New Specification

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2019

Construction and the Built Environment

GCN21

Unit 2
Sustainable Construction

[GCN21]
MONDAY 10 JUNE, AFTERNOON

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all nine** questions.
Questions **1**, **2**, **5**, **6**, **7** and **8** should be answered in relation to the enclosed house drawings and specifications previously issued as pre-release material.
You should not bring any of the material previously issued into this examination.
You will be provided with a clean copy of the pre-release material.

INFORMATION FOR CANDIDATES

The total mark for this paper is 120.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Quality of written communication will be assessed in questions **6** and **9**.

A scale ruler and a calculator are required.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

Answer **all** questions

Use the pre-release material to assist with answering questions 1, 2, 5, 6, 7 and 8.

Examiner Only	
Marks	Remark

1 Label the pre-release side elevation drawing shown in **Fig. 1** below using some of the following terms:

Roofing felt	Ridge
Fascia board	Barge board
Purlin	Front door
Downpipe	Tiling battens
Soffit	First floor window
Chimney	Roof tiles
Patio doors	Quoin stones
Door steps	Gutter
Ground floor window	

Write the correct answer in the box provided.

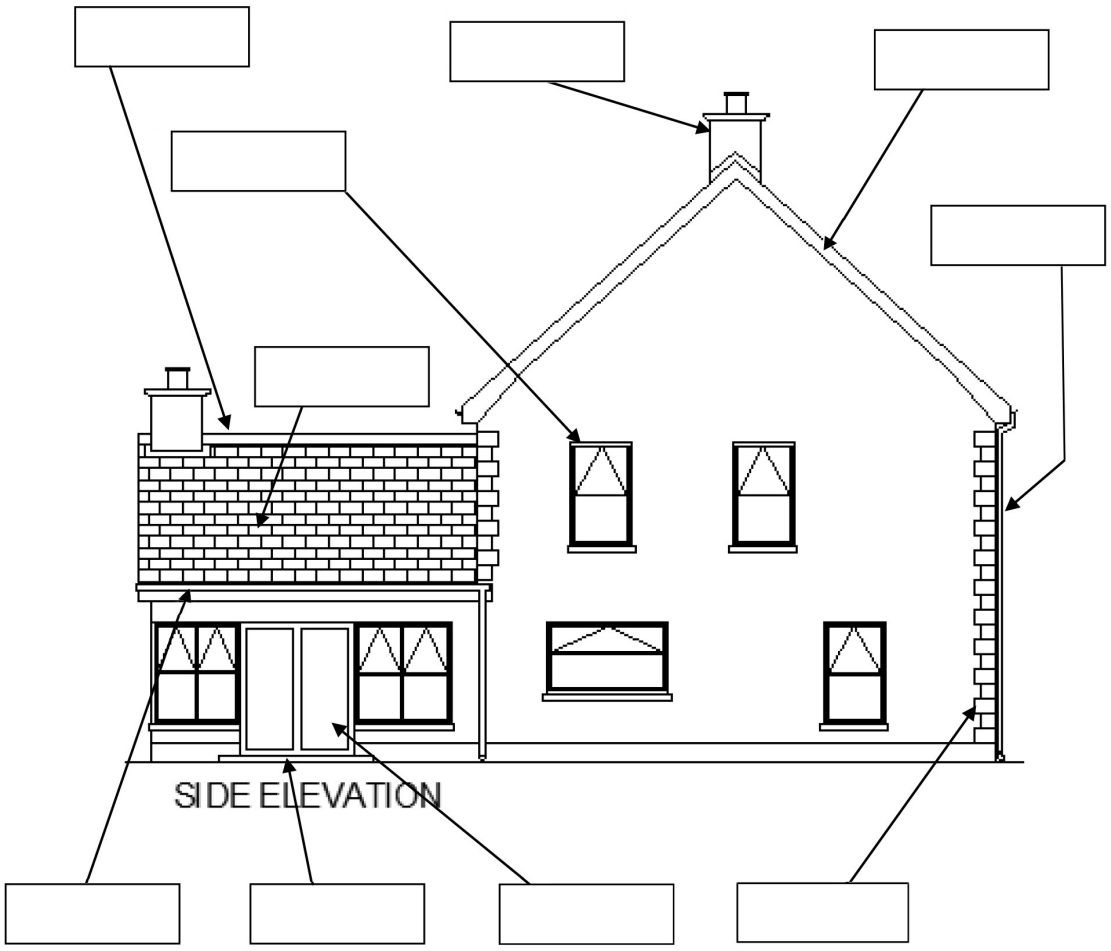


Fig. 1

[10]

Examiner Only	
Marks	Remark

2 Using the attached pre-release material, give the following internal room dimensions in **millimetres**.

Some dimensions may need to be scaled.

(a) The length and width of the **Lounge**.

Length _____ mm Width _____ mm [2]

(b) The length of the **Hall**.

Length _____ mm [1]

(c) The length and width of the **Kitchen / Dining** area.

Length _____ mm Width _____ mm [4]

(d) The **overall length** of the house along the **Front Elevation**.

Length _____ mm [2]

(e) Ignoring the sanitary fittings, **calculate the total floor area** of the first floor bathroom.

Show the working out of your answer.

_____ **square metres** [3]

(f) How many **900 mm wide windows** are in the first floor of the house shown in the pre-release material?

_____ [2]

Examiner Only	
Marks	Remark

3 Demonstrate your understanding of the following terms and give an example of each to support your answer:

(a) Green Belt

[2]

(b) Conservation Area

[2]

(c) Recycling

[2]

(d) Retrofit

_____

_____

_____

_____ [2]

(e) Damp Proof Membrane

_____

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

4 Complete a cutting list for the table shown in **Fig. 2** below.

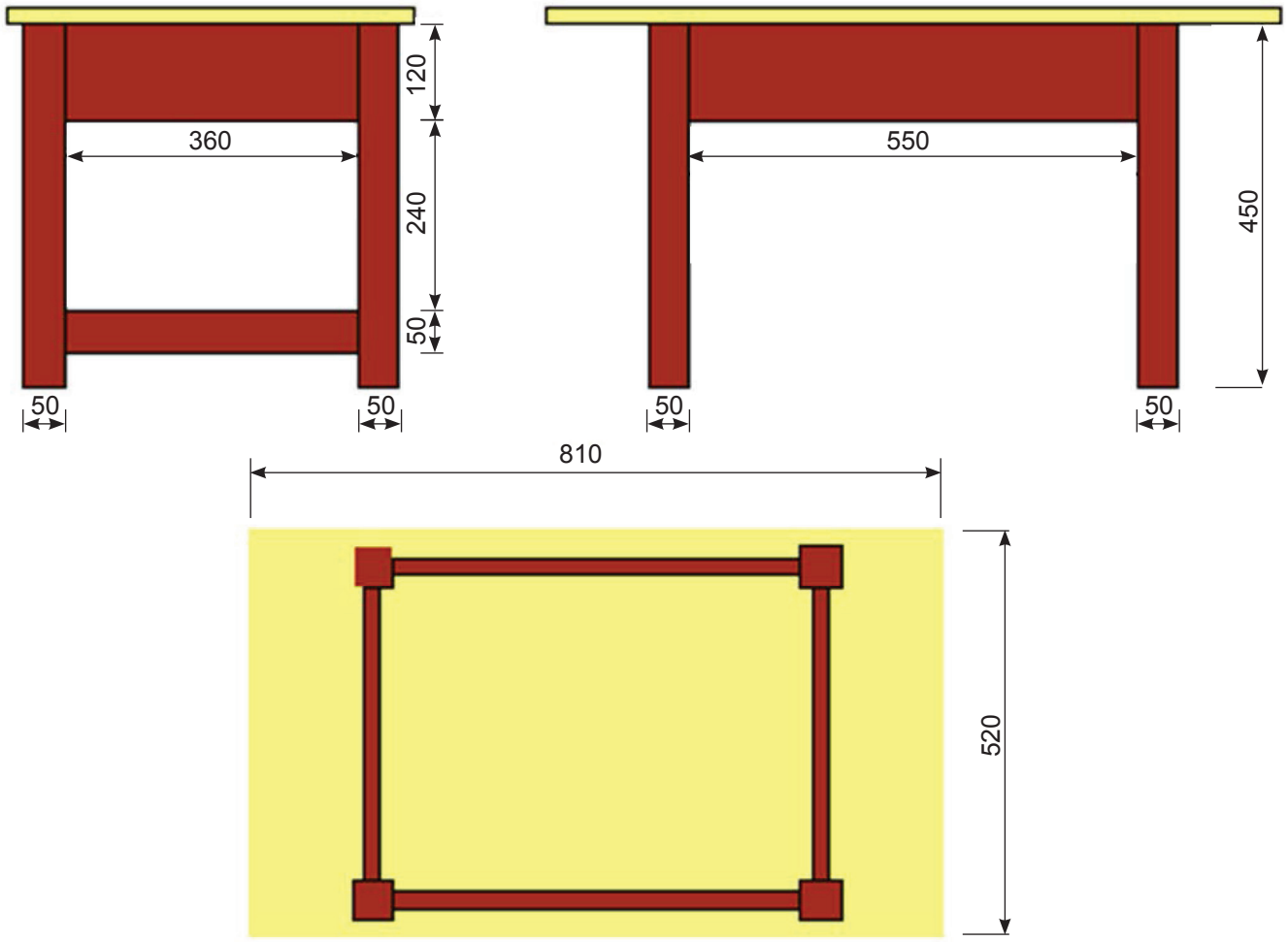


Fig. 2

The cost of the materials to be used in your table is shown below.

The cost of:

- 50 mm square section tulipwood timber is **£5.46** per linear metre.
- Top long rails 120 mm × 18 mm planed all round (PAR) tulipwood timber is **£4.59** per linear metre.
- Top short rails 120 mm × 18 mm planed all round (PAR) tulipwood timber is **£4.59** per linear metre.
- Bottom rails 50 mm × 18 mm planed all round (PAR) tulipwood timber is **£2.97** per linear metre.

Ash faced 18 mm thick MDF costs **£42** for a sheet measuring 2440 mm × 1220 mm. You will be able to cut 6 table tops from one sheet of MDF.

Mortice and Tenon joints are used to join the rails of the table to the legs.

Remember to allow 30 mm each end of the rails for cutting out the Tenon Joints.

Item	Part	Quantity	Description of material required	Length in mm	Width in mm	Thickness in mm	Total length required	Total cost	
1	Legs	4	Tulipwood	450	50	50	1.8 m		[1]
2	Long Top Rails	2	Tulipwood						[5]
3	Short Top Rails	2	Tulipwood						[5]
4	Short Bottom Rails	2	Tulipwood						[5]
5	Table Top	1	Ash Faced MDF				6 table tops from one sheet		[4]
							Total cost of glue, connection blocks, varnish etc.	£4.00	
							Total cost of table	£	[2]

Fig. 3

Complete the shaded boxes in the cutting list above.

Additional space is provided on the next page for calculations.

Examiner Only	
Marks	Remark

Use this area for calculations where necessary.

Examiner Only	
Marks	Remark

5 **(a)** List **six** of the main functions of the external hardwood door construction used in the house shown in the pre-release material.

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____ [6]

Building regulations require that the external walls of a domestic house are insulated.

(b) List **two** suitable insulation materials used for external walls.

1. _____

2. _____ [2]

(c) Discuss **one** benefit of insulating the external walls.

_____

_____

_____

_____ [2]

6 Evaluate the advantages and disadvantages of using renewable energies to heat the home shown in the pre-release material.

You should include, but not give a definition for, the following points in your answer:

Cost
Performance
Reliability

Quality of written communication will be assessed in your answer.

[10]

Examiner Only	
Marks	Remark

BLANK PAGE

(Questions continue overleaf)

Examiner Only	
Marks	Remark

7 **Fig. 4** shows a photograph of a solid brick wall one brick thick with no Damp Proof Course.

Fig. 4

Explain why this type of construction would not be considered suitable for the external wall of the house shown in the pre-release material if it were to be constructed to current Building Regulations.

As part of your answer you should consider:

Damp penetration
Energy conservation

Examiner Only

Marks	Remark

[10]

Examiner Only	
Marks	Remark

8 **Fig. 5** shows an incomplete foundation detail which is to be used for the house shown in the pre-release material.

(a) When completing your drawing add the following:

The cavity
Damp Proof Membrane
Sand and cement screed

[3]

Draw in hatch patterns to represent the following:

Hardcore
Foundation concrete
Sand and cement screed
Inner skin of block work
Outer skin of block work
Cavity insulation
Floor insulation

[7]

(b) Include labels from the list below:

Foundation concrete	Outer skin of block work
Inner skin of block work	Inner plaster with skim finish
Damp Proof Course (DPC)	Skirting board
Floor insulation	Hardcore
Cavity insulation	Subfloor concrete

[10]

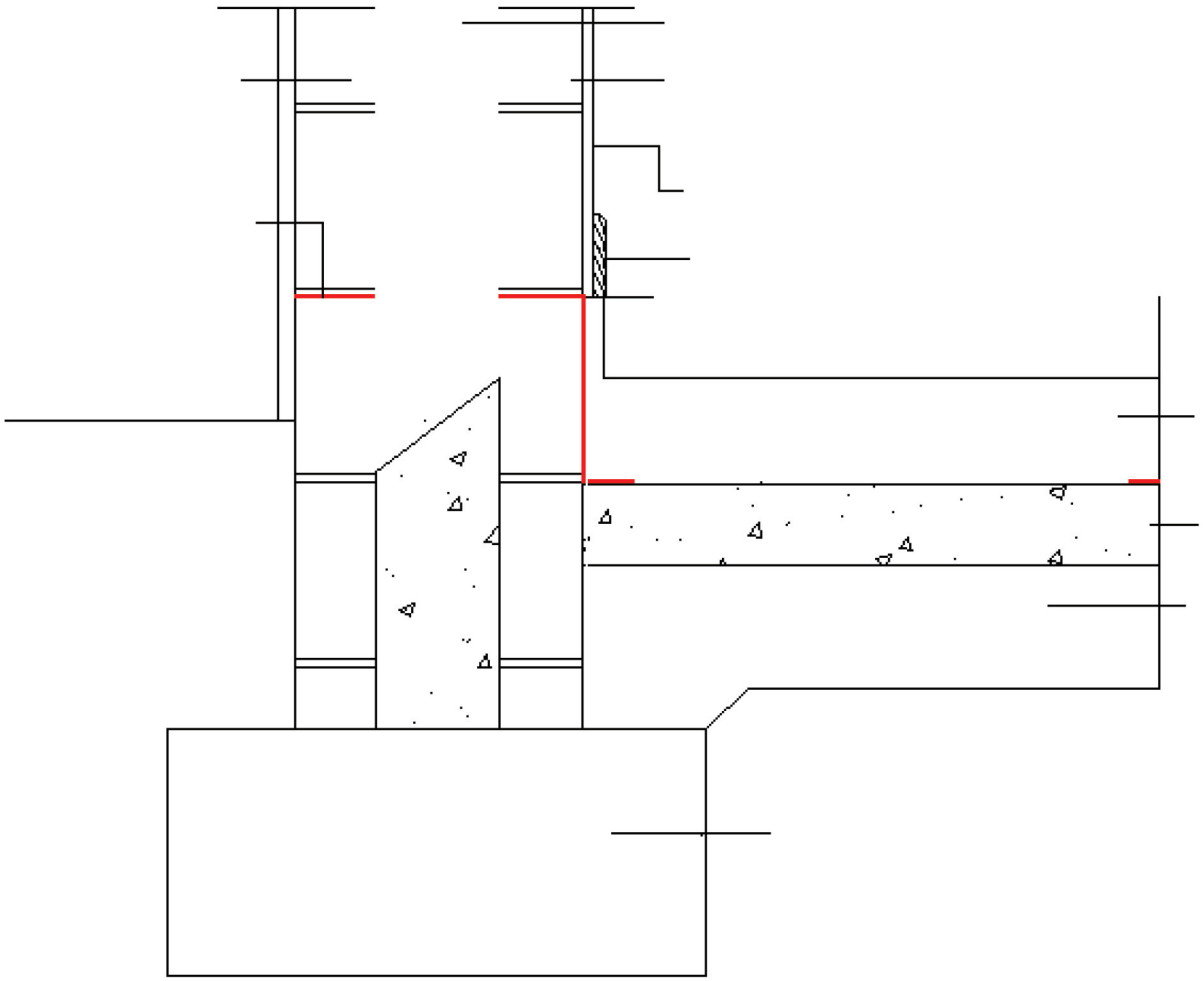


Fig. 5

(c) Analyse the foundation detail you have completed in **Fig. 5** and explain how energy performance has been improved when compared with a typical solid concrete floor which would have been used 100 years ago.

[4]

Examiner Only	
Marks	Remark

9 The construction industry has a large impact on society and the generation of wealth. This is particularly true for large scale construction projects like schools, sporting arenas and infrastructure projects.

Evaluate the impact of a new 20 million pound school under the following headings:

Construction as a stimulus for the economy.

Providing opportunities for training apprentices, the unemployed and student placement.

Long term benefits of a new school to the community.

Quality of written communication will be assessed in your answer.

[10]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

239618

New Specification

Rewarding Learning

General Certificate of Secondary Education
2019

Construction and the Built Environment

Unit 2

Sustainable Construction

[GCN21]
MONDAY 10 JUNE, AFTERNOON

INFORMATION FOR CANDIDATES

A copy of the pre-release information for this examination is included in the following pages.

You must use this clean copy of the Pre-release Material in the examination and not your own annotated copy.

Introduction

A copy of the pre-release material for this examination is included in this paper and five associated drawings.

The pre-release material contains drawings and specifications relating to a house which is to be constructed within a housing development. A range of different house types will be constructed within this development including detached, semi-detached and terrace housing.

An existing row of terrace houses is to be retained and refurbished. As part of the retrofit requirements, **the terrace houses require to have new hard wood windows fitted. The inner wall will be drylined to prevent the passage of damp and incorporate high specification 150 mm thick insulation**.

The developer is very keen to explore sustainable methods of generating energy.

Specification

Cavity wall construction

Outer leaf: 100 mm concrete block, 150 mm cavity fill insulation, held in position using stainless steel insulation retaining wall ties to BS 1243.
Inner leaf: 100 mm block work. Provide sand/cement plaster and carlite finish to inner face.
25 mm insulation to all jambs, between lintels and behind sill. D.P.C. in front of insulation in each case.

Solid floor construction

Seal all floors with two coats of penetrating liquid dust proofer, 100 mm fine aggregate screed, 150 mm high density floor insulation. Visqueen 1200 grade D.P.M., 100 mm concrete sub-floor, 150 mm consolidated hard-core.

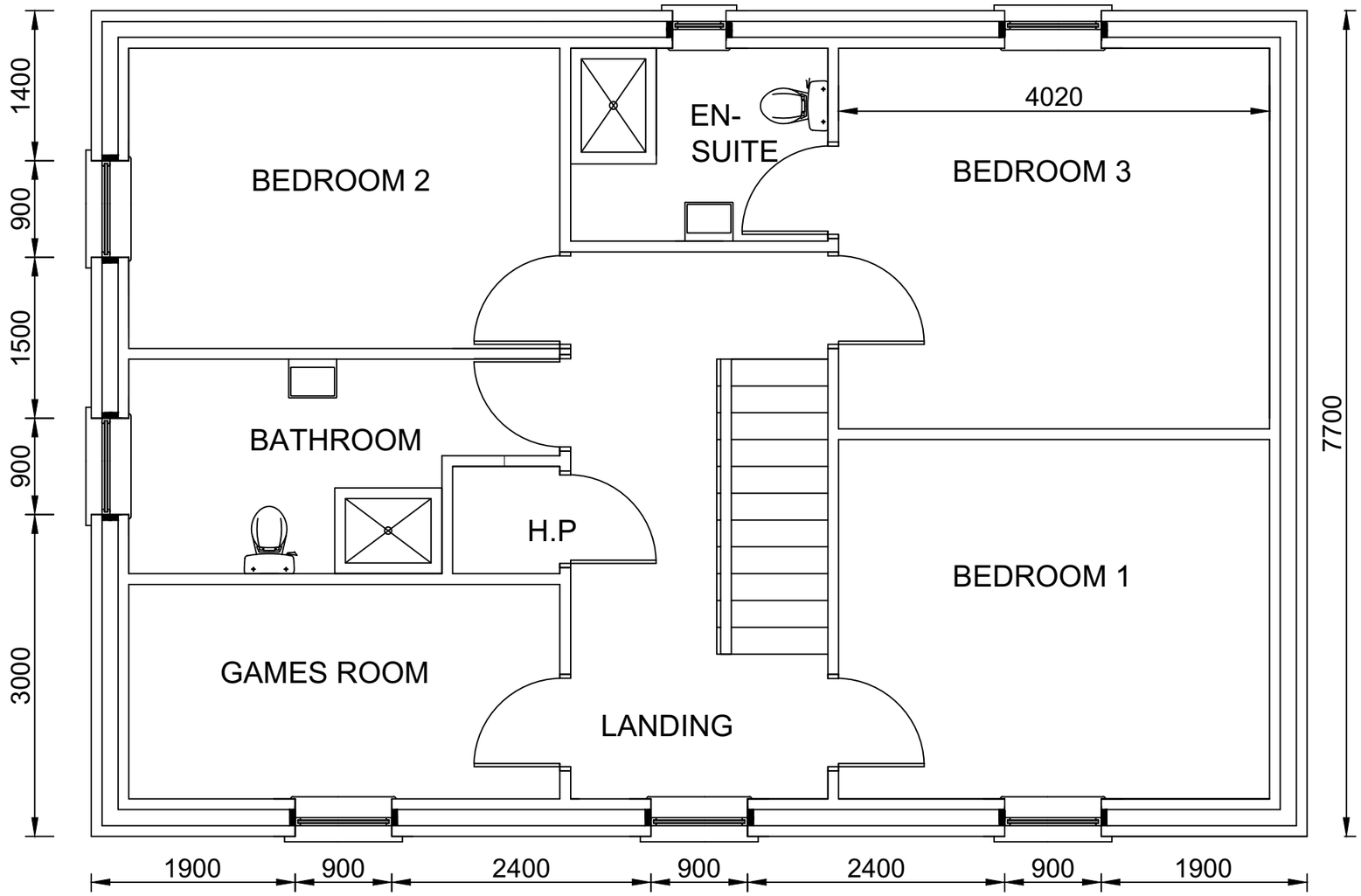
Damp proof course

Vertical D.P.C. to all window and external door jambs, horizontal D.P.C. behind and under sills and stepped lintels. Wall D.P.C. to external skin, layers at 150 mm minimum above finished ground levels.
D.P.C. to internal walls to overlap and be bonded to floor D.P.M. by a minimum of 215 mm.

Foundations

650 mm × 300 mm foundations to 350 mm walls.
450 mm × 300 mm foundations to 100 mm walls.
The above to be concrete strip foundations. The size and depth of foundations shown to be determined and agreed with Building Control when sub-soil bearing pressures are known.
Cavity fill to external walls to stop a minimum of 150 mm below D.P.C.

NOTE Students will require the use of a scale ruler and a calculator during the examination.



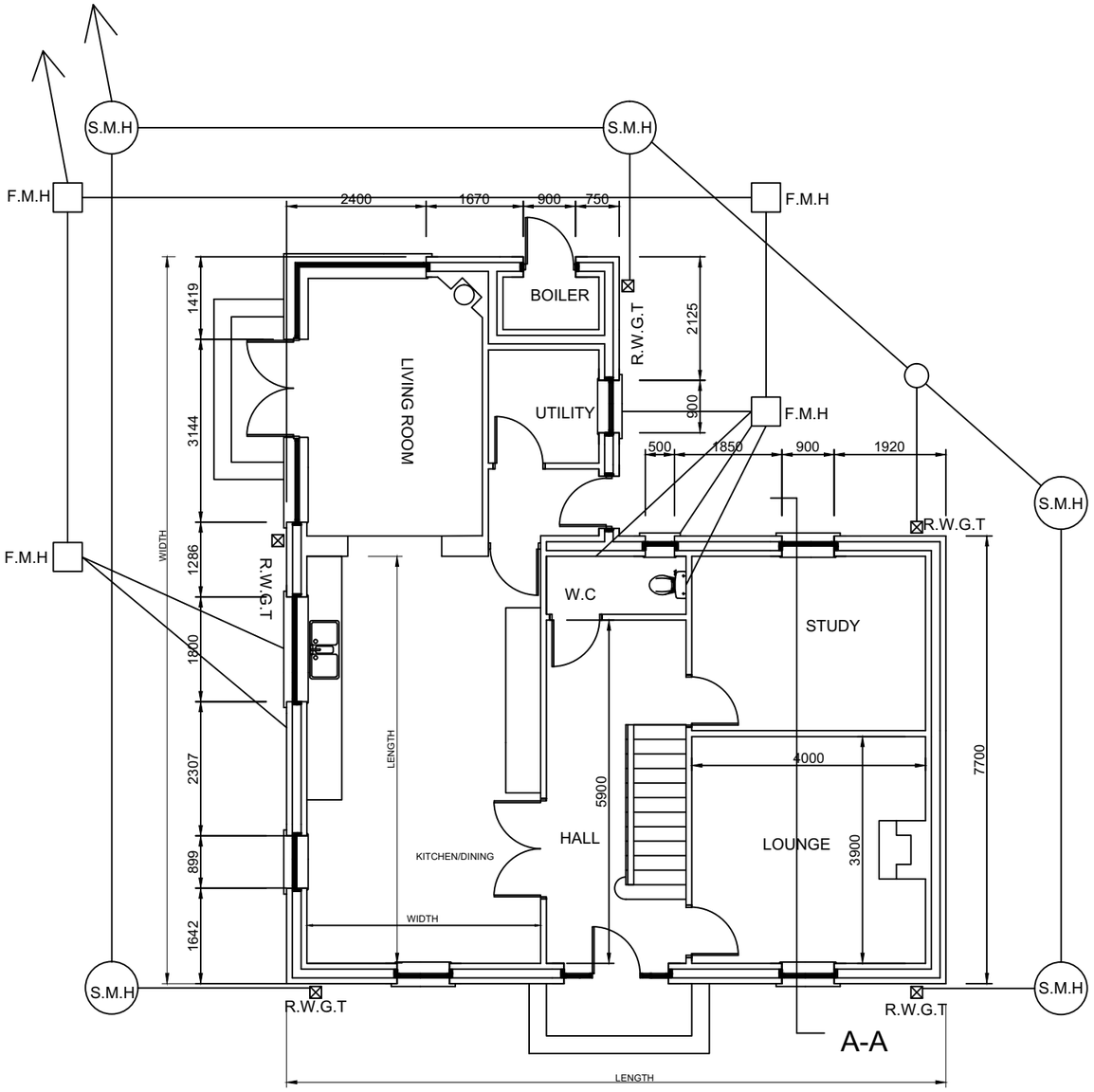
FIRST FLOOR PLAN

GCSE Construction and the Built Environment

Plan View Drawing No 1

Unit 2
Pre-release material
Summer 2019
SCALE: 1: 50

11961.03



GROUND FLOOR PLAN

GCSE Construction and the Built Environment

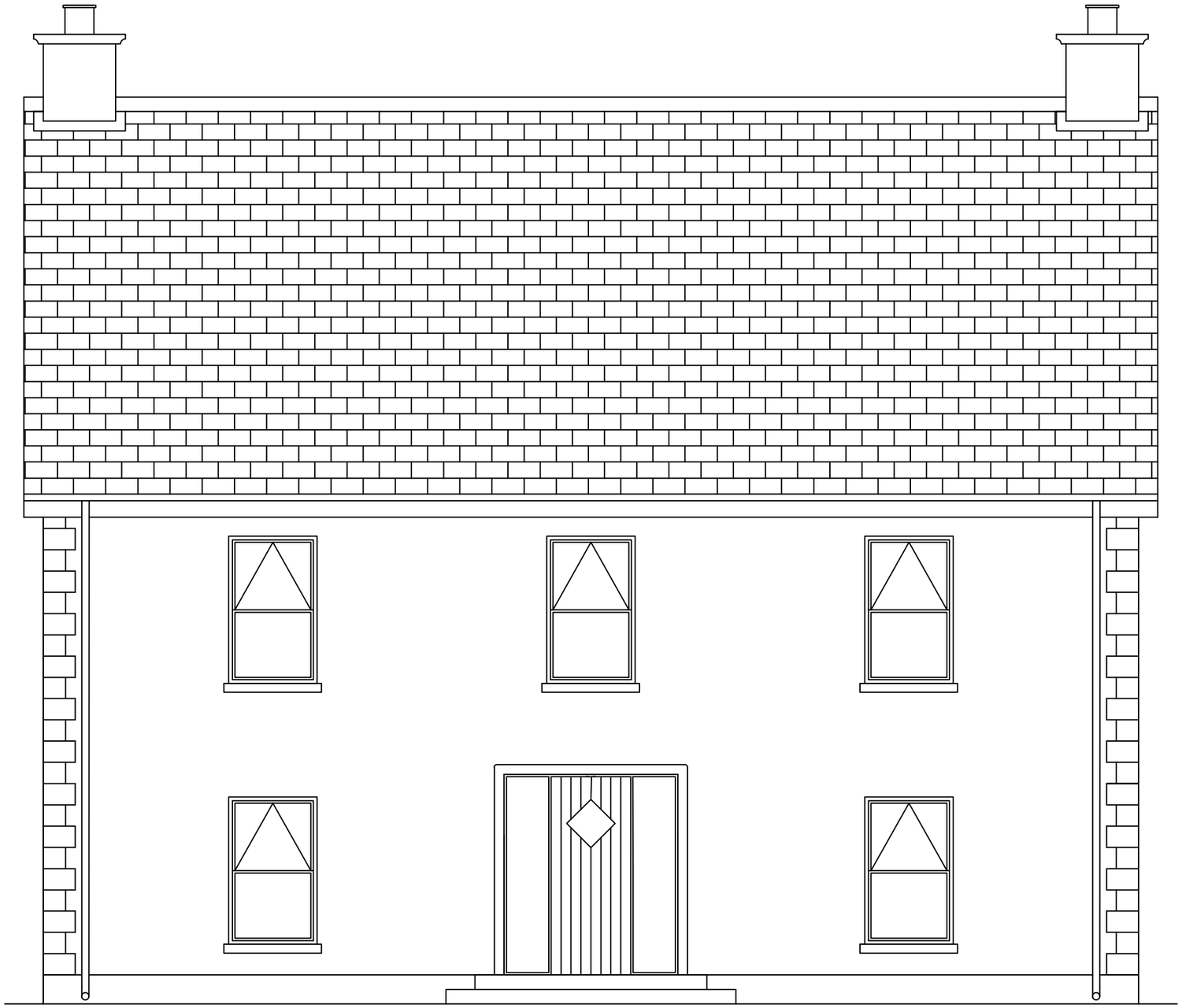
Plan View Drawing No 2

Unit 2

Pre-release material

Summer 2019

SCALE: 1: 100



GCSE Construction and the Built Environment

Front View Drawing No 3

Unit 2
Pre-release material
Summer 2019
SCALE: 1: 50

REAR ELEVATION

GCSE Construction and the Built Environment

Rear Elevation Drawing No 4

Unit 2
Pre-release material
Summer 2019
SCALE: 1: 50

SIDE ELEVATION

GCSE Construction and the Built Environment

Side Elevation Drawing No 5

Unit 2
Pre-release material
Summer 2019
SCALE: 1: 50