



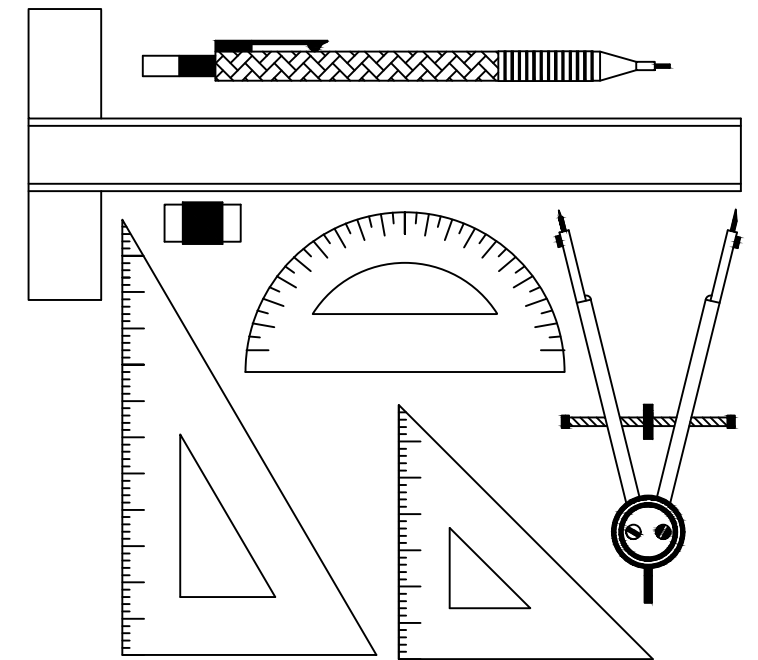
**NATIONAL SENIOR CERTIFICATE EXAMINATION**  
**NOVEMBER 2024**

**ENGINEERING GRAPHICS AND DESIGN**  
**PAPER 1**

MARKS: 200  
TIME: 3 HOURS

**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This question paper consists of **6 pages** including the cover page and **4 questions**.
2. **All** questions must be answered.
3. Unless specified otherwise, all questions are in **First-Angle Orthographic Projection**.
4. Unless specified otherwise, all questions are to be completed to a **scale of 1:1**.
5. **All** answer sheets must be restapled in numerical order, even questions that have not been answered.
6. All **construction work** must be shown.
7. Print your **examination number** neatly on each page.
8. Use only the **answer sheets** provided.
9. Your drawings should reflect **neatness** and **accuracy**.
10. All dimensions or detail not given may be **assumed** in **good proportion**.
11. Your drawings should comply with SANS 10143.
12. All measurements are in millimetres (mm) unless otherwise indicated.



FOR OFFICIAL USE ONLY						
QUESTION	SECTION	MARK	MODERATED	MAXIMUM	CODE	
<b>1</b>	CIVIL ANALYTICAL				<b>20</b>	
<b>2</b>	INTERPENETRATION				<b>40</b>	
<b>3</b>	PERSPECTIVE				<b>40</b>	
<b>4</b>	CIVIL DRAWING				<b>100</b>	
	<b>TOTAL</b>				<b>200</b>	

PLEASE PASTE THE  
BARCODED LABEL  
HERE

CHECKED BY

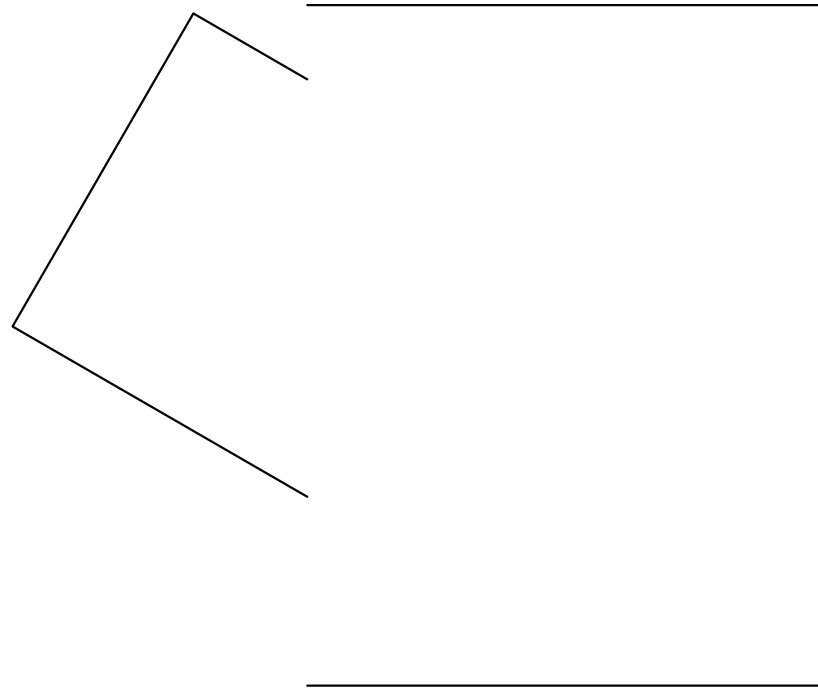
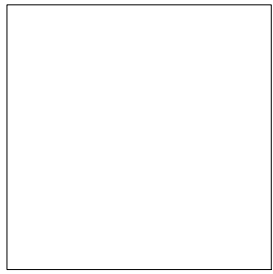
**EXAMINATION NUMBER**

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**QUESTION 2**

**INTERPENETRATION**



**Given:**

- The INCOMPLETE Front View and COMPLETE Top View of a **SQUARE PIPE** penetrated by a **SQUARE DUCT**. The axes of the duct and pipe lie in a common vertical plane.
- The auxiliary views of the square duct.

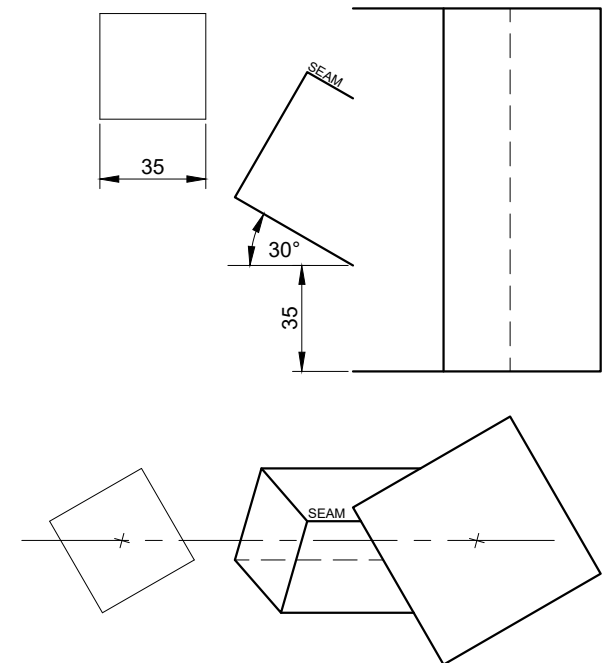
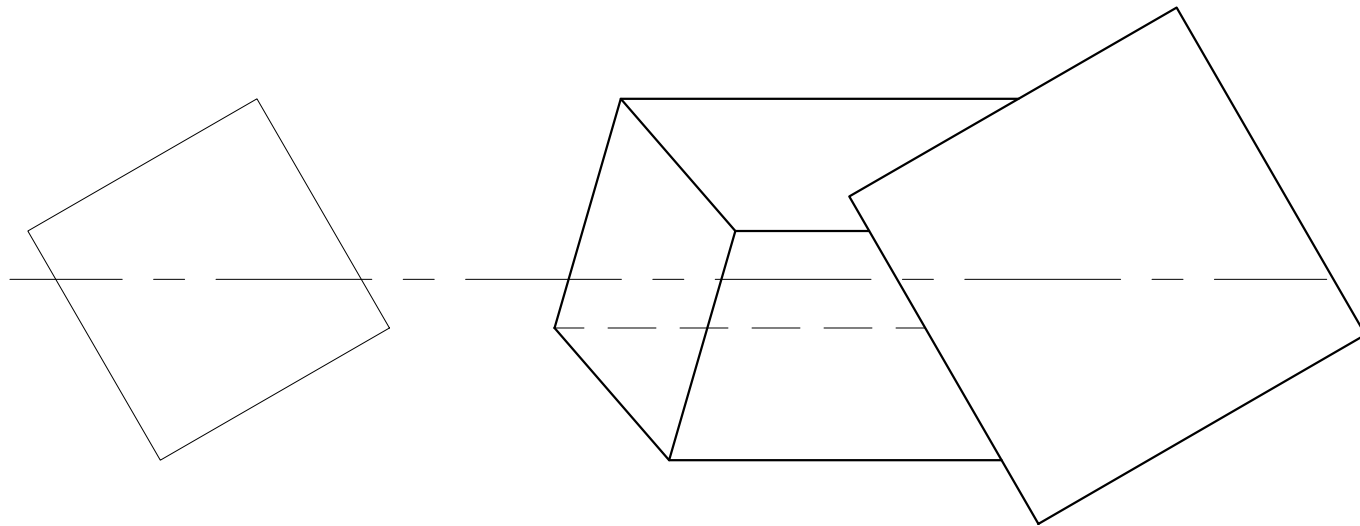
**Instruction:**

- Draw the complete FRONT view, clearly showing the lines of interpenetration.
- Draw the development of the SQUARE DUCT only. Use the given SEAM as your start.
- Show all hidden detail.
- Show all construction.

**ASSESSMENT CRITERIA**

You will be assessed on your ability to do the following:

- determine and draw the lines of interpenetration 20
- complete the Front View 7
- draw the development 13



LINES	
8	
H/D	
8	
PTS	
6	
DEV	
11	
CON	
7	

**40 MARKS**

**EXAMINATION NUMBER**

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**ANSWER SHEET 2**

**QUESTION 3**

**TWO-POINT PERSPECTIVE**

The figures show the three views of a dwelling with a chimney and porch.  
Draw a neat two-point perspective drawing of the dwelling.

- PP - Picture Plane
- HL - Horizon Line
- GL - Ground Line
- SP - Station Point

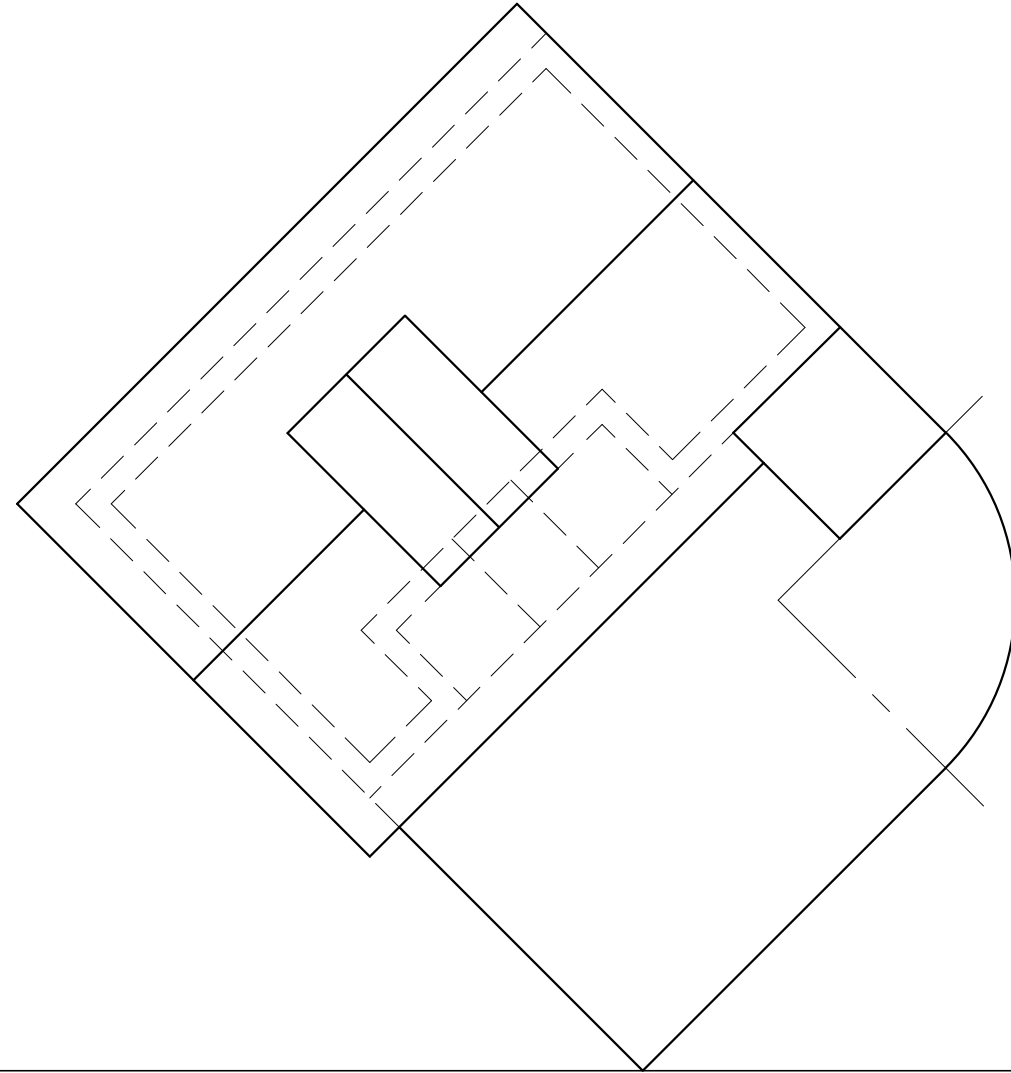
Determine and neatly label the vanishing points RVP and LVP and LVP.

NO HIDDEN DETAIL IS REQUIRED.

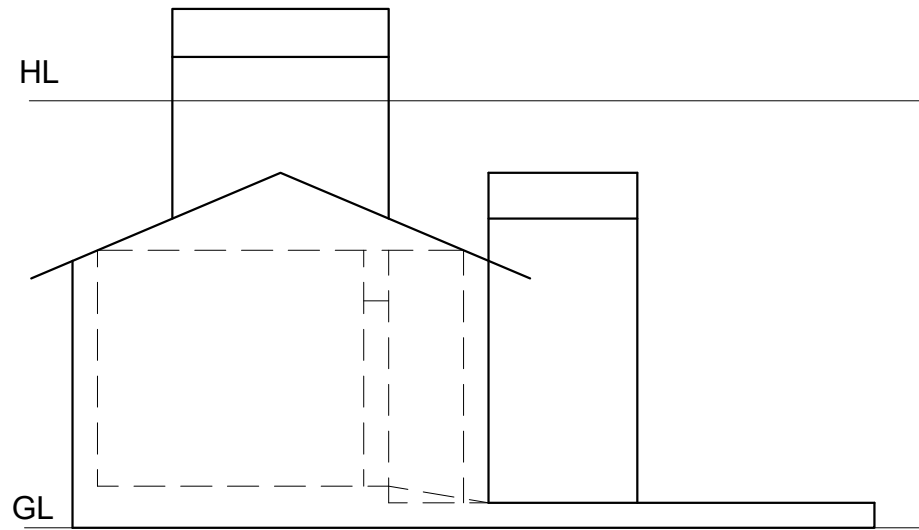
**ASSESSMENT CRITERIA**

You will be assessed on your ability to do the following:

- determine and label the vanishing points 2
- draw the two-point perspective view 38

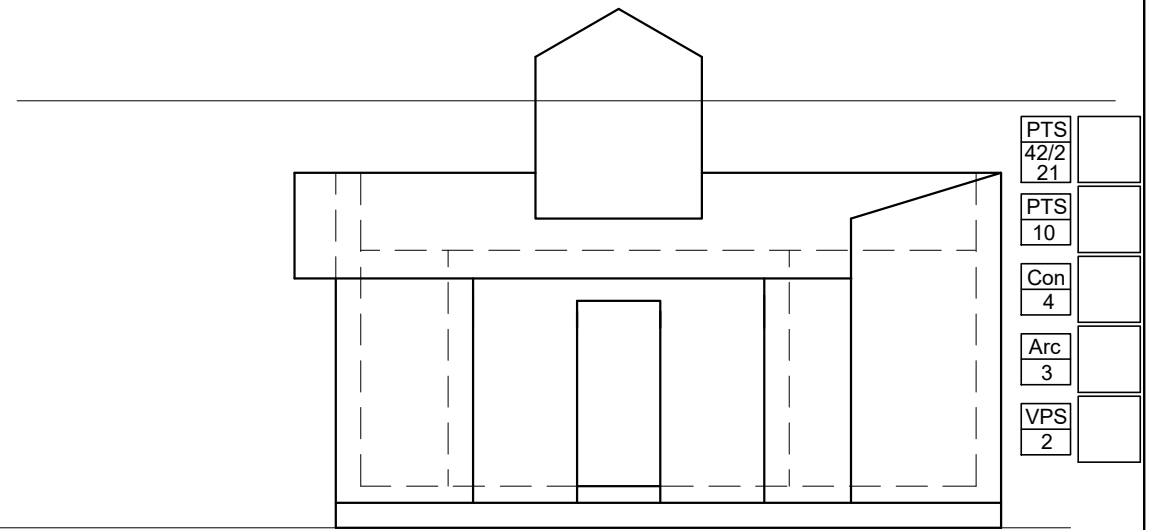


PP



HL

GL



PTS	42/2	
	21	
PTS	10	
Con	4	
Arc	3	
VPS	2	

SP<sup>+</sup>

**40 MARKS**

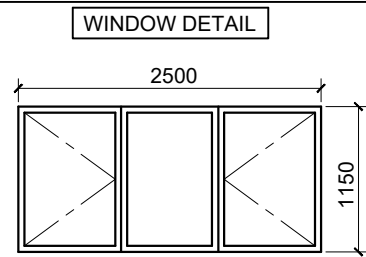
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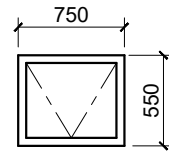
**ANSWER SHEET 3**

**QUESTION 4**

**CIVIL  
DRAWING**



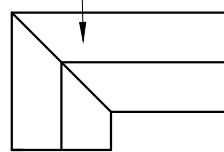
C22 CASEMENT WOODEN WINDOW



C11 CASEMENT WOODEN WINDOW

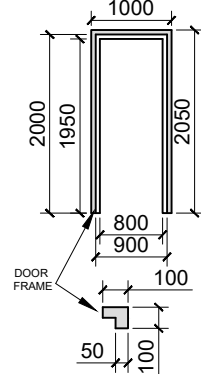
**ROOF DETAIL**

CORRUGATED METAL SHEETING

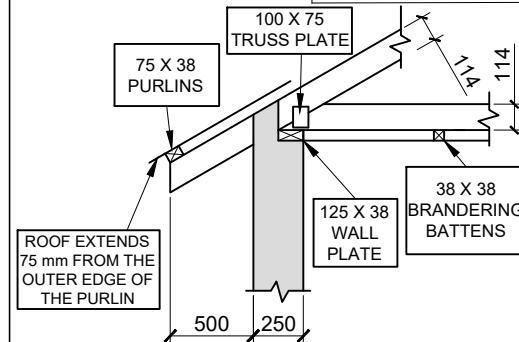


ROOF PROFILE

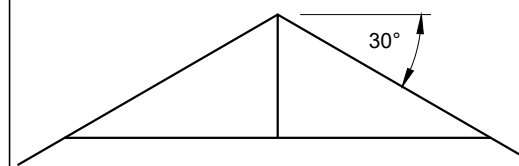
**DOOR DETAIL**



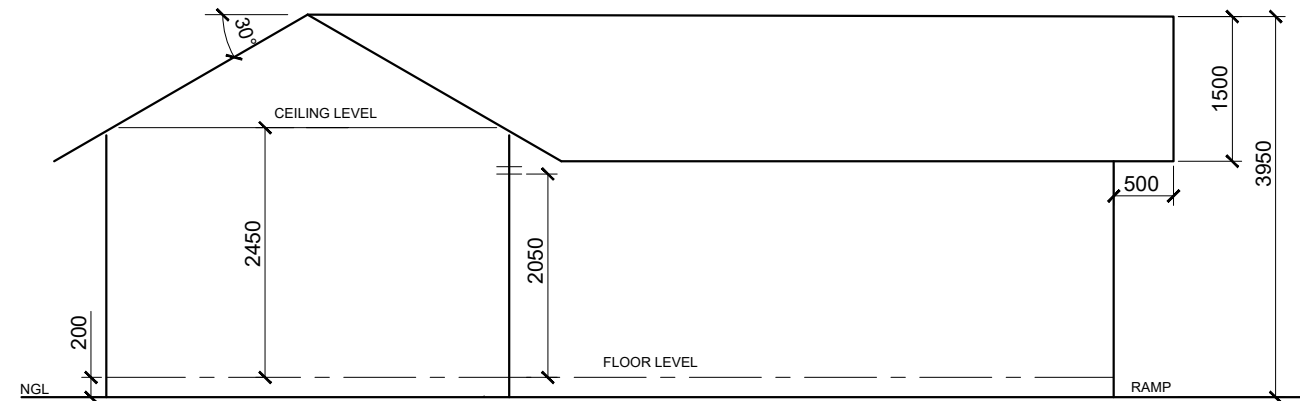
DOOR FRAME



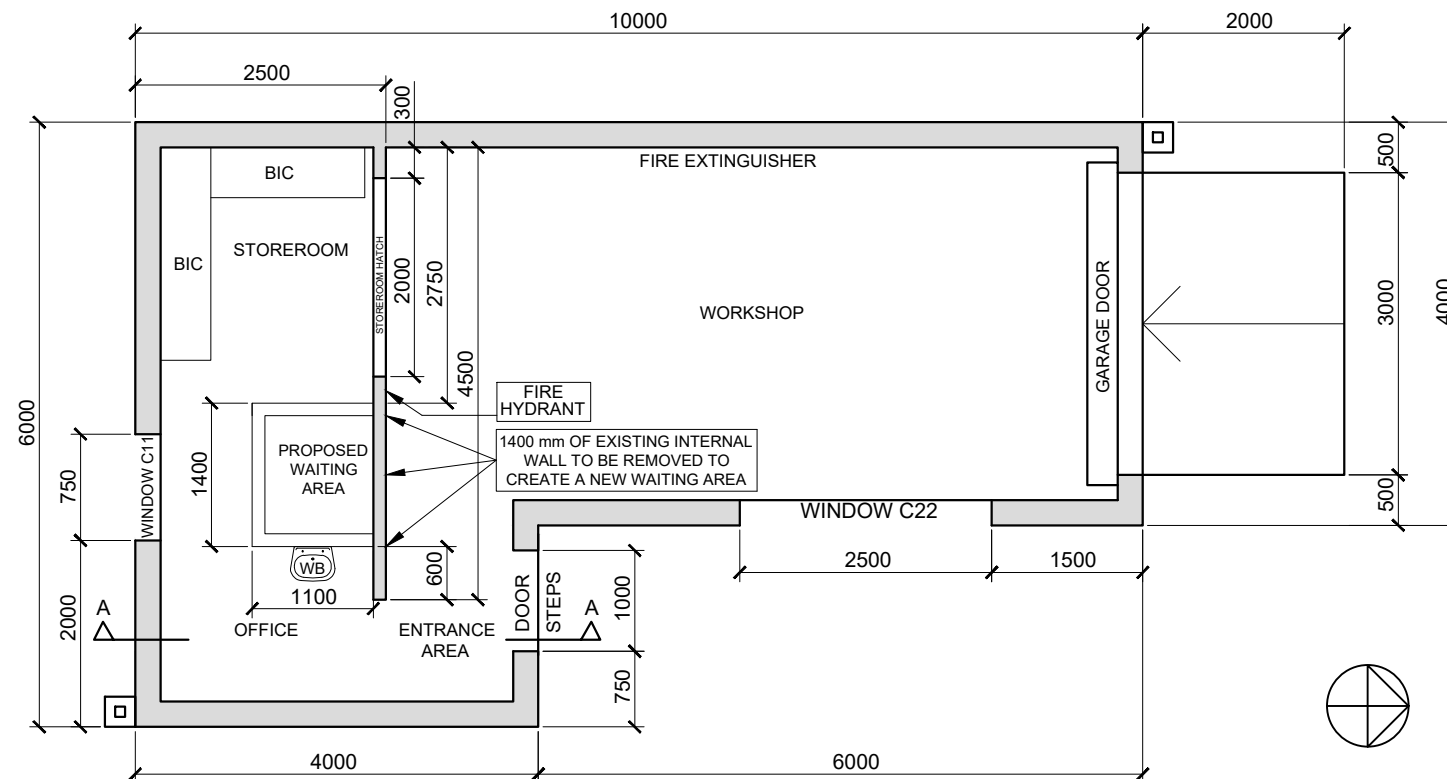
ROOF TRUSS DETAIL



INCOMPLETE FOUNDATION DETAIL



SCHEMATIC EAST ELEVATION



SCHEMATIC FLOOR PLAN

**NOTES:**

- Floor tiles will be used for the office and storeroom. Grano will be used for the workshop floor finish.
- Brickwork must be carried out as indicated on the schematic floor plan:
  - ▶ Part of the internal wall must be removed as indicated to cater for the proposed waiting area
- Place the wash-basin as indicated. It is 800 mm from the finished floor level.
- Insert the following electrical detail:
  - ▶ A two-tube, 60 watt fluorescent light in the storeroom
  - ▶ a single-pole, light switch for the fluorescent light on the north wall of the passage between the office and storeroom
  - ▶ a switched socket on the south wall of the office
- The ramp leads onto a landing which is the same height as the finished floor level. The ramp has a gradient of 1:10.
- The finished floor level is in line with the top of the 10 mm screed.
- The two steps have a tread of 150 mm and riser of 100 mm
- The built-in-cupboard on the south wall is 900 mm high and the built-in-cupboard on the west wall goes up to the ceiling.
- The windows do not have window sills.

Answer this question on ANSWER SHEET 4 (page 6).  
All drawings must comply with SANS 10143.

**The following are given:**

- Window detail
- Roof detail
- Door detail
- Roof Truss detail
- Incomplete foundation detail
  - ▶ door position, ground level, floor and ceiling levels
- An incomplete schematic floor plan of an **EXHAUST WORKSHOP, OFFICE AND STOREROOM** with
  - ▶ window and door positions
  - ▶ perimeter dimensions
- The perimeter of the external walls on ANSWER SHEET 4 (page 6)

**Draw the following on Answer Sheet 4 using a scale of 1:50:**

- 1) The **complete FLOOR PLAN**
- 2) The **SECTIONAL EAST ELEVATION** on the indicated cutting plane

**FLOOR PLAN INSTRUCTIONS**

- Using the given outer perimeter lines on page 6 of the external walls, draw the complete floor plan of the workshop
- The following alteration must be made to the workshop:
  - ▶ Remove part of the internal wall as indicated to create a DOORWAY
- Draw the internal walls and hatch all walls
- Insert all window details, according to the given window codes. The windows do not have window sills
- Insert the door details at the entrance
- Draw the two steps
- Indicate the ramp inclination
- Insert the electrical detail
- Insert the plumbing fixture as indicated by the symbol. Use appropriate measurements
- Insert the fire protection symbols as indicated by the labels
- Label the room designation and floor finish for the workshop ONLY

**SECTIONAL EAST ELEVATION INSTRUCTIONS**

- Draw the complete SECTIONAL EAST ELEVATION showing the section as per the indicated cutting plane
- Draw the internal walls and built-in-cupboards
- Draw the basin
- Draw the concrete steps
- Draw the ramp
- Complete the foundation details
  - ▶ insert all floor slab details
  - ▶ use 100 mm compacted hardcore filling
- Label the ground level
- Label the damp-proof course at the floor slab
- Label and draw the finished floor level
- Draw the sectional door, using the given frame detail
  - ▶ use ONE 250 mm x 75 mm concrete lintel above the door
- DO NOT DRAW THE C22 WINDOW
- Roof details:
  - ▶ draw the roof truss using 114 mm x 38 mm rafters and TWO 100 mm x 75 mm truss plates on the king post ONLY
  - ▶ use FOUR 75 mm x 38 mm purlins spaced appropriately
  - ▶ use TWO 125 mm x 38 mm wall plates
  - ▶ use TWO 38 mm x 38 mm ceiling battens. Show one in the office and one in the entrance area
  - ▶ use corrugated metal sheeting for the roof and a 30° pitch
  - ▶ use 9 mm gypsum ceiling boards
- Show all hatching detail
- Label the complete EAST ELEVATION
- Label and draw the finished floor level

[100]

