BUILD DESIGN

5 Elmfield Road
Cheltenham
Glos GL51 9JH
01242 693047

DATE	SCALE	REV
19/01/20		

DRAWN	CHECKED	PROJECT No.	SHEET No
ASB		-	02A

CLIENT
Minh Quach

CONTRACT
LIDLINGTON PLACE
LONDON

DESCRIPTION
BASEMENT EXTENSION

STRUCTURAL CALCULATIONS

SLIDING

RETAINING WALL ABUTS SLAB AND RESISTED AGAINST OPOSITE RETAINING WALL

NO CHECK REQUIRED

HORIZONTAL LOADS

SURCHARGE = 0.35 X 18 X 0.556 X 4.35 = 15.237 KN X 2.175 = 33.14 KNM/M
RETAINED EARTH = 0.35 X 18 X 4.35 X 4.35/2 = 59.6 KN/M X 1.4 = 77.79 KNM/M

TOTAL = 74.84 KN/M TOTAL = 110.93 KNM/M

C OF G = 110.93/74.84 = 1.482

ESTIMATE VERTCAL LOAD

CAVITY WALL = 3.2 X 6.0 = 19.20 KN
FLOORS 3.1 X 2.0 X 2 = 12.4 KN/M
FROM ROOF = 1.90 X 3.0 = 5.70 KN/M
PARTITIONS = 1.0 X 3.0 X 3 = 9.0 KN/M
TOTAL = 46.30 KN

VERTICAL LOADS

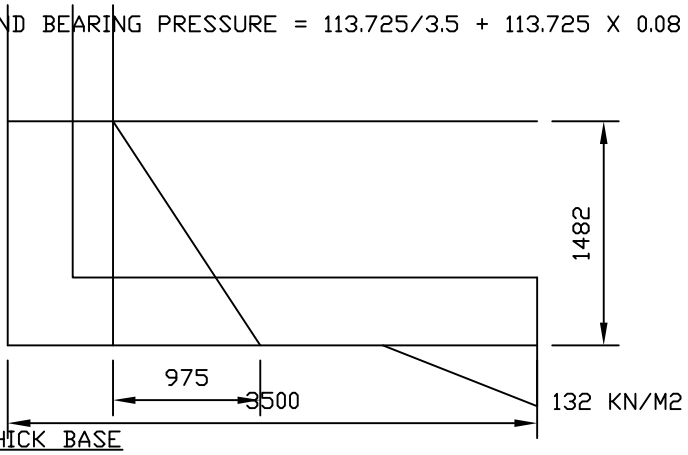
WALL LOAD = 46.30 KN/M X 0.175 = 8.1025 KNM/M
WALL STEM = 24 X 0.32 X 3.9 = 29.952 KN/M X 0.16 = 4.792 KNM/M
BASE = 24 X 0.45 X 3.5 = 37.5 KN X 1.75 = 66.15 KNM/M
TOTAL = 113.725 KN/M TOTAL = 79.045 KNM/M

C OF G = 79.045/113.725 = 0.695

x = 1.482 x 74.84/113.725 = 0.975

e = 0.695 + 0.975 - 1.75 = -0.08 < D/6

MAX GROUND BEARING PRESSURE = 113.725/3.5 + 113.725 X 0.08 X 6/3.5 X 3.5 = 37 KN/M2 < 100 KN/M2



450 THICK BASE

BENDING MOMENT = 37 X 3.2 X 3.2/2 = 189 KNM

ULT BENDING MOMENT = 189 X 1.5 = 284 KNM

b = 1000; d = 450 - 100 = 350; fk = 460 N/mm2; Fcu = 35 N/mm2

k = 287.3 X 10000000/1000 X 350 X 350 X 35 = 0.067

z = 0.5 + 0.25 - 0.067/0.9 = 0.919

Ast = 284 X 1000000/460 X 0.95 X 350 X 0.918 = 2024mm2

PROVIDE T25 @ 200crs(2545mm2)