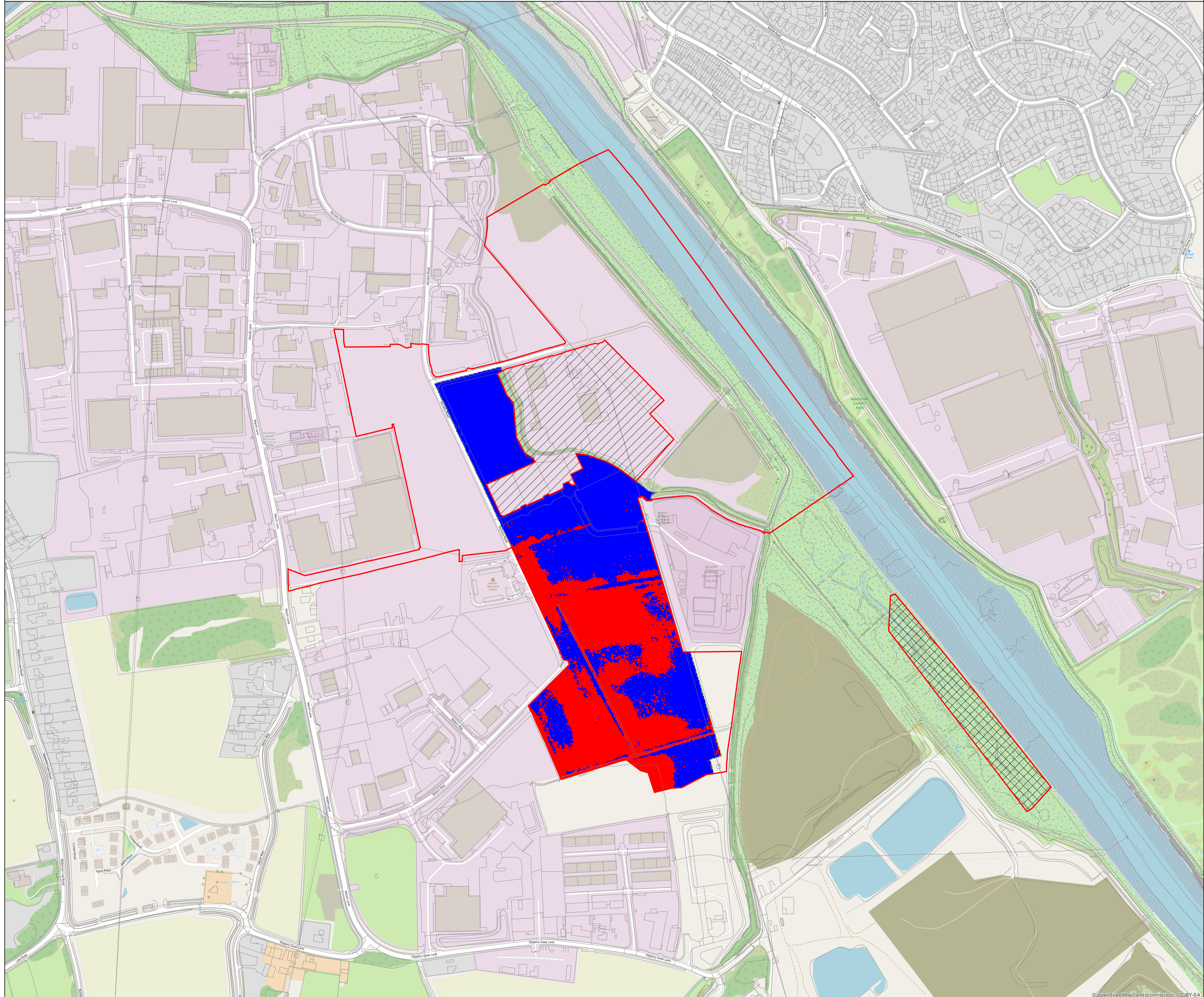
Change in Ground Level	Change in Volume (m³)
Increase in ground level as a result of the Facility	- 4,934
Decrease in ground level as a result of the Facility	+ 27,300
Net Change in Flood Storage Volume (i.e. decrease in ground level – increase in ground level)	+ 22,366

5 Impact on Off-Site Flood Risk

- 5.1.1 The Applicant previously confirmed the need to remove approximately 0.5m of surface material and replace this with approximately 0.8m of surcharged material during construction to aid in the levelling of the site and setting out of the buildings.
- 5.1.2 However, once this process has been undertaken the Facility, once constructed, will be set at a ground level of approximately 2.4m AOD to match that of the adjacent Boston Biomass No. 3 site.
- 5.1.3 Following calculation of the areas of the Principal Application Site that will require lowering of ground levels (i.e. cut) compared with those areas that will require raising (i.e. fill), as summarised in **Table 1**, it is concluded that generally the existing ground levels across the Principal Application Site are sufficiently elevated that there will be limited permanent raising of ground levels across the Principal Application Site, following construction.
- 5.1.4 Furthermore, as noted in Section 4, the land between the proposed wharf and the Roman Bank will not be subject to the same cut and fill exercise as the Principal Application Site. As such, the land between the proposed wharf and Roman Bank has been omitted from the assessment as no change in ground levels means there will be no reduction in flood storage in this location post-development compared with the existing scenario.
- 5.1.5 In discussions with the Environment Agency, at the meeting on 3 February 2022, it was agreed that a conservative assessment related to land raising would be undertaken, to understand the potential for wider impacts as a result of the Facility.
- 5.1.6 During the meeting it was discussed that this may require the volume of displaced water to be compared with the wider flood extent during a breach event to demonstrate the limited impact as a result of the Facility.
- 5.1.7 However, on the basis that the additional volume of potential flood storage, associated with ground lowering, would be in excess of the loss of potential flood storage associated with ground raising it has been concluded that there will be no increased displacement of flood water, should there be a breach in the defences in the future.
- 5.1.8 Therefore, there is no requirement to carry out an assessment of the displacement of water across the wider flood extent and, in accordance with guidance set out in the National Planning Policy Framework, it has been demonstrated that the Facility would not result in an increase in flood risk to the wider area, should there be a breach in the defences.



BOSTON ALTERNATIVE ENERGY FACILITY DEVELOPMENT CONSENT ORDER
Regulation 5(2)(o) - Technical Note - Deadline 7 - Worst Case Assessment for Land Raising
BOSTON BOROUGH COUNCIL
Sheet 1 of 1



Key

- Order limits
- Habitat Mitigation Area
- Land outside Order limits

Areas of cut and fill to level 2.4m AOD

VOLUME m3

- Area subject to land raising - Fill volume 4,943m3
- Unchanged
- Area subject to land lowering - Cut volume 27,300m3

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APPLICANT **ALTERNATIVE USE BOSTON PROJECTS LTD**

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REV	DATE	DESCRIPTION		BY	CHK	APP

TITLE **BOSTON ALTERNATIVE ENERGY FACILITY DEVELOPMENT CONSENT ORDER Regulation 5(2)(o) - Technical Note - Deadline 7 Worst Case Assessment for Land Raising Figure 1**

Application Number EN010095			
DRAWN MCP	CHECKED HW	APPROVED PS	
DATE 15/02/2022	SCALE @A1 1:2,500	REF PB6934	
DRAWING NUMBER PB6934-RHD-01-ZZ-DR-4034		STATUS SO	REVISION 0