



Project Preface

<i>Project name:</i>	Calculation package for the Retaining walls
<i>Client name:</i>	Joseff Galea
<i>Construction site address:</i> <i>House no, Street:</i> <i>City/Town:</i> <i>Postcode:</i>	25 heol corn ddu beacon heights, merthyr tydfil, CF48 1BW
<i>Document prepared by:</i>	Marcin Krawucki BSc (Hons) GMICE ICE Membership: 92007313
<i>Address:</i>	50 Quarry Row Merthyr Tydfil, CF47 8PS
<i>Date of preparation:</i>	25-06-2024
<i>Job reference number:</i>	AUX 333
<i>Revision</i>	C01



Project:	Calculation package for the Retaining walls		
Address:	25 heol corn ddu beacon heights, merthyr tydfil,		
Job No.	AUX 333	Sheet	1
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Design content

1 Introduction

1.1 Instructions

In accordance with instructions received from the client I have carried out a Structural calculations for the Retaining wall

1.2 Brief

I have been requested to carry out a Structural calculation for new Retaining wall at:

**25 heol corn ddu
beacon heights, merthyr tydfil,
CF48 1BW**

2 Construction works

All the construction works must be done by experienced builder or contractor.

As there is no ground investigation I use the worst case $GBP=75\text{kN/m}^2$. The minimum reinforcement cover in the concrete base should be 50mm. The concrete for the Retaining wall is C40. Movement joints must be provided at a maximum of 6m space with a maximum 3m from a corner or change of direction, They must commence at concrete foundation level and continue through the coping courses. The backfill material must be granular type to relieve hydrostatic pressure.

If the builder/contractor has any queries regarding the above-mentioned works during the installation process, please contact me.

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Marcin Krawucki
BSc (Hons) GMICE
ICE Membership: 92007313

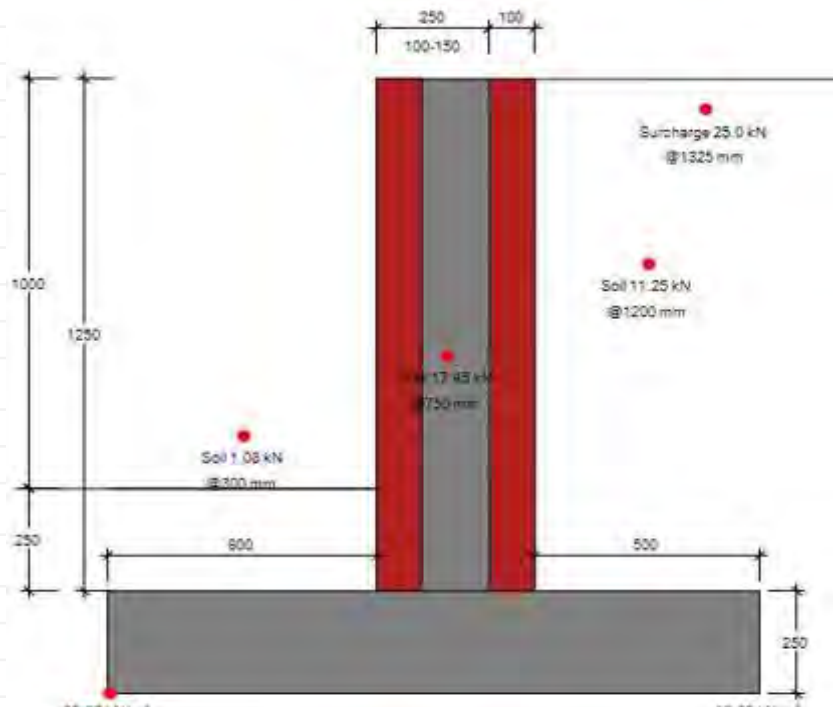


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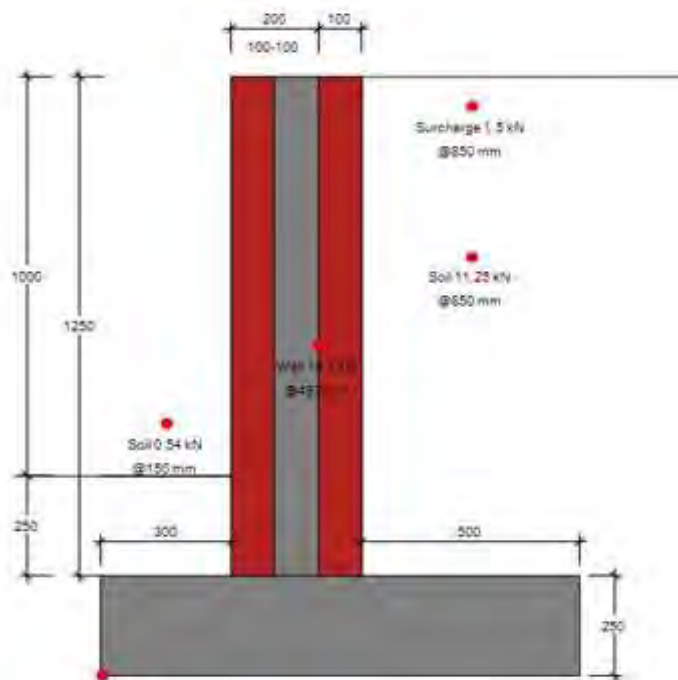
Mobile: +44 7465819500
Email: design@auxiliumse.com

Project:	Calculation package for the Retaining walls		
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Sections - 1



WALL 1 SECTION



WALL 2 SECTION

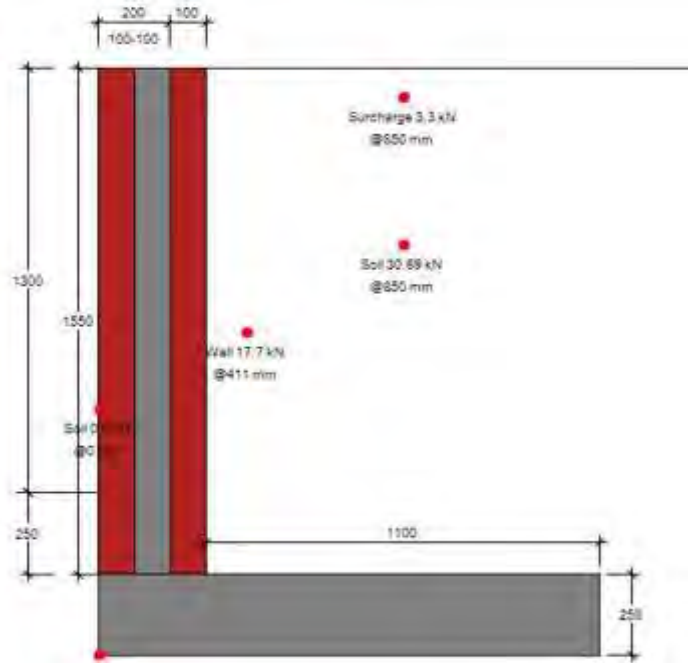


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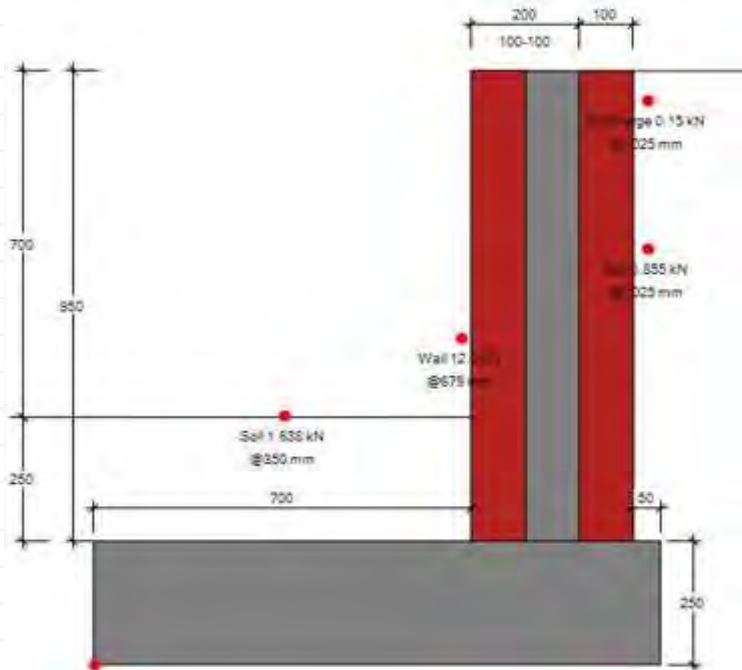
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Sections - 2



WALL 3 SECTION



WALL 4 SECTION

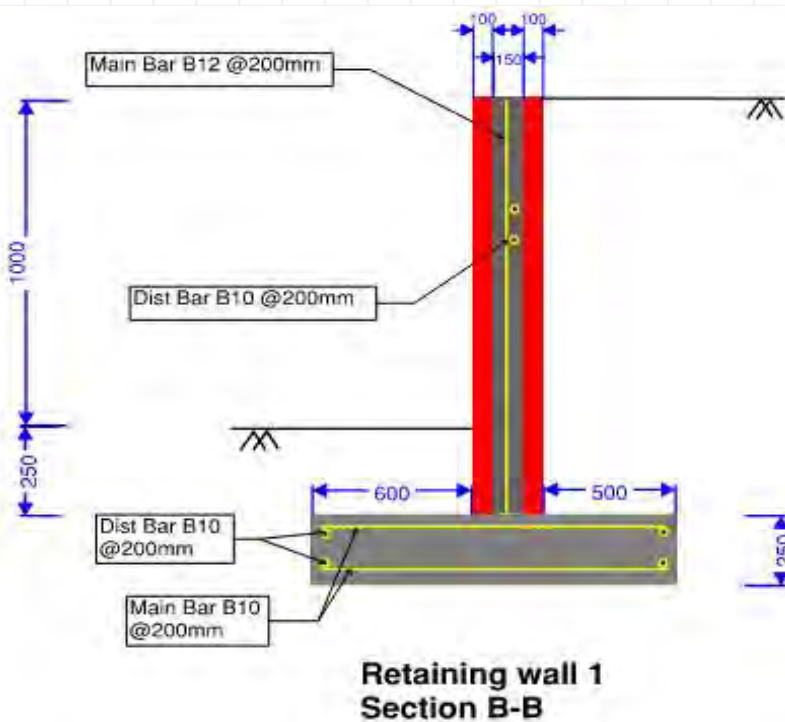
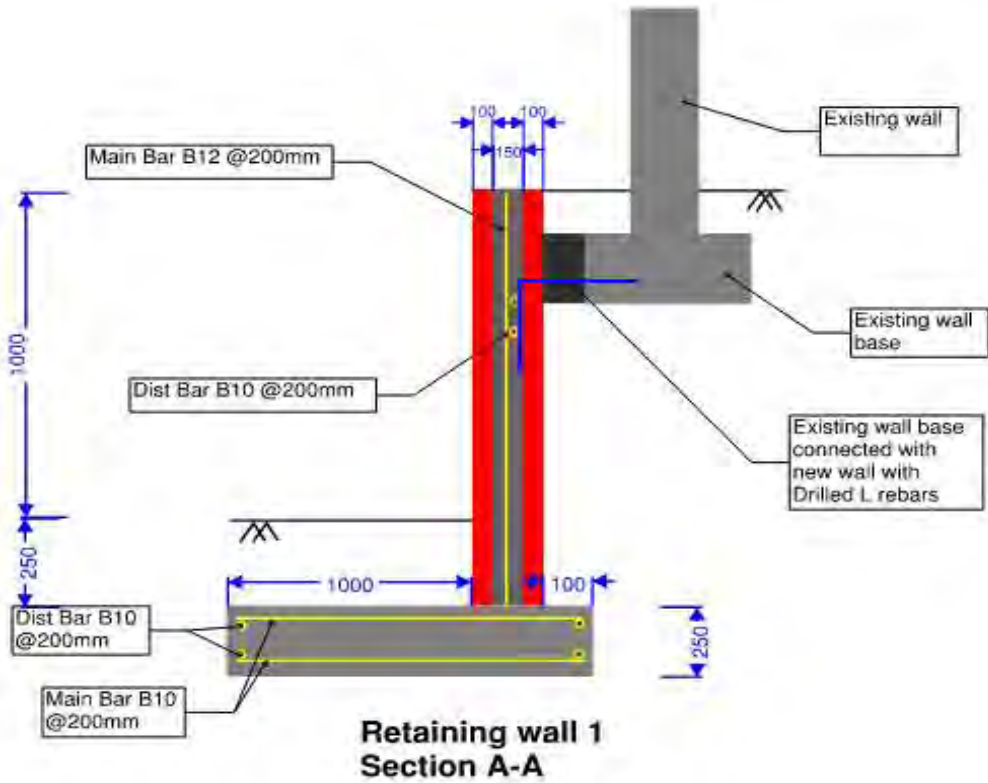


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Reinforcement details - 1



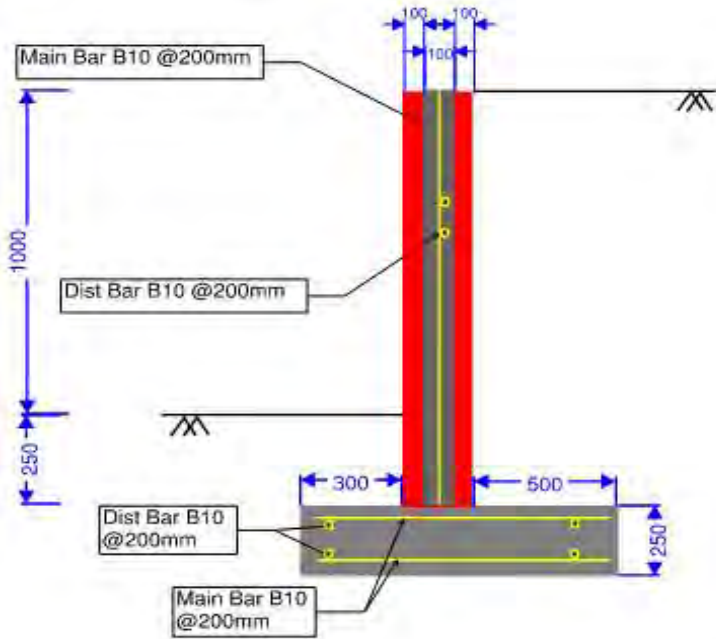


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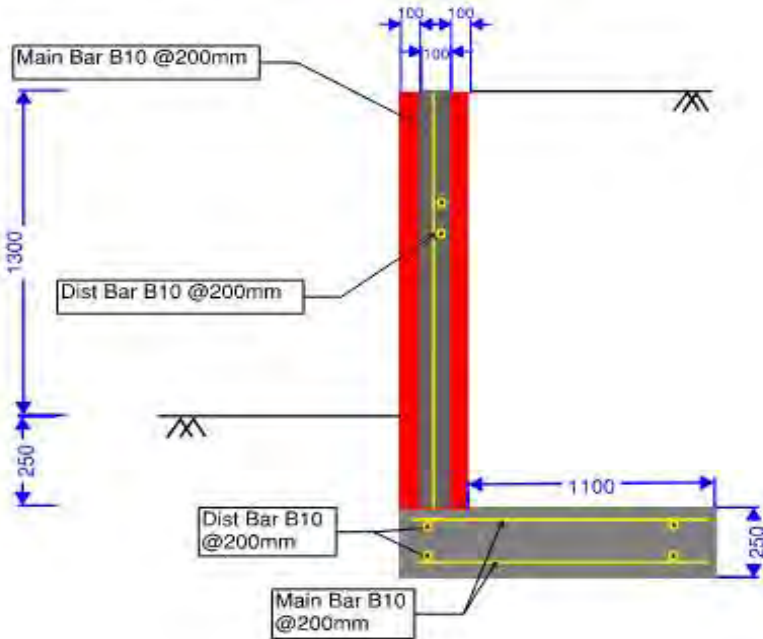
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Reinforcement details - 2



Retaining wall 2

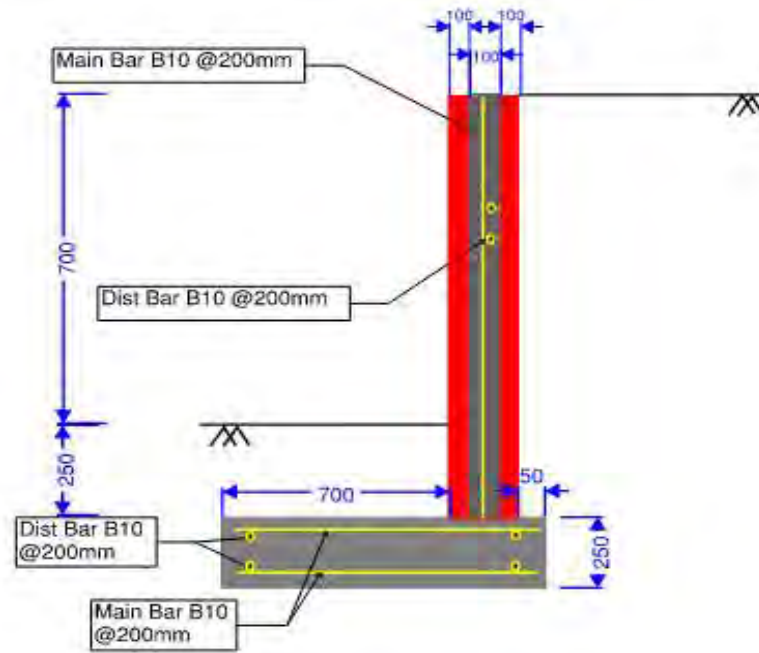


Retaining wall 3



Project:	Calculation package for the Retaining walls		
Address:	25 heol corn ddu beacon heights, merthyr tydfil,		
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Reinforcement details - 3



Retaining wall 4

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PROJECT NO: **AUX-333**

RETAINING WALL 1

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Job ref :
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**MasterKey : Retaining Wall Design to BS 8002 : 1994,
 BS EN 1996-1-1:2005+A1:2012 and BS 8110 : 1997**

Basic RC Retaining Wall

Reinforced Masonry Cavity Filled 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/m ³)	Soil 18.00, Concrete 24.00, Masonry 20.00
Concrete grade	fcu 40 N/mm ² , Permissible tensile stress 0.250 N/mm ²
Concrete covers (mm)	Cavity inner cover 30 mm, Cavity outer cover 110 mm, Base cover 50 mm
Reinforcement design	fy 500 N/mm ² , fyt 500 N/mm ² designed to BS 8110: 1997
Surcharge and Water Table	Surcharge 0.00 kN/m ² , Fully drained
Unplanned excavation depth	Front of wall 150 mm
† The Engineer must satisfy him/herself to the reinforcement detailing requirements of the relevant codes of practice	

Additional Loads

Distributed Surcharge Load	100 kN/m ² starting @ 250 mm and ending @ 550 mm - Load type Live
† Dimensions	Ties, line loads and partial loads are measured from the inner top edge of the wall

Soil Properties

Bearing pressure	Premissable service pressure @ front 75.00 kN/m ² , @ back 75.00 kN/m ²
Back Soil Friction and Cohesion	$\phi = \text{Atn}(\text{Tan}(25)/1.2) = 21.24^\circ$
Base Friction and Cohesion	$\delta = \text{Atn}(0.75 \times \text{Tan}(\text{Atn}(\text{Tan}(25)/1.2))) = 16.25^\circ$
Front Soil Friction and Cohesion	$\phi = \text{Atn}(\text{Tan}(30)/1.2) = 25.69^\circ$

Loading Cases

G _{Soil} - Soil Self Weight, G _{Wall} - Wall & Base Self Weight, F _{VHeel} - Vertical Loads over Heel,	
P _a - Active Earth Pressure, P _{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 _{VHeel} + 1.00 P _a + 1.00 P _{surcharge} + 1.00 P _p
Case 2: Structural Ultimate Design	1.40 G _{Soil} + 1.40 G _{Wall} + 1.60 F _{VHeel} + 1.00 P _a + 1.00 P _{surcharge} + 1.00 P _p

Geotechnical Design

Wall Stability - Virtual Back Pressure

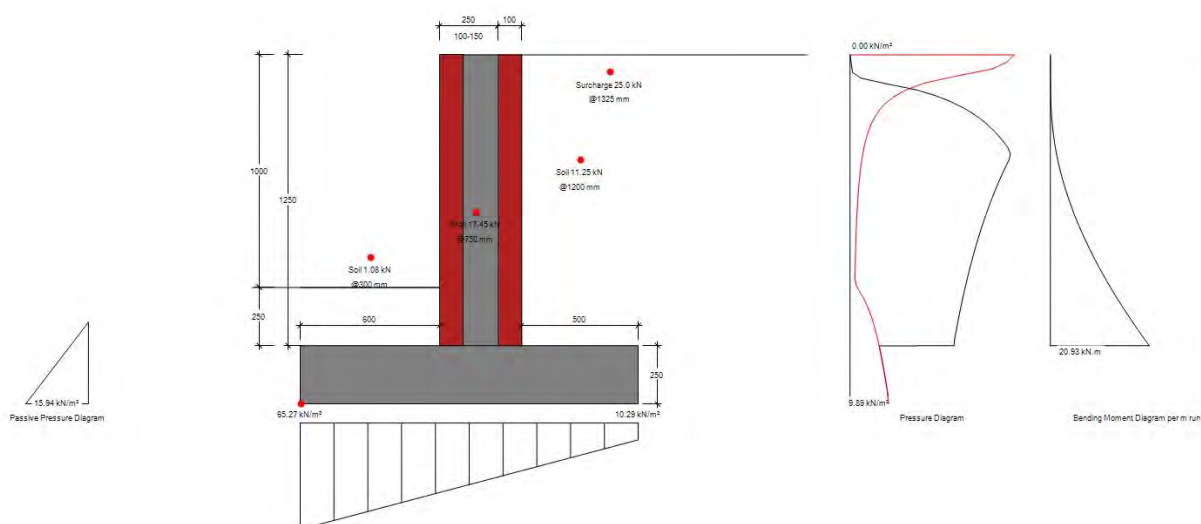
Case 1 Overturning/Stabilising	11.939/60.038	0.199	OK
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Wall Sliding - Virtual Back Pressure

F _x /(R _x Friction+R _x Passive)	13.665/(15.965+2.798)	0.728	OK
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Soil Pressure

Virtual Back (No uplift)	Max(13.855/75, 61.703/75) kN/m ²	0.823	OK
Wall Back (No uplift)	Max(65.269/75, 10.290/75) kN/m ²	0.870	OK



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Structural Design**Outer Leaf Details**

Partial Safety Factor (γ_{mc}/γ_{mf})	Units Category II, Execution Control Class 2	3/2.7	Table NA.1
Material	Clay bricks with water absorption less than 7%		
Units and Mortar Strength	10 N/mm ² , Mortar designation M12/(i)		
Compressive Strength (f_k)	Group 1, $\gamma=20$ kN/m ²	5.0 N/mm ²	Table NA.6

Inner Leaf Details

Partial Safety Factor (γ_{mc}/γ_{mf})	Units Category II, Execution Control Class 2	3/2.7	Table NA.1
Material	Clay bricks with water absorption less than 7%		
Units and Mortar Strength	10 N/mm ² , Mortar designation M12/(i)		
Compressive Strength (f_k)	Group 1, $\gamma=20$ kN/m ²	5.0 N/mm ²	Table NA.6

Wall Design (Inner Steel)

Critical Section	Critical @ 0 mm from base, Case 2		
Steel Provided (Cover)	Dist. H10@200 (30 mm in cavity)		
	Main H12@200 (30 mm in cavity)	565 mm ²	OK
Leverarm $z=fn(d,b,As,fy,f_k)$	214 mm, 1000 mm, 565 mm ² , 500 N/mm ² , 5.0 N/mm ²	148 mm	
$Mr=fn(above, \gamma_{mf}, \gamma_{ms})$	2.70, 1.15	33.9 kN.m	
Moment Capacity Check (M/M_r)	M 20.9 kN.m, M_r 33.9 kN.m	0.617	OK
Shear Capacity Check	F 35.9 kN, f_{vk} 0.721 N/mm ² , F_{vr} 61.7 kN	0.58	OK

Base Top Steel Design

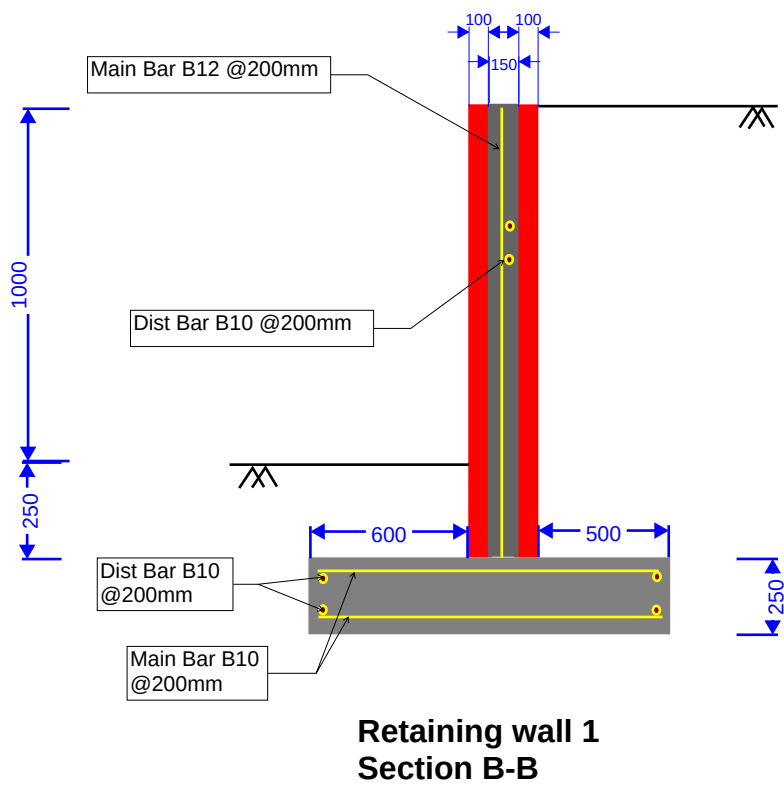
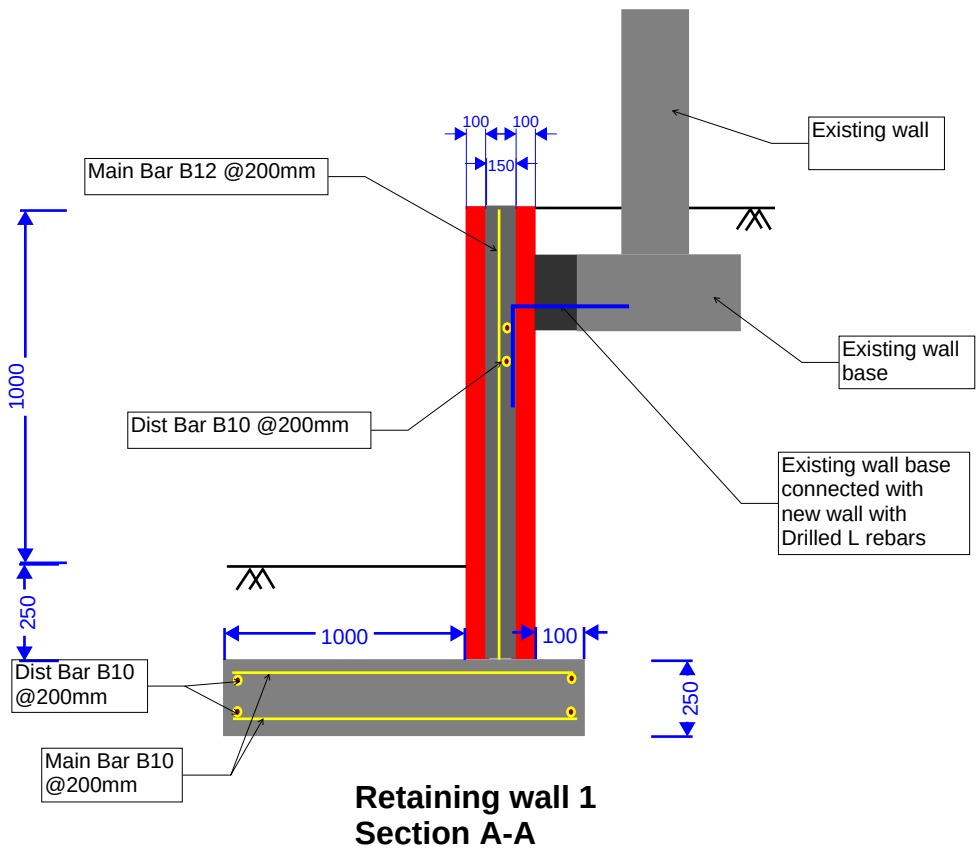
Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	OK
Compression Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	
Leverarm $z=fn(d,b,As,fy,F_{cu})$	195 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 40 N/mm ²	185 mm	
$Mr=fn(above, As', d', x, x/d)$	393 mm ² , 55 mm, 11 mm, 0.06	31.6 kN.m	
Moment Capacity Check (M/M_r)	M 16.7 kN.m, M_r 31.6 kN.m	0.528	OK
Shear Capacity Check	F 35.0 kN, v_c 0.519 N/mm ² , F_{vr} 101.1 kN	0.35	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 $z=fn(d,b,As,fy,F_{cu})$	195 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 40 N/mm ²	185 mm	
$Mr=fn(above, As', d', x, x/d)$	393 mm ² , 55 mm, 11 mm, 0.06	31.6 kN.m	
Moment Capacity Check (M/M_r)	M 12.0 kN.m, M_r 31.6 kN.m	0.380	OK
Shear Capacity Check	F 27.8 kN, v_c 0.519 N/mm ² , F_{vr} 101.1 kN	0.28	OK

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PROJECT NO: **AUX-333**

RETAINING WALL 2

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**MasterKey : Retaining Wall Design to BS 8002 : 1994,
 BS EN 1996-1-1:2005+A1:2012 and BS 8110 : 1997**

Basic RC Retaining Wall

Reinforced Masonry Cavity Filled 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/m ³)	Soil 18.00, Concrete 24.00, Masonry 20.00
Concrete grade	fcu 40 N/mm ² , Permissible tensile stress 0.250 N/mm ²
Concrete covers (mm)	Cavity inner cover 30 mm, Cavity outer cover 60 mm, Base cover 50 mm
Reinforcement design	fy 500 N/mm ² , fyb 500 N/mm ² designed to BS 8110: 1997
Surcharge and Water Table	Surcharge 3.00 kN/m ² , Fully drained
Unplanned excavation depth	Front of wall 150 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 75.00 kN/m ² , @ back 75.00 kN/m ²
Back Soil Friction and Cohesion	$\phi = \text{Atn}(\text{Tan}(25)/1.2) = 21.24^\circ$
Base Friction and Cohesion	$\delta = \text{Atn}(0.75 \times \text{Tan}(\text{Atn}(\text{Tan}(25)/1.2))) = 16.25^\circ$
Front Soil Friction and Cohesion	$\phi = \text{Atn}(\text{Tan}(30)/1.2) = 25.69^\circ$

Loading Cases

G _{Soil} - Soil Self Weight, G _{Wall} - Wall & Base Self Weight, F _{vHeel} - Vertical Loads over Heel,	
P _a - Active Earth Pressure, P _{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 _{vHeel} + 1.00 P _a + 1.00 P _{surcharge} + 1.00 P _p
Case 2: Structural Ultimate Design	1.40 G _{Soil} + 1.40 G _{Wall} + 1.60 F _{vHeel} + 1.00 P _a + 1.00 P _{surcharge} + 1.00 P _p

Geotechnical Design

Wall Stability - Virtual Back Pressure

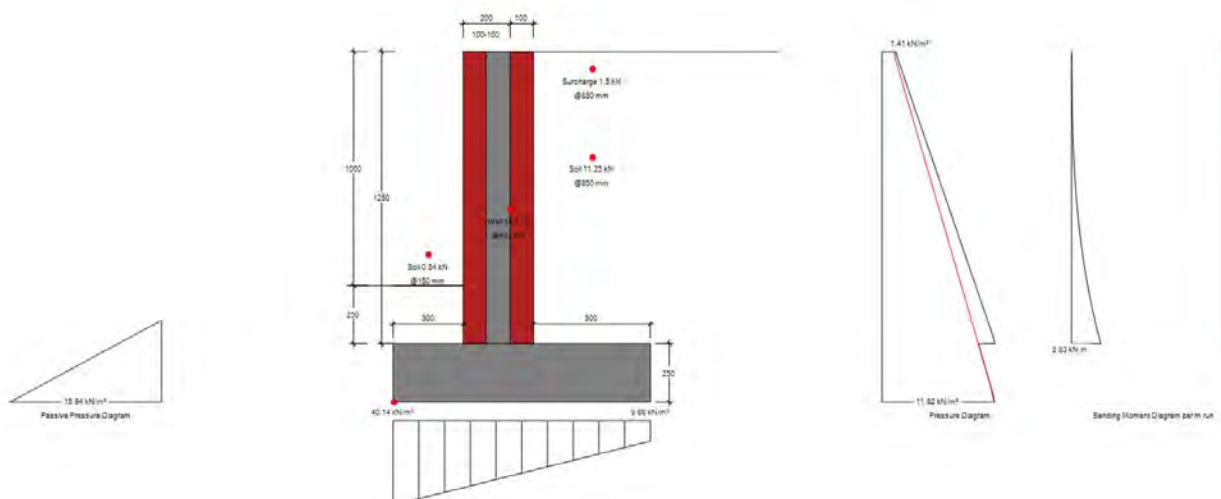
Case 1 Overturning/Stabilising	5.367/17.923	0.299	OK
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Wall Sliding - Virtual Back Pressure

F _x /(R _x Friction+R _x Passive)	9.775/(7.983+2.798)	0.907	OK
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Soil Pressure

Virtual Back (No uplift)	Max(37.338/75, 12.462/75) kN/m ²	0.498	OK
Wall Back (No uplift)	Max(40.137/75, 9.663/75) kN/m ²	0.535	OK



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Structural Design**Outer Leaf Details**

Partial Safety Factor (γ_{mf}/γ_{mf})	Units Category II, Execution Control Class 2	3/2.7	Table NA.1
Material	Clay bricks with water absorption less than 7%		
Units and Mortar Strength	10 N/mm ² , Mortar designation M12/(i)		
Compressive Strength (f_k)	Group 1, $\gamma = 20$ kN/m ²	5.0 N/mm ²	Table NA.6

Inner Leaf Details

Partial Safety Factor (γ_{mf}/γ_{mf})	Units Category II, Execution Control Class 2	3/2.7	Table NA.1
Material	Clay bricks with water absorption less than 7%		
Units and Mortar Strength	10 N/mm ² , Mortar designation M12/(i)		
Compressive Strength (f_k)	Group 1, $\gamma = 20$ kN/m ²	5.0 N/mm ²	Table NA.6

Wall Design (Inner Steel)

Critical Section	Critical @ 0 mm from base, Case 2		
Steel Provided (Cover)	Dist. H10@200 (30 mm in cavity)		
	Main H10@200 (30 mm in cavity)	393 mm ²	OK
Leverarm $z = \text{fn}(d, b, A_s, f_y, f_k)$	165 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 5.0 N/mm ²	119 mm	
$M_r = \text{fn}(\text{above}, \gamma_{mf}, \gamma_{ms})$	2.70, 1.15	20.2 kN.m	
Moment Capacity Check (M/M_r)	M 3.8 kN.m, M_r 20.2 kN.m	0.190	OK
Shear Capacity Check	F 8.1 kN, f_{yk} 0.698 N/mm ² , F_{vr} 46.1 kN	0.18	OK

Base Top Steel Design

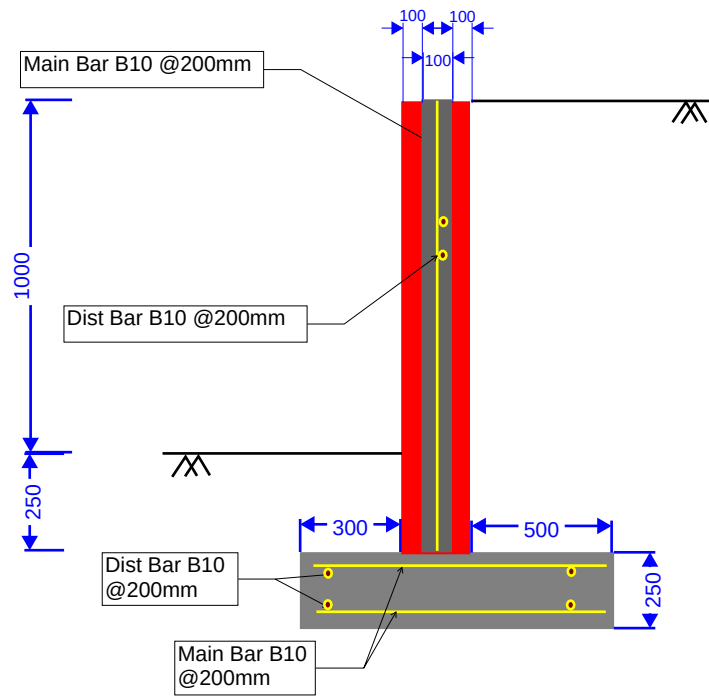
Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	OK
Compression Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	
Leverarm $z = \text{fn}(d, b, A_s, f_y, F_{cu})$	195 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 40 N/mm ²	185 mm	
$M_r = \text{fn}(\text{above}, A_s', d', x, x/d)$	393 mm ² , 55 mm, 11 mm, 0.06	31.6 kN.m	
Moment Capacity Check (M/M_r)	M 3.0 kN.m, M_r 31.6 kN.m	0.094	OK
Shear Capacity Check	F 8.3 kN, v_c 0.519 N/mm ² , F_{vr} 101.1 kN	0.08	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 $z = \text{fn}(d, b, A_s, f_y, F_{cu})$	195 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 40 N/mm ²	185 mm	
$M_r = \text{fn}(\text{above}, A_s', d', x, x/d)$	393 mm ² , 55 mm, 11 mm, 0.06	31.6 kN.m	
Moment Capacity Check (M/M_r)	M 2.8 kN.m, M_r 31.6 kN.m	0.087	OK
Shear Capacity Check	F 9.3 kN, v_c 0.519 N/mm ² , F_{vr} 101.1 kN	0.09	OK

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Retaining wall 2

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PROJECT NO: **AUX-333**

RETAINING WALL 3

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**MasterKey : Retaining Wall Design to BS 8002 : 1994,
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Basic RC Retaining Wall

Reinforced Masonry Cavity Filled 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/m ³)	Soil 18.00, Concrete 24.00, Masonry 20.00
Concrete grade	fcu 40 N/mm ² , Permissible tensile stress 0.250 N/mm ²
Concrete covers (mm)	Cavity inner cover 30 mm, Cavity outer cover 60 mm, Base cover 50 mm
Reinforcement design	fy 500 N/mm ² , fyt 500 N/mm ² designed to BS 8110: 1997
Surcharge and Water Table	Surcharge 3.00 kN/m ² , Fully drained
Unplanned excavation depth	Front of wall 180 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 75.00 kN/m ² , @ back 75.00 kN/m ²
Back Soil Friction and Cohesion	$\phi = \text{Atn}(\text{Tan}(25)/1.2) = 21.24^\circ$
Base Friction and Cohesion	$\delta = \text{Atn}(0.75 \times \text{Tan}(\text{Atn}(\text{Tan}(25)/1.2))) = 16.25^\circ$
Front Soil Friction and Cohesion	$\phi = \text{Atn}(\text{Tan}(30)/1.2) = 25.69^\circ$

Loading Cases

G _{Soil} - Soil Self Weight, G _{Wall} - Wall & Base Self Weight, F _{VHeel} - Vertical Loads over Heel,	
P _a - Active Earth Pressure, P _{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 _{VHeel} + 1.00 P _a + 1.00 P _{surcharge} + 1.00 P _p
Case 2: Structural Ultimate Design	1.40 G _{Soil} + 1.40 G _{Wall} + 1.60 F _{VHeel} + 1.00 P _a + 1.00 P _{surcharge} + 1.00 P _p

Geotechnical Design

Wall Stability - Virtual Back Pressure

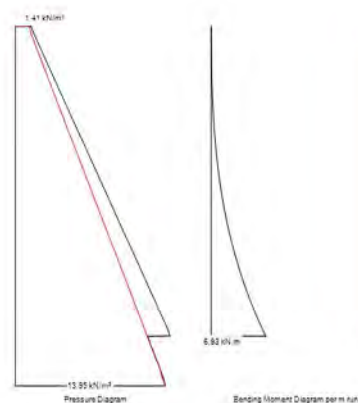
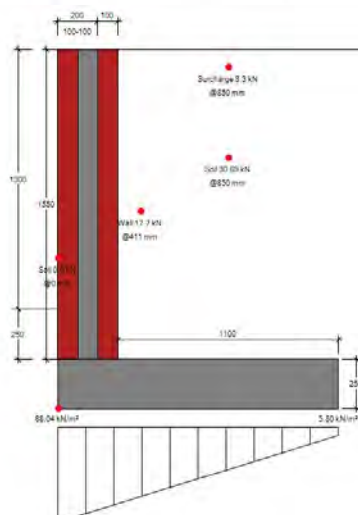
Case 1 Overturning/Stabilising	8.905/36.166	0.246	OK
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Wall Sliding - Virtual Back Pressure

F _x /(R _x Friction+R _x Passive)	13.730/(15.065+2.340)	0.789	OK
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Soil Pressure

Virtual Back (No uplift)	Max(64.232/75, 9.611/75) kN/m ²	0.856	OK
Wall Back (No uplift)	Max(68.042/75, 5.801/75) kN/m ²	0.907	OK



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Structural Design**Outer Leaf Details**

Partial Safety Factor (γ_{mc}/γ_{mf})	Units Category II, Execution Control Class 2	3/2.7	Table NA.1
Material	Clay bricks with water absorption less than 7%		
Units and Mortar Strength	10 N/mm ² , Mortar designation M12/(i)		
Compressive Strength (f_k)	Group 1, $\gamma=20$ kN/m ²	5.0 N/mm ²	Table NA.6

Inner Leaf Details

Partial Safety Factor (γ_{mc}/γ_{mf})	Units Category II, Execution Control Class 2	3/2.7	Table NA.1
Material	Clay bricks with water absorption less than 7%		
Units and Mortar Strength	10 N/mm ² , Mortar designation M12/(i)		
Compressive Strength (f_k)	Group 1, $\gamma=20$ kN/m ²	5.0 N/mm ²	Table NA.6

Wall Design (Inner Steel)

Critical Section	Critical @ 0 mm from base, Case 2		
Steel Provided (Cover)	Dist. H10@200 (30 mm in cavity)		
	Main H10@200 (30 mm in cavity)	393 mm ²	OK
Leverarm $z=fn(d,b,As,fy,f_k)$	165 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 5.0 N/mm ²	119 mm	
$Mr=fn(above, \gamma_{mf}, \gamma_{ms})$	2.70, 1.15	20.2 kN.m	
Moment Capacity Check (M/M_r)	M 6.9 kN.m, M_r 20.2 kN.m	0.343	OK
Shear Capacity Check	F 12.2 kN, f_{yk} 0.641 N/mm ² , F_{vr} 42.3 kN	0.29	OK

Base Top Steel Design

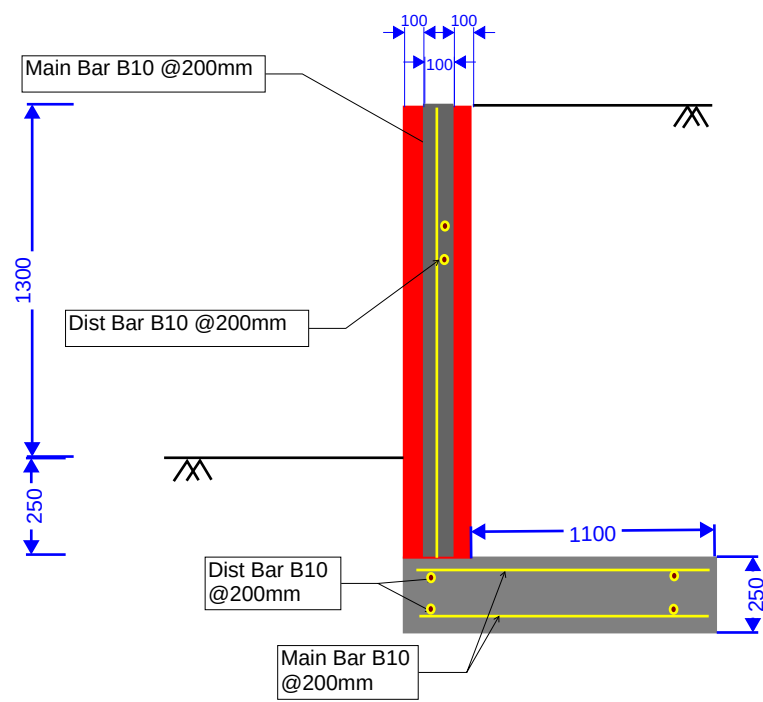
Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	OK
Compression Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	
Leverarm $z=fn(d,b,As,fy,F_{cu})$	195 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 40 N/mm ²	185 mm	
$Mr=fn(above, As', d', x, x/d)$	393 mm ² , 55 mm, 11 mm, 0.06	31.6 kN.m	
Moment Capacity Check (M/M_r)	M 9.8 kN.m, M_r 31.6 kN.m	0.310	OK
Shear Capacity Check	F 10.9 kN, v_c 0.519 N/mm ² , F_{vr} 101.1 kN	0.11	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 $z=fn(d,b,As,fy,F_{cu})$	195 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 40 N/mm ²	185 mm	
$Mr=fn(above, As', d', x, x/d)$	393 mm ² , 55 mm, 11 mm, 0.06	31.6 kN.m	
Moment Capacity Check (M/M_r)	M 0.3 kN.m, M_r 31.6 kN.m	0.009	OK
Shear Capacity Check	F 3.9 kN, v_c 0.519 N/mm ² , F_{vr} 101.1 kN	0.04	OK

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Made By :
Date :
Checked :
Approved :



Retaining wall 3

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Made By	:
Date	:
Checked	:
Approved	:

STRUCTURAL CALCULATIONS

Using
MASTERSERIES POWERPAD

STRUCTURAL ENGINEERS CALCULATIONS

PROJECT NO: **AUX-333**

RETAINING WALL 4

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**MasterKey : Retaining Wall Design to BS 8002 : 1994,
 BS EN 1996-1-1:2005+A1:2012 and BS 8110 : 1997**

Basic RC Retaining Wall

Reinforced Masonry Cavity Filled 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/m ³)	Soil 18.00, Concrete 24.00, Masonry 20.00
Concrete grade	fcu 40 N/mm ² , Permissible tensile stress 0.250 N/mm ²
Concrete covers (mm)	Cavity inner cover 30 mm, Cavity outer cover 60 mm, Base cover 50 mm
Reinforcement design	fy 500 N/mm ² , fyd 500 N/mm ² designed to BS 8110: 1997
Surcharge and Water Table	Surcharge 3.00 kN/m ² , Fully drained
Unplanned excavation depth	Front of wall 120 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 75.00 kN/m ² , @ back 75.00 kN/m ²
Back Soil Friction and Cohesion	$\phi = \text{Atm}(\tan(25)/1.2) = 21.24^\circ$
Base Friction and Cohesion	$\delta = \text{Atm}(0.75 \times \tan(\text{Atm}(\tan(25)/1.2))) = 16.25^\circ$
Front Soil Friction and Cohesion	$\phi = \text{Atm}(\tan(30)/1.2) = 25.69^\circ$

Loading Cases

G _{Soil} - Soil Self Weight, G _{Wall} - Wall & Base Self Weight, F _{VHeel} - Vertical Loads over Heel,	
P _a - Active Earth Pressure, P _{surcharge} - Earth pressure from surcharge, P _p - Passive Earth Pressure	
Case 1: Geotechnical Design	1.00G _{Soil} +1.00G _{Wall} +1.00F _{VHeel} +1.00P _a +1.00P _{surcharge} +1.00P _p
Case 2: Structural Ultimate Design	1.40G _{Soil} +1.40G _{Wall} +1.60F _{VHeel} +1.00P _a +1.00P _{surcharge} +1.00P _p

Geotechnical Design

Wall Stability - Virtual Back Pressure

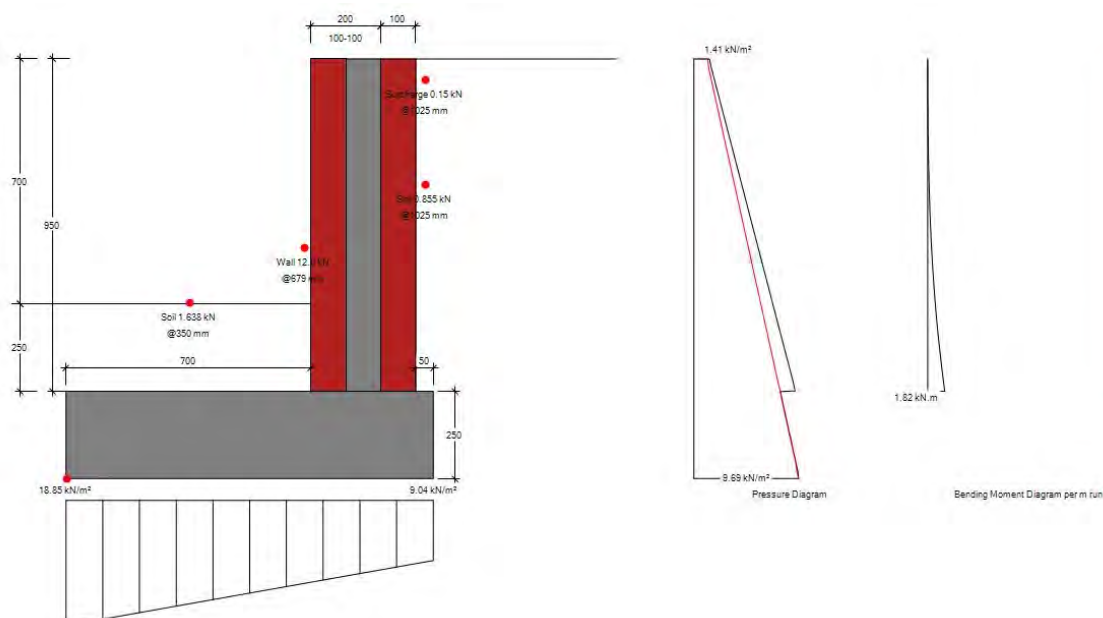
Case 1 Overturning/Stabilising	2.920/9.756	0.299	OK
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Wall Sliding - Virtual Back Pressure

F _x /(R _x F _{Friction} +R _x P _{Passive})	6.571/(4.268+3.297)	0.869	OK
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Soil Pressure

Virtual Back (No uplift)	Max(18.580/75, 9.311/75) kN/m ²	0.248	OK
Wall Back (No uplift)	Max(18.848/75, 9.043/75) kN/m ²	0.251	OK



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Structural Design**Outer Leaf Details**

Partial Safety Factor (γ_{mc}/γ_{mf})	Units Category II, Execution Control Class 2	3/2.7	Table NA.1
Material	Clay bricks with water absorption less than 7%		
Units and Mortar Strength	10 N/mm ² , Mortar designation M12/(i)		
Compressive Strength (f_k)	Group 1, $\gamma=20$ kN/m ²	5.0 N/mm ²	Table NA.6

Inner Leaf Details

Partial Safety Factor (γ_{mc}/γ_{mf})	Units Category II, Execution Control Class 2	3/2.7	Table NA.1
Material	Clay bricks with water absorption less than 7%		
Units and Mortar Strength	10 N/mm ² , Mortar designation M12/(i)		
Compressive Strength (f_k)	Group 1, $\gamma=20$ kN/m ²	5.0 N/mm ²	Table NA.6

Wall Design (Inner Steel)

Critical Section	Critical @ 0 mm from base, Case 2		
Steel Provided (Cover)	Dist. H10@200 (30 mm in cavity)		
	Main H10@200 (30 mm in cavity)	393 mm ²	OK
Leverarm $z=fn(d,b,As,fy,f_k)$	165 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 5.0 N/mm ²	119 mm	
$M_r=fn(above, \gamma_{mf}, \gamma_{ms})$	2.70, 1.15	20.2 kN.m	
Moment Capacity Check (M/M _r)	M 1.8 kN.m, M _r 20.2 kN.m	0.090	OK
Shear Capacity Check	F 4.7 kN, f_{vk} 0.751 N/mm ² , F _{vr} 49.6 kN	0.10	OK

Base Top Steel Design

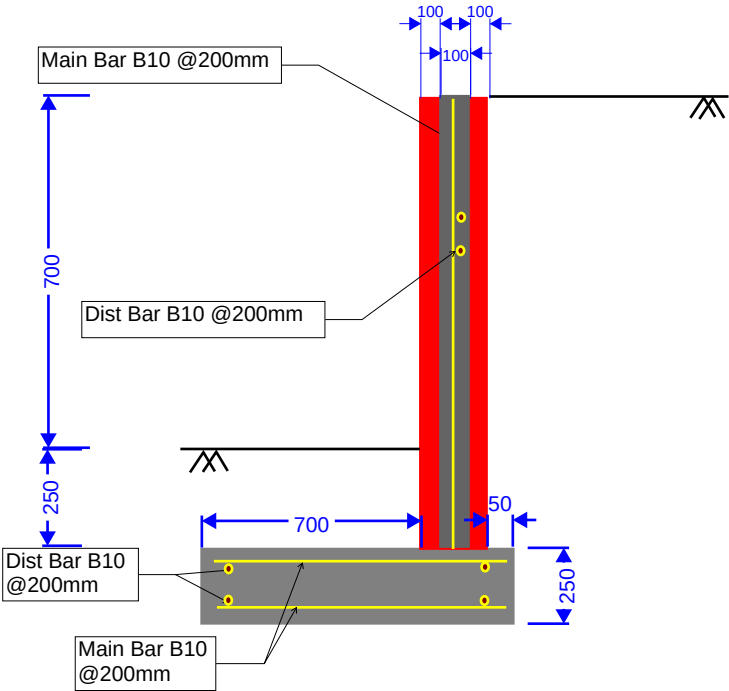
Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	OK
Compression Steel Provided (Cover)	Main H10@200 (50 mm) Dist. H10@200 (60 mm)	393 mm ²	
Leverarm $z=fn(d,b,As,fy,F_{cu})$	195 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 40 N/mm ²	185 mm	
$M_r=fn(above, As', d', x, x/d)$	393 mm ² , 55 mm, 11 mm, 0.06	31.6 kN.m	
Moment Capacity Check (M/M _r)	M 0.3 kN.m, M _r 31.6 kN.m	0.010	OK
Shear Capacity Check	F 3.2 kN, v_c 0.519 N/mm ² , F _{vr} 101.1 kN	0.03	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 $z=fn(d,b,As,fy,F_{cu})$	195 mm, 1000 mm, 393 mm ² , 500 N/mm ² , 40 N/mm ²	185 mm	
$M_r=fn(above, As', d', x, x/d)$	393 mm ² , 55 mm, 11 mm, 0.06	31.6 kN.m	
Moment Capacity Check (M/M _r)	M 2.5 kN.m, M _r 31.6 kN.m	0.079	OK
Shear Capacity Check	F 5.4 kN, v_c 0.519 N/mm ² , F _{vr} 101.1 kN	0.05	OK

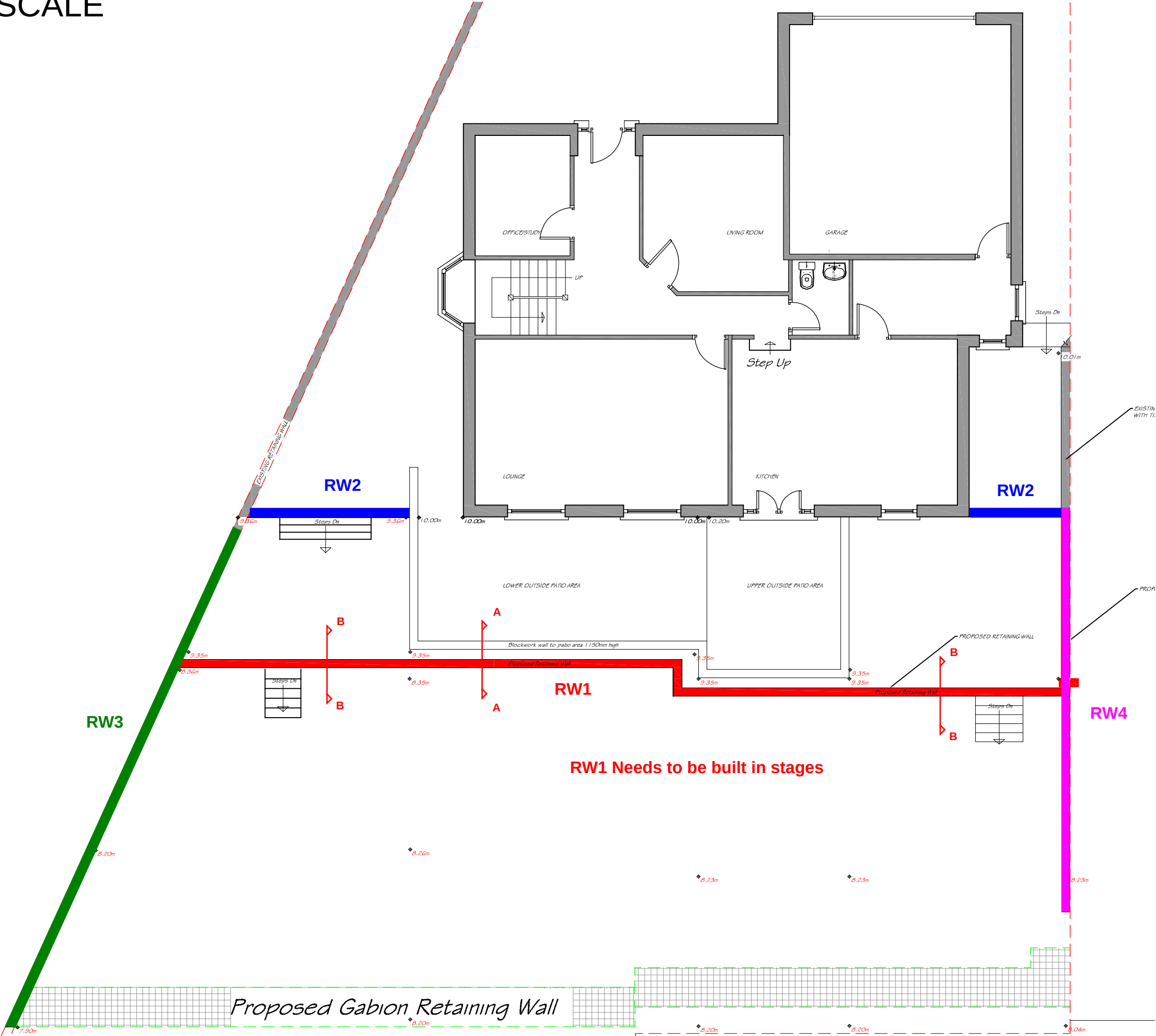
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Retaining wall 4

DO NOT SCALE



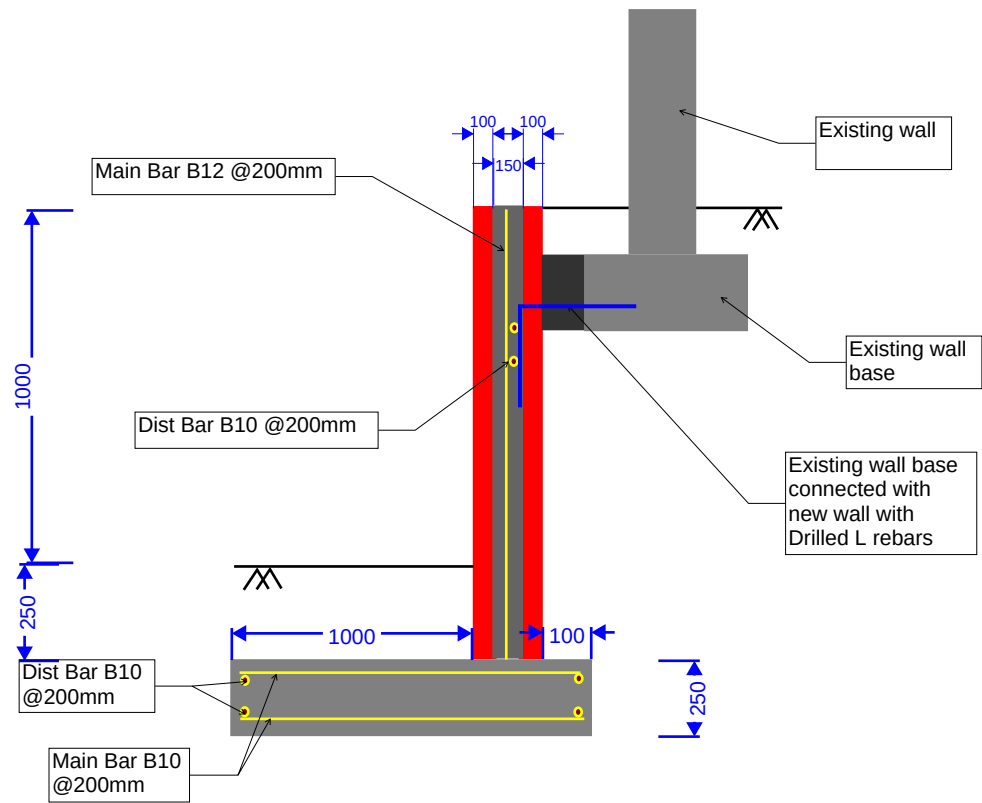
- NOTES:
- 1. ALL DIMENSIONS IN mm UNLESS NOTED OTHERWISE.
 - 2. DO NOT SCALE FROM THIS DRAWING.
 - 3. ALL DIMENSIONS TO BE VERIFIED ON SITE PRIOR TO COMMENCING WORKS

			
Client Joseff Galea			
Project 25 heol corn ddu beacon heights, merthyr tydfil, CF48 1BW			
Drawing Title proposed plan view			
Drawing Status For Construction			
Drawn By: MK	Date: 25/06/2024	Checked By:	Date:
Original Size A3	Scale NTS	Issue Date	
Project Number AUX- 333	Drawing Number 101	Revision C01	

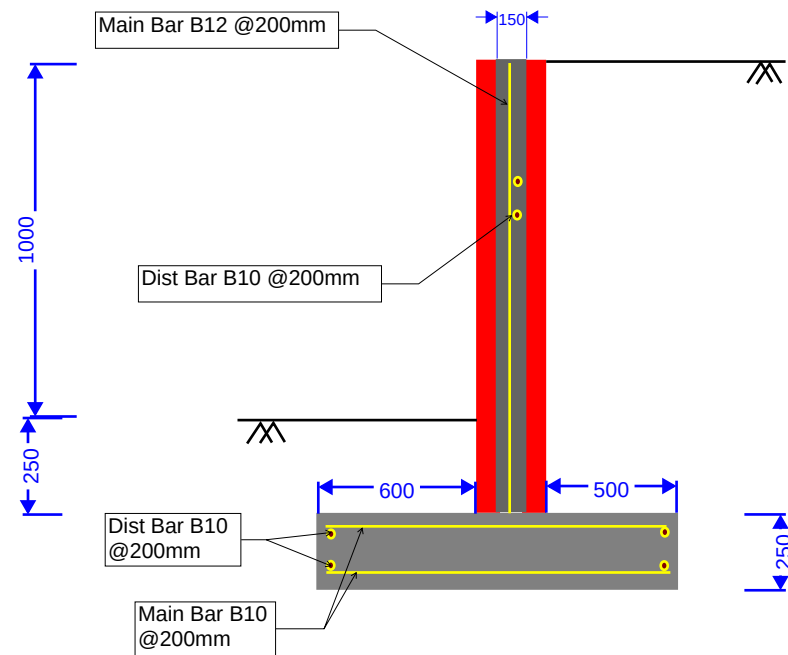
PROPOSED WALL PLAN

DO NOT SCALE

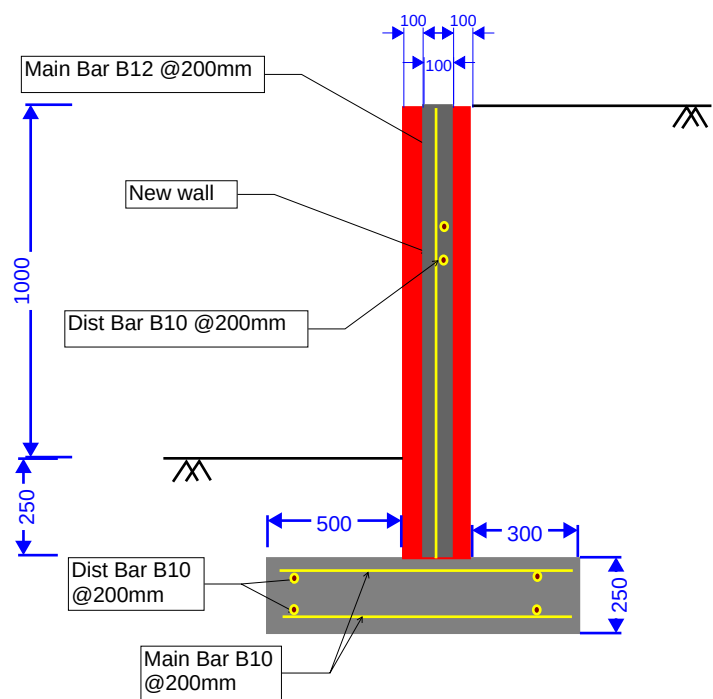
NOTE : RETAINING WALL 1 TO BE BUILT IN STAGES



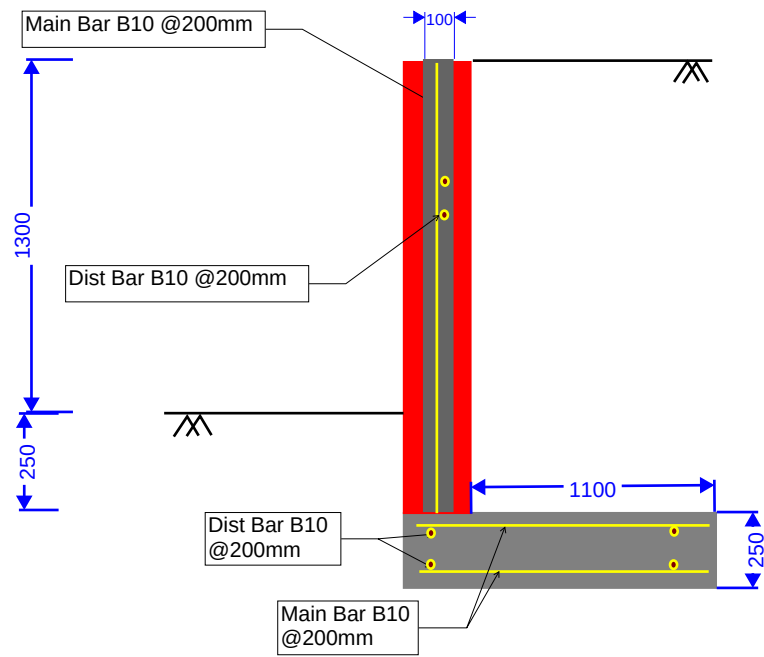
Retaining wall 1
Section A-A



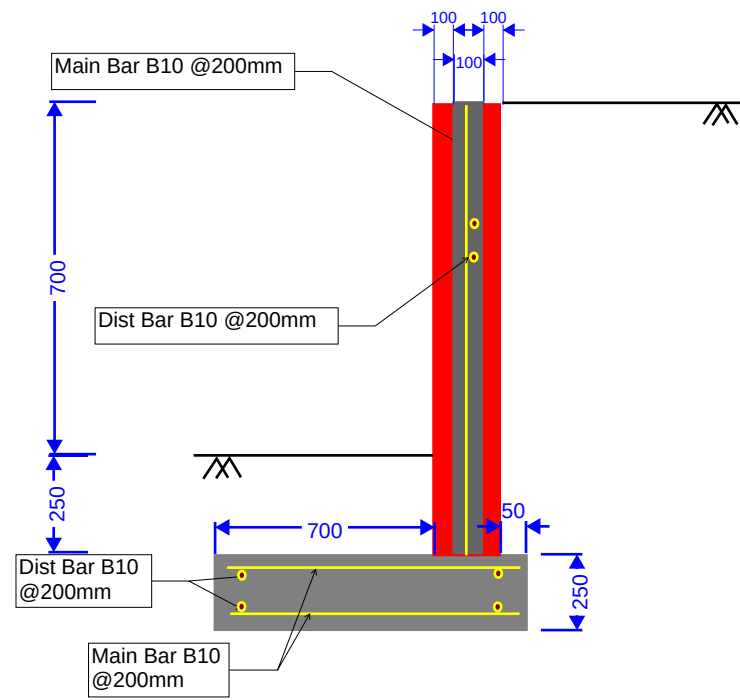
Retaining wall 1
Section B-B



Retaining wall 2



Retaining wall 3



Retaining wall 4

WALL SECTION AND
REINFORCEMENT DETAILS

- NOTES:
1. ALL DIMENSIONS IN mm UNLESS NOTED OTHERWISE.
 2. DO NOT SCALE FROM THIS DRAWING.
 3. ALL DIMENSIONS TO BE VERIFIED ON SITE PRIOR TO COMMENCING WORKS

			
Client			
Joseff Galea			
Project			
25 heol corn ddu beacon heights, merthyr tydfil, CF48 1BW			
Drawing Title			
PROPOSED RETAINING WALL SECTION VIEW WITH REINFORCEMENT DETAILS			
Drawing Status			
For Construction			
Drawn By:	Date:	Checked By:	Date:
MK	25/06/2024		
Original Size	Scale	Issue Date	
A3	NTS		
Project Number	Drawing Number	Revision	
AUX- 333	102	C01	