



Model form of Approval in Principle for the design/assessment¹ of bridges and other highway structures where UK National Standards (Non-Eurocodes) are used

Name of Project 18 Grove Terrace NW5 1PH
Name of Bridge or Vaults in Front Garden
Structure
Structure Ref No. N/A

Summary: Within the front garden there are two barrel vaults separated by a spine wall. It is proposed to lower the floor in one of the vaults to increase headroom. The new floor is to be constructed at approx. 400 below the existing floor level and hence the walls of one of the vaults are to be underpinned.

1. HIGHWAY DETAILS

- 1.1 Type of Highway: Urban
- 1.2 Permitted Traffic Speed :20mph
- 1.3 Existing Restrictions N/A

2. SITE DETAILS

- 2.1 The vaults are in the front garden approx. one metre from the pavement edge.

3. PROPOSED STRUCTURE

- 3.1 There are two vaults in the garden and in one of the vaults the floor is to be lowered and to achieve this the walls are to be underpinned.
- 3.2 Structural type: Brickwork walls and vaulted arch with concrete ground slab.
- 3.3 Foundation type: Existing brickwork sits on London Clay (Weathered).
Underpinning to be plain concrete.

3.3.1 Arrangements for future maintenance and inspection of structure
Access arrangements to structure

3.3.2 There are no further investigations proposed due to the small scale of the project.

3.4 Durability. The existing masonry walls are in a good structural condition and there is no evidence of significant defects which is affecting the performance of the structure.

The concrete specified for the concrete under pinning is of sufficient grade to ensure a theoretical design life of sixty years.

3.5 The risk and hazards are of a conventional nature and would be apparent to a competent contractor from reading the structural drawings. Also the works have been sequenced to minimise the risks and hazards and the design, and execution of the works proposed are conventional and well understood.
It should be recognised that the structural works are to be carried out in the Garden of the property.

<u>Hazard</u>	<u>Risk</u>
Collapse of excavation	Extremely small due sequencing
Tripping	Extremely small area of pavement to be kept clear at all times.
Unloading and loading of materials	Extremely Small: Banksman to be used.
Death or Injury: Damaged Services	Extremely small, incoming services to be determined and cat scan used. Unloading and loading to respect overhead services. I.e. not carried out in proximity to same.
Delivery vehicles surcharge	Extremely small: Contractor to consult with local authority on possible pavement closure. Also Banksman to be used.

3.6 Proposed arrangements for construction

3.6.1 Construction of structure: Underpinning Proposed.

3.6.2 Traffic management: Not required.

3.6.3 Service diversions: Not required

3.6.4 There is no Interface with existing structures

3.7 Building Constructed Early 1900's

3.8 Reason for assessment: To determine whether the highway and pavement will be affected by the structural works and to ensure if so the works are carried out to ensure no loss of ground and the existing structure is capable of supporting the loads following underpinning.

3.9 Articulation: The structure as described above is a masonry vaulted structure, the walls which retain the soil will transfer the loads in bending and shear to the longitudinal walls. For horizontal loads the wall is designed as a masonry panel supported on four sides. The sides of the panel and the top are continuous and the base is pinned.

4 DESIGN/ASSESSMENT¹ CRITERIA

4.1 Actions

4.1.1 Permanent actions: Dead and Live loads from Garden Surcharge, loads from Pavement and accidental wheel load/ Note the loads on the highway will not apply surcharge loadings due the distance from the road edge to the vault wall. However the temporary load from a vehicle mounting the pavement is considered.

Normal Conditions: The horizontal force due earth pressure is 45 kN/m and surcharge load of 5kN/sq.m is applied to the pavement. Note the Retaining Wall will not be surcharged by road traffic due to its distance from the road

Abnormal Condition/Temporary Load; The horizontal forces due earth pressures is 45kN/m and a wheel load of 115kN acting at 1.5 m from face of vault wall as a temporary load from a vehicle mounting the pavement.

4.1.2 Snow load will be applied, wind load not applicable also thermal actions not applicable.

4.1.3 Actions relating to normal traffic under AW regulations and C&U regulations. The distance to the vaults is such that the walls will not be surcharged by normal traffic. However as noted above a temporary load for a vehicle mounting the pavement has been assessed.

4.1.4 Actions during construction: Same as normal.

- 4.3 Authorities Consulted: The requirement of the London Borough of Camden is that the maximum horizontal deflection of the vaults at footway level should be less than 25mm.

In this respect it should be recognised that the vaults on plan are cellular and sufficiently stiff that there will be no horizontal deflection.

- 4.5 Documents for analysis and design
BS 6399; Loadings
BS 8002 1992: Code of Practice Foundation Design
BS 5628 Masonry.

5. STRUCTURAL ANALYSIS

- 5.1 Retaining wall to be checked as a masonry panel supported on their sides and at the base.
For assessment the following software will be used:

1 Horizontal Pressures: Reinforced Concrete Council Retaining Wall Spreadsheet.
2 Vault Wall: CADS Wall Panel
- 5.2 Idealised force diagrams: See LC 01 and 02.
- 5.3 The thickness of the walls are known and hence their stiffness.
- 5.4 The soil parameters to be used are Angle of Internal Friction 30degrees and soil density 18 kg/m³ for the design/assessment of earth retaining elements.

6. GEOTECHNICAL CONDITIONS

- 6.1 A trial pit has been excavated and the soils are weathered London Clay at Lower Ground Floor with fill material above.

BGS Borehole Records have also been consulted and the BGS geology for the area is London Clay Formation.

- 6.2 There will be no differential settlement due the nature of the works proposed.

7. CHECK

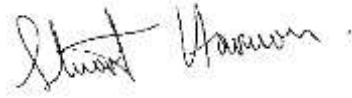
- 7.1 Calculation Category 1.
- 7.2 If Category 3, name of proposed independent Checker. **Not Applicable**

8. DRAWINGS AND DOCUMENTS

- 8.1 List of Drawings (including numbers) and documents accompanying the submission:
- Structural Drawings:**
2079/GN 01 General Notes
2079/SK 02 Vaults Underpinning
2079/SK 03 Section Underpinning
- Architectural Drawings:**
1439/P01 Proposed Lower Ground Floor Plan
1439/P02 Proposed Ground Floor Plan
1439/P07 Section A-A
1439/P08 Section B-B
- Idealised Force Diagrams**
LC 01: Normal Loadings
LC 02: Abnormal/Accidental Loading
- 8.2 List of construction and record drawings (including numbers) to be used in the assessment. **As above**

9. THE ABOVE IS SUBMITTED FOR ACCEPTANCE

Signed



Name

Stuart Harmon
Design/Assessment¹ Team Leader

Engineering Qualifications

B.Eng(Dist), C.Eng, M.I.Struct.E.

Name of Organisation

Quadrant Harmon Consulting Ltd

Date

19 January 2021

Signed



Name

Francisco Diaz
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Name of Organisation

Quadrant Harmon Consulting Ltd

Date

19 January 2021

APPROVAL IN PRINCIPLE
(Bridge and other Highway Structures), Non-Eurocodes

Name of Project:

**10. THE ABOVE IS ~~REJECTED~~ ^{ACCEPTED} AGREED¹ SUBJECT TO THE AMENDMENTS
AND CONDITIONS SHOWN BELOW** 18

Signed



Name

G Natkunan

Position held

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Engineering Qualifications

BSc(Hons) CEng MICE

17

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Date

20.1.2021