



### **Document History and Status**

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	September 2020	Comment	KBemb-290920-13398-45 Land Between Gondar House and South Mansions.doc	КВ	GK	GK
F1	February 2021	For Planning	KBemb-13398-45-170221- Land Between Gondar House and South Mansions F1.doc	КВ	EMB	EMB

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Last saved	17/02/2021 17:24
Path	KBemb13398-45-170221-Land Between Gondar House and South Mansions F1.doc
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Project Number	13398-45
Project Name	Land Between Gondar House and South Mansions
Planning Reference	2020/3553/P

Structural ◆ Civil ◆ Environmental ◆ Geotechnical ◆ Transportation

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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 the Land Between Gondar House and South Mansions, London NW6 1QD (planning reference 2020/3553/P). The basement is considered to fall within Category B 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 prepared by individuals who possess suitable qualifications.
- 1.5. It is noted that some sections of the BIA and supporting documents reference superseded LBC guidance.
- 1.6. The BIA has confirmed that the proposed basement will be founded within the London Clay Formation and will be constructed using a contiguous pile wall.
- 1.7. It is accepted that the proposed development will not impact the hydrogeology or slope stability of the area.
- 1.8. Surface water mitigation measures have been included in the proposals, therefore it is accepted that the basement will not impact the wider hydrological environment.
- 1.9. The ground movement assessment (GMA) has been updated and the building damage assessment indicates that damage to adjacent properties will not exceed Burland Category 1 (Very Slight).
- 1.10. The impact of ground movements on the adjacent highway is identified as negligible.
- 1.11. Monitoring of the surrounding buildings prior to and during construction is proposed and trigger levels have been revised to reflect the results of the GMA.
- 1.12. Based on the revised submission it can be confirmed that the BIA complies with the requirements of CPG: Basements.

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### 2.0 INTRODUCTION

- 2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 17 August 2020 to carry out a Category B audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for the Land Between Gondar House and South Mansions, London NW6 1QD.
- 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: Basements. March 2018.
  - 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;
- 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 "The construction of a new part three, part four storey plus basement residential building to deliver 6 x residential (Class C3) dwellings, together with associated landscape, cycle parking, refuse and recycling storage"
- 2.6. The Audit Instruction confirmed the development neither involves, nor is a neighbour to, listed buildings.
- 2.7. CampbellReith accessed LBC's Planning Portal on 14 September 2020 and gained access to the following relevant documents for audit purposes:

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- Basement Impact Assessment by Card Geotechnics Ltd, ref. CG/28978B, rev 0, dated May 2020.
- Structures Stage 2 Report by SD Structures, ref. SD795, rev. P1, dated 14 May 2020.
- Planning Application Drawings consisting of an existing site layout, proposed plans and proposed sections.
- Flood Risk Assessment by Hydrock, ref. 14487-HYD-XX-XX-RP-FR-0001, rev. P04, dated 6
   May 2020.
- Arboricultural Impact Assessment by Keen Consultants, ref. 1325-KC-XX-YTREE-Impact Assessment-Rev 0, dated May 2020.
- Design and Access Statement by EMRYS, ref. 1912 06 REP 010, revision PL01, dated 7 August 2020
- Planning Consultation Responses.
- 2.8. In order to address queries raised by the initial audit, the following additional documents were provided to CampbellReith in November and December 2020, as follows:
  - Basement Impact Assessment by Card Geotechnics Ltd, ref. CG/28978B, rev 1, dated December 2020.
  - Revised Planning Application Drawings consisting of proposed plans and proposed sections, all dated 15 October 2020.
  - Addendum Design and Access Statement by EMRYS, ref. 1912 06 REP 013, revision PL02, dated 15 October 2020.

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• E-mail correspondence.



### 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?	Yes	
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	
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?	Yes	The revised BIA presents appropriate responses for the development.
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Is a conceptual model presented?	Yes	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	The impact of removing trees is considered in the revised BIA.



Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	N/A	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	No	The increase in the proportion of hard surfaces is not carried forward to scoping however this is addressed in the separate Flood Risk Assessment and Drainage Strategy.
Is factual ground investigation data provided?	Yes	
Is monitoring data presented?	Yes	Three rounds of groundwater monitoring undertaken.
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?	No	It has been assumed that the neighbouring property to the south has a basement and other neighbouring properties do not.
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	
Are reports on other investigations required by screening and scoping presented?	Yes	Flood Risk Assessment, Drainage Strategy and Arboricultural Impact Assessment provided.
Are the baseline conditions described, based on the GSD?	Yes	
Do the base line conditions consider adjacent or nearby basements?	Yes	Although presence of basements has been assumed.
Is an Impact Assessment provided?	Yes	

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Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	
Is the Impact Assessment appropriate to the matters identified by screening and scoping?	Yes	The revised submission considers the impact of removing trees.
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	Based on the revised submission.
Has the need for monitoring during construction been considered?	Yes	
Have the residual (after mitigation) impacts been clearly identified?	Yes	Based on the revised BIA submission.
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	
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?	Yes	Based on the revised submission.
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	Yes	
Are non-technical summaries provided?	Yes	

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### 4.0 DISCUSSION

- 4.1. The Basement Impact Assessment (BIA) has been carried out by Card Geotechnics Ltd and the individuals involved in its production have suitable qualifications.
- 4.2. It is noted that some sections of the BIA and supporting documents reference superseded LBC guidance.
- 4.3. The LBC Instruction to proceed with the audit identified that the basement proposal neither involves, nor is adjacent to, any listed buildings.
- 4.4. The original scheme proposed to construct a new 3- to 4-storey block of flats, with a single basement level below the east side of the development, within a currently undeveloped parcel of land. The scheme has since been revised to remove the fourth storey of the development, with no alterations to the proposed basement. The BIA and associated drawings indicate the basement will be formed using a contiguous pile wall. Piles are indicated to be 9m long.
- 4.5. It is noted that the Basement Plan drawing SDS795-PL000 by SD Structures uses a graphic more commonly used to represent a secant pile wall to show the location of the contiguous pile wall. The retaining wall construction is referred to on the drawing and in associated documents as being a contiguous pile wall. However, if the type of retaining wall used to form the basement changes to a secant wall the BIA will require revision.
- 4.6. Section 11.1 of the revised BIA indicates that two foundation options to support internal walls and columns are being considered; a concrete raft or piles. The BIA indicates that on the west side, where the basement is absent, the building will be supported by a pile foundation. A raft will support the basement.
- 4.7. The site is identified as sloping from 78m OD in the north to 76m OD in the south. Due to the slope of the site, the BIA identifies basement excavation as varying between 3.35m to 4.50m in depth.
- 4.8. A site investigation indicates that ground conditions generally comprise Made Ground over London Clay. A thin layer of possible Head Deposits were encountered in one location during the site investigation.
- 4.9. No groundwater was encountered during the site investigation. Three subsequent rounds of groundwater monitoring were undertaken indicating groundwater at 4.02m depth. The BIA states that this is considered to be representative of perched water within the London Clay as opposed to a continuous body of groundwater.

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- 4.10. The site is underlain by the London Clay Formation, which is designated an unproductive aquifer. As such it is accepted that the development will not impact the hydrogeology of the area.
- 4.11. Section 2.4 of the BIA identifies the site as having a slope of approximately 1 in 10 (c. 5.7°). Steeper slopes have been identified south of the site, but these are c. 30m from the proposed development. As such it is accepted that the slope stability of the area will not be impacted by the development.
- 4.12. A Flood Risk Assessment (FRA) has been undertaken. The FRA identifies a very low risk of fluvial or tidal flooding. The risk of surface water flooding is identified as being low due to the presence of South Mansions directly north of the site and the gradient of the area. Proposals for surface water attenuated drainage are detailed in Section 4 of the SSR, comprising the use of below ground storage tanks and flow controls to limit off-site surface water flow to 5 l/s. On this basis, and recognising that the impermeable site area remains largely unchanged, it is accepted that the development will not impact the wider hydrological environment.
- 4.13. An Arboricultural Impact Assessment (AIA) has been carried out for the site that indicates a number of trees within the site will be removed. Section 7.4 of the BIA identifies the presence of desiccation within the London Clay to a depth of 5.5m. The impact of removing the identified trees from the site is addressed in the revised BIA, and protection recommendations made where relevant. The impact to neighbouring structures is indicated to be low.
- 4.14. A bottom up type construction is indicated and the SSR states that temporary propping will be used to support ground "where required" during basement construction. Section 3.2 of the SSR indicates the pile wall will be "generally designed as a free-standing cantilever apart from where the basement is close to adjacent buildings and temporary and permanent propping is provided at the top". This use of temporary propping 'as required' is also stated in Section 11.1 of the BIA, and the ground movements presented in Table 19 of the BIA are described as being "achievable with early installation of high-level propping".
- 4.15. A Ground Movement Assessment (GMA) has been undertaken for the basement development and is presented in Section 11 of the revised BIA. The assessment considers five critical sections CS) around the site; CS1 and CS1a South Mansions in the north, CS2 an outbuilding of No. 3 Hillfield Road in the east, CS3 a proposed extension to No. 3 Hillfield Road in the east and CS4 No. 1 Hillfield Road in the south.
- 4.16. The revised BIA considers an additional critical section for South Mansions, CS1a, which is located at the closest point to the proposed basement.

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- 4.17. Critical section CS2 (the outbuilding for No. 3 Hillfield Road) has been positioned on a section of the retaining wall that is indicated to be propped. However, the unpropped lightwell retaining wall extends adjacent to the southern wall of this building. Subsequent correspondence from CGL states: "The corner of the outbuilding to No. 3 extends along 0.7m of the unpropped lightwell section. Wall displacements along this length are not likely to cause ground movements to foundations beyond what has been modelled given the support stiffness in this area". Assessment of the outbuilding to 3 Hillfield Road without the use of a permanent highlevel prop, has not been undertaken. However, the ground movements predicted in the propped condition have been used to inform the monitoring trigger levels, which is considered to be a conservative approach.
- 4.18. Section 11.5.1 of the GMA presents ground movements resulting from installation of the contiguous pile wall, which is based on the guidance provided in CIRIA C760. The revised BIA has removed the previously applied reduction to the CIRIA ground movement curves. This is considered to meet LBCs requirement for assessments to use moderately cautious engineering values or estimates.
- 4.19. Movement of the contiguous pile wall during excavation has been assessed using WALLAP software for the four critical sections. The WALLAP assessments all include the use of a single high-level prop and excavation depths are given as 4.05m for CS1 and CS2 in the north and 3.35m for CS3 and CS4 in the south. The pile length assessed is 8m, although it is noted that 9m long piles are proposed. The resulting deflections are summarised in Plate 2 of the BIA.
- 4.20. Section 11.5.3 of the BIA includes an assessment of vertical ground movements arising from basement excavation. PDisp software has been used to carry out the assessment, which assumes that imposed loads at basement level will be distributed across the basement floor as a raft foundation. The PDisp assessment does not consider the option of a pile foundation being used instead of a raft, which would likely result in a lower imposed load on the basement floor. This will need to be considered at detailed design stage. Input and output data for the PDisp assessment is now provided.
- 4.21. Section 12 of the revised BIA presents a Building Damage Assessment (BDA) for the neighbouring properties. The results of the assessment indicate a maximum of Burland Category 1 (very slight) for the proposed development.
- 4.22. The impact to the adjacent highway Gondar Gardens has been considered further in the revised submission and a negligible impact is indicated. It is recommended that asset protection criteria is agreed with utility asset owners potentially impacted by the proposed works.
- 4.23. The SSR identifies the need for movement monitoring of the surrounding buildings. Trigger levels proposed for this monitoring have been presented in Section 6.3 of the revised SSR but

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have not been updated to reflect the updated GMA. Subsequent correspondence (presented in Appendix 3) indicates that 'red' trigger level values for the monitoring will be set to reflect the results of the ground movement assessment; a maximum of 5mm vertical movement and 7mm horizontal movement.

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### 5.0 CONCLUSIONS

- 5.1. The BIA has been carried out by individuals who possess suitable qualifications.
- 5.2. It is noted that some sections of the BIA and supporting documents reference superseded LBC quidance.
- 5.3. The BIA has confirmed that the proposed basement will be founded within the London Clay Formation and will be constructed using a contiguous pile wall.
- 5.4. It is accepted that the proposed development will not impact the hydrogeology or slope stability of the area.
- 5.5. Surface water mitigation measures have been included in the proposals, therefore it is accepted that the basement will not impact the wider hydrological environment.
- 5.6. The ground movement assessment (GMA) has been updated and the building damage assessment indicates that damage to adjacent properties will not exceed Burland Category 1 (Very Slight).
- 5.7. The impact of ground movements on the adjacent highway is identified as negligible.
- 5.8. Monitoring of the surrounding buildings prior to and during construction is proposed and trigger levels have been revised to reflect the results of the GMA.
- 5.9. Based on the revised submission it can be confirmed that the BIA complies with the requirements of CPG: Basements.

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Appendix 1: Residents' Consultation Comments

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### Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Shaw	Not given	08/09/2020	Basement excavation causing ground movement that effect neighbouring South Mansions.	The predicted ground movements are predicted to meet the Council's requirements for no greater than Burland Category 1 (very Slight) damage to adjacent buildings. Monitoring is proposed during works to ensure this condition is met.
Gondar and Agamemnon Residents Association	N/A	10/09/2020	Cumulative impact of neighbouring basements.	The proposed basement is not considered to impact neighbouring properties with respect to hydrogeology. Based on the BIA, damage due to ground movements is not anticipated to exceed the criteria set by the Council and proposals for monitoring during construction have been put forward.



Appendix 2: Audit Query Tracker

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### **Audit Query Tracker**

Query No	Subject	Query	Status	Date closed out
1	Stability	The impact of removing trees within the site should be addressed.	Closed	18/12/20
2	Stability	Details of the proposed foundation scheme and temporary propping arrangement should be provided.	Closed	18/12/20
3	Stability	Input data for the PDisp assessment should be provided and consideration of the pile foundation options included in the appraisal.	Closed	18/12/20
4	Stability	The ground movement assessment and building damage assessment should be revised in line with the comments in Section 4.	Closed	20/01/21
5	Stability	Further consideration of the impact to the adjacent highway is required.	Closed	18/12/20



Appendix 3: Supplementary Supporting Documents

E-mail correspondence

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**Appendices** 



Re: FW: Land Between Gondar House and South Mansions BIA Michael Davies to: KatharineBarker 12/02/2021 09:52

Cc: "Adam Bier", camdenaudit

Hi Kat

Yes this can be set at 5mm.

Kind regards

Mike Davies SD STRUCTURES

On Fri, 12 Feb 2021, 09:25, < KatharineBarker@campbellreith.com > wrote: Michael.

Thank you. The 7mm value relates to horizontal movement. Can you also confirm that the red trigger level for vertical movement will be amended to 5mm?

Kind regards,

Kat

Katharine Barker

Senior Geotechnical Engineer

15 Bermondsey Square, London, SE1 3UN

Tel +44 (0)20 7340 1700

"Michael Davies" < mike@sd-structures.com> From:

To: KatharineBarker@campbellreith.com

camdenaudit@campbellreith.com, "Adam Bier" <adam@anx.co.uk>

Date: 11/02/2021 19:39

Subject: Re: FW: Land Between Gondar House and South Mansions BIA

Hi Kat

Noted.

I can confirm we will amend the red trigger level to 7mm.

Is this email sufficient for your records?

Kind regards

Mike Davies SD STRUCTURES

On Thu, 11 Feb 2021, 09:47, <KatharineBarker@campbellreith.com>wrote: Good morning Michael,

We are close to being able to finalise our audit for this project but have one further query regarding the monitoring trigger values you provide in Section 6.3 of your report.

The BIA predicts that a maximum of 4.9mm vertical movement and 6.9mm horizontal movement will arise from the proposed development, and that these movements will result in no greater than Category 1 damage to adjacent structures. The monitoring trigger levels should reflect these values. Currently the 'red' trigger value, where work ceases and action is taken, is given as 10mm. This amount of movement may result in damage that exceeds Category 1, which would be unacceptable according to Camden Council policy. We therefore request that the 'red' trigger value be revised to reflect the values stated above, to ensure that action will be taken before the development potentially causes unacceptable levels of damage to the adjacent buildings.

This update can be provided as an e-mail or letter, we don't need the full Stage 2 report to be re-submitted.

Kind regards,

Kat

#### Katharine Barker

Senior Geotechnical Engineer

15 Bermondsey Square, London, SE1 3UN

Tel +44 (0)20 7340 1700 www.campbellreith.com

From: "Michael Davies" < mike@sd-structures.com>

To: KatharineBarker@campbellreith.com

Cc: "Adam Bier (ANX Developments Limited)" <a href="mailto:sdam@anx.co.uk">adam@anx.co.uk</a>, "Oliver Rhodes" <OliverR@cgl-uk.com</a>, camdenaudit@campbellreith.com</a>,

"Richard Ball" < RichardB@cgl-uk.com >, "Jonathan" < Jonathan.McClue@camden.gov.uk >

Date: 15/01/2021 14:40

Subject: Re: FW: Land Between Gondar House and South Mansions BIA

### Dear Kat

Regarding your last query on the propping of the basement, this information is contained in section section 5 our report. In case you don't have our latest version please find below a link to download this.

### [Suspicious URL detected]

This shows that temporary props will be placed against the capping beam in the same locations as in the permanent case where beams will provide the propping force. The props are located very close to the location of the adjacent structures so this keeps the lateral deflections to a minimum. I trust this closes out this query.

CGL will be able to advise on the remaining comments on the BIA.

#### Kind regards

MIKE DAVIES CENG MIStructE MEng Hons

D 020 3371 0035 T 020 8144 8900 www.sd-structures.com mike@sd-structures.com 60 Grays Inn Road, London, WC1X 8AQ

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From: KatharineBarker@campbellreith.com<KatharineBarker@campbellreith.com>

Sent: 13 January 2021 13:34

To: Oliver Rhodes < Oliver R@cgl-uk.com >

Cc: <a href="mailto:campbellreith.com">camdenaudit@campbellreith.com</a>; Richard Ball <a href="mailto:RichardB@cgl-uk.com">RichardB@cgl-uk.com</a>; McClue, Jonathan

<Jonathan.McClue@camden.gov.uk>

Subject: Land Between Gondar House and South Mansions BIA

#### Oliver,

I'm reviewing the revised submission for the Land Between Gondar House and South Mansions and need some additional information/clarification for your revised BIA:

-What height and length values did you use for the neighbouring buildings? I can work out the lengths from Plates 4 to 8 but it's not clear what height values were used.

-On Figure 5a CS2 and CS3 both appear to be directly adjacent to the pile wall, but Plate 6 shows CS2 to be 0.5m from the wall and Plate 7 shows CS3 has no offset. Could you confirm these are correct?

-Can you clarify what values are given in Table 16? If it is the movement at the closest point of each critical section to the pile wall, then the values for CS3 (directly adjacent to the wall) would be 3.6mm for both the horizontal and vertical components. Could you clarify?

- -The BIA consistently identifies the pile wall as being 9m in length but the WALLAP assessments use an 8m long pile. Is there a reason for this?
- -In your response to our comment regarding the lightwell adjacent to the outbuilding of No. 3 you indicated that it does not extend to border the building. The attached plan shows the edge of the outbuilding to be adjacent to the lightwell, and the edge of the extension to No3. also bounds the lightwell.
- -Do you have the temporary propping arrangement drawing? Your initial comments indicate these were provided by SD Structures in October but it's not clear where they are in your BIA.

Kind regards,

Kat

Katharine Barker Senior Geotechnical Engineer

[https://www.campbellreith.com/wp-content/uploads/crlogosmall.jpg]

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