Map Reading

Mr Tim Bateson

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Brief Introduction

- Electronic Engineering Degree, University of York, 2001-05
- RAF Engineering Officer, 2006-2011
- Cybersecurity Consultant, 2011-2016
- Cybersecurity & Risk Manager, McLaren, 2016-now
- Occasional 135 Sqn Civilian Instructor, 2015-now







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Objectives

- Be able to describe some different types of maps.
- Be able to describe why maps are useful/important.
- Understand different map scales and their uses.
- Identify the main symbols used on OS maps.
- Use the OS Grid Referencing system.
- Understand contour lines and use them in route planning.

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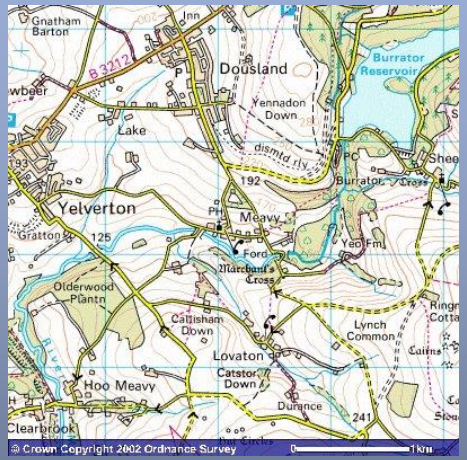
Before We Start

- No need to take lots of notes.
- These slides are available at www.timbateson.co.uk/rafac/

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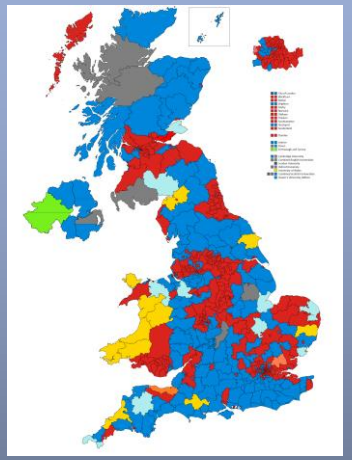
(Some) Types of Map



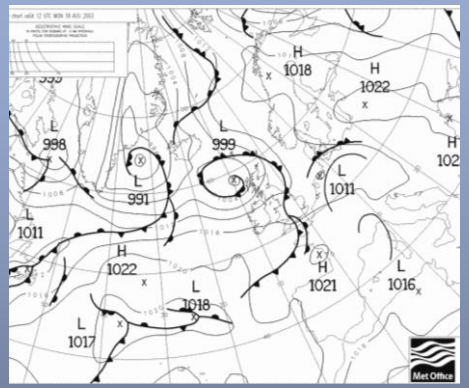
Topographic – shows the shape of the land.



Political – shows borders between countries, regions, cities.



Demographic – shows population information.



Synoptic – shows weather.

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Why Are Maps Important?

- Surely we just pull out our phones and use Google Maps, right?

- Why not?
  - Might not have signal (especially up a mountain).
  - Battery might go flat (while we're a long way from a charger).
  - Phones generally don't like water/rain or cold.
  - Lost phone = lost team.

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Map Scales

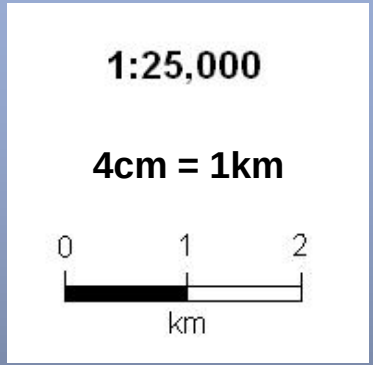
- What is the scale of a map?
  - *The ratio of a distance on the map to the corresponding distance on the ground.*
  - How ‘zoomed in’ or ‘zoomed out’ the map is.
- Map scales may be expressed in words, as a ratio, or as a fraction. For example:
  - ‘One centimetre to one hundred metres‘ or 1:10,000 or 1/10,000.
  - ‘One centimetre to one thousand kilometres‘ or 1:100,000,000 or 1/100,000,000 (this would usually be abbreviated as 1:100M).
  - ‘One inch to one mile' or 1:63,360 or 1/63,360.

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Map Scales

- The scale bar to the right shows that:
  - The scale of the map is 1:25,000.
  - 1cm on the map = 250m on the ground.
  - 4cm on the map = 1km on the ground.

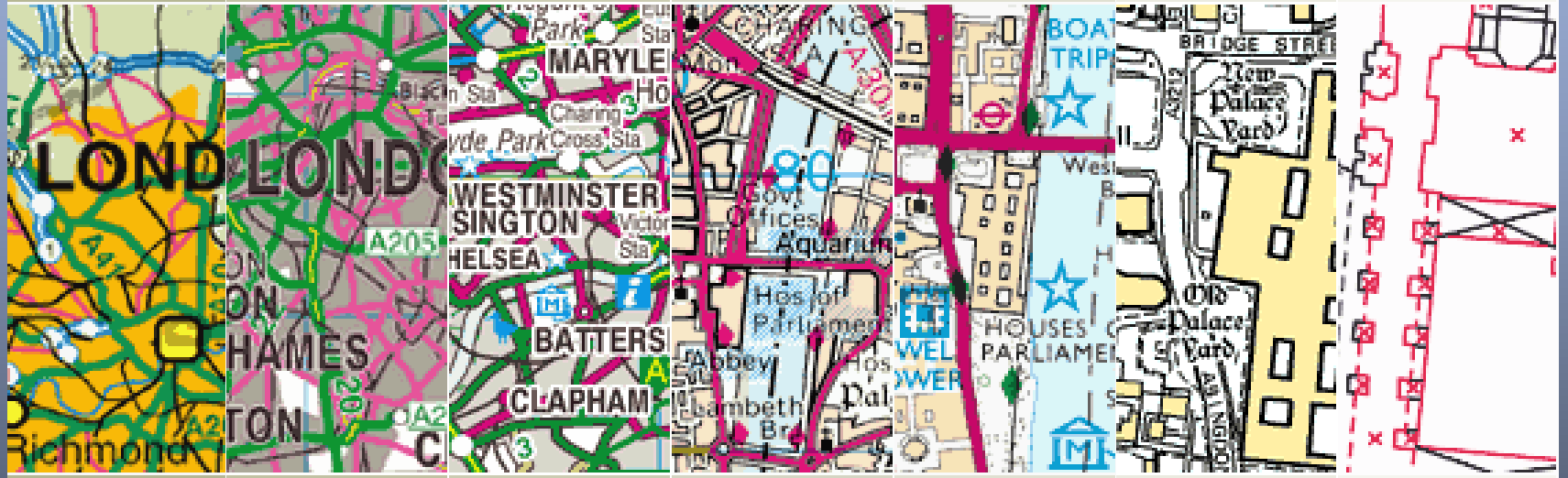


- The higher the number on the right of the scale:
  - The more ‘zoomed out’ the map is.
  - The bigger the area covered.
  - The lower the amount of detail you can see.

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Map Scales



1:1,000,000 scale mapping	1:625,000 scale mapping	1:250,000 scale mapping	1:50,000 scale mapping	1:25,000 scale mapping	1:10,000 scale mapping	1:1250 scale mapping

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Map Scales – 1:1,000,000



- 1cm on map = 1,000,000cm (10km) on the ground.
- Can see:
  - Cities and towns.
  - Motorways and dual carriageways.
  - Major railway lines.
  - Airports/airfields.
- Useful for: air navigation.

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Map Scales – 1:625,000



- 1cm on map = 625,000cm (6.25km) on the ground.
- Can see:
  - Cities and towns.
  - Major rivers.
  - Motorways and junctions.
  - Major (A) roads.
- Useful for: long distance road journey planning.

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Map Scales – 1:250,000



- 1cm on map = 250,000cm (2.5km) on the ground.
- (Roughly 1 inch = 4 miles.)
- Can see:
  - Town and district names.
  - Major roads and rivers.
  - Parks, golf courses, country houses, caravan parks.
- Useful for: road journey planning (e.g. UK road atlas).

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Map Scales – 1:50,000

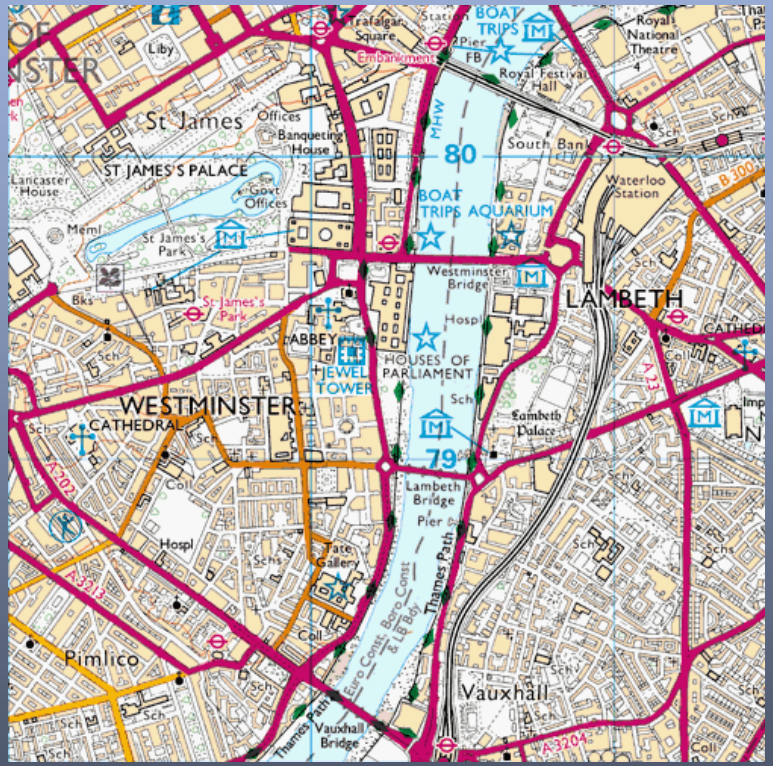


- 1cm on map = 50,000cm (500m) on the ground.
- Can see:
  - Most roads and railway lines.
  - Lakes, bridges, tunnels, roundabouts, rail stations.
  - Churches, hospitals.
  - Major tourist attractions.
- Useful for: walking/general.
- Probably the most common.

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Map Scales – 1:25,000

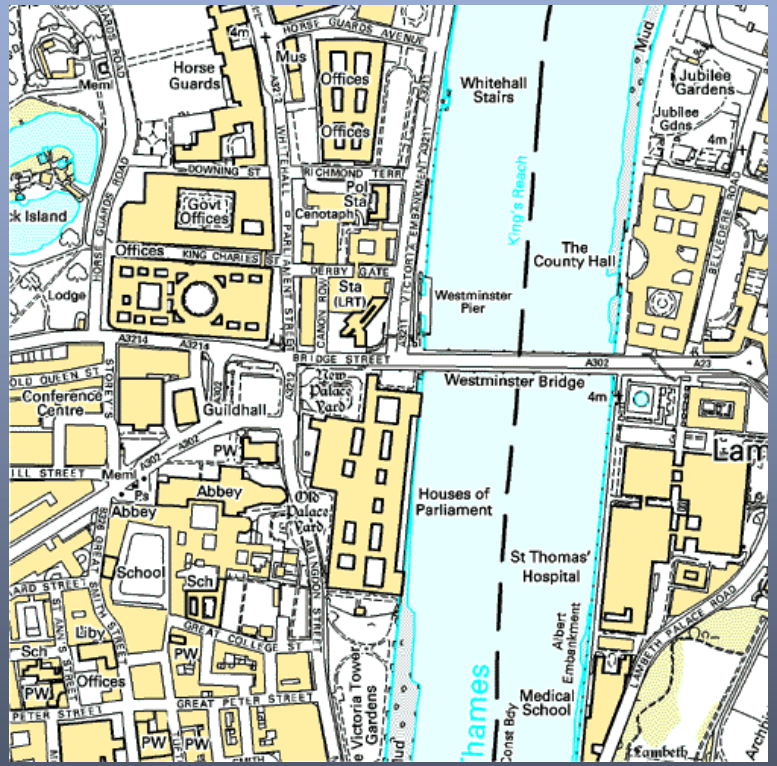


- 1cm on the map = 50,000cm (500m) on the ground
- Can see:
  - Minor roads and footpaths.
  - Shapes of buildings.
  - Schools, colleges, museums, libraries, tube stations.
  - Field boundary walls.
- Useful for: detailed navigation on foot.

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Map Scales – 1:10,000

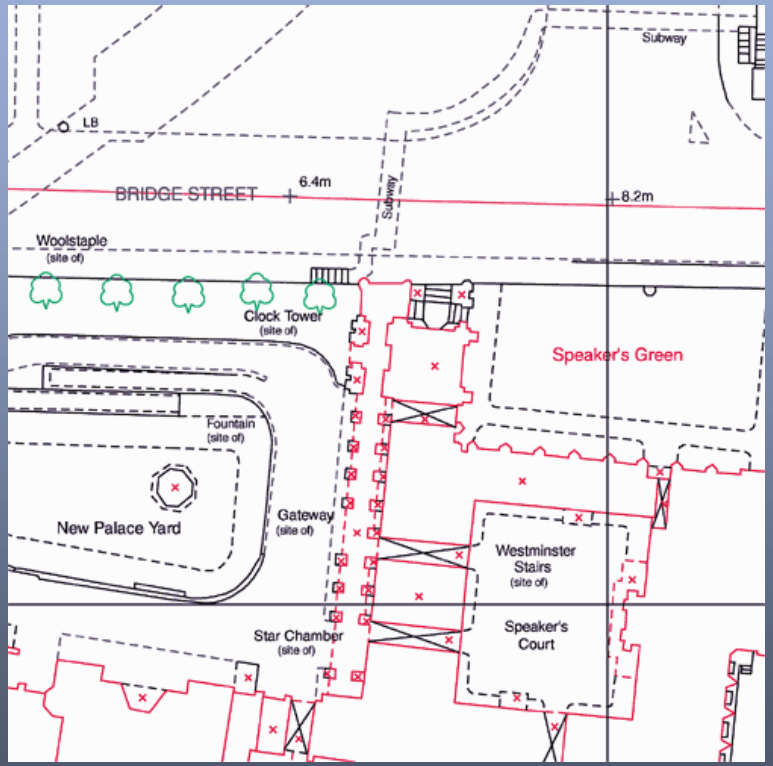


- 1cm on the map = 10,000cm (100m) on the ground
- Can see:
  - Street names.
  - Detailed building outlines.
  - Piers, fountains, statues.
- Useful for: town planning.

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Map Scales – 1:1,250

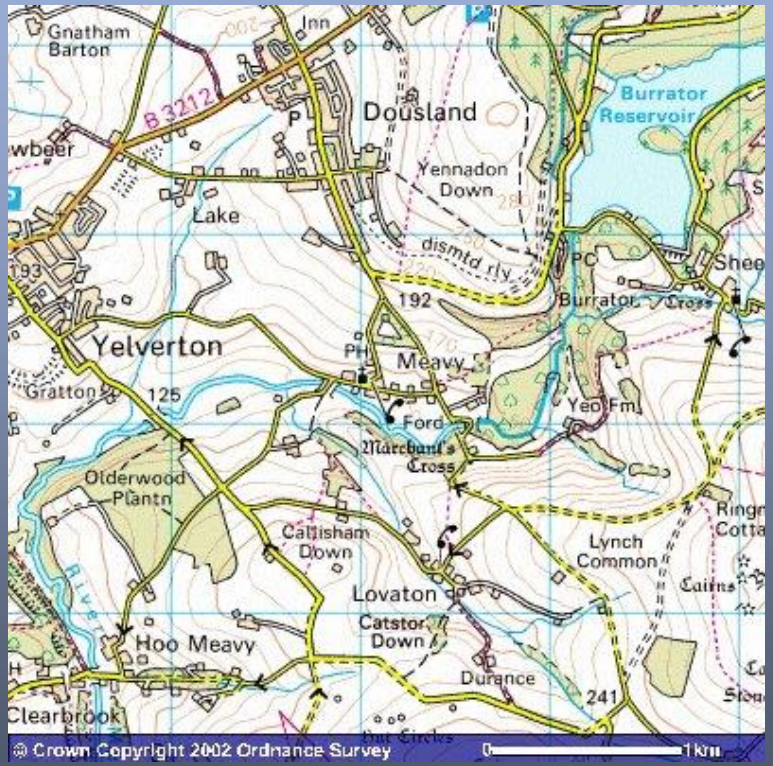


- 1cm on the map = 1,250cm (12.5m) on the ground
- Can see:
  - Pedestrian walkways (pavements, subways, stairs).
  - Individual trees.
  - Lawns, gardens.
  - Pillars and posts.
- Useful for: building planning.

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1:50,000 – Popular for Walking



- 1cm on map = 50,000cm (500m) on the ground.
- 1 grid square = 2cm = 1km.
- Each map = 40km^2.
- No field boundaries.

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1:25,000 – Very Detailed Walking Maps

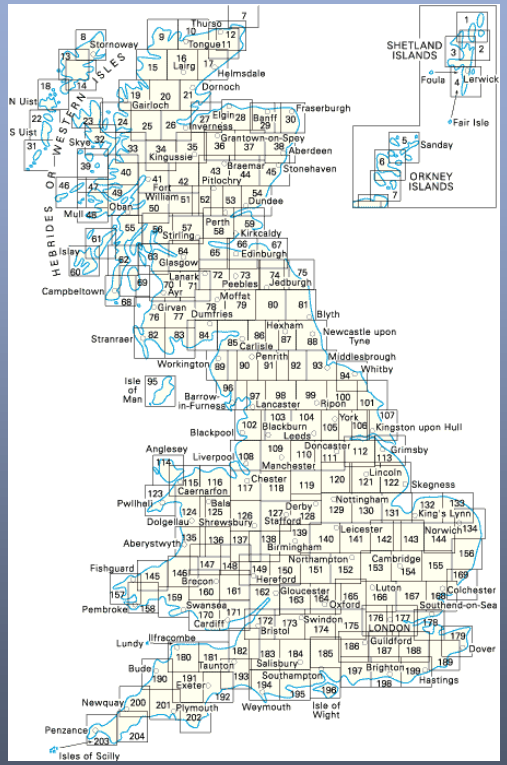


- 1cm on map = 25,000cm (250m) on the ground.
- 1 grid square = 4cm = 1km.
- The largest scale at which you get field boundaries – really useful on DofE etc.

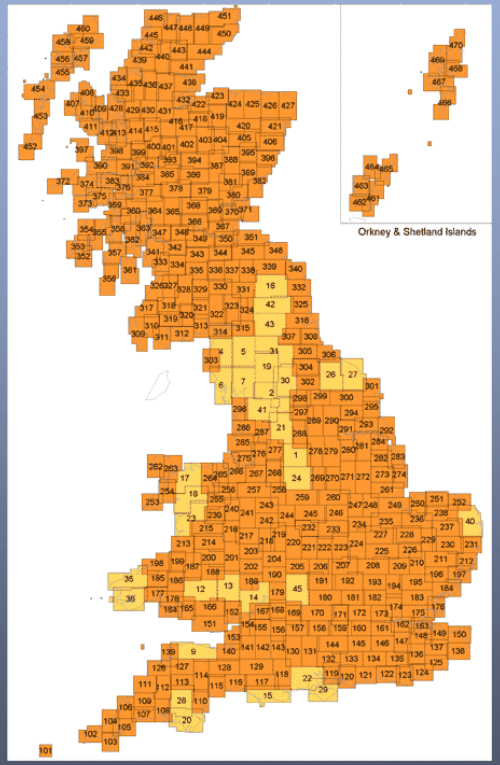
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1:50,000 and 1:25,000 Maps of the UK



- To cover the whole of the UK, you'd need:
  - 204 maps at 1:50,000 scale (left).
  - 403 maps at 1:25,000 scale (right).
- To cover Kent, Surrey & Sussex, you'd need:
  - 12 maps at 1:50,000.
  - 20+ maps at 1:25,000.



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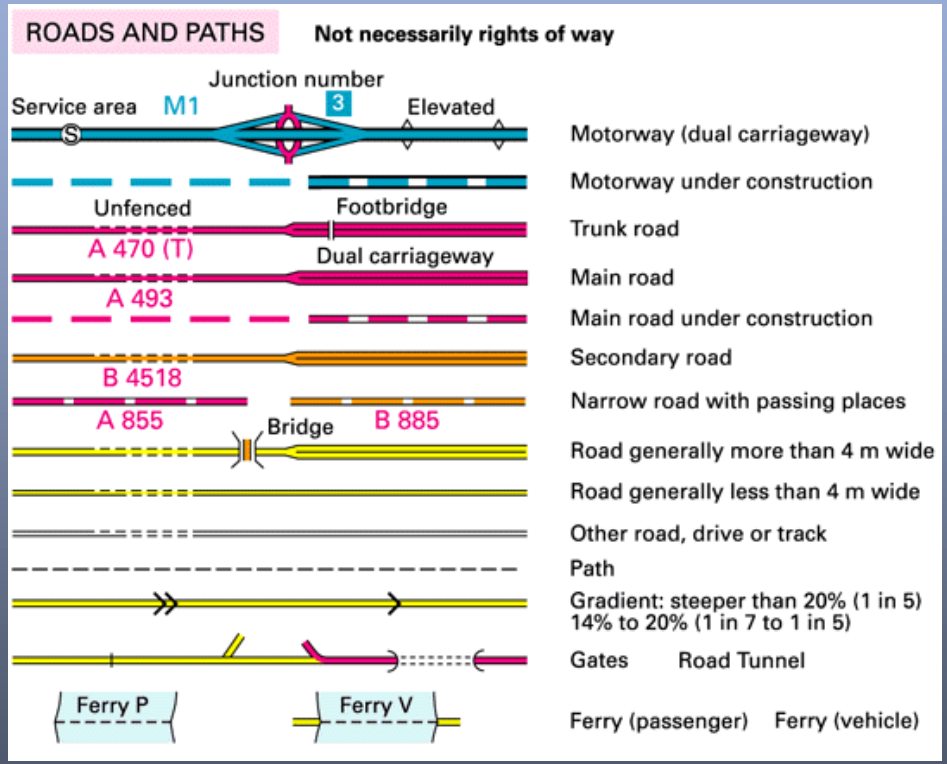
Map Symbols

- Symbols on the map are used to represent notable features, either natural (e.g. a forest) or man-made (e.g. a road).

- Features are useful to us, as:
  - They help us to identify where we are.
  - They help us avoid danger.
  - They help us to plan better routes.

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Map Symbols – Roads



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Map Symbols – Railways

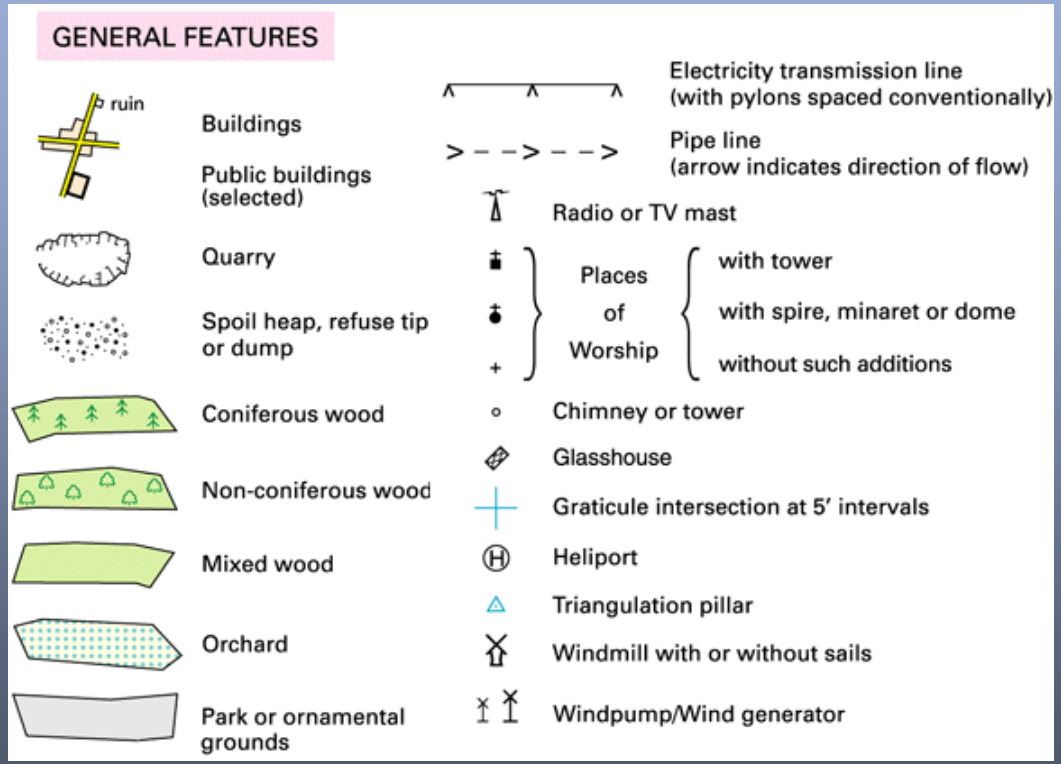
RAILWAYS

	Track multiple or single
	Freight line, siding or tramway
	Track narrow gauge
a b	Station (a) principal (b) closed to passengers
LC	Level crossing
	Embankment
	Cutting
	Bridges, Footbridge
	Tunnel
	Viaduct

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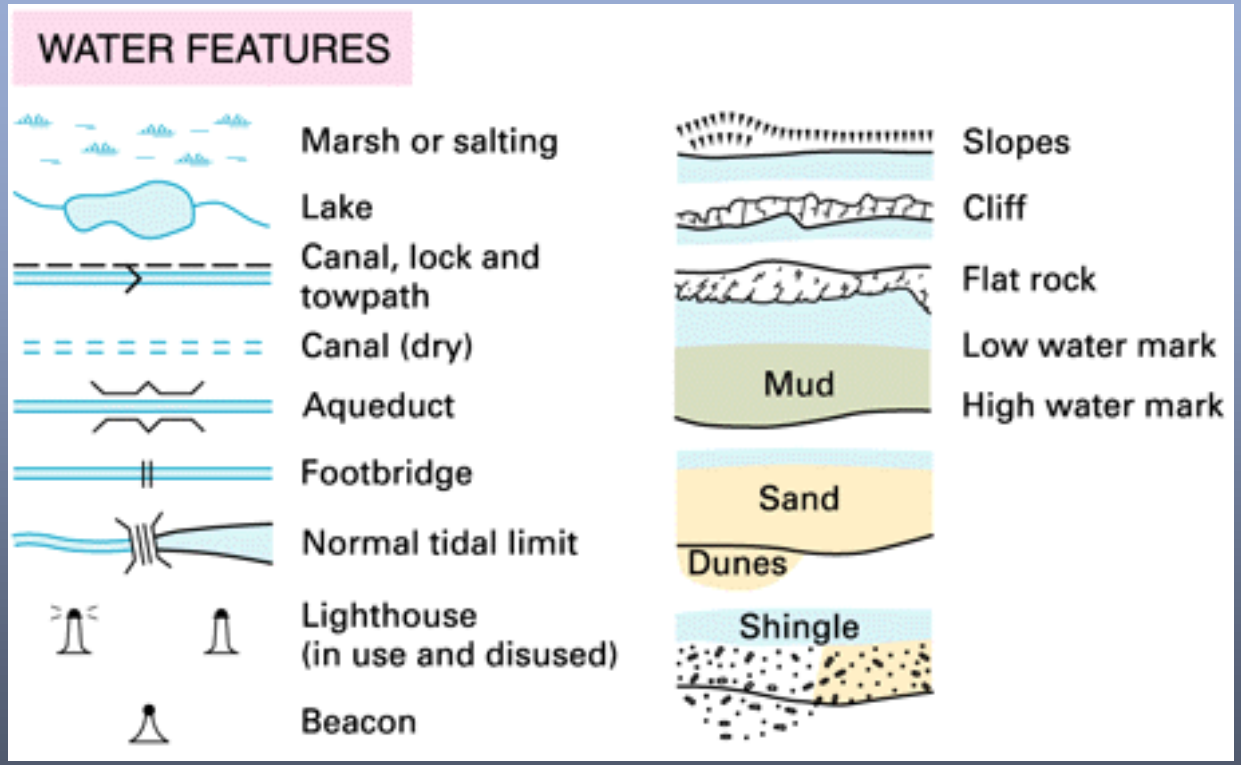
Map Symbols – General



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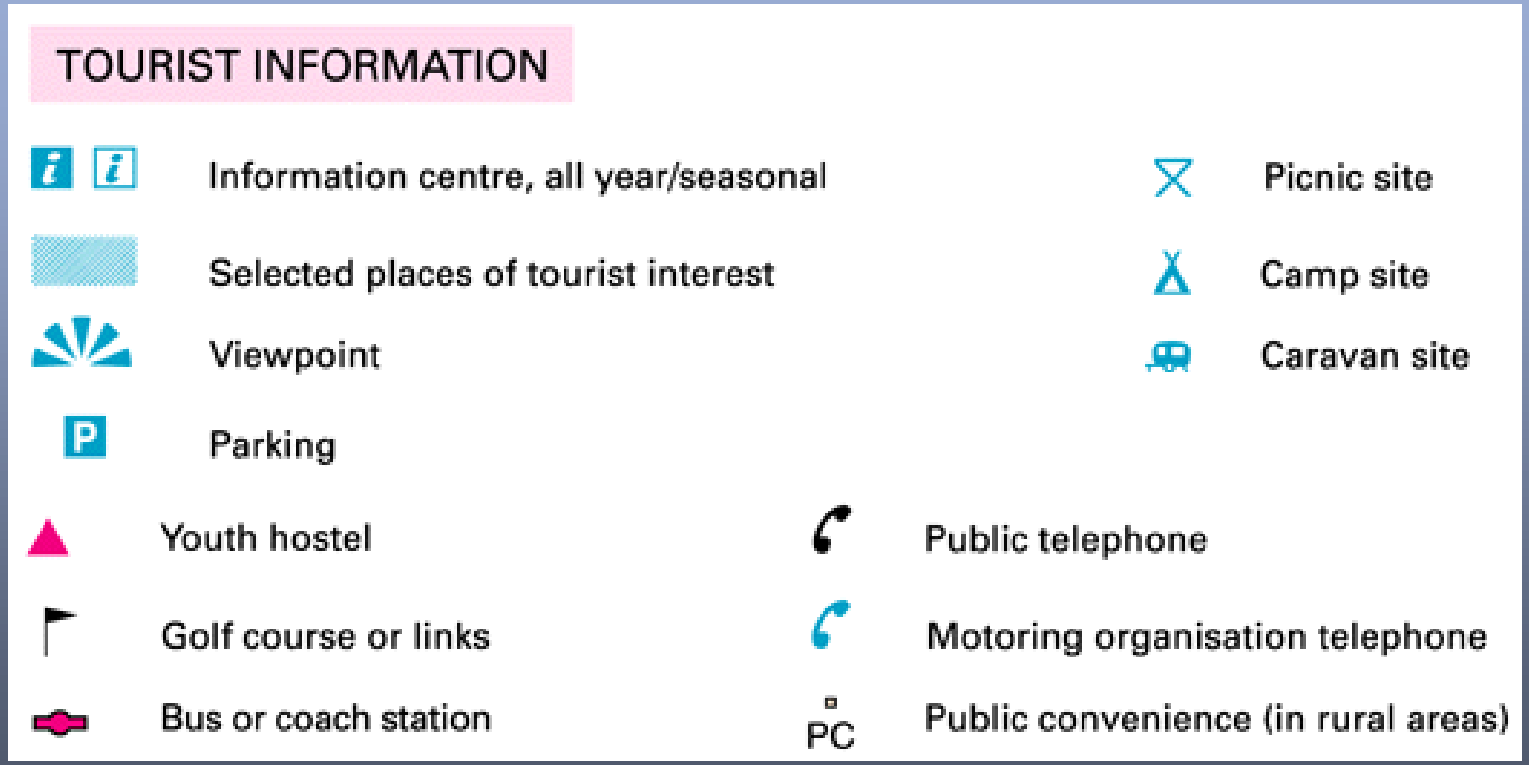
Map Symbols – Water



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Map Symbols – Tourist



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Grid References

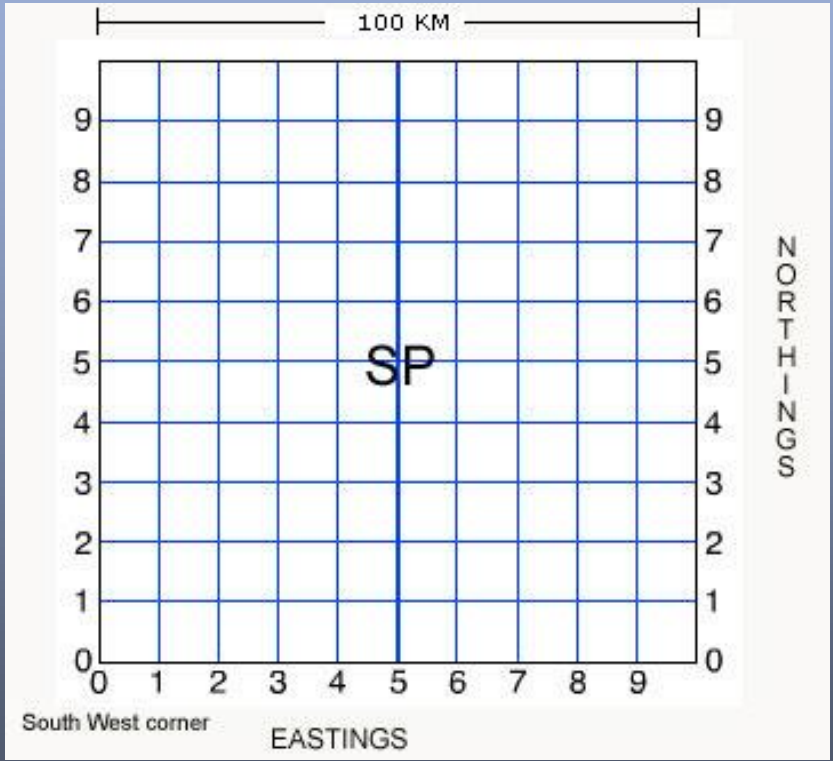


- Great Britain has been laid out on a grid system by the Ordnance Survey (OS).
- Each square measures 100km by 100km.
- Each square is identified by its two letter code.
- The two letters form the prefix of the National Grid Reference system.

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Grid References

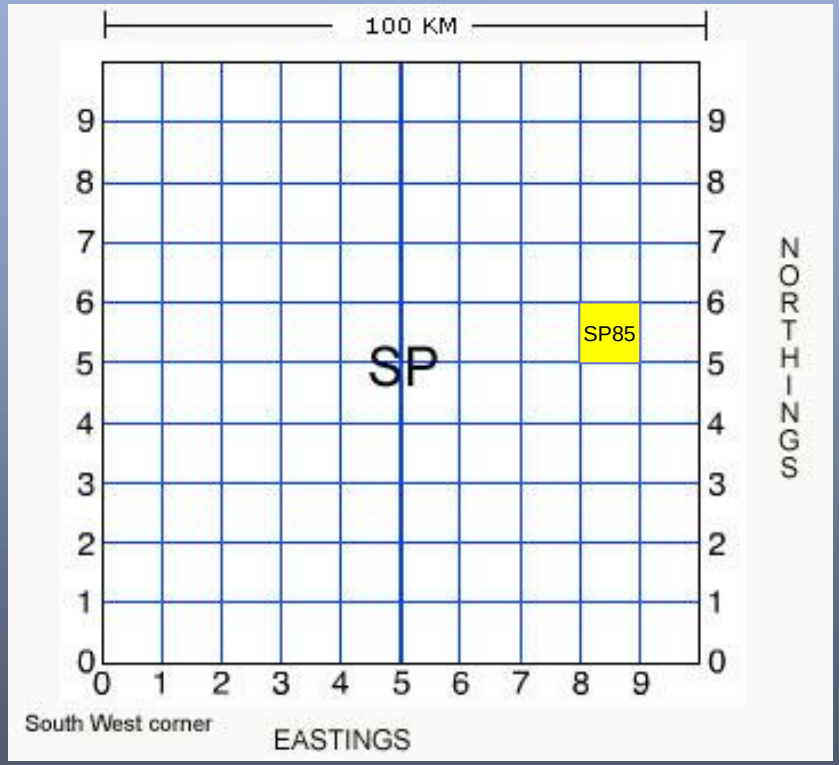


- Each letter-coded grid square is then further broken down into 100 smaller squares, using a 10 x 10 grid.
- Each square is 10km by 10km.
- This example is grid square SP.

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Grid References



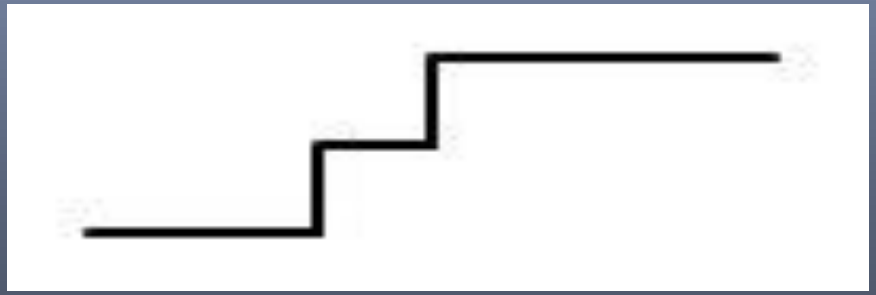
- You can describe any 10km x 10km square by giving:
  - The number of squares it is from the left (the EASTING).
  - The number of squares it is from the bottom (the NORTHING).
- For example: the National Grid Reference for the square highlighted is SP85.

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Grid Reference

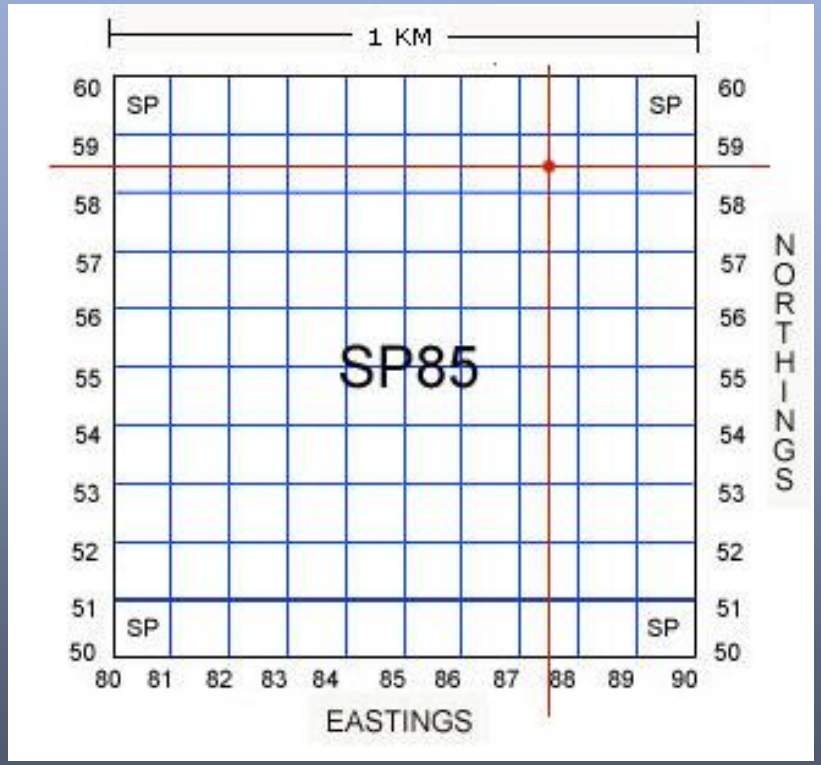
- Each of these smaller squares is numbered from 0 to 9 from the south-west corner, both horizontally (eastwards) and vertically (northwards).
- The easting (left to right) is given first.
- The northing (bottom to top) is given second.
- To remember this, think “along the corridor and up the stairs”.



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Grid References

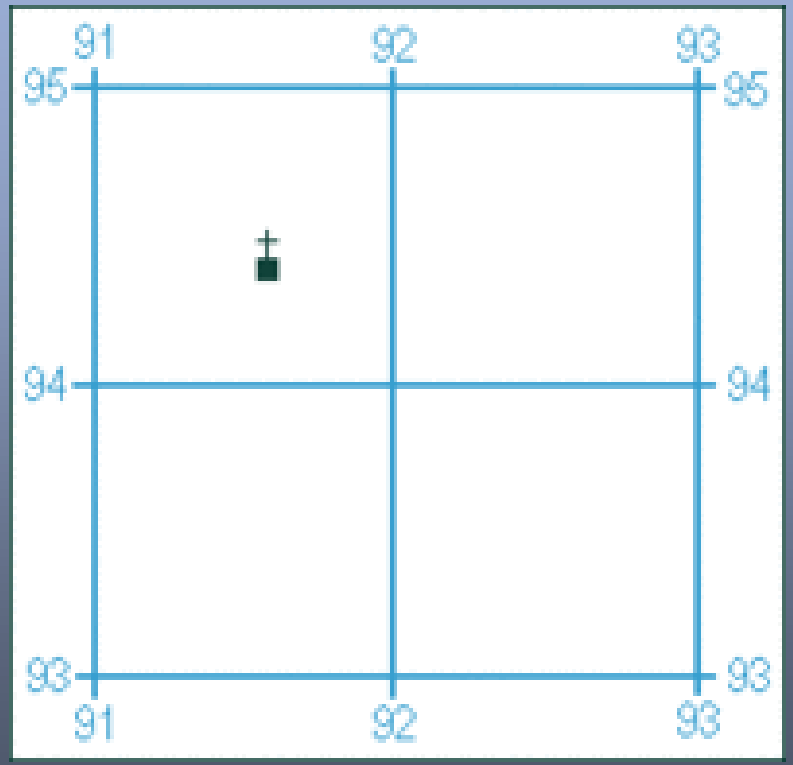


- In real life, we often need more precision.
- To do this, we use a 6 figure grid reference.
- The NGR prefix is SP.
- The easting is: 875.
- The northing is: 585.
- The full 6 figure grid reference is thus: SP875585.

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Grid References

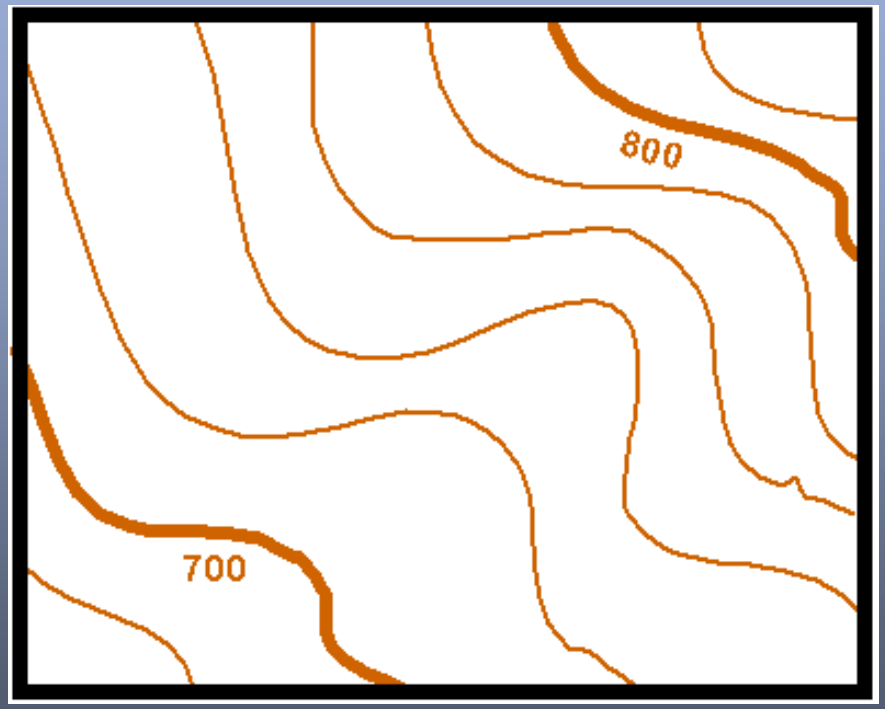


- What is the 6 figure grid reference of the church?
- (Let's assume we're still within National Grid Reference SP).

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Contour Lines

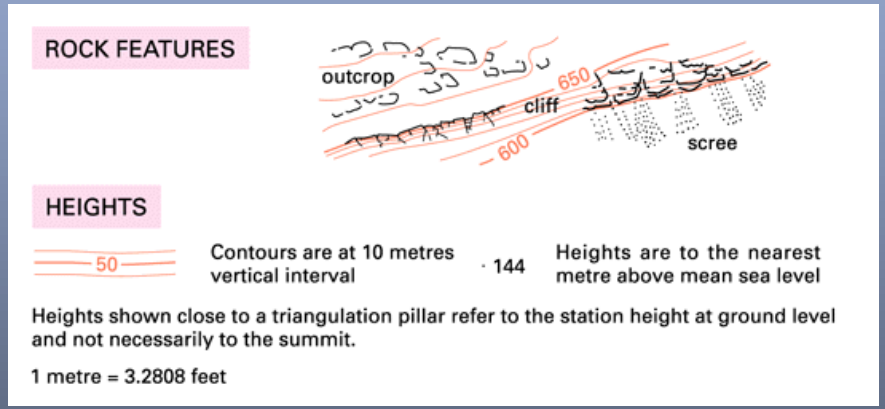


- What are they?
- What do they show?

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Contour Lines

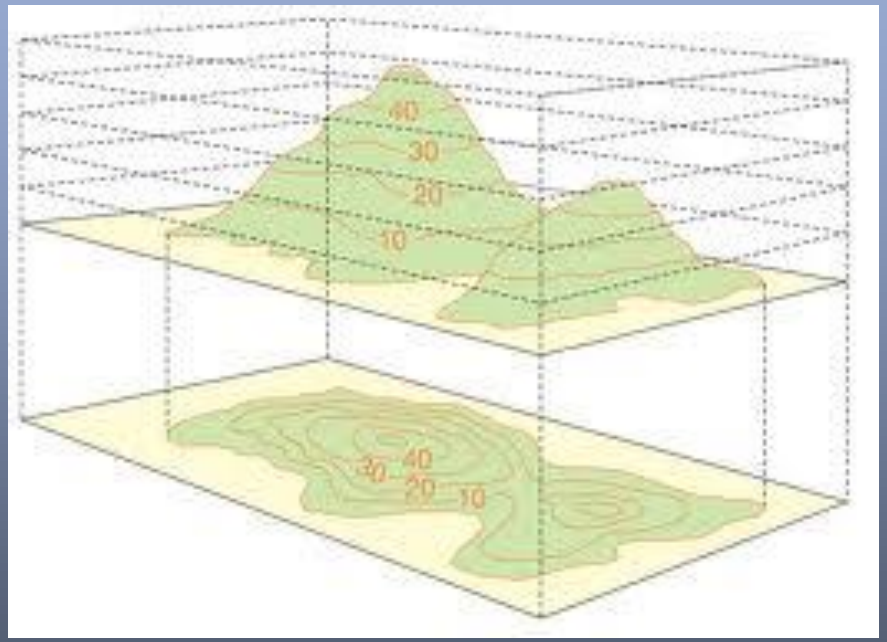


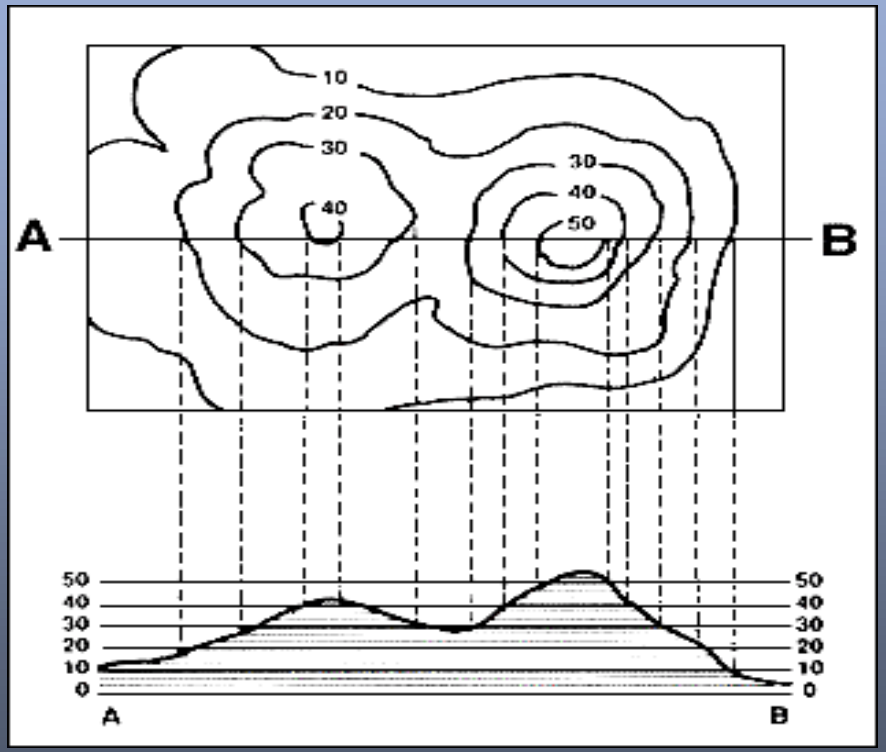
- Contour lines join points of equal elevation (height above sea level).
- Marked at intervals of 10m on most scales of map.
- Contour lines far apart = gentle slope.
- Contour lines close together = steep slope.

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Contour Lines

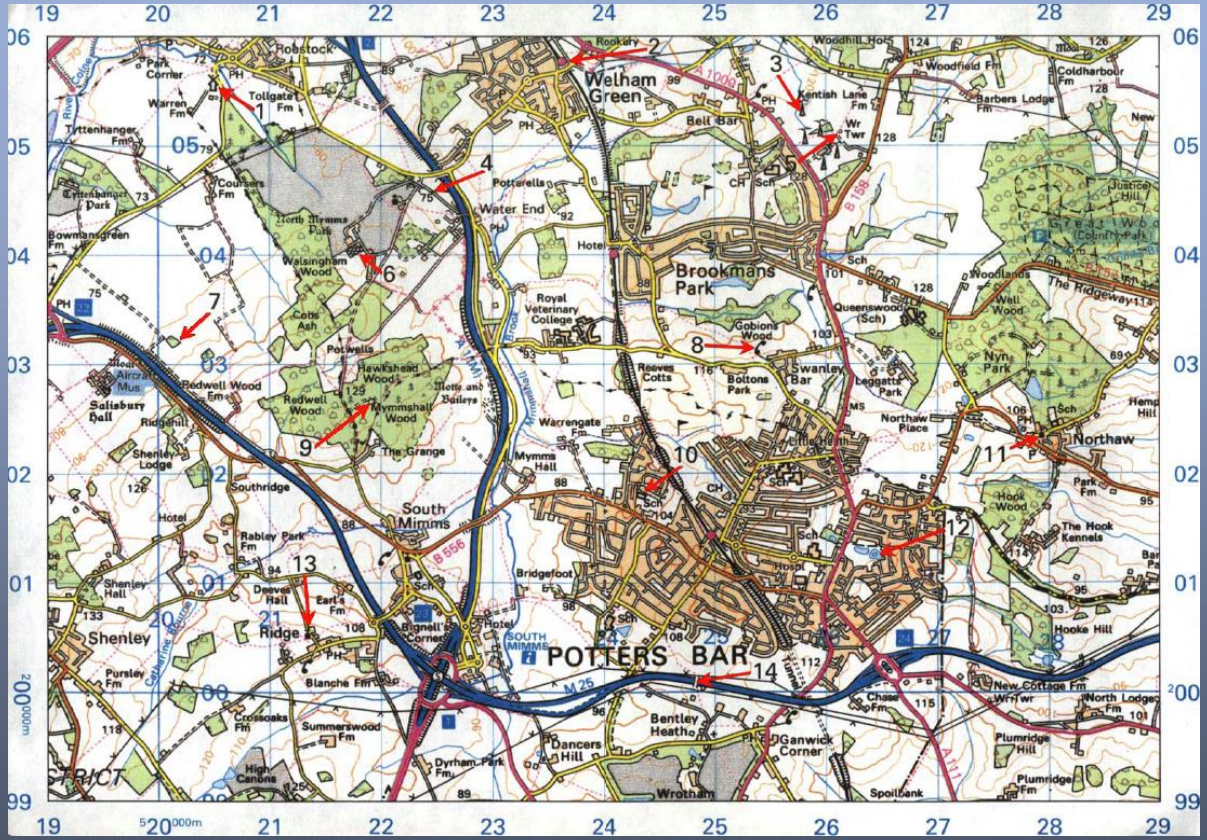




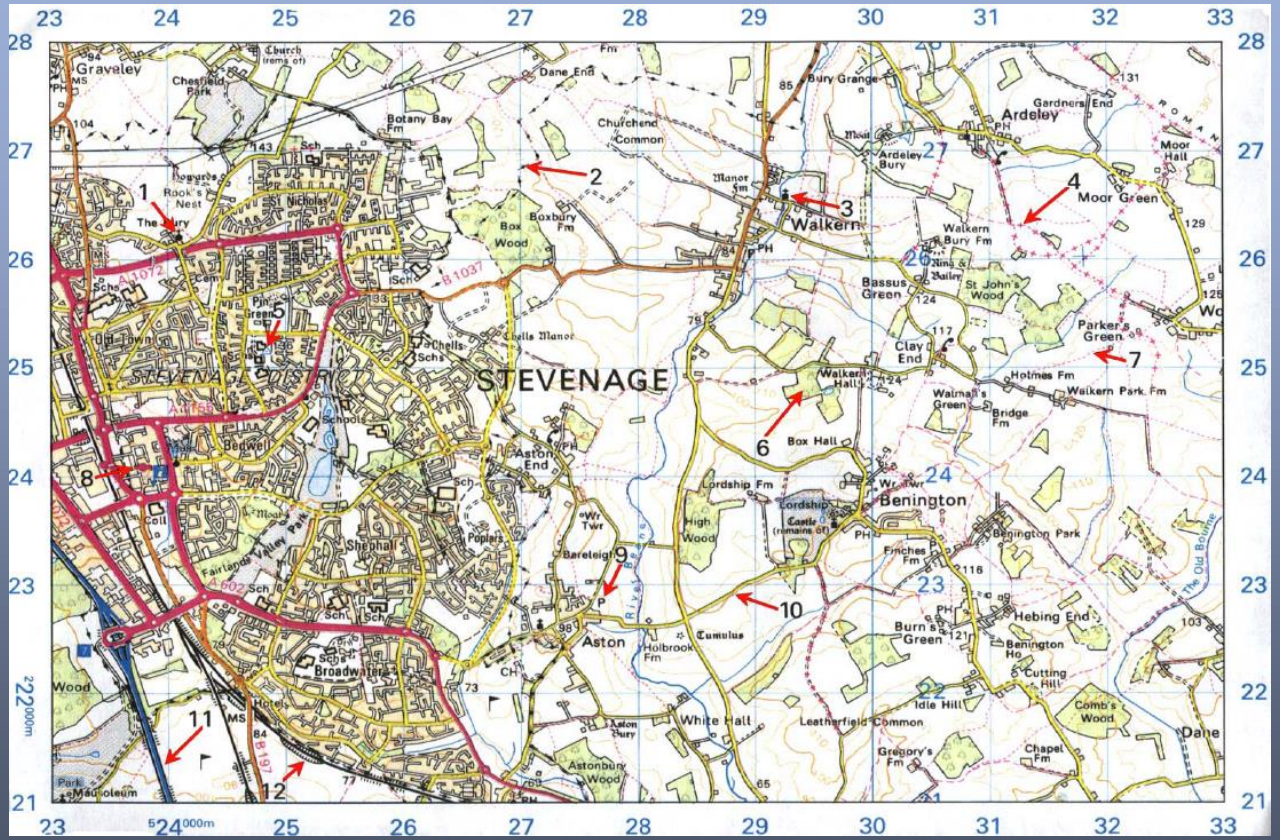
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What are the 6 figure grid references for each red arrow?


1
2
3
4
5
6
7
8
9
10
11
12
13
14
Welham Green
Brookmans Park
Northaw
South Mimms
POTTERS BAR
Shenley
Ridge
Water End
Rookery
Tollgate Fm
Kentish Lane Fm
Potterells
Walsingham Wood
Cotts Ash
Redwell Wood
Mymmshall Wood
Hawkshead Wood
Gobions Wood
Swanley Bar
Boltons Park
Leggetts Park
Northaw Place
Mymms Hall
Warrengate Fm
Bridgefoot
Rabley Park Fm
Deaves Hall
Earls Fm
Bignells Corner
Blanche Fm
Summerswood Fm
Crossoaks Fm
Dancers Hill
Bentley Heath
Ganwick Corner
Wrotham
Spoilbank
New Cottage Fm
Plumridge Hill
Plumridge Fm
Hooke Hill
The Hook Kennels
Queenswood (Sch)
Woodlands
Barbers Lodge Fm
Coldharbour Fm
Woodfield Fm
Woodhill Hall
Bell Bar
Wr Twr
Justice Hill
Roestock
Warren Fm
Tyttenhanger Fm
Coursers Fm
Bowmansgreen Fm
Royal Veterinary College
Reeves Cotts
Warrengate Fm
Redwell Wood Fm
Salisbury Hall
Shenley Lodge
Southridge
Shenley Hall
Pursley Fm
Blanche Fm
Summerswood Fm
High Canons
Dyrham Park Fm
Chase Fm
North Lodge Fm
Hook Wood
Park Fm
Hemp Hill
Nyn Park
Woodlands
The Ridgeway
Well Wood
Justice Hill
Coldharbour Fm
Barbers Lodge Fm
Woodfield Fm
Woodhill Hall
Bell Bar
Kentish Lane Fm
Wr Twr
Rookery
Welham Green
Tollgate Fm
Warren Fm
Roestock
Tyttenhanger Fm
Coursers Fm
Potterells
Water End

What features are indicated by the numbered arrows?



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1. What are the relief features numbered 1 to 5?



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2. What types of slopes are under lines 6 and 7?



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3. At what height above sea level is Long Loch?



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4. What is the height difference between Kinloch Mountain Rescue Post and Hallival (395 963)?



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5. What feature is under line 8, and what is its highest point?



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Objectives (Recap)

- Be able to describe some different types of maps.
  - E.g. topographic, political, demographic, synoptic.
- Be able to describe why maps are useful/important.
  - Phones aren't 100% reliable and the impact of getting lost is high.
- Understand different map scales and their uses.
  - 1:25,000 is best for walking; 1:50,000 as a general-purpose map.
- Identify the main symbols used on OS maps.
- Use the OS Grid Referencing system.
- Understand contour lines and use them in route planning.

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Any Questions?

(Feel free to ask in private if you prefer)

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