WORKSHEET 08 · CAD & ENGINEERING GRAPHICS

# THE BUILT ENVIRONMENT

Read surveys, levels and drainage, interpret a layered floor plan and explain what each creator and user needs from the SUMMIT Base drawings.

08

COURSE NOTES **CH 09** TIME **55 MIN** TOTAL **29 MARKS** EDITION **TYPE-IN**

NAME _____ CLASS _____ DATE _____

**LEARN IT** THE ESSENTIALS

### PLANS AND SURVEYS

- **Location plan** 1:1250 / 1:2500, site edged red. **Site plan** 1:200 / 1:500. **Floor plan** 1:50 / 1:100 with electrical, plumbing and services layers.
- **Topographical**: levels, contours, slope aspect, natural features. **Feature**: everything built or growing on the site. **Underground**: previous use, strata, groundwater.

### LEVELS AND DRAINS

- Levels in m AOD. Gradient = fall ÷ horizontal distance, as 1 : *n* or %. Slope aspect = the downhill direction.
- Chamber depth = CL − IL. Foul and storm water run in separate drains, falling to the sewer and the outfall.
- Level of a layer = ground level − depth below ground.

**MISSION BRIEF** SUMMIT Base is the new hangar and operations building for SUMMIT-X on a former forestry depot near Glencoe village (a fictional site). Your A3 drawings SB-A3-01 and SB-A3-02 show the same site.

**1** Many people create and use the SUMMIT Base drawings.

**(a)** Explain what a **landscape architect** needs from the topographical survey, and why.

**2**

**(b)** Explain what a **quantity surveyor** needs from the floor plan, and why.

**2**

**(c)** Explain why the town planner is sent a location plan at 1:2500 as well as the site plan.

**2**

**2** Fig 1 is part of the topographical survey of the site, with the proposed building outline added.

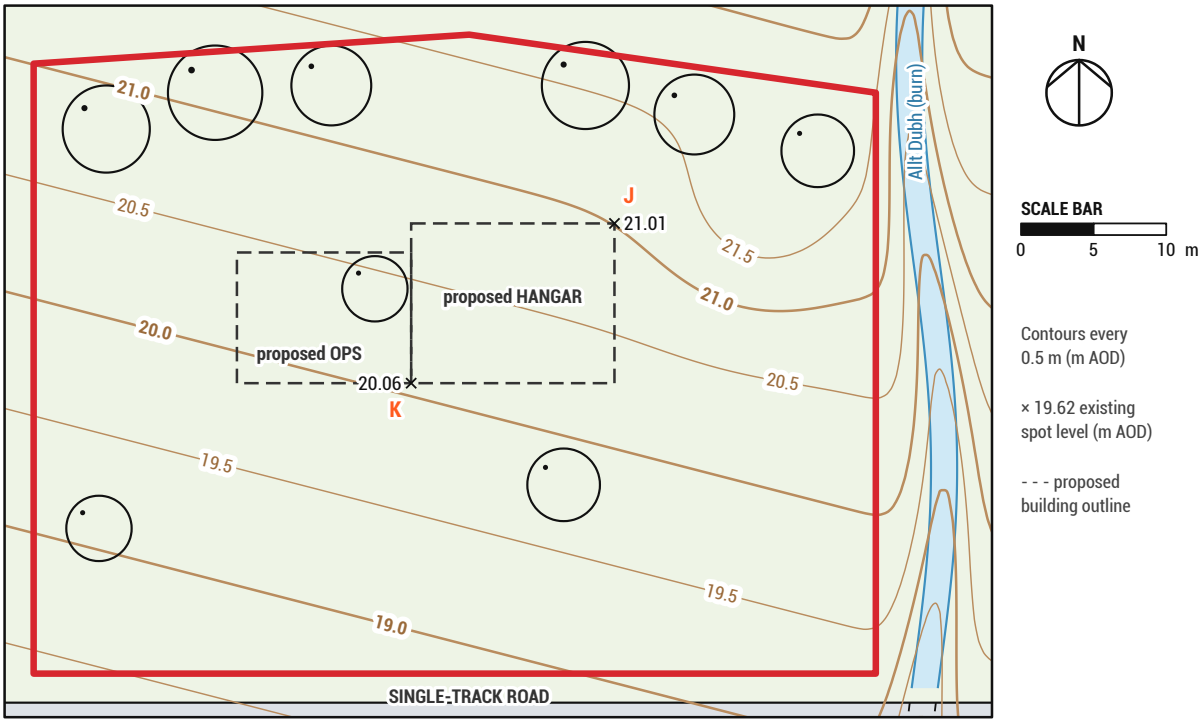


**Fig 1** Topographical survey extract: contours every 0.5 m, existing spot levels J and K at two corners of the proposed hangar.

**(a)** State the slope aspect of the site.

1

**(b)** Measured at right angles to the contours, the 20.0 m and 20.5 m contours are 7.8 m apart. Calculate the gradient of the ground as 1 : *n*.

2

**(c)** The hangar floor is to be built at a finished floor level (FFL) of 20.35. Calculate the depth of cut at J and the depth of fill at K.

2

**(d)** Explain **one** difference between the information on a topographical survey and on a feature survey.

2

**3** The proposed storm drain runs from inspection chamber S3 to S4 (drawing SB-A3-01).

| CHAMBER | COVER LEVEL (CL) | INVERT LEVEL (IL) |
|---|---|---|
| **S3** | 21.15 | 19.61 |
| **S4** | 20.40 | 19.48 |

Pipe length S3 to S4: 12.66 m. Levels in m AOD.

**(a)** Calculate the depth of chamber S3.

1

**(b)** Calculate the gradient of the pipe from S3 to S4 as 1 : *n*.

2

**(c)** Explain why rainwater from the hangar roof is drained to the burn and not to the public foul sewer.

2

**4** Borehole BH1 (ground level 19.62 m AOD) found: concrete to 0.15 m, made ground to 0.90 m, glacial till to 3.40 m and slate bedrock to 4.50 m. Groundwater was struck at 2.60 m. All depths are below ground level.

**(a)** Calculate the level of the top of the glacial till and the level of the groundwater, in m AOD.

2

**(b)** Explain why the engineers need to know the previous land use of the site.

2

**5** Drawing SB-A3-01 is the proposed site plan for the planning application. Apart from the building, describe **two** items a site plan must show, and why the planner needs each.

2

**6** Fig 2 shows the electrical and plumbing layers of the operations wing floor plan (drawing SB-A3-02).

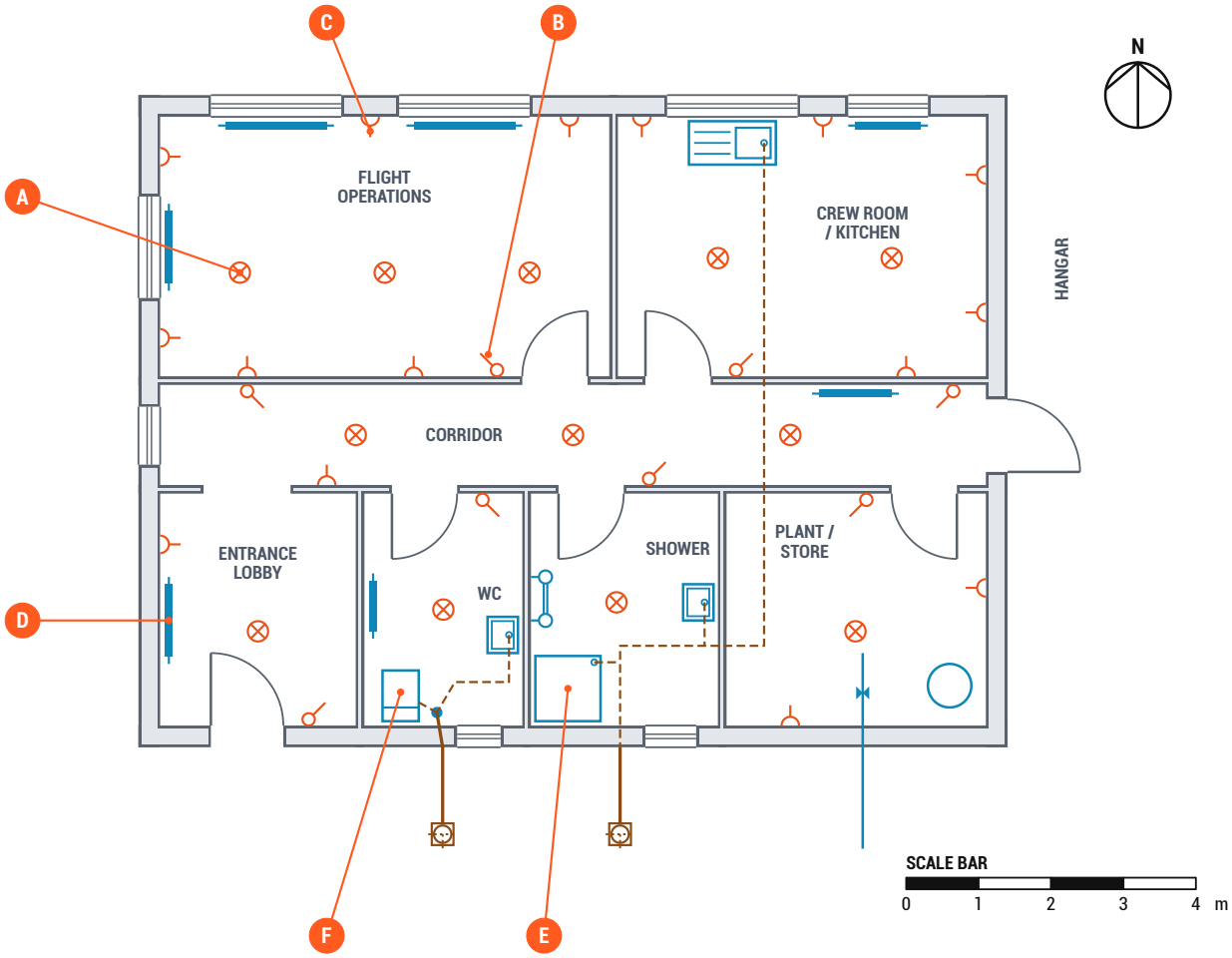


**Fig 2** Operations wing floor plan with the electrical layer (orange) and plumbing layer (blue).

**(a)** Identify the symbols A to F.

**A** **B**

**C** **D**

**E** **F**

3

**(b)** Explain why the electrical and plumbing services are drawn on separate CAD layers.

2

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**TOTAL 29 MARKS**