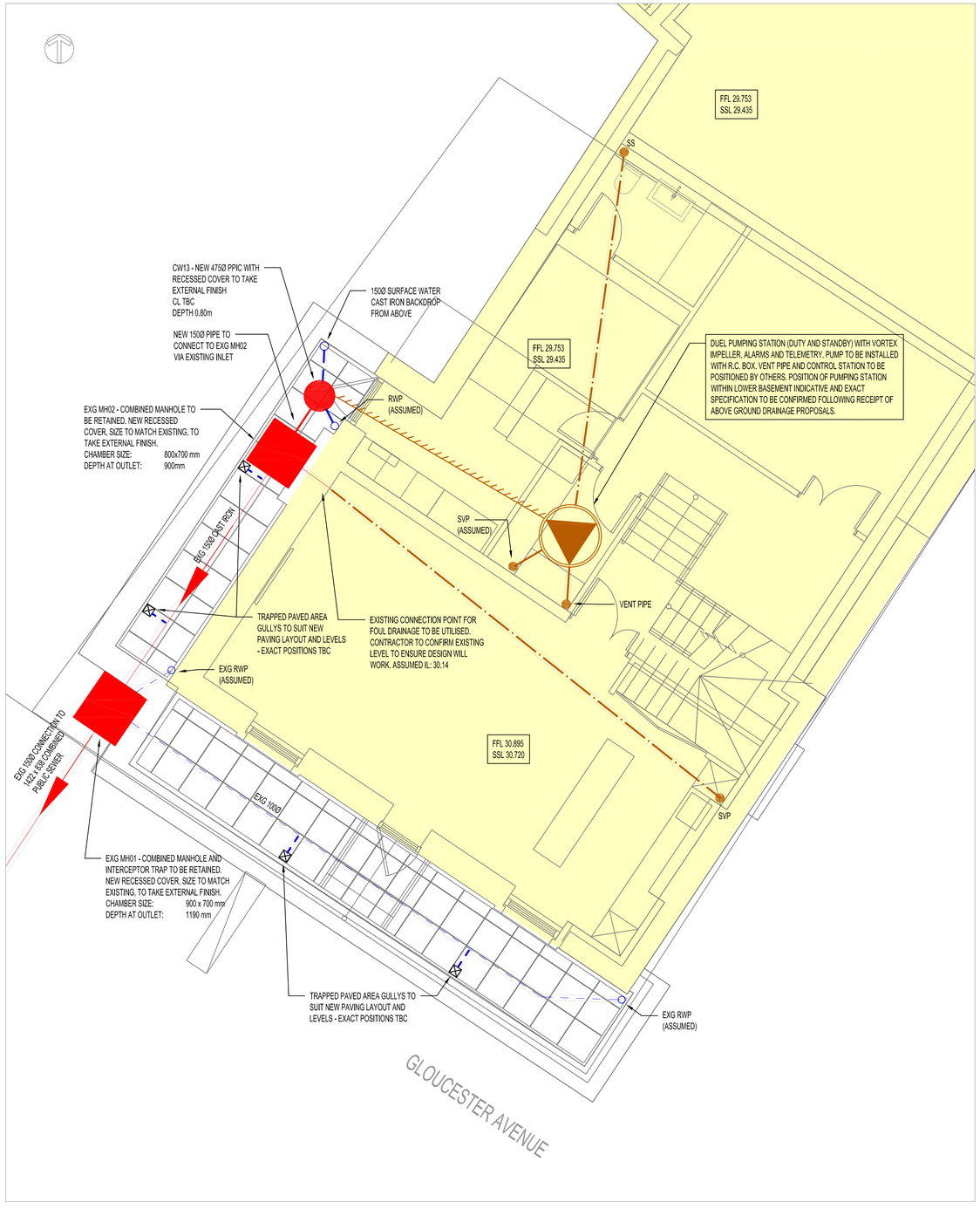
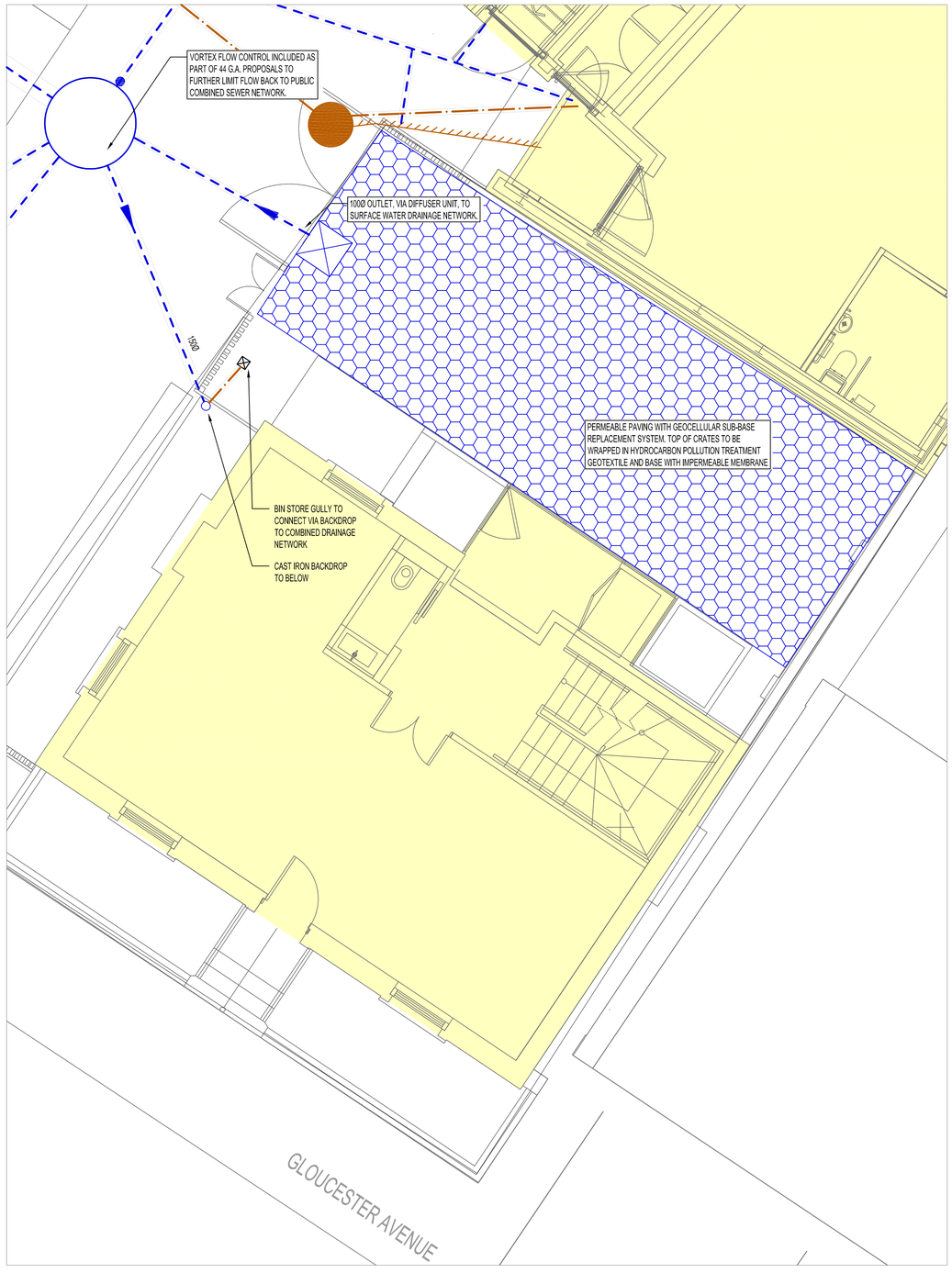


BASEMENT LEVEL



GROUND FLOOR

This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

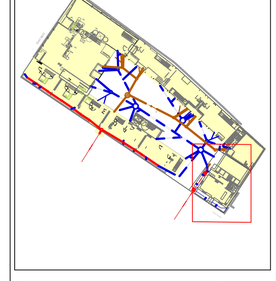
Do not scale from this drawing.

LEGEND

- EXISTING COMBINED MANHOLE
- PROPOSED COMBINED MANHOLE IN RC BOX
- PROPOSED FOUL MANHOLE IN RC BOX
- PROPOSED FOUL PUMPING STATION IN RC BOX
- EXISTING COMBINED WATER SEWER/DRAIN
- EXISTING FOUL WATER SEWER/DRAIN
- EXISTING SURFACE WATER SEWER/DRAIN
- PROPOSED COMBINED WATER SEWER/DRAIN
- PROPOSED FOUL WATER SEWER/DRAIN
- PROPOSED SURFACE WATER SEWER/DRAIN
- COMBINED DRAIN TO BE REMOVED
- CAVITY DRAIN RISING MAIN
- FOUL WATER RISING MAIN
- TRAPPED GULLY
- SS STUB STACK
- SVP SOIL VENT PIPE
- RWP RAIN WATER PIPE
- CHANNEL DRAIN WITH SUMP UNIT AND FOUL AIR TRAP
- PERMEABLE SURFACING

NOTES:
1. CAVITY DRAINAGE SYSTEM NOT SHOWN - REFER TO ARCHITECT'S DRAWINGS FOR DETAILS.

SITE LOCATION PLAN:



NOT FOR CONSTRUCTION

rev	date	by	chk	description
P1	16.12.16	CDa	PCh	For planning

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project

44A Gloucester Avenue

drawing title

Proposed Below Ground Drainage
Basement & Ground

scale (s)	date	drawn
1:50@A1; 1:100@A3	December 2016	CDa

project no.			drawing status.		
211593			Preliminary		
originator.	zone.	level.	role.	drg no.	revision
EW	00	-	D	5002	P1

Appendix E: Structural Calculations

Project name: 44 Gloucester Avenue

Project number: 2115413 | Sheet: | Revision:

Date: Dec '16 | Engineer: TH | Checked:

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Uplift Check - Block E

Check Heave For Area To Rear of Block E

Floor Weight Per m^2

Basement

Type 1 Infill = $0.68m \times 20Kn/m^3 = 13.6Kn/m^2$

750m Raft = $0.75m \times 25Kn/m^3 = 18.75Kn/m^2$

Finishes (screed/etc) = $2Kn/m^2$

$34.35Kn/m^2$

Ground Floor

250m Slab = $0.25m \times 25Kn/m^3 = 6.25Kn/m^2$

Finishes (Attenuation) = $0.3m \times 10Kn/m^3 = 3Kn/m^2$

$9.25Kn/m^2$

Retaining Walls

$= 0.25m \times 25Kn/m^3 \times \frac{(Perimeter \times Height)}{Floor\ Area}$

$= 0.25m \times 25Kn/m^3 \times \frac{12.6m \times 3.3m}{52m^2}$

$= 4.997Kn/m^2$

$\Sigma = 48.597Kn/m^2$

$FOS = 0.9 \Rightarrow 43.73Kn/m^2$

Project name:
64 Grosvenor Avenue

Project number:
21150

Sheet:

Revision:

Date:
Dec '16

Engineer:
THi

Checked:

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UNLOADING FROM SOIL EXCAVATION

32.75m = EXISTING GROUND LEVEL
28.00m = APPROXIMATE CLAY LEVEL
17.0KN/m³ = BULK DENSITY OF MADE GROUND.

$\therefore \Rightarrow (32.75 - 28) \times 17 = 80.75 KN/m^2$

ASSUME 50% OF UNLOADING ACTS ON THE BASEMENT RAFT.

$80.75 \times 0.5 = 40.375 KN/m^2 < 43.75 KN/m^2$

∴ NO NET UPLIFT.

Project name:
84 Gloucester Avenue

Project number: 211593 Sheet: 01 Revision:

Date: Engineer: Checked:

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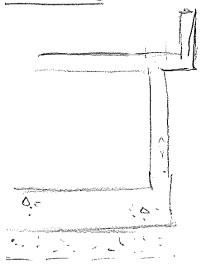
Block R/D : Lateral Earth Pressures

THE BLOCK R BASEMENT IS TO BE FORMED OF RC RETAINING WALLS AND A RAFT SLAB, SITTING ON TYPE 1 INFILL WHICH GOES DOWN TO THE CLAY LEVEL. TRADITIONAL UNDERPINNING IS TO BE USED AROUND THE PARTY WALLS AND BENEATH ADJACENT STRUCTURE SO THEY AREN'T UNDERMINED. THE AREA FACING THE CENTRAL COURTYARD IS TO BE BATTERED BACK.

Loading



Lateral Earth Pressures

Assumed Ground Level = 33.000

	γ (kN/m³)	c' (kN/m²)	ϕ'
Made Ground	1700	0	27
Clay	2000	0	25

Water Level

Not encountered in Boreholes / Trial Pits. Perched water found below Block A/C Basement slabs.

BSEN 1997-1 CL9.6(3) For ULS, Assume inches at 1m b.g.l

Partial Factors - Actions

	$\gamma_{G,unfav}$	$\gamma_{G,fav}$	γ_Q	
GEO1	1.35	1.00	1.5	(Structure)
GEO2	1.00	1.00	1.30	(Soil)

Partial Factors - Soil Properties

	γ_φ	$\gamma_{c'}$	γ_{cu}	γ_γ
GEO1	1.00	1.00	1.00	1.00
GEO2	1.25	1.25	1.40	1.00

Effective Angle of Shearing Resistance

$$\tan\varphi'_d = \tan\left(\varphi'/\gamma_\varphi\right)$$

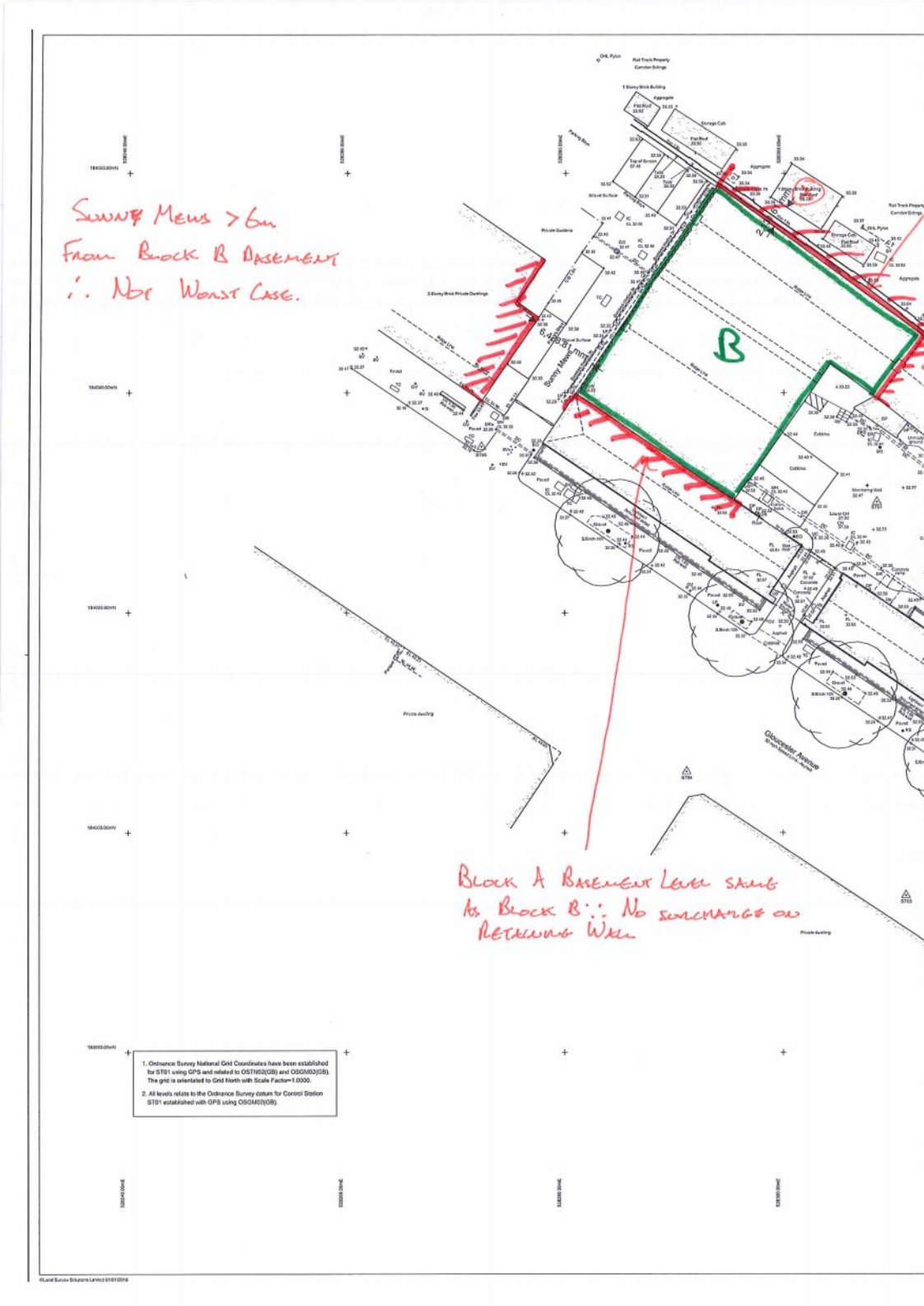
GEO1: $\varphi'_d = 27°$

GEO2: $\varphi'_d = 22.2°$

Active / Passive Pressure Coefficients

	K_{AA}	K_{AA}
GEO1:	0.375	2.663
GEO2:	0.452	2.215

$$K_{AA} = \left(\frac{1-\sin\phi}{1+\sin\phi}\right) \qquad K_P = \frac{1}{K_A}$$


Sunny Mews >6m
From Block B Basement
∴ Not Worst Case.
B
Block A Basement Level stands
as Block B ∴ No surcharge on
Retaining Wall
Sunny Mews 7m
Gloucester Avenue
Private dwelling
1. Ordnance Survey National Grid Coordinates have been established for ST01 using GPS and related to OSTN02(GB) and OSGM02(GB). The grid is orientated to Grid North with Scale Factor=1.0000.
2. All levels relate to the Ordnance Survey datum for Control Station ST01 established with GPS using OSGM02(GB).

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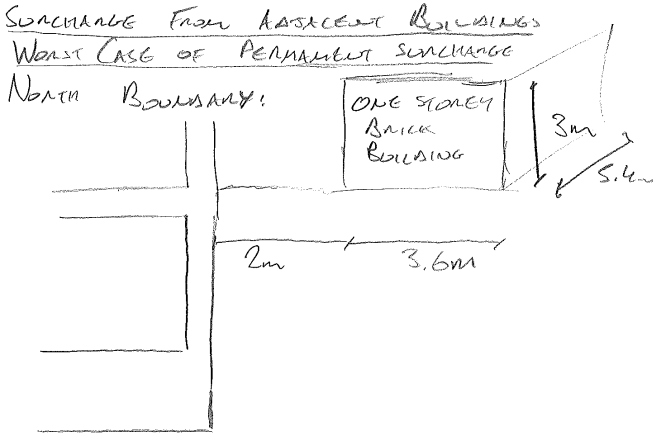
SURCHARGE FROM ADJACENT BUILDINGS
WORST CASE OF PERMANENT SURCHARGE



LOADING

BRICK WALLS ASSUME 100mm THK

L = 3.6m x 2 + 5.4x2 = 18m
23m height
x0.1 wide
x 20KN/m³ = 104KN.

ROOF & FF SLABS = 1 KN/m² + 2 KN/m²

∴ UNIFORM PRESSURE

= 1 + 2 + $\frac{104}{3.6 \times 5.4}$ = 8.6 KN/m²

BY INSPECTION

CONSTRUCTION SURCHARGE OF 10KN/m

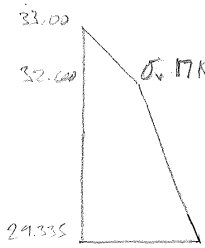
AT FACE OF RETAINING WALL IS WORST CASE

Lateral Load on Walls

* Wall is propped at ground floor
* GL assumed worst case
* Water level assumed in B.g.L 32.00

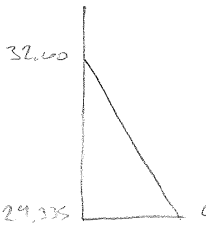
Active Soil Pressure - Made Ground: 17 kN/m³

(vertical, unfactored)



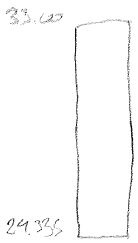
$\sigma_s = 17 + (32.00 - 29.335)(17 \times 1.0)$
$= 55.65 kN/m^2$

Pore Water Pressure



$\sigma_s = (32.00 - 29.335) \times 10$
$= 26.65 kN/m^2$

SURCHARGE

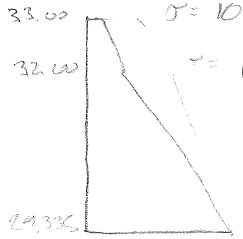


σ_s = 10 KN/m²

(VERTICAL, UNFACTORED)

ULS COMBINATION FOR HORIZONTAL PRESSURE

GEO1

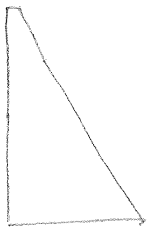


$\sigma = 10 \times 1.5 \times 0.375 = 5.625 KN/m^2$

$\sigma = (16 \times 1.5 + 17 \times 1.35) \times 0.375$
$= 14.23 KN/m^2$

$\sigma = (10 \times 1.5 + 35.65 \times 1.35) \times 0.375$
$+ 26.65$
$= 50.32 KN/m^2$

GEO2



$\sigma = 10 \times 1.3 \times 0.452 = 5.876 KN/m^2$

$\sigma = (10 \times 1.3 + 17 \times 1.0) \times 0.452 = 13.56 KN/m^2$

$\sigma = (10 \times 1.3 + 35.65 \times 1.0) \times 0.452$
$+ 26.65 = 46.64 KN/m^2$

EFFECTIVE VERTICAL STRESS = ACTIVE SOIL PRESSURE + SURCHARGE

σ = EFFECTIVE VERTICAL STRESS × K_{AH} + PORE WATER PRESSURE

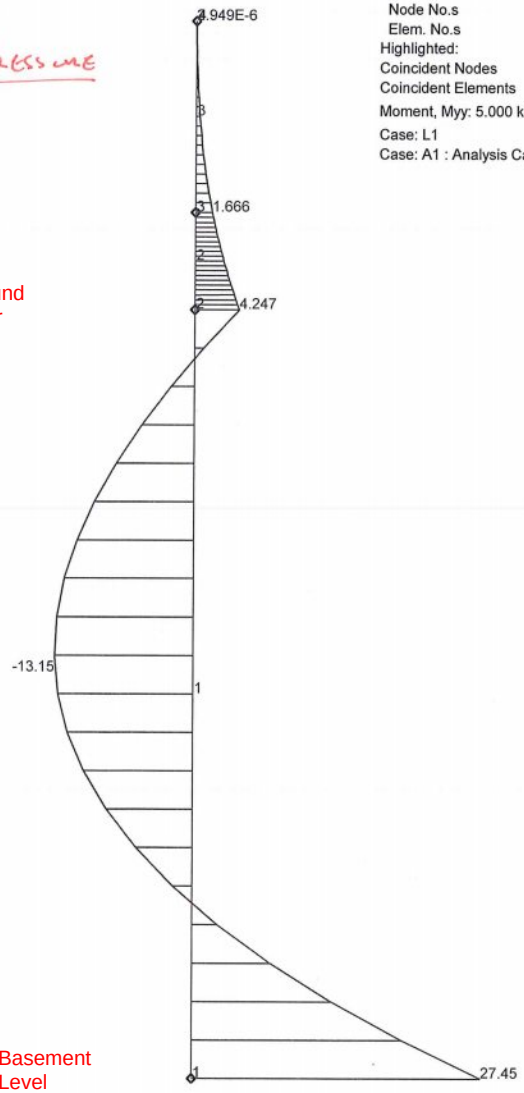
Oasys

ELLIOTT WOOD PARTNERSHIP

Job No.	Sheet No.	Rev.
211593		
Drg. Ref.		
Made by	Date 01-Jun-2016	Checked

BMD - Lateral Earth Pressure ULS

BMD
Scale: 1:18.48
Labels:
Node No.s
Elem. No.s
Highlighted:
Coincident Nodes
Coincident Elements
Moment, Myy: 5.000 kNm/pic.cm
Case: L1
Case: A1 : Analysis Case 1



Project name:
214 Gracechurch Avenue

Project number: 211549
Sheet:
Revision:

Date: Dec '16
Engineer: THi
Checked:

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Worst Case Retaining Moment

$M_{Ed} = 27.45 kNm$

$f_{ck} = 35 MPa$ $f_y = 500 MPa$

250mm thk wall $d = 250mm - 50mm\ Cover - 16/2 = 192mm$

$K = \frac{M_{Ed}}{bd^2 f_{ck}} = 0.0213$

$0.95d = z = 182.4mm$

$A_{s\,req} = \frac{M}{f_{yd} z} = 346.2 mm^2/m$

H12 @ 200 Vertical Bars

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structural and civil engineers