جامعة بيرزيت

BIRZEIT UNIVERSITY
FACULTY OF ENGINEERING
ENCE 5372 Transportation Planning
Fall 2021

Subdivision Assignment

You will find eight AutoCAD files on the course board on Ritaj numbered from 1 to 8. I will assign you into eight groups of five students each; each group assigned to one file, which has a lot of land with property lines and contour lines. The map may also have some land uses (some houses or structures, utility lines, etc.) and some planned roads for various purposes. You are to check if the area of provided lot of land to be between 200 and 250 dunims, if it is more you can reduce the area with consultation with the instructor. You need to delete and clean the map of all land uses and proposed roads (keep existing agricultural roads).

The objective of the assignment is to distribute the land to regular shape parcels (rectangles or four sided shapes close to a rectangle) of appropriate dimensions according to the criteria provided. Each parcel must have appropriate access to at least one road. The horizontal and vertical alignment of roads should be preliminary designed in order not to have excessive cuts and fills or excessive slopes, in addition to suitable sight distance and drainage. Thus, you need to maximize utilizing the contour lines for this purpose. Slopes 6% or less are recommended on most roads, but exceptions of up to 12% may be used for some roads with small segments and/or with no access to land uses.

Each subdivision should have access to the main road. No details of surrounding land uses are provided. Assume the subdivision is independent without any significant influence from the surrounding areas. Assumed owners to own only one parcel of land (no owner owns two parcels of land, just for simplicity). The new subdivision **should not** consider the current property lines. However, after distribution of the new roads and land parcels, each landowner will have the same area of the original land minus a percentage deducted for roads and public areas. The location of new parcels should be as close as possible to the old location or of similar characteristics whenever is possible. The final output is a subdivision with appropriate streets and traffic circulation, regular shape and comparable areas of parcels for specific uses, in addition to public areas for various uses. The outcome of the project should include a chart providing a list of the owners of the original parcels and their new assigned parcel numbers; one or more parcels plus percentages (or shares) of other parcels.

The main tasks of the project:

1. Determine the area within the boundaries of assigned project (it should be about 200 to 250 dumins, if not consult with the instructor for modifications).
2. Clean unrelated lines (if any) from the given map, but make sure to keep the following lines: project borders, parcel borders, contour lines, and agriculture roads. It is important to delete any proposed construction lines such as proposed roads, and delete any built up areas (if existed, just for the purpose of simplicity, but this usually is not the case in real life), as well as utility line or any unknown lines on the AutoCAD drawing.
3. Delineate the right-of-way of the main road (25 m) outside and adjacent to one the property borderlines. You need to consider the best choice for the main road. Base your consideration on the slope of the main road and the connections to minor roads of the subdivision. If no contour lines are provided outside the borders or the provided lot, you need to extrapolate the contour lines to adjacent proposed straight main road along one of the sides of the provided lot of land.
4. You may have fills no more than one meter and cuts no more than three meters for the main road, but for roads within the subdivision assume you are mostly using natural existing contour lines for vertical alignment of streets.
5. Provide a simple vertical profile design of the main road and a typical cross section. Assume design speed of the main road is 60 km/h.
6. The subdivision map may have uncompleted lines for parcels or contour lines that need to be connected; please connect such lines, especially you must connect the parcel lines to form closed areas. Make sure there is no duplication in parcels numbering; in addition there may be some files (provided project lots) with some large area parcels, you need to divide such parcels that are greater than 10 dunims to parcels less than 10 dunims (let's have the maximum original parcel area 10 dunims so to be fair to the various groups). You should number unnumbered parcels.
7. Determine the area of each parcel (after completing the above steps).
8. Agriculture roads are also included in the map, these are public land and you should determine their areas by enclosing each agriculture road to a closed polygon. Measure the area of the each agriculture road and provide the sum of their areas. Later, when calculating the percentage for land used for public areas from each parcel, it should take into consideration the area of these public roads.
9. Make a list of all original parcels and their areas, and agriculture roads and their areas

- Summary 1 of the above Requirements: A new map of completely enclosed parcels with a distinct number for each parcel. Also a list (or table) of each parcel number (original) and its area plus the total area of the agriculture roads. Make sure the sum of areas equal the total enclosed project area. Minor error is expected, and you should adjust it according to area measurement of entire provided lot area. Finally, the lot of land should have one main road passing adjacent to one of its borderlines. Provide its geometric design, namely typical cross-section and vertical profile; the horizontal profile is adjacent to one of the project borders.

The remaining tasks

1. Use the entire area to design a subdivision with parcels of four kinds (plus public parcels and streets):
   a. Parcels A: 500 – 600 sq. meters residential for maximum two stories and roof. Minimum frontage distance 20m (no limitations on number of parcels).
   b. Parcels B: 900 – 1100 sq. meters residential (villas), maximum two stories and a roof. Minimum frontage distance 25 m and the number of parcels should be in the range of 10% - 20% of the number of private parcels area.
   c. Parcels C: 2000 – 3000 sq. meters for commercial use (adjacent to the main road only) for 2-stories buildings. Number of parcels must be in the range of 3-10 with appropriate parking. Minimum frontage distance 25 meters for each 1000 m^2 of parcel area. Parking should be within each parcel with an entrance and exit (at least two rows of parking for two-floor buildings). Minimum setbacks are front: 18 meters, back and sides 4 meters. Outline parking and building lines in the drawing (preferably provide more detail drawings, especially of parking configuration, building lines, pedestrian area adjacent to buildings, vehicle entrance and exists, etc.)
   d. Parcels D: 1500-3000 sq. meters parcels, for apartments with 6-8 floors each. Number of parcels must be in the range of 2-4, with area for parking (underground is a valid option) and playgrounds. Minimum frontage distance 15 meters for each 1000m^2 of parcel area. Maximum built up area is 50% and minimum setbacks: front 10 meters, sides and back 5 meters. Some surface parking and area for vehicles' pickup and drop-off near the entrance of the building and within the property is required. Show on the sketch at least the building lines, surface parking, vehicles' paths within the property and to/from parking garage.

2. Number each new parcel and determine its area
3. The entrance and exist to the subdivision is through the main road (25 m wide); there may be one or more roads entering/exiting the subdivision.
4. All other roads must have 12 – 16m ROW. Consider the contour to limit the slope. Show typical cross-section for each road type used. **The distribution and connection of roads is the most important task with the greatest impact. Think it carefully**.
5. If cul-de-sacs are used; use a radius of 9-15 meters for ROW (including sidewalks and possible parking)
6. Intersection should be perpendicular or close to perpendicular as possible. Basic design of intersections is needed, particular radius for curves and channelization (if needed).
7. Roads' typical cross-sections are required.
8. You may include pedestrian paths (2-3m wide)
9. Use 1-5 parcels of 1500 – 5000 square meters in **total** for public areas and suggest their uses, with a minimum area of any parcel 700 square meters.
10. Calculate the private parcels areas. Also, find the percentage of area for each type of parcel. Find the percentage used for roads and public areas, and the percent deduction

from each original parcel area (hint: considered existing/original public agriculture roads).

11. Subtract this percentage of area from each parcel (existing areas) and re-allocated new parcels' areas for the existing/original parcels' owners.
12. Allocate specific parcels (defined by parcel number) for each original landowner, close to the area of his/her original land; some shared ownership are expected, define the percentages for each. Note also the importance of the land uses to original owner.
13. You should allocate parcels to original owners based primarily on the original location of parcel. Thus, you should allocate commercial parcels to owners with land adjacent to main road, but it is possible to provide commercial parcels to original owners with land close to main road, where her/his land is included in the commercial parcels along the main road. Furthermore, this applies to land designated as apartments, thus the decision of designating various land uses would affect the owners of the land. **Discuss** the land preference, land value, fairness to owners, and recommend options.

- Summary 2 of the remaining requirements:

  - Write up a brief report for the given information, requirements and a short background about subdivisions (This assignment sheet should be cited and included in an appendix)
  - All maps/drawings must be to scale, use A0 paper and folded within appendix in the report (smaller paper size, e.g., A3 and A4, may be used for details drawings as noted in this assignment). Show scale, title, north arrow, legend, and other essential information on each map. It is highly recommended to have the same template of information for all maps/drawings. The final subdivision map should include:
    - Planned roads, which are connected directly or indirectly to the main road
    - Parcels located on the map according to requested criteria. Number each parcel. You should color various land uses or to at least distinguish among them in a certain manner (For printed maps you may want to save color ink and use various hatching patterns). At least the following maps are required:
      - A map with original parcels (all enclosed and numbered), agriculture roads, contour lines, and main road
      - A map with the planned new roads, contour lines, and new parcels, with approximate slope of the various road segments (no coloring or numbering of parcels).
      - A map with all planned roads and new parcels of lands, with no contour lines. Road slopes at various segments are required, basic intersection design, if needed (channelization or roundabout). The parcels should be numbered and colored according to the specific land use (including public area and their usages). Provide detail drawings for commercial and apartment parcels as outlined earlier.
      - Provide typical cross-sections of main road and all other roads (no duplication needed) on A4 paper. Furthermore, provide vertical profile of the main road on A4 or A3 paper.

- Table for all original parcels' numbers (should be for owners, but we assumed each parcel has a different owner) and corresponding new parcels that each owner should have, including shared parcels and the percentage of ownership. Fair distribution of location is preferable (but you need to justify).
- Conclusion and recommendation, benefits, drawbacks, possible problems and your main recommendations for future practice for such method of subdivisions in Palestine.