



NATIONAL SENIOR CERTIFICATE EXAMINATION  
NOVEMBER 2018

**GEOGRAPHY: PAPER II**

**MARKING GUIDELINES**

Time: 1½ hours

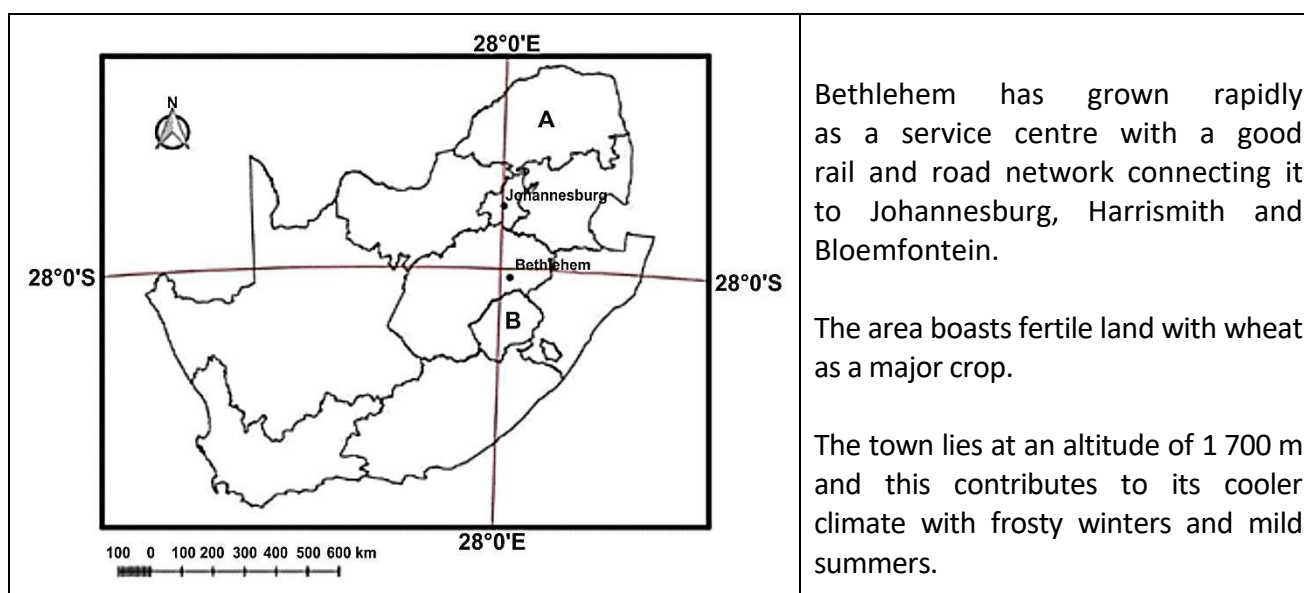
100 marks

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These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.

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**Figure 1: Location Map of Bethlehem in the Free State**

[Source: Examiner's description]

**QUESTION 1 ATLAS USE, MAP ORIENTATION AND TECHNIQUES**

1.1 Refer to the location map above (Figure 1), as well as the topographic map extract 2828 AB and 2828 AD to answer the questions that follow. **Tick** the correct box.

1.1.1 The province labelled A in Figure 1 above is ...

Limpopo	X
North West	
Gauteng	
Mpumalanga	

1.1.2 The neighbouring country labelled B in Figure 1 above is ...

Swaziland	
Mozambique	
Lesotho	X
Zimbabwe	

1.1.3 Johannesburg is ... of Bethlehem.

NE	
NW	
NNW	X
NNE	

- 1.1.4 The approximate distance from Bethlehem to Johannesburg is ... (use Figure 1).

200 km	
225 km	
275 km	X
300 km	

- 1.1.5 (a) The Ballyduff smallholdings (D4) rely on underground water for irrigating their crops.

True	X
False	

- (b) **Justify** your answer to Question 1.1.5 (a).

There are a number of windmills to pump underground water.

The reservoirs are too small to hold enough water. There is only a small nonperennial stream that runs through the area.

NOTE: FALSE can be accepted provided the justification is correct, i.e. they don't rely on underground water because there is the Saulspoort Dam to supply water for irrigation OR because of the numerous small dams.

- 1.2 Photograph 1 was taken on the outskirts of Bethlehem on the R26 toward Retief and Warden.

### Photograph 1



[Source: Examiner's photograph]

- 1.2.1 Study positions 1, 2, 3 and 4 on R26 on the topographic map extract. At which position was the photographer standing? **Tick** the correct option.

1	
2	X
3	
4	

- 1.2.2 **Account for** your answer to Question 1.2.1 using evidence from the topographic map extract.

The powerlines that run to the top of the hill are evident on the map as well as in this photo. The communications tower as well as the top of Bird Cage Hill are almost directly opposite from where the picture was taken. There is a built up area of low cost housing visible in the left photo. Any one answer.

- 1.2.3 **State** the direction in which Photograph 1 was taken.

East, East South East or Southeast (accept acronyms)

- 1.2.4 (a) **Determine** whether the diggings (D4) are visible from where the photographer stood.

Yes	
No	X
Answer can be YES or NO, based on 1.2.4b's justification, see below in 1.2.4b	

- (b) Using evidence from the topographic map extract, **account for** your answer to Question 1.2.4 (a).

Bird Cage Hill is clearly an obstacle in the way.

The following variations of 1.2.4a and b can be accepted.

If position 1.2.1 is ...

4 – Yes, it is visible, nothing physical in the way

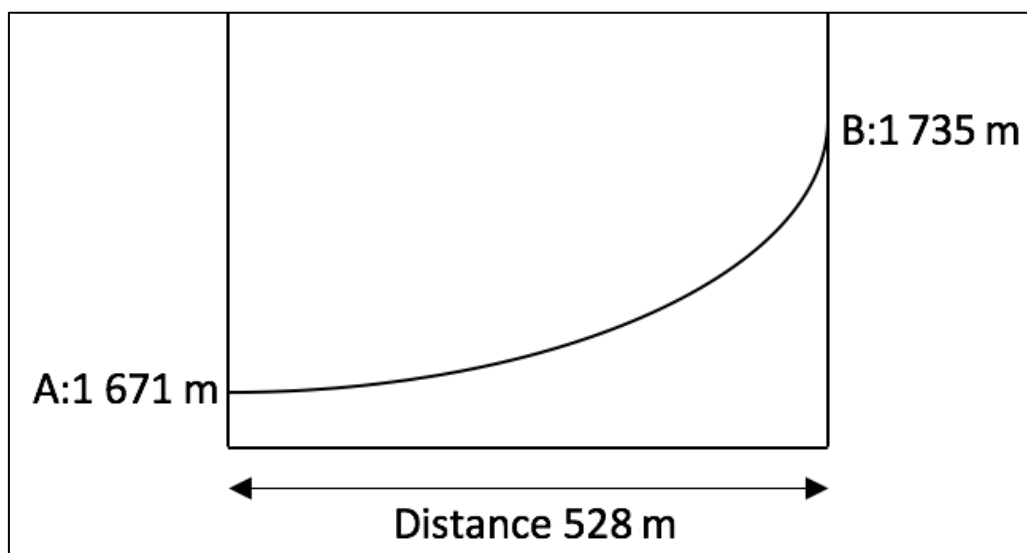
3 – Yes, it is visible, top of a hill and can be seen

1 – No, built up area in the way

If any of these answers are given reference must be made to position given in 1.2.1 and justification must be correct.

- 1.2.5 Refer to Figure 2.

**Figure 2: The gradient from A to B in Photograph 1**



Using the data in Figure 2, **calculate** the gradient between A and B.

- (a) Gradient: 1 : 8,3 (accept 8,25 or 8, only 1 mark)

Calculations:

Difference in height:  $1\,735 - 1\,671 = 64\text{ m}$

Distance between the two points: 528 m

$$\text{Gradient} = \frac{\text{HS} - 1 : 10\,000}{\text{VS} - 1 : 2\,000}$$

(1 method mark can be allocated in the calculation for a CORRECT method, no mark awarded for a formula only).

- (b) **Circle** the word that best describes the slope shown in Figure 2.

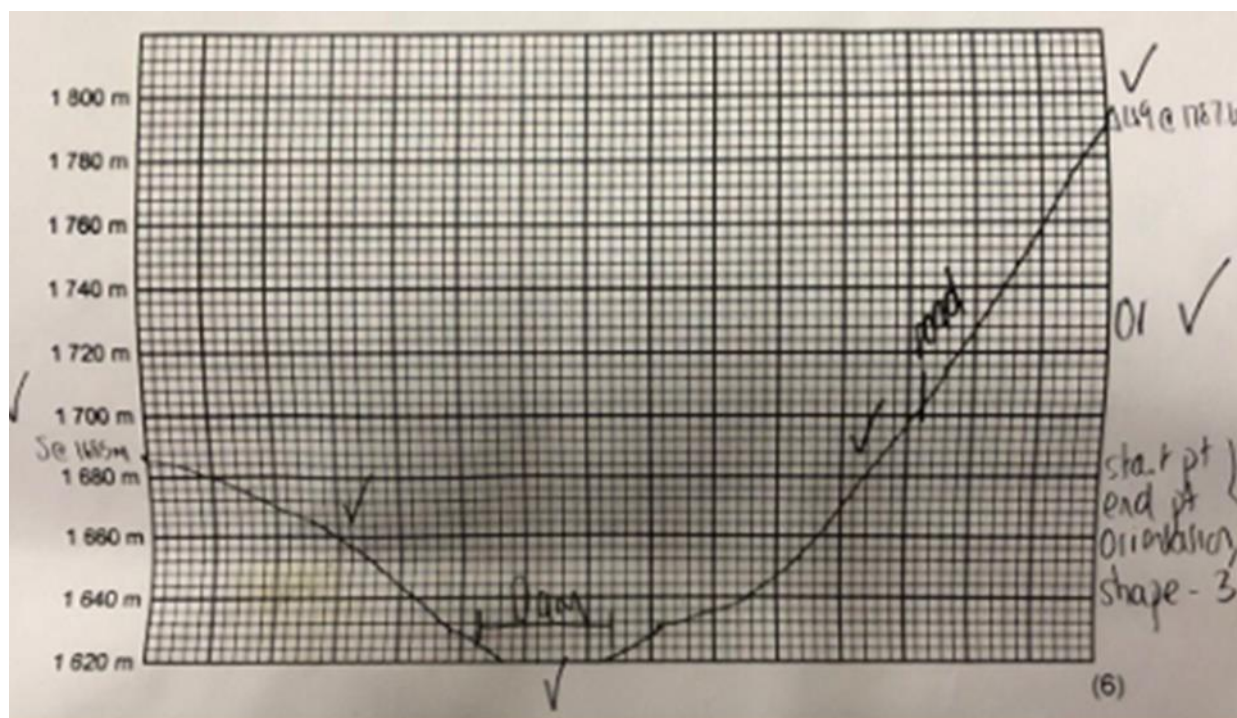
Concave    convex    flat    gentle    steep    very steep

### 1.3 Geographic techniques and orthophoto interpretation

- 1.3.1 Study the orthophoto map extract 2828 AB 24 SAULSPOORT DAM. This area is covered by the purple square drawn on the topographic map extract.

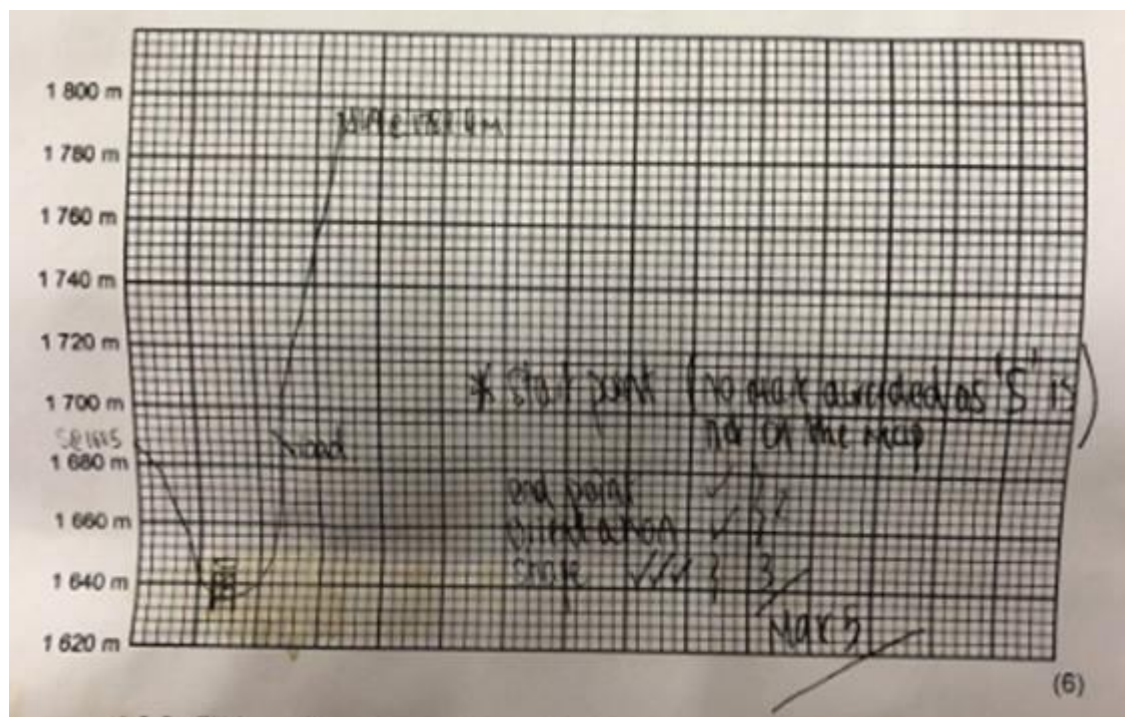
**Draw** a cross section on the graph paper below from position S (E8) north of Coenana Farm to trigonometric station 49 at 1 784,4 m (D8 and D9). A vertical scale of 1 cm : 20 m has been provided for you.

This will be inserted onto graph paper.



If candidates drew a cross section using the topographic map and alternative cross section is provided. This is on the following page.

Start and end points **MUST** be at the right height – 2 marks,  
 Orientation of S to trig station 49 – 1 mark,  
 Shape must show down, a valley and then steeply up the other side – 3 marks



1.3.2 Fill in and label the position of the following on the cross section:

- the Saulspoort Dam
- any road

1.3.3 **Determine** the vertical scale of the cross section as a ratio.

1 : 2 000

1.3.4 **Calculate** the vertical exaggeration of the cross section.

5 times. Alternatively if c/s was drawn on 1:50000 (above) 25 times is the correct answer.

Calculations:

HS – 1 : 10 000

VS – 1 : 2 000

= 5 times

If there is a mistake in 1.3.3 and it is carried through here and the correct method is used –1 mark can be allocated. A formula only does not constitute a mark. There must be a method.



- 1.4 Photograph 2 is of a scene simulating landing a plane at Bethlehem Aerodrome/Airport (E3 and E4). This picture shows the southern runway, Runway ONE on the topographic map extract. Photograph 3 shows the landing fees at Bethlehem Aerodrome/Airport.



[Source: <<https://flyawaysimulation.com>>]

[Source: Examiner's photograph]


A pilot is completing the preflight information that is needed to program into the light aircraft's (weighing 2 400 kg) GPS navigation system. **Complete** the preflight checklist below with the information needed to make a successful flight. SIX local flights will be completed during the day.

1.4.1 Number of runways at Bethlehem Aerodrome/Airport	2
1.4.2 The landing cost of six trips today	$R90 \times 6 = R540$
1.4.3 Bearing of Runway ONE (landing in an easterly direction)	$96^{\circ} 28'$ (accept $94^{\circ}$ – $98^{\circ}$ )
1.4.4 The magnetic declination for 2018 is ... Calculations:	Change is 3' W pa Difference in years – 2018–2010 – 8 yrs ... = $8 \times 3' = 24'$ change (1 method mark can be allocated here if this calculation is correct) $21^{\circ} 04' W$ of TN in 2010 $24' W$ change = $21^{\circ} 28' W$ of TN in 2018
1.4.5 Magnetic bearing for a pilot to land on Runway ONE in 2018 would be ...	$96 + 21 = 117^{\circ}$ Follow through from 1.4.3 means range can be from 115–119, 1 method mark can be awarded if figures used show correct method.
1.4.6 Co-ordinates of the eastern end of Runway ONE to enter into the GPS	$S - 28^{\circ} 14' 56''$ (accept $54''$ – $58''$ ) $E - 28^{\circ} 30' 31''$ (accept $29''$ – $33''$ ) If minutes are incorrect then position is incorrect and no further marks can be awarded.



## QUESTION 2 FLUVIAL PROCESSES, CLIMATE AND GEOGRAPHIC INFORMATION SYSTEMS

2.1 Study the Fact File and Photograph 4 of the Saulspoort Dam below.

<p><b>Fact File:</b></p> <p>Saulspoort Dam supplies Bethlehem with domestic water. The water level when the dam is full is at 1 627,3 m above sea level.</p> <p>The dam wall is in block D5. The water exits north into block C5.</p>	<p style="text-align: center;"><b>Photograph 4</b></p> 
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[Source: Department for Water Affairs]

2.1.1 Using information from the topographic map extract and Photograph 4 **estimate** from the options below what the correct bottom level is.

**Hint: bottom level** is the lowest point of the dam along the original river course.

1 415 m	
1 523 m	
1 616 m	X
1 640 m	

2.1.2 Using evidence from Photograph 4, **substantiate** why the dam is at full capacity.

You can see the water flowing over the dam wall and down the sluices.

- 2.2 Study the satellite photograph of the river below and the map extract of the area just north of the dam wall and the Skulpspruit Farm in C5 and C6 indicated by Y on the photograph.

**Photograph 5: Skulpspruit Farm; Bethlehem**



[Source: Google Earth]

- 2.2.1 What type of fluvial feature is evident at X in Photograph 5? **Tick** the correct option.

Waterfall	
Meander	X
Oxbow lake	
Paired terraces	

- 2.2.2 (a) Is the river at peak flow in this image? **Circle** the correct answer.

YES / **NO** (yes can be accepted provided justification below in (b) is correct.)

- (b) **Substantiate** your answer with evidence from Photograph 5 and the topographic map extract.

The water lines are way below the level of the floodplain as indicated by the tree line. The actual river channel is a very narrow line compared to the floodplain which is covered by vegetation.

Reference could be made to the dam upstream controlling the flow of the river and therefore it isn't at peak flow.

If the answer is YES to 2.2.2a then substantiation is as follows:

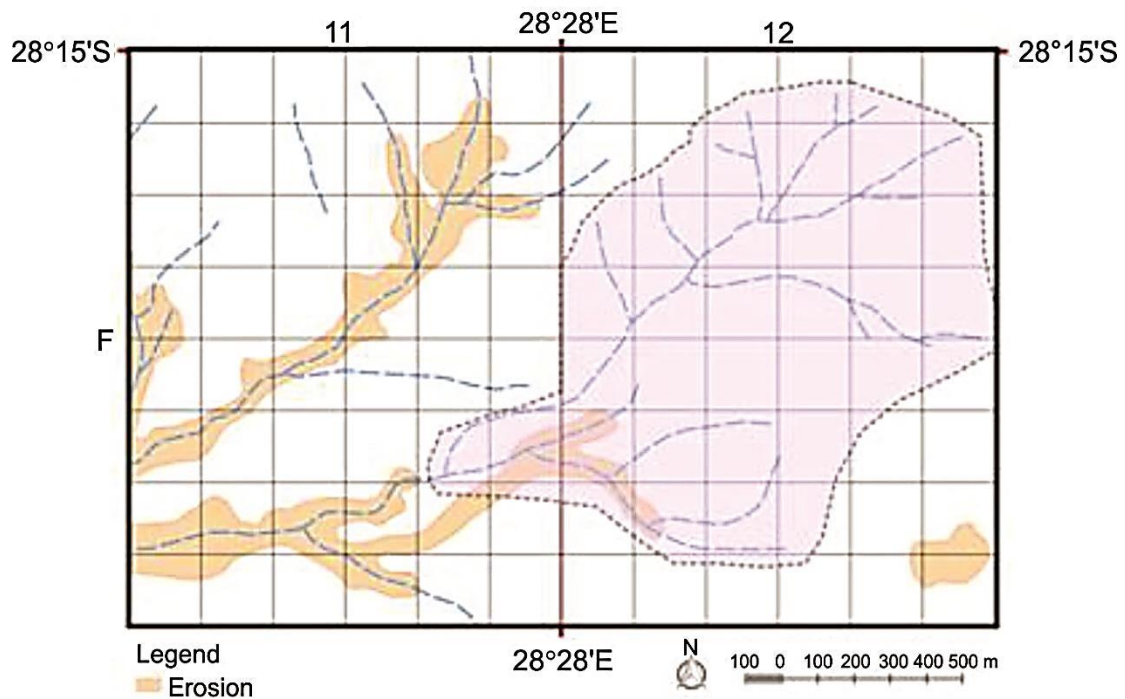
The floodplains appear dark due to riparian vegetation. This darkness makes it appear to be well watered and full. The presence of marshes and swamps would indicate that it is full.

- 2.3 **Describe** why the farm buildings at Skulpspruit (located at Y on Photograph 5) are located in an ideal microclimatic position.

The farm, at 1 660 m, is located away from the frost pocket at the bottom of the valley at 1 620 m. The farm will experience katabatic winds at night but, because of its location in the thermal belt, it will be warmer, especially on the "cold frosty nights" (fact file). The farm is situated on the North facing and therefore, warmer slopes. The water in the river has a moderating effect on the temperature.

NO reference can be made to site factors, answer specifically referred to microclimatic factors.

- 2.4 Study the tributaries of the Liebenbergsvlei River in blocks F11 and F12 of the topographic map extract. Figure 3 is a GIS-generated map of the same area showing the rivers and erosion.

**Figure 3**

2.4.1 **Calculate** the area of the drainage basin indicated by the dotted line in Figure 3.

Area: \_\_\_\_\_ m<sup>2</sup>

Calculations:

Roughly 30 squares at (200 m × 200 m = 40 000 m<sup>2</sup>) = 1 200 000 m<sup>2</sup>

Accept any number of blocks from 28 (1 120 000 m<sup>2</sup>) to 32 (1 280 000 m<sup>2</sup>)

If other, less accurate methods are used and answers range from 1 000 000 to 1 100 000 or 1 300 000 to 1 400 000 = 2 marks for answer.

2.4.2 **Circle** the type of data evident on this GIS-generated map (Figure 3).

<div style="border: 1px solid black; border-radius: 50%; padding: 5px; display: inline-block;">Vector</div>	Raster
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2.4.3 **Circle** THREE types of attribute data that best describe the Liebenbergsvlei River tributaries found in blocks F11 and F12.

Perennial	Non-perennial	Episodic	Periodic
Exotic	Dendritic	Parallel	Haphazard

2.4.4 **Give** ONE possible reason for the erosion evident in F11.

- Cattle may have caused degradation of soils and, after heavy rainfall, water removes topsoil.
- Slope is steep giving water more erosive capability.
- Slope may not be vegetated meaning topsoil is washed away.
- Underlying rock may be impermeable creating lots of runoff and therefore erosion.
- Poor farming methods result in erosion.
- Water flowing quickly giving it more erosive capability.
- NO marks awarded for reference to heavy rainfall only or flooding only.

2.4.5 A dotted line shows the drainage basin of this system in Figure 3. **Define** the term drainage basin.

An area drained by a river and all of its tributaries. NO reference made to a catchment area.

2.5 **Circle** the correct underlined word to complete the sentence below.

The drainage density of the stream network in Figure 3 could be described as high / medium / low and the river's texture could be described as medium / coarse / fine.

2.6 2.6.1 **Tabulate** the stream orders of the drainage basin in Figure 3 in the table below.

Stream order	1	2	3
Number of streams	15	5	1

2.6.2 **Comment** on how stream ordering can be used as a predictor of flooding.

There are many (15) order-1 streams that will feed water into order-2 and order-3 streams quite quickly and there may be flooding in their areas.

There is a relatively short distance between the order-1 and order-3 streams so the area is prone to erosion as a result of frequent flooding.

Lots of order-1 streams = higher chance of flooding.

Alternatively

Less order-1 streams = less likely chance of flooding

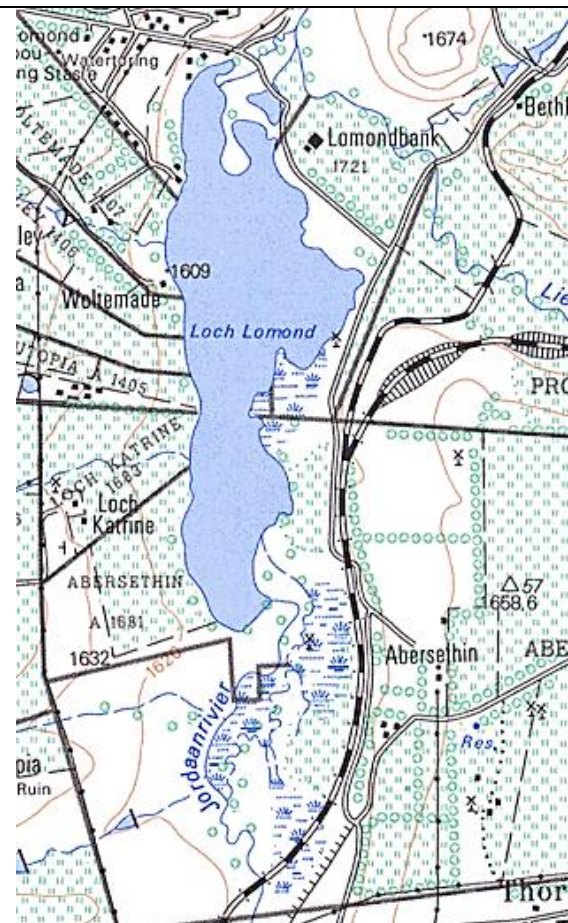
Higher bifurcation ratio = higher chance of flooding

NOT reference to many higher order streams = more chance of flooding



**QUESTION 3      SETTLEMENT AND THE ECONOMY**

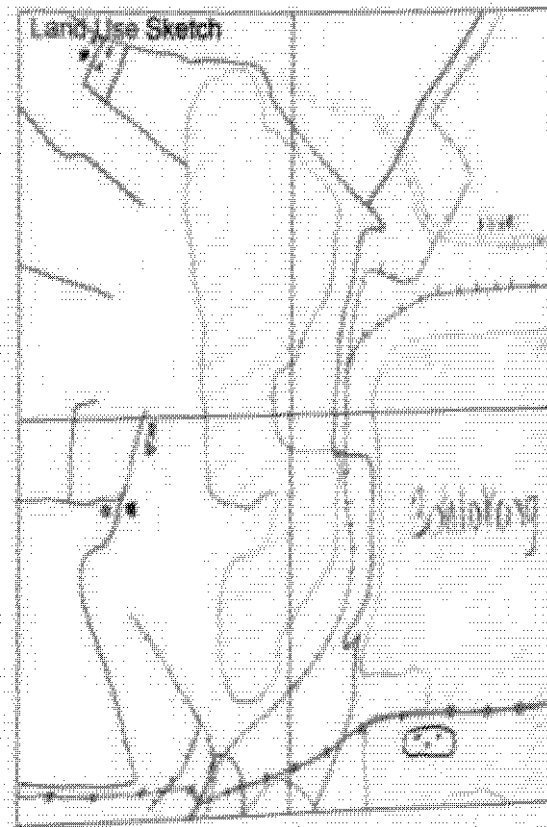
Study the topographic map extracts in Figures 4 and 5 below.

**Figure 4 – Land use around Loch Lomond****Figure 5 – Land use around Loch Lomond**

- 3.1 Refer to the map extracts above. Which is the more recent map of the area, Figure 4 or Figure 5? **Explain** your answer.

Figure 4 is more recent. There is development of infrastructure (most noticeably housing in Bohlokong) that would have happened in the past 20 years. Vegetation was cleared in the development of Bohlokong. Reference could have been made to the dam becoming bigger too.

- 3.2 Referring to Figure 4, **draw** a land-use sketch map for the area in Bethlehem. Use the template provided below. It must have a legend or key.



Legend or Key	
Features	Symbol
Railway lines	
Roads	
Bodies of water	
Buildings (use topographic symbology)	
Other features	

2 marks for railway (1 for accuracy, 1 for complete and there)  
 2 marks for roads (1 for accuracy, 1 for complete and there)  
 2 marks for bodies of water (1 for accuracy, 1 for complete and there)  
 1 mark for buildings  
 1 mark for other features  
 1 mark for complete legend  
 2 mark overall presentation (use of colour, neatness)

If the incorrect area of Bethlehem (e.g. blocks D/E 1/2) was drawn, a maximum of TWO marks can be awarded for the presentation of the map.

**Total: 100 marks**