

GG5569 / GG5570: ASSESSED ASSIGNMENT

Assignment 2: GIS-Based Site Suitability Analysis for the Optimal Location and Construction of an Alpine River Dam.

Aims

- project and rectify images
- handle dxf files
- build a TIN and a DEM from contours and points of known elevation
- interpret aerial photos and topographic maps
- digitize new vector layers
- use various spatial analysis tools to optimize decision-making solutions
- quantify the degree of changes on the landscape as an effect of possible anthropogenic alterations
- synthesize results of analysis into good quality maps

Tasks

1. Project the provided topo map file (XX_topo.tif) into the Monte Mario (Rome) Italy 1 projection system (1 mark)
2. Rectify the provided aerial photo (YY_photo.tif) with the topo map. Add a figure (PrintScreen, paste) showing the Georeferencing Link_Table, where I will be able to see the number of points used and the total RMS error value. Add a map showing the distribution of the points across the study area. (1 mark)
3. Create a 30 m DTM from the provided ZZ.dxf file using contours and points of known elevation. Remember to clean the original dxf file from unnecessary or incorrect elements. Generate one or more maps showing the original data, the cleaned data and the DTM obtained. (1 mark)
4. Digitize the river/stream system/network of the area (at least up to the Strahler's 3rd orders). Show the work with one or more maps. (2 marks)

5. Identify the best location to build a dam (assuming homogeneous impermeable bedrock) using Map Algebra on a number of selected criteria of your choice. Describe the selection process (why did you chose specific criteria? How were these assembled to give you a final product?) in words and through maps. The length of the dam cannot exceed 500 m and its height cannot exceed 50 m. Logic (but no need to study dam engineering, just reasonable choices and well explained), originality and quantity of selected criteria along with the correctness of the applied methodology will define your mark. (5 marks)
6. Draw the extent of the reservoir (as a polygon) that will be formed with the construction of the dam (show this on a dedicated map) and measure its area (square meters) and volume (cubic meters). Show this on a map. (3 marks)
7. Measure the areas (square meters) of the various basic landcover units (water courses, buildings, roads, trees, grass, bare soil/rock) that will be covered by the lake's water and create a landcover map (3 marks)
8. Produce a poster (set the page layout to an A3 page size) that illustrates, with one or more maps, your study (use Layout view tools). Keep descriptive text to a minimum (max 200 words) and work on the producing map that are clear, complete of all map elements and as self-explanatory as possible (4 marks)
9. Write a report of max 2000 words (+ unlimited figures/maps) with details of the tools used in the different stages of this exercise, the criteria applied for point 5 and the various outputs. Make sure all figures/maps presented are of good quality and complete of all necessary map elements. Make sure all figures/maps are numbered and come with a caption and do refer to figure numbers throughout the text. The quality of the report (its clarity, structure, writing, the figures/maps etc.) will also be assessed (2 marks)

Submission

Add your name or student ID number to the poster and the report and submit these via the Turnitin Link provided on MyAberdeen. Also send relevant (digital; shapefile and raster) files used in the exercise to me (stephen.howcutt@abdn.ac.uk) via ZendTo (<https://zendto.abdn.ac.uk/>). Make sure the files and folders are well organised and saved with easy-to-understand names. All submissions are due by **12 noon of Friday the 29th of April**.

Remember: this is an **INDIVIDUAL** piece of work: any sign of group working will be treated as plagiarism, which is taken very seriously by the University of Aberdeen.