higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T190**(E)**(A3)T

NATIONAL CERTIFICATE: MULTI-DISCIPLINARY DRAWING OFFICE PRACTICE

BUILDING DRAUGHTING

(2050035)

3 April 2018 (X-Paper)
09:00–13:00

REQUIREMENTS: ONE A2 drawing sheet

Calculators, drawing instruments and CAD software may be used.

This question paper consists of 6 pages, 3 diagram sheets and 2 information sheets.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE: MULTI-DISCIPLINARY DRAWING OFFICE PRACTICE
BUILDING DRAUGHTING
TIME: 4 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Use BOTH sides of the DRAWING SHEET.
5. A balanced layout is very important and candidates will be penalised for bad planning.
6. A 15 mm border must be drawn around the DRAWING SHEET (both sides).
7. ALL drawing work, including candidate information, must be done in pencil.
8. ALL drawing work must comply with the SABS Recommended Code of Practice for Building Drawing as well as the SANS 10111-1990.
9. ALL building regulations must comply with the National Building Regulations SANS 10400-1990.
10. Brick sizes should be taken as 220 mm × 110 mm × 75 mm.
11. ALL abbreviations and symbols must comply with the latest National Building Regulations and ALL relevant SANS (SABS) codes.
12. Write neatly and legibly.

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QUESTION 1: CONSTRUCTION DRAWING

1.1 Redraw and complete the following table of abbreviations used for drainage fittings on the DRAWING SHEET:

Abbreviation	Drainage fittings
G	
SWP	
WSP	
VP	
DP	

NOTE: ALL information must be printed freehand or stencilled 3 mm high. (5)

1.2 Draw, to scale 1 : 10, a typical vertical section through a round precast manhole. Label ALL parts of the manhole. (10)
[15]

QUESTION 2: FLOOR PLAN LAYOUT

DIAGRAM SHEET 1 (attached) shows a plan of a Howe-type roof truss. Your client bought these roof trusses to cover a house of 100,85 m².

BRIEF SPECIFICATIONS:	
Roof pitch	15°
Roof type	Open gable roof
Roof truss	Howe-type roof trusses
Roof cover	Roof tiles
Roof overhang	500 mm
Ceiling height	29 brick courses
Exterior walls	1 face brick wall with15 mm plaster on the interior sides
Interior walls	A half-brick wall with 15 mm plaster both sides
Barge boards	250 × 10 mm Nutec fascia
MATERIAL AVAILABLE ON SITE:	
Complete roof to cover 100,85 m².	
1 × 1 830 mm aluminium sliding door	
1 × steel frame with hardwood exterior door	
4 × steel frame with hollow core interior door	
1 × sliding door rail with hollow core interior door	
2 × 600 × 1 500 aluminium window frame (6DT15)	
2 × 1 800 × 900 aluminium window frame (18DT9)	
1 × 1 500 × 600 aluminium window frame (15T6)	
1 × 1 500 × 900 aluminium window frame (15T9)	
2 × 900 × 600 aluminium window frame (9T6)	
1 × 1 800 × 900 aluminium window frame (18T9)	

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The client wants you to design a rectangular house by using what is already available on site. Use the outside dimensions given on the truss plan.

HINT: Area = length × width

Draw, to scale 1 : 100, a fully detailed working drawing of the floor plan layout of the dwelling.

The following must be included and indicated on the plan:

2.1	THREE bedrooms, a kitchen/living room, a full bathroom and en suite (see INFORMATION SHEET 1 (attached) for minimum room sizes)	(12)
2.2	Room names and floor finishes	(2)
2.3	ALL external, internal and wall dimensions	(7)
2.4	Window and door symbols	(2)
2.5	Sanitary installation symbols must be in accordance with the SABS Code of Practice for Building Drawing	(2)
2.6	Window codes	(1)
2.7	Section arrows	(2)
2.8	Title and scale	(2)
2.9	True north	(2)
		[32]

QUESTION 3: SECTION THROUGH A HOUSE

Draw, to scale 1 : 50, a section A-A through the middle of a dwelling. Indicate the following specifications:

3.1	The pitch, roof cover, truss and ceiling (see INFORMATION SHEET 2 (attached) for roof truss design standards)	(3)
3.2	Gutter on fascia	(2)
3.3	Roof covering (eaves projection) = 500 mm	(2)
3.4	Strip foundation (include sizes)	(2)
3.5	Concrete slab	(2)
3.6	Damp-proof course (include minimum height above FGL)	(2)
3.7	Damp-proof membrane	(2)

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3.8	Compacted fill	(2)
3.9	Screed	(2)
3.10	External and internal walls	(2)
3.11	Finished ground level and finished floor level	(2)
3.12	Dimension the ceiling height, roof overhang, total height and minimum damp-proof course distance from the ground level	(3)
3.13	Title and scale	(2)
		[28]

QUESTION 4: ELEVATION

Draw, to scale 1 : 100, ALL views (north, east, south and west) from your design of the complete dwelling. Indicate the following on each elevation:

4.1	Wall finish (face brick with brick on edge window sill)	(4)
4.2	Window and door codes (see DIAGRAM SHEET 2 (attached))	(4)
4.3	Title and scale	(2)
		[10]

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QUESTION 5: SITE PLAN

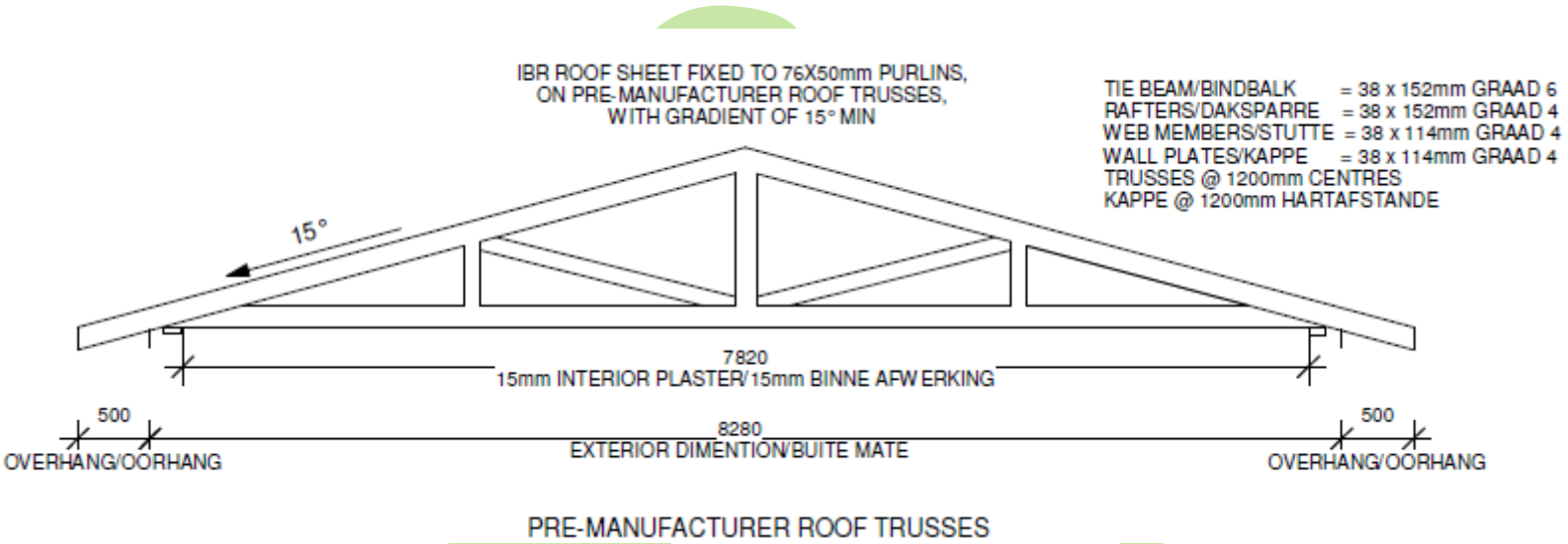
Refer to DIAGRAM SHEET 3 (attached). Do NOT copy the given view, but draw, to scale 1 : 200, the site plan. The following must be included and indicated on the site plan:

5.1	The boundary lines and pegs	(2)
5.2	The position of the driveway (carriage-way crossing)	(2)
5.3	The building lines	(2)
5.4	The complete dwelling and double garage in the correct position (show the roof as seen from the top)	(2)
5.5	The drainage system	(2)
5.6	The direction of true north	(2)
5.7	Title and scale	(2)
5.8	The name of the street	(1)
		[15]

TOTAL: 100

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DIAGRAM SHEET 1

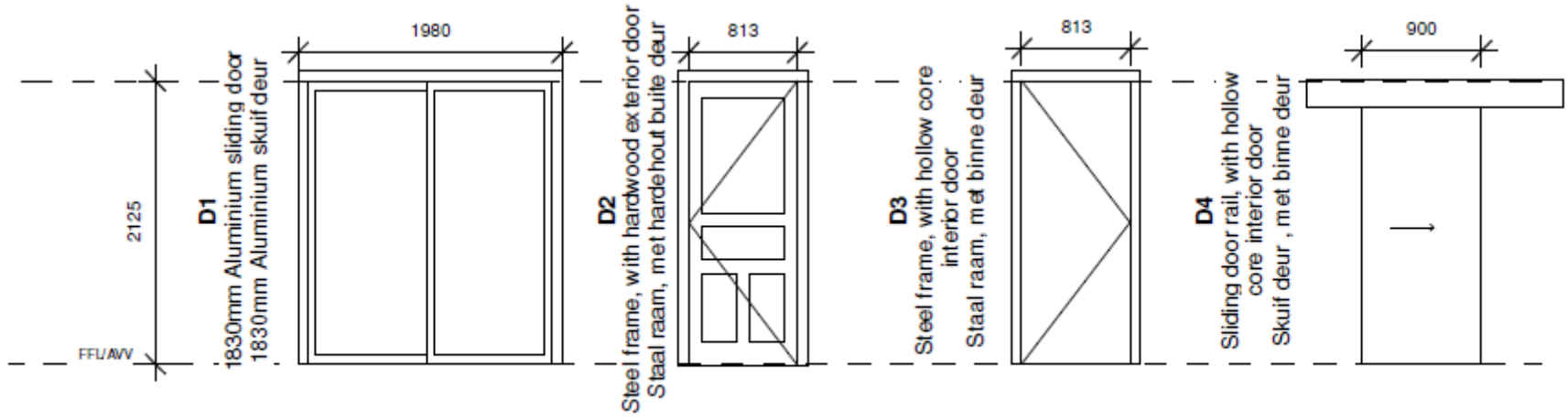


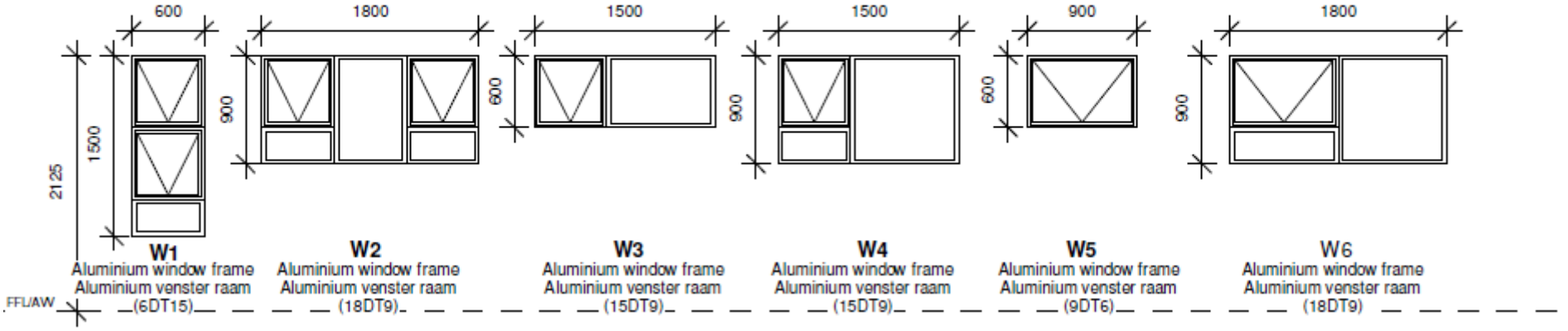
ROOF TRUSS DETAIL

SCALE 1 : 50

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DIAGRAM SHEET 2

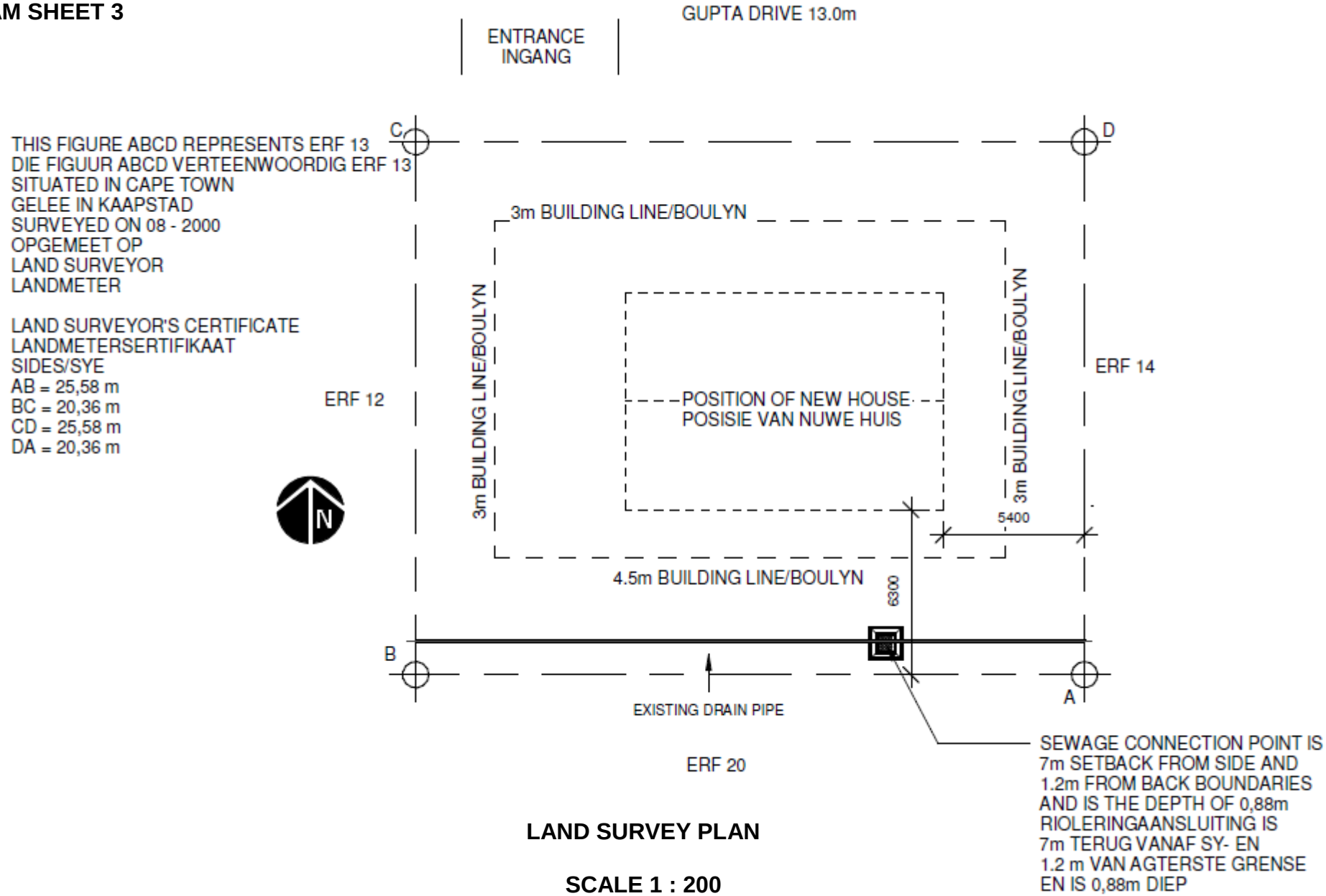




DOOR AND WINDOW SCHEDULE

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DIAGRAM SHEET 3



LAND SURVEY PLAN

SCALE 1 : 200

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INFORMATION SHEET 1

Room area		
Type of occupancy	**Room**	**Minimum plan area**
All occupancies	Any habitable room other than kitchen, scullery and laundry	6 m² with no linear dimension of less than 2 m
B, D or J	Change rooms and dining rooms	Population 1–15: 0,8 m² per person but not less than 6 m² Population 16–100: 0,6 m² per person but not less than 12m² Population more than 100: 0,5 m² per person but not less than 60 m²

Rooms and their dimensions	
Room or space	**Minimum height**
Bedroom	2,4 m above a floor area of at least 6 m² with a clear height of at least 1,8 m at any point more than 0,75 m from the edge of the floor space
Any other habitable room in a dwelling house or a dwelling unit	2,4 m above a minimum of 70% of the floor area, and not less than 2,1 m above the remaining floor area
All habitable rooms other than those listed above	2,4 m
Passage or entrance hall	2,1 m
Bathroom, shower room, laundry or room containing a toilet pan	2,1 m above any area where a person would normally be in a standing position
Open mezzanine floor which has an area not exceeding 25% of the area of the floor immediately below it	2,1 m above and below the mezzanine floor

SANS 10400-C: 2010

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INFORMATION SHEET 2

Howe-type roof trusses

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Roof covering	**Pitch degrees**			**Maximum clear span m**	**Maximum centre-to-centre truss spacing mm**	**Bolts at heel and splice joints (number × type)[a]**	**Member sizes and grade of timber in accordance with SANS 1783-2[b, c]**						**Number of bays**
	Minimum	**Maximum**	**Recommended**				**TC[d]**		**BC**		**Web**		
							Size mm	**Grade**	**Size mm**	**Grade**	**Size mm**	**Grade**	
Tiles and slates with 38 mm × 38 mm battens spaced at centres that do not exceed 345 mm maximum, and in accordance with the manufacturer's instructions	17,5	35	26	3,0 4,0 5,0 6,0 6,5 7,0 7,5 8,0	760 (650 where slates or tiles have a self-mass in excess of 55 kg/m^2)	2 × M12	114	5	114 114 114 114 114 152 152 152	5	114	5	2 4 4 4 6 6 6 6
Metal or fibre-cement sheets with 50 mm × 76 mm purlins on edge spaced at centres that do not exceed 1 200 mm	15	30	17,5	3,0 4,0 5,0 6,0 6,5 7,0 7,5 8,0	1 200	2 × M12	114	5	114 114 114 114 114 152 152 152	5	114	5	2 4 4 4 6 6 6 6
Metal tiles with 38 mm × 38 mm battens spaced in accordance with the manufacturer's instructions	15	30	20	3,0 4,0 5,0 6,0 6,5 7,0 7,5 8,0	1 000	2 × M12	114	5	114 114 114 114 114 152 152 152	5	114	5	2 4 4 4 6 6 6 6

TC = top chord or rafter
BC = bottom chord or tie beam

[a] Heel joints shall have 2 × M12 bolts per joint with 40 mm washers at each end.
[b] All timber members shall have a thickness of 38 mm (36 mm if planed).
[c] 38 mm × 114 mm grade 7 members may be substituted for 38 mm × 152 mm grade 5 material, if required.
[d] The maximum overhang of a 114 mm TC is 600 mm. The TC needs to be increased to 152 mm if the overhang is greater than 600 mm but less than or equal to 900 mm.

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