Job Number: 210906

CROFT STRUCTURAL ENGINEERS

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Subterranean Structural Statement

Site:

2 Bingham Place
Westminster
W1U 5AT

Client:

Bradley Mackenzie
Westminster
W1U 5AT

Report by	Vijaya Dubagunta M.Tech CEng MICE
Structural Design Reviewed by	Chris Tomlin MEng CEng MIStructE
Hydrogeology, Soils &Above Ground Drainage Reviewed by	Phil Henry M.Eng CEng MICE

Rev	Date	By	Comment
-	20.09.21	VLD	First Issue

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1. Preamble
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Executive Summary

Croft Structural Engineers has reviewed the scope of the proposed basement development at 2 Bingham Place. The existing features of the building and the neighbouring properties were studied as well as the ground and hydrogeological conditions of the site and the surrounding area. The potential impacts that the basement may have on the built and natural environment were assessed. A structural design scheme is proposed together with a construction method statement to demonstrate that the development is technically feasible. The report concludes that the basement can be safely constructed without having any significant adverse effects on the existing structure, the surrounding buildings or the hydrogeology of the surrounding area.

1. Introduction

Planning Context

Planning requirements

As part of the planning application for a new basement, Westminster Council requires that a construction methodology statement be prepared. This document clarifies:

- Details of the subsoil
- Groundwater
- Method of excavation and formation including the sequence of construction and details of temporary supports

The purpose of this is to highlight that at planning stage, adequate investigation has been completed on the site to demonstrate that the works can be undertaken without significant risks, or that any risks can be mitigated. This report is not adequate for Building Control or Party Wall approval, but should form the basis of construction related decision making and underline any further work.

This Method Statement has been completed by a Chartered Civil Engineer (MICE).

Croft Structural Engineers

Croft Structural Engineers is a highly experienced company in the field of historic conversions and also in basement construction. Over the last eight years, the practice has completed over 400 basements in London. Croft Structural Engineers Ltd has built up a wealth of knowledge on the ground conditions and construction techniques required for basements in the Westminster area. Croft has extensive knowledge of the design and construction of new basements, many of which include new structures under existing buildings. The practice takes great care and pride in providing a carefully considered and appropriate design of the basement construction.

The neighbouring properties are considered and appropriate measures are put into place to determine the works necessary.

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Project Brief

Existing Structure

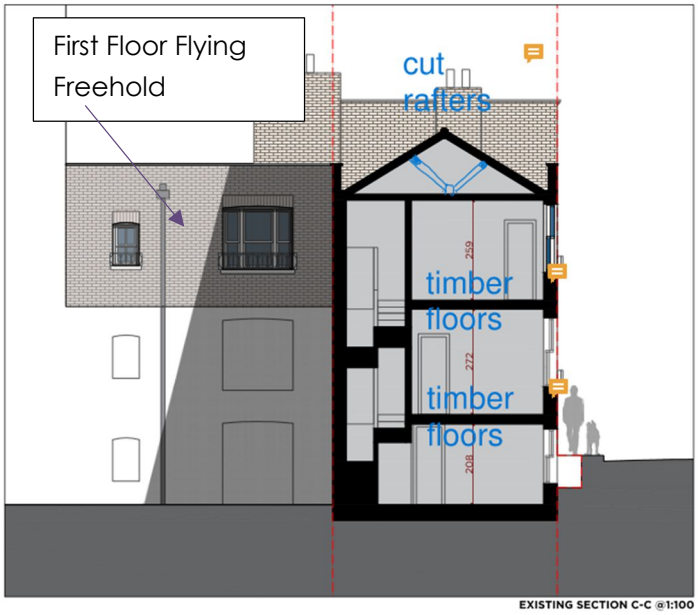
The existing property is a Victorian mid-terrace building that fronts directly onto 2 Bingham place. The building is three storeys high and has a cut rafter roof. There is a lower ground floor on the right of the building and an old coal cellar which is half height.

There is an upper ground floor and first floor.

The general construction is a load bearing masonry walls on the lower ground and ground floor with timber studs above. The floors are timber except for the lower ground floor which is concrete.

The building to the rear is of similar construction. The rear is unsual, the first floor demise of nos 2 Bingham place is a flying free hold to the rear. The owner must ensure the legal requirements to any changes to the floors or roof in this area. This will be clarified by the Party Wall surveyors

Front view of property

	 *Existing Section*
Proposed Works	The proposed works involve a new mansard roof, the floor levels on all other floors to be altered. Lower ground: Lowered by underpinning of boundary walls. Upper ground and first floor : Replaced with new floors at new levels. Front door to be moved.

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2. Desk Study and Site Investigation

Land and Hydrogeological Impact Assessment

Topography, Geology and Site History

The land within the site is flat, as is the area surrounding it.

There are no significant made-made slope changes within 20m of the site boundary.

The British Geological Survey (BGS) drift sheets show the highest underlying natural stratum to be Lynch Hill Gravel. An extract from the BGS online viewer, which replicates this information is presented below:

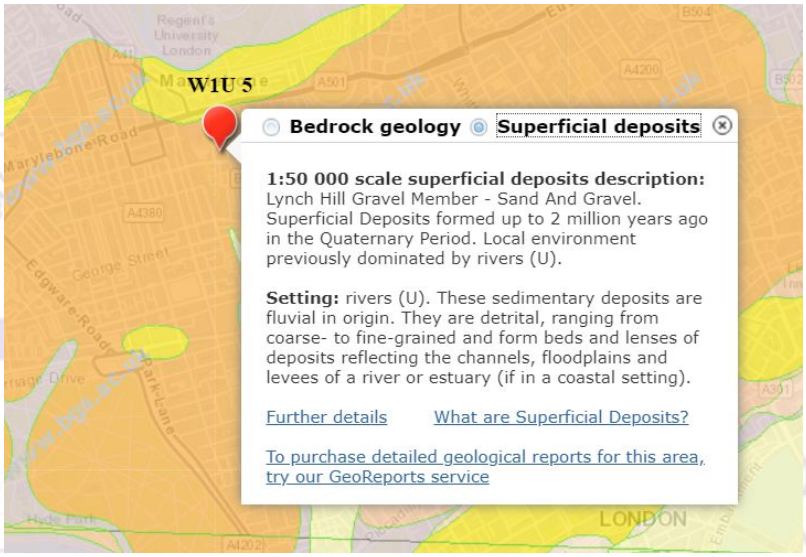

Figure 1 Extract from BGS viewer, with site location indicated

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Bore hole Information

Borehole information is available for 4 Bingham Place, a nearby property. The data from this confirms data from the BGS viewer. The borehole report records gravel down to a depth of 8.2m, ie below the formation level of the proposed basement.

GEA Geotechnical & Environmental Associates
Widbury Barn, Widbury Hill, Ware, Herts SG12 7QE

Site	Borehole Number
4 Bingham Place, London, W1U 5AT	BH1

Boring Method	Casing Diameter	Ground Level (mOD)	Client	Job Number
Cable percussion rig	150 mm to 12.45 mm		Lockbane Ltd	J15326

Location	Dates	Engineer	Sheet
	13/04/2015-14/04/2015	Elliott Wood	1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.15) 0.15	Tarmac		
						(0.40)	Made Ground (brown silty slightly clayey sand with gravel and abundant brick and concrete fragments)		
0.55	D1					0.55 (0.45)	Made Ground (dark greyish brown silty sandy clay with gravel, brick, concrete, china, wood and ash fragments and a slight organic odour)		
1.00	D2					1.00 (0.30)	Firm brown mottled grey silty sandy CLAY		
1.30	D3					1.30	Stiff brown slightly sandy CLAY with abundant fine to coarse sub-angular to sub-rounded gravel		
1.50-1.95 1.50-1.95	CPT N=23 B4	1.50	DRY	2,3/6,8,4,5					
						(1.55)			
2.50-2.95 2.50-2.95	CPT N=32 B5	2.50	DRY	2,3/5,7,12,8					
2.85	D6					2.85	Dense brown sandy fine to coarse angular to sub-rounded GRAVEL		
3.50-3.95 3.50-3.95	CPT N=51 B7	3.50	3.30	4,8/8,10,15,18					
4.50-4.95 4.50-4.95	CPT N=39 B8	4.50	4.40	1,3/4,8,11,16					
						(5.35)			

Extract from borehole record for no. 4 Bingham Place

The soil investigation report for no. 4 Bingham place states that ground water was recorded in the standpipe at 6.04m below ground.

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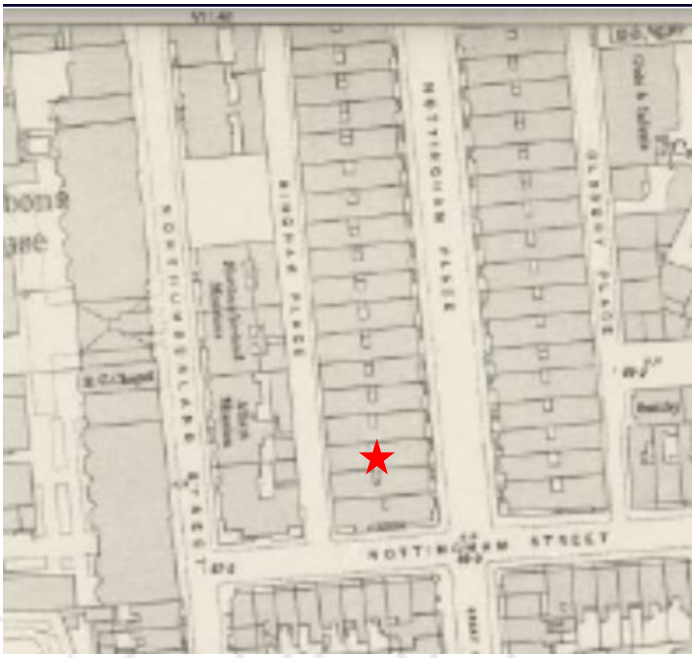
Site History

Inspection of historic maps show that the site and the surrounding area has been occupied by residential buildings for over 125 years.



Extract from historic map, surveyed 1893 published in 1895

The Tyburn river passed the site to the west. This is now culverted. The river is more than 200m from the site.

Extract from historic map of 'Lost Rivers of London'

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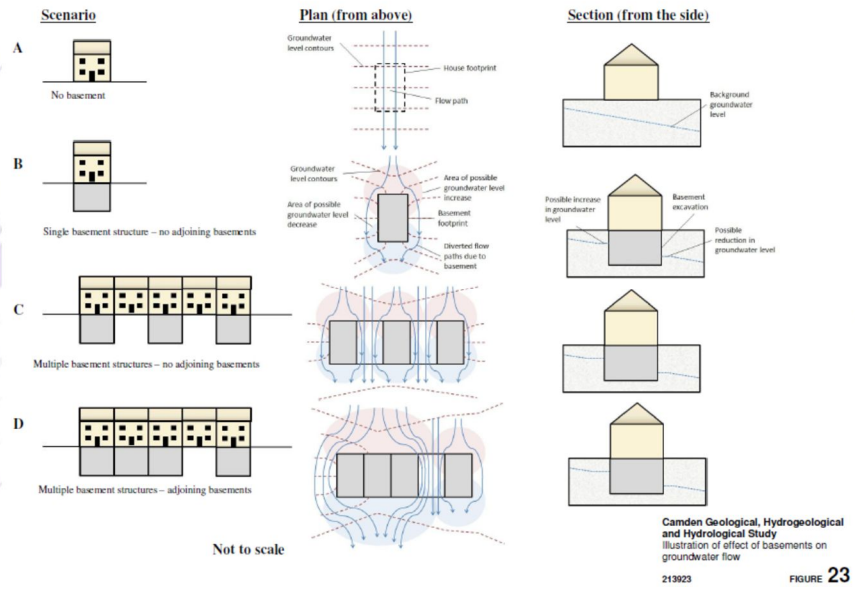
Hydro geology Groundwater

Data from the BGS and the Environment Agency's websites conclude the following:

- The site does not lie above a groundwater source protection zone
- The site does not lie above a principal aquifer
- The site does not lie above a boundary of different soils

The borehole record from the nearby property (mentioned previously) recorded water table at 6.04m below ground that would be well below the basement formation level. The new structure is not likely to extend below the water table. In the unlikely event that water rises above the formation level, the gravel surrounding the basement structure will maintain the conveyance of groundwater, as illustrated in the diagrams below.



Extract from guidance on subterranean development illustrating ground water flow

The effect that the basement construction will have on ground water will therefore be negligible.

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Surface water and flooding

The site lies in a densely built up area. There are no surface water features (natural or man-made) within the site boundary or the immediate vicinity. The existing site drainage discharges into the sewer. This will remain the case with the proposed development. The basement will be within the footprint of the existing building and will not increase the amount of surface water that will enter the sewer network. There will therefore be no adverse effects on the surface water flow in the surrounding area. The site is in flood zone 1

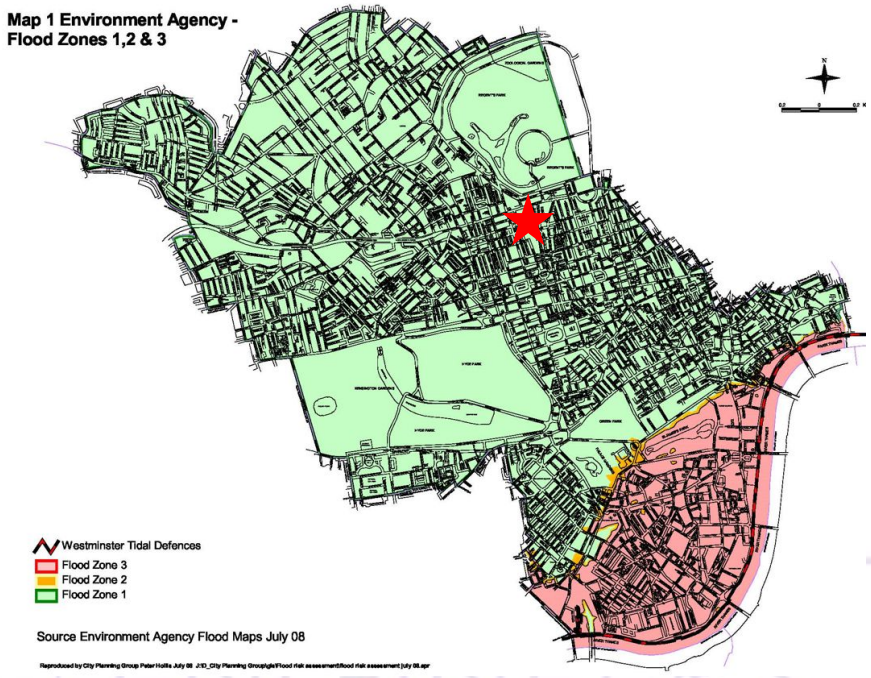
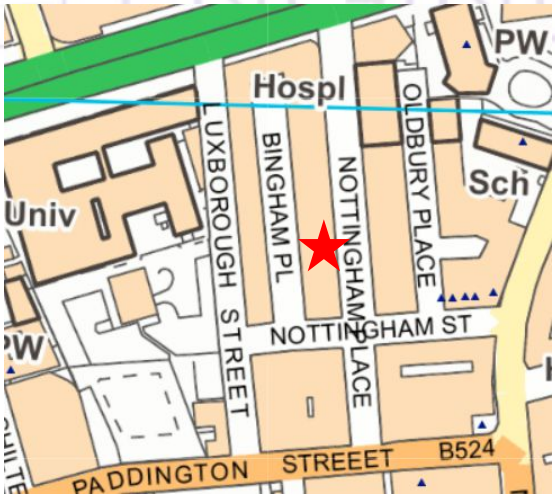


Figure 2 Extract from Westminster Council's reproduction of a map showing areas at risk of rapid flooding.

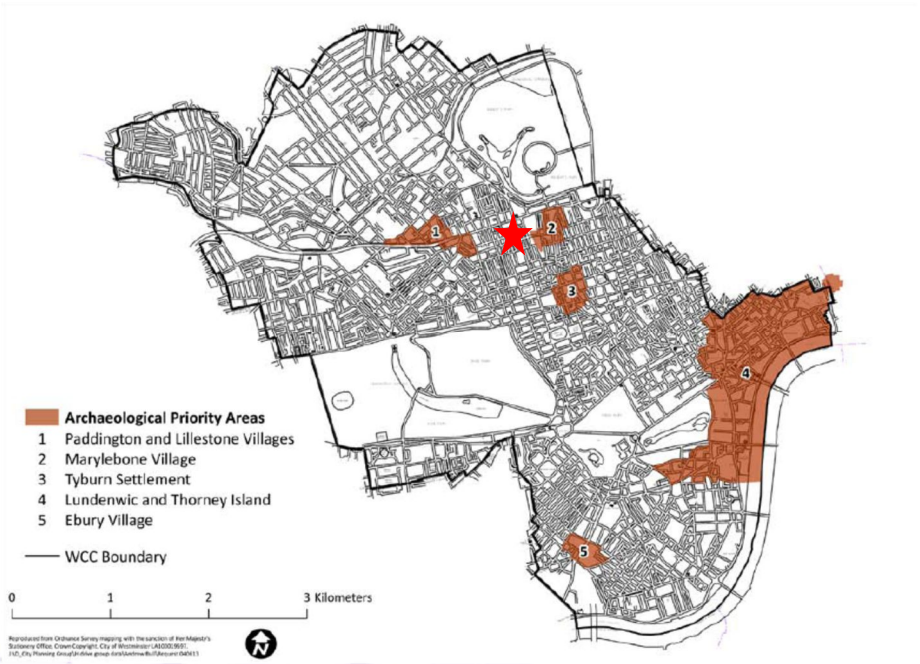
FLOOD RISK	SELF-CONTAINED BASEMENT DWELLING	BASEMENT EXTENSION TO EXISTING DWELLING	Flood Risk Assessment required
FLOOD ZONE 3 (RAPID INUNDATION ZONE)	Not acceptable	Not acceptable	Yes
FLOOD ZONE 3	Not acceptable	Required to pass the Exception Test*	Yes
FLOOD ZONE 2	Required to pass the Exception Test.	Consider flood resistance and resilience measures	Yes
FLOOD ZONE 1 (rest of Westminster)	Acceptable	Acceptable	No
CRITICAL FLOOD LOCATIONS	Acceptable	Acceptable	Yes

	A flood risk assessment is not required. Given that the basement is below the footprint of the existing building, the development is unlikely to increase the risk of flooding from surface water in the surrounding area.

Built Environment Impact Assessment

Adjacent properties	In this section, references to right and left are given when facing the front of the property from the outside, from Bingham Place. 7 Nottingham Street is immediately to the right of the property. When observed from outside, the property has three stories above ground and built with masonry external walls. Immediately to the left of the property there is 3 Bingham Place. This is similar in construction to 2 Bingham Place.
Transport infrastructure	There is a road in front of the building with a footpath. This is public highway. The nearest underground line is jubilee line which is more than 300m from site.
Listed Buildings	A search on Historic England has shown that the building is not listed.  *Extract from London Historic maps*

Archaeology	The site is not in an area of archaeological interest.



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3. Structural Design and Construction Considerations

Basement Design	
Design Approach	New reinforced concrete retaining walls will form the perimeter of the basement below the existing basement masonry walls. See Appendix A for initial calculations of retaining wall designs.
Lateral Actions	Lateral Forces applied from: • Soil loads • Hydrostatic pressures • Surcharge loading These produce retaining wall thrust. This is restrained by the opposing retaining wall.
Retained soil Parameters	The overall stability of the walls should use K_a & K_p values. Lateral movement necessary to achieve K_a mobilisation is height/500 (from Tomlinson). This is tighter than the deflection limits of the concrete wall.

Hydrostatic pressures Surcharges	A borehole investigation from a neighbouring property (No 4 Bingham Place) recorded water at 6.04m. This is below the proposed formation level of the basement. Water may later be present at a higher level due to failure of infrastructure (e.g. burst mains). To account for this, the retaining wall analysis and design should have hydrostatic pressures applied to a level 1m below ground. The design of the retaining walls should account for the following: • The vehicle loading at ground level, (10kN/m^2 recommended) • Neighbouring property loads at ground level (1.5kN/m2 + 4kN/m^2 for concrete ground bearing slab)
Predicted Ground Movement	The basement will be constructed using standard underpinning procedures. The amount of ground movement that may occur due to these works is not anticipated to be significant. A complex settlement analysis is not considered necessary. The design and construction methodology is proposed and appended to this report. This aims to limit damage to the existing building on the site, and to the neighbouring buildings. The maximum damage category, as set out in Table 2.5 of CIRIA C580 Embedded Retaining Walls: Guidance for Economic Design, is not expected to be greater than to Category 1. So long as suitable mitigation measures are in place, any damage that may occur in the neighbouring buildings will be minor and can be repaired with standard decorative works.

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Mitigation Measures

A method statement is appended. The procedures described in this have been formulated with Croft's experience of over 500 basements completed without error. As mentioned previously, the measures described in this statement will mitigate the impacts that the construction of the basement may have on nearby properties.

The works must be carried out in accordance with the Party Wall Act and condition surveys will be necessary at the beginning and the end of the works. The Party Wall Approval procedure will reinforce the use of the proposed method statement and, if necessary, require it to be developed in more detail with more stringent requirements than those required at planning stage.

To reduce the risk of damage associated with the development, the following measures are advised:

- Employ a reputable firm that has extensive knowledge of basement works.
- Employ suitably qualified consultants
- Provide method statements for the contractors to follow
- Investigate the ground
- Record and monitor the properties close by. This is usually completed by a condition survey under the Party Wall Act, before and after the works are completed. Refer to the end of the appended Basement Construction Method Statement.

With the measures listed above, the maximum level of cracking anticipated is 'Fine' cracking. This can be repaired with normal decorative works. At detailed design stage, the Party Wall Application and the appointment of Party Wall Surveyors will ensure that the above measures are applied. Under the Party Wall Act, minor damage, although unwanted, can be tolerated; it is permitted to occur to a neighbouring property as long as repairs are suitability undertaken to rectify this. To mitigate this risk, the Party Wall Act is to be followed and a Party Wall Surveyor will be appointed.

Drainage and Damp proofing	For structural waterproofing, the walls should be lined with a dimpled cavity membrane (Delta or similar). This would be integral to the basement drainage system, which will allow water to be drained to a sump and pumped away. As a minimum requirement, all drainage connections to sewers must be fitted with a one-way value to prevent the drains flooding. During periods when the drains are surcharged, the drainage system may not work. Basement designers should consider installing a pumped sewage system to protect against this. A waterproofing specialist should be appointed. The structural water-proofer must inspect the structural details and confirm that he is happy with the robustness.

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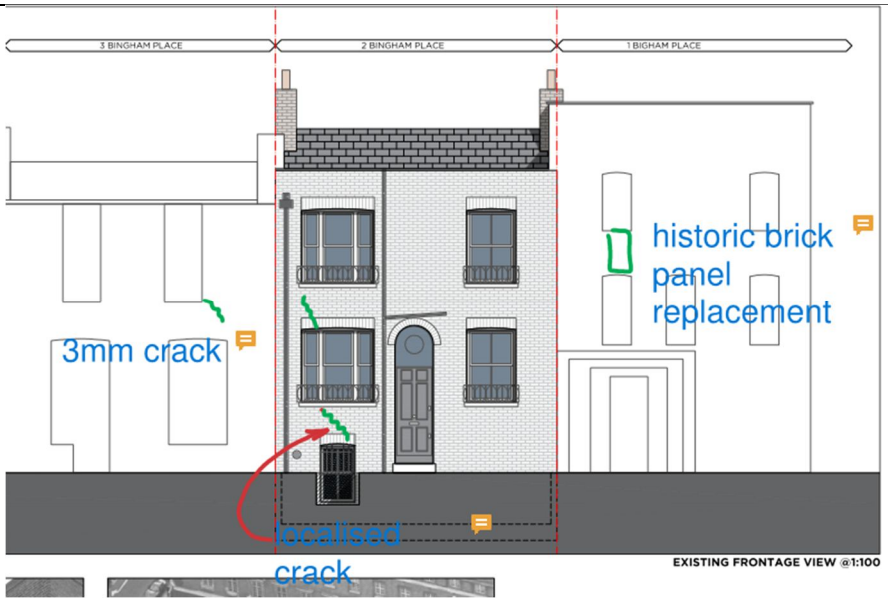
4. Ground Movement Assessment & Predicted Damage Category

Predicted Ground Movement	The amount of ground movement that may occur due to these works is not anticipated to be significant. Given the scale of the development, a detailed GMA (ground movement assessment) is not considered necessary. The basement will be constructed using standard underpinning procedures. A design and construction methodology is proposed and appended to this report. This aims to limit damage to the existing building on the site, and to the neighbouring buildings. The maximum damage category, as set out in CIRIA C760, is not expected to be greater than to Category 1. So long as suitable mitigation measures are in place, any damage that may occur in the neighbouring buildings will be minor and can be repaired with standard decorative works. There is limited guidance on predicting or calculating the movement that may occur during the construction basements. CIRIA C580 is currently the most widely used technical document advising on the design of retaining walls. This includes guidance on predicting the damage category associated with the construction of retaining walls. It is pertinent to note that this guidance relies on empirical evidence based on data from large developments. The calculations presented in this would therefore over-estimate the movements for smaller scale excavations. Croft SE has been involved in a number of basement designs of a similar scale to the proposed development at 2 Bingham Place. Many of these have been followed through to the construction phase and have involved the use of regular movement monitoring before, during and after the basement works are complete. It is in Croft's experience that basement construction of this scale to do not give rise to movements resulting in a damage category greater than Category 1. **The anticipated Damage Category for the new basement is between 0 and 1**
Current defects	During our site survey no movement or defects were noted to the rear of the property. To the font of the property cracking was noted. And there has been work to the property on the right in the past.

	
Mitigation Measures	Croft would propose propping the sides of the excavations as they progress downwards from ground level. A method statement for the construction of the basement is appended. The procedures described in this have been formulated with Croft's experience of over 500 basements completed without error. As mentioned previously, the measures described in this statement will mitigate the impacts that the construction of the basement may have on nearby properties. The works must be carried out in accordance with the Party Wall Act and condition surveys will be necessary at the beginning and the end of the works. The Party Wall Approval procedure will reinforce the use of the proposed method statement and, if necessary, require it to be developed in more detail with more stringent requirements than those required at planning stage. To reduce the risk of damage associated with the development, the following measures are advised: • Employ a reputable firm that has extensive knowledge of basement works. • Employ suitably qualified consultants • Provide method statements for the contractors to follow • Investigate the ground • Record and monitor the properties close by. This is usually completed by a condition survey under the Party Wall Act, before and after the works are completed. Refer to the end of the appended Basement Construction Method Statement. With the measures listed above, the maximum level of cracking anticipated is 'Fine' cracking. This can be repaired with normal decorative works. At detailed design stage, the Party Wall Application

	and the appointment of Party Wall Surveyors will ensure that the above measures are applied. Under the Party Wall Act, minor damage, although unwanted, can be tolerated; it is permitted to occur to a neighbouring property as long as repairs are suitability undertaken to rectify this. To mitigate this risk, the Party Wall Act is to be followed and a Party Wall Surveyor will be appointed. Temporary works are described further in the following section and a proposed construction sequence for the works is appended.

5. Conclusion

The basement development will not have any major adverse effects on ground or surface water and it will not increase the likelihood of flooding in the local area. With suitable design and construction measures such as those proposed in this report, the basement can be safely constructed without any significant adverse effects on the neighbouring properties.

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Appendix A - Structural Design

wall 1

Location	Area			Type	L	Action	Actions, kN or kN/m			
	L	W	m^2			kN/m^2	Perm., g_k	%	Var., q_k	Total
Wall 1										
325 wall	8.2	1	8.2	g_k		7.00	57.4	kN/m		
225 wall	1.1	1	1.1	g_k		5.00	5.5	kN/m		
Floors-Timber	3.15	2	6.3	g_k		0.63	4.0	kN/m		
				q_k		1.50			9.5	kN/m
Roof	3.15	2	6.3	g_k		1.10	6.9	kN/m		
				q_k		0.75			4.7	kN/m
Ground floor	3.15	1	3.15	g_k		4.62	14.6	kN/m		
				q_k		1.50			4.7	kN/m
							88.4	kN/m	**18.9**	kN/m

Retaining wall analysis

In accordance with EN1997-1:2004 incorporating Corrigendum dated February 2009 and the UK National Annex incorporating Corrigendum No.1

Tedds calculation version 2.9.14

Retaining wall details

Stem type Cantilever

Stem height h_{stem} = **3100** mm

Stem thickness t_{stem} = **350** mm

Angle to rear face of stem α = **90** deg

Stem density γ_{stem} = **25** kN/m^3

Toe length l_{toe} = **1200** mm

Base thickness t_{base} = **300** mm

Base density γ_{base} = **25** kN/m^3

Height of retained soil h_{ret} = **3100** mm Angle of soil surface β = **0** deg

Depth of cover d_{cover} = **0** mm

Library item: Soil details summary

Height of water h_{water} = **2100** mm

Water density γ_w = **9.8** kN/m^3

Retained soil properties

Soil type Medium dense well graded sand and gravel

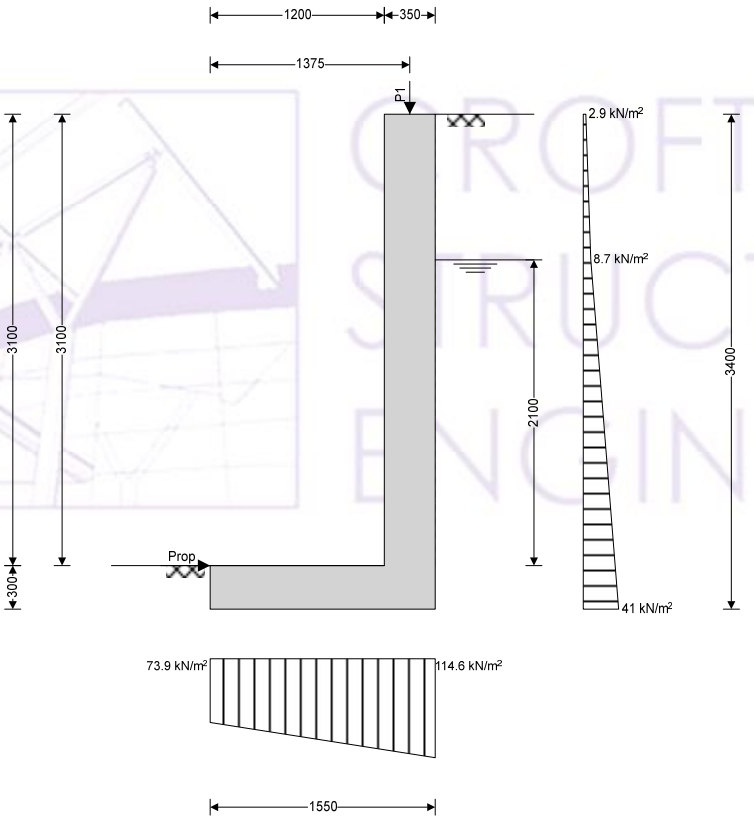
Moist density γ_{mr} = **20** kN/m^3
Saturated density γ_{sr} = **22.3** kN/m^3
Characteristic effective shear resistance angle $\phi'_{r.k}$ = **30** deg
Characteristic wall friction angle $\delta_{r.k}$ = **15** deg

Base soil properties

Soil type Dense well graded sand and gravel
Soil density γ_b = **20.5** kN/m^3
Characteristic effective shear resistance angle $\phi'_{b.k}$ = **36** deg
Characteristic wall friction angle $\delta_{b.k}$ = **18** deg
Characteristic base friction angle $\delta_{bb.k}$ = **24** deg
Presumed bearing capacity $P_{bearing}$ = **125** kN/m^2

Loading details

Variable surcharge load $Surcharge_Q$ = **10** kN/m^2
Vertical line load at 1375 mm P_{G1} = **88.4** kN/m
P_{Q1} = **18.9** kN/m

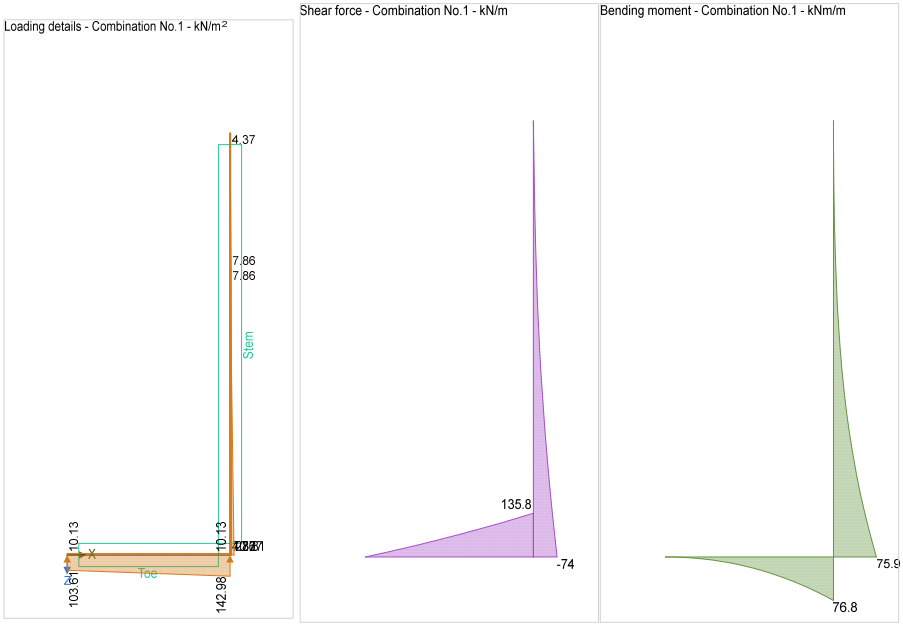


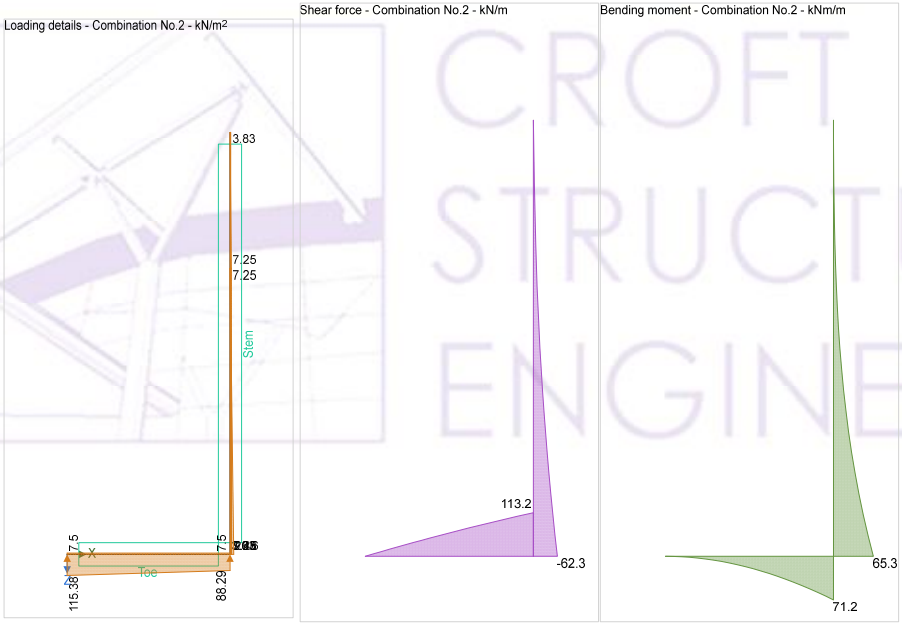
General arrangement

Calculate retaining wall geometry

Base length l_{base} = **1550** mm
Saturated soil height h_{sat} = **2100** mm
Moist soil height h_{moist} = **1000** mm
Length of surcharge load l_{sur} = **0** mm
Vertical distance x_{sur_v} = **1550** mm

Effective height of wall h_{eff} = **3400** mm
Horizontal distance x_{sur_h} = **1700** mm
Area of wall stem A_{stem} = **1.085** m² Vertical distance x_{stem} = **1375** mm
Area of wall base A_{base} = **0.465** m² Vertical distance x_{base} = **775** mm
Using Coulomb theory
Active pressure coefficient K_A = **0.301** Passive pressure coefficient K_P = **8.022**
Library item: Calculated soil props summary
Bearing pressure check
Vertical forces on wall
Total $F_{total\_v} = F_{stem} + F_{base} + F_{P\_v} + F_{water\_v}$ = **146.1** kN/m
Horizontal forces on wall
Total $F_{total\_h} = F_{sur\_h} + F_{sat\_h} + F_{water\_h} + F_{moist\_h} + F_{pass\_h}$ = **58.4** kN/m
Moments on wall
Total $M_{total} = M_{stem} + M_{base} + M_{sur} + M_P + M_{sat} + M_{water} + M_{moist}$ = **121.3** kNm/m
Check bearing pressure
Propping force F_{prop_base} = **58.4** kN/m
Library item: Prop forces base summary
Bearing pressure at toe q_{toe} = **73.9** kN/m² Bearing pressure at heel q_{heel} = **114.6** kN/m²
Library item: Bearing pressure common summary
Factor of safety FoS_{bp} = **1.091**
PASS - Allowable bearing pressure exceeds maximum applied bearing pressure
Library item: Bearing FoS summary
Retaining wall design
In accordance with EN1992-1-1:2004 incorporating Corrigendum dated January 2008 and the UK National Annex incorporating National Amendment No.1
Tedds calculation version 2.9.14
_LibXXX - Design calculation title output
Concrete details - Table 3.1 - Strength and deformation characteristics for concrete
Concrete strength class C32/40
Char.comp.cylinder strength f_{ck} = **32** N/mm² Mean axial tensile strength f_{ctm} = **3.0** N/mm²
Secant modulus of elasticity E_{cm} = **33346** N/mm² Maximum aggregate size h_{agg} = **20** mm
Design comp.concrete strength f_{cd} = **18.1** N/mm² Partial factor γ_C = **1.50**
Reinforcement details
Characteristic yield strength f_{yk} = **500** N/mm² Modulus of elasticity E_s = **200000** N/mm²
Design yield strength f_{yd} = **435** N/mm² Partial factor γ_S = **1.15**
Library item – Material details summary
Cover to reinforcement
Front face of stem c_{sf} = **50** mm Rear face of stem c_{sr} = **75** mm
Top face of base c_{bt} = **50** mm Bottom face of base c_{bb} = **75** mm





Check stem design at base of stem

Depth of section h = **350** mm

Rectangular section in flexure - Section 6.1

Design bending moment M = **75.9** kNm/m K = **0.033** K' = **0.207**

K' > K - No compression reinforcement is required

Tens.reinforcement required $A_{sr.req}$ = **688** mm²/m

Tens.reinforcement provided 16 dia.bars @ 100 c/c Tens.reinforcement provided $A_{sr.prov}$ = **2011** mm²/m

Min.area of reinforcement $A_{sr.min}$ = **420** mm²/m Max.area of reinforcement $A_{sr.max}$ = **14000** mm²/m

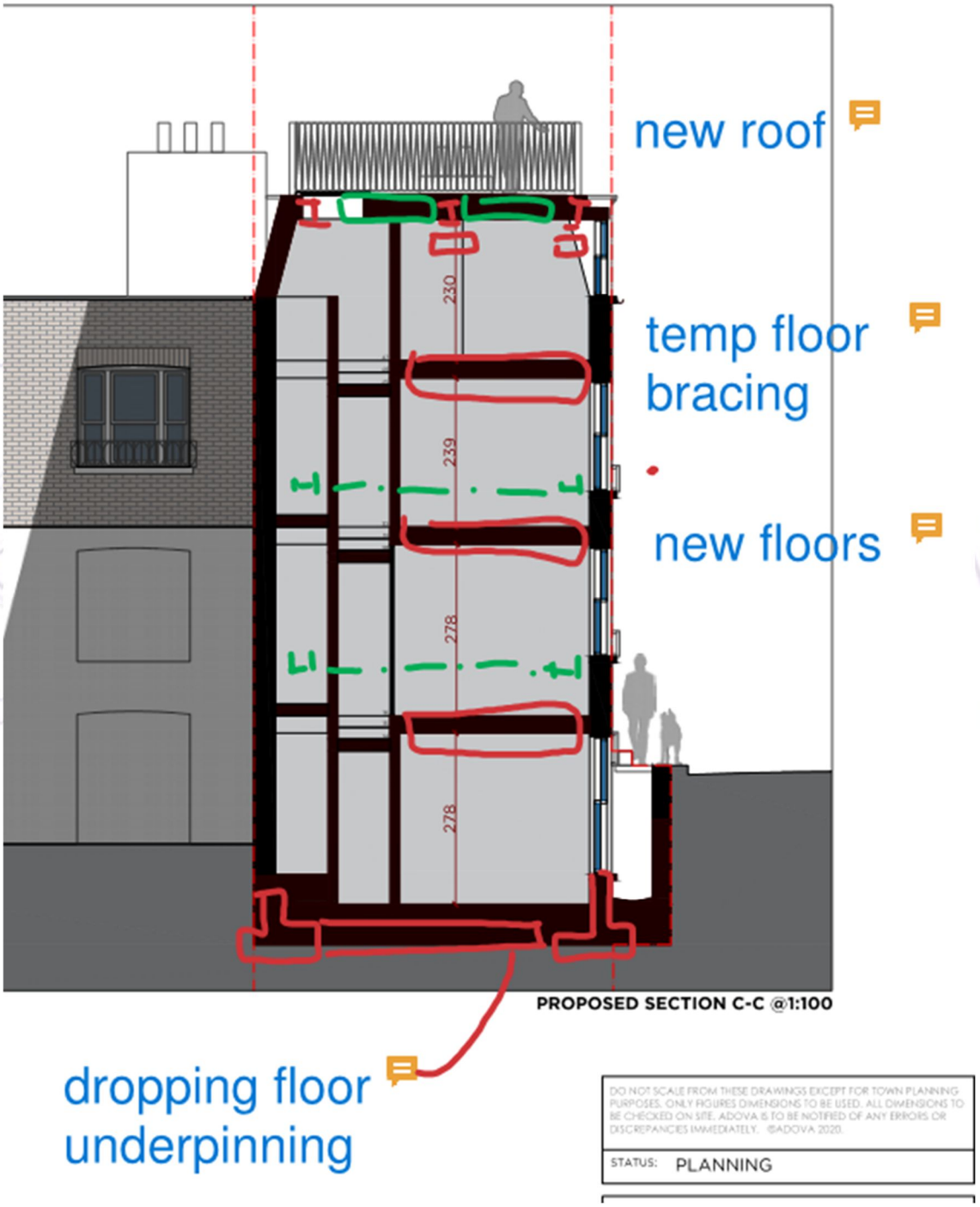
PASS - Area of reinforcement provided is greater than area of reinforcement required

Library item: Rectangular single summaryDeflection control - Section 7.4
Limiting span to depth ratio 16 Actual span to depth ratio 11.6
PASS - Span to depth ratio is less than deflection control limit
Library item: Deflection control summary
Crack control - Section 7.3
Limiting crack width w_{max} = **0.3** mm Maximum crack widthw_k = **0.115** mm
PASS - Maximum crack width is less than limiting crack widthLibrary item: Crack width summary
Rectangular section in shear - Section 6.2
Design shear force V = **74** kN/m Design shear resistance $V_{Rd.c}$ = **172.6** kN/m
PASS - Design shear resistance exceeds design shear force
Library item: Shear capacity summary
Horizontal reinforcement parallel to face of stem - Section 9.6
Min.area of reinforcement $A_{sx.req}$ = **503** mm²/m Max.spacing of reinforcement s_{sx_max} = **400** mm
Trans.reinforcement provided 10 dia.bars @ 150 c/c Trans.reinforcement provided $A_{sx.prov}$ = **524** mm²/m
PASS - Area of reinforcement provided is greater than area of reinforcement required
Library item: Transverse reinforcement summary
Check base design at toe
Depth of section h = **300** mm
Rectangular section in flexure - Section 6.1
Design bending moment M = **76.8** kNm/m K = **0.051** K' = **0.207**
K' > K - No compression reinforcement is required
Tens.reinforcement required $A_{bb.req}$ = **856** mm²/m
Tens.reinforcement provided 16 dia.bars @ 100 c/c Tens.reinforcement provided $A_{bb.prov}$ = **2011** mm²/m
Min.area of reinforcement $A_{bb.min}$ = **341** mm²/m Max.area of reinforcement $A_{bb.max}$ = **12000** mm²/m
PASS - Area of reinforcement provided is greater than area of reinforcement required
Library item: Rectangular single summaryCrack control - Section 7.3
Limiting crack width w_{max} = **0.3** mm Maximum crack widthw_k = **0.151** mm
PASS - Maximum crack width is less than limiting crack widthLibrary item: Crack width summary
Rectangular section in shear - Section 6.2
Design shear force V = **135.8** kN/m Design shear resistance $V_{Rd.c}$ = **158** kN/m
PASS - Design shear resistance exceeds design shear force
Library item: Shear capacity summary
Secondary transverse reinforcement to base - Section 9.3
Min.area of reinforcement $A_{bx.req}$ = **402** mm²/m Max.spacing of reinforcement s_{bx_max} = **450** mm
Trans.reinforcement provided 10 dia.bars @ 150 c/c Trans.reinforcement provided $A_{bx.prov}$ = **524** mm²/m
PASS - Area of reinforcement provided is greater than area of reinforcement required
Library item: Transverse reinforcement summary

CROFT STRUCTURAL ENGINEERS

Appendix B – Method Statement

The existing floors are going to demolished and new floors will be constructed. Before removing the floors, the existing façade walls to be stabilised with lateral braces to ground and first floors and to cross prop the walls. 150x90 PFC's will be provided as knee braces in plan.



A method statement to build the basement is given below.

CROFT STRUCTURAL ENGINEERS

2 Bingham Place

1. Preamble

1.1. This method statement provides an approach that will allow the basement design to be correctly considered during construction. The statement also contains proposals for the temporary support to be provided during the works. The Contractor is responsible for the works on site and the final temporary works methodology and design on this site and any adjacent sites

1.2. This method statement has been written by a Chartered Engineer. The sequencing has been developed using guidance from ASUC (Association of Specialist Underpinning Contractors). Croft Structural Engineers are an Associate Member of ASUC.

1.3. This method has been produced to allow for improved costings and for inclusion in the Party Wall Award. Final site conditions need there to be flexibility in the method statement: Should the site staff require alterations to the Method statement this is allowed once an alternative methodology, of the changes is provided, and an Addendum to the Party Wall Award will be required.

1.4. Contact Party Wall Surveyors to inform them of any changes to this method statement.

1.5. On this development, the approach is: construct the underpin segments that will support the permanent steel work insert the new steelwork remove load from above and place it onto new supporting steelwork cast the remainder of the retaining walls that will form the perimeter of the basement.

1.6. Temporary props will be provided along the height of the pin in the temporary condition. Before the base is cast cross props are needed. The base/ground slab provides propping in the final condition. In the temporary condition, the edge of the slab is buttressed against the soil in the middle of the property. Also the skin friction between the concrete base and the soil provides further resistance. The central soil mass is to be removed in portions (thirds but no greater than 8m) and cross propping subsequently added as the central soil mass is removed

1.7. A ground investigation has not been undertaken. The British Geological Survey maps shows the underlying soil to be Lynch Hill Gravel Member. There exists a borehole in the neighbouring property, which also states that the soil type is gravel.

1.8. The bearing pressures have been limited to 100kN/m^2. This is standard loading for the local ground conditions and acceptable to Building Control and their approvals

1.9. The water table is at site is unknown at present but the local borehole has a water level 6.04m below ground.

1.10. The structural waterproofer (not Croft) must comment on the proposed design and ensure that he is satisfied that the proposals will provide adequate waterproofing. When using drainaed cavities Lime reduction additives should be added to the concrete surface.

1.11. Provide engineers with concrete mix, supplier, delivery and placement methods two weeks prior to the first pour. Site mixing of concrete should not be employed apart from in small sections (less than 1m3). The contractor must provide a method on how to achieve site

mixing to the correct specification. The contractor must undertake toolbox talks with staff to ensure site quality is maintained.

2. Enabling Works

2.1. The site is to be hoarded with ply board sheets, at least 2.2m high, to prevent unauthorised public access.

2.2. Licences for skips and conveyors should be posted on the hoarding.

2.3. Provide protection to public where conveyor extends over footpath. Depending on the requirements of the local authority, construct a plywood bulkhead over the pavement. Hoarding to have a plywood roof covering over the footpath, night-lights and safety notices.

2.4. Dewater:

If water is present:

2.4.1. Place a bore hole to the front of the property down to a depth of 6m
2.4.2. Pump water away from site.

If water is not present

2.4.3. No significant dewatering is expected. Localised removal of water may be required to deal with rain from perched water or localised water. This is to be dealt with by localised pumping. Typically achieved by a small sump pump in a bucket.

2.5. On commencement of construction, the contractor will determine the foundation type, width and depth. Any discrepancies will be reported to the structural engineer in order that the detailed design may be modified as necessary.

3. Basement Sequencing

3.1. Begin by placing cantilevered walls noted on plans.
3.2. Needle and prop the walls over.

3.3. Insert steel over and sit on cantilevered walls.

3.3.1. Beams over 6m to be jacked on site to reduce deflections of floors.

3.3.2. Dry pack to steelwork. Ensure a minimum of 24 hours from casting cantilevered walls to dry-packing. Grout column bases

3.4. Excavate first front corner of lightwell.
3.5. Excavate next pin as shown on plan.

3.6. Excavate second front corner of lightwell.

3.7. Continue excavating section pins.
3.8. Place cantilevered retaining walls. Maintain 48 hours to place cantilevered retaining wall when adjacent pins are cast.

3.9. Needle and prop front wall. Insert support

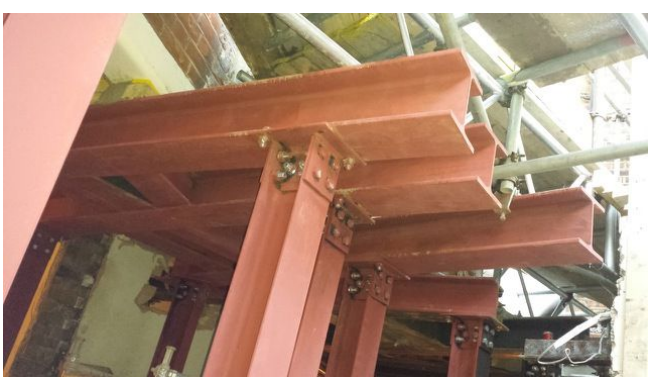



Figure 3 Example of needling to existing wall

3.10. Excavate out first 1.2m around front opening, prop floor and erect conveyor.

3.11. Continue cantilevered wall formation around perimeter of basement following the numbering sequence on the drawings.

3.11.1. Excavation for the next numbered sequential sections of underpinning shall not commence until at least 8 hours after drypacking of previous works. Excavation of adjacent pin to not commence until 48 hours after drypacking. (24hours possible due to inclusion of Conbextra 100 cement accelerator to dry pack mix). No more than

3.11.2. Floor over to be propped as excavation progresses. Steelwork to support floor to be inserted as works progress.

3.12. Excavate and cast floor slab

3.12.1. Excavate 1/3 of the middle section of basement floor. As excavation proceeds, place Slim Shore props at a maximum of 2.5m c/c across the basement. Locate props at a third of the height of the wall.


3.12.2. Continue excavating the next 1/3 and prop then repeat for the final 1/3.

3.12.3. Place below-slab drainage. Croft recommends that all drainage is encased in concrete below the slab and cast monolithically with the slab. Placing drainage on pea shingle below the slab allows greater penetration for water ingress.

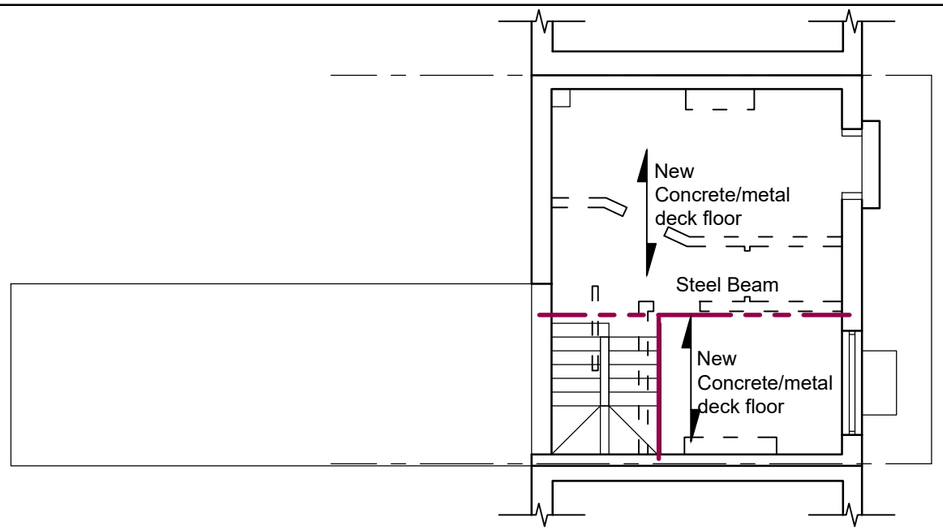
3.12.4. Place reinforcement for basement slab.

3.12.5. Building Control Officer and Engineer are to be informed five working days before reinforcement is ready and invited for inspection.

3.12.6. Once inspected, pour concrete.

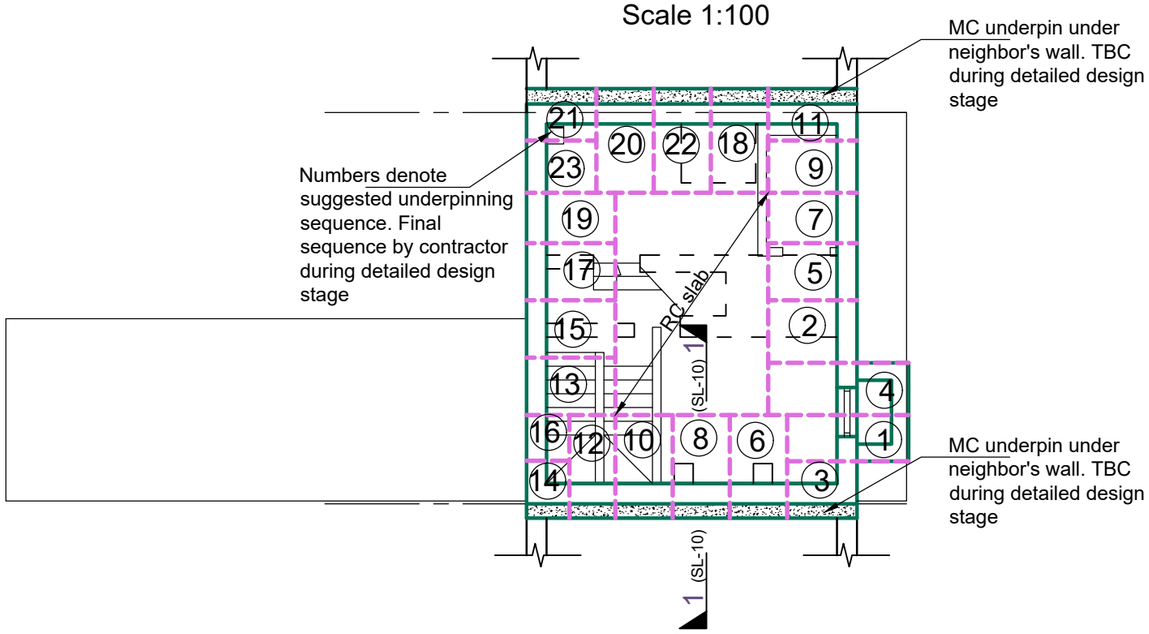
3.13. Provide structure to ground floor and water proofing to retaining walls as required. It is recommended to leave 3-4 weeks between completion of the basement and installing drained cavity. This period should be used to locate and fill any localised leakage of the basement

Appendix C – Structural Plans



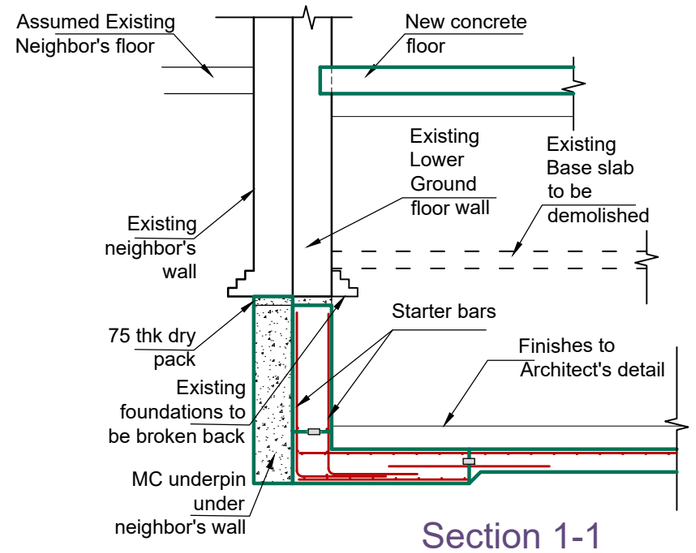
Proposed Ground Floor Plan

Scale 1:100



Proposed Lower Ground Floor Plan

Scale 1:100



Section 1-1

Scale (1:50)

Rev	Date	by	Amendments
-	20.09.21	VLD	First Issue

- PLANNING ISSUE -
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Bradley Mackenzie

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Plans and Section

Issued for **PLANNING ONLY**

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