KNAPP HICKS & PARTNERS LTD
CONSULTING STRUCTURAL, CIVIL
& GEOTECHNICAL ENGINEERS

☐ Brentford 020 8232 1888
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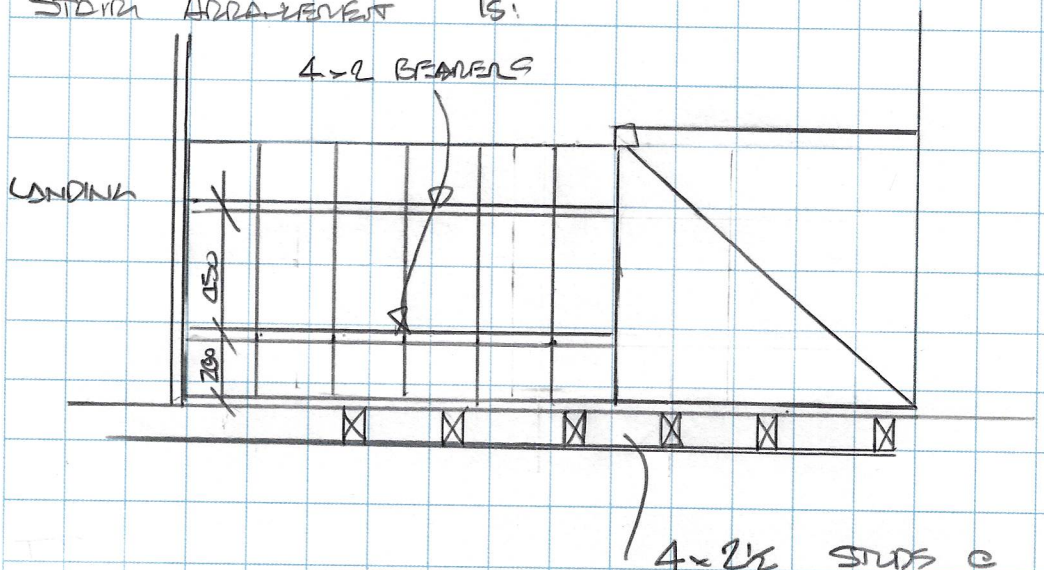
Project: 4 HANDEL STREET.		Job Ref: 37740	Page No. 01
Designed by: DALE	Date: NOV-21.	Checked by:	Date:

SUPPORT TO FLIGHTS OF STAIRS ADJACENT TO THE WALDENS.

STAIR ARRANGEMENT IS:



LOAD ON BEARERS = (0.2+0.225)+(0.5+2.5) = 1.275 kN/m

FOR TOP 1.4m FLIGHT END REACTIONS ARE 0.7×1.275 = 0.89kN

BENDING ON SPIGOT = 0.89×(0.2+0.65) = 0.841 kNm

Z REQD ASSUMING C24 f_{bm} = $\frac{0.841\times10^6}{7.5}$ = 112133 mm³.

IF THE DESIGN LOADS IS AS A SINGLE DWELLING (ORIGINAL DESIGN)

BENDING ON SPIGOT = 0.56 kNm

Z REQD ASSUMING C24 f_{bm} = $\frac{0.56\times10^6}{7.5}$ = 74667 mm³

100×50 f_{bm} 2 = 83333 mm³

A SINGLE 4-2 WALL SUFFICE FOR ORIGINAL DESIGN

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Project: 4 HANDEL STREET		Job Ref: 5774D	Page No. C2
Designed by: DBLC	Date: NOV-21	Checked by:	Date:

FOR A 3 M LEVER ARM $\frac{1.486}{3}$ = 0.496 kN T+B

COACH SCREW WITH WASH PLATE.

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Project: 4 HANDEL STREET - LONDON.			Job Ref: 57740	Page No. 03
Designed by: DACC	Date: NOV-2021	Checked by:	Date:	

NEW SPIGOT DESIGN

LOAD ON BEARERS (0.2+0.285)-(0.5-3.0) = 1.488 kN/m
(BASED ON 6399 TABLE 1 C3)

FOR TOP FLIGHT END REACTIONS = 0.7×1.488 = 1.0416 kN

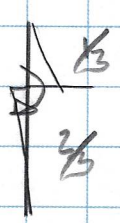
BENDING ON SPIGOT 1.0416×(0.2+0.65) = 0.885 kNm

FOR A 76×38 CHANNEL @ LE = 1.7 Mb = 4 kNm

ASSUMING LOADING FACTOR = 1.6 ALLOWABLE MOMENT IS

$\frac{4}{1.6}$ = 2.5 kNm.

FOR SUPPORTING POST BENDING IS.



MAXIMUM MOMENT IS 2/3×0.885
= 0.59 kNm

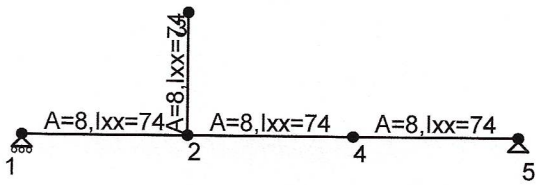
FOR A 76×38 CHANNEL @ LE = 3.0 Mb = 3.0 kNm

TOTAL ALLOWABLE = $\frac{3.0}{1.6}$ = 1.875 kNm > 0.59 kNm

FROM ANALYSIS DEFLECTION IS 2.5mm ∴ OK

Knapp Hicks and Partners
Prospect House
1 Highpoint Business Park
Henwood, Ashford,
Kent,
TN24 8DH

Proj: Admin_SP	**Ref :**
Date: 11/01/22	**Page:** 1
Admin's ScratchPad General components	



Materials Table - units: N/mm^2

Type	E
Steel	205000

Sections Table - units: cm^2,cm^4

Code	Description	A	I
A	A=8,Ixx=74	8.00	74.00

Joints Table - units: mm

Joint	X	Y
1	0	0
2	1000	0
3	1000	750
4	2000	0
5	3000	0

Members Table

Member	Code	Description
1-2	A	A=8,Ixx=74
2-4	A	A=8,Ixx=74
2-3	A	A=8,Ixx=74
4-5	A	A=8,Ixx=74

Members Table

Member	Code	Description

Load Cases Table

Case	Description
1	Load Case 1
2	Load Case 2 (Undefined)
3	Load Case 3 (Undefined)
4	Load Case 4 (Undefined)

Load Case 1 - "Load Case 1"

Joint Loads - units: Load kN, Angle Degrees

Joint	G	Q	W	Direction
3	1.2	0.0	0.0	left to right

Joint Deflections - units: Deflections mm, Rotations degrees

Joint	X	Y	Theta
1	0.01	0.00	-0.0557
2	0.01	-1.30	-0.1114
3	2.57	-1.30	-0.2368
4	0.01	-1.62	0.0557
5	0.00	0.00	0.1114

Member Forces - units: Axial kN (-ve tension), Shear kN, Bending kNm

Member		----------End1----------				----------End2----------			
Ref.	Length	Joint	Axial	Shear	Bending	Joint	Axial	Shear	Bending
1-2	1000	1	0.0	-0.3	0.0	2	0.0	-0.3	-0.3
2-4	1000	2	1.2	-0.3	0.6	4	1.2	-0.3	0.3
2-3	750	2	0.0	1.2	-0.9	3	0.0	1.2	0.0
4-5	1000	4	1.2	-0.3	0.3	5	1.2	-0.3	0.0

Support Reactions - units: kN

Joint	X	Y	Moment
1	0.0	-0.3	0.0
5	-1.2	0.3	0.0

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Project: 4 HANDEL STREET LONDON.		Job Ref: 5740	Page No. 06
Designed by: DALE	Date: NOV-2021	Checked by:	Date:

CONNECTION DESIGN.

BEAM = 1.6 - 0.885 = 1.416 kN.

ADDITIONAL SHEAR AT 110 mm LOADING IN BOLTS = $\frac{1.416}{0.11}$ = 12.8 kN

ADDITIONAL DUE TO ECCENTRIC LOAD = 2×1.6 - 1.0416 = 3333 kN

RESULTANT LOAD IN BOLTS $\sqrt{(12.8 + 3333)}$ = 13.2 kN.

ADOPT 12mm BOLTS GRADE 8.8 SINGLE SHEAR = 31.6 kN
BEARING 27 kN

REACTION @ TOP = 0.3 kN ⇒ TWIN 6 mm COACH SCREWS
SHEAR CAPACITY 6 Ø COACH SCREWS = 0.765 × 2 = 1.550 kN

REACTION @ BOTTOM = 2.0832 BEARING 0.3 kN SHEAR
ADOPT SIMILAR

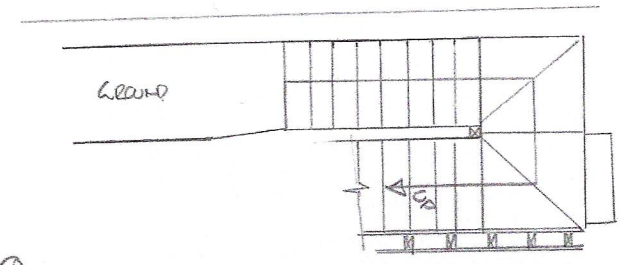
THE EXISTING WEB PLATES SUPPORT THE LOADING CURRENTLY WITHOUT ANY DISTRESS OR DEFORMATION ASSUME SATISFACTORY

CHECK FILLET WELD = $\frac{1.416 \times 1.6}{0.076}$ = 29.816 kN

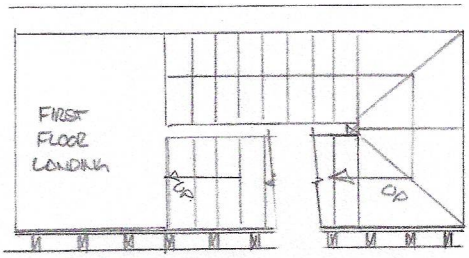
LENGTH OF WELD NEED = $\frac{27.816}{0.602}$ = 49 mm < 60 mm ∴ OK

Our ref: 37440/L/001/A/DALC/dalc
Date: 4th November 2021

Arrangement of Stairs



ARRANGEMENT OF STAIRS.
4 HANOVER STREET
LONDON



CONTINUED BELOW.

SUBJECT STAIR