

Chris Newman
Land & Water Group
Sent by email.

Our ref: SL/2024/123179/01-L01
ENVPAC/1/KSL/00714

Date: 26 February 2024

Dear Chris,

Advice regarding 22/3139/FUL - Bank stability and improvement works including sheet pile installation, grading of bank, reinstatement with engineered fill, replacement of concrete surfacing and joints and extended drainage pipe to west and North banks.

Thames Young Mariners Base, Riverside Drive, Ham, Richmond, TW10 7RX

Thank you for your request for charged advice regarding the above site.

As part of this consultation, we have reviewed the submitted information received on 12 February 2024, including:

- Floodplain Statement, C3123-LAWS-ZZ-XX-TN-C-0002, dated 19 January 2024

Floodplain compensation

We have reviewed the floodplain statement (ref: C3123-LAWS-ZZ-XX-TN-C-0002) and acknowledge that compensation storage will now be provided. However, further information is needed to demonstrate that the proposed compensation will operate effectively and ensure the proposal does not increase flood risk.

Next steps

A revised Flood Risk Assessment (FRA) accompanying the application 22/3139/FUL should be submitted, including:

- A plan showing where flood waters are being displaced by the development (i.e. where ground raising is occurring in the floodplain) in addition to a plan showing where the compensation area is located. This should include existing and proposed topographical data for the site.
- It should be clarified at what level (m AOD) the 26.4m³ of material is being removed, instead a wide range of 5.00m AOD to 8.25m AOD currently provided. The compensation volume needs to be at the same level or lower than that of the lost flood storage volume.
- A comparative 'cut n fill' table to demonstrate that level for level flood compensation has been achieved should be submitted to show the potential loss and gain of flood storage for each respective horizontal slice.
- The thickness of each vertical slice should typically be 100-300mm.

Flood Risk Assessment – sources of data

As raised in our formal response to this application dated 2 February 2024 (ref: SL/2023/123082/01-L01), a revised FRA should be informed by our Thames Tidal Upriver Breach Inundation Modelling [2017] and Lower Thames, Jubilee River and River Ash Modelling Study [2020].

Copies of our Thames Tidal Upriver Breach Inundation Modelling [2017] and Lower Thames, Jubilee River and River Ash Modelling Study [2020] can be requested by contacting our Kent and South London customer & engagement team on the following email address KSLE@Environment-Agency.gov.uk

Ground anchors

Our previous comment concerning clarification on the location of ground anchors along the North Bank in relation to the new structure remains. This is to mitigate any potential clash between the ground anchors and structure, including foundations.

TE2100 raising strategy

The information submitted to date does not address the requirement for a raising strategy for the Thames tidal flood defences (Objection 2 in our letter ref: SL/2023/123082/01-L01).

Detailed plans to raise the tidal flood defence crest line, in line with the Thames 2100 Plan e.g. 6.45m AOD by 2065 and 6.90m AOD by 2100, should be submitted. The current statutory defence crest level is 6.10m AOD. We note that the submitted floodplain statement states that this level ranges from 6.27m – 7.13mOD, however this does not negate the need for a raising strategy as required by the Richmond Local Plan.

Water voles

Previous concerns raised at the Flood Risk Activity Permit stage, regarding whether water voles had been considered within surveys before bank works take place, have been addressed within the Floodplain Statement.

Flood Risk Activity Permit

The Environmental Permitting (England and Wales) Regulations 2016 require a permit to be obtained for any activities which will take place:

- on or within 8 metres of a main river (16 metres if tidal)
- on or within 8 metres of a flood defence structure or culvert (16 metres if tidal)
- on or within 16 metres of a sea defence
- involving quarrying or excavation within 16 metres of any main river, flood defence (including a remote defence) or culvert
- in a floodplain more than 8 metres from the river bank, culvert or flood defence structure (16 metres if it's a tidal main river) and you don't already have planning permission.

For further guidance please visit <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits> or contact our National Customer Contact Centre on 03702 422 549 or by emailing enquiries@environment-agency.gov.uk. The applicant should

creating a better place
for people and wildlife



not assume that a permit will automatically be forthcoming once planning permission has been granted, and we advise them to consult with us at the earliest opportunity. Should you have any queries regarding this response, please contact me.

Yours sincerely,

George Goodby
Sustainable Places Planning Specialist

E-mail kslplanning@environment-agency.gov.uk

Thames Young Mariners

EA Planning Response Document

Document Number: C3123-LAWS-TYM-ZZ-RP-C-0001

Status: A - Approved

This report has been issued, amended and approved as follows:

Rev	Issue Date	Revision Details	Required Approvals		
			Drafted by:	Reviewed By:	Approved By:
01	22/04/2024	First Issue	Chris Newman	James North	James North
02	02/07/2024	Amendment to flood compensation area	Chris Newman	James North	James North

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1 Summary

Land and Water Services (LAWS) have been appointed by Surrey County Council (SCC) to undertake bank stabilisation works at Thames Young Mariners site, where there is evidence of erosion and instability. The project is based on a report by Terratech in 2016, which recommended sheet pile walls as the best solution compared to gravity retaining walls, due to constructability, design life, maintenance, sustainability, land take, impact and disruption.

The project was initiated by the maintenance department of SCC to address the instability and erosion of the banks, which was worsened by the removal of Japanese knotweed. The stabilisation works are separate from the major development on the site, which was led by a different department of SCC.

Discussions with the Environment Agency (EA) raised concerns within document ref: 'SL123082 (GG) Thames Young Mariners- Bank Stability'. This report outlines each of these concerns and provides a response for each.

2 Floodplain Compensation

2.1 Environment Agency Comment:

We have reviewed the floodplain statement (ref: C3123-LAWS-ZZ-XX-TN-C-0002) and acknowledge that compensation storage will now be provided. However, further information is needed to demonstrate that the proposed compensation will operate effectively and ensure the proposal does not increase flood risk.

Next steps

A revised Flood Risk Assessment (FRA) accompanying the application 22/3139/FUL should be submitted, including:

- A plan showing where flood waters are being displaced by the development (i.e. where ground raising is occurring in the floodplain) in addition to a plan showing where the compensation area is located. This should include existing and proposed topographical data for the site.
- It should be clarified at what level (m AOD) the 26.4m³ of material is being removed, instead a wide range of 5.00m AOD to 8.25m AOD currently provided. The compensation volume needs to be at the same level or lower than that of the lost flood storage volume.
- A comparative 'cut n fill' table to demonstrate that level for level flood compensation has been achieved should be submitted to show the potential loss and gain of flood storage for each respective horizontal slice.
- The thickness of each vertical slice should typically be 100-300mm.

2.2 Land and Water Response:

A series of sections have been produced at 300mm horizontal slices. The location of these sections can be seen in the below map (figure 1).

Following this, figure 2 provides a table indicating the area occupied within the functional flood plain within each horizontal slice. As well as the volume for each based on the depth as shown in figure 1 for each section.

Finally, the Total Volume Table which details 2 figures, these are the:

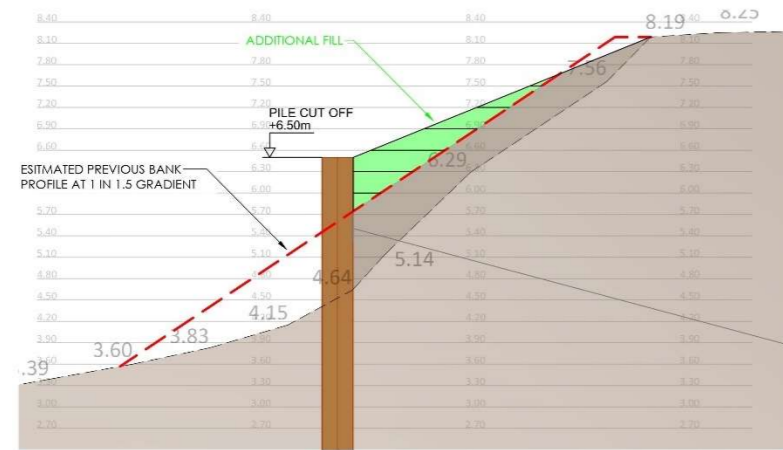
- Total Volume occupied between 4.20mOD – 7.80mOD: **63.30m3**
- Total Volume occupied between 4.20mOD – 6.9mOD (TE2100 level): **48.86m3**

It was agreed during the meeting that flood compensation is only required below the level of 6.9mOD. Therefore, 48.86mOD of flood compensation is required on a volume for volume / level for level basis.

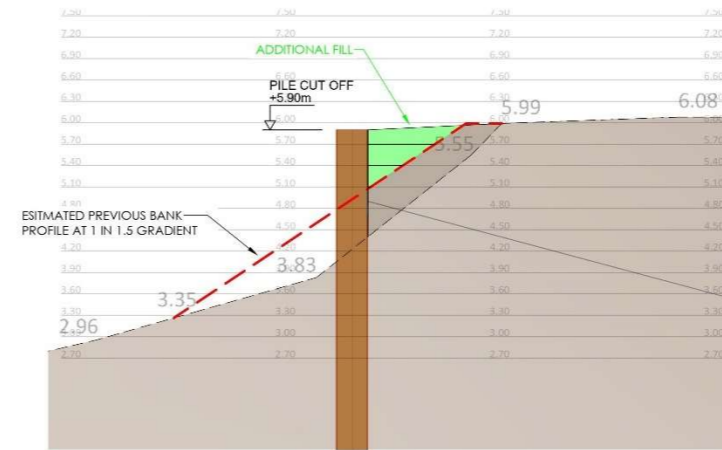


Figure 1. Sections Location

Doc No.:	PR-SP-13 TW Procedure	Issue No.:	3	Issue Date:	27/06/22
Author:	Marc Babin	Reviewed by:	Kevin Kirkland	Date of First Issue:	

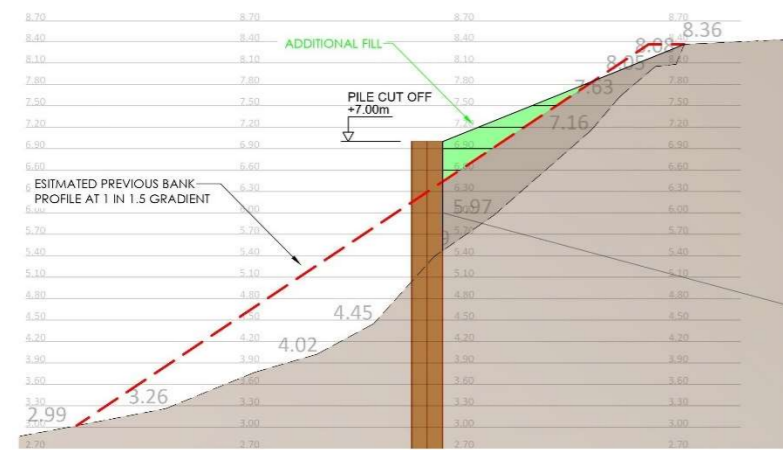


SECTION A-A
SCALE 1:50



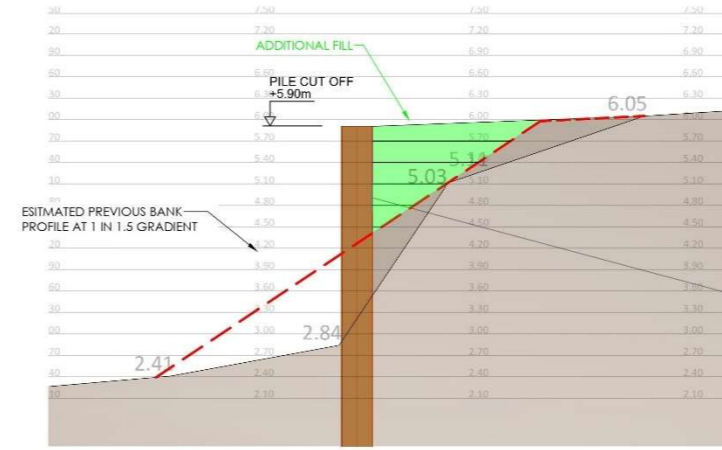
SECTION D-D
SCALE 1:50

Area 1 (Section E/E)			
Flood Slice (m AOD)	Depth (m)	Area of Slice (m ²)	Volume (m ³)
8.40 - 8.10	7		
8.10 - 7.80	7		
7.80 - 7.50	7		
7.50 - 7.20	7		
7.20 - 6.90	7		
6.90 - 6.60	7		
6.60 - 6.30	7		
6.30 - 6.00	7		
6.00 - 5.70	7	0.5324	3.7268
5.70 - 5.40	7	0.5109	3.5763
5.40 - 5.10	7	0.3759	2.6313
5.10 - 4.80	7	0.2409	1.6863
4.80 - 4.50	7	0.1057	0.7399
4.50 - 4.20	7	0.0054	0.0378
4.20 - 3.90	7		
3.90 - 3.60	7		
3.60 - 3.30	7		
3.30 - 3.00	7		
3.00 - 2.70	7		



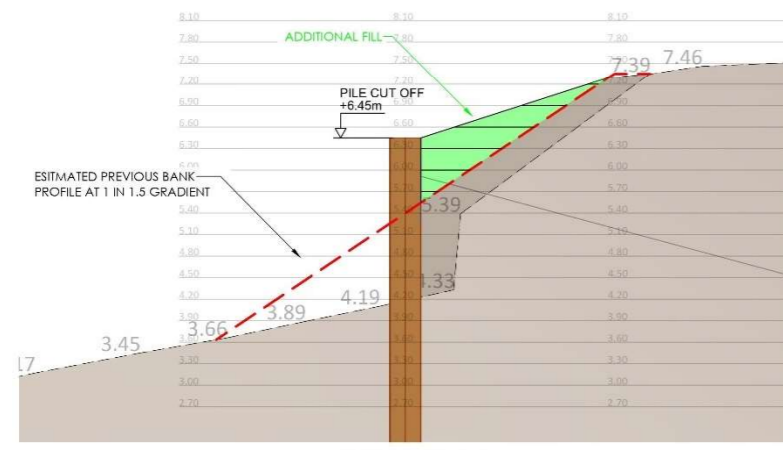
SECTION B-B
SCALE 1:50

Area 3 (Section B/B)			
Flood Slice (m AOD)	Depth (m)	Area of Slice (m ²)	Volume (m ³)
8.40 - 8.10			
8.10 - 7.80			
7.80 - 7.50	25.6	0.0597	1.52832
7.50 - 7.20	25.6	0.1484	3.79904
7.20 - 6.90	25.6	0.2246	5.74976
6.90 - 6.60	25.6	0.1393	3.56608
6.60 - 6.30	25.6	0.019	0.4864
6.30 - 6.00			
6.00 - 5.70			
5.70 - 5.40			
5.40 - 5.10			
5.10 - 4.80			
4.80 - 4.50			
4.50 - 4.20			
4.20 - 3.90			
3.90 - 3.60			
3.60 - 3.30			
3.30 - 3.00			
3.00 - 2.70			



SECTION D-D
SCALE 1:50

Area 2 (Section D/D)			
Flood Slice (m AOD)	Depth (m)	Area of Slice (m ²)	Volume (m ³)
8.40 - 8.10	25		
8.10 - 7.80	25		
7.80 - 7.50	25		
7.50 - 7.20	25		
7.20 - 6.90	25		
6.90 - 6.60	25		
6.60 - 6.30	25		
6.30 - 6.00	25		
6.00 - 5.70	25	0.2561	6.4525
5.70 - 5.40	25	0.2149	5.3725
5.40 - 5.10	25	0.0798	1.995
5.10 - 4.80	25	0.0006	0.015
4.80 - 4.50	25		
4.50 - 4.20	25		
4.20 - 3.90	25		
3.90 - 3.60	25		
3.60 - 3.30	25		
3.30 - 3.00	25		
3.00 - 2.70	25		



SECTION C-C
SCALE 1:50

Area Volumes				
Flood Slice (m AOD)	Area 1	Area 2	Area 3	Total (m ³)
8.40 - 8.10				
8.10 - 7.80				
7.80 - 7.50			1.54252	1.54252
7.50 - 7.20			3.94664	3.94664
7.20 - 6.90			8.95468	8.95468
6.90 - 6.60			9.0264	9.0264
6.60 - 6.30			7.29968	7.29968
6.30 - 6.00			4.45592	4.45592
6.00 - 5.70	3.7268	6.4525	1.70516	11.88446
5.70 - 5.40	3.5763	5.3725	0.1408	9.0896
5.40 - 5.10	2.6313	1.995		4.6263
5.10 - 4.80	1.6863	0.015		1.7013
4.80 - 4.50	0.7399			0.7399
4.50 - 4.20	0.0378			0.0378
4.20 - 3.90				
3.90 - 3.60				
3.60 - 3.30				
3.30 - 3.00				
3.00 - 2.70				
Total (m³)				63.3052
Total (m³) Below TE2100 Level (6.9mAOD)				48.86136

TOTAL VOLUME TABLE

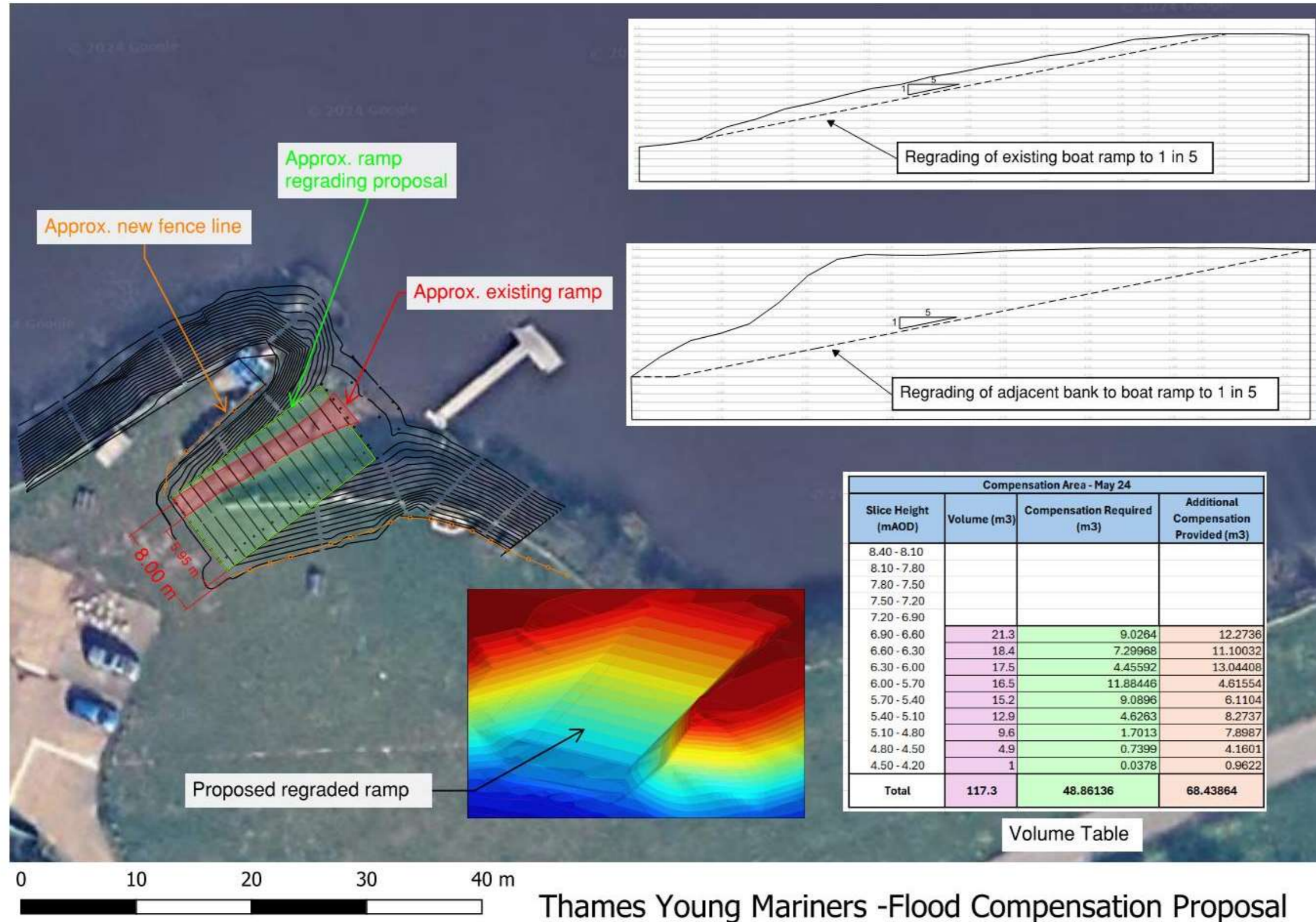
Figure 2. Sections Volume

To provide compensation, Land and Water are proposing to widen and regrade the existing on site earth boat ramp.. The proposal is to extend the ramp and regrade the existing slope at a 1 in 5 stable gradient from the toe up to the top of bank. This area of bank has been chosen as it occupies levels between 4.20mOD – approx. 7.6mOD which is within the required range to provide compensation within. The below figure details the location of the proposed compensation location as well as a section taken through the bank using LiDAR data.



Figure 3. Flood Compensation Proposal Location

To inform the flood compensation calculations, a topographical survey was undertaken on site to provide detail around the boat ramp. The new proposed bank regrade was modelled to meet the required flood compensation provision. During the modelling process it was determined that the boat ramp will require a typical extension of 6m. The below figure presents the proposed regrade and flood compensation volumes within a table.



Thames Young Mariners -Flood Compensation Proposal

Figure 4. Flood Compensation Area - Volumes

3 Flood Risk Assessment – Sources of data

3.1 Environment Agency Comment:

As raised in our formal response to this application dated 2 February 2024 (ref: SL/2023/123082/01-L01), a revised FRA should be informed by our Thames Tidal Upriver Breach Inundation Modelling [2017] and Lower Thames, Jubilee River and River Ash Modelling Study [2020].

Copies of our Thames Tidal Upriver Breach Inundation Modelling [2017] and Lower Thames, Jubilee River and River Ash Modelling Study [2020] can be requested by contacting our Kent and South London customer & engagement team on the following email address KSLE@Environment-Agency.gov.uk

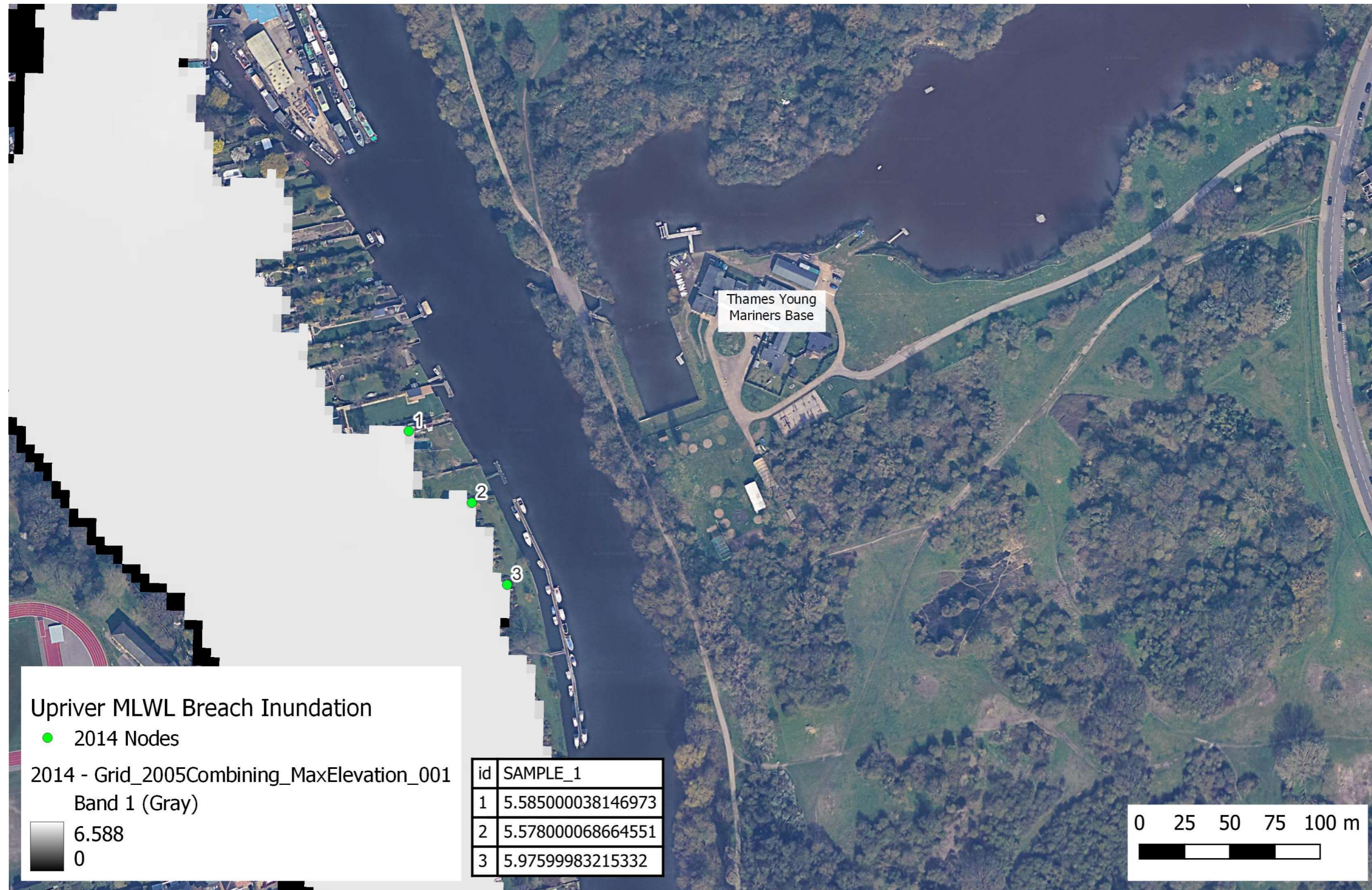
3.2 Land and Water Response:

Data was requested and received. The relevant elevation 2d grid data was overlaid onto QGIS. Points were plotted onto the data at the closest location to the Thames Young Mariners base as not all of the data covered the site.

The points were used to extract / sample data at each location, a map for each of the sample data has been produced below which includes the point location and extracted / sampled data table.

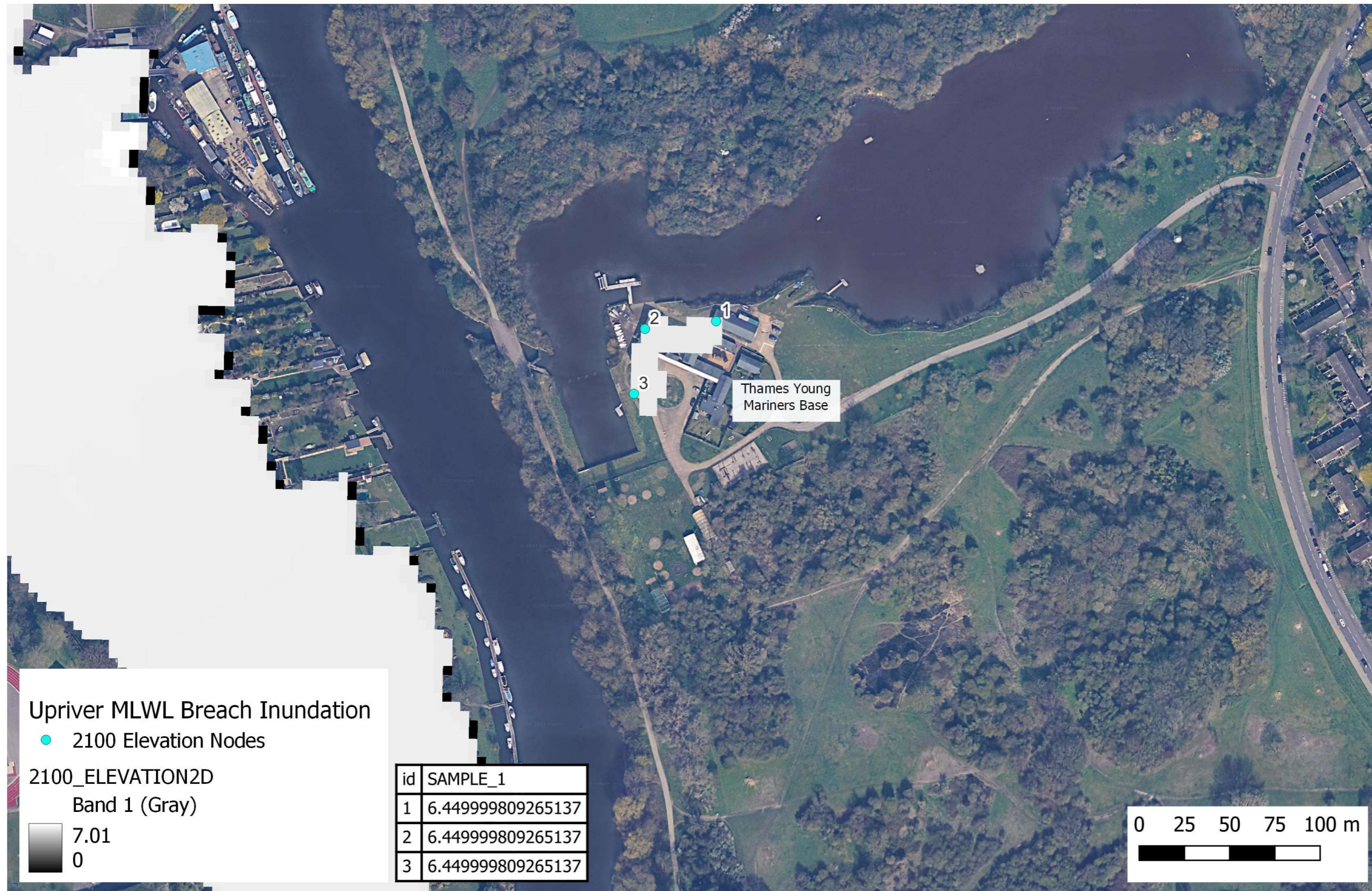
Doc No.:	PR-SP-13 TW Procedure	Issue No.:	3	Issue Date:	27/06/22
Author:	Marc Babin	Reviewed by:	Kevin Kirkland	Date of First Issue:	

3.2.1 2014 Maximum Likely Water Level

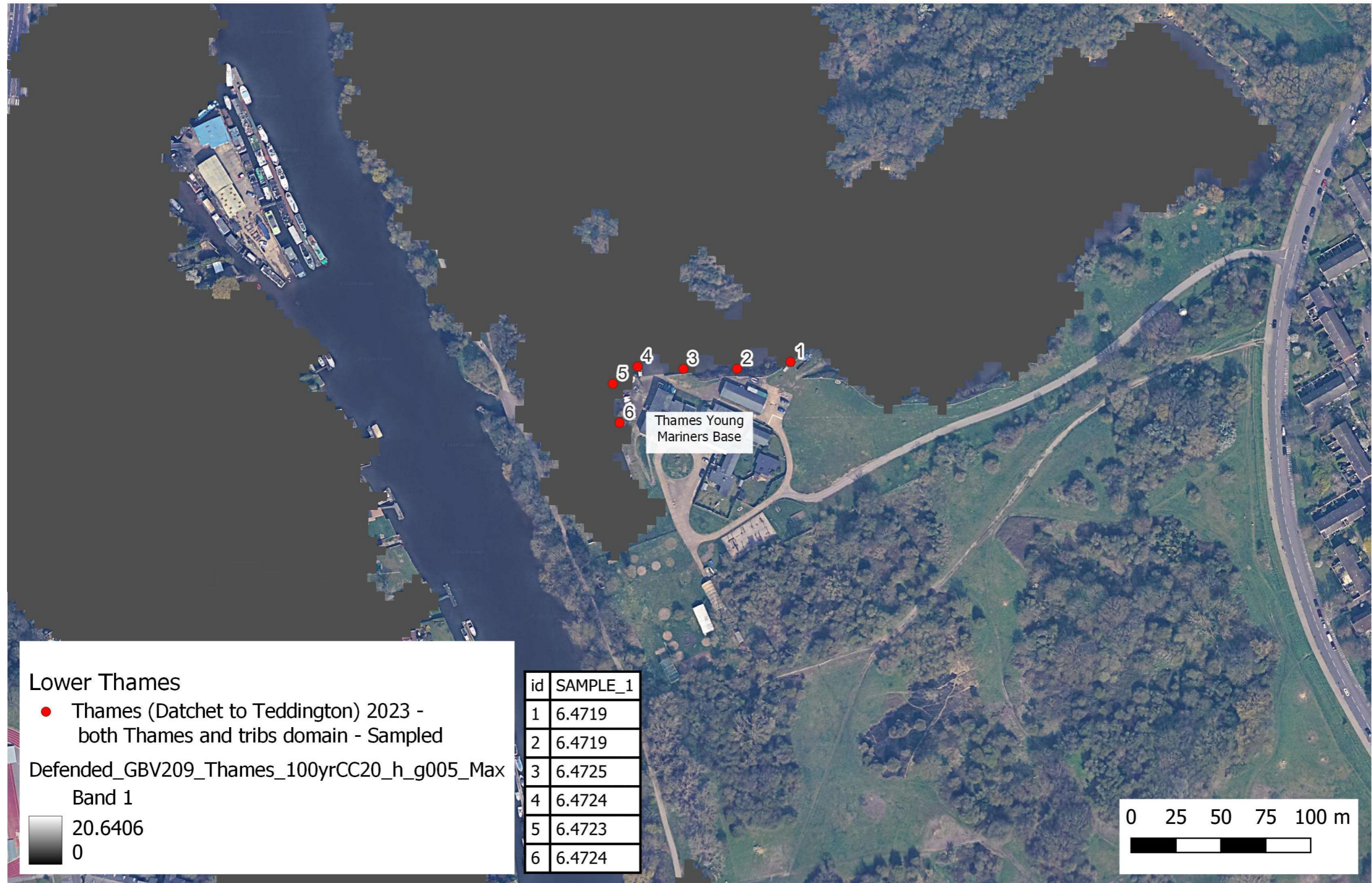


Doc No.:	PR-SP-13 TW Procedure	Issue No.:	3	Issue Date:	27/06/22
Author:	Marc Babin	Reviewed by:	Kevin Kirkland	Date of First Issue:	

3.2.2 2100 Maximum Likely Water Level



3.2.3 Lower Thames, Jubilee River and River Ash Modelling Study (2020) 1 in 100 year inclusive of Climate Change Level



3.2.4 Flood Data plotted onto sections

An average of the flood data extracted from the models is as follows:

- **2014 MLWL: 5.71mOD**
- **2100 MLWL: 6.44mOD**
- **Lower Thames 1 in 100 year: 6.47mOD**

These levels have been plotted on the main works cross sections below in addition with the TE2100 levels for 2065 & 2100. The location for each cross section matches that of the locations shown in figure 1.

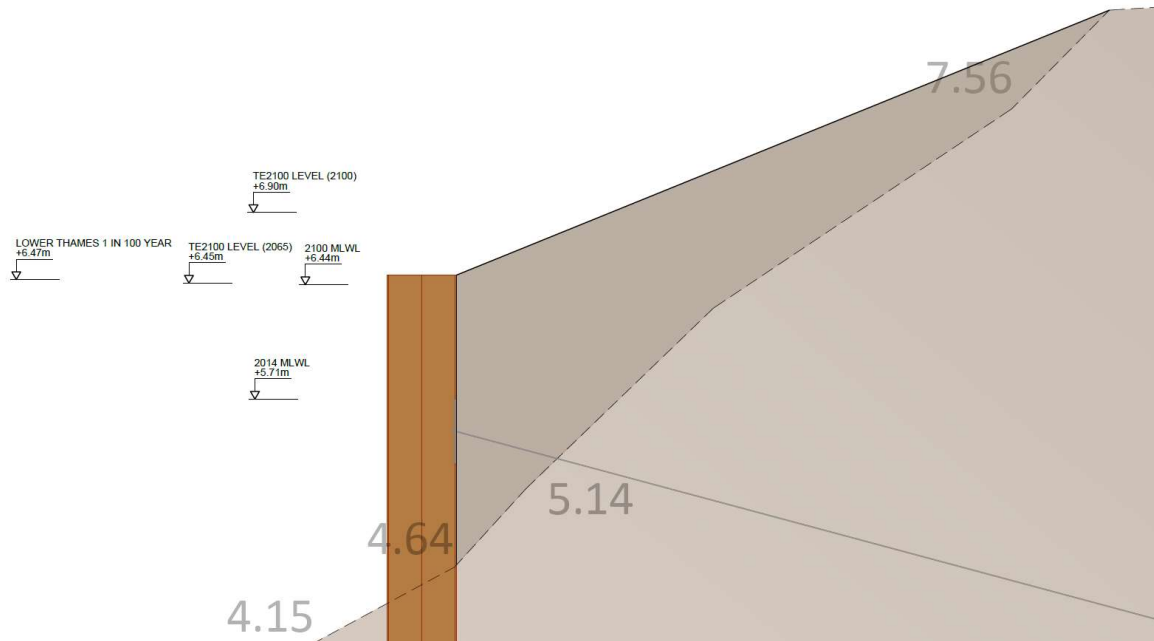


Figure 5. Section A/A

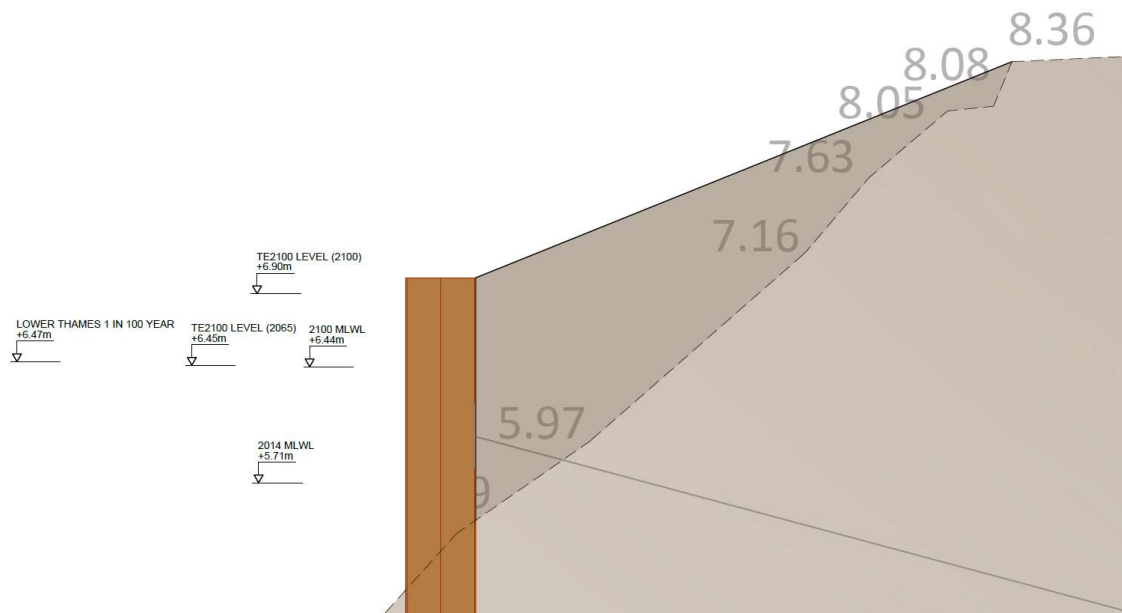


Figure 6. Section B/B

Doc No.:	PR-SP-13 TW Procedure	Issue No.:	3	Issue Date:	27/06/22
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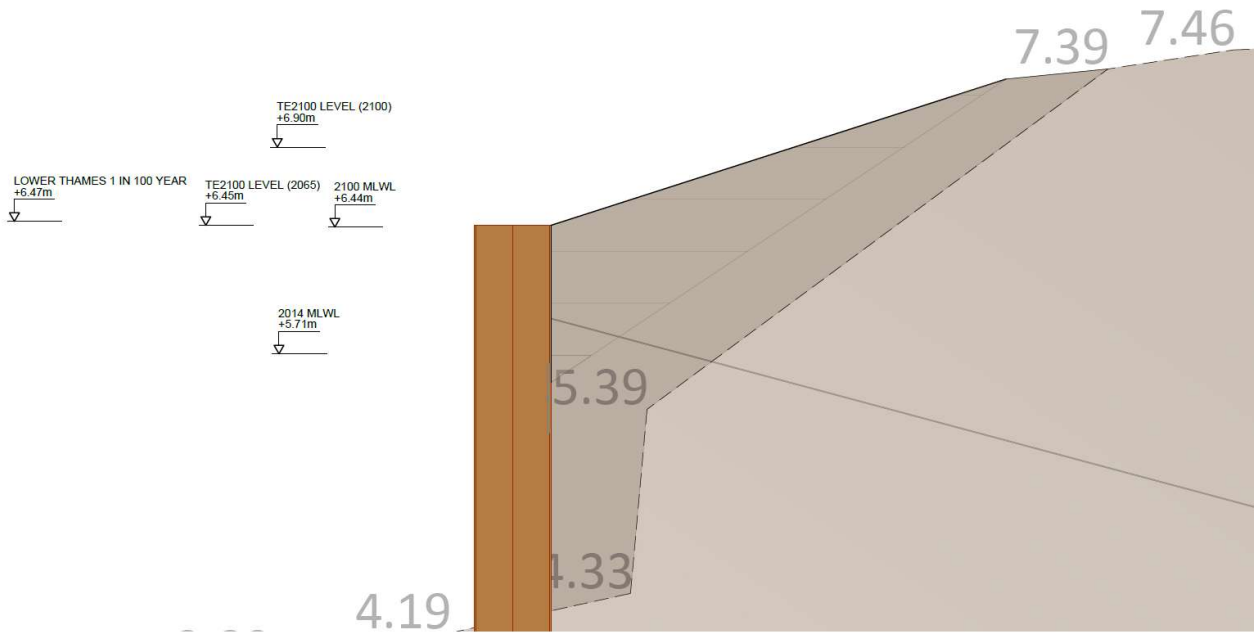


Figure 7. Section C/C

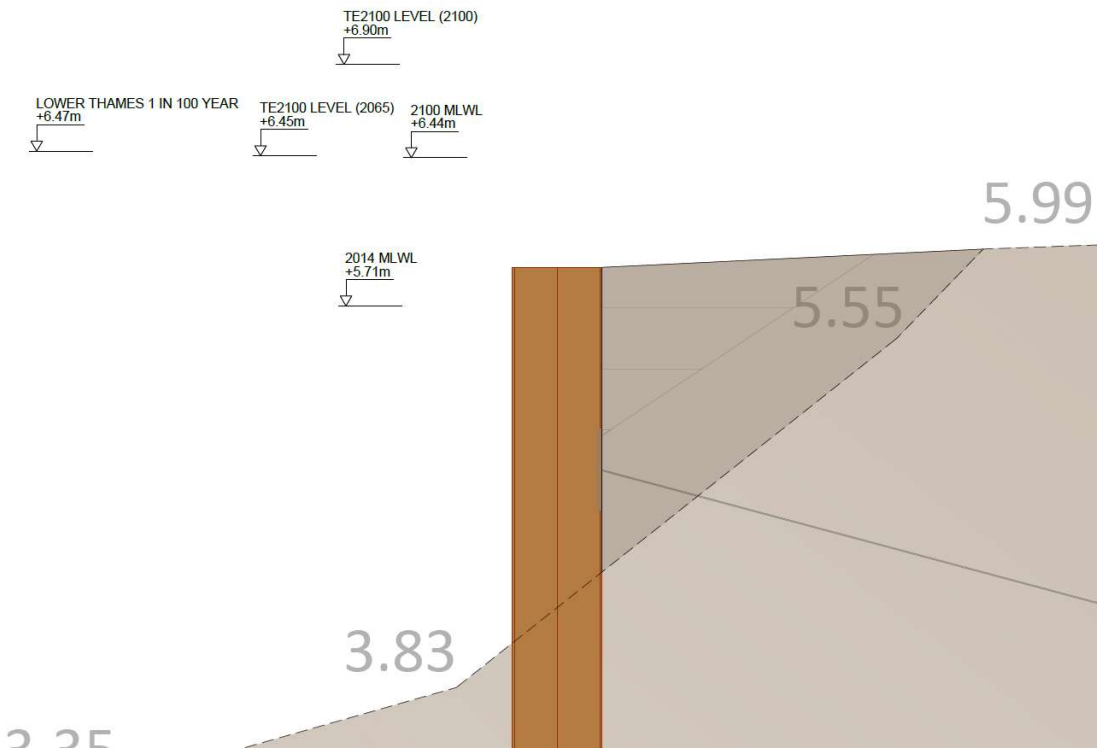


Figure 8. Section D/D

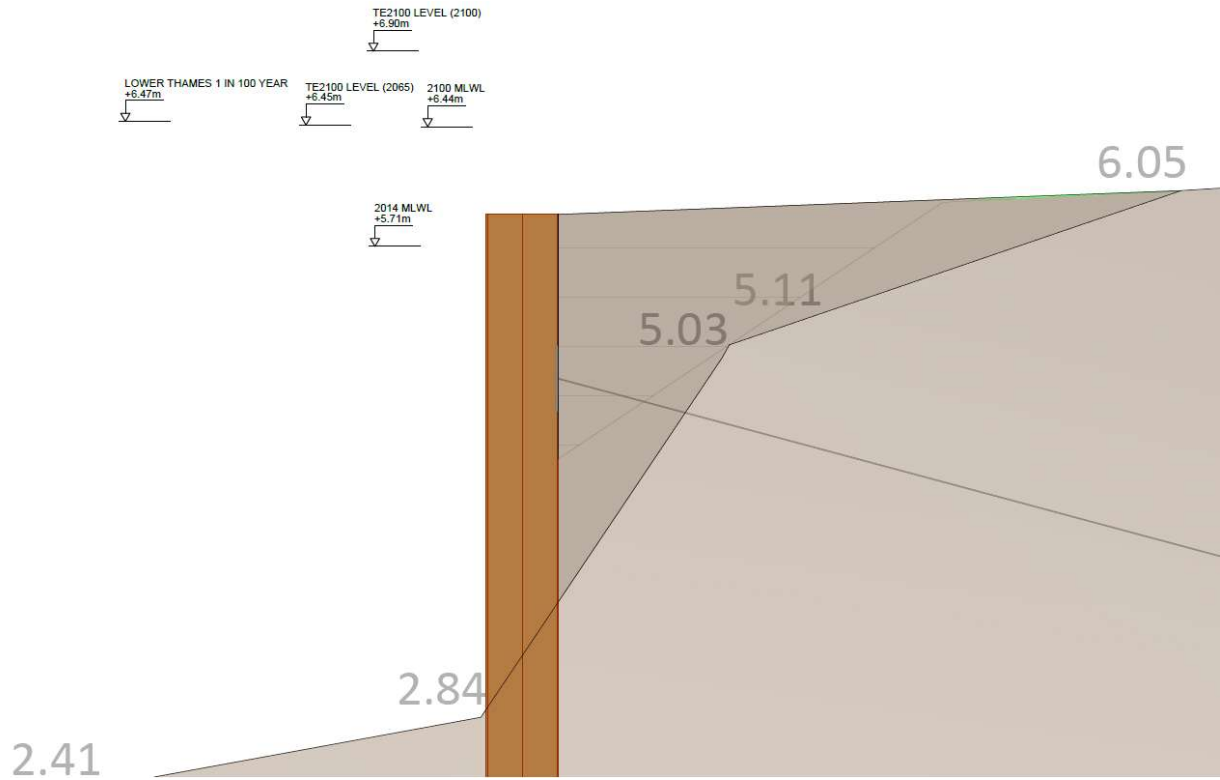


Figure 9. Section E/E

4 Ground Anchors

4.1 Environment Agency Comment:

Our previous comment concerning clarification on the location of ground anchors along the North Bank in relation to the new structure remains. This is to mitigate any potential clash between the ground anchors and structure, including foundations.

4.2 Land and Water Response:



Figure 10. Proposed works overlaid on new development plans.

To address the concern regarding the location of ground anchors along the North Bank, we have provided a revised figure that illustrates the alignment of the proposed sheet pile stabilisation works and the new development. The figure shows that there is no conflict between the ground anchors and the main building footprint of the development. The ground anchors are designed to be installed at an angle and have a typical depth of 3-4 metres below ground level. The new car park, which is located adjacent to the sheet pile wall, will have a shallow foundation that will likely not exceed 1 metre in depth. Therefore, there will be sufficient clearance between the ground anchors and the car park surfacing, even if they intersect slightly in plan view. We believe that this mitigates the potential risk of any clash between the ground anchors and the new structure, including foundations.

5 TE2100 Raising Strategy

5.1 Environment Agency Comment:

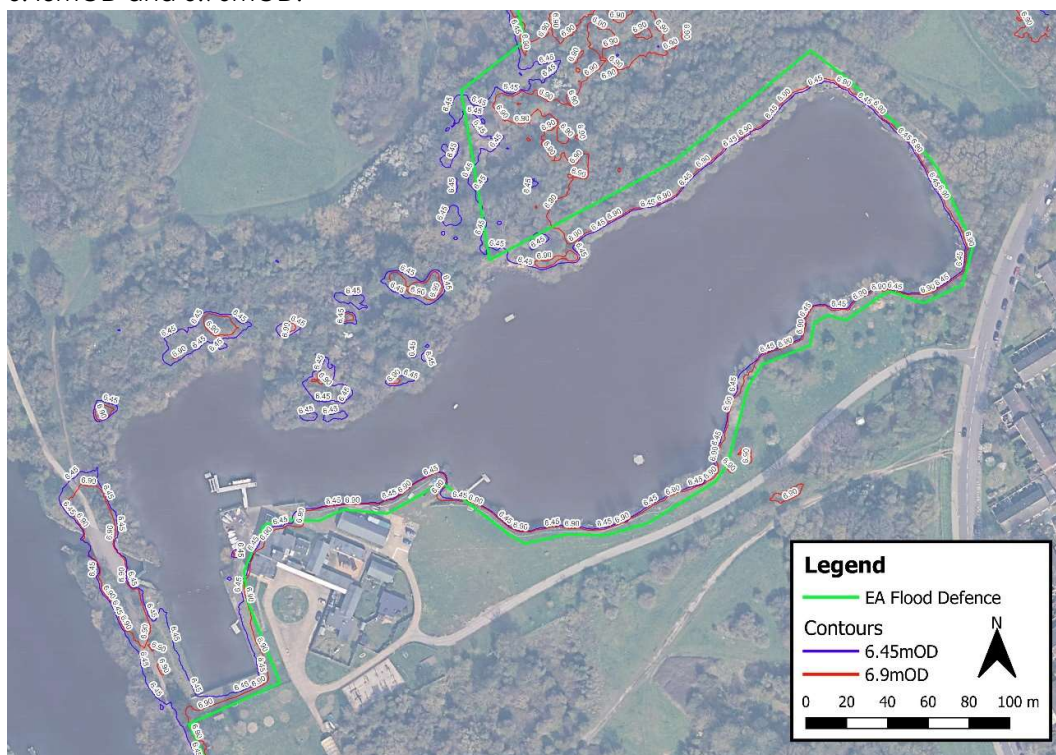
The information submitted to date does not address the requirement for a raising strategy for the Thames tidal flood defences (Objection 2 in our letter ref: SL/2023/123082/01-L01).

Detailed plans to raise the tidal flood defence crest line, in line with the Thames 2100 Plan e.g. 6.45m AOD by 2065 and 6.90m AOD by 2100, should be submitted. The current statutory defence crest level is 6.10m AOD. We note that the submitted floodplain statement states that this level ranges from 6.27m – 7.13mOD, however this does not negate the need for a raising strategy as required by the Richmond Local Plan.

5.2 Land and Water Response:

A request has been made for a raising strategy regarding the Thames tidal flood defences, as stipulated by the Richmond Local Plan and the Thames 2100 Plan. These plans set out the minimum defence crest levels that should be achieved by 2065 and 2100 to protect against tidal flooding.

However, we reviewing LiDAR information of the existing ground levels in the area of the proposed works, indicates that they are above the minimum requirements set by the Thames 2100 Plan. The map below shows the EA Flood Defence location and contour lines at 6.45mOD and 6.90mOD.



The proposed works consist of installing sheet piles along the bank to provide stability and prevent erosion for the design life of the sheet piles, which is 75 years. The sheet piles will not alter the existing ground or defence levels, but will reinforce them and ensure their long-term integrity. Therefore, the proposed works do not conflict with the Thames 2100 Plan or the Richmond Local Plan, and do not require a raising strategy for the Thames tidal flood defences.

Land and water have contacted the designer who are going to produce as part of the design a inspection/maintenance plan for the proposed sheet piles and ground anchors.

6 Water Voles

6.1 Environment Agency Comment:

Previous concerns raised at the Flood Risk Activity Permit stage, regarding whether water voles had been considered within surveys before bank works take place, have been addressed within the Floodplain Statement.

6.2 Land and Water Response:

The banks within and adjacent to the proposed works area have has an Ecological survey to check for any evidence of water vole presence. The survey results did not indicate any water vole activity on the banks.

4.5.8 Other Mammals – Otters & Water Voles

The surveyed area and adjacent habitats were inspected for field signs of otter and water vole activity. This includes holts, burrows, feeding sites, or dung piles. No evidence of otters or water voles was recorded.

Project:	Thames Young Mariners – Retaining Walls			
Title:	Sheet Pile Design Life			
Reference:	A123043-TGEE-ZZ-XX-RP-C-0001			Rev : P01
Date:	03/05/2024	By: JJF	Checked: JJF	Approved: APM

1. Sheet Pile – Design Life

Tony Gee and Partners LLP has been appointed by Land and Water Services to undertake the design of a sheet piled retaining wall to stabilise selected lengths of the riverbanks forming part of the Thames Young Mariners compound.

The design consists of driven steel sheet piles predominantly in cantilever with a short section stabilised through provision of ground anchor tie backs.

The steel sheet piles are designed for a design life of 75 years, in accordance with the client scope, with the design life achieved through provision of sacrificial steel. Corrosion rates are considered in accordance with BS EN 1993-5 (and associated National Annex).

The ground anchors are formed of stainless steel rods with isolation washers provided to prevent development of bimetallic corrosion and achieve a design life to match or better the steel sheet piles.