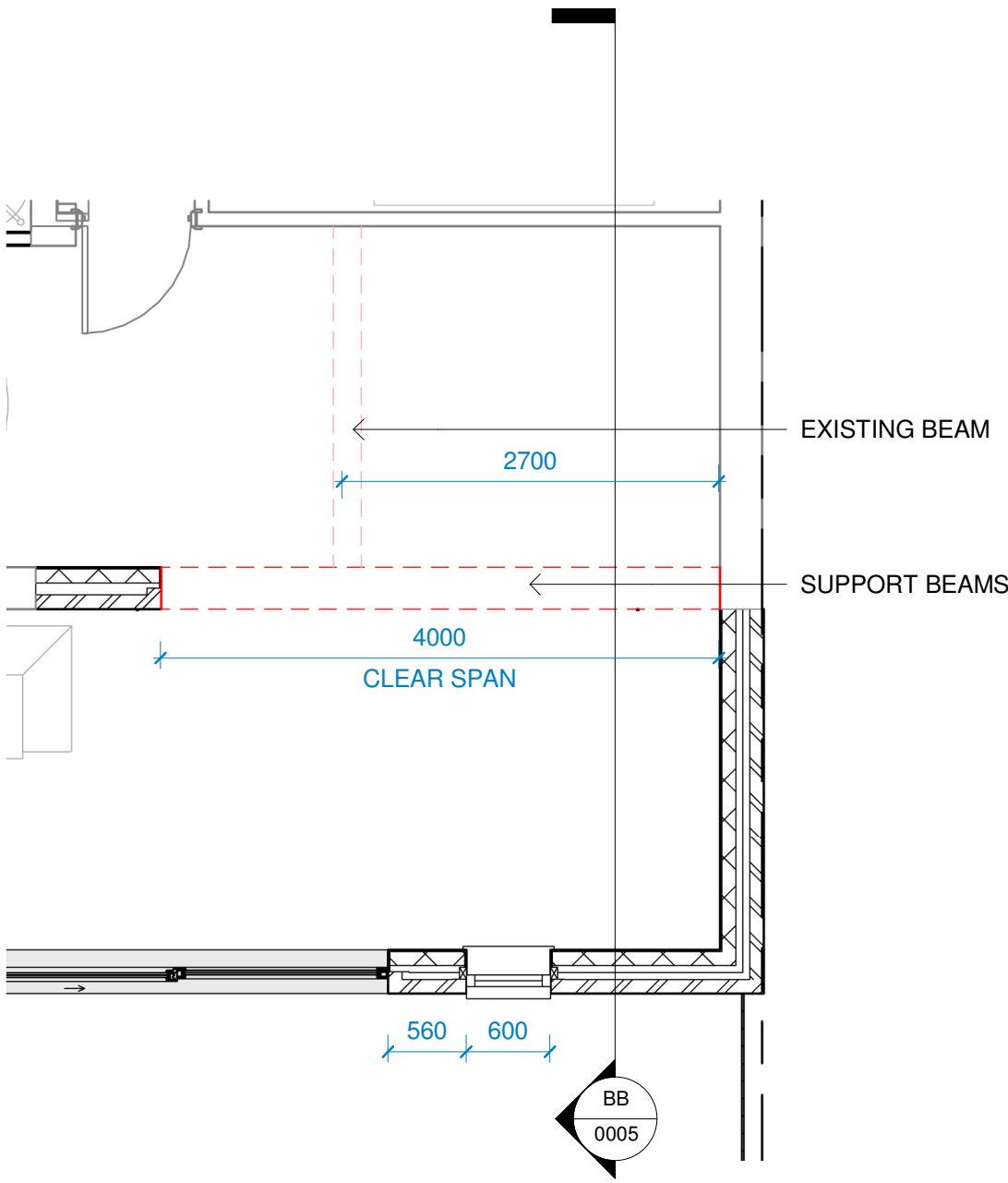
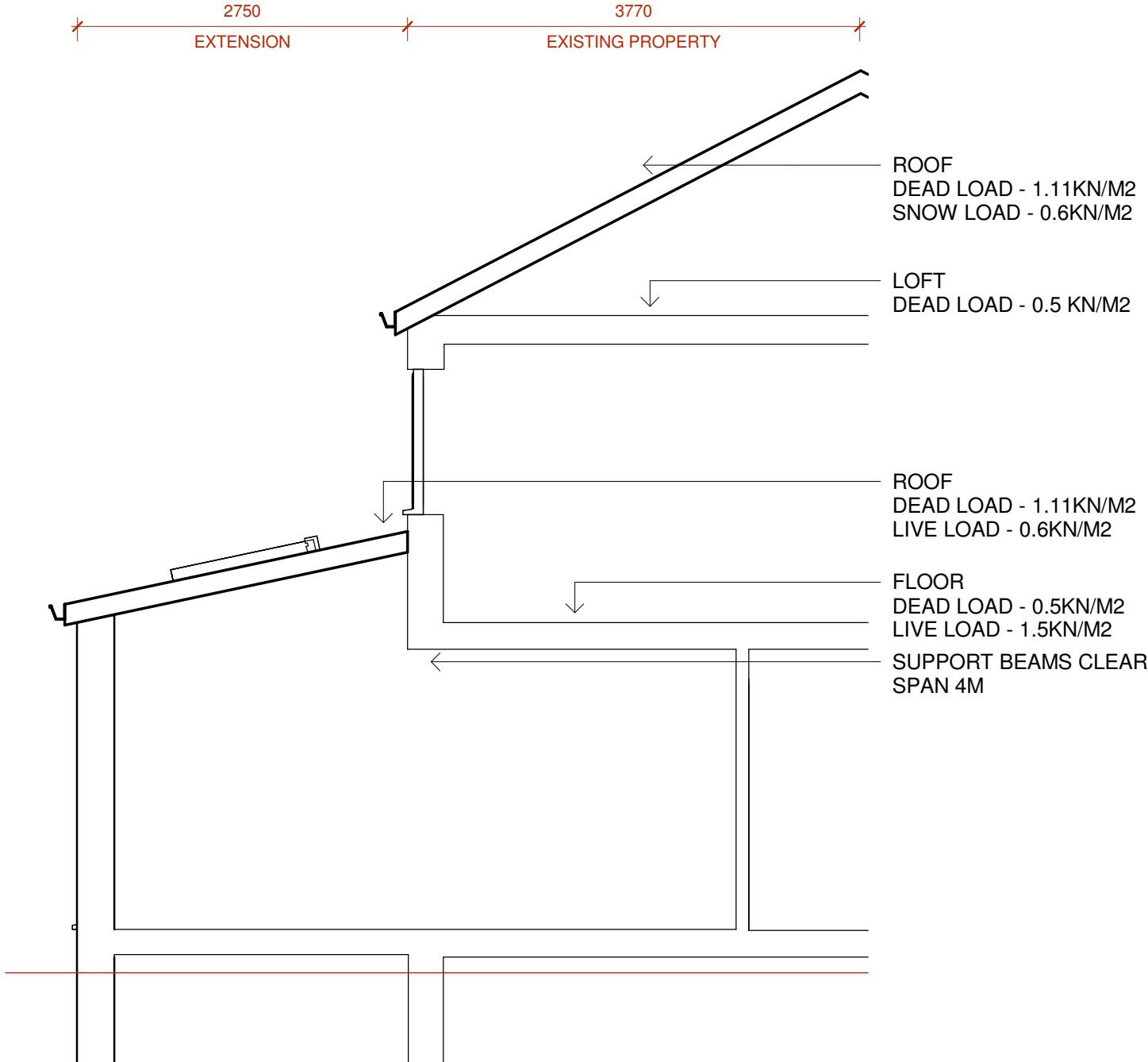


THIS DRAWING HAS BEEN DEVELOPED BASED ON INFORMATION RECIEVED FROM THE PROJECT STRUCTURAL ENGINEER. LD ARCHITECTURAL SERVICES HOLD NO RESPONSIBILITY FOR THE CALCULATIONS, DESIGNS AND LOADINGS DETAILED ON THIS DRAWING.

PLEASE SEE WW-PROPOSED SINGLE STOREY SIDE EXTENSION AND SINGLE STOREY REAR EXTENSION CALCULATIONS PREPARED BY W L WOOD ON 01/08/2022



Kitchen Area Proposed
1 : 50



Section BB Proposed
1 : 50

Analysis

Span (m)	4.200
----------	-------

Choose steel section:
305x127x37

☒ UB
☐ UC
☐ RSJ
☐ PFC

E (N/mm²)
205000

I_x (cm⁴)
7171

Load Factors			
Dead	1.4		
Imposed	1.6		

LOADING	Dead kN	Imposed kN	Position m	Length m
UDL	48	17	-	-
Point load	2	6	2.700	-
Point load				-
Point load				-
Partial UDL				-

RESULTS			
M max	F _y max	Max. deflection (mm)	Total load
kNm	kN	only	
60.40	-56.24	+1.68	-5.11

Design

Design Strength	I _{xx} N/mm ² 275
section classification	Plastic

☒ grade S275
☐ grade S355

Shear Capacity	
Area A _v	capacity P _v
mm ²	kN
2161.2	356.60

Moment Capacity	Position m	Moment kNm	F _y kN	M _{xx} kNm	Unity Factor
Maximum Moment	2.310	60.40	0.00	148.23	0.41
Critical section	2.310	60.40	-0.40	148.23	0.41

Lateral torsional buckling

Equivalent Uniform Moment		kNm
Maximum moment	M _{xx}	40.30
Uniform factor	m	1.00
Buckling moment	M _{xx}	40.30

Z _x (cm ³)	471
S _x (cm ³)	539

Slenderness Ratio			
Effective length L	radius of gyration r _y	slenderness λ	correction factor n
m	cm		
4.200	1.00	4.200	2.67

Deflection		Allowable mm
span/deflection ratios		
Imposed Loads	360	11.7
Total Loads	600	7.0

Design Status

Vertical shear	PASS	0.16
Moment	PASS	0.41
Buckling	PASS	0.69
Deflection	PASS	0.73

Bending Moment Diagram

Shear Force Diagram

Deflection Diagram

Section used:

UB

305x127x37

Web Bearing and Buckling Design

☒ grade S275
☐ grade S355

Choose steel section:
305x127x37

☒ UB
☐ UC
☐ RSJ
☐ PFC

E (N/mm²)
205000

Design Strength of Web	
p _{yw} N/mm ²	275

FULL DESIGN LOADING (kN)	
Concentrated loading or reaction at support *	57

Web Buckling

Web Slenderness Ratio	
Flange Restrained	
d	t (not used)
mm	mm
285.2	7.1

Flange Unrestrained	
L _e factor	0.70
ry (mm)	2.05
λ	90.57

☐ Tick for flange restrained

Web Buckling Resistance, P _w				
b ₁	c	n ₁	t	P _c
mm	mm	mm	mm	N/mm ²
100	0	152.20	7.1	141.33

Web Bearing

Local Web Bearing Capacity, P _{sub}				
b ₁	c	n ₁	t	P _{sub}
mm	mm	mm	mm	kN
100	0	49.00	7.1	275

Design Status

Web Buckling	PASS	0.23
Web Bearing	PASS	0.20

Section Dimensions (mm)	
depth	D
web thickness	t
flange thickness	T
depth between fillets	d
root radius	r

Web Compression Strength	
design strength	P _{yw}
Robertson constant	a
slenderness	λ
limiting slenderness	λ _{lim}
Perry factor	n ₁
Euler strength	P _E
root	φ
compressive strength	P _c

NOTES:

b₁ = stiff bearing length
n₁ = length obtained by load dispersion at 45 degs though half the section depth.
n₂ = length obtained by load dispersion through the flange and root radius at a slope of 1 : 2.5.
c = overlap distance from end of beam section to the stiff bearing.
(If end of beam section on stiff bearing, c = 0)

Section used:

UB

305x127x37

Design Status

Web Buckling	PASS	0.23
Web Bearing	PASS	0.20

Section Dimensions (mm)	
depth	D
web thickness	t
flange thickness	T
depth between fillets	d
root radius	r

Web Compression Strength	
design strength	P _{yw}
Robertson constant	a
slenderness	λ
limiting slenderness	λ _{lim}
Perry factor	n ₁
Euler strength	P _E
root	φ
compressive strength	P _c

NOTES:

b₁ = stiff bearing length
n₁ = length obtained by load dispersion at 45 degs though half the section depth.
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c = overlap distance from end of beam section to the stiff bearing.
(If end of beam section on stiff bearing, c = 0)

SCALE BAR

Scale bar at 1:50

0 100 200 300mm

GENERAL NOTES:

DO NOT SCALE FROM THE DRAWING SCALE FROM SCALE BAR ONLY

*ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCEMENT OF WORKS

**THE DRAWING IS AVAILABLE IN PDF OR DWG FORMAT ON REQUEST

ALL DIMENSIONS TO BE CHECKED ON SITE BEFORE COMMENCEMENT OF WORKS AND ANY DISCREPANCIES NOTED TO THE DESIGNER

ALL WORKING TO BE CARRIED OUT TO THE SATISFACTION AND APPROVAL OF THE LOCAL AUTHORITY BUILDING CONTROL APPROVED INSPECTOR

ALL SAMPLES TO BE APPROVED WITH CLIENT/OCCUPYER PRIOR TO COMMENCEMENT OF WORKS ON SITE. ALL SAMPLES TO BE MADE AVAILABLE TO MAIN CONTRACTOR AT EARLIEST OPPORTUNITY

ALL PRODUCTS/MATERIALS TO BE INSTALLED TO MANUFACTURERS RECOMMENDED SPECIFICATION AND GUIDELINES. ALL INSTRUCTIONS AND WARRANTIES GUARANTEED TO BE COMPLETE AND HANDED TO CLIENT/OCCUPYER UPON COMPLETION OF WORKS

ALL STRUCTURAL ELEMENTS - LATELIS BEAMS OPENING PERS SHOULD BE DESIGNED AND APPROVED BY A STRUCTURAL ENGINEER PRIOR TO COMMENCEMENT OF WORKS AND SUBMISSION OF DRAWINGS FOR APPROVAL

PARTY WALL ACT:

IF YOUR INTENDED BUILDING INVOLVES EITHER WORK ON AN ADJOINING WALL SHARED WITH ANOTHER NEIGHBOUR BUILDING OR THE BOUNDARY WITH A NEIGHBOURING PROPERTY OR EXCAVATING NEAR A NEIGHBOURING BUILDING, THEN BY LAW YOU MUST GIVE A STATUTORY NOTICE ON ALL ADJOINING OWNERS TO INFORM THEM OF YOUR PROPOSALS

IF THE NEIGHBOUR AGREES TO THE PROPOSED WORK IN WRITING PRIOR TO WORK STARTING ON SITE THEN THE ABOVE WORK CAN GO AHEAD

THE NEIGHBOUR SHOULD BE GIVEN 14 DAYS TO REPLY TO THE NOTICE

IF HOWEVER THE NEIGHBOUR DOES NOT AGREE WITH THE PROPOSED WORK OR DOES NOT REPLY TO THE NOTICE THEN THE NOTICE IS REGARDED TO HAVE A REPLY

IF YOU CARRY OUT THE WORK WITHOUT WRITTEN PERMISSION OF YOUR NEIGHBOUR AND PROBLEMS ARE CAUSED TO YOUR NEIGHBOUR'S HOUSE DUE TO YOUR DEVELOPMENT ON YOUR LAND THEN AN INDEPENDENT SURVEYOR MAY BE CALLED IN WHO COULD BE MADE TO GIVE COMPENSATION TO RECTIFY ANY PROBLEMS

FOR A FULL EXPLANATION OF THE PARTY WALL ACT SEE THE BOOKLET PUBLISHED BY THE DEPARTMENT OF THE ENVIRONMENT

P01	Minor Amendments	WW	LD	12/08/22
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Revised:

Notes:

Drawn By:

Checked By:

Issue Date:

LD Architectural Services

Alkington Garden Village

Middleton

M24

INTERIOR DESIGN | ARCHITECTURAL DESIGN | VISUALISATION | SURVEYING

Project Title & Address

19 Lilworth Road, Middleton, Rochdale - Proposed Single Storey Side Extension & Single Storey Rear Extension

Drawing Title

Structural Calculations

Scale:

1:50

Drawn By:

WW

Drawn On:

01/08/22

Drawing Status:

Design

Project #:

LD0006

Scale:

GRY - LD - 00 - 00 - DR - S - 0005

Revision:

P01