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NOTES

General

1.1 This specification is to be read in conjunction with all Architect's, Engineer's and Services Engineer's drawings and specifications.

1.2 Do not scale from any of the drawings. All dimensions to be verified on site and any discrepancies should be highlighted

1.3 The contractor is responsible for the stability of the building and adjoining structures during construction and shall design, install, adapt and maintain all necessary propping and temporary works. A method statement for the temporary works must be submitted to the contractor administrator for comment before work begins.

1.4 Fire protection to all structural elements to Architect's details.

1.5 All waterproofing to the Architect's details.

1.6 All materials to comply with the relevant British Standard.

1.7 Information based on limited opening up on site. All structural details to be confirmed on site upon commencing works.

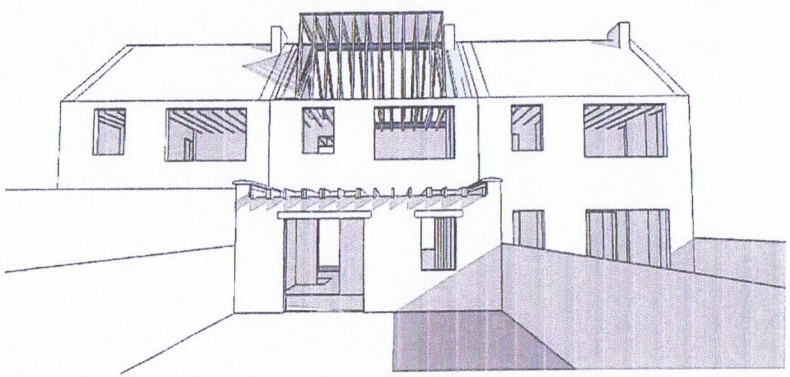


Fig 1.1 - Garden View Including Neighbouring Properties

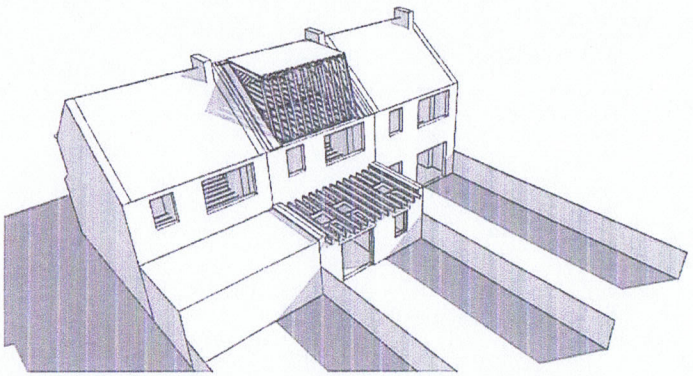


Fig 1.2 - Aerial View Including Neighbouring Properties

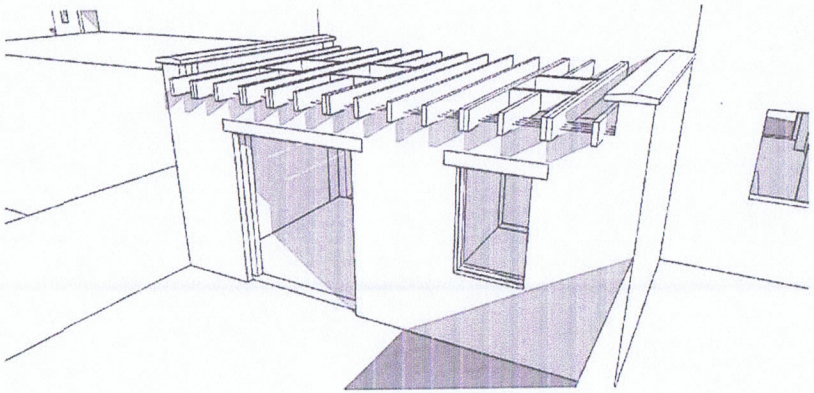


Fig 1.3 - Rear Extension

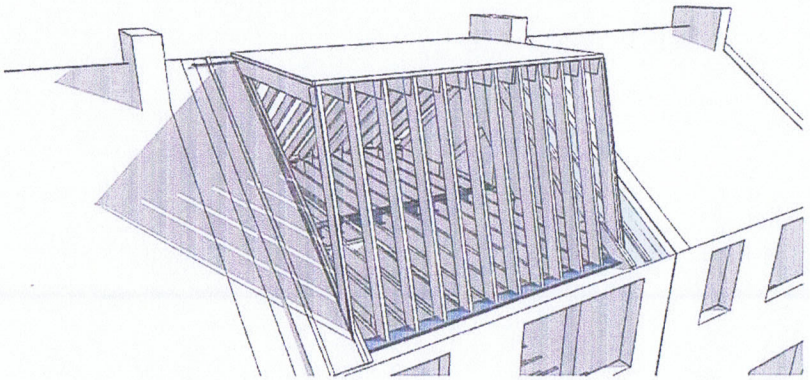


Fig 1.4 - Loft Extension

P1	Issued For Comment	17.02.15 JP

STATUS: PRELIMINARY

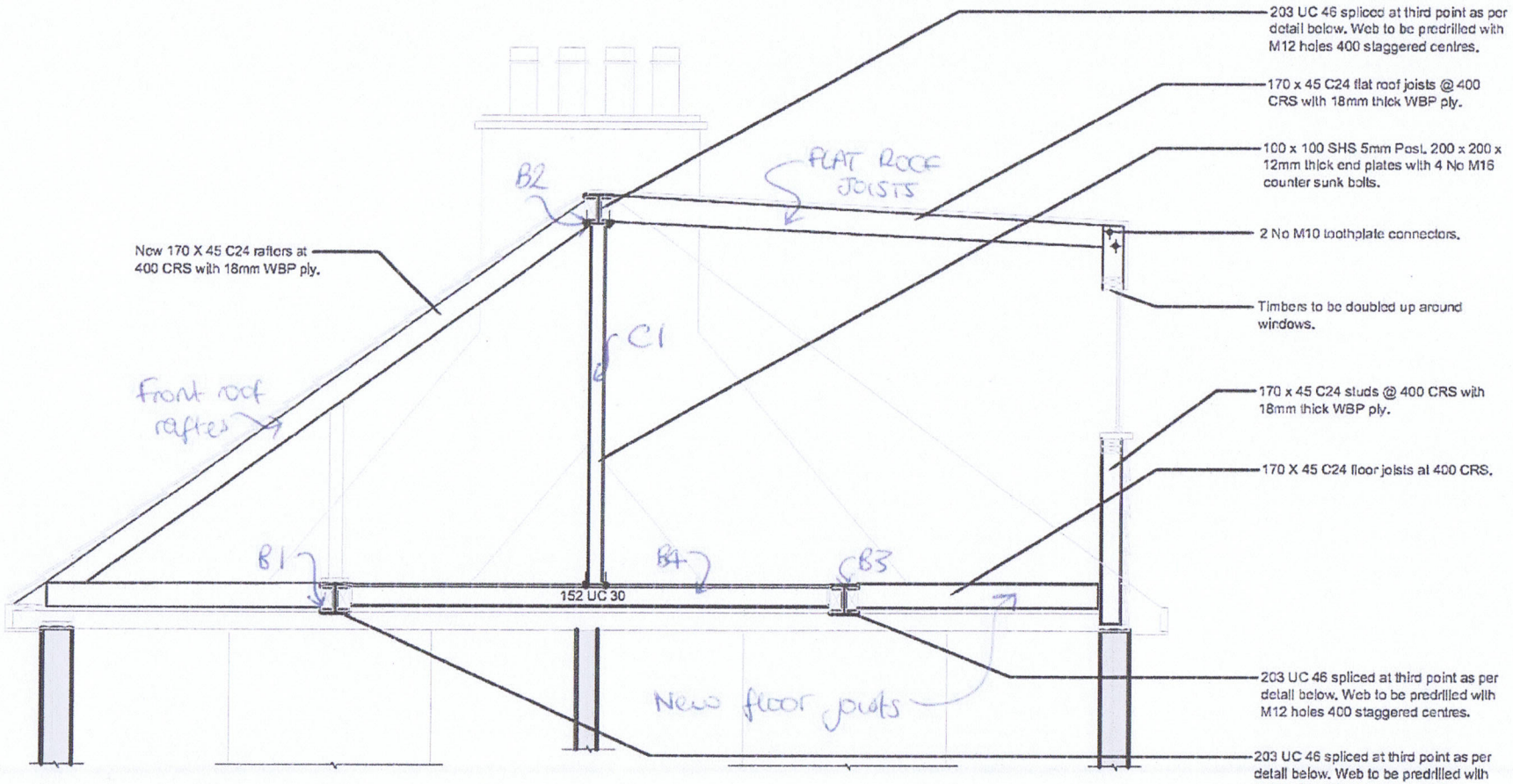
Interior Perspective

CLIENT: Marian Cioara

PROJECT: 62 Downhills Way London N17

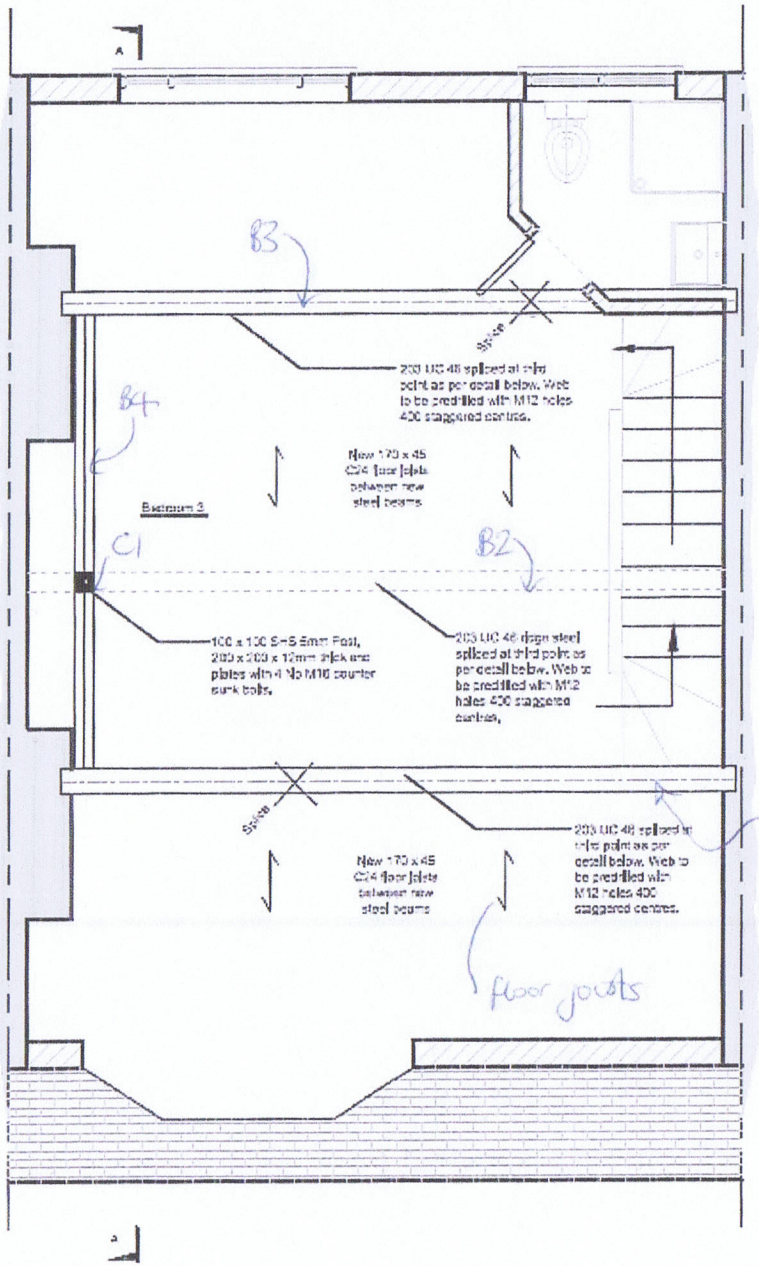
DRAWING TITLE: Proposed Details

SCALE: NTS		DATE: 15.02.15
DRAWN BY: JP		CHECKED BY: JP
JOB No: 215001	DRAWING No: 102	REV: P1



Proposed Loft Section A-A

Scale 1:50

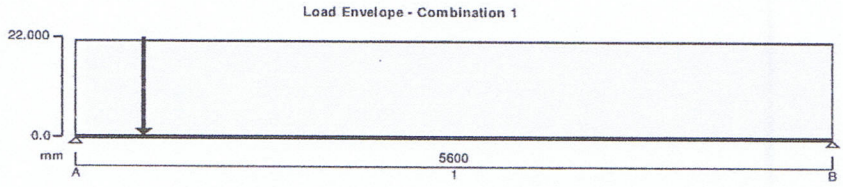

A
B3
Splice
203 UC 46 spliced at third point as per detail below. Web to be predrilled with M12 holes 400 staggered centres.
B4
New 170 x 45 C24 floor joists between new steel beams
Bedroom 3
C1
B2
100 x 100 S+S 6mm Post, 200 x 200 x 12mm plate and plates with 4 No M16 counter sunk bolts.
203 UC 46 dgm steel spliced at third point as per detail below. Web to be predrilled with M12 holes 400 staggered centres.
Splice
B1
New 170 x 45 C24 floor joists between new steel beams
203 UC 46 spliced at third point as per detail below. Web to be predrilled with M12 holes 400 staggered centres.
floor joists
A

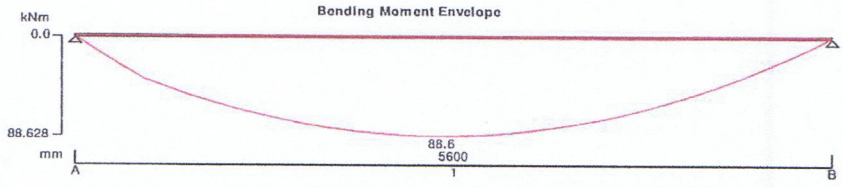
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	62 DOWNHILLS WAY				215001	
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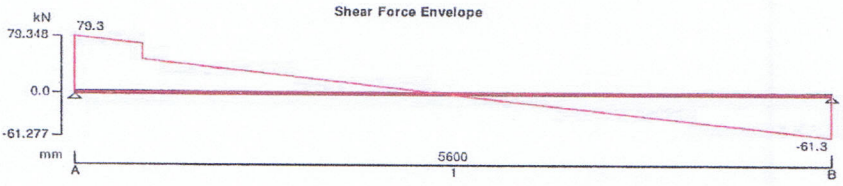
STEEL BEAM ANALYSIS & DESIGN (BS5950)

In accordance with BS5950-1:2000 incorporating Corrigendum No.1

TEDDS calculation version 3.0.05







Support conditions

Support A	Vertically restrained
	Rotationally free
Support B	Vertically restrained
	Rotationally free

Applied loading

Beam loads	Dead self weight of beam × 1
	Floor Load - Dead full UDL 2.4 kN/m
	Floor Load - Imposed full UDL 4.5 kN/m
	Roof Load - Dead full UDL 4.2 kN/m
	Roof Load - Imposed full UDL 2 kN/m
	Stud Wall - Dead full UDL 0.65 kN/m
	B4 DL - Dead point load 10 kN at 500 mm
	B4 LL - Imposed point load 5 kN at 500 mm

Load combinations

Load combination 1	Support A	Dead × 1.40

	Project			Job no.	
	62 DOWNHILLS WAY			215001	
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	B1			2	
	Calcs by	Calcs date	Checked by	Checked date	Approved by	Approved date
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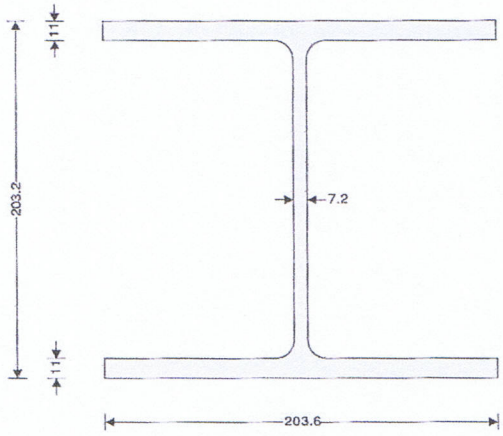
		Imposed × 1.60
	Span 1	Dead × 1.40
		Imposed × 1.60
	Support B	Dead × 1.40
		Imposed × 1.60

Analysis results

Maximum moment	M_{max} = **88.6** kNm	M_{min} = **0** kNm
Maximum shear	V_{max} = **79.3** kN	V_{min} = **-61.3** kN
Deflection	δ_{max} = **9.4** mm	δ_{min} = **0** mm
Maximum reaction at support A	R_{A_max} = **79.3** kN	R_{A_min} = **79.3** kN
Unfactored dead load reaction at support A	R_{A_Dead} = **30.7** kN	
Unfactored imposed load reaction at support A	$R_{A_Imposed}$ = **22.8** kN	
Maximum reaction at support B	R_{B_max} = **61.3** kN	R_{B_min} = **61.3** kN
Unfactored dead load reaction at support B	R_{B_Dead} = **22.5** kN	
Unfactored imposed load reaction at support B	$R_{B_Imposed}$ = **18.6** kN	

Section details

Section type	**UKC 203x203x46 (Corus Advance)**
Steel grade	**S275**
From table 9: Design strength p_y	
Thickness of element	max(T, t) = **11.0** mm
Design strength	p_y = **275** N/mm^2
Modulus of elasticity	E = **205000** N/mm^2



Lateral restraint

Span 1 has lateral restraint at supports only

Effective length factors

Effective length factor in major axis	K_x = **1.00**
Effective length factor in minor axis	K_y = **1.00**
Effective length factor for lateral-torsional buckling	$K_{LT.A}$ = **1.00**
	$K_{LT.B}$ = **1.00**

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	62 DOWNHILLS WAY				215001	
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		2/23/2015				

Classification of cross sections - Section 3.5

$\varepsilon = \sqrt{[275\ N/mm^2 / p_y]} = \mathbf{1.00}$

Internal compression parts - Table 11

Depth of section — $d = \mathbf{160.8}$ mm

$d / t = 22.3 \times \varepsilon <= 80 \times \varepsilon$ — Class 1 plastic

Outstand flanges - Table 11

Width of section — $b = B / 2 = \mathbf{101.8}$ mm

$b / T = 9.3 \times \varepsilon <= 10 \times \varepsilon$ — Class 2 compact

Section is class 2 compact

Shear capacity - Section 4.2.3

Design shear force — $F_v = \max(\text{abs}(V_{max}), \text{abs}(V_{min})) = \mathbf{79.3}$ kN

$d / t < 70 \times \varepsilon$

Web does not need to be checked for shear buckling

Shear area — $A_v = t \times D = \mathbf{1463}\ mm^2$

Design shear resistance — $P_v = 0.6 \times p_y \times A_v = \mathbf{241.4}$ kN

PASS - Design shear resistance exceeds design shear force

Moment capacity - Section 4.2.5

Design bending moment — $M = \max(\text{abs}(M_{s1_max}), \text{abs}(M_{s1_min})) = \mathbf{88.6}$ kNm

Moment capacity low shear - cl.4.2.5.2 — $M_c = \min(p_y \times S_{xx}, 1.2 \times p_y \times Z_{xx}) = \mathbf{136.6}$ kNm

Effective length for lateral-torsional buckling - Section 4.3.5

Effective length for lateral torsional buckling — $L_E = 1.0 \times L_{s1} = \mathbf{5600}$ mm

Slenderness ratio — $\lambda = L_E / r_{yy} = \mathbf{109.071}$

Equivalent slenderness - Section 4.3.6.7

Buckling parameter — $u = \mathbf{0.847}$

Torsional index — $x = \mathbf{17.713}$

Slenderness factor — $v = 1 / [1 + 0.05 \times (\lambda / x)^2]^{0.25} = \mathbf{0.767}$

Ratio - cl.4.3.6.9 — $\beta w = \mathbf{1.000}$

Equivalent slenderness - cl.4.3.6.7 — $\lambda_{LT} = u \times v \times \lambda \times \sqrt{[\beta w]} = \mathbf{70.777}$

Limiting slenderness - Annex B.2.2 — $\lambda_{L0} = 0.4 \times (\pi^2 \times E / p_y)^{0.5} = \mathbf{34.310}$

$\lambda_{LT} > \lambda_{L0}$ - Allowance should be made for lateral-torsional buckling

Bending strength - Section 4.3.6.5

Robertson constant — $\alpha_{LT} = \mathbf{7.0}$

Perry factor — $\eta_{LT} = \max(\alpha_{LT} \times (\lambda_{LT} - \lambda_{L0}) / 1000, 0) = \mathbf{0.255}$

Euler stress — $p_E = \pi^2 \times E / \lambda_{LT}^2 = \mathbf{403.9}\ N/mm^2$

$\phi_{LT} = (p_y + (\eta_{LT} + 1) \times p_E) / 2 = \mathbf{391}\ N/mm^2$

Bending strength - Annex B.2.1 — $p_b = p_E \times p_y / (\phi_{LT} + (\phi_{LT}^2 - p_E \times p_y)^{0.5}) = \mathbf{186.5}\ N/mm^2$

Equivalent uniform moment factor - Section 4.3.6.6

Moment at quarter point of segment — $M_2 = \mathbf{70.5}$ kNm

Moment at centre-line of segment — $M_3 = \mathbf{88.5}$ kNm

Moment at three quarter point of segment — $M_4 = \mathbf{65}$ kNm

Maximum moment in segment — $M_{abs} = \mathbf{88.6}$ kNm

Maximum moment governing buckling resistance — $M_{LT} = M_{abs} = \mathbf{88.6}$ kNm

Equivalent uniform moment factor for lateral-torsional buckling

$m_{LT} = \max(0.2 + (0.15 \times M_2 + 0.5 \times M_3 + 0.15 \times M_4) / M_{abs}, 0.44) = \mathbf{0.929}$