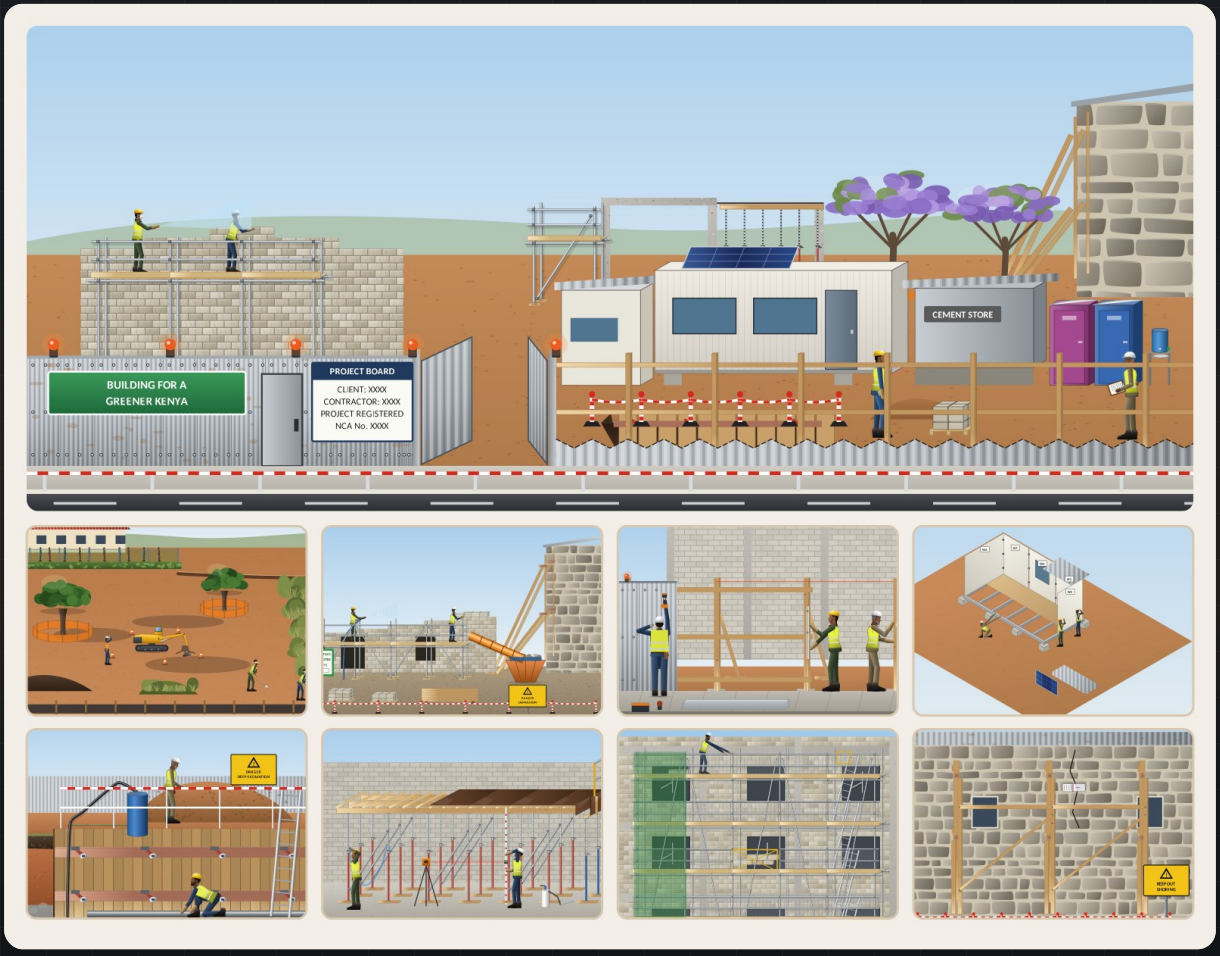
KNQF LEVEL 4 · TVET CDACC CYCLE 3

# Masonry

## Level 4

### A Practical Study Guide for Kenyan Trainees

Site clearance · Demolition · Hoarding · Amenities · Trenches · Formwork · Scaffolds · Shores




**Realistic pictures** **Step-by-step tasks** **Mock assessments**

For trainees, RPL candidates, trainers, foremen and masonry fundis

**Alphonce Kimutai Kirui**

Aligned to the TVET CDACC Competency-Based Modularized Curriculum, Masonry KNQF Level 4

# Masonry Level 4

## A Practical Study Guide for Kenyan Trainees

Building Site Preliminary Works I · Building Temporary Works · Industrial Attachment
Kenya National Qualifications Framework (KNQF) Level 4

**Alphonce Kimutai Kirui**

**Masonry Level 4: A Practical Study Guide for Kenyan Trainees**
First edition, November 2026

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Published by the author. Website: alphoncekirui.com

## About the curriculum

This book follows the topics and units of the TVET CDACC Competency-Based Modularized Curriculum and Occupational Standard for Masonry, KNQF Level 4 (Cycle 3, greened edition), and the assessment documents for the Level 4 units. It covers the two Level 4 units (Module II): Building Site Preliminary Works I (CON/CU/BLD/CR/01/4/MB, 120 hours) and Building Temporary Works (CON/CU/BLD/CR/02/4/MB, 120 hours), together with the industrial attachment. The Level 3 units of the qualification (Module I: Masonry Works, Masonry Works Finishes I and Masonry Units Production) are covered in the companion book, *Masonry Level 3: A Practical Study Guide for Kenyan Trainees*, by the same author. Unit titles and codes are used for reference only.

**This is an independent study guide. It is not published or endorsed by TVET CDACC, TVETA or the Ministry of Education.** Always follow the current official curriculum and your trainer's guidance.

## Safety and accuracy notice

Site preliminary works and temporary works can injure and kill. Trench sides collapse without warning and bury workers; formwork, props and shores that are overloaded or removed in the wrong order bring down slabs and walls; people fall from scaffolds, towers, ladders and slab edges; excavators, dozers and tippers crush people in their blind spots and slew radius; demolition drops masonry and raises silica dust; asbestos-cement sheets cause cancer when broken; pangas and slashers cut; and cement burns the skin. The methods in this book are for training under the supervision of a qualified trainer, always with the correct personal protective equipment for the task. Never enter an unsupported trench, never use an uninspected scaffold, never strike a prop, shore, tie or wedge without instruction, never touch asbestos, and leave the design of deep excavations, tall or heavily loaded formwork, scaffolds and shores to the engineer or temporary-works designer named on the drawing. Values given as "typical" or "example" (spacings, sizes, depths, loads, outputs, quantities and prices) are general guidance only: always follow the drawing, the engineer or supervisor, and the maker's instructions. Follow the current Kenyan laws and rules, including the National Building Code 2024, the Occupational Safety and Health Act 2007 and its rules, the Environmental Management and Co-ordination Act 1999 and its regulations, the NEMA Waste Management Regulations 2006, the Sustainable Waste Management Act 2022, the Public Health Act and your county's laws. Prices are approximate (2026) and vary by town.

Names of people, businesses, schools and sites used in examples are made up for teaching. Tools, plant, props, scaffold systems and materials are described by type, not by brand.

## Illustrations and photographs

The illustrations in this book were drawn for it. They are realistic teaching illustrations and are not to scale unless dimensions are given. Charts marked "typical" or "example" show typical shapes and values, not measured data. Photographs come from Wikimedia Commons under free licences (public domain, CC0, CC BY or CC BY-SA); some have been resized or cropped. Each photograph is credited under the picture, and the full list of credits is at the back of the book.

## How this book was made

Automated tools, including AI writing and drawing assistants, were used under the author's direction to help draft the text, draw the illustrations and charts, and check calculations, cross-references and layout. The content was checked against the curriculum documents and against published sources such as the National Building Code 2024, Kenya Standards, makers' data and Kenyan law, and the author is responsible for it. If you find a mistake, please report it through alphoncekirui.com so that it can be corrected in the next edition.

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# Preface

Before the first stone of a new building is laid, somebody has to make the site ready and safe. Walk past any Kenyan town and you will see that work: an iron-sheet hoarding with lamps and a project board along a busy road, an old shop coming down stone by stone with its roof sheets carried away by a licensed team, a site office and cement store by the gate, a timbered sewer trench, a forest of adjustable props under a fresh slab, a scaffold climbing the front of a storey building, and raking shores holding up the neighbour's old wall. The Affordable Housing Programme, county hospitals, schools and private developers all need people who can plan and run that work: clear the site without harming it, demolish safely and keep the waste out of the drains, put up and take down hoardings and amenities, and erect, inspect and strike the temporary works that hold the job up. That is the Level 4 mason.

This guide covers the new units of the Masonry KNQF Level 4 course (Module II): Building Site Preliminary Works I and Building Temporary Works, together with the industrial attachment and the assessments that lead to your certificates. The Level 3 units of the qualification (Module I: Masonry Works, Masonry Works Finishes I and Masonry Units Production) are not repeated here. They are covered in the companion book, *Masonry Level 3: A Practical Study Guide for Kenyan Trainees*, which this book calls "the Level 3 guide". Where a Level 4 job uses a Level 3 skill, such as setting out with 3-4-5, levelling, mixing concrete, building a wall or making a column form, this book gives a short reminder and points you to the right chapter of the Level 3 guide.

The book is written for trainees in vocational training centres and technical colleges, for candidates seeking recognition of prior learning, for trainers, and for working masons, foremen and fundis with contractors, county works departments, hire firms and demolition and salvage contractors who want their skills recognised. Everything is explained in plain English, with realistic drawings, site and temporary-works plans, worked calculations using Kenyan materials, prices and conditions, practical tasks with record sheets, and checklists matched to the way you will be assessed.

Above all, work safely. Trench collapses, falls from scaffolds and slabs that come down during a pour kill workers in Kenya every year, and silica and asbestos dust harm health slowly. Learn the safety rules in Chapter 2 before you step into a trench, climb a scaffold or strike a prop, and keep to them on every job. And look after the site: keep the trees and the topsoil, sort every load of waste, never burn it, and reuse what you take down. A Level 4 mason who wastes less earns more.

**Alphonce Kimutai Kirui**
Bomet, November 2026

# How to use this book

This book follows the Level 4 part of the Masonry course from start to finish. It covers the two Level 4 core units and the industrial attachment, in the same order as your training. You can read it cover to cover, or study one unit at a time if you are taking a part qualification. Topics that both units share are taught once in Part 1: safety, PPE and green practice (Chapter 2), site and temporary-works drawings, measurement and the science of soils, loads and materials (Chapter 3), and materials, quantities and costing (Chapter 4 — the costing method the whole book uses). Within the units, demolition and debris are taught in depth in Chapter 6, trench systems in Chapter 10, props in Chapter 11 and scaffold components in Chapter 12; later chapters refer back to them. Level 3 topics are summarised and referred to the Level 3 guide.

The course at a glance

| Part | What it covers | Training time |
|---|---|---|
| 1. Getting started, safety, drawings and costing | The Level 4 mason and the course, assessment, site safety, PPE and green practice, site, logistics and temporary-works drawings, measurement, soils, loads and materials science, materials, quantities, hire and costing | Used throughout (about 31 hours of the two units) |
| 2. Building site preliminary works I | Unit 1 (CON/CU/BLD/CR/01/4/MB): site survey and clearance, demolition, waste separation and debris disposal, hoarding, planning, building, dismantling and storing site amenities | 120 hours |
| 3. Building temporary works | Unit 2 (CON/CU/BLD/CR/02/4/MB): trench timbering, formwork on props and striking, scaffolds and mobile towers, raking, flying and dead shores and prop grids | 120 hours |
| 4. Industrial attachment and assessment | The industrial attachment, the mentoring tool and portfolio, a small site-set-up and temporary-works business, and mock assessments for every learning outcome | 320 hours in the curriculum's unit table (confirm with your institution) |

The new Level 4 work is 120 + 120 = 240 hours of units (24 credits) plus 320 hours of industrial attachment as the curriculum's unit table gives: 560 hours. The full Level 4 qualification also includes the three Level 3 units (Module I, 320 hours), covered in the Level 3 guide: 880 hours (88 credits) in all. Chapter 1 explains the industrial-attachment hours in more detail.

## Three example jobs

Three jobs run through the book, so that each chapter builds on the last. **The Kisii town site** is a four-storey shop-and-office block on a 20 × 30 m plot beside a busy road: an old stone shop with an asbestos-cement roof is demolished, the site is cleared, hoarded and set up with amenities, and then trenched, propped, scaffolded and shored. **The Machakos school site** is a two-classroom block built on sloping ground inside a school while pupils are in session, with a reusable hoarding and careful erosion control. **The VTC practice yard** is the 10 × 10 m yard where you do the practical tasks and mock assessments.

## What is in each chapter

- **What you will learn:** the chapter's goals, with the unit, learning outcome and training hours it belongs to.
- **Key words:** the trade words you need, explained simply. More are in the Glossary at the back.
- **Explanations and drawings:** each topic explained step by step, with realistic labelled illustrations, site plans, sections, temporary-works details, charts and photographs.
- **Worked examples:** areas, volumes and lorry loads, debris tonnages, hoarding and amenity take-offs, prop, strut and scaffold counts, loads on props and platforms, raker lengths and angles, hire against buying, and full quotations worked through with real numbers and Kenyan prices.
- **Practical tasks:** real yard and site jobs with the tools, materials, steps, safety points and a "Record your results" table to fill in. Do them with your trainer.

- **Check your competence:** a checklist of what an assessor will expect you to show. Tick each item when you can do it without help.
- **Practice questions:** answers, with full working for calculations, are at the back of the book.

## Look out for these boxes

**SAFETY FIRST**

Hazards and how to stay safe. Never skip these.

**GREEN TIP**

Ways to protect trees, soil and water, sort and reduce waste, save energy and materials, and reuse what you take down on the next site.

**TRAINER'S TIP**

Advice from experienced trainers and foremen to help you work faster and better.

**COMMON MISTAKES**

Errors trainees often make, and how to avoid them.

**ON SITE IN KENYA**

How the topic looks on real Kenyan jobs: town plots, county projects, schools, health centres and housing estates.

**WORKED EXAMPLE**

A calculation worked step by step with real numbers.

## About the pictures and diagrams

This book uses realistic illustrations of real sites, plant, hoardings, amenities, trenches, formwork, scaffolds and shores, together with site plans, sections, details, charts and photographs. Labels and thin leader lines point to the parts that matter. On drawings, soil is tan with hatching and murram red-brown, concrete and masonry grey, sawn timber pale tan with darker end grain, marine board red-brown with its plies, GI sheets grey and steel props red or blue; dimensions are in millimetres on details and metres on site plans unless marked. Red marks a danger, fault, load or mistake; green marks the correct way or a green choice. Values marked "Example — follow the drawing and the maker's instructions" are typical, not rules. Some photographs show real sites where people are not following every safety rule; the captions point this out. Always wear the PPE shown in Chapter 2.

PART 1

# Getting Started, Safety, Drawings and Costing

What a Level 4 mason does beyond Level 3, how the two Level 4 units and the industrial attachment are trained and assessed, and how this book links to the Level 3 guide. Then what both units share: safety, PPE and green practice on site preliminaries and temporary works; reading site, logistics and temporary-works drawings, measurement and the science of soils, loads and materials; and the materials, quantities and costing method the whole book uses.

Chapter 1: Moving Up to Level 4: The Mason Who Prepares and Supports the Site
Chapter 2: Safety, Health and Green Practice on Site Preliminaries and Temporary Works
Chapter 3: Site Drawings, Measurement and the Science of Temporary Works
Chapter 4: Materials, Quantities and Costing for Site and Temporary Works

CHAPTER 1

# Moving Up to Level 4: The Mason Who Prepares and Supports the Site

**WHAT YOU WILL LEARN**

- Describe what a Level 4 mason does beyond Level 3.
- Explain how the course is built: the two units, their learning outcomes, hours, credits and the industrial attachment.
- Explain in outline how you are assessed and where the marks are.
- Describe the Kenyan site scene and the rules that govern site preliminaries and temporary works.
- Plan a career path and work professionally with clients, engineers, inspectors and neighbours.
- Find your way around this book and your Level 4 practice yard.

Course overview · Units CON/CU/BLD/CR/01/4/MB and CON/CU/BLD/CR/02/4/MB and industrial attachment

At Level 3 you built foundations, walls and slabs on a site that someone else had cleared, fenced and made safe. You dug a shallow trench, made small forms for a column and a lintel, and worked from a scaffold that someone else had put up. At Level 4 you are that someone else. You prepare the site, and you build, check and take down the temporary works that hold the soil, the wet concrete, the workers and the old walls in place. This chapter shows you the road ahead.

## Key words

**Site preliminaries**
Everything done to get a site ready before the building starts: clearing, demolition, debris removal, hoarding and site amenities.

**Temporary works**
Structures put up to support work while it is being built and then removed: trench timbering, formwork, scaffolds and shores.

**Hoarding**
A solid fence round a building site, usually mabati (GI iron sheets) on timber posts and rails.

**Site amenities**
The site office, stores, toilets, changing rooms and security hut that workers need while the job runs.

**Shore**
A temporary prop, usually timber or steel, that holds up a wall or structure that could move or fall.

**Unit of competency**
A block of the course with its own assessment and certificate.

**Learning outcome (LO)**
A main task inside a unit, such as "carry out site hoarding". In the assessment tools the same task is called an element.

**PC weighting**
The marks given to each performance criterion (PC) in formative assessment.

**Greened curriculum**
A curriculum that builds care for soil, trees, water, materials and waste into every task.

**Industrial attachment**
Supervised work on a real site, assessed by a workplace mentor.

## 1.1 What a Level 4 Mason Does

A Level 3 mason builds the permanent work. A Level 4 mason gets the site ready for it and keeps it safe while it goes up:

- **surveys and clears the site**: marks the boundaries and the trees to keep, diverts storm water, slashes and grubs bush, strips and stockpiles topsoil;
- **demolishes old structures** in a safe order, salvages stone, timber and steel, and sorts the debris for reuse, recycling or the approved tip;
- **sets out and erects the hoarding**, with gates, a pedestrian door, lamps and signs, and later dismantles it for reuse;
- **builds the site amenities**: office, stores, toilets, changing rooms and security hut;
- **timbers trenches**, **erects formwork** for slabs and beams, **erects scaffolds** and **sets up shores** to the drawing, inspects them, records the checks and dismantles them in the right order;
- **supervises Level 3 juniors and labourers** on these jobs and speaks for the work with engineers, inspectors and neighbours.

Table 1.1 shows how the same kind of job grows at Level 4. Figure 1.1 shows these jobs on the book's main example, a four-storey shop-and-office block on a town road in Kisii, and Figure 1.2 sorts them into the seven learning outcomes.

Table 1.1 From Level 3 to Level 4: the same site, more responsibility

| Job | Level 3 mason | Level 4 mason |
|---|---|---|
| Clearing | Clears a small plot by hand | Plans clearance of a whole site, by hand and machine, under the ESMP |
| Old structures | — | Demolishes in sequence, salvages materials, keeps debris records |
| Boundaries | Works inside a fence someone else built | Sets out, erects and dismantles the hoarding |
| Welfare | Uses the site toilet and store | Builds the office, stores, toilets and changing rooms |
| Trenches | Digs a shallow trench and keeps it safe | Timbers deeper trenches with a full system, inspects and removes it |
| Formwork | Makes edge, column and lintel forms | Erects slab and beam formwork on props and strikes it safely |
| Scaffolds and shores | Works from a scaffold | Erects, inspects, tags and dismantles scaffolds; erects shores to the engineer's design |

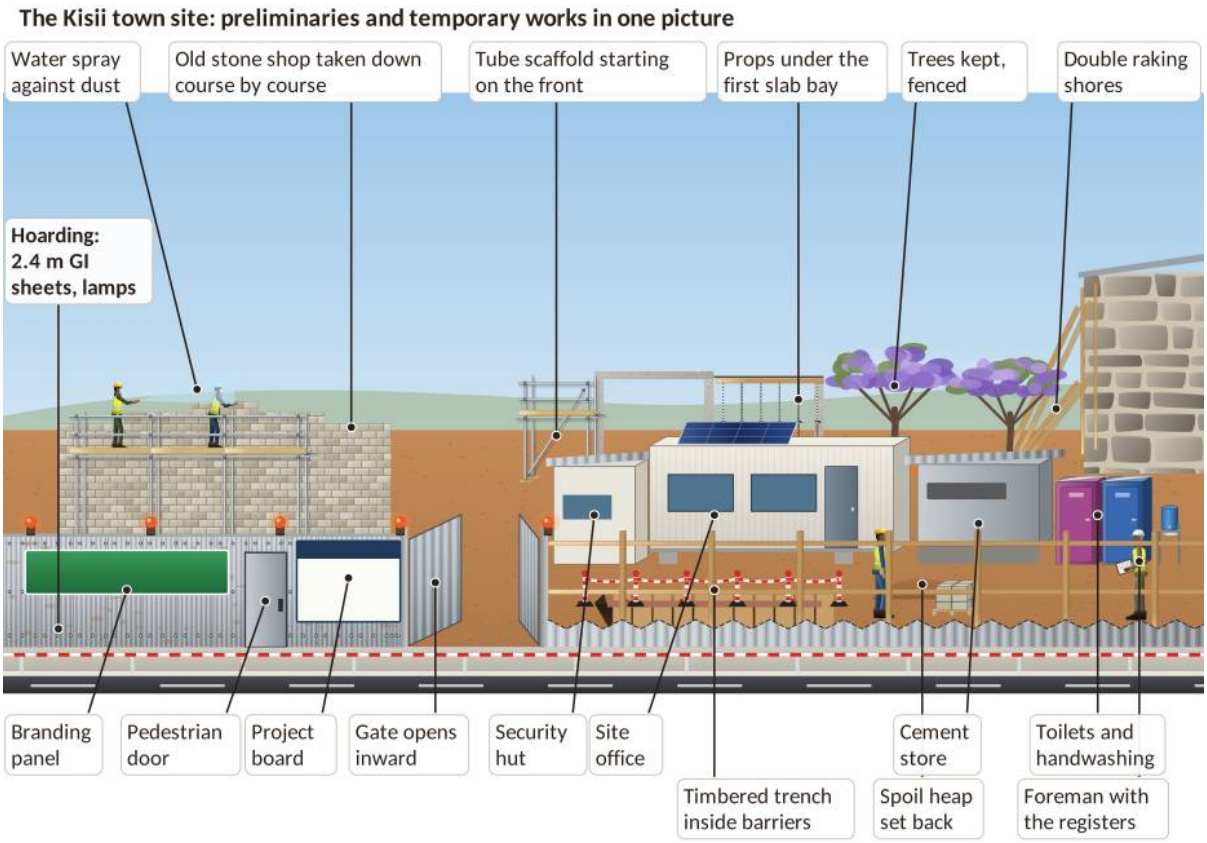



**Figure 1.1** The Kisii town site early in the job: the old stone shop is taken down behind the new hoarding while the amenities, a timbered trench, slab props, a scaffold and raking shores go up. The hoarding is cut away right of the gate to show the site.

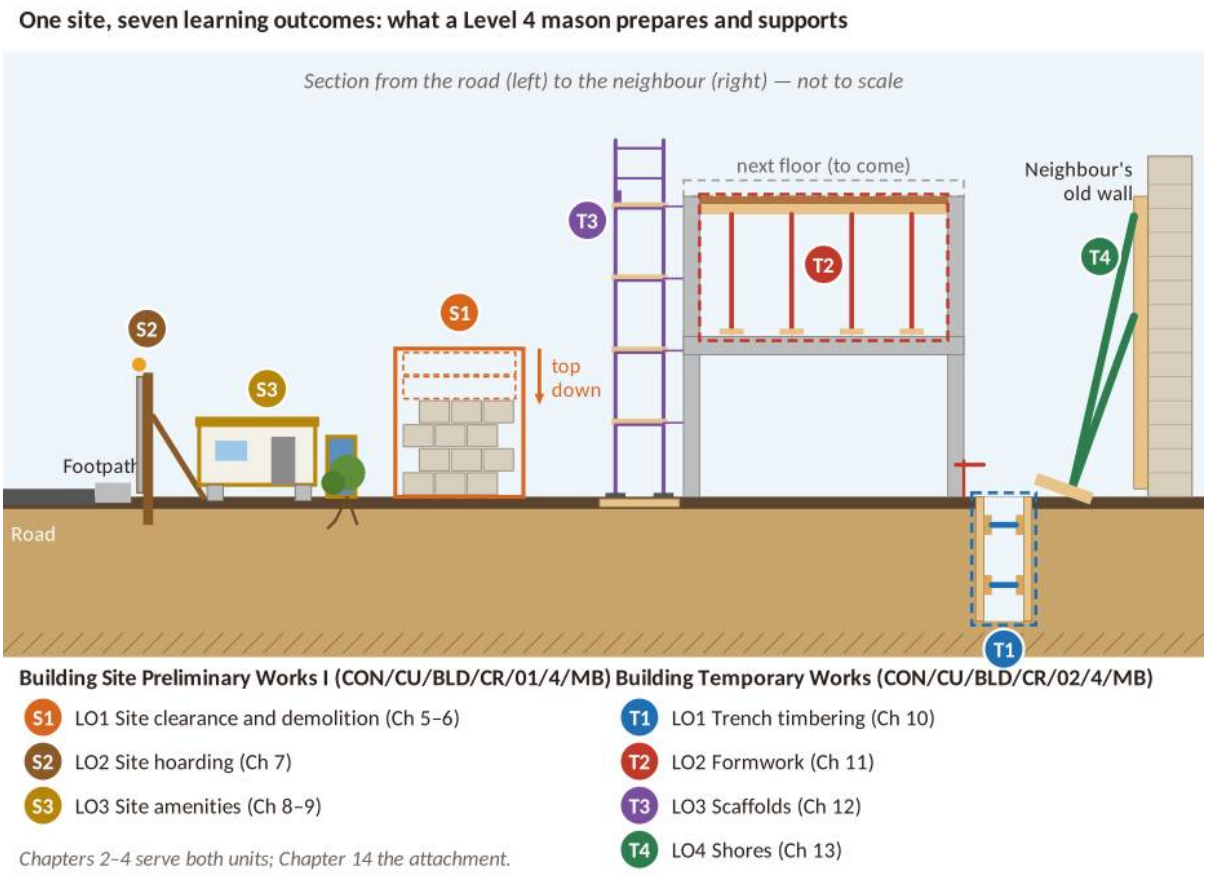



**Figure 1.2** The seven learning outcomes of the two Level 4 units on one site, colour-coded, with the chapters that teach them. Not to scale.

## 1.2 Where This Book Fits in the Course

The TVET CDACC curriculum for Masonry Level 4 (Cycle 3, greened edition) has two modules. **Module I** holds the three Level 3 units: Masonry Works, Masonry Works Finishes I and Masonry Units Production. **Module II** holds the two new Level 4 units in Table 1.2. An industrial attachment completes the course.

This book covers **only Module II and the attachment**. Module I is taught in the companion book, *Masonry Level 3: A Practical Study Guide for Kenyan Trainees*, called "the Level 3 guide" from now on. If you enter from KCSE without Level 3, study the Level 3 guide alongside this one, because this book assumes its skills: PPE, setting out, levelling, trench safety, small forms and walling.

Table 1.2 The Level 4 units and where this book teaches them

| Unit and code | Learning outcomes (hours) | Hours | Credits | Chapters |
|---|---|---|---|---|
| Building Site Preliminary Works I CON/CU/BLD/CR/01/4/MB | 1 Site clearance (30); 2 Site hoarding (40); 3 Site amenities (50) | 120 | 12 | 5–9 |
| Building Temporary Works CON/CU/BLD/CR/02/4/MB | 1 Timbering (30); 2 Formwork (30); 3 Scaffolds (30); 4 Shores (30) | 120 | 12 | 10–13 |
| Industrial attachment | Mentoring tool on a real site | 320 | 32 | 14 |
| **New Level 4 work** | | **560** | **56** | |

After this chapter the units are called Site Preliminary Works and Temporary Works. Chapters 2, 3 and 4 serve both: safety and green practice; drawings, measurement and the science of soil and loads; and materials, quantities and costing. The occupational standard prints the same units with OS instead of CU, and the PC weighting tool you may be given uses the earlier .../MA version codes (CON/OS/MSN/...); they refer to the same units.

The whole course is 320 + 240 + 320 = 880 hours (88 credits), as Figure 1.3 shows. The curriculum's unit table gives 320 hours of industrial attachment; one paragraph of the same curriculum says 480 hours. Your institution confirms the period; the mentoring tool expects at least three months. Chapter 14 explains the attachment in full.

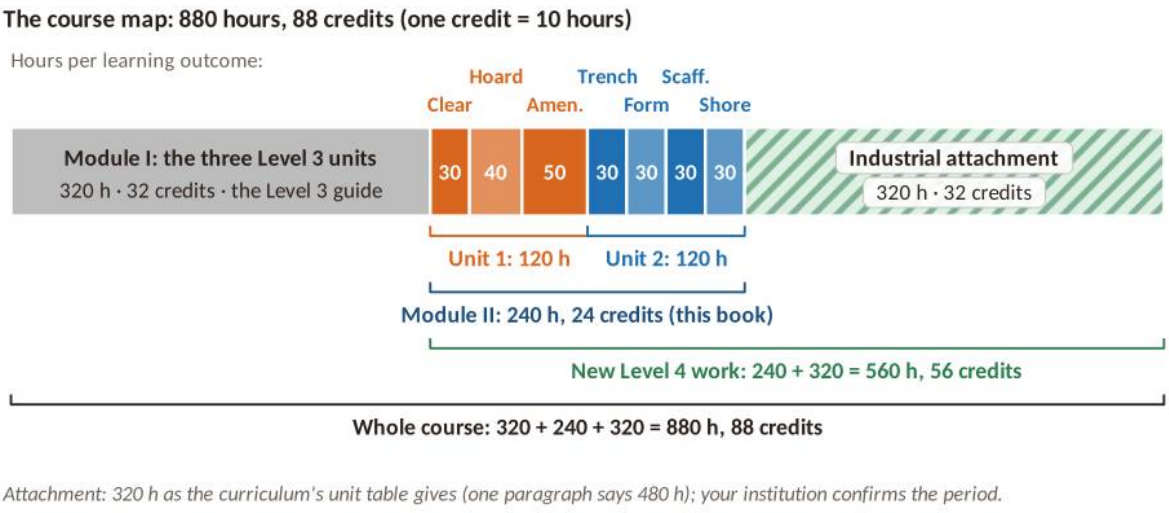



**Figure 1.3** The course map in hours. This book covers Module II and the industrial attachment: 560 of the 880 hours.

## 1.2.1 Entry, trainers and credit for Level 3

The curriculum admits holders of KCSE or an equivalent recognised by TVETA. If you hold a Masonry Level 3 certificate, ask your institution whether it admits you on that and about credit for Module I. Your trainer holds a higher qualification than Level 4 in masonry or building technology and is registered by TVETA; the curriculum also asks for Engineers Board of Kenya licensing.

### WORKED EXAMPLE 1.1: HOURS TO WEEKS

Your VTC trains for 40 hours a week. How long are the Level 4 units, the attachment, all the new Level 4 work and the whole course?

Weeks = hours ÷ hours per week

Level 4 units: 240 h ÷ 40 h/week = **6 weeks**

Industrial attachment: 320 h ÷ 40 h/week = **8 weeks**

New Level 4 work: 560 h ÷ 40 h/week = **14 weeks**

Whole course: 880 h ÷ 40 h/week = **22 weeks**

Sense-check: 6 + 8 = 14 weeks, and Module I (320 h = 8 weeks) brings it to 22. Holidays, revision and assessment weeks make the calendar time longer.

## 1.3 The Greened Curriculum

Your curriculum is "greened". Every learning outcome asks for eco-friendly PPE and tools, reclaimed or re-usable materials, care for the land and correct waste handling. The Level 3 guide, Chapter 1, introduced the green mason. On a Level 4 site, green means habits like these:

- **Follow the ESIA and the ESMP.** The environmental and social impact assessment and its management plan say which trees stay, where topsoil goes, and how dust, noise and waste are controlled.
- **Keep trees and topsoil.** Fence the trees to keep, strip topsoil and stockpile it for reuse, and control erosion with cut-off drains and silt fences (sustainable land management, SLM).
- **Deconstruct, do not just smash.** Salvage stone, bricks, timber, sheets, doors and steel from old buildings.
- **Run circular temporary works.** Hoarding sheets, amenity panels, formwork, props and scaffold go on to the next site. Bolted and modular systems last for many uses.
- **Never burn waste on site.** Sort it at source and send each stream to its proper route.
- **Make PPE last.** "Eco-friendly PPE" means durable, repairable PPE that is cleaned, stored and disposed of correctly, not a cotton cloth sold as a dust mask.

> **GREEN TIP**
>
> Before you strike a single prop or pull a hoarding post, decide where each piece goes next. A stack of de-nailed, sorted timber with a chalk note of sizes and condition is worth money on the next job. A heap of nailed offcuts is waste.

## 1.4 How You Will Be Assessed

Your course follows competency-based education and training (CBET): you prove that you can do the job to industry standard, mostly with your hands while an assessor watches and asks questions. The Level 3 guide, Chapter 1, explains units, elements and performance criteria. Here is the outline; Chapter 14 gives the full rules and seven mock assessments.

- Each unit is assessed **formatively** during training, against every performance criterion, and **summatively** at the end, on the critical tasks.
- Theory carries 10% and practical 90% of each assessment. The unit mark is 60% formative plus 40% summative.
- You are competent only if theory is at least 40% and practical at least 50% in both formative and summative assessment, and the weighted unit mark is at least 50.
- Ratings: 80–100 Mastery; 65–79 Proficiency; 50–64 Competent; 49 and below Not Yet Competent. "Y" records assessment malpractice or irregularities.
- You work **individually**, on a real site or in a simulated workplace, with the processes, equipment, materials, instructions and deadlines of a real job. Inspection follows the drawings, the National Building Code 2024 and NCA requirements.
- Your assessor is a TVETA-licensed trainer registered by TVET CDACC to assess the unit and also registered with an engineering body; an industry expert registered by TVET CDACC may also assess.

TVET CDACC issues a **Certificate of Competency** for each core unit you pass, a **Statement of Attainment** for a certifiable element, and the **Kenya National TVET Certificate in Masonry Level 4** for the full qualification. Recognition of prior learning (RPL) can lead to part or all of it, which helps practising fundi wa mawe who learned on site.

> **WORKED EXAMPLE 1.2: UNIT MARK FROM THEORY AND PRACTICAL**
>
> In Temporary Works, Chebet scores theory 60 and practical 75 in formative assessment, and theory 50 and practical 68 in summative assessment. What is her unit mark and rating?
>
> Each assessment = 0.1 × theory + 0.9 × practical
>
> Formative = 0.1 × 60 + 0.9 × 75 = 6 + 67.5 = **73.5**
>
> Summative = 0.1 × 50 + 0.9 × 68 = 5 + 61.2 = **66.2**
>
> Unit mark = 0.6 × 73.5 + 0.4 × 66.2 = 44.1 + 26.48 = **70.6**, in the 65–79 band: **Proficiency**.
>
> Conditions: theory 60 and 50 (both at least 40), practical 75 and 68 (both at least 50), unit mark 70.6 (at least 50). All three are met, so she is competent.
>
> Sense-check: the mark lies between 66.2 and 73.5, nearer 73.5 because formative carries more weight. It does.

### 1.4.1 Where the marks are

In the PC weighting tool every unit adds up to 100, so marks read as percentages (Figure 1.4). Four lessons stand out:

- **Clearance and demolition carry half of Site Preliminary Works** (50 marks), although they have only 30 hours. Hoarding has 40 hours but only 17 marks.
- **Shores (40) and trench timbering (30) carry 70% of Temporary Works.** Formwork and scaffolds carry 15 each, although they are the jobs you will meet most often on site.
- **Taking down is assessed as hard as putting up.** Dismantling amenities, timbering and shores carries 10 + 8 + 10 = 28 marks across the two units.
- PPE, tools and materials earn marks in every element. Wearing the right PPE is the easiest mark you will ever earn, and the easiest to lose.

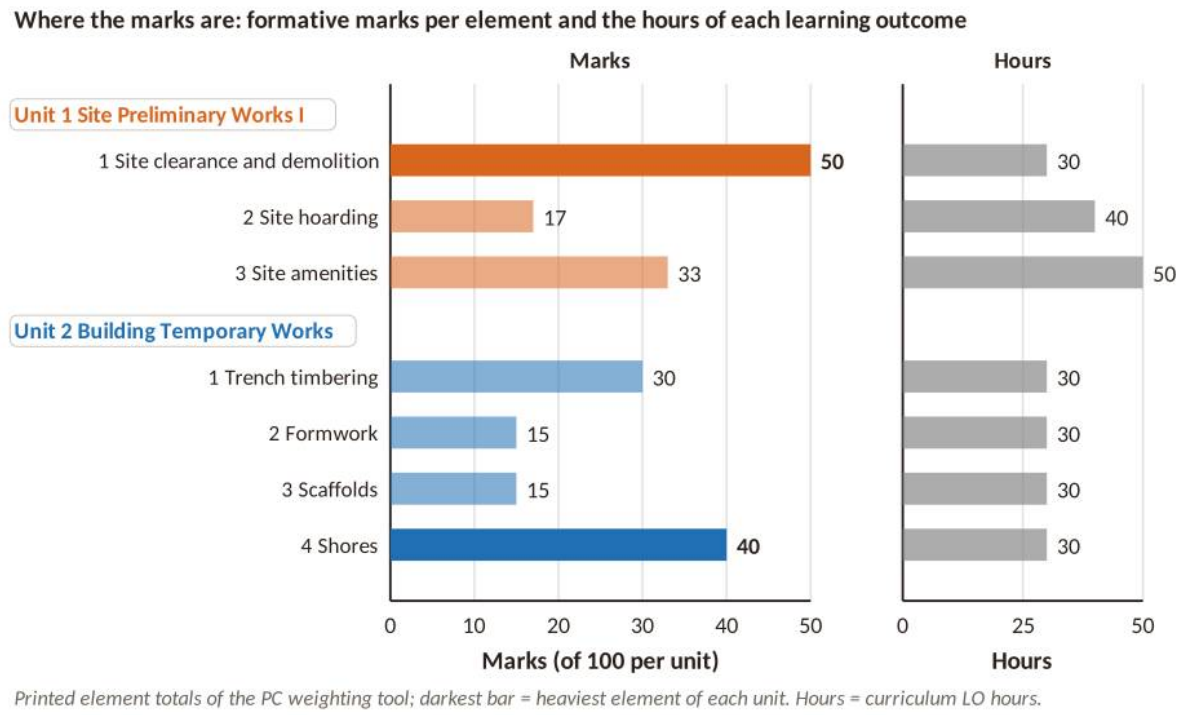



**Figure 1.4** Where the marks are. Left: formative marks per element (each unit totals 100). Right: the hours of the matching learning outcome.

### WORKED EXAMPLE 1.3: MARKS TO A RATING

In a formative assessment of Site Preliminary Works, Otieno gains 22 of 50 (site clearance), 10 of 17 (hoarding) and 16 of 33 (amenities). What is his total and rating, and what should he do?

Total = 22 + 10 + 16 = **48 of 100**

48 is below 50: **Not Yet Competent**.

Marks lost: 28, 7 and 17. Site clearance lost most (28 of 50, so he scored only 44% there). He should practise the clearance sequence and demolition with his trainer, file the records, and ask to be reassessed.

Sense-check: 100 − (28 + 7 + 17) = 100 − 52 = 48. It agrees. Only 2 more marks would have made him Competent.

During the attachment a workplace mentor assesses you with a separate mentoring tool, three times in about three months; Chapter 14 explains its rules.

## 1.5 Site Preliminaries and Temporary Works in Kenya Today

Building is busy across Kenya (Figure 1.5). Storey buildings go up on narrow town plots beside busy roads, behind iron-sheet hoardings with adverts and amber lamps. The Affordable Housing Programme puts up blocks of flats in many counties. Counties and the national government build classrooms, health centres and offices, often in school compounds while pupils are in session. Rural homes rise on sloping farmland and on black cotton soil plains, and old stone shops in town centres are pulled down for new blocks. Every one of these jobs starts with site preliminaries, and most need temporary works. Figure 1.6 shows a real Nairobi site where the slab formwork alone stands on hundreds of poles.

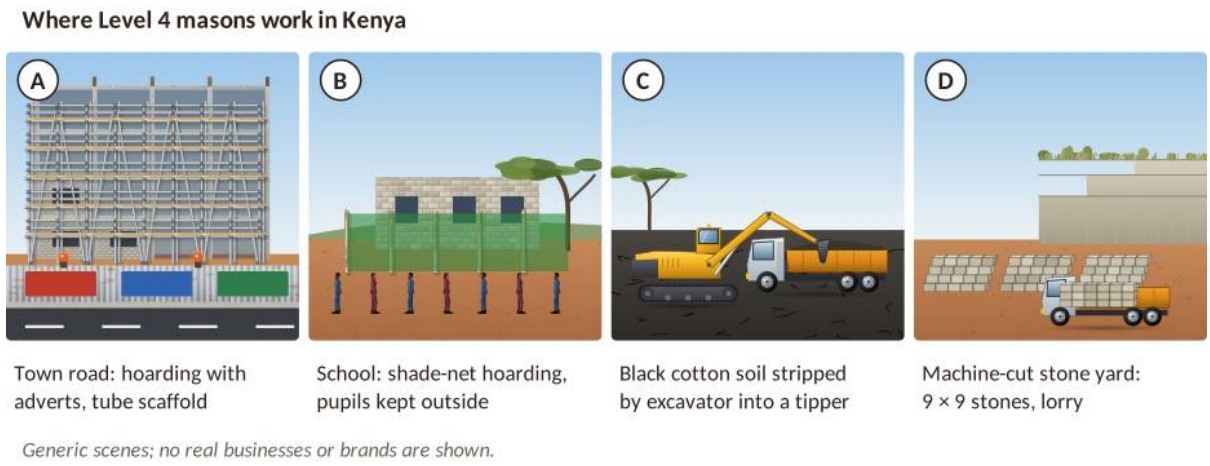



**Figure 1.5** Where Level 4 masons work: a town-road site (A), a school site (B), black cotton soil being stripped (C) and a machine-cut stone yard (D).



**Figure 1.6** A storey building going up in Nairobi. The slab formwork stands on closely spaced timber poles and the site is enclosed by iron sheets: temporary works and preliminaries on a real town site. Note that pole props need sole plates, bracing and an engineer's check like any other props (Chapter 11).

Photo: SuaveKevinKariuki, CC BY-SA 4.0, via Wikimedia Commons

## 1.5.1 The rules you work under

The **National Building Code 2024** is Kenya's building code. It came into force on 1 March 2025 and is enforced by the **National Construction Authority (NCA)**. Its parts on the preparation of construction sites, on demolition, and on scaffolds and working platforms all touch Level 4 work: the site must be fenced to keep the public out before work starts; a contractor's shed and temporary sanitary facilities are provided and removed at the end; demolition is supervised by an architect or engineer; and scaffolds are erected under supervision and inspected by an engineer. Chapter 2 and the unit chapters give the details. Every project is registered with the NCA before construction, and the registration board stands at the gate.

Other bodies you will meet: **NEMA** (the EIA licence, the ESMP and waste), **DOSHS** under the Occupational Safety and Health Act 2007, the county (plan approval, inspections and permission for hoardings on road reserves) and the Kenya Power line team when plant works near overhead lines.

### 1.5.2 Why temporary works matter

Most years Kenyan newspapers report a storey building that collapsed while under construction, or workers buried when a trench wall fell in. Where causes are reported, they often include props removed too early, formwork overloaded during a pour, and excavations left unsupported. Temporary works are only on site for days or weeks, so people treat them as unimportant. They are not. While they stand, they carry the soil, the wet concrete, the workers and the old walls, and a failure gives no warning. That is why this book keeps saying: **follow the drawing, the engineer or supervisor and the maker's instructions**.

**ON SITE IN KENYA**

On a site in Kisii, the engineer's drawing shows double raking shores against the neighbour's old two-storey stone wall, to go up before any machine works near it: two sets behind the old shop before demolition starts, and the third as soon as the shop's back corner has been taken down by hand. The labourers want to start demolition at once because the excavator is hired by the hour. The Level 4 mason holds the machine back for half a day, erects the shores with his team, checks the wedges and records the job. The excavator costs a little more; the neighbour's wall is still standing. Chapters 6 and 13 explain why.

**SAFETY FIRST**

On your first visit to the practice yard or a site, look but do not climb a scaffold, enter a trench, strike a prop or knock out a wedge. You may work on temporary works only after your trainer or supervisor has shown you, watched you and told you to go ahead, and then only in the PPE the task needs (Chapter 2).

## 1.6 Your Career at Level 4

Figure 1.7 shows the ladder from Level 3 to Level 6 and the specialisms that open at Level 4. Casual site rates in this book are KSh 1,500 a day for a mason and KSh 2,500 for a foreman; an employed Level 4 mason earns about KSh 30,000–50,000 a month (an estimate; it varies by town and employer). The statutory minimum for an Artisan Grade III in Nairobi, Mombasa and Kisumu is KSh 27,352 a month. Many Level 4 masons later run a site set-up or temporary-works service; Chapter 14 covers this.

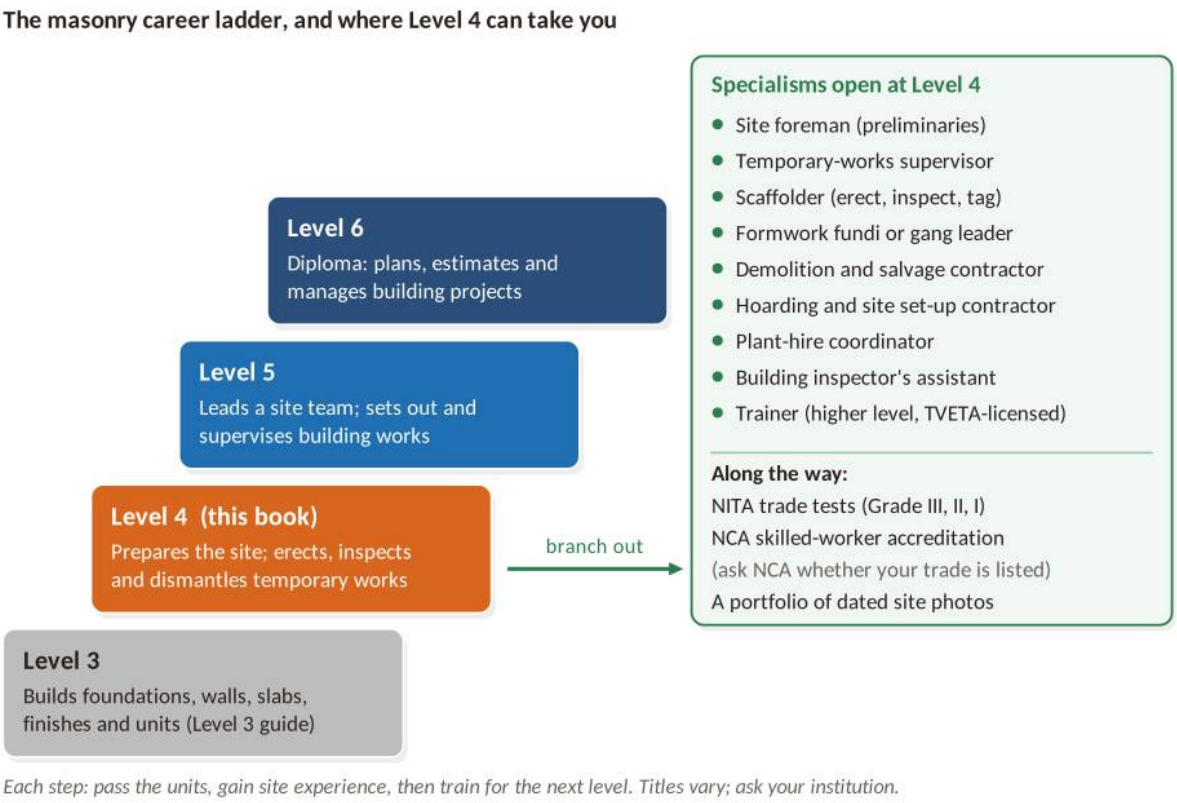



**Figure 1.7** The masonry career ladder from Level 3 to Level 6, and the specialisms open to a Level 4 mason.

Three steps add value to your certificate. **NITA trade tests** (Grades III, II and I) are well known to employers; ask NITA or your trainer about the current masonry test. The **NCA** accredits skilled construction workers (the card costs about KSh 1,000 and lasts three years); ask NCA whether your trade class is listed. A **portfolio** of dated photos and records shows clients and employers what you can do.

## 1.7 Working Professionally

At Level 4 people judge you on how you work and on the records you keep.

- **Clients.** Explain what the preliminaries involve, why they cost money and how long they take. Put agreements in writing, with a sketch.
- **Engineers and architects.** Build temporary works exactly as drawn. Ask in writing when something is unclear; never change a prop spacing, a shore or a scaffold tie without approval.
- **NCA and county inspectors.** Keep the approved drawings, the NCA registration, the ESMP and the inspection registers ready, and leave work open until it has been checked.
- **Neighbours and the public.** Warn neighbours before demolition and noisy work, keep footpaths open and safe, control dust and keep the gate closed.
- **Juniors and labourers.** Show, watch, then let them try. Check PPE before work, explain the day's hazards in a toolbox talk, and never leave a junior alone in a trench or on a scaffold being altered.

Use your phone well. Photograph every stage: the site before clearance, the trees you fenced, each lift of a scaffold before boarding, the props before a pour. Dated photos go into your portfolio and protect you if a dispute arises later. Inspection registers can be kept on a phone and printed for the file, and measurement apps help with quick checks. WhatsApp quotations are common; make them professional, with your name, the date, an itemised list, the validity period and the payment terms.

**COMMON MISTAKES**

- Thinking Level 4 is "more walling". It is site preparation and temporary works, with bigger risks and more paperwork.
- Treating temporary works as rough work that needs no drawing, check or record.
- Practising only the erecting. Dismantling carries as many marks and causes many accidents.
- Leaving the portfolio to the end of the course instead of filing each record the same day.

## 1.8 How to Use This Book

Each chapter opens with what you will learn and the unit, learning outcome and hours. Key words come first; boxes mark safety, green tips, trainer's tips, common mistakes, Kenyan site examples and worked examples. Practical tasks end with a "Record your results" table for your portfolio. Each chapter closes with a summary, a competence checklist and ten practice questions; answers with full working are at the back. Three example jobs run through the book: the Kisii town site, a Machakos school site and your VTC practice yard. Values in this book are **typical examples**, and figures with example values carry the note "Example — follow the drawing and the maker's instructions". Prices change; this book uses approximate 2026 figures.

**TRAINER'S TIP**

Start your Level 4 portfolio today with three dividers: Site Preliminary Works, Temporary Works and Attachment. Every survey sheet, waste record, inspection register, method statement and dated photo goes behind the right divider the same day. Assessors trust a portfolio that grew week by week.

### Practical task 1.1: Know your Level 4 practice yard

**Tools and equipment**

- Full PPE: helmet with chin strap, reflective vest, safety boots, gloves
- Clipboard, pen and the record sheet below
- Phone camera
- 5 m tape measure

**Materials**

- Yard layout sketch (A4)
- Portfolio file with three dividers

**Steps**

1. With your trainer, walk round the practice yard (about 10 × 10 m) and the store. Touch nothing that is erected.
2. Find the hoarding materials: sheets, posts, rails, a gate or door, lamps and signs. Note how many and their condition.
3. Find the trench-timbering stock: poling boards, walings, struts or trench props, and the practice trench with its barrier and ladder.

4. Find the formwork panels, joists, bearers and adjustable steel props, and check that props have their pins and base plates.
5. Find the scaffold components or tower, base plates, sole boards, boards and the scaffold tag holder.
6. Find the shoring timbers, wedges and the practice wall.
7. Find the PPE store, first-aid box, fire extinguisher, assembly point and waste bays.
8. Mark everything on your sketch with its condition, report anything unsafe to your trainer, and file a dated photo with this sheet.

### Safety

- Do not climb, enter, strike or adjust anything during this task.
- Keep out of any area taped off for other work.

### Record your results

| Item | Location | Quantity | Condition / safety notes |
|---|---|---|---|
| Hoarding materials | | | |
| Trench-timbering stock and practice trench | | | |
| Formwork panels and props | | | |
| Scaffold components or tower | | | |
| Shoring timbers and wedges | | | |
| PPE store | | | |
| First aid, fire point, assembly point | | | |
| Waste bays | | | |

## Chapter summary

- A Level 4 mason prepares the site (clearance, demolition, debris, hoarding, amenities) and erects, inspects and dismantles the temporary works (trench timbering, formwork, scaffolds, shores), and supervises juniors.
- This book covers Module II (240 h) and the industrial attachment (320 h as the unit table gives): 560 h. Module I is in the Level 3 guide; the whole course is 880 h and 88 credits.
- The units are Building Site Preliminary Works I (CON/CU/BLD/CR/01/4/MB) and Building Temporary Works (CON/CU/BLD/CR/02/4/MB), 120 h each.
- Each assessment is 10% theory and 90% practical; the unit mark is 0.6 × formative + 0.4 × summative, with three conditions for competence.
- Clearance and demolition carry half of Site Preliminary Works; shores and timbering carry 70% of Temporary Works; dismantling is heavily marked.
- The National Building Code 2024, enforced by the NCA, governs site fencing, demolition and scaffolds; NEMA governs the ESMP and waste.
- Temporary works fail without warning: follow the drawing, the engineer or supervisor and the maker's instructions, and keep records.

## Check your competence

- [ ] I can name the two Level 4 units with their codes, hours and learning outcomes.
- [ ] I can explain why the course is 880 hours but the new Level 4 work is 560 hours.
- [ ] I can calculate a unit mark from theory and practical scores and check the three conditions.
- [ ] I can say which elements carry the most marks in each unit.
- [ ] I can name the current Kenyan building code and the body that enforces it.
- [ ] I can explain what "green" means on a Level 4 site.
- [ ] I can describe three specialisms open to a Level 4 mason.
- [ ] I can find the temporary-works stock, PPE, first-aid and fire points in my practice yard.

## Practice questions

1. Name the two Level 4 units with their codes, and list their learning outcomes with the hours of each.
2. The Level 4 units and the attachment add up to 560 hours, but the course total is 880 hours. Explain the difference.
3. Your evening class trains for 30 hours a week. How many weeks will the 240 hours of Level 4 units take? How many weeks would all 560 hours of new Level 4 work take at the same rate?
4. Oral: what is the difference between a Certificate of Competency, a Statement of Attainment and the Kenya National TVET Certificate in Masonry Level 4?
5. Kamau's formative mark in Site Preliminary Works is 70. What summative mark does he need to reach Proficiency (65)? Could he still reach Mastery?
6. A trainee scores formative theory 35 and practical 82, and summative theory 45 and practical 76. Work out the unit mark. Is the trainee competent? Explain.
7. In a formative assessment of Temporary Works a trainee gains 22 of 30 (timbering), 11 of 15 (formwork), 12 of 15 (scaffolds) and 24 of 40 (shores). Give the total and the rating, the element that lost most marks, and the marks still needed for Mastery.
8. Fault-finding: on a town site (a) the hoarding gate has been hung to swing out over the footpath, and (b) a labourer has started knocking out props under a slab "because the concrete looks hard". What is wrong in each case, and which chapters of this book deal with them?
9. Oral: name the current Kenyan building code and the body that enforces it, and give four things a "green" Level 4 mason does on every site.
10. Practical: complete Task 1.1, then set up your Level 4 portfolio. List two pieces of evidence you will file behind each of the three dividers.

PART 2

# Building Site Preliminary Works I

Unit 1: Building Site Preliminary Works I (CON/CU/BLD/CR/01/4/MB, 120 hours). Environmentally responsible site clearance under the ESIA and SLM; demolition, waste separation and green debris disposal; site hoarding from demarcation to erection, dismantling and reuse; and planning, building, dismantling and storing site amenities: the site office, stores, toilets, changing rooms and security hut.


Chapter 5: Environmentally Responsible Site Clearance
Chapter 6: Demolition, Waste Separation and Green Debris Disposal
Chapter 7: Site Hoarding: Demarcation, Erection, Dismantling and Reuse
Chapter 8: Planning Construction Site Amenities
Chapter 9: Building, Dismantling and Storing Site Amenities

CHAPTER 7

# Site Hoarding: Demarcation, Erection, Dismantling and Reuse

**WHAT YOU WILL LEARN**

- Explain why a site needs a hoarding and choose a hoarding type that suits the site.
- Name the parts of a hoarding and the permissions needed beside a road.
- Set out a hoarding line from the beacons, square the corners and place the gates.
- Erect a hoarding in the right order and check it for line, plumb, level and rigidity.
- Take off and price the materials for a hoarding.
- Dismantle a hoarding in reverse order and sort, store and record the materials for reuse.

Unit: Building Site Preliminary Works I · CON/CU/BLD/CR/01/4/MB · Learning outcome 2 · About 35 hours

Before the first stone of the old Kisii shop comes down, the public must be kept out. The hoarding is the first thing a passer-by sees of your site and the last thing you take down. This chapter sets out, erects, checks, prices and dismantles the 50 m Kisii road hoarding shown on the logistics plan (Figure 3.3). The materials and the costing method are in Chapter 4; the Machakos reusable hoarding priced there comes back in section 7.10.

## Key words

**Hoarding**
A solid or screened temporary fence round a building site.

**Post**
An upright set in the ground that carries the rails.

**Rail**
A horizontal member between posts that carries the cladding.

**Cladding**
The sheets, boards or panels that close the hoarding.

**Stay (raker)**
A sloping member on the site side that props a post against wind.

**Kicker**
A short stake or block at the foot of a stay that stops it sliding.

**Cover width**
The width one sheet covers after its lap.

**Chainage**
Distance measured along a line from a start point, e.g. ch 12.0.

**Drop bolt**
A vertical bolt on a gate leaf that drops into a keep in the ground.

**Rigidity**
Stiffness: the hoarding does not rock, lean or flap when pushed.

**Green branding panel**
A panel on the hoarding with an environmental message, not a brand advert.

## 7.1 Why a Site Needs a Hoarding

The National Building Code 2024, in its part on preparing construction sites, requires the owner to put up a boundary that keeps the public out and protects the site **before work starts**. Its siting part says hoardings and temporary buildings must be as the Code specifies. In plain words, a hoarding:

- keeps the public, children and animals out of danger: demolition, trenches, plant and falling objects;
- secures materials, tools and plant at night;
- holds back dust, noise and flying debris, and gives neighbours privacy;
- carries the project board, warning lamps, safety signs and a green branding panel.

A hoarding is also a temporary structure. Chapter 3 showed that wind pushes on it like a sail. It must be designed, built and checked like any other temporary work. Figure 7.1 shows the finished Kisii road hoarding.

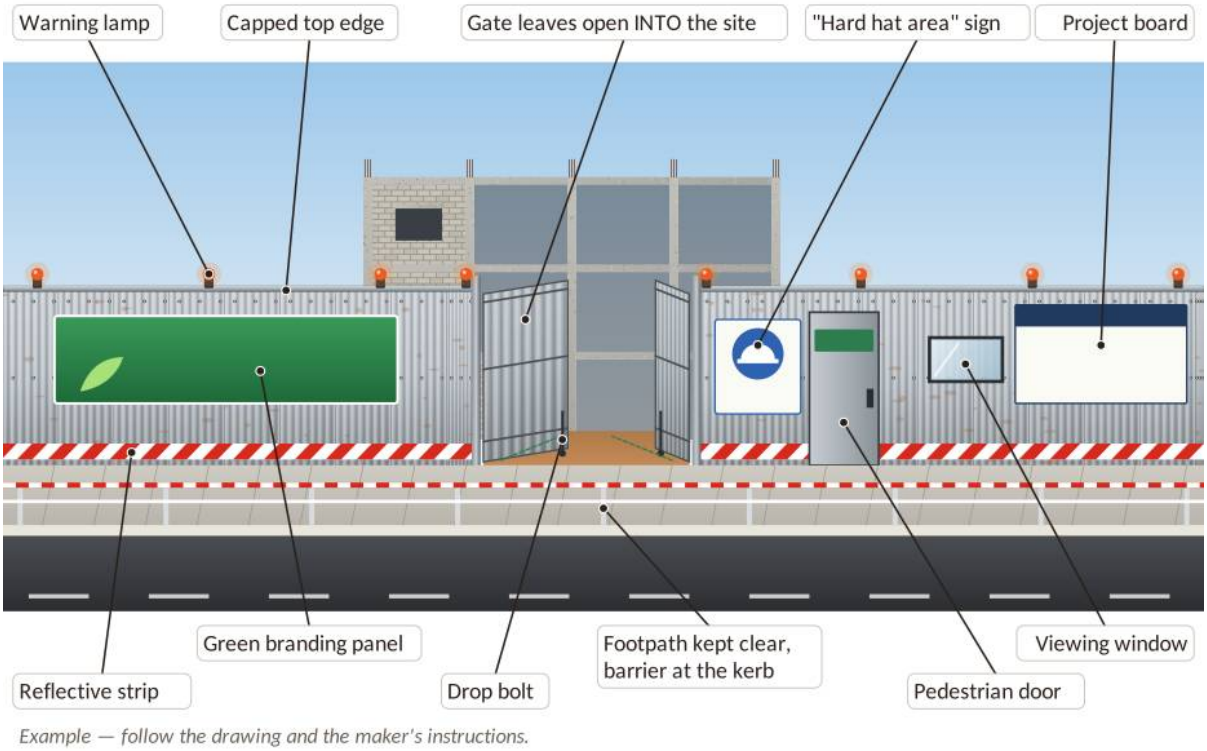



**Figure 7.1** The finished Kisii road hoarding seen from the footpath: 2.4 m GI sheets with a capped top, lamps, reflective strip, green branding panel, project board, a viewing window, a pedestrian door and a double gate opening into the site. The footpath stays clear behind a barrier.

## 7.2 Types of Hoarding

The curriculum lists GI sheets, assorted timber, bamboo, hempcrete and recycled plastic. Figure 7.2 and Table 7.1 compare the types you will meet. Chapter 4 explains each material and how to inspect it. Hempcrete (hemp and lime) panels are named in the curriculum but are rare in Kenya and are not structural; treat them as cladding on a frame.

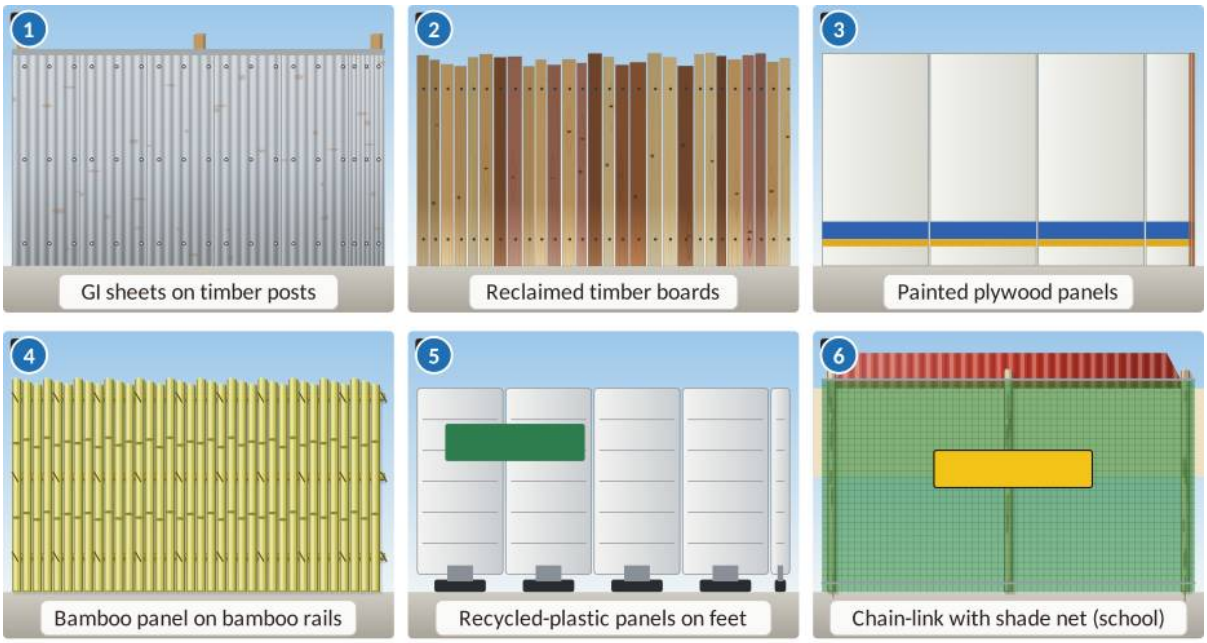



**Figure 7.2** Six hoarding types. Choose by the road, the job length, the security needed and the next reuse (Table 7.1).

Table 7.1 Hoarding types and where each suits (typical)

| Type | Suits | Strengths | Watch for |
|---|---|---|---|
| GI sheets (mabati) on timber posts | Town roads, storey buildings | Solid, secure, cheap per metre, reusable sheets | Sharp edges, wind load, dents |
| Reclaimed timber boards | Small sites with salvaged timber | Uses demolition timber, low cost | Nails, rot, gaps; must still perform (Code materials part) |
| Painted plywood panels | Shop fronts, sites wanting a neat face | Smooth face for signs and branding | Edges swell if wet; seal and paint |
| Bamboo panels | Rural and school sites | Local, light, low-carbon | Not secure; needs treated culms and good lashing |
| Recycled-plastic (uPVC) modular panels | Repeat jobs, short moves | Bolted, very reusable, no digging on ballasted feet | High first cost; feet must be heavy enough |
| Chain-link with shade net | Schools and open land where people must see in | Light, quick, cheap, see-through | Easy to cut or climb; net catches wind |

Choose by asking: how busy is the road beside it, how long is the job, how secure must it be, what will it be reused for, and what does the drawing or the client ask for? Kisii, on a busy town road, gets solid GI sheets. Machakos, inside a school, got a reusable bamboo and chain-link hoarding (Chapter 4, Worked example 4.3).

## 7.3 Parts of a Hoarding

Figure 7.3 shows a typical GI-sheet hoarding in elevation and section. Member sizes are **typical — follow the drawing**:

- **Posts**: 4x4 (100 × 100 mm) treated cypress or eucalyptus poles, about 600 mm in the ground, at 1.8–2.4 m centres. Kisii uses 2.0 m at most.

- **Rails**: three 4x2 (100 × 50 mm) rails on the road face of the posts, near the bottom, middle and top.
- **Cladding**: 3 m GI sheets cut to 2.4 m, lapped one corrugation, screwed with washers to every rail. The top edge is capped and the cut edges face into the site.
- **Stays and kickers**: sloping 4x2 stays on the site side, about every third post, each held at the foot by a kicker stake.
- **Footings**: rammed murram and stones for light hoardings; concrete for town roads, gate posts and corners; heavy ballasted feet for modular panels.
- **Gates**: a double gate 4–6 m wide for lorries, opening **inward**, with drop bolts and a padlock. Kisii has a 5 m gate at ch 12.0–17.0.
- **Pedestrian door** with a lock, a **viewing window** for the security guard, and an access hatch where a water meter sits behind the line.
- **Lamps and reflectors** along road sides, the **project board** (NCA project registration, contractor, county approval), **signs** ("HARD HAT AREA", "NO UNAUTHORISED ENTRY") and the **green branding panel**.

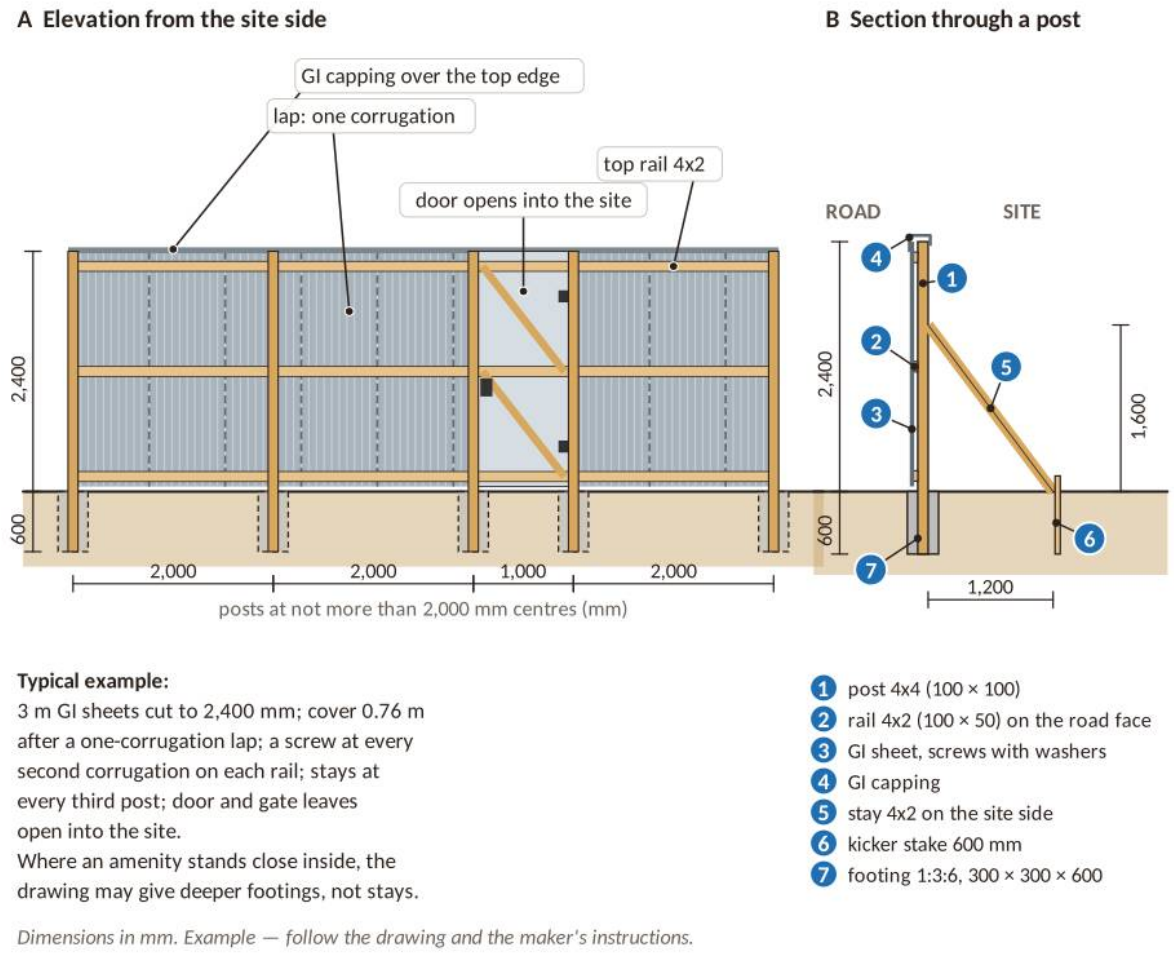



**Figure 7.3** A typical GI-sheet hoarding: (A) elevation from the site side with posts at 2,000 mm centres, three rails and a door opening into the site; (B) section through a post with the rails and sheets on the road face and the stay on the site side.

## 7.4 Permissions and the Public

Build the hoarding on your own plot. The boundary beacons fix the line, and the posts stand just inside it. Anything on the road reserve or footpath needs permission:

- the **county planning or roads office** for any hoarding, scaffold or materials on the road reserve or footpath;
- an **outdoor-advertising permit** from the county for adverts on the hoarding;
- **KeNHA** or **KURA** beside national roads and urban trunk roads: ask before you start.

Fees and rules change, so ask the county each time. Keep a safe footpath open beside the hoarding. Where the footpath must be closed, the county may ask for a covered walkway or a fenced path on the road with barriers and lamps.

> **SAFETY FIRST**
>
> Most hoarding accidents hurt the public, not the workers. Hang every gate and door to open **inward**, never over the footpath or road. Cap or fold sheet edges and keep screw tips and cut corners away from people. Light the hoarding at night. Never pile debris or materials against a hoarding: the Code's demolition part forbids it because the load can push the hoarding over. Stop hoarding work in strong wind and lightning. Kisii has a Kenya Power line along the road reserve: keep posts, sheets and ladders well clear and ask the power company before working near it (Chapter 2).

## 7.5 Demarcation and Setting Out

Demarcation means marking the boundary of the construction zone on the ground. Start from the biodiversity audit and clearance plan (Chapter 5): trees to keep, services, the water meter, no-go zones. Then set out the hoarding line. The tools and the 3-4-5 method are in the Level 3 guide, Chapter 4; Level 4 adds chainage, the gate and door positions and the checks.

1. Find the beacons B1, B2 and B3 and agree them with the surveyor and the neighbours.
2. Strain a builder's line 100 mm inside the boundary along each run. This is the post centre line.
3. Measure chainage from B1 along the line. Mark the door (ch 9.0–10.0) and the gate posts (ch 12.0 and 17.0).
4. Divide each run into equal spaces not more than the post spacing. Peg every post centre.
5. Check each corner with a 3-4-5 triangle (or 6-8-10 for more accuracy) and the plot diagonals.
6. Take levels along each run. On a slope, plan stepped panels.
7. Walk the line again for tree roots, buried services and drains before any hole is dug.

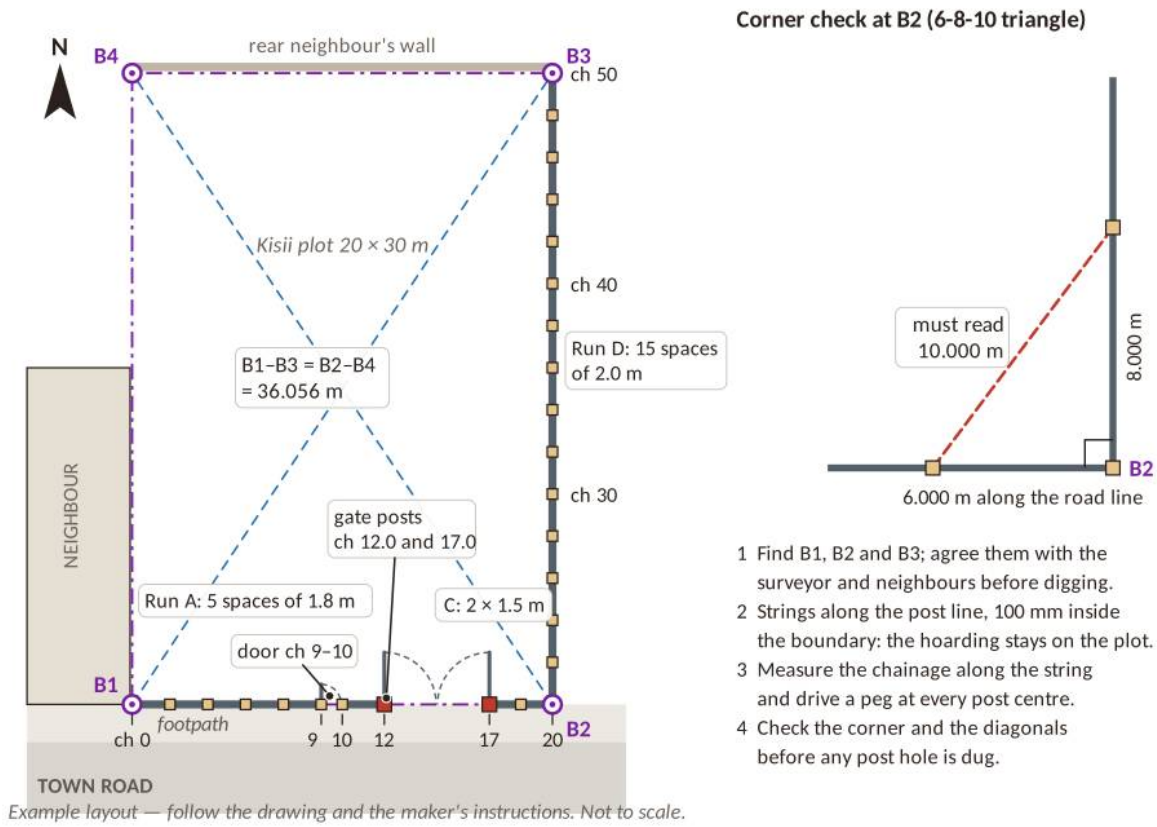



**Figure 7.4** Setting-out plan for the 50 m Kisii hoarding: post pegs along runs A to D measured by chainage from B1, the door at ch 9–10, the 5 m gate at ch 12–17 swinging inward, the plot diagonals and the 6-8-10 check at the B2 corner.

### WORKED EXAMPLE 7.2: SQUARING THE B2 CORNER AND CHECKING THE GATE

**Corner.** From B2, measure 6.000 m along the road line and 8.000 m along the east line and peg both points. Diagonal needed = $\sqrt{(6^2 + 8^2)} = \sqrt{100} =$ **10.000 m**. Swing the east line until the tape reads 10.000 m. If it reads 10.150 m, the angle is about 91.8°: the east line leans out, so swing it in.

**Whole plot.** Diagonals B1–B3 and B2–B4 = $\sqrt{(20^2 + 30^2)} =$ **36.056 m** each. Equal diagonals prove a true rectangle.

**Gate.** Clear opening 5.000 m. Allow 20 mm at each hinge and 20 mm between the leaves: leaf width = (5.000 − 2 × 0.020 − 0.020) ÷ 2 = **2.470 m**.
Peg 2.5 m in from each gate post, square to the road. The diagonals of the 5.0 × 2.5 m rectangle must both read $\sqrt{(5^2 + 2.5^2)} =$ **5.590 m**. Keep this area clear for the leaves to swing.

**Slope.** B2 is at +100.050 and B3 at +100.950: a rise of 0.900 m in 30 m. Step the tops up 0.900 × 6 ÷ 30 = **0.180 m every 6 m** (every third post), five steps in all.

Sense-check: 6-8-10 is just 3-4-5 doubled; a bigger triangle shows a small error more clearly.

Figure 7.5 shows the gate, corner and slope details. Gate posts carry the weight of the leaves and the slam of the gate, so they go deeper (1,000 mm) in bigger footings. Corner posts are held both ways by a diagonal stay. On sloping ground the sheets stay vertical, their bottoms follow the ground and the tops step up at posts. Never leave a gap under the sheets that a child or a goat can crawl through.

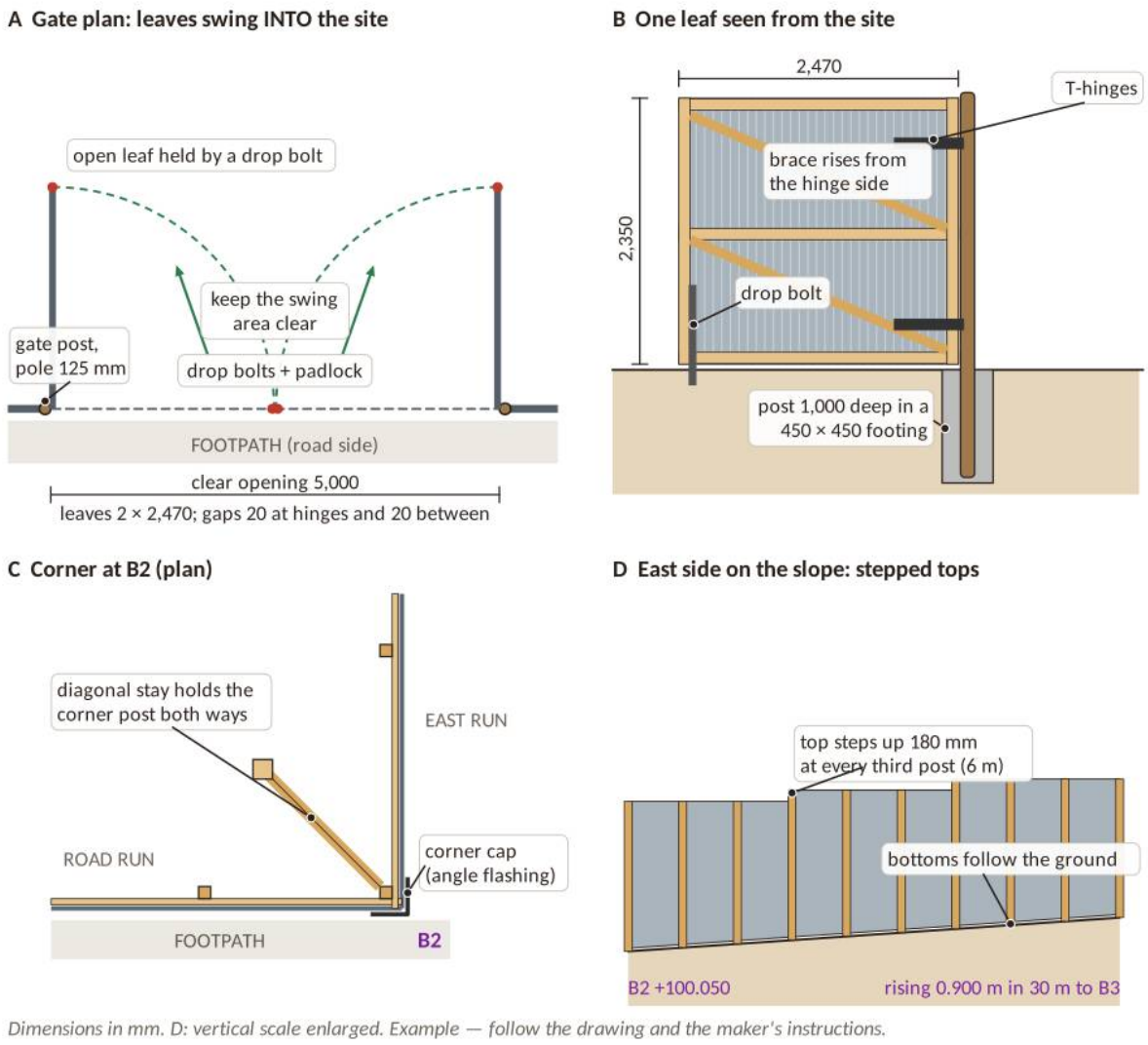



**Figure 7.5** Gate, corner and slope details: (A) the 5 m gate in plan with both leaves swinging into the site; (B) one leaf with its brace, T-hinges, drop bolt and deep gate post; (C) the B2 corner with a diagonal stay and corner cap; (D) stepped tops on the east side as the ground rises 0.900 m in 30 m.

## 7.6 Wind and Rigidity

A 2.4 m hoarding is a sail. In Chapter 3, a 72 km/h wind gave about 1.38 kN on one 2.4 × 2.4 m bay and about 28.8 kN on the whole 50 m Kisii hoarding (typical values; the engineer adds safety factors). Double the wind speed and the push is four times as large. The hoarding resists it with:

- **post depth and footings**: the ground holds the post like a fist;
- **stays** on the site side, fixed with bolts or coach screws and held by kickers;
- **fixings**: a screw with a washer at every second corrugation on each rail, so sheets cannot tear off;
- **continuous rails** with joints over posts, never between them.

Where an amenity stands close inside the hoarding, as the Kisii site office does, there may be no room for stays. The drawing may then give deeper footings; never tie a hoarding to a temporary cabin. Where a trench will be dug close inside the line, as the Kisii sewer trench is beside the east run (Chapter 10), the stays there would stand across it: the drawing must say how those posts are held while the trench is open. Inspect the whole line every morning and after every storm (section 7.9).

## 7.7 Tools for Hoarding

The hoarding tool kit is small: tape, builder's line and pins, spirit level, mason's square, spade and jembe, crow bar, tamping rod, hand saw, claw hammer, mason's hammer, screwdrivers, tin snips and a file, panga for trimming, and a cordless drill-driver. Cut sheets with snips, not a grinder: snips are quieter, make no sparks and leave a cleaner edge. Light the site with solar lamps, and use a generator only when there is no other power.

> **GREEN TIP**
>
> Share tools through a signed tool store instead of buying for each gang. Keep cordless batteries charged from the site office's solar panel. Clean and oil tools with biodegradable products, store them dry in lockable boxes, repair handles rather than throwing tools away, and send broken tools to a scrap dealer. Buy legal, treated timber, reuse sound sheets and posts, and fix with screws and bolts so the hoarding comes apart for the next site.

## 7.8 Erecting the Hoarding

Work in this order. Figure 7.6 shows the Kisii gang at work.

1. Set out and peg the line (section 7.5); mark services and roots.
2. Dig post holes about 300 × 300 mm and 600 mm deep (gate posts 450 × 450 × 1,000).
3. Set the end and corner posts plumb on both faces, braced with temporary props.
4. Strain a string between them at the top and bottom; set the line posts to the string.
5. Pour or ram the footings, check plumb again, and let concrete harden before loading.
6. Fix the rails level with joints over posts; step them where the ground slopes.
7. Fix the sheets, lapping one corrugation away from the main wind, screws at every second corrugation, edges inward, top capped.
8. Fix the stays and kickers on the site side.
9. Hang the gate and door; check the swing, the drop bolts and the locks.
10. Fit the lamps, project board, signs and green branding panel.

**Checks.** The assessor wants the hoarding "securely fastened and checked for rigidity". Check and record: line straight to the string; posts plumb both ways; rails level or evenly stepped; sheets fully fixed with no sharp edges; gate and door open inward, close and lock; and rigidity. For rigidity, push each post at the top: it must not rock or lean.

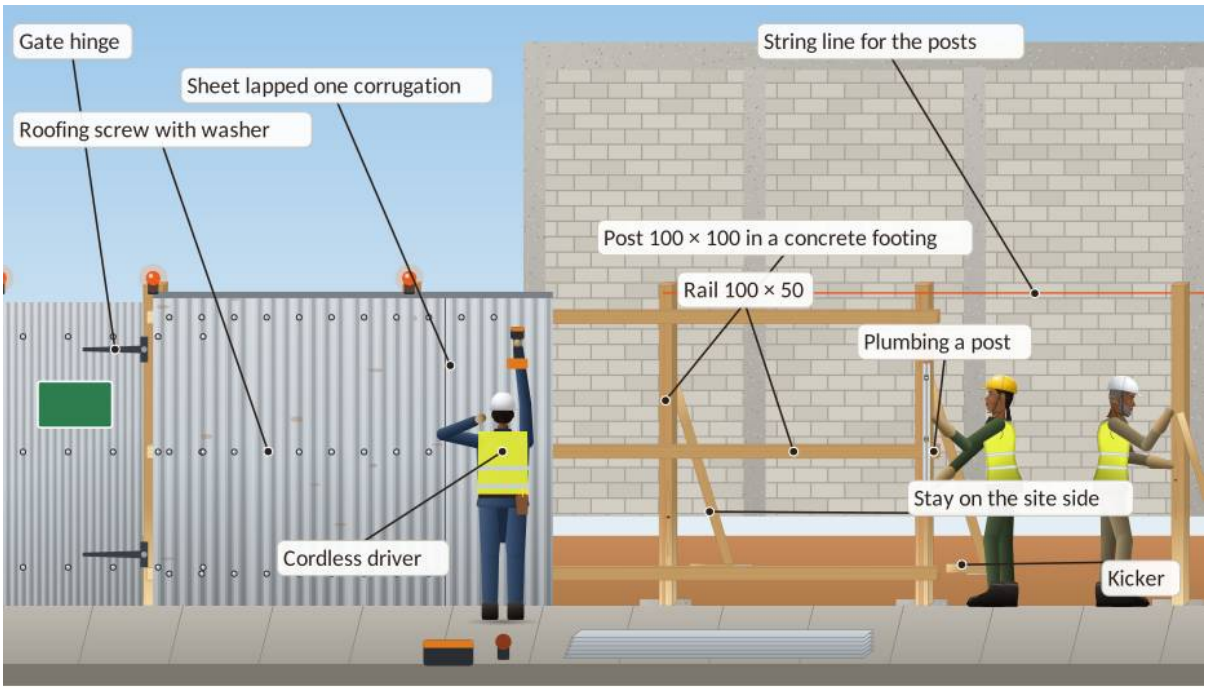



**Figure 7.6** Erecting the Kisii hoarding from the footway: one mason fixes a sheet with a cordless driver while others plumb a post and line the next post to a string. Posts stand in concrete footings with stays and kickers on the site side.

### WORKED EXAMPLE 7.1: QUANTITIES AND PRICE FOR THE 50 M KISII HOARDING

**Runs.** 50 m less the 5 m gate and the 1 m door leaves 44 m of sheeting in runs A (ch 0–9, 9 m), B (ch 10–12, 2 m), C (ch 17–20, 3 m) and D (ch 20–50, 30 m).

**Posts** (straight run = spaces rounded up + 1; posts at 2.0 m at most):
A: 9 ÷ 2.0 = 4.5 → 5 spaces → 6 posts. B: 2 ÷ 2.0 = 1 → 2 posts. C: 3 ÷ 2.0 = 1.5 → 2 spaces → 3 posts.
D: 30 ÷ 2.0 = 15 → 16 posts, less the B2 corner post already counted = 15.
Total = 6 + 2 + 3 + 15 = **26 posts**: 24 posts of 4x4 × 10 ft (2.4 m up + 0.6 m down = 3.0 m) and 2 gate posts.

**Rails** = 3 × 44 m = 132 m = 132 ÷ 0.3048 = 433.07 ft; + 10% = 476.38 → **477 ft** of 4x2.

**Sheets** (by layout, each run rounded up, cover 0.76 m): A 9 ÷ 0.76 = 11.84 → 12; B 2.63 → 3; C 3.95 → 4; D 39.47 → 40. Gate leaves 2 × (2.47 ÷ 0.76 = 3.25 → 4) = 8; door 0.95 ÷ 0.76 = 1.25 → 2. Total = 12 + 3 + 4 + 40 + 8 + 2 = **69 sheets**.

**Stays** = 26 ÷ 3 = 8.7 → **9**, each 8 ft plus a 2 ft kicker = 90 ft; + 10% = 99 ft. Each stay runs 1.6 m up the post and 1.2 m out: $\sqrt{(1.6^2 + 1.2^2)} = 2.0$ m.

**Screws**: 0.76 m cover ÷ 76 mm pitch = 10 corrugations; every second = 5 per rail; 69 × 3 × 5 = 1,035 → order **1,050**.

**Concrete 1:3:6**: 24 footings × (0.3 × 0.3 × 0.6 − 0.1 × 0.1 × 0.6) = 24 × 0.048 = 1.152 $m^3$; 2 gate footings × (0.45 × 0.45 × 1.0 − pole 0.012) = 0.380 $m^3$; total 1.532 $m^3$ wet × 1.54 = 2.360 $m^3$ dry; one part = 0.236 $m^3$. Cement = 0.236 × 1,440 = 339.8 kg = 6.80 bags + 5% = 7.14 → **8 bags**; sand 0.743 $m^3$ → 1.0 $m^3$; ballast 1.487 $m^3$ → 1.5 $m^3$ (method: Level 3 guide, Chapter 5).

Table 7.2 prices everything by the Chapter 4 method. Labour: 3 days to erect and 1 to dismantle with 2 masons and 4 helpers, plus the foreman for 2 days: 12,000 + 12,800 + 5,000 = KSh 29,800.
Prime cost = 181,275 + 29,800 = 211,075. Overheads 10% = 21,107.50. Transport (example) 8,000.
Profit = 0.10 × (211,075 + 21,107.50 + 8,000) = 24,018.25.
Total = 211,075 + 21,107.50 + 8,000 + 24,018.25 = **KSh 264,200.75** (say KSh 264,201, about KSh 5,284 per metre). VAT 16%, only if registered: 42,272.12; total KSh 306,472.87.

Sense-check: sheets are about a third of the materials (62,100 of 181,275 = 34.3%), as expected for a solid hoarding.

Table 7.2 Materials for the 50 m Kisii hoarding (example prices, approximate 2026)

| Item | Quantity × rate | KSh |
|---|---|---|
| Posts 4x4 × 10 ft | 240 ft × 110 | 26,400 |
| Gate posts, eucalyptus 6 m (cut to 3.4 m) | 2 × 450 | 900 |
| Rails 4x2 | 477 ft × 55 | 26,235 |
| Stays and kickers 4x2 | 99 ft × 55 | 5,445 |
| Gate and door frames 4x2 (41.12 m + 10%) | 149 ft × 55 | 8,195 |
| GI sheets 3 m | 69 × 900 | 62,100 |
| Concrete 1:3:6 | 8 bags, 1.0 $m^3$ sand, 1.5 $m^3$ ballast | 16,600 |
| Roofing screws with washers | 1,050 × 10 (example) | 10,500 |

| Item | Quantity × rate | KSh |
|---|---|---|
| Nails and coach screws | 12 kg × 200 | 2,400 |
| Gate and door ironmongery | examples 5,000 + 2,500 | 7,500 |
| Solar amber lamps | 8 × 1,500 (example) | 12,000 |
| Reflective tape and signs | example | 3,000 |
| **Materials** (project board and branding panel supplied by others) | | **181,275** |

Figure 7.7 shows the counting rules for any straight run. Notice that wider post spacing saves posts but not sheets, and sheets cost the most.

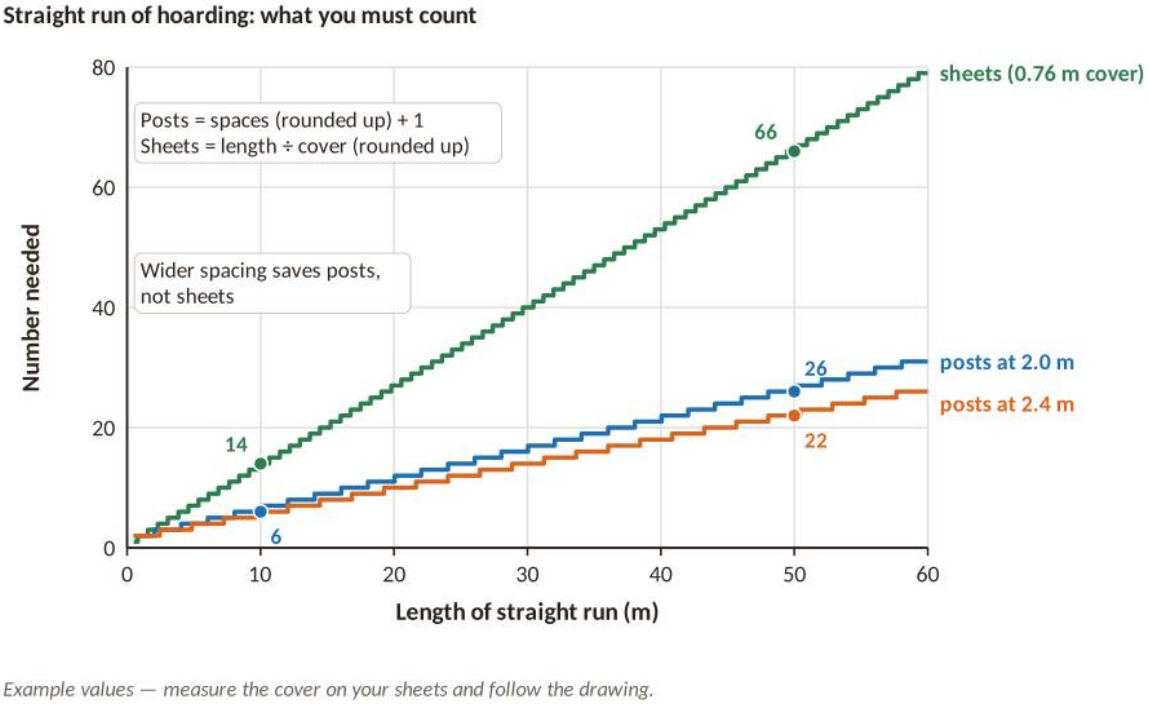



**Figure 7.7** Posts and sheets needed for a straight run of hoarding with posts at 2.0 m or 2.4 m centres and sheets at 0.76 m cover (example). Wider spacing saves posts but not sheets.

## 7.9 Inspecting and Maintaining the Hoarding

Walk the hoarding every morning and after every storm, from both sides. Look for leaning or loose posts, lifted stays, missing screws, flapping or torn sheets, sharp edges, gaps at the bottom, gates that drag or will not lock, dead lamps, and materials or debris piled against the inside. Fix faults the same day. If a section leans, keep people away from it, prop it from the site side, and find the cause before you straighten it. Record each inspection and repair in the site diary.

**ON SITE IN KENYA**

On a busy county-town road, hoardings take knocks from handcarts, boda bodas and parked lorries, and the rains soften the footings. Good foremen keep a "hoarding kit" at the gate: spare sheets, screws, a few stays, a lamp and a tin of paint for the branding panel. They also agree with the county where the footpath goes during deliveries, so the public is never pushed into the road.

## 7.10 Dismantling, Storage and Reuse

Dismantling is assessed as carefully as erection. Take the hoarding down in the **reverse order of erection**, and only when the supervisor says the boundary is no longer needed:

1. Switch off and remove lamps, signs, the project board and the branding panel.
2. Take off the gate and door leaves and their ironmongery.
3. Remove the sheets bay by bay, from the top screws down, in calm weather, with gloves.
4. Remove the rails, then the stays and kickers.
5. Pull or dig out the posts; break the footings away and send the concrete to the crushing pile.
6. Backfill and level the holes and leave the boundary clean.

De-nail every piece as it comes off. Sort into **A** (reuse as it is), **B** (repair or shorter use) and **reject** (to a scrap dealer or recycler, never burnt on site). Count each group and store as the maker says: sheets flat on bearers with edges protected, timber stickered off the ground under cover, ironmongery oiled in labelled boxes, lamps charged and tested. Record the counts, condition and the number of times each batch has been used. That record prices the next job.

**WORKED EXAMPLE 7.3: REUSING THE MACHAKOS HOARDING AT FOUR SCHOOLS**

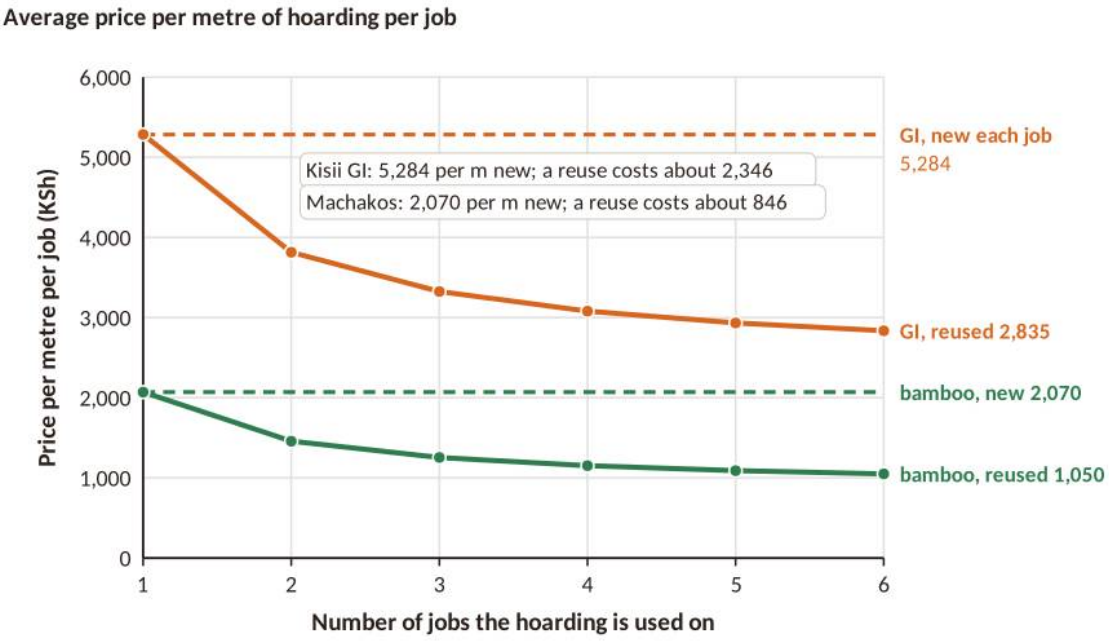
Chapter 4 priced the 130 m Machakos hoarding at KSh 269,144 new and KSh 109,946 when reused at the next school. A contractor has four school jobs over two years (example).

Reuse plan = 269,144 + 3 × 109,946 = 269,144 + 329,838 = **KSh 598,982**.
New each time = 4 × 269,144 = **KSh 1,076,576**.
Saving = 1,076,576 − 598,982 = KSh 477,594, which is 477,594 ÷ 1,076,576 × 100 = **44.4%**.

Per year = 598,982 ÷ 2 = **KSh 299,491** with reuse, against 1,076,576 ÷ 2 = KSh 538,288 new each time.

Sense-check: a reused hoarding costs about 41% of a new one, so after the first job most of the price is labour.

Figure 7.8 shows the same effect for the Kisii GI hoarding. Reused at the next town site with new screws, nails and concrete and 20% of the other materials replaced, the price falls from KSh 5,284 to about KSh 2,346 per metre.




*Example prices, approximate 2026; whole quotation (materials, labour, overheads, transport, profit) before VAT.*

**Figure 7.8** Average price per metre of hoarding per job: reusing the hoarding pulls the price down with every job, while buying new each time stays flat (example; Kisii GI from Worked example 7.1, Machakos bamboo and chain-link from Chapter 4).

### COMMON MISTAKES

- Hanging the gate to open outward over the footpath.
- Setting line posts by eye instead of to a string, so the hoarding snakes.
- Joining rails between posts, or fixing sheets at only two points per rail.
- Leaving out stays "because the posts are in concrete".
- Cutting sheets with a grinder and leaving burred edges at head height.
- Stacking cement or debris against the inside of the hoarding.
- Dismantling by ripping sheets off with a crow bar, then buying new sheets for the next site.

## Practical task 7.1: Demarcate and erect a 10 m hoarding section with a corner and a door

### Tools and equipment

- Tape, builder's line and pins, pegs, spirit level, mason's square
- Spade, jembe, crow bar, tamping rod
- Hand saw, claw hammer, cordless drill-driver, tin snips, file
- Full PPE: helmet, boots, leather gloves, reflective vest, goggles when drilling

### Materials

- 7 posts 4x4 or eucalyptus poles
- 4x2 rails for 3 × 9 m, 2 stays, 1 door frame
- 14 GI sheets cut to 2.4 m, screws with washers
- Murram and stones for rammed footings

### Steps

1. On the practice yard, set out a 7 m line and a 3 m return square to it (3-4-5 check). Mark a 1 m door at the corner end of the 7 m line.
2. Peg posts at 0, 2, 4 and 6 m, the corner post at 7 m, and the return at 1.5 m and 3.0 m.
3. Dig the holes, set the end and corner posts plumb, line the others to a string, and ram the footings.
4. Fix three rails level, then the sheets with a screw at every second corrugation, edges inward.
5. Fix two stays with kickers; hang the door to open inward with a lock.
6. Check line, plumb, level and rigidity, and fill in the record.

### Safety

- Carry sheets by two people in gloves, edge-up, not in wind.
- Cover or barrier open post holes.
- Keep 3 m between people using spades and bars.

### Record your results

Hoarding setting-out and quality check sheet

| Check | Required | Measured | OK / action |
|---|---|---|---|
| Corner diagonal (3-4-5) | 5.000 m | | |
| Post spacing | ≤ 2.0 m | | |
| Posts plumb, both faces | bubble central | | |
| Rails level | bubble central | | |
| Line straight to string | within 10 mm | | |
| Fixings at every second corrugation | yes | | |
| Door opens inward and locks | yes | | |
| Rigidity: push at post tops | no rocking | | |
| No sharp edges or gaps at the bottom | yes | | |

## Practical task 7.2: Dismantle, sort and store the hoarding section for reuse

### Tools and equipment

- Cordless drill-driver, claw hammer, crow bar, nail bar, pincers
- Spade, wheelbarrow, bearers for stacking
- Full PPE including leather gloves

### Materials

- Labels and marker, labelled boxes for screws and ironmongery
- Oil for hinges and bolts

### Steps

1. Get the supervisor's go-ahead and barrier the area.
2. Remove the door, then the sheets from the top screws down, then rails, stays and posts: the reverse of erection.
3. De-nail and clean each piece; sort it into A, B or reject.

4. Stack sheets flat with edges protected and timber stickered off the ground; box and oil the ironmongery.
5. Backfill the holes, level and sweep the area.
6. Count everything and fill in the record.

### Safety

- Never stand on the far side of a sheet being freed; it can spring.
- Bend over or pull every nail at once.
- Do not pull posts by rocking the whole line.

### Record your results

Dismantling and reuse record

| Item | Count out | A reuse | B repair | Reject | Stored where / uses so far |
|---|---|---|---|---|---|
| Posts | 7 | | | | |
| Rails and stays | | | | | |
| GI sheets | 14 | | | | |
| Door and ironmongery | 1 set | | | | |
| Screws (kg) | | | | | |

## Chapter summary

- The Code requires a boundary that keeps the public out before work starts; a hoarding also gives security, screening and a place for signs.
- Choose the type for the site: GI sheets on town roads, bamboo or chain-link with shade net at schools, modular panels for repeat jobs.
- Set out from the beacons with a string line, chainage and pegs; check corners by 3-4-5 and the diagonals; step panels on slopes.
- Erect in order: posts, footings, rails, sheets, stays, gates, lamps and signs; check line, plumb, level and rigidity.
- A hoarding is a sail: post depth, stays and full fixings keep it up. Inspect daily and after storms.
- Kisii's 50 m GI hoarding needs 26 posts, 477 ft of rails and 69 sheets, priced at about KSh 264,201.
- Dismantle in reverse order, sort, store and record: reuse cut the Machakos cost over four schools by 44.4%.

### Check your competence

- [ ] I can explain why a hoarding is needed and choose a suitable type.
- [ ] I can name the parts of a hoarding and the permissions needed beside a road.
- [ ] I can set out a hoarding line from beacons with chainage and square corners.
- [ ] I can count posts, rails, sheets, stays and fixings and price them.
- [ ] I can erect a hoarding in the right order with gates opening inward.
- [ ] I can check line, plumb, level and rigidity and record the results.
- [ ] I can dismantle a hoarding in reverse order and sort, store and record the materials.

### Practice questions

1. Give four reasons why a town site needs a hoarding before work starts. Which part of the National Building Code 2024 requires a boundary?
2. Compare a GI-sheet hoarding with chain-link and shade net: say where each suits and give one strength and one weakness of each.
3. (Oral) Explain to a new helper why the gate opens inward and how it is held open and locked.

4. A straight 26 m run has posts at 2.4 m centres and sheets with 0.76 m cover. Find the posts, the sheets and the rails in feet for three rails with 10% waste.
5. (a) What diagonal proves a corner square with a 9-12-15 triangle? (b) A 6-8-10 check reads 10.150 m. Is the angle more or less than 90°, and what do you do?
6. Put these in erection order: sheets, lamps and signs, posts, stays, footings, rails, setting out, gate.
7. (Fault-finding) After a night storm, 12 m of the Kisii east hoarding leans about 150 mm towards the open plot. Two stays have lifted out of the soft ground and some sheets flap. What do you do now, what caused it, and how do you fix it for good?
8. Which offices must you ask before (a) putting a hoarding on a footpath, (b) painting an advert on it, (c) building beside a national road?
9. Describe how you dismantle a hoarding for reuse and what you record.
10. (Practical) Carry out Practical task 7.1 and hand in the completed setting-out and quality check sheet.

# Enjoyed this sample?

This free sample of **Masonry Level 4** has the front matter, Chapter 1 and the full Chapter 7 on site hoarding: hoarding types and green materials, permissions and demarcation along the boundary, setting out by chainage, posts, rails, sheets, stays, gates and lamps, checking rigidity after a storm, a full KSh costing, and dismantling and storing the materials for reuse. The complete guide has **14 chapters** and **270 pages**. It covers both Level 4 units (Building Site Preliminary Works I and Building Temporary Works) plus the industrial attachment: site surveys, environmentally responsible clearance, demolition with asbestos rules, waste separation and debris records; hoardings and site amenities; trench timbering and dewatering; slab, beam, column and wall formwork on props and safe striking; independent, putlog and mobile tower scaffolds; raking, flying and dead shores; and costing every job in KSh.

It also includes 108 realistic illustrations, diagrams, charts and photos, 47 worked examples, 32 practical tasks with record sheets, 140 practice questions with full answers, seven mock assessments (one per learning outcome), a 196-term glossary, a quick reference of typical values and formulas, and photocopiable logbook, method-statement, waste-register, trench, formwork and scaffold inspection sheets.

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