

SQA/SNIJIB



Training and Assessment Programme for SVQ 3 SVQ level 3 Domestic Plumbing and Heating

Section Above and Below Ground Drainage

H98F 04 Install and test domestic plumbing and heating systems

H98G 04 Service and maintain domestic plumbing and heating systems

H98H 04 Inspect and pre-commission domestic plumbing and heating systems

H98J 04 Commission domestic plumbing and heating systems

H98K 04 Decommission domestic plumbing and heating systems

Stage 1

Syllabus Document D1.1–D1.4

Stage 1 (Part 2)

Syllabus Document D2.1–D2.3

Learning and delivery guidance

This Unit covers all aspects of above-ground drainage installation: from initial theory input to practical installations. Delivering this Unit to a group of learners will involve many teaching and learning techniques and approaches.

It is recommended that teaching and learning take place in an environment where learners experience simulated full-scale working above-ground drainage systems. The use of modern teaching and learning aids, eg 'smart' boards, and proprietary interactive teaching materials would also greatly enhance the learning experience.

The syllabus document is set out in a manner to allow the lecturer to determine the areas of work to be covered within a certain time frame. It is envisaged that this Unit will be offered over the first year of 'off the job' training. It is presented in two syllabus sections. Both sections conclude with a summative assessment.

The programme structure (see Guidance for Assessors outlines the progress of the Unit and its integration with the other Units of the qualification.

Assessment

A holistic approach has been adopted for the formative and summative aspects of the practical installation part of this Unit. This is in conjunction with:

- H98F 04 Install and Test Domestic Plumbing and Heating Systems
- H98G 04 Service and Maintain Domestic Plumbing and Heating Systems
- H98H 04 Inspect and Pre-commission Domestic Plumbing and Heating Systems
- H98J 04 Commission Domestic Plumbing and Heating Systems
- H98K 04 Decommission Domestic Plumbing and Heating Systems

Assessments other than practical assessments will be undertaken using the SOLAR e-assessment method. This process is completed entirely online and randomly selects the assessment questions from a bank of questions which cover the Unit content. In this Unit there are two assessments in the first year. (Refer to programme structure in Guidance for Assessors.

Assignment

This Unit has an assignment which is a summative assessment. Learners should be introduced to the assignment as part of the induction to the Unit — to give direction and motivate learning. It should be completed by the second assessment diet.

Syllabus

D 1.1 Systems of drainage for domestic premises. Regulations and normative documents applying to both above- and below-ground drainage systems.

Assessment method: SOLAR e-assessment and assignment

- ◆ The Building Standards (Scotland) Regulations parts pertaining to below- and above-ground sanitary pipework
- ◆ British Standards, BS ENs relevant for both below- and above-ground drainage
- ◆ Separate systems of below-ground drainage for domestic premises
- ◆ Combined systems of below-ground drainage for domestic premises

D1.2 Systems of above-ground drainage and rainwater pipework for domestic premises

Assessment method: SOLAR e-assessment

Above-ground systems to include:

- ◆ Primary vented stack*
- ◆ Ventilated discharge branch system*
- ◆ Ventilated discharge and secondary stack system*
- ◆ Stub stack system for domestic buildings
- ◆ Sizes and limitations of unventilated discharge branches
- ◆ Reason for trap seals; reasons for loss of trap seal
- ◆ Structural requirements when passing drain pipes through walls and floors
- ◆ Secure drainage pipework to the structure

Rainwater installations to include:

- ◆ Types of gutter and rainwater pipe
- ◆ Position of rainwater outlets on roofs
- ◆ Eaves gutters
- ◆ Secure gutters, down-pipes to structure

*indicates definitions from current legislation and Approved Codes of Practice

D1.3 Select methods of jointing above-ground drainage pipework to above and below ground domestic drainage systems

Assessment method: SOLAR e-assessment

Select methods of jointing to include: above-ground drainage pipework to above-ground drainage pipework; above ground-drainage to below-ground drainage.

Select compatible components — rigid and/or flexible jointing of pipes and branches of similar and dissimilar materials in the following range: cast iron; copper; plastics (UPVC, MUPVC)

Jointing methods to comply with Building Standards (Scotland) Regulations, British Standards BS ENs, and manufacturers' instructions.

D1.4 Describe appropriate methods of testing sanitary pipework

Assessment method: SOLAR e-assessment

Methods of soundness testing as set out in current Building Standards (Scotland) Regulations.

Methods of performance testing as set out in current Building Standards (Scotland) Regulations.

D2.1 Materials, components, sanitary appliances

Assessment method: SOLAR e-assessment

Identification of materials; manufacture and methods of fixing: sinks, baths, shower trays, water closets, wash basins, bidets, macerators, waste disposal units, urinals (slab and bowl).

Operating principles, automatic flushing cisterns, (flush control) flushing valve types for WC macerators, waste disposal units.

Accessible toilets and bathroom accommodation.

D2.2 Appreciation of rainwater harvesting and grey water recycling

Assessment method: SOLAR e-assessment

- ◆ Why rain water harvesting contributes to sustainable urban drainage and reduced carbon footprint
- ◆ Identify pipes that are not carrying wholesome water
- ◆ Harvested rainwater uses
- ◆ Grey water recycling: appliances that grey water may be collected from; appliances that grey water may be used for
- ◆ Why grey water recycling contributes to sustainable urban drainage and reduced carbon footprint
- ◆ Recycled grey water: limitations of use; methods of storing, treating and distribution

D2.3 Design of rainwater and above-ground drainage

Assessment method: Assignment

- ◆ Types of above-ground drainage system
- ◆ The dimensions and angles of pipework
- ◆ Provision for access
- ◆ Pipework diameters
- ◆ Provision for pipe clips
- ◆ Provision of cleaning access
- ◆ Rain water outlets
- ◆ Calculate number and size of rain water pipes

Assignment

Information for assessors

D1.1 Systems of drainage for domestic premises. Regulations and normative documents applying to both above- and below-ground drainage systems

Learners will be required to complete layout drawings for below ground drainage systems, combined and separate.

D2.3 Design of rainwater and above-ground drainage for a six storey block of flats

Learners will be required to complete a layout drawing and work out pipe sizes for sanitary and rainwater pipework.

Performance Criteria:

- (a) The type of above and below ground drainage systems system drawn is correct
- (b) The dimensions and angles of pipework are correct
- (c) Provision for access is correct
- (d) The pipework diameters selected are correct
- (e) The provision for pipe clips is correct
- (f) The provision of cleaning access is correct
- (g) The selected rain water outlets are of the correct type
- (h) The number and size of rain water pipes calculated are correct

The above should be correct in accordance with the current Building Standards (Scotland) Regulations, and current legislation and Approved Practices. The drawings should be single line rule-assisted drawings.

D1.1 — The learner is required to complete drawing numbers Drawing 1, 2 in accordance with the above Performance Criteria.

D2.3 — The learner is required to complete drawing numbers DWG 1, 2 and 3 in accordance with the above Performance Criteria.

Information for learners

D 1.1 Systems of drainage for domestic premises. Regulations and normative documents applying to both above- and below-ground drainage systems.

You are required to produce pipework layout drawings Assignment 1 and 2 for combined and separate below drainage systems.

D2.3 Design of rainwater and above-ground drainage for a six storey block of flats

Brief

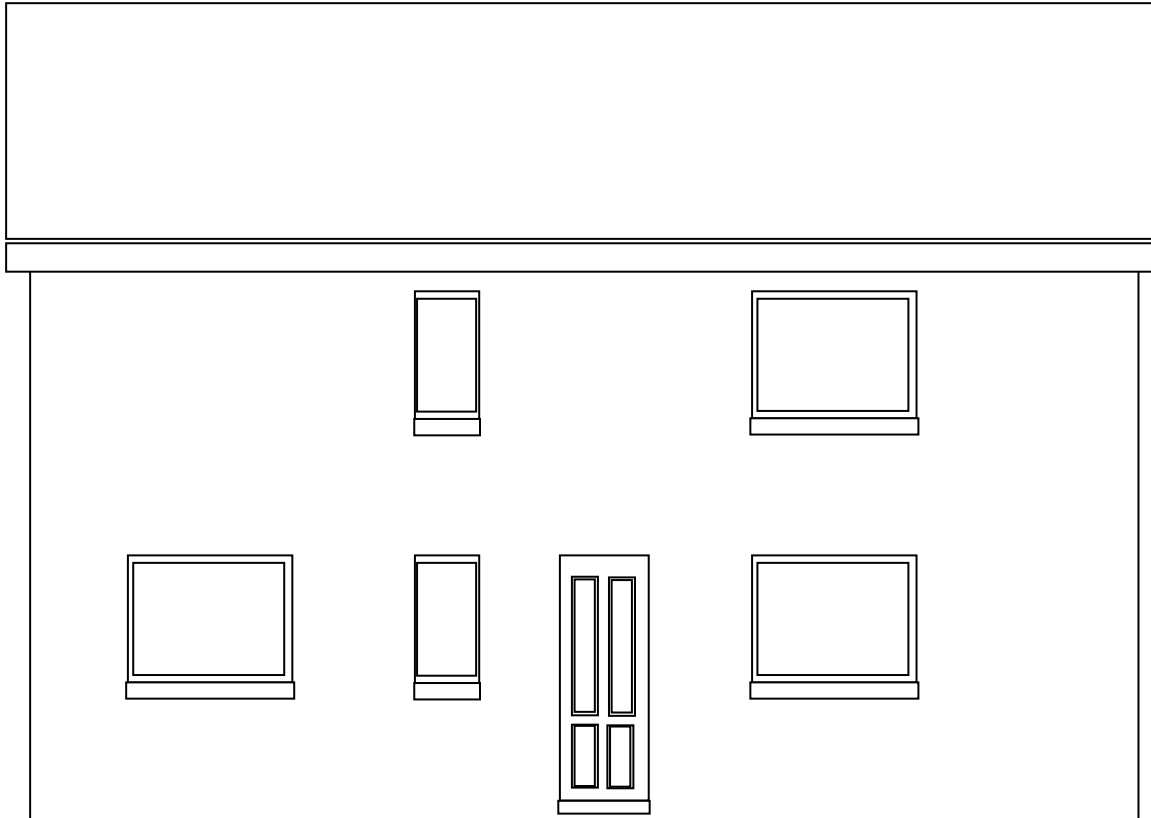
You are required to complete the pipework layout for drawings DWG 1, 2 and 3. In each case you must work out pipe sizes for sanitary and rainwater pipework

The drawings should be single line rule-assisted drawings.

Your layout drawings should comply with current legislation and Approved Codes of Practice Building Standards (Scotland) Regulations, and British Standards.

D 1.1 Systems of drainage for domestic premises. Regulations and normative documents applying to both above- and below-ground drainage systems.

Assignment



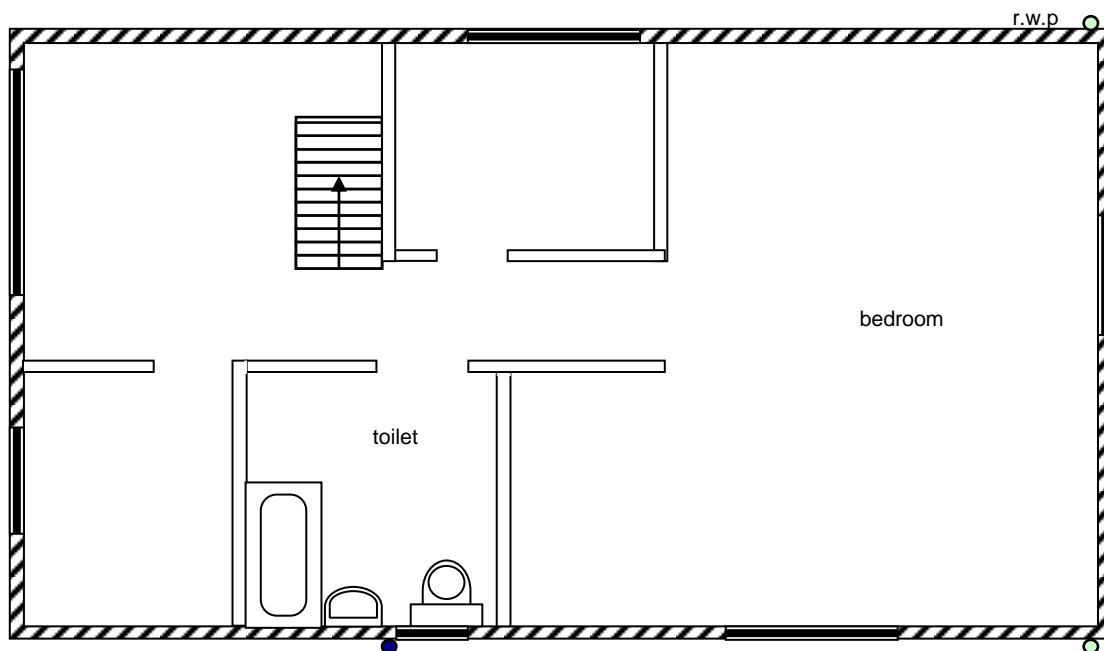
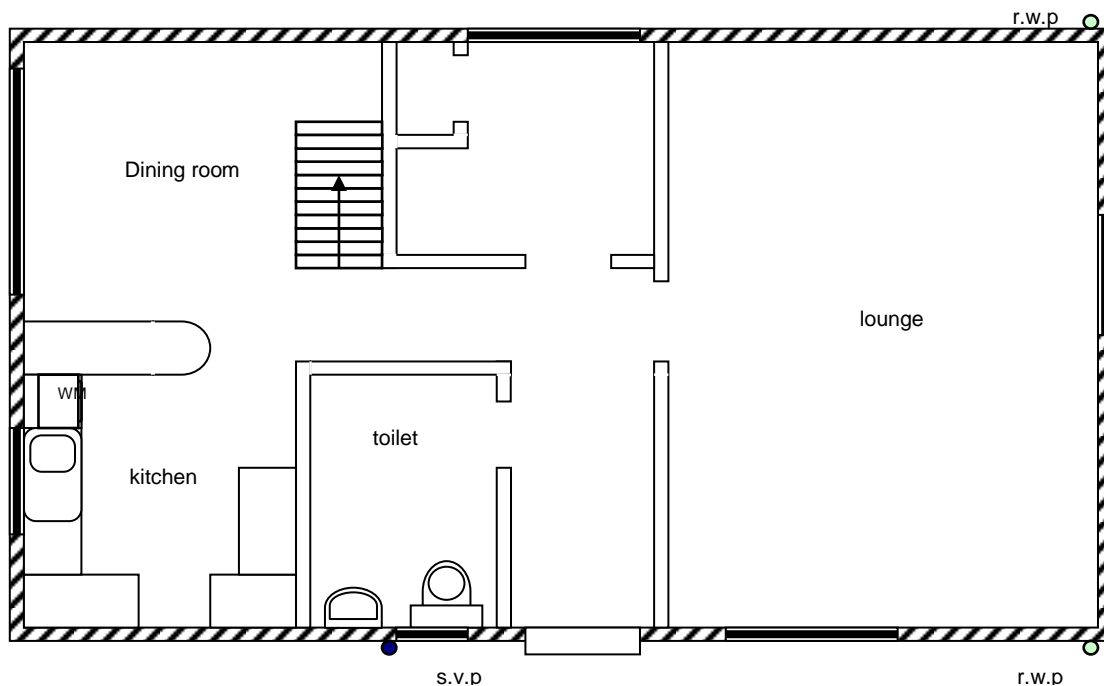
Assignment (Drawings can be increased to A3 size)

Drawing No 1 (combined system of drainage) and Drawing No2 (separate system of drainage) produce a rule assisted sketch which is correct in terms of:

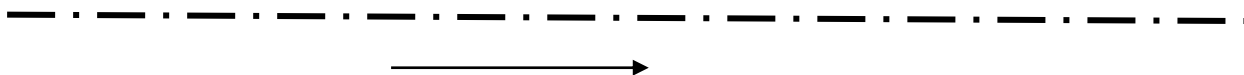
- (a) Neat, legible, and labelled with the use of current BS symbols
- (b) Most economical route
- (c) Provision for access in the event of blockages
- (d) Provision for ventilation

Assignment Drawing No1 — Combined System of Drainage

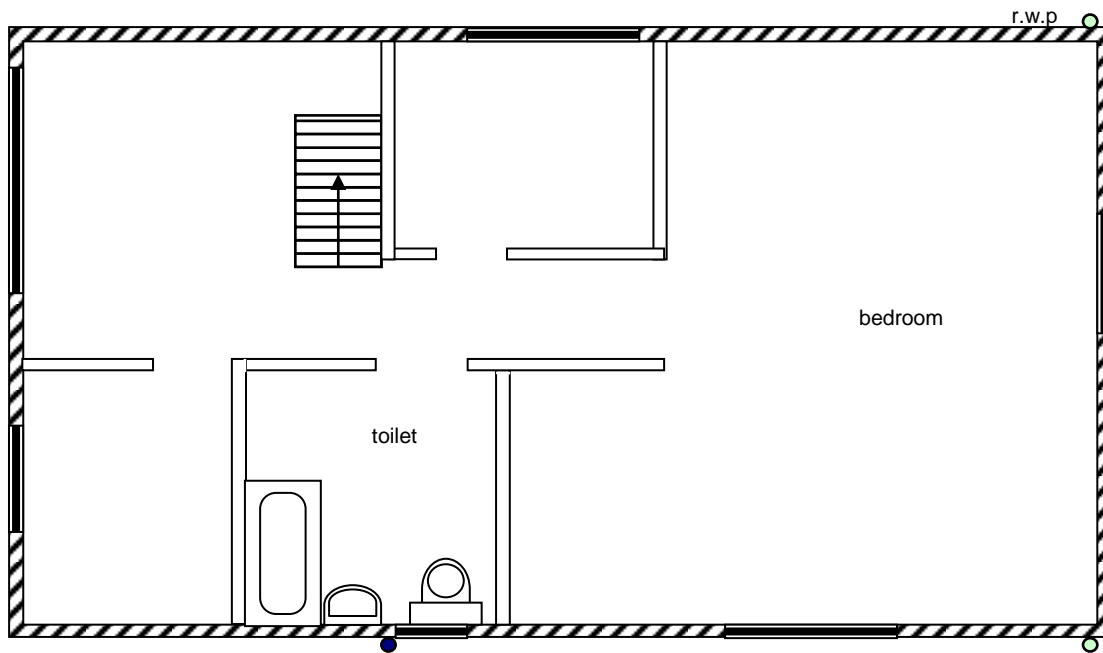
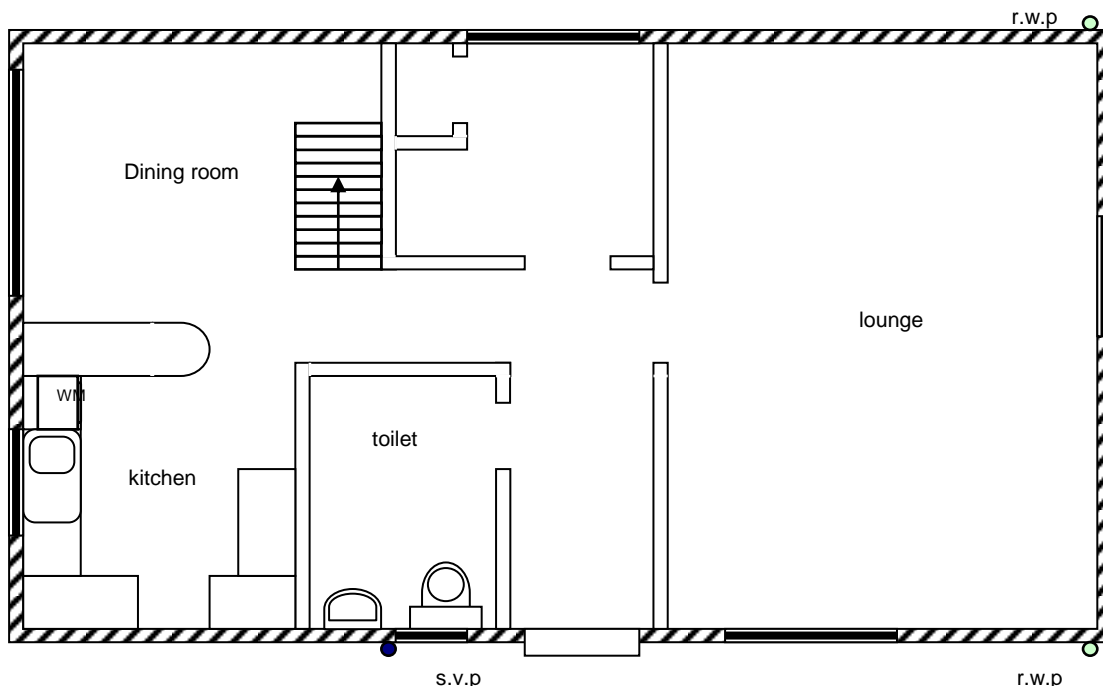
Standard answer to be produced by centres as there can be many variations in the drainage layouts.



Main Foul Sewer

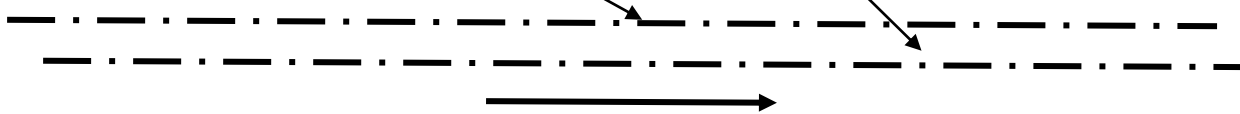


Assignment Drawing No 2 — Separate System of Drainage



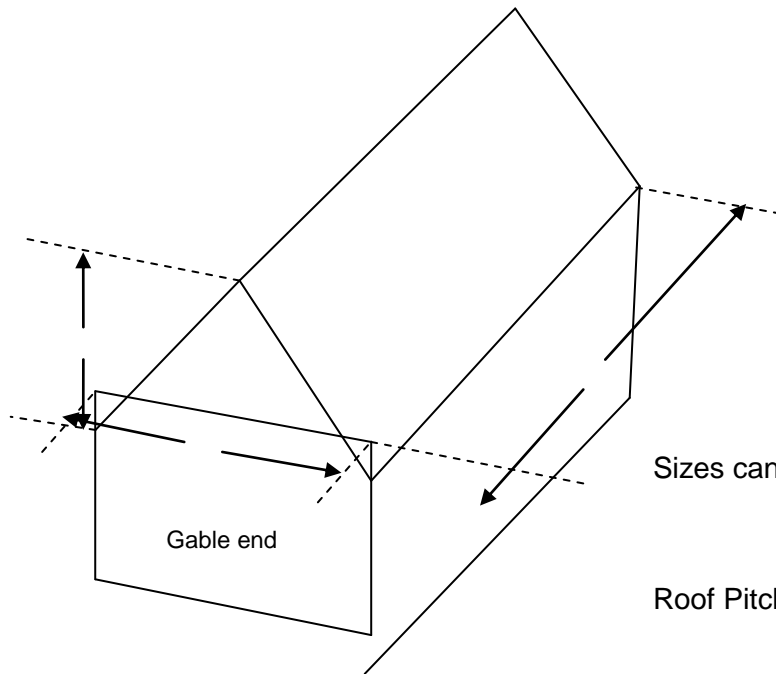
Main Foul Sewer

Rainwater Sewer



Assignment No 1 D2.3 Design of rainwater and above-ground drainage for a six storey block of flats

Rain water section

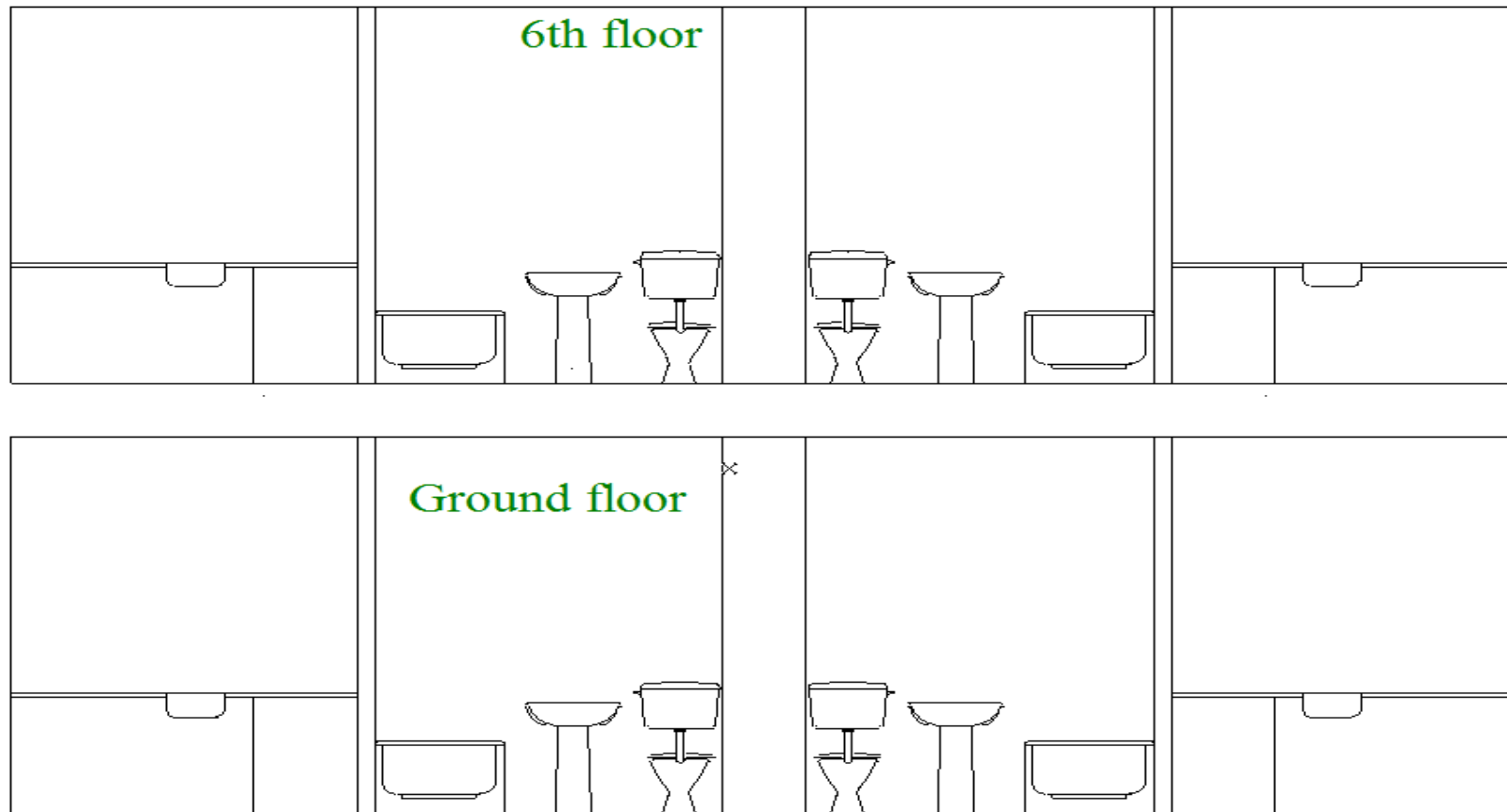


- a) Calculate the effective roof area to be drained
- b) Decide on correct gutter sizing/downpipes using manufacturers instructions
- c) Calculate the effective roof area with the use of electronic/online methods
- d) Decide on downpipe diameters, positions and how many for the design
- e) Select and specify the correct materials for the completed installation

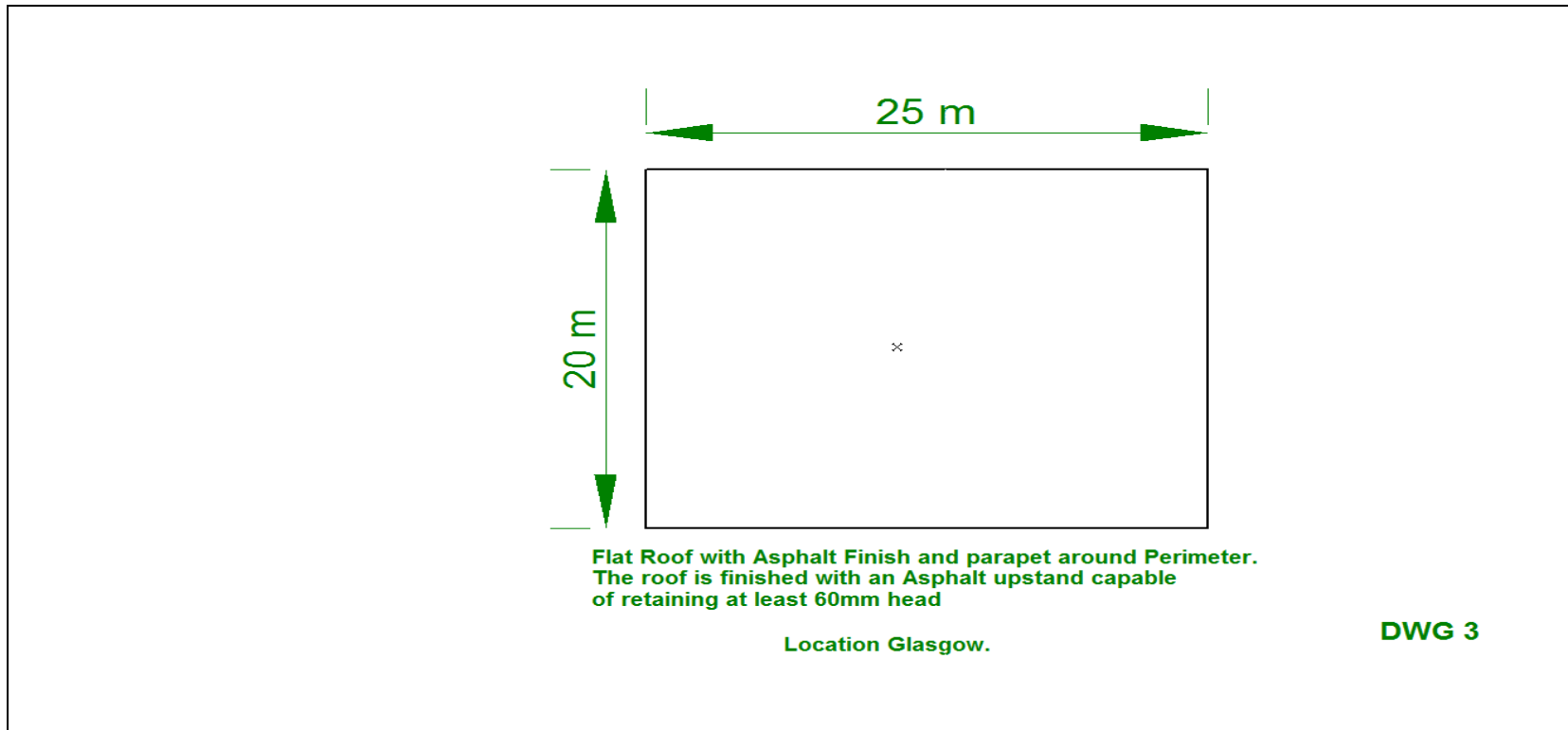
Sizes can be entered on the drawing to allow variation In the assignment.

Roof Pitch can be between 10°–50°

Centres to produce standard answers



DWG 2



Marking schedule and learner feedback

D2.3 Design of rainwater and above-ground drainage for a six storey block of flats

Name:	Class:	Date:
Result:	Assessor:	Date:

Marking schedule	1st	2nd
(a) The type of above-ground system drawn complies with the Building Standards (Scotland) Regulations and current legislation and Approved Codes of Practice.		
(b) The dimensions and angles of pipework comply with the Building Standards (Scotland) Regulations and current legislation and Approved Codes of Practice.		
(c) Provision for access complies with the Building Standards (Scotland) Regulations and current legislation and Approved Codes of Practice.		
(d) The pipework diameters selected comply with the Building Standards (Scotland) Regulations and Current Legislation and Approved Codes of Practice.		
(e) The provision for pipe clips complies with the Building Standards (Scotland) Regulations and current legislation and Approved Codes of Practice.		
(f) The provision of cleaning access complies with the Building Standards (Scotland) Regulations and current legislation and Approved Codes of Practice.		
(g) The selected rain water outlets comply with the Building Standards (Scotland) Regulations and current legislation and Approved Codes of Practice.		
(h) The number and sizes of rain water pipes calculated comply with the Building Standards (Scotland) Regulations and current legislation and Approved Codes of Practice.		
Learner feedback		
Learner's response		

Learner's signature

Note to assessor: Learner feedback should relate to the marking schedule

D1.1 Systems of drainage for domestic premises. Regulations and normative documents applying to both above- and below-ground drainage systems.

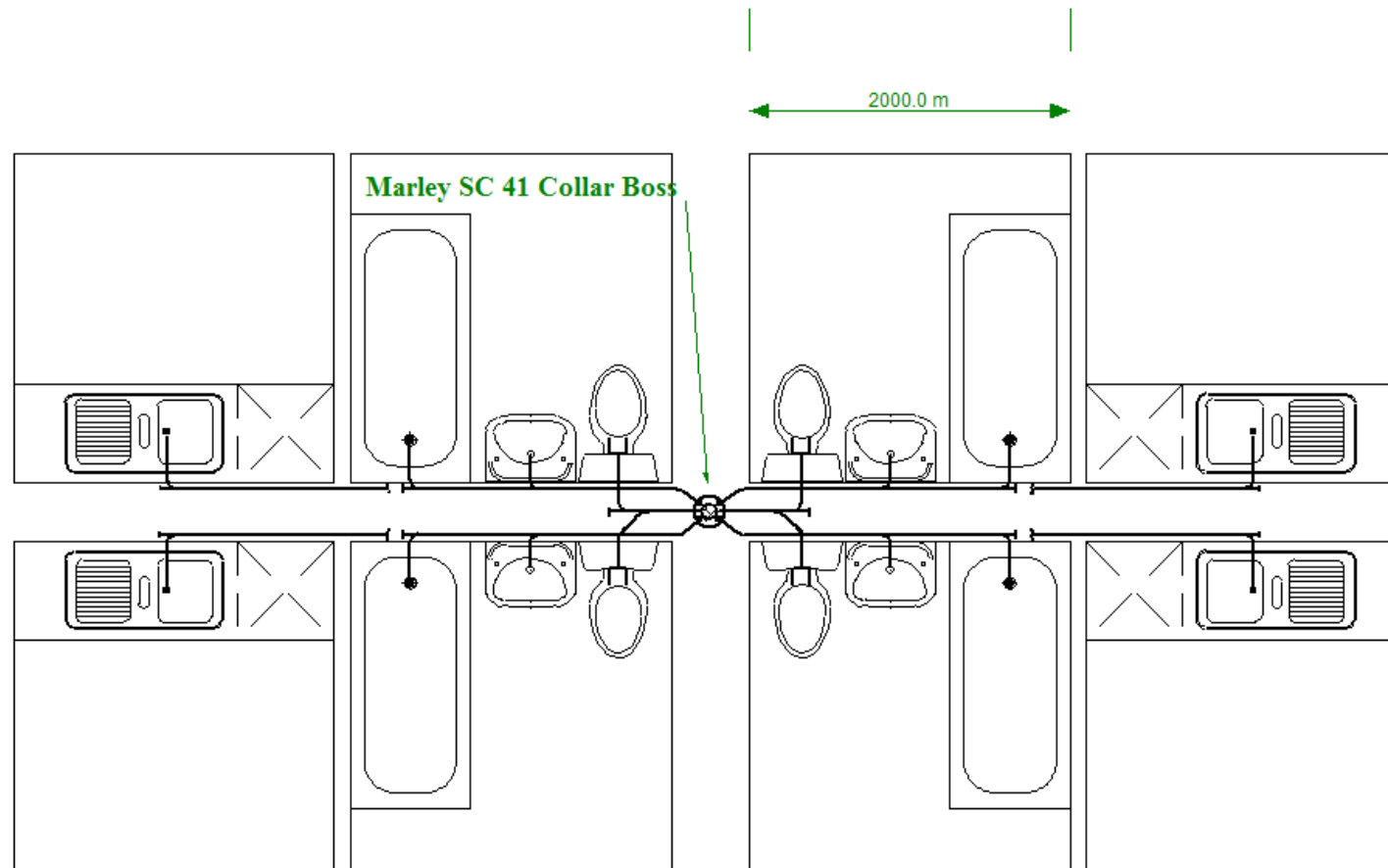
Name:		Class:	Date:
Result:	Assessor:		Date:

Marking schedule	Drawing 1 Combined System	1st	2nd
Neat, clean, legible, and labelled with the use of current BS symbols			
Most economical route			
Provision for access in the event of blockages			
Provision for ventilation			
Marking schedule	Drawing 2 Separate System		
Neat, clean, legible, and labelled with the use of current BS symbols			
Most economical route			
Provision for access in the event of blockages			
Provision for ventilation			
Learner feedback			
Learner's response			
Learner's signature			

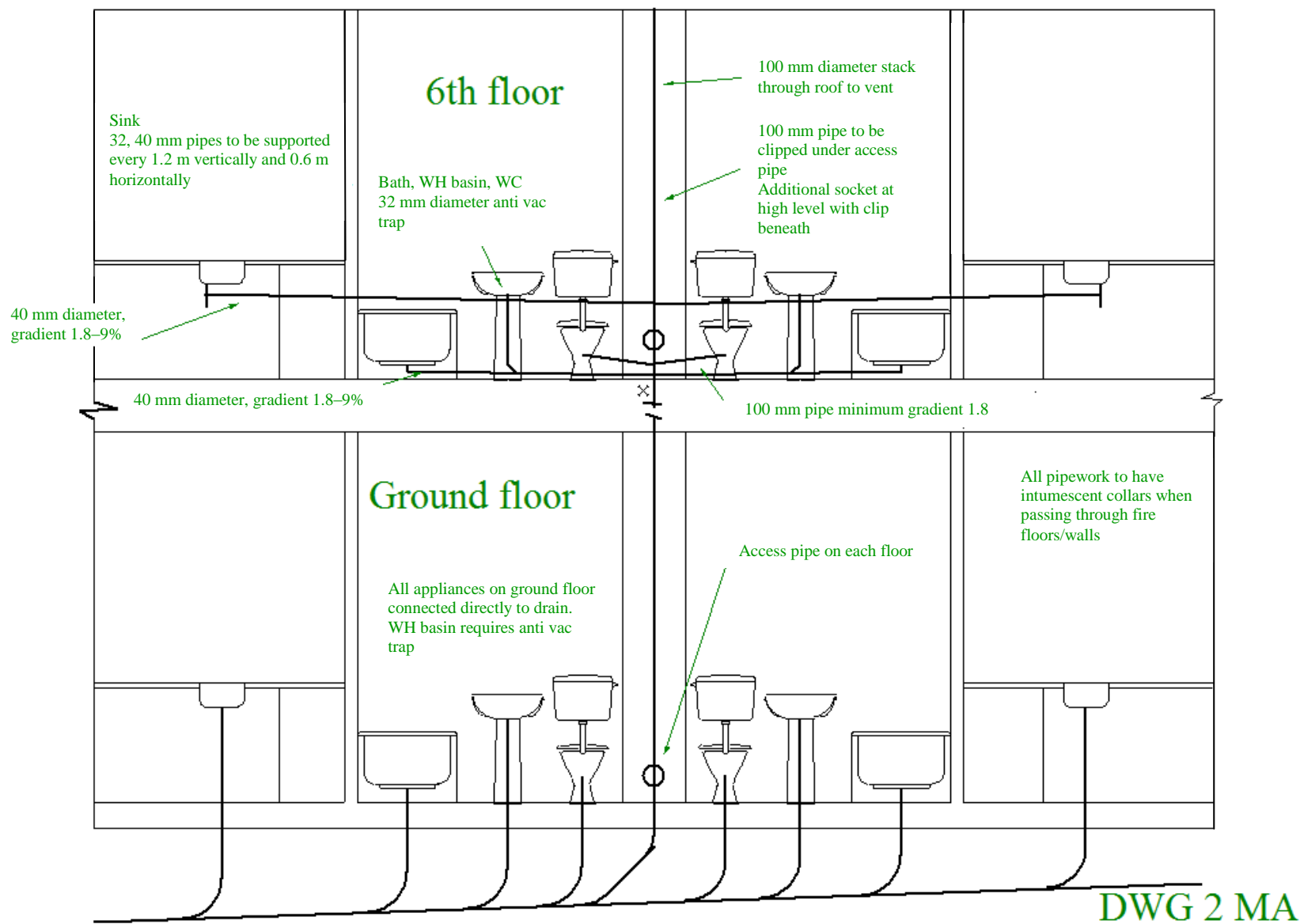
Note to assessor: Learner feedback should relate to the marking schedule

Assessment 2.3 — Model answer

(NOTE: This is one possible answer. Assessors will have to use their experience where answers differ.)



DWG1 MA
scale 1:25



Assessment 2.3 — Model answer

Floors	5	floors 1-6
Apartments	20	
discharge units	system 3	

Sum of discharge units for 1 apartment

Floor	no	du	ΣDU
sinks	1	1.3	1.3
wc 6l	1	1.7	1.7
whb	1	0.3	0.3
bath	1	1.3	1.3
total per flat			4.6
total for 20	20		92

DN100

Q_{ww} = 4.795832 ls

NOTE: Ground floor appliances connect separately to the below-ground drain.

Rainwater

Calculate the number of rainwater outlets.

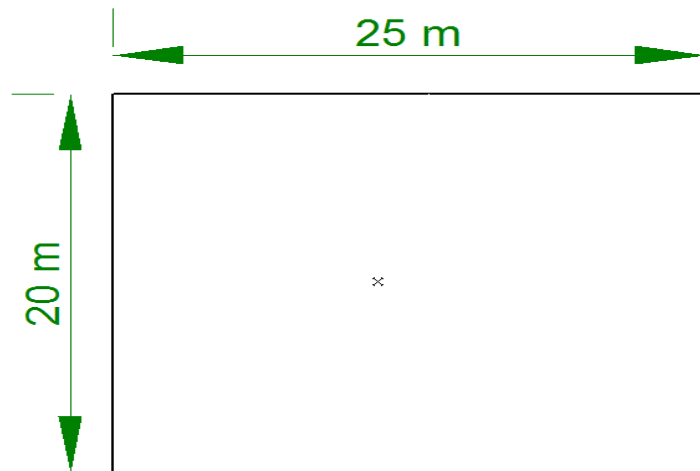
Area of roof

Flow rate

Flow rate in l/s =

Number of rain water outlets required from _____ Catalogue. Each _____ outlet has a flow rate of _____ l/s

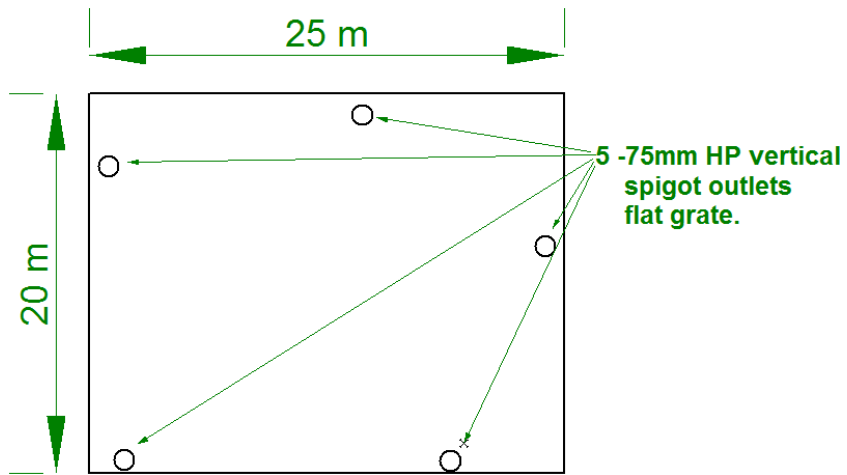
Number of outlets required _____ therefore _____ outlets would be required with _____ mm vertical discharge pipes.



**Flat Roof with Asphalt Finish and parapet around Perimeter.
The roof is finished with an Asphalt upstand capable
of retaining at least 60mm head**

Location Glasgow.

DWG 3



5 -75mm HP vertical
spigot outlets
flat grate.

Flat Roof with Asphalt Finish and parapet around Perimeter.
The roof is finished with an Asphalt upstand capable
of retaining at least 60mm head

Location Glasgow.

Model Answer DWG 3