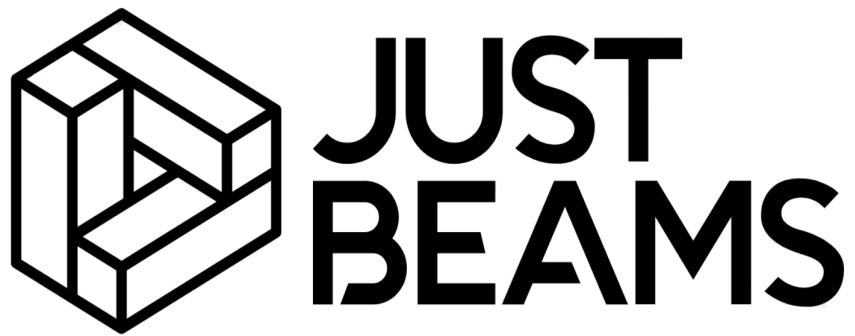




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07949813086

Project:301

GLEN VIEW, PONTIR ROAD NP18 3NW

RETAINING WALL DESIGN

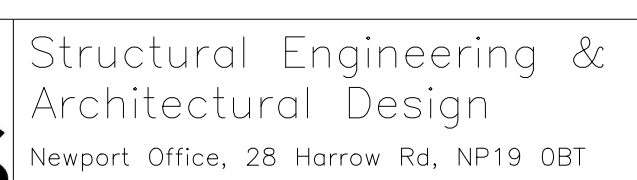


1. DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH BUILDING REGULATIONS
3. ALL UNSPECIFIED LEVELS AND SETTING OUT SHALL BE AS PER THE ARCHITECTURAL DRAWINGS AND CONFIRMED BY THE CONTRACTOR.
4. THE CONTRACTOR IS TO DESIGN, SUPPLY, INSTALL, AND MAINTAIN ALL NECESSARY TEMPORARY PROPPING TO ENSURE VERTICAL AND LATERAL STABILITY TO ALL PARTS OF THE NEW AND EXISTING STRUCTURE.
5. UNLESS NOTED OTHERWISE, IT HAS BEEN ASSUMED THAT THERE ARE SUITABLE FOUNDATIONS BENEATH ALL EXISTING LOAD-BEARING WALLS.
6. THE LENGTHS OF ALL STRUCTURAL ELEMENTS (E.G. BEAMS, COLUMNS, RAFTERS ETC) MUST BE MEASURED BY THE CONTRACTOR TO SUIT ON SITE BEFORE PLACING ANY ORDERS ON MATERIALS - DO NOT SCALE FROM DRAWINGS OR TAKE DIMENSIONS FROM THE CALCULATIONS AND ANY DISCREPANCIES MUST BE REPORTED IMMEDIATELY TO THE STRUCTURAL ENGINEER.
7. ALL WORKS MUST BE UNDERTAKEN BY A SUITABLY COMPETENT AND EXPERIENCED CONTRACTOR
8. ALL STEELWORK TO BE GRADE S355
9. NOMINAL COVER TO REINFORCEMENT 50MM, +/- 10MM UNLESS STATED OTHERWISE.

1. ALL EXCAVATIONS SHOULD BE UNDERTAKEN IN ACCORDANCE WITH HEALTH & SAFETY GUIDELINE 47
2. EXISTING PIPES, DRAINS AND OTHER SERVICES TO BE PROTECTED FOR THE DURATION OF THE WORKS.
3. EXCAVATIONS FOR NEW LOAD BEARING FOUNDATIONS THAT ARE ADJACENT TO EXISTING FOUNDATIONS. THE CONTRACTOR IS TO USE METHODS WHICH WILL PREVENT DISTURBANCE OF THESE STRUCTURES.
4. CONTRACTOR MUST CONFIRM THAT THE BEAM'S WIDTH IS SUFFICIENT TO FULLY SUPPORT THE WALL ABOVE BEFORE ORDERING MATERIAL ON-SITE. A MAXIMUM MASONRY OVERHANG OF 50MM IS PERMITTED; ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER FOR FURTHER ADVISE.
5. CONTRACTOR TO ENSURE A MINIMUM 1-METER CONTINUOUS BEARING MASONRY WALL UNDER EACH SPECIFIED PADSTONE, IN CASE IT IS OTHERWISE SPECIFIED ON DRAWINGS.

RETAINING WALL NOTES:

1. Drawings shall be referred to for structural work only unless otherwise stated and read in conjunction with Architect's, Services Engineer's and Sub-Contractor's drawings.
2. The contractor shall check all levels and dimensions, any errors or omissions are to be reported at once to the Engineer.
3. Concrete mix to be grade C30 with 320 Kg/m² minimum cement content, 0.5 free water/cement ratio and 20mm maximum aggregate size.
4. Provide 15mm movement joints in blockwork every 6m or at stepped locations.
5. Backfill behind retaining wall not to be placed until blockwork has cured for at least 7 days.
6. Reinforcement to have a characteristic strength of 500N/mm².
7. Density of backfill taken as 1800Kg/m³ with angle of repose of 30 degrees.
8. Concrete base slabs to be cast into undisturbed ground, or level made up in mass concrete.
9. Weep holes (65mm diameter) to be located through the retaining wall at 1m c/s along its entire length.
10. Back faces of the retaining walls shall be coated with 2 No. coats of Bituminous paint to reduce the leaching of sulphates through the visible face of the wall.



ISSUE	P01	NG INVESTMENT No-100306	FIRST ISSUE	Site			GLEN VIEW, PONTNIR ROAD, NP18 3NW		A1
DRAWN	JRT			Originator Drawing Number			301		CAD
CHECKED	RS/ZR				Sheet No.	No. of Sheets	1	1	ISSUE P01
APPROVED/DATE	RS/ZR			31/08/25	SCALE:- 1:10				

Project GLEN VIEW, PONTNIR ROAD NP18 3NW				Status BUILDERS REVIEW				
Date By Checked	31-08-2025 Z.RAHMAN -	Job no. 301	Section -	Sheet no. 1	Rev R0			
Rev R0	Date 07-08-2025	Details RETAINING WALL DESIGN			Tel Fax +44(0) 7949813086 -			
Part INTRODUCTION								
Ref:								
INTRODUCTION CLIENT WOULD LIKE TO DESIGN A RETAINING WALL. <u>Retaining wall details</u> (1500 max. difference in level)								
GENERAL SPECIFICATION								
- ALL UNSPECIFIED LEVELS AND SETTING OUT SHALL BE AS PER THE ARCHITECTURAL DRAWINGS AND CONFIRMED BY THE CONTRACTOR. - THE CONTRACTOR IS TO DESIGN, SUPPLY, INSTALL, AND MAINTAIN ALL NECESSARY TEMPORARY PROPPING TO ENSURE VERTICAL AND LATERAL STABILITY TO ALL PARTS OF THE NEW AND EXISTING STRUCTURE. - UNLESS NOTED OTHERWISE, IT HAS BEEN ASSUMED THAT THERE ARE SUITABLE FOUNDATIONS BENEATH ALL EXISTING LOAD-BEARING WALLS. - THE LENGTHS OF ALL STRUCTURAL ELEMENTS (E.G. BEAMS, COLUMNS, RAFTERS ETC) MUST BE MEASURED BY THE CONTRACTOR TO SUIT ON-SITE BEFORE PLACING ANY ORDERS ON MATERIALS - DO NOT SCALE FROM DRAWINGS OR TAKE DIMENSIONS FROM THE CALCULATIONS AND ANY DISCREPANCIES MUST BE REPORTED IMMEDIATELY TO THE STRUCTURAL ENGINEER. - ALL WORKS MUST BE UNDERTAKEN BY A SUITABLY COMPETENT AND EXPERIENCED CONTRACTOR								

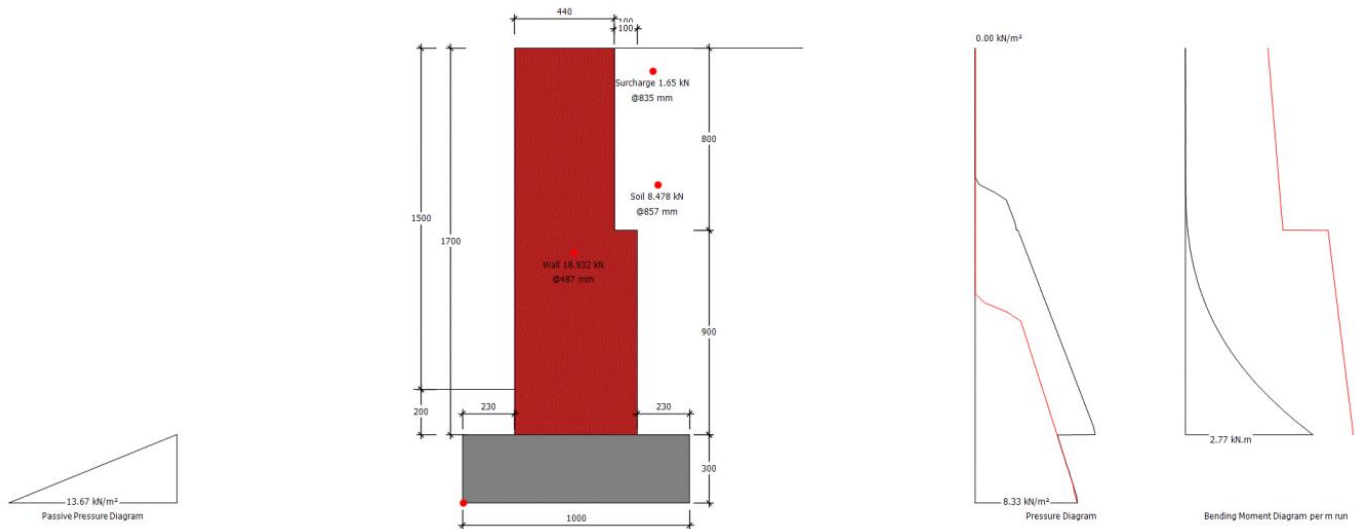
Project GLEN VIEW, PONTIIR ROAD NP18 3NW				Status BUILDERS REVIEW			
Date By	31-08-2025 Z.RAHMAN	Job no. 301	Section -	Sheet no. 2	Rev R0		
Checked -							
Rev R0	Date 07-08-2025	Details RETAINING WALL DESIGN				Tel +44(0) 7949813086	
Fax -							
Part							
LOADINGS							
Ref:	LOADINGS (SOURCE: NA TO BS EN 1991-1-1:2002) Dead Loadings Internal Timber Floor Build - Timber boards+joist = 0.35 kN/m2 - Ceiling and services = 0.15 kN/m2 Total = 0.50 kN/m2 Internal Timber Floor Build (Attic) - Timber boards+joist = 0.15 kN/m2 - Ceiling and services = 0.15 kN/m2 Total = 0.30 kN/m2 Timber Flat Roof - Asphalt waterproofing = 0.35 kN/m2 - Timber joists and insulation = 0.30 kN/m2 - Ceiling and services = 0.15 kN/m2 Total = 0.8 kN/m2 Timber Pitched Roof - Tiles = 0.60 kN/m2 - Batens = 0.10 kN/m2 - Rafters = 0.15 kN/m2 Total = 0.85 kN/m2 Roof Space - Joist+Insulation = 0.15 kN/m2 - Soffit = 0.15 kN/m2 Total = 0.30 kN/m2 Masonry Walls - Blockwork = 14.00 kN/m3 - Lightweight Blockwork 7.3N = 10.00 kN/m3 - Standard clay bricks = 20.00 kN/m3 Live Loadings Internal Live Loading - A1 Domestic use = 1.50 kN/m2 - Partitions with a self-weight of 1.0 kN/m wall length: qk = 0.5 kN/m2. = 0.50 kN/m2 Total = 2.00 kN/m2 - Snow and access (flat roof) = 0.75 kN/m2 - Snow and access (pitched roof) = 0.75 kN/m2 - Flat roof accessible for normal maintenance and Repair - Category H = 0.75 kN/m2 - Attic, live loading = 0.60 kN/m2					Output	

Project GLEN VIEW, PONTNIR ROAD NP18 3NW				Status BUILDERS REVIEW		JUST BEAMS	
Date 31-08-2025		Job no. 301	Section -	Sheet no. 3	Rev R0		
By Z.RAHMAN							
Checked -							
Rev R0	Date 07-08-2025	Details RETAINING WALL DESIGN				Tel +44(0) 7949813086	
						Fax -	
Part							
Load Takedown							
Ref:							
LOADING Retaining wall Surcharge Dead Load Live Load 5.000 kN/m2							

MASTERKEY : RETAINING WALL DESIGN TO BS 8002 : 1994, BS EN 1996-1-1:2005+A1:2012 AND BS 8110 : 1997

Basic RC Retaining Wall

Gravity Masonry Retaining Wall with Reinforced Concrete Base



Summary of Design Data

EC6 National Annex	UK
Notes	All dimensions are in mm and all forces are per metre run
Material Densities (kN/m³)	Soil 18.00, Concrete 24.00, Masonry 14.00
Concrete grade	fcu 20 N/mm², Permissible tensile stress 0.250 N/mm²
Concrete covers (mm)	Base cover 50 mm
Reinforcement design	fy 500 N/mm², fyb 500 N/mm² designed to BS 8110: 1997
Surcharge and Water Table	Surcharge 5.00 kN/m², Fully drained
Unplanned excavation depth	Front of wall 200 mm
† The Engineer must satisfy him/herself to the reinforcement detailing requirements of the relevant codes of practice	

Soil Properties

Bearing pressure	Premissable service pressure @ front 100.00 kN/m², @ back 100.00 kN/m²
Back Soil Friction and Cohesion	$\phi = \text{Atn}(\tan(30)/1.2) = 25.69^\circ$, $c = 5/1.5 = 3.333 \text{ kN/m}^2$
Base Friction and Cohesion	$\delta = \text{Atn}(0.75 \times \tan(\text{Atn}(\tan(30)/1.2))) = 19.84^\circ$, $c = 0.75 \times 5/1.5 = 2.5 \text{ kN/m}^2$
Front Soil Friction and Cohesion	$\phi = \text{Atn}(\tan(30)/1.2) = 25.69^\circ$

Loading Cases

G_{Soil} - Soil Self Weight, G_{Wall} - Wall & Base Self Weight, $F_{V_{\text{Heel}}}$ - Vertical Loads over Heel,	
P_a - Active Earth Pressure, $P_{\text{surcharge}}$ - Earth pressure from surcharge, P_p - Passive Earth Pressure	
Case 1: Geotechnical Design	1.00 G_{Soil} +1.00 G_{Wall} +1.00 $F_{V_{\text{Heel}}}$ +1.00 P_a +1.00 $P_{\text{surcharge}}$ +1.00 P_p
Case 2: Structural Ultimate Design	1.40 G_{Soil} +1.40 G_{Wall} +1.60 $F_{V_{\text{Heel}}}$ +1.00 P_a +1.00 $P_{\text{surcharge}}$ +1.00 P_p

Geotechnical Design

Wall Stability - Virtual Back Pressure

Case 1 Overturning/Stabilising	1.883/17.503	0.108	OK
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Wall Sliding - Virtual Back Pressure

$F_x/(R_x \text{Friction} + R_x \text{Passive})$	5.062/(12.806+2.058)	0.341	OK
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Soil Pressure

Virtual Back (No uplift)	Max(20.518/100, 36.602/100) kN/m²	0.366	OK
Wall Back (No uplift)	Max(38.295/100, 18.825/100) kN/m²	0.383	OK

Structural Design

Masonry Wall Details

Partial Safety Factor (γ_{mc}/γ_{mf})	Units Category II, Execution Control Class 2	3/2.7	Table NA.1
Material	Concrete blocks, $\gamma=14 \text{ kN/m}^3$		
Units and Mortar Strength	7.3 N/mm ² , Mortar designation M4/(iii)		
Blocks Ratio	Unit height=215, Least horizontal dimensions=102.5	2.10	
Compressive Strength (f_k)	Group 1	4.57 N/mm ²	Table NA.4

Wall Design (Inner Face Tension)

Critical Section	Critical @ 0 mm from base, Case 2		
Section Properties @ Base	t=540 mm, Area=5400 cm ² , Zb=48600 cm ³		
Flexural Strength f_{xk1}	$f_{xk1}=0.15$, $gd=0.022 \text{ N/mm}^2$, $f_{xk1}=f_{xk1}+0.9 \text{ gd} \cdot \gamma_{mf}$	0.203 N/mm ²	Table NA.6
$M_r=f_{xk1} \cdot Z_b/\gamma_{mf}$	0.203x48600/2.7	3.65 kN.m	
Moment Capacity Check (M/Mr)	M 2.8 kN.m, Mr 3.7 kN.m	0.759	OK
Shear Capacity Check	F 6.5 kN, $f_{vk}0.159 \text{ N/mm}^2$, Fvr 34.3 kN	0.19	OK

Base Top Steel Design

Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	OK
Compression Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	
Leverarm $z=fn(d,b,As,f_y,F_{cu})$	245 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 20 N/mm ²	233 mm	
$M_r=fn(\text{above}, As', d', x, x/d)$	393 mm ² , 55 mm, 21 mm, 0.08	39.8 kN.m	
Moment Capacity Check (M/Mr)	M 0.6 kN.m, Mr 39.8 kN.m	0.015	OK
Shear Capacity Check	F 5.0 kN, $vc 0.388 \text{ N/mm}^2$, Fvr 95.1 kN	0.05	OK

Base Bottom Steel Design

Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	OK
Compression Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	
Leverarm $z=fn(d,b,As,f_y,F_{cu})$	245 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 20 N/mm ²	233 mm	
$M_r=fn(\text{above}, As', d', x, x/d)$	393 mm ² , 55 mm, 21 mm, 0.08	39.8 kN.m	
Moment Capacity Check (M/Mr)	M 0.8 kN.m, Mr 39.8 kN.m	0.021	OK
Shear Capacity Check	F 7.2 kN, $vc 0.388 \text{ N/mm}^2$, Fvr 95.1 kN	0.08	OK