Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2015

Construction and the Built Environment

GCB11

Assessment Unit 1
The Construction Industry for the 21st Century

[GCB11]
THURSDAY 11 JUNE, MORNING

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 eleven** questions.
Questions 1, 2, 3, 8 and 9 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 **8** and **10**.

A scale ruler is required.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
Total Marks	

Section A

Answer **all** questions

Examiner Only	
Marks	Remark

Use the pre-release material house drawing and images to assist with answering questions 1, 2, 3, 8 and 9.

1 **(a)** List below the **external finishes** used on the outside of the walls shown in the pre-release material.

1. _____ [1]

2. _____ [1]

(b) List below **seven functions** of a cavity wall.

1. _____ [1]

2. _____ [1]

3. _____ [1]

4. _____ [1]

5. _____ [1]

6. _____ [1]

7. _____ [1]

(c) Bonding of brickwork is the arrangement of the bricks / blocks in a wall, column or pier which will give maximum overlap and no continuous vertical joints.

State **two reasons** why it is good practice to bond bricks in a wall.

1. _____

_____ [1]

2. _____

_____ [1]

Examiner Only	
Marks	Remark

2 **(a)** Identify **three** of the main roles that a Building Services Engineer would have in relation to the building shown in the pre-release material.

Building Services Engineer

1. _____

_____

2. _____

_____

3. _____

_____ [3]

(b) Identify **three** of the main roles that the following craft operatives would have for the project shown in the pre-release material.

Plumber

1. _____

_____

2. _____

_____

3. _____

_____ [3]

Electrician

1. _____

_____

2. _____

_____

3. _____

_____ [3]

Examiner Only	
Marks	Remark

3 **(a)** Using the attached pre-release material give the following internal room dimensions in millimetres.

Some dimensions may need to be scaled.

(i) The length and width of the living room.

Length _____ mm Width _____ mm [4]

(ii) The overall length of the dwelling.

Length _____ mm [2]

(iii) The length and width of bedroom 1.

Length _____ mm Width _____ mm [4]

(iv) What is the overall width of the external doors in the living room?

_____ mm [2]

(b) How many 1200 mm wide windows are in the ground floor of the dwelling?

_____ [2]

Examiner Only	
Marks	Remark

4 When lifting any small heavy object it is important to use the correct technique, which is known as the **kinetic handling technique**.

Fig. 1

Write out the following **3 steps in the correct order** for a person lifting a 20 kg box of ironmongery.

I. Position the load in its new location

II. Grip firmly using the whole hand and not just the finger tips, while keeping your back straight

III. Lift the load using your legs not your back

Step 1 _____

_____ [1]

Step 2 _____

_____ [1]

Step 3 _____

_____ [1]

5 **Fig. 2** shows a timber flat roof.

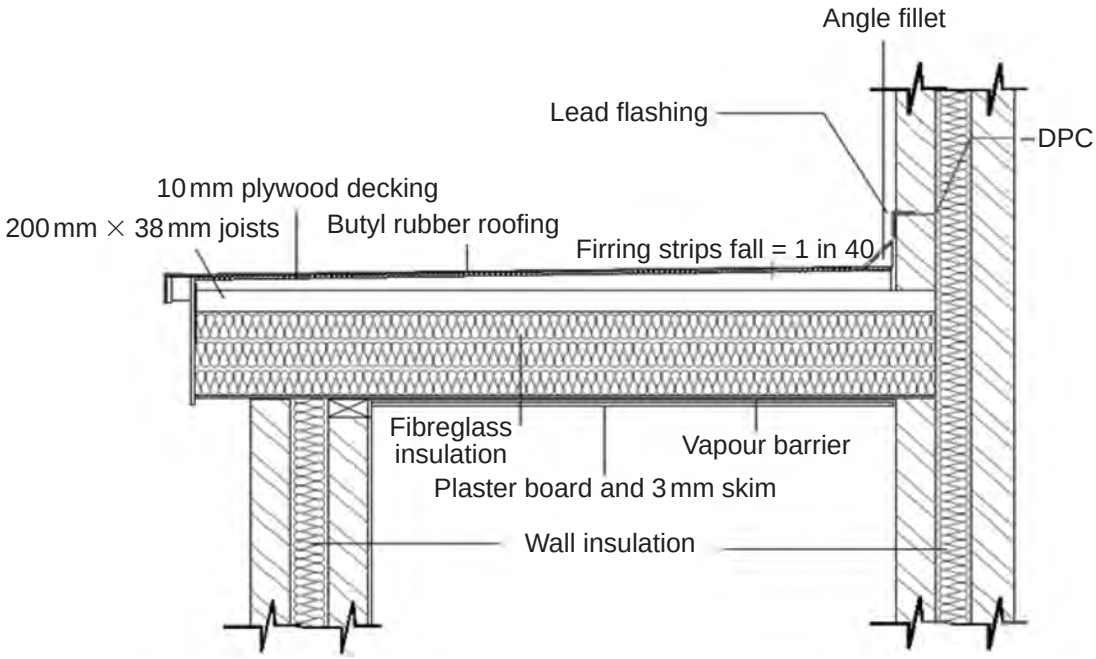

Fig. 2

State below the function of the following elements and the material from which the element in **Fig. 2** is made.

1. Roof joist _____

_____ [2]

2. Waterproof sheet _____

_____ [2]

3. Decking _____

_____ [2]

4. Firring pieces _____

_____ [2]

5. Flashing _____

_____ [2]

Examiner Only	
Marks	Remark

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(Questions continue overleaf)

Examiner Only	
Marks	Remark

6 **Fig. 3** shows the foundation plan for a rectangular framed structure.

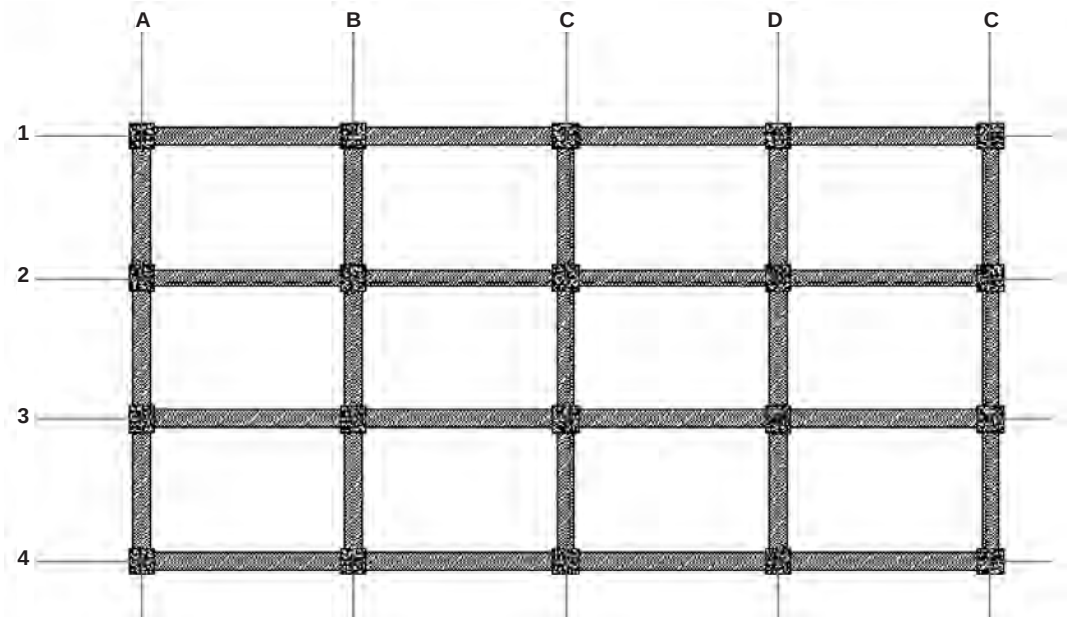


Fig. 3

(a) What are the **two** most common materials from which to make a rectangular framed structure?

1. _____ [1]

2. _____ [1]

(b) What is the correct name given to the horizontal members and vertical members used to construct a rectangular framed structure?

Horizontal members are called _____ [1]

Vertical members are called _____ [1]

(c) List **six** advantages of a steel rectangular framed structure.

1. _____

_____ [1]

2. _____

_____ [1]

Examiner Only	
Marks	Remark

3. _____

_____ [1]

4. _____

_____ [1]

5. _____

_____ [1]

6. _____

_____ [1]

(d) Complete the sketch in **Fig. 4** for the base detail for a rectangular framed structure.

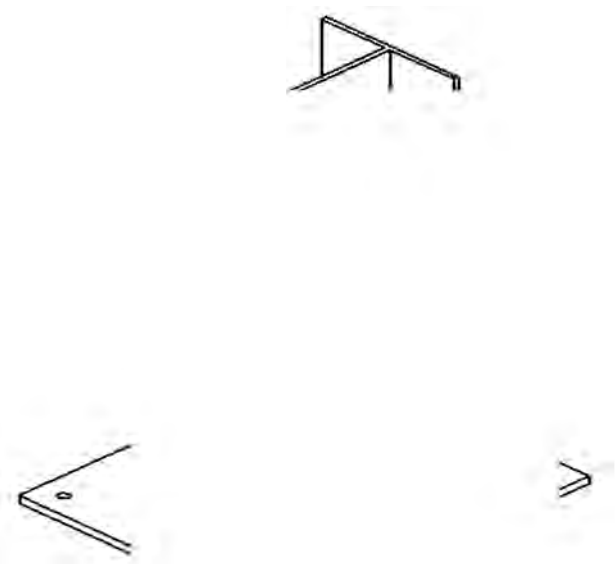


Fig. 4

[5]

(e) List the **two** most common methods used to join a steel framed structure.

1. _____ [1]

2. _____ [1]

Examiner Only	
Marks	Remark

7 **(a)** List **two** materials from which windows are commonly made.

1. _____ [1]

2. _____ [1]

(b) List **four** performance requirements of **a sliding sash** window.

1. _____ [1]

2. _____ [1]

3. _____ [1]

4. _____ [1]

Section B

Answer **all** questions

Examiner Only	
Marks	Remark

8 Sustainable development in the countryside is underpinned by the work of the Planning Service in NI.

Analyse the pre-release material and discuss why the architect in consultation with the client has encouraged **excavation to a reduced level** before commencing construction and has chosen the **specified finishes and location**. You should also consider the style of the dwelling.

[10]

Examiner Only	
Marks	Remark

9 **Fig. 5** below shows an incomplete detail of a foundation / floor / rear wall of the dwelling similar to the one shown in the pre-release material.

(a) Complete the drawing.

(b) Add the annotations from the list below.

You will need to insert some additional arrows.

Outer skin of block work	Cavity Insulation
Inner skin of block work	100 mm floor screed
100 mm floor insulation	D.P.M.
Existing Ground Level	D.P.C.
100 mm concrete subfloor	Hardcore
Wet dash	Internal Plaster

[10]

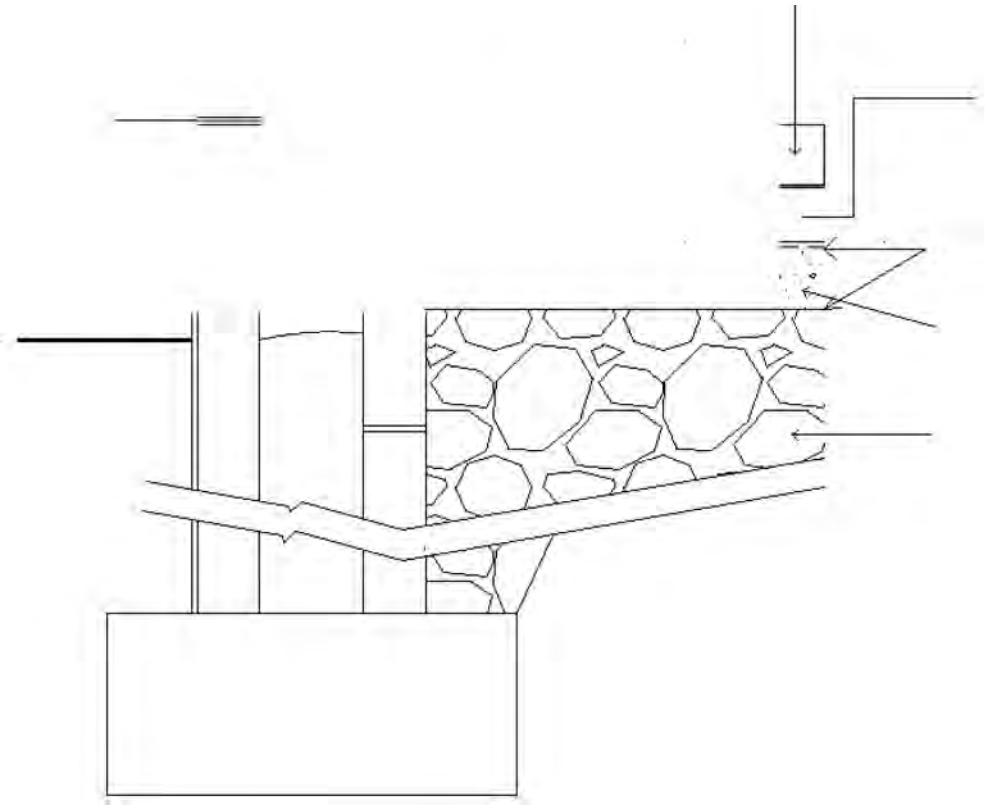


Fig. 5

[10]

10 In demonstrating a knowledge and understanding of the need to reduce the environmental impact when sourcing building materials**,** a useful indicator is **Embodied Energy.**

Embodied energy is the **SUM** of **ALL** the energy required throughout the lifecycle of a material.

Discuss the term “Embodied Energy” as it relates to copper, which is mined in Brazil, and used for pipes in a new hospital in Belfast. Discuss the full life span of the hospital in Belfast including demolition. The copper is manufactured into pipes in Brazil at a location which is in close proximity to the mining process.

[10]

Examiner Only	
Marks	Remark

11 **Fig. 6** shows a simple strip foundation excavated in boulder clay.

Examiner Only	
Marks	Remark

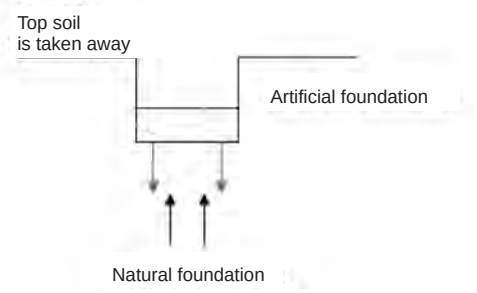


Fig. 6

(a) State why this type of foundation is called a **strip foundation**, and name the **material** from which it is normally made.

_____

_____

_____

_____

_____ [2]

(b) Define **Dead Loads** and give at least **one** example as it relates to a **multi storey hospital** building.

_____

_____

_____

_____

_____ [2]

(c) Define **Imposed Loads** and give at least **one** example of an imposed load when related to a **three storey library building**.

[2]

(d) Define **Bearing Capacity** in the substrata when related to **a steel framed factory building constructed on reclaimed land near the coast.**

[2]

(e) State what a **Profile Board** would be used for and give the name of the **material** from which it is normally made.

[2]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

Introduction

A copy of the Pre-Release Material is included in the following pages.

The Pre-Release Material contains an A3 drawing, photographs and specifications relating to a dwelling. Photographs 1–5 relate to the floor plan included (Drawing 1). This dwelling has been constructed close to a scenic mountain range on the edge of a small village.

Photograph 1

The landowner is a private client who has employed the following people to oversee the design of his development:

Architect
Building Services Engineer
Quantity Surveyor
Contractor

The Contractor will employ the following team:

Site Engineer/Manager
Plasterers
Joiners
Electricians
Plumbers

Your client has strict planning guidelines with which he must comply, including a maximum ridge height, and external wall finishes.

Specification

Cavity Wall construction

Outer leaf: 100 mm concrete block, 150 mm cavity, 150 mm insulation held in position using stainless steel insulation retaining wall ties to BS 1243.
Inner leaf: 100 mm concrete block work. Provide sand/cement plaster and carlite finish to inner face. Wall ties to be spaced at 750 mm horizontally, 450 mm vertically and un-bonded jambs ties to be spaced 300 mm vertically. 25 mm insulation to all jambs, between lintels and behind sill. D.P.C. in front of insulation in each case.

External Finishes walls

The front elevation is to be faced with a 200 mm skin of natural stone sourced from the local area, in keeping with surrounding rock types.

Remaining external walls to be wet dash, painted white.

External finishes roofs

Natural slate in standard sizes.
Dark brown plastic fascia board.
Dark brown 100 mm half round gutter.

Photograph 2

Window

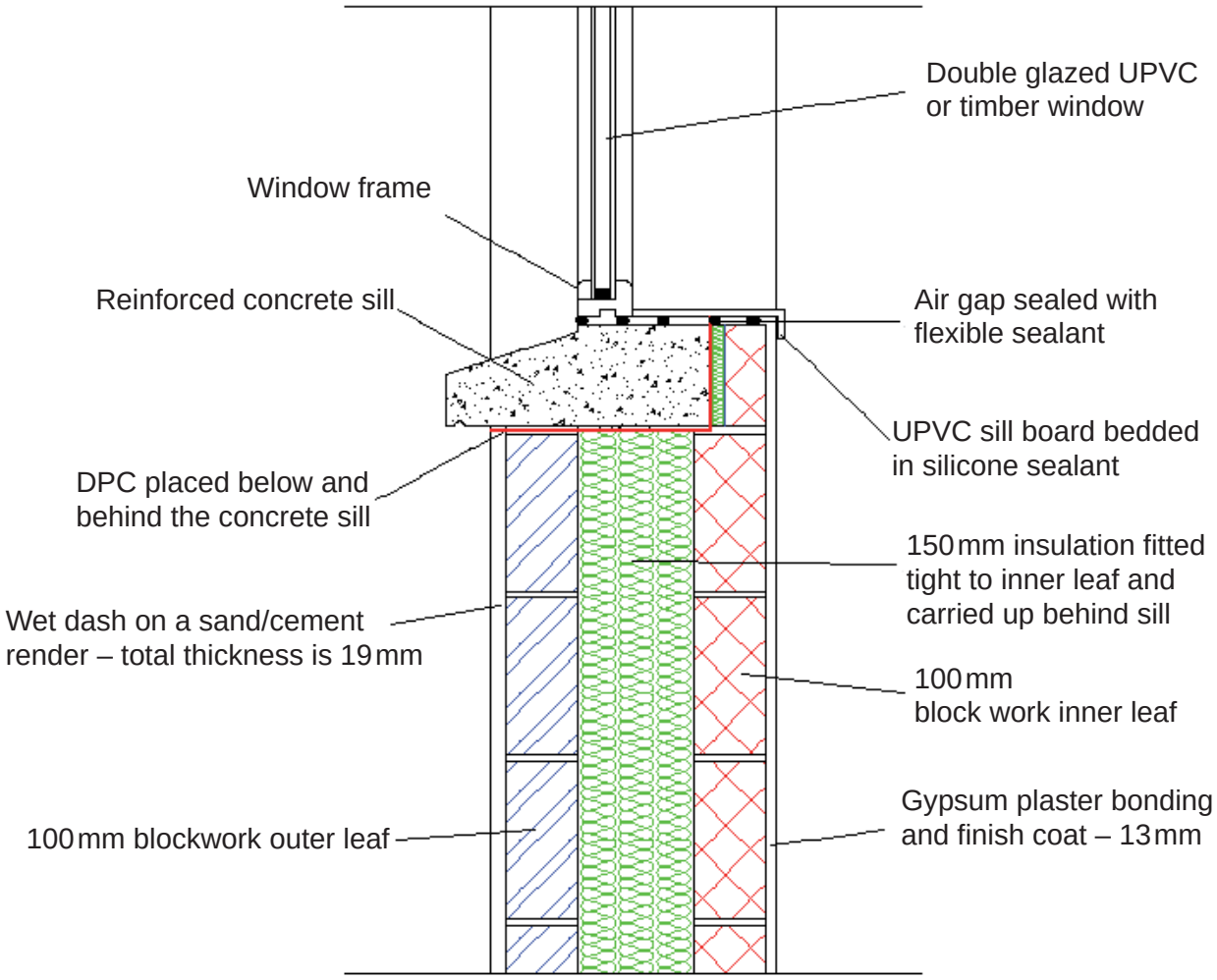
Dark brown plastic windows.
Dormer window structure sheeted with white plastic cladding.

Photograph 3

Solid floor construction

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

Sill Detail for Living Room window A



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

Foundations
600 mm x 300 mm foundations to 300 mm walls.
450 mm x 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.

Photograph of a window as constructed on site for the external elevation

Photograph 4

Photograph of Window B as constructed on site for the internal elevation

Photograph 5

Photograph 6

Dry stone wall used to construct the boundary fence around the garden.

Excavation to reduce levels in preparation for construction of the dwelling.

Photograph 7

Rewarding Learning

General Certificate of Secondary Education

Construction and the Built Environment

Pre-Release Material

Examination Copy

Assessment Unit 1: The Construction Industry for the 21st Century

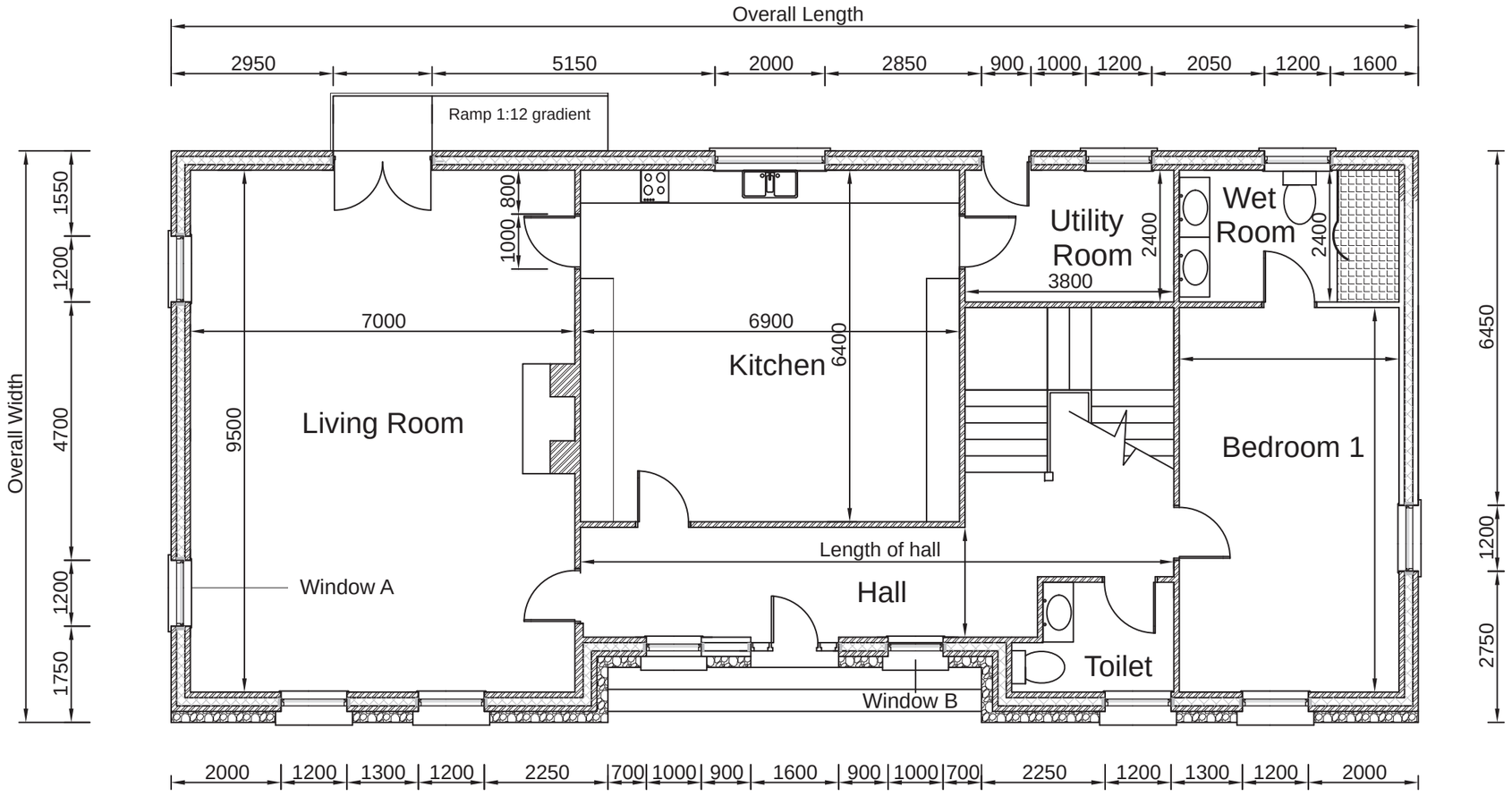
[GCB11]

JANUARY 2015 AND SUMMER 2015

GCB11

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

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



GCSE Construction and the Built Environment

Plan View Drawing No 1

Unit 1
Pre-Release Material
January 2015 - Summer 2015
SCALE: 1: 100