

Basement Impact
Assessment Audit

King's Cross Methodist
Church, London,
WC1H 8BW

For
London Borough of Camden

Project No.
14291-15

Date
April 2025

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DOCUMENT HISTORY AND STATUS

Revision	Date	Purpose/ Status	File Ref	Author	Check	Review
D1	April 2025	For comment	BBgk14291-15-030425 King's Cross Methodist Church D1.docx	BB	GK	GK

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Document Details

Last Saved	03/04/2025 12:26
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Project Number	14291-15
Project Name	Basement Impact Assessment Audit
Revision	D1
Planning Reference	2024/5792/P
File Ref	BBgk14291-15-030425 King's Cross Methodist Church D1.docx

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1.0 NON-TECHNICAL SUMMARY

- 1.1 CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for King's Cross Methodist Church, 58A Birkenhead Street, London, WC1H 8BW (Planning reference 2024/5792/P). The basement is considered to fall within Category C as defined by the Terms of Reference.
- 1.2 The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.
- 1.3 CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.
- 1.4 The BIA has been produced by Geotechnical & Environmental Associates Limited (GEA) and the authors' qualifications meet the requirements of CPG Basements.
- 1.5 The proposed development includes the partial demolition of the existing building, and the construction of a basement beneath the southwest part of the building. It is proposed that the basement construction is undertaken using a combination of contiguous piled walls and reinforced concrete underpinning.
- 1.6 Screening and scoping assessments are presented, supported by desk study information.
- 1.7 The BIA confirms that the ground conditions on site comprise Made Ground over London Clay Formation, underlain by the Lambeth Group.
- 1.8 The BIA considers that it is unlikely to encounter groundwater during construction, and anticipates any flows encountered to be minor and easily manageable. The development should not have an impact on the wider hydrogeological environment.
- 1.9 The proposed development adopts attenuation SuDS and should not have an impact on the wider hydrological environment. The site should not be subject to flooding.
- 1.10 The depth of excavation, ground levels and geotechnical parameters are presented inconsistently across the BIA and the GMA, and clarifications are requested.
- 1.11 Outline construction information including temporary works, sketches and sequence of underpinning works are requested.
- 1.12 A Ground Movement Assessment (GMA) has been undertaken to assess the impact of the basement construction on the neighbouring property walls. Further information is requested, as discussed in section 4.
- 1.13 As described in Section 5, it cannot be confirmed that the BIA complies with the requirements of CPG: Basements and the Principles for Audit set out in the Basement Impact Assessment (BIA) Audit Service Terms of Reference & Audit Process. Queries and comments on the BIA are described in Section 4 and Appendix 2.

2.0 INTRODUCTION

2.1 CampbellReith was instructed by London Borough of Camden (LBC) on 28th January 2025 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for King's Cross Methodist Church, 58A Birkenhead Street, London, WC1H 8BW (Planning reference 2024/5792/P).

2.2 The audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3 A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within

- Camden Local Plan 2017 - Policy A5 Basements.
- Camden Planning Guidance (CPG): Basements. January 2021.
- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.

2.4 The BIA should demonstrate that schemes:

- a) maintain the structural stability of the building and neighbouring properties;
- b) avoid adversely affecting drainage and run off or causing other damage to the water environment;
- c) avoid cumulative impacts upon structural stability or the water environment in the local area;

and evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5 LBC's Audit Instruction described the planning proposal as *"Part demolition, extension and reconfiguration of existing building, including enlargement of lower ground floor, erection of additional storey and new west wing and alterations to east elevation to provide replacement church (Class F1) with ancillary cafe and additional student accommodation (Sui Generis), together with associated plant, cycle and refuse storage."*

2.6 The Audit Instruction confirmed that the following adjacent buildings are listed: 59 Birkenhead Street, 54 to 58 Birkenhead Street and 1 to 5 Crestfield Street.

2.7 CampbellReith accessed LBC's Planning Portal on 17th February 2025 and gained access to the following relevant documents for audit purposes:

- Ground Investigation & Basement Impact Assessment by Geotechnical & Environmental Associates Limited (GEA), Ref. J24145 Rev 2, dated September 2024.
- Design & Access statement by Matthew Lloyd Architects, Ref. KXMC-PL01, dated December 2024.

- Architectural Existing, and Proposed plans and sections by Matthew Lloyd Architects, dated December 2024.
- Demolition plans and sections by sections by Matthew Lloyd Architects, dated January 2025.
- Planning Statement by Pegasus Group, Ref. P20-0063, dated December 2024.
- Planning Consultation Responses.

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
Is data required by Cl.233 of the GSD presented?	No	Consistent existing / proposed site levels; outline structural information.
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	
Are suitable plan/maps included?	Yes	Section 2.3 of the BIA
Do the plans/maps show the whole of the relevant area of study, and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	No	Section 3.1.2 of the BIA Justifications missing for "No" answers.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1.1 of the BIA
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	Section 3.1.3 of the BIA
Is a conceptual model presented?	Yes	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.0 of the BIA
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.0 of the BIA
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	Section 4.0 of the BIA

Item	Yes/No/NA	Comment
Is factual ground investigation data provided?	Yes	Section 5 and Appendix A of the BIA
Is monitoring data presented?	Yes	Section 5.4 of the BIA
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	Section 7.1.1 and 9.2.1 of the BIA. Clarifications regarding stiffness parameters of the Lambeth Group are requested.
Are reports on other investigations required by screening and scoping presented?	No	
Are the baseline conditions described, based on the GSD?	No	Consistent existing / proposed site levels; outline structural information.
Do the baseline conditions consider adjacent or nearby basements?	Yes	
Is an Impact Assessment provided?	Yes	Section 12.0 of the BIA
Are estimates of ground movement and structural impact presented?	Yes	GMA provided
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	No	GMA requires review
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	GMA requires review
Has the need for monitoring during construction been considered?	Yes	Section 10.2 of the BIA

Item	Yes/No/NA	Comment
Have the residual (after mitigation) impacts been clearly identified?	No	GMA requires review
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	No	GMA requires review, excavation beneath north lightwell needs to be included in the model.
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	No	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	No	GMA requires review; Sensitivity analysis predicts Category 2 damage to the walls of 1 Crestfield Street.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

- 4.1 The Basement Impact Assessment (BIA) has been produced by Geotechnical and Environmental Associates Limited (GEA) and the authors' qualifications meet the requirements of CPG Basements.
- 4.2 The subject site is not a listed building but is adjacent to listed buildings.
- 4.3 The property comprises a roughly rectangular shaped area measuring approximately 20m by 35m and accommodates a two-storey building, with a three-storey section in the northeast part of the site. The building features an existing lower ground floor, approximately 2m below ground level, and two lightwells at basement level along the northern and southern extents of the three-storey section. The site is bordered by Birkenhead Street to the northeast and Crestfield Street to the southwest. On the southeast and northwest sides, it is bounded by four-storey terrace buildings that include lower ground floors.
- 4.4 The proposed development includes the demolition of the structure in the southwest of the site and the extension of the lower ground floor beneath the entire footprint of the building. The third floor of the building is to be demolished and rebuilt in a new configuration. The BIA states that the proposed basement retaining walls will be formed by underpinning the existing walls to the northeast and southeast using a 'hit and miss' approach, along with the installation of contiguous pile walls at the southwest part of the basement excavation.
- 4.5 Ground investigations undertaken by GEA included a cable percussive borehole to a depth of 30.00m bgl, two window sampler boreholes and seven trial pits. The investigation indicates between approximately 0.22m to 2.20m of Made Ground, followed by the London Clay Formation up to a depth of 24.00m below ground level (bgl), overlying the Lambeth Group. The BIA states that the formation level of the new basement would be within the stiff London Clay Formation, at approximately 4.00m bgl.
- 4.6 Groundwater was not encountered in any of the boreholes during the ground investigation, and the standpipe installed in the cable percussive borehole was observed to remain dry during the monitoring visits. The BIA notes the presence of perched groundwater at a depth of 0.30m bgl within the Made Ground in trial pit No. 2. Additionally, the BIA identifies that the site lies over an unproductive stratum of the London Clay Formation and states that groundwater is unlikely to occur within this stratum. Any groundwater flows encountered during construction are predicted to be relatively minor and manageable through conventional pumping techniques. There should be no impact to the hydrogeological environment.
- 4.7 The BIA includes screening and scoping assessments supported by desk study information. Relevant figures and maps from the ARUP GSD and other guidance documents have been referenced within the BIA to support screening questions.

- 4.8 The screening flowchart identifies that the site is located approximately 90m south of the former River Fleet and is discussed in detail in section 2.5 of the BIA. The BIA states that the historic watercourse has been culverted, and as such, is not considered to increase the flood risk on site. The BIA identifies that the site has a low flood risk from surface waters, sewers, reservoirs and other sources.
- 4.9 Section 2.1 of the BIA states that the existing building and associated hardstanding occupy the entire site, with no trees present. However, in Section 12.1, the BIA states that numerous trees are present on-site and that the proposed basement is likely to extend below the depth of root action, and clarifications are requested.
- 4.10 GEA considers that the proposed development would not alter the proportion of hardstanding or impermeable surface areas on-site and would therefore have a negligible impact on surface water flows. It is proposed that the existing drainage infrastructure will be utilised wherever possible. Additionally, attenuation SuDS via blue roofs is proposed. However, the drainage strategy should be agreed upon with LBC and Thames Water.
- 4.11 The BIA states that the proposed basement construction will be carried out using a combination of reinforced concrete underpinning of the party walls to the northeast and southwest of the proposed basement excavation, along with the installation of a contiguous pile wall at the rear of the site. Drawings, including existing plans, proposed plans, and demolition plans, have been provided. The drawings indicate that the proposed basement would extend to the site boundaries near the north and south lightwell areas. However, it is unclear how the existing boundary walls are proposed to be retained.
- 4.12 A construction sequence has been provided in section 8.2 of the BIA. The BIA recommends adequate lateral propping to the underpinned and piled walls at the top level during the basement excavation. It is noted that no drawings indicating the sequence of underpinning works or layouts of the proposed underpinning works have been provided. As outlined in Section 6 of the LBC Scope of Engineering Services, additional information, including sketches of structural solutions, underpinning sequences, and temporary works, is requested.
- 4.13 Section 2.1 of the BIA states that the existing lower ground floor of the building is approximately 2.00m below ground level. However, it is noted that the lower ground floor levels are specified inconsistently as 4.00m bgl elsewhere within the BIA and the GMA, and as 2.60m in the Design & Access Statement. The depth of excavation, and the ground levels should be presented in a clear and consistent manner within the BIA.
- 4.14 The BIA states that the geotechnical parameters adopted in the GMA are based on the site investigation. However, it is noted that geotechnical parameters are used inconsistently within the BIA. Section 7.1 provides a bulk density of 17kN/m³ for the Made Ground and 19.5kN/m³ for the London Clay Formation, estimating a net unloading of 75kN/m² due to the proposed basement excavation. However, in Section 9.2, a unit weight of 19.5kN/m³ is assumed, to predict an unloading pressure of 39kN/m². The soil parameters should be presented consistently throughout the BIA, and clarification is requested regarding the anticipated unloading pressures.

- 4.15 It is understood that the neighbouring buildings have lower ground floors similar to that of the existing building. This information is presented in a figure within Section 2.3 of the BIA; however, the BIA notes that the floor levels of these buildings are unknown. The BIA notes that the foundations of the neighbouring structures are assumed to be at a depth of 1.00m bgl for the GMA.
- 4.16 Section 10.3 of the BIA discusses the impacts on existing buried services and states that all known nearby services are located below the pavement of Crestfield Street. It is understood that a utility service search has been conducted; however, this has not been included in the BIA. In accordance with Camden's Scope of Engineering Services, utility plans and confirmation of consultation with relevant asset owners (where required) should be provided.
- 4.17 The BIA identifies that the neighbouring buildings and the road pavements of Birkenhead Street and Crestfield Street would be affected by the proposed construction, and a Ground Movement Assessment (GMA) has been undertaken. The ground movements arising from the excavation and construction of the proposed basement has been estimated using Oasys suite of geotechnical modelling software PDisp and XDisp.
- 4.18 The demolition plans for the lower ground floor and ground floor indicate that the area beneath the north lightwell will be excavated and deepened. However, the ground model used in the GMA does not account for this excavation. The GMA should therefore be updated to include the ground movements arising from this excavation, and it should also consider the potential impacts on the boundary walls adjacent to the north and south lightwells.
- 4.19 The depth range provided for the Lambeth Group in Section 9.2.1 indicates its presence between -7.00m to -53.00m AOD. However, the soil profiles in the PDisp input show the Lambeth Group from a depth of -9.00m AOD. The ground model should be used consistently across the BIA and the GMA.
- 4.20 It is also noted that the value of Young's Modulus used in the GMA have been derived from the empirical relationships $E_u = 2000 \times \text{SPT N value}$, assuming the Lambeth Group soil to be granular. However, the borehole logs for borehole BH2 indicate a silty sandy clay from a depth of 24m bgl, with SPT N numbers ranging from 30 to 50. The stiffness parameters adopted in the BIA and the GMA should be reconsidered and clarified.
- 4.21 The BIA states that the proposed loads for the new structure within the lower ground floor have been adopted from structural load drawings by Price & Myers. It is understood that these loads have been included in the PDisp assessment as polygonal loads. The BIA also notes that the dimensions of the loads were unknown at the time of the analysis and were therefore modelled to reduce the bearing pressure to 150kN/m². However, the PDisp inputs indicate that different loading pressures have been applied as rectangular loads on the columns. Structural load drawings showing the proposed column loads, along with clarifications on the adopted loads in PDisp, are requested for review.

- 4.22 Appendix D of the BIA includes the results of Ground Movement Analysis and includes settlement contours showing short term and total ground movements. However, it is noted that the input and output data for the short-term movements have not been provided, and this information is requested.
- 4.23 It is noted that the overall (total) ground movements have been calculated after offsetting heave movements. This method is not considered to be an adequately conservative approach, as required by CPG Basements.
- 4.24 The PDisp input data indicates that a polygonal load, labelled "Southwest Wall Load" has been applied along the southwest boundary of the model, representing the retaining wall section along Crestfield Street. A loading pressure of 31kN/m² has been applied at 12.55m, which is understood to be approximately 450mm below the basement slab level. However, it is understood that this section of the basement retaining wall is proposed to be formed using contiguous piled walls. The model should be reconsidered and updated to reflect the loading on the contiguous piled wall.
- 4.25 The horizontal and vertical ground movements resulting from the proposed basement construction are estimated using CIRIA C760 curves. Section 9.1.2 of the BIA discusses the results of the GMA, and states that vertical and horizontal movements of 2mm to 3mm are anticipated due to the underpinning works and the installation of the bored piled wall. Additionally, the GMA predicts vertical movements of 3mm to 5mm and horizontal movements of 5mm to 8mm from combined installation and excavation movements.
- 4.26 The BIA also states that the movements are likely to be overpredicted due to the re-entrant corners present in the model. However, it is noted that the basement excavation has been modelled as a rectangular excavation, and as such, no entrant corners are noted to be present in the model and clarifications are requested.
- 4.27 While CIRIA C760 is intended for use with embedded retaining walls, it is acknowledged that it can also predict ground movements in the range of those expected for a single lift of underpinning undertaken using good workmanship practices. Industry experience indicates that vertical and horizontal movements of between 5mm and 10mm should be anticipated per lift of underpinning.
- 4.28 The XDisp inputs indicate that the proposed basement construction has been modelled in two stages: one representing the basement underpinning and contiguous piled wall installation and the other representing the basement excavation. It is noted that a surface level of 16.00m has been adopted for the XDisp installation and excavation stages, whereas a surface level of 17.00m has been adopted for the PDisp assessment. Additionally, the excavation curves are noted to be applied between 16.00m and 13.00m, which does not represent the full depth of excavation. It is also noted that the installation curve for the contiguous piled wall has not been applied for the full length of the pile. The GMA should be updated to accurately reflect the full depth of both the installation and excavation.

- 4.29 In section 9.1.1 of the BIA it is stated that the piled retaining walls are assumed to have a toe depth of 4.00m bgl for the assessment. This statement should be clarified. In accordance with the Scope of Engineering Services, the BIA should include detailed information on retaining wall design, including outline calculations with clearly stated assumptions to support the assumed pile length.
- 4.30 Corner stiffening has been applied for the installation curves in the XDisp input data. This is not considered to represent an appropriately conservative approach, as is required by CPG Basements, and should be reconsidered.
- 4.31 The results of the Building Damage Assessment are presented in section 10 of the BIA. The damage assessment estimates a maximum damage category of Burland Category 1 (Very Slight) to the neighbouring buildings. However, this needs to be confirmed following review of, and clarifications to the BIA and provision of the associated structural information.
- 4.32 Additionally, the GMA includes a sensitivity analysis that accounts for movements associated with underpinning, assuming vertical and horizontal movements of 5mm for single stage underpin installation. Vertical and horizontal movement curves labelled "5mm Movement Curve" have been applied to the excavation; however, it is unclear how these curves have been derived, and clarifications are requested. The GMA anticipates a maximum damage category of Burland Category 2 (Slight) for the walls of 1 Crestfield Street.
- 4.33 The BIA indicates that a movement monitoring scheme, including appropriate action trigger levels and contingency measures, will be implemented to ensure that ground movements generated during construction remain within the predicted limits.

5.0 CONCLUSIONS

- 5.1 The qualifications of the individuals concerned with the production of the BIA are in accordance with LBC guidelines.
- 5.2 Screening assessments are presented, supported by desk study information. The ground conditions have been confirmed through a site investigation.
- 5.3 The BIA has confirmed that the ground conditions on site comprise Made Ground over London Clay Formation, underlain by the Lambeth group.
- 5.4 It is understood that the site has a low flood risk from all sources.
- 5.5 There should be no impacts to the hydrological and hydrogeological environments.
- 5.6 Additional structural information regarding the underpinning, and temporary works, including the sequence of construction, detailed plans and sections are requested.
- 5.7 The depth of excavation of the proposed basement has been presented inconsistently across the GMA and the BIA, and clarifications are requested.
- 5.8 Public utility services plans and confirmation of consultation with asset owners are requested.
- 5.9 A Ground Movement Assessment (GMA) has been undertaken. Clarifications are requested, as discussed in Section 4. Structural information consistent with the assumptions made in the GMA should be provided for review.
- 5.10 It cannot be confirmed that the BIA complies with the requirements of CPG: Basements and the Principles for Audit set out in the Basement Impact Assessment (BIA) Audit Service Terms of Reference & Audit Process, specifically:
- The Basement Impact Assessment has not been prepared in accordance with the processes and procedures set out in CPG: Basements.
 - The methodologies and assumptions are not clearly stated and/or are not appropriate to the scale of the proposals and the nature of the site.
 - The conclusions have not been arrived at based on all necessary and reasonable evidence and considerations, in a reliable, transparent manner, by suitably qualified professionals, with sufficient attention paid to risk assessment and use of cautious or moderately conservative engineering values/estimates.
 - The conclusions of the various documents/details comprising the BIA are not consistent with each other. The conclusions are not sufficiently robust and accurate and are not accompanied by sufficiently detailed amelioration/mitigation measures to support the grant of planning permission in accordance with Policy A5 of the Local Plan, in respect of:
 - maintaining the structural stability of the building, the ground and any neighbouring properties to within limits set out in the policy/guidance
 - avoiding cumulative impacts on ground and structural stability in the local area.
- 5.11 Queries and comments on the BIA are described in Section 4 and Appendix 2.

Basement Impact Assessment Audit
King's Cross Methodist Church, London,
WC1H 8BW

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Appendix 1

Consultation Responses

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Cullerne Bown	Unknown	02/02/2025	Extent of basement excavation and potential damage to party walls	The impact to neighbouring properties has been queried as part of this audit.

Basement Impact Assessment Audit
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Appendix 2

Audit Query Tracker

Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Justifications should be provided where a "No" response has been recorded.	Open- see section 4.7	
2	Land stability	Clarifications about the presence of trees on site are requested.	Open- see section 4.9	
3	Land stability	An outline sequence of construction, including detailed sketches of the proposed temporary and permanent works are requested. The depth of the proposed excavation and ground levels has been used inconsistently across the GMA/BIA.	Open- see section 4.12 and 4.13	
4	Land stability	Geotechnical parameters used inconsistently. Unloading pressures estimated inconsistently across the BIA/GMA.	Open- see section 4.14	
5	BIA	Utility plans and confirmation of consultation with relevant asset owners are requested.	Open- see section 4.16	
6	Land stability	GMA should consider the excavation beneath the north lightwell and demonstrate how the boundary walls are to be retained.	Open- see section 4.18	
7.	Land stability	Anticipated depth of geological units used inconsistently across the BIA/GMA. Clarifications regarding the stiffness parameters adopted for the Lambeth Group are requested.	Open- see section 4.19 and 4.20	
8.	Land stability	Clarifications regarding the loadings used in PDisp are requested. Structural load drawings are requested for review.	Open-see section 4.21	
9.	Land stability	PDisp Input and output data for short term movements are requested.	Open-see section 4.22	

Query No	Subject	Query	Status	Date closed out
10.	Land stability	Overall (total) ground movements calculated after offsetting heave movements.	Open- see section 4.23	
11.	Land stability	Clarifications regarding the loading on the contiguous piled wall section in PDisp	Open- see section 4.24	
12.	Land stability	Clarification regarding re-entrant corners are requested. Surface levels are used inconsistently within XDisp and PDisp. Outline calculations for the adopted pile lengths are requested. Corner stiffening has been adopted for the installation curves to be reviewed.	Open-see section 4.26 to 4.30	
13.	Land stability	Clarifications regarding the sensitivity analysis are requested. The damage category for the neighbouring structures should be updated following revisions to the GMA.	Open- see section 4.31 and 4.32	

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Appendix 3

Supplementary Supporting Documents

None

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