Bangkok 2025

21st International Geography Olympiad
28th July 2025 – Fieldwork Exercise 2

Afternoon

Data Interpretation, Analysis, and Presentation

Student Number

2	1				

General Instructions

- Fieldwork Exercise 2 consists of 3 parts:
  - Task 1: Numerical, Graphical, and Geographical skills (16 marks)
  - Task 2: Mapping, Interpretation and Analysis of Observational Data (24 marks)
  - Task 3: Decision Making (Geographic Reasoning) (6 marks)
  - **Total score is 46 marks**
- Students educated in English will have 2 hours to complete the tasks.
- Students not educated in English will be provided with 30 extra minutes, for a total of 2 hours and 30 minutes.
- Remember to use information booklet, maps, and worksheets from FWE 1.

Task 1: Numerical, Graphical, and Geographical skills (16 marks)

1. Based on the satellite image below, calculate the total area of Ko Kret Island and show your calculations in the blank space provided. (2 marks)
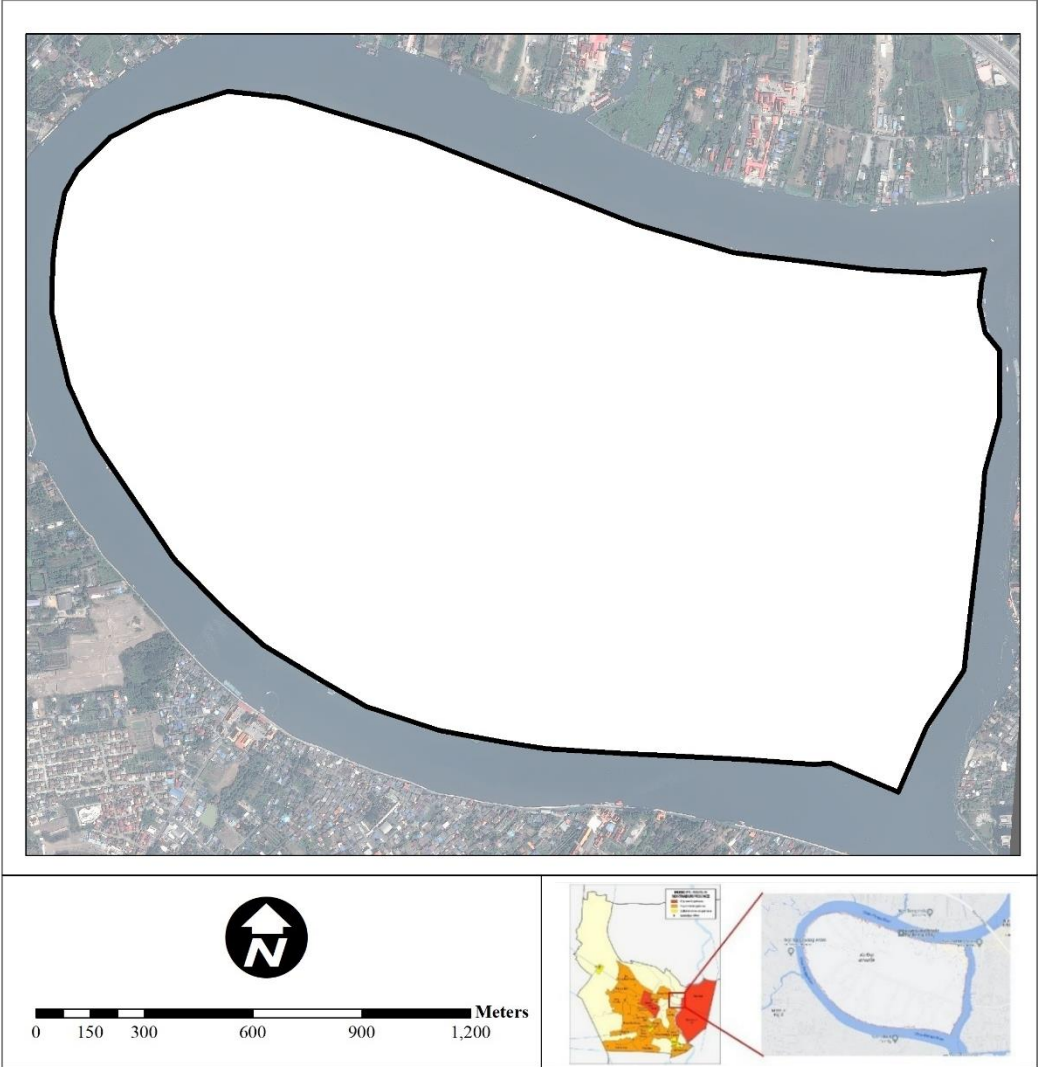
The area of Ko Kret is _____**3.55**_____ km².

Show your calculations for the area of Ko Kret Island.

Guideline for marking:

- *Give 2 marks to those who answer 3.55 km² or provide a value within the range of 3.20–3.91 km².*
- *Give 1 marks to those who provide an answer within the ranges of 2.84–3.19 km² and 3.92–4.26 km².*

2. Table 1 shows population data at the village level in Ko Kret for both 2014 and 2024. Refer to Figure 2 in the information booklet for the locations of the villages and their administrative boundaries.

Table 1: Number of male and female population at each of seven villages of Ko Kret in 2014 and 2024.

Village	2014		2024		Average annual growth rate of population	Range of Average annual growth rate of population	
	male	female	male	female		*Min*	*Max*
1	534	595	590	659	*1.06*	*0.95*	*1.17*
2	533	674	494	804	*0.75*	*0.68*	*0.83*
3	473	515	437	462	*-0.90*	*-0.81*	*-0.99*
4	196	199	168	184	*-1.09*	*-0.98*	*-1.20*
5	404	489	417	420	*-0.63*	*-0.57*	*-0.69*
6	339	374	293	362	*-0.81*	*-0.73*	*-0.89*
7	154	199	142	192	*-0.54*	*-0.49*	*-0.59*
Total	2,633	3,045	2,541	3,083	*-0.10*	*-0.09*	*-0.11*

2.1 Calculate the average annual growth rate of population for each village and for the total population of Ko Kret. Write down your answer using two decimal places in Table 1 (2 marks).

Guideline for marking:

- Give 0.25 marks to those who answer the corrected average annual growth rate with two decimal places.

2.2 Use the data for 2014 and 2024 to create a graph comparing the number of males and females in the villages listed in Table 1. (3 marks).
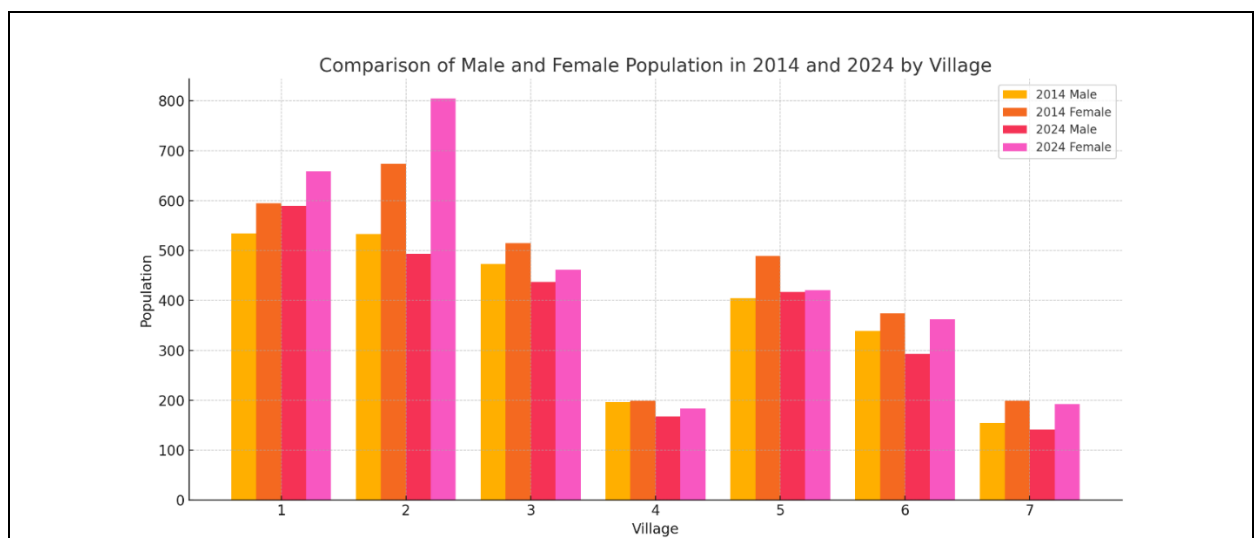
Guideline for marking:

- *Give 1 mark for the title of the graph.*
- *Give 1 mark to those who make a bar graph showing comparisons*
- *Give 1 mark to those who set the correct axis to show the population number*

2.3 Describe, in detail, spatial patterns and trends related to population changes in Ko Kret between 2014 and 2024, based on the data in Table 1. Also, use information from the booklet and your observations during FWE 1 to elaborate on your answers (5 marks).
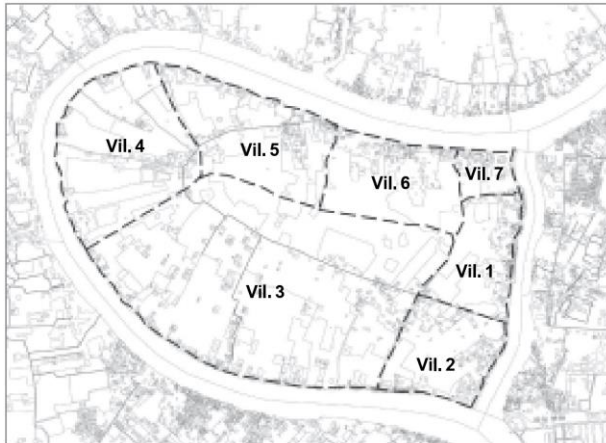
Guideline for marking:

Give 1 mark for each answer.

General Observations:
- ***Villages 1 and 2*** *are growing, likely because of better infrastructure and accessibility.*
- ***Villages 4 and 3*** *are shrinking, possibly due to isolation or agricultural zoning.*
- ***Villages 5, 6, and 7*** *show small to moderate declines, possibly due to non-residential land use such as temples and tourism.*

Village-wise Analysis:
Village 1:
- *Population increased significantly for both males and females from 2014 to 2024.*
- *Growth rate is positive and high, the highest among all villages.*
- *Indicates strong urbanization or inward migration.*

Village 2:
- *Also shows a clear population increase, especially among females.*
- *Has the second-highest positive growth rate.*
- *Dense settlement likely due to proximity to transport hubs (as per your previous text).*

Village 3:
- *Slight decrease in population for both genders.*
- *Negative growth rate, indicating a modest decline.*
- *Area is likely agricultural and less attractive for settlement.*

Village 4:
- *Significant population decrease in both genders.*
- *Most negative growth rate across all villages.*
- *Possibly due to remoteness or lack of accessibility.*

Village 5:
- *Mixed trend: Female population remains roughly the same; slight male decline.*
- *Growth rate is close to neutral, indicating population stability.*
- *Could be maintained by tourism or commercial use.*

Village 6:
- *Noticeable population drop, especially among males.*
- *Negative growth rate, but not as steep as Village 4 or 7.*
- *Tourism-related land use may limit residential expansion.*

Village 7:
- *Lowest population figures overall.*
- *Slight decline from 2014 to 2024.*
- *Smallest population decrease, as shown by a less negative growth rate.*
- *This may be due to its function as a temple area and starting point for tourism.*

3. The photo below was taken in 1895, showing that the pagoda at Wat Poramai Yikawat was not inclined from its vertical axis as much as it is today. Based on your observations in Task 1 in FWE 1, estimate the level of river bank subsidence over the past 130 years. You can assume that the ground distance between the center of the pagoda to the river bank on the right was 3 metres in 1895. The inclination angle of the pagoda in 2025 is 20 degrees from its vertical, and the vertical pagoda axis is always approximately perpendicular to the ground surface. Show your calculations and explain your process in the white space below. (2 marks).

Source: https://www.silpa-mag.com/history/article_6198

The level of river bank subsidence was _____ meters between 1895 and 2025.

Show your calculations and explain your process here:

Inclination of pagoda from its vertical axis in 1895 is approximately 3 degrees (use protractor – error $\pm$ 1° is acceptable)

Change in pagoda inclination from 1895 to 2025 = 20°-3° = 17°

Distance of pagoda to the river in 1895 = 3 m

Use trigonometry to calculate the change in river bank height (X)

tan 73° = 3/x meter
3.27 =3/x → x= 0.9179 m
tan 74° = 3/x meter; x = 0.8603
tan 72° = 3/x meter ; x = 0.9748

tan 80° = 3/x meter
5.67=3/x → x= 0.5291 m

Guideline for marking:
- *Give 2 marks for the correct result.*
- *Give 1 mark for the answer with in the range between 0.86 and 1*
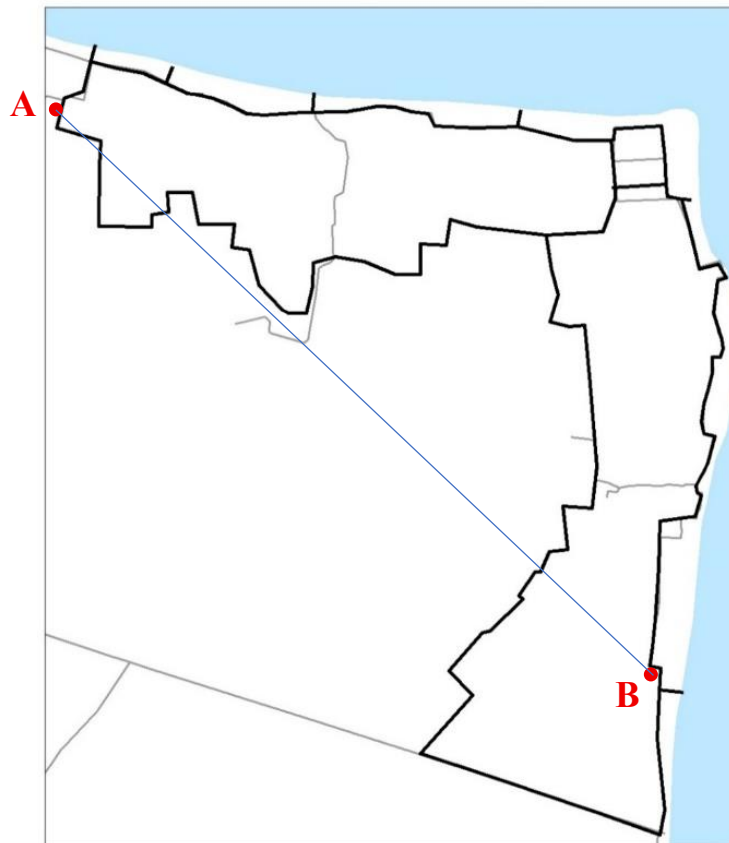- *Give 0.5 mark to those who provide an answer using 20 ° (0.5291)*

4. The figures below show two major pagodas in Ko Kret.

Pagoda A at Wat Sao Thong Thong   **Pagoda B at Wat Chimplee Sutthawas**

Map 2-1: Locations of two pagodas.

4.1 Mark the locations of Pagoda A and Pagoda B on Map 2-1. (1 mark)
    0.5 marks for each location

   Guideline for marking: *Give 0.5 marks for each location.*

4.2 Measure the compass bearings from pagoda A to pagoda B.
    The compass bearing is _____*133 (120-146)*_____degrees. (1 mark)

Task 2: Mapping, Interpretation and Analysis of Observational Data (24 marks)

5. Using the worksheets from Fieldwork Exercise 1 (Routes 1 and 2), develop a map of Ko Kret based on Map 2-2 that includes the following details (10 marks):

   - Major types of land use and land cover including two local plant clusters (Lotus and Nor Kala)
   - Key tourist attractions. These must include cultural sites, local businesses, and facilities and amenities.
   - A clear and coherent set of map symbols including annotations that are visually appropriate and intuitive for users.
   - A map scale.

Guideline for marking:

- *Major types of land use and land cover:*
  - o *Give 0.5 marks for each land use and land cover (built-up area, natural vegetation, agricultural field, Lotus field, Nor ka la field).*
  - o *The maximum is 2.5 marks for 5 categories.*
- *Key tourist attractions, facilities and amenities:*
  - o *Give 1 mark for using the point to show the key legends.*
  - o *Give 1 mark for using the key symbols of Tourist attractions (cultural sites, local businesses, and nature areas. The maximum is. 3 marks*
  - o *The examples of key symbols include:*
    - ▪ *Cultural sites: temple, pagoda*
    - ▪ *Local business: food court, café, bicycle shop*
    - ▪ *Facilities and amenities: Toilet, pier, tourist information, bin*
- *Give 1 mark for making map scale.*
- *Give 0.5 marks for each annotation (clear and relevance). The maximum is 2.5 marks.*

land uses in this zone are mixed between residential and commercial activities
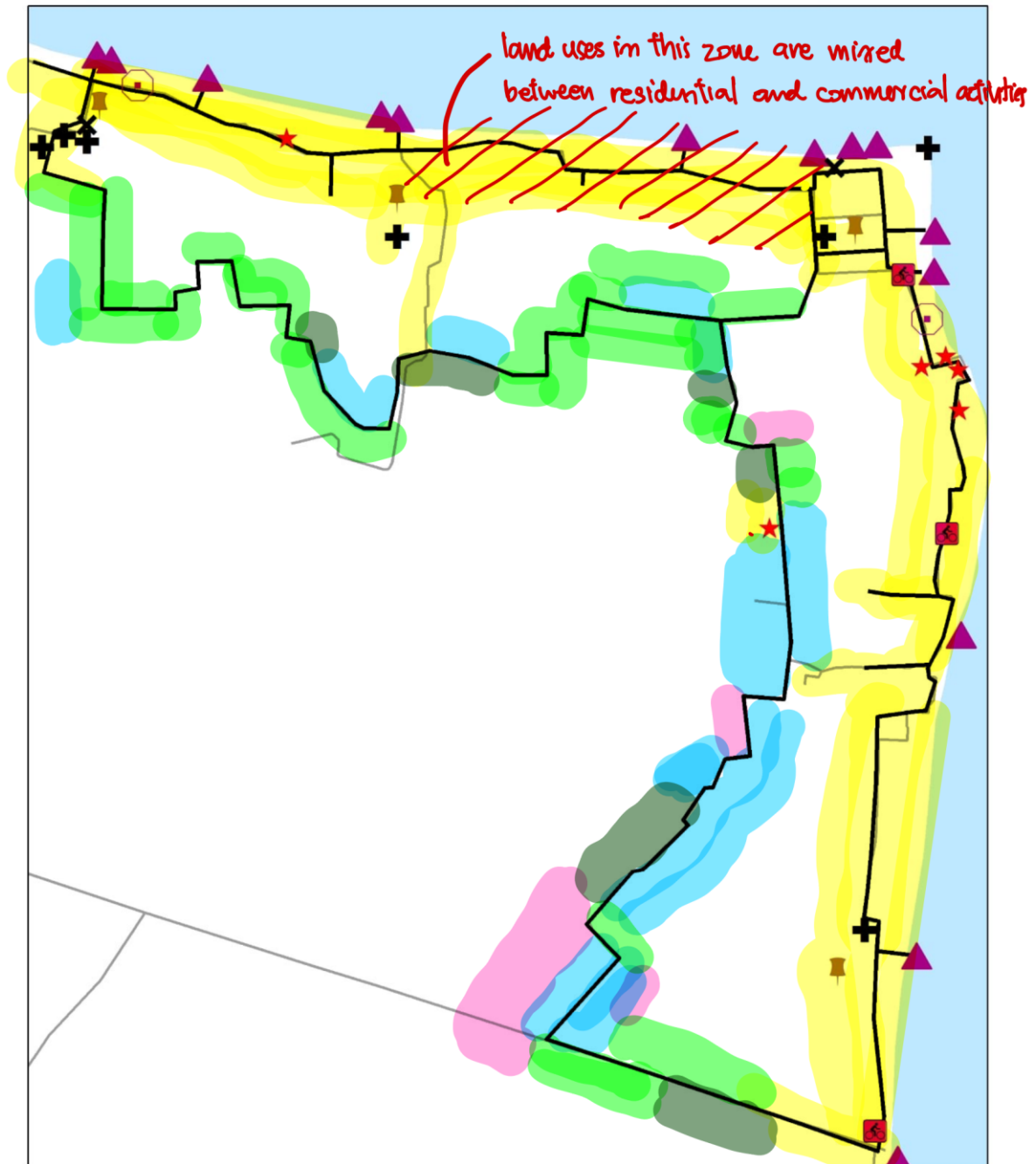
Legend

✗ Toilet   ▲ Pier   🚲 bicycle shop   ▮ water
⚑ Temple   ⬡ Food court   🟨 Built-up area   🟩 Natural vegetation   🟪 Lotus field
✛ Pagoda   ★ cafe   🫒 Agricultural field   🟦 Nor Kala field

Map 2-2: Information map of Ko Kret (A3-size)

6. Based on Map 2-2, describe the major land uses and spatial patterns for key tourist attractions, facilities and amenities. (5 marks)

- *Major tourist attractions, such as temples, along with associated amenities like restaurants and cafés, are typically located along the roads near the riverside.*
- *Chedis (Pagoda) are mostly situated within temple grounds, reflecting religious beliefs.*
- *Land use on both sides of the roads near the riverside is characterized by high building density and a mixed-use pattern of **commercial and residential functions**.*
- *Public toilets are found only in specific locations, primarily within temple areas.*
- *Pottery kilns are scattered throughout the area, mostly situated along roads near the river. Only one kiln is isolated in the inner area, close to agricultural and natural land.*
- *The **inner pedestrian paths** of the island are surrounded by **sparsely cultivated agricultural land** and predominantly **abandoned natural areas**, with little human settlement. Some houses in this area are uninhabited.*
- *Along the **inner roads of Route B**, there is a wider distribution of **Nor Kaka** land use, which is significantly larger in area compared to Route A. In some areas, there is a mix of **Nor Kalar** and **Lotus** land uses.*

Guideline for marking: *Give 1 mark for each answer (with full explanation).*

7. Compare and contrast the observable economic, environmental, and social and cultural characteristics on Route A and Route B. What are the main problems or challenges associated with these aspects that may affect tourism? Suggest practical ways to improve or enhance tourism experiences for future visitors – especially on the route that is less developed (9 marks).

| Characteristic	Similarities & Differences	Problems or Challenges	Practical ways to improve or enhance tourism experiences for future visitors
Economics	Route A has more economic activities than route B. Economic activities on route A are tourist shops and services (e.g. souvenirs, clothes, local snacks, food stalls, restaurants, massage, and boat tour services, etc.), while those on route B are mainly restaurants, café and local businesses (e.g. groceries). Pottery production, arts and craft shops, and workshops are found on both routes.	• Overtourism and overcrowding of tourists on route A • Narrow walking paths and high concentration of shops on route A, obstruct the flow of tourists • Economic inequality (e.g. tourism income) between 2 routes	• Need more economic/tourism activities to draw more tourists to route B, e.g. souvenir shops, open market (use open space near the pier), pottery-related activities such as workshops, gallery • Renovate or improve some existing attractions that are not well maintained in route B (e.g. parks) • Encourage future visitors to use the pier on route B, instead of the main pier.
Environment	• Route B has litter and garbage on the ground; route A is much cleaner. • River erosion and flooding are more obvious on route B. • Natural environment is quite similar for both routes. Route B has more agricultural fields that are still in operation, while agriculture on route A is abandoned and become natural areas. Two local vegetation (lotus and Nor Kala) can be found on both routes.	• Not enough trash bins as a result in garbage disposal on the ground and in the canals • Public zones or cultural sites (e.g. temples) near the river are losing their areas and being ruined due to river bank erosion • Tourists do not pay attention to the importance of natural zones, especially herbs used in local cuisine which are very widespread in the area.	• Increase the number and locations of trash bins for route B • Put more warning signs on the trash disposal for route B • Construction measures against flooding (e.g. increasing dike level) and river bank erosion (e.g. revetment) • Add information boards along the routes about ecosystems and local plant species for tourists to learn more about the nature of the area.

Characteristic	Similarities & Differences	Problems or Challenges	Practical ways to improve or enhance tourism experiences for future visitors
Social & Culture	People on route A are more diverse compared to route B because route A has tourist markets. We can find tourists, local vendors, villagers, and migrant workers on route A but not B. Route B mainly runs through villages and residential areas; therefore, there are not as many tourists as there are in route A. Two routes have quite similar cultural sites (temple and pagodas). All temples on route A are under good preservation and regularly offer religious services/events. Temples on route B are not well maintained, part of it is no longer in service and become archeological sties	• Local people and residential areas got disturbed by tourists (for both route A and B) • Tourism is quite underrepresented on Route B despite its cultural resources and facilities • Degradation of cultural sites and potentials of old pagodas to collapse	• Control the tourist activities on route A, move some activities to route B. • Information and warning signs for tourists to respect the community privacy. • Engineering solutions to preserve and restore old pagodas and ancient buildings • Organize regular events/religious activities at the temple on route B to attract more tourists and visitors.

Guideline for marking schemes:
- 1 mark at answers in each box.

Task 3: Decision Making (Geographic Reasoning) (6 marks)

8. If you were given the authority to build a 400-square-meter Ko Kret Museum and Cultural Centre, where would be the most appropriate location to build it? Draw a polygon, to scale, at the proposed location on Map 2-6 (2 marks).
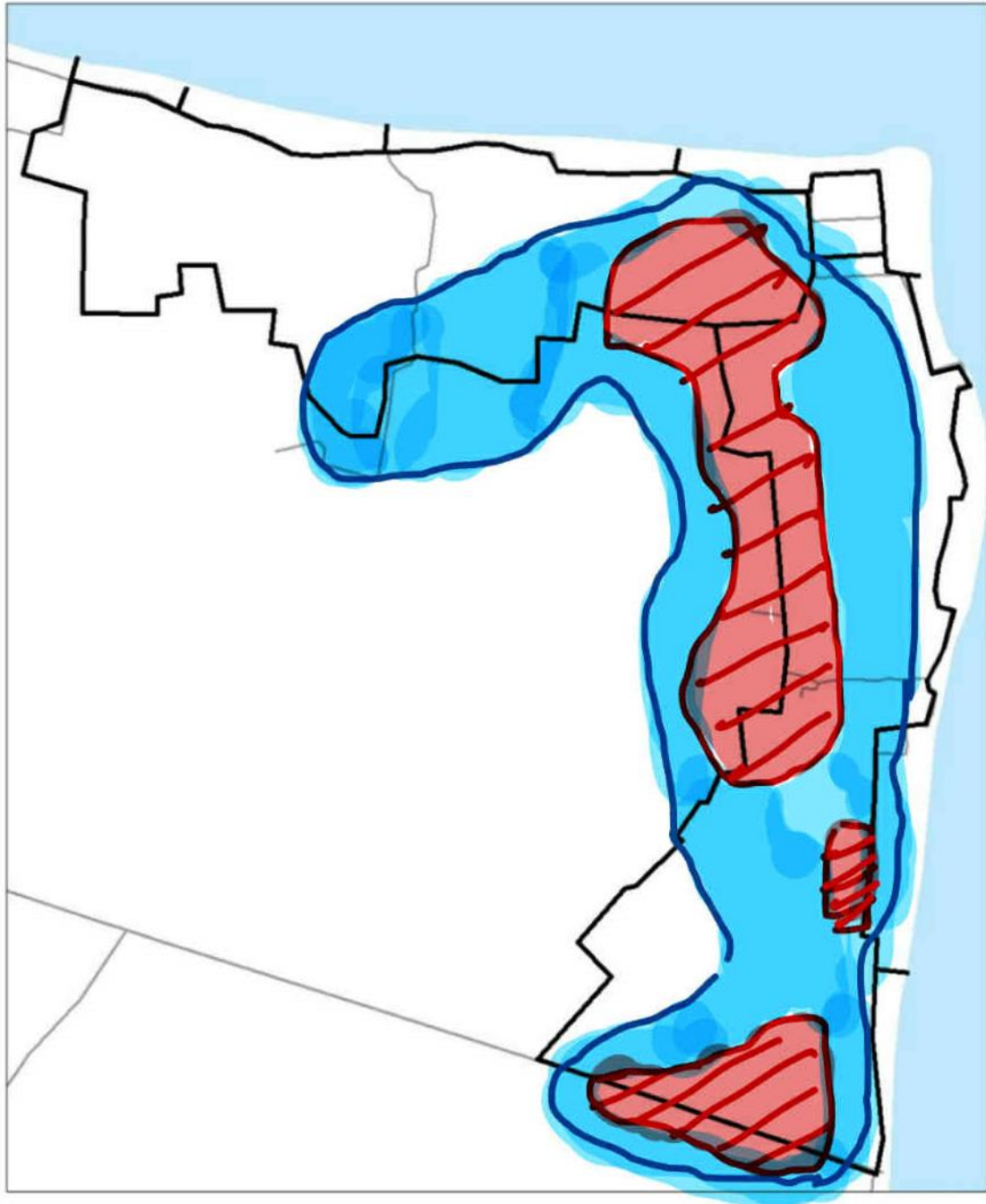
Map 2-6: Location of Ko Kret Museum and Cultural Centre

Guideline for marking schemes:

- *1 mark if located within the red zone, 0.5 marks if located within the blue zone, and 0 marks if located outside these zones.1 mark for drawing areas sized between 2–4 mm,*

0.5 marks for areas sized between 1–2 mm and 5–7 mm, and 0 marks for all other sizes.

9. Explain why you chose to locate the Museum and Cultural Centre where you did. Provide 4 geographical reasons for your decision. (4 marks).

1) *This location should be in an empty or open space (e.g. agricultural or natural areas) because the museum and cultural centre require some spaces to build on. Moreover, the location on residential or commercial areas is not quite appropriate since it may raise conflicts with the building owners). It is also possible that students choose to renovate the abandoned buildings in the residential or commercial areas to become the museum (e.g. abandoned school).*

2) *This location should be on the main route (either route A or B), so that it can be visible by tourists. The location should not be on small routes that detour from the main route.*

3) *This location should not be very close to the river. This is to ensure that it is safe from flooding and ground subsidence. (This reason cannot be applied to the case that students choose the old & abandoned school because this location is regularly flooded)*

4) *The location should be quite close to major commercial zones, market areas (e.g at the edge of the commercial zone on an empty space) , cultural attractions (e.g. temples), or public pier on route B. This makes it easy for tourists to go to the museum and encourage them to walk through the commercial areas to reach the museum.*

Guideline for marking scheme:

1 mark for each reason (with full explanation) that can be applied to the location that students proposed