Palestine Polytechnic

University College of

Engineering

Civil Engineering Department

Graduation Project

Redesigning and planning part of the lands of Wadi al-Joz and Ain Naqar, located between the city of Hebron and Dura.

Project Team

Deema Omar Nsr, Maha Iyad Khallaf & Manar Abo Sharkh

Project

Supervisor Msc.

Musab Shahin

H e b r o n - P a l e s t i n e

January 2 0 2 5

The undersigned certify that they have reviewed, examined and recommended to the Department of Civil Engineering at the College of Engineering at Palestine Polytechnic University the approval of a project entitled - **Redesigning and planning part of the lands Wadi al-Joz and Ain al-Naqar, located between the city of Hebron and Dura**, by: Deema Omar Nasr, Maha Iyad Khallaf and Manar Abu Sharkh, in partial fulfillment of the requirements for a bachelor's degree

Msc. Musab Shahin (Supervisor):

Signature ……………………

Date………………………….

Project Approved by:

Dr. Ghadi Younis Zakarna

Head of Civil Engineering Department

Palestine Polytechnic University

Signature ………………………..

Date……………………………...

Dr. Iyad Hashlamon

Dean of College of Engineering

Palestine Polytechnic University

Signature ………………………..

Date……………………………...

ABSTRACT

Redesigning and planning part of the lands Wadi al-Joz and Ain al-Naqar, located between the city of Hebron and Dura

Project Team

Deema Omar Nasr, Maha Iyad Khallaf and Manar Abu Sharkh

Supervisor

Msc. Musab Shahin

Our project aims to design the infrastructure of the residential neighborhood, in a modern, smart and creative style, with a special focus on the re-sorting and distribution of lands and the design of road networks.

The team used photogrammetry techniques in the first phase of the project to study and analyze the topography of the project site, which is located within the lands of the Wadi al-Joz area located between the city of Hebron and Dura on an area of 177 dunums., and in the second phase we worked on designing the roads based on the nature of the terrain of the land so that it works to cover the area and take into account the service of all lands, and from there we started with the point of using land division laws that enabled us to sort and distribute the lands so that they are more suitable for the purpose Finally, work on three-dimensional programs was uploaded.

الملخص

إعادة تصميم وتخطيط جزء من أراضي وادي الجوز وعين ننقر الواقعة بين مدينة الخليل ودورا

فريق العمل

ديما عمر نصر　　　مها إياد خلاف　　　ومنار أبو شرخ

اشراف

م. مصعب شاهين

يهدف مشروعنا إلى تصميم البنية التحتية للحي السكني، بأسلوب عصري وذكي ومبدع، مع التركيز بشكل خاص على إعادة فرز وتوزيع الأراضي وتصميم شبكات الطرق.

استخدم الفريق تقنيات التصوير المساحي في المرحلة الأولى من المشروع لدراسة وتحليل تضاريس موقع المشروع الذي يقع ضمن أراضي منطقة وادي الجوز الواقعة بين مدينة الخليل ودورا على مساحة قدرها 177 دونم، وفي المرحلة الثانية عملنا على تصميم الطرق بناء على طبيعة تضاريس الأرض بحيث تعمل على تغطية المساحة ومراعاة خدمة جميع الأراضي، ومن هنا بدأنا بنقطة استخدام واخيرا رفع العمل على برامج بنمط قوانين تقسيم الأراضي مما مكننا من فرز الأراضي وتوزيعها بحيث تكون أكثر ملاءمة للغرض ثلاثي الابعاد .

1.1 DEDICATION

To those who have always believed in us …

To those who have been our source of inspiration …

To those who gave us strength …

To those who provide us their endless support and encouragement …

To our families …

to our friends…

To everyone who carries love in his heart for us …

1.2 ACKNOWLEDGEMENT

It was a great opportunity for us to gain a lot of knowledge by working on this project, but completing any task successfully would not be complete without mentioning the people who made it possible. Therefore, we would like to thank everyone who helped, supported and encouraged us:

Palestine Polytechnic University, Faculty of Engineering, Department of Civil Engineering, including all the helpful and respectful staff members.

Special thanks to our supervisor, Mr. Musab Shaheen, who was a guiding light every step of the way while we were working on this project.

Finally, our deep gratitude and sincere thanks to our parents, brothers and sisters for their patience, and to everyone who tried to help us during our work and gave us the strength to complete this task.

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CHAPTER 1

INTRODUCTION

1.1 General Overview

The lands of the city of Hebron and the town of Dura are characterized by their diverse geographical nature, granting them a unique agricultural and residential significance.

These lands are divided into fertile agricultural areas covered with olive and grape trees, grazing lands used for livestock, and residential areas designated for urban expansion.

The lands of Hebron include elevated mountainous regions and low-lying valleys, offering diversity in agricultural crops and multiple investment opportunities.

In Dura, agricultural lands are particularly prevalent, making it an important agricultural hub in the region. These lands also include various legal classifications, such as privately owned lands, endowment (waqf) lands, and government-owned lands, which influence their use and development.

1.2 Project Problem

The study area has a difficult terrain to create street networks and infrastructure, and there are many disputes over the division of land between its owners. During the field visit, we found a lack of streets leading to the residents' land plots,

As it was difficult to work with devices such as GPS and Total Station, we used aerial photography "Drone" to facilitate the data collection process, as surveyors can now obtain data quickly and accurately using modern drones.

1.3 Objectives of the project

This project was selected to achieve the following thresholds:

-Linking the theoretical information acquired during the study period with practical information Life.

- Survey the Neighborhood using a drone.

- Use the aerial photo from the drone and enter it into Agisoft to Make a 3D model.

-Prepare Topo map and clarify each element within the Area in terms of (buildings, streets, wall, trees).

1.4 Methodology

Dura Municipality provided information such as structural plans, and based on discussions with the project supervisor and staff from Dura Municipality, the following stages were agreed upon for implementing the project:

Phase 1: Data collection

Determine the work area and then conduct a site survey visit and get a complete idea about the nature of the project, the problems related to it and the important details in order to obtain the best and most accurate results.

Figure 0-1DATA COLLECTION DAY

Phase 2: Area of study

Select the study area and obtain approval from the supervisor, and set a suitable date for a site survey. The project area in Hebron is called "Wadi al-Joz - Wadi Nanqar" on an area of . . . .

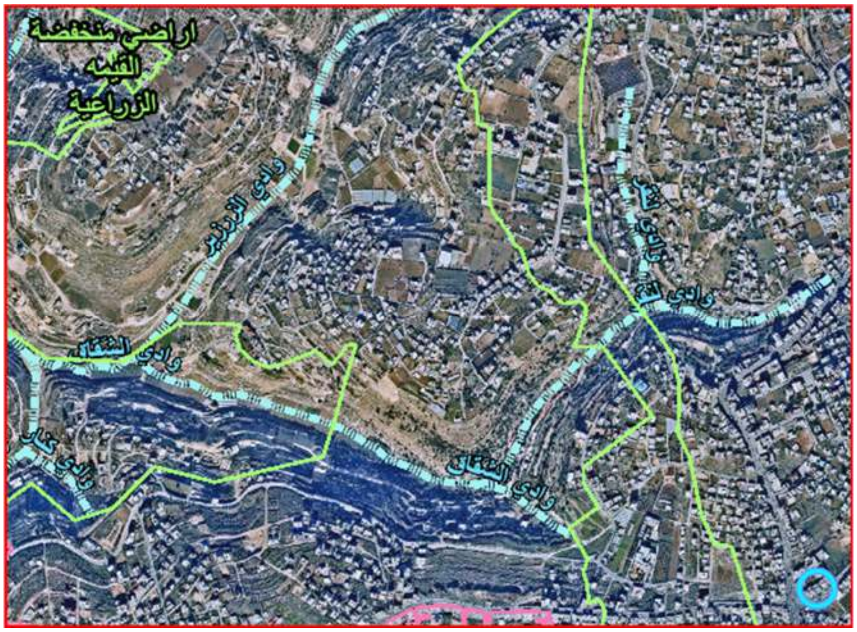
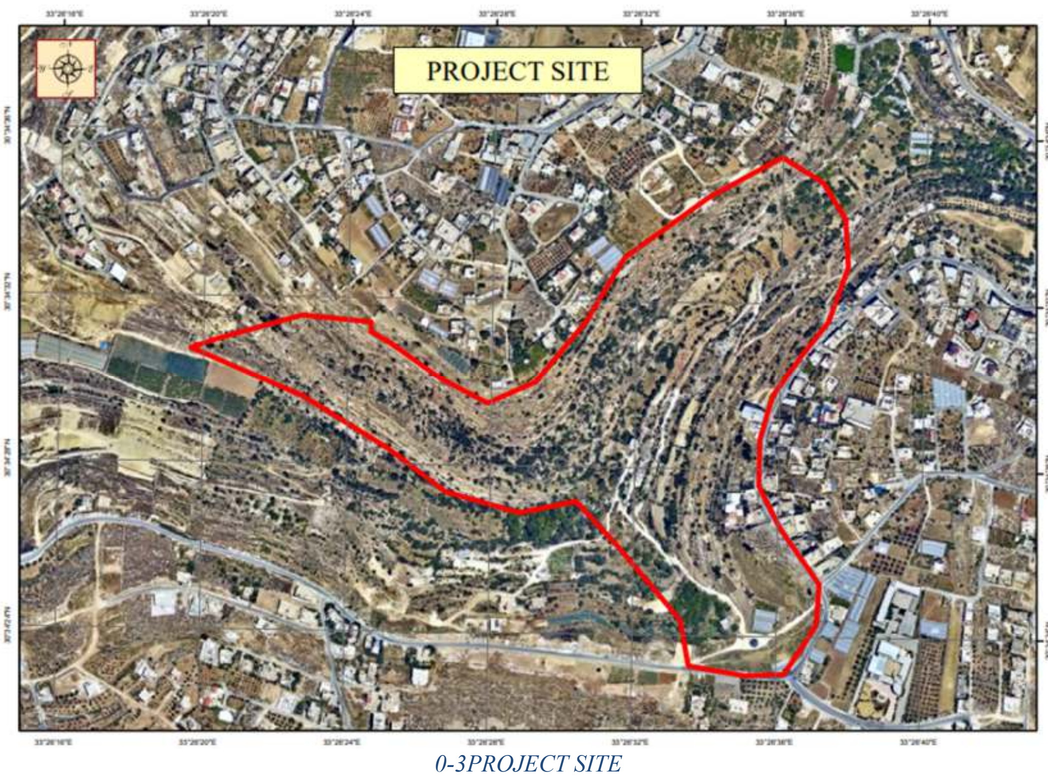


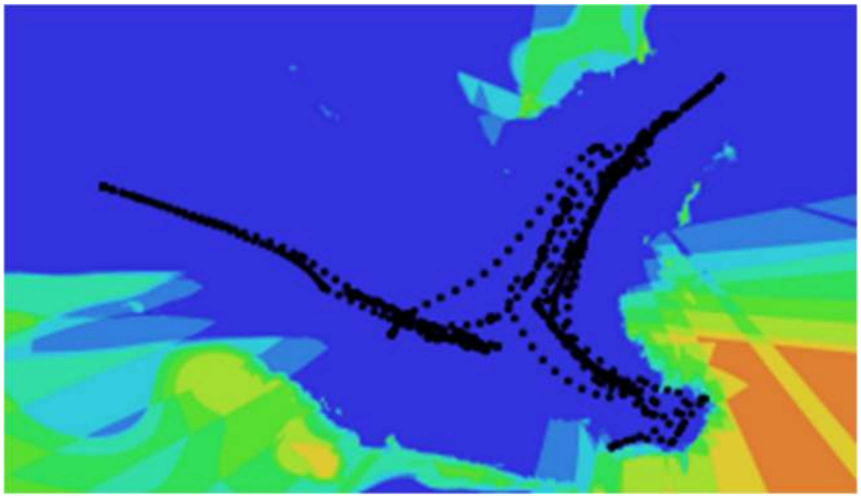
Figure0-2AREA OF STUDY



0-3PROJECT SITE

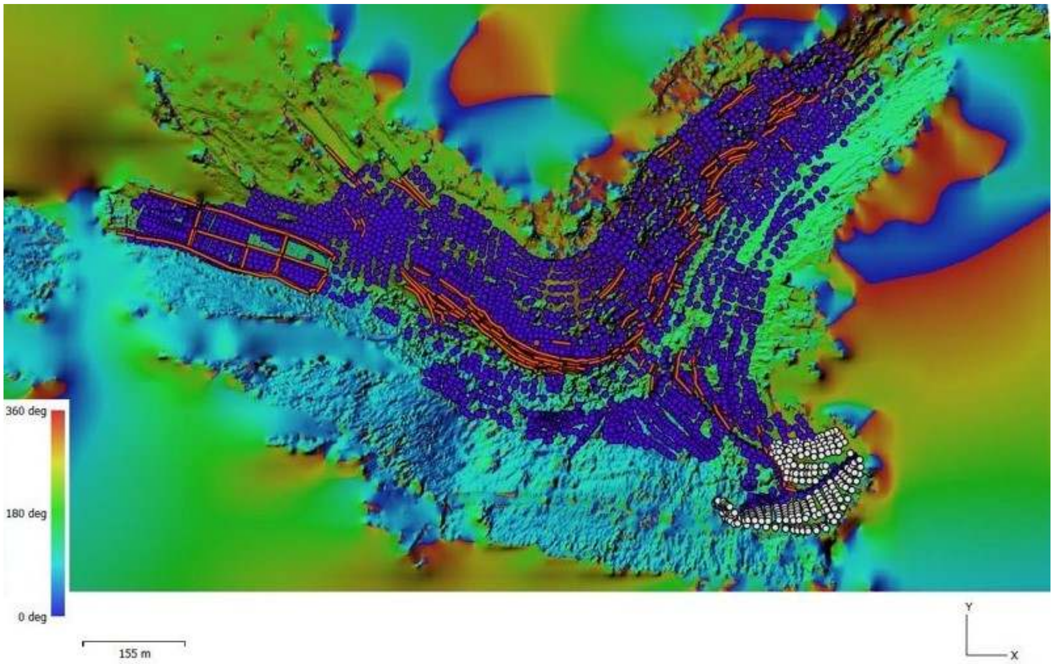
Phase 3: Survey works

1 Selection and distribution of control points.
2 drone was flown within the study area and pictures were taken from the plane.
3 Photogrammetric modeling: Processing the images and linking the control points within the Agisoft program, including creating a 3D model of them to produce aerial images.



0-4ELEVETION

0-5CONTROL POINT POSITION



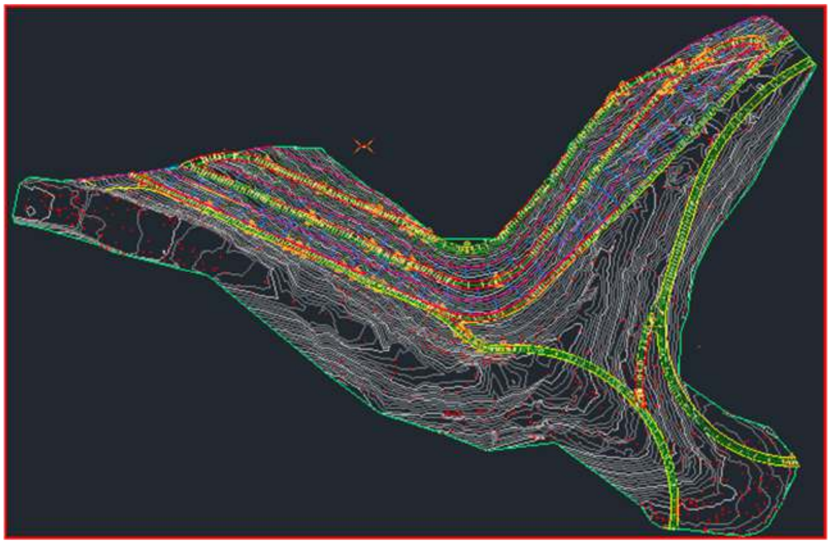
0-6DEM

Phase 4: Topoghraphic map

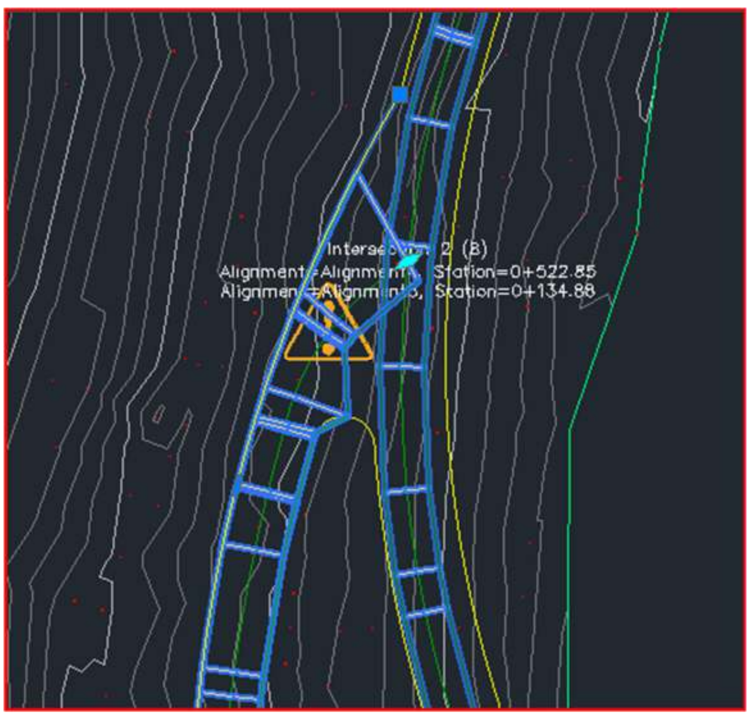
Digitising inside agisoft program, took general points, drew break lines, exported them, and made a Topo Map inside the civil program.

Phase 5: Work within the Civil program according to the following steps:

1. Create a service for the project area.
2. Open roads so that they are distributed throughout the entire area.
3. Divide plots of land.
4. Create a corridor to export the file to the Inflow program to create a 3D model.



0-7ROAD IN CIVIL



0-9 Corridor

Phase 6: Inflow program

After adding the files to the program in the form of liras arranged on top of each other, a 3D model was produced and a special video was made for it.

Phase 7: Results and Recommendations

- The survey is moving towards using the latest devices in surveying work such as drones because they are safer and faster than traditional devices.
- Keeping up with technology and using modern programs related to aerial photography.
- Also using programs that help understand areas and analyze their data better
- The presence of a road on the land is important to facilitate the process of access and linking the area
- Land division is a law that has made it easy for the state and its residents to organize and divide properties and solve problems since long ago.

1.5 Project timeline

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	1.5.1.1 week activity
															Methodology
															Data collection
															Area of study
															Survey works
															Topoghraphic map

Table 1TIME LINE The introduction

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	1.5.1.2 week activity
															Create a service
															Open roads
															Divide plots of land
															Create a corridor
															Inflow program
															Layout design
															3D video
															Results and Recommendations

Table 2TIIME LINE FINAL PROJECT

1.6 Programs used in the project

- Microsoft Office
- AGI SOFT
- CIVIL 3D
- GIS 10.8
- INFRAWORKS

1.7 Project challenges

The nature of the project land is characterized by its difficult terrain and the presence of steep slopes within it, which leads to a high cost for the project during construction. In addition, there are many disputes over the division of the lands in the area between their owners.

CHAPTER 2

Surveying

2.1 Definition, Categories, and Purpose of Surveying

Surveying is the process of determining the relative position of natural and manmade features on or under the earth's surface, the presentation of this information either graphically in the form of plans or numerically in the form of tables, and the setting out of measurements on the earth's surface. It usually involves measurement, calculations, the production of plans, and the determination of specific locations. The surveyor may be called on to determine heights and distances; to set out buildings, bridges and roadways; to determine areas and volumes and to draw plans at a predetermined scale.

There are two major categories of surveying:

1. Plane Surveying Plane surveying deals with areas of limited extent and it is assumed that the earth's surface is a plane and therefore no corrections necessary for the earth's curvature.

2. Geodetic Surveying Geodetic surveying is concerned with determining the size and shape of the earth and it also provides a high-accuracy framework for the control of lower order surveys. The highest standards of accuracy are necessary. Geodetic surveys cover relatively large areas (e.g. a state or country) for which the effects of earth curvature must be considered.

Apart from the two main categories, we may also classify surveys according to their different branches and those disciplines directly associated with surveying:

1. Topographic Surveys are concerned with the measurement and mapping of the physical features of the earth. These features are all natural and manmade features.
2. Engineering Surveys cover surveys carried out as part of the preparation for, and carrying out of, engineering works, including roads, railways, pipelines, drainage etc.
3. Cadastral Surveys are concerned with the measurement, definition and mapping and recording of property boundaries.
4. Hydrographic Surveys are those made for determining the shape of the bottom of lakes, rivers, harbours and oceans. They also include the measurement of the flow of water in streams and the estimation of water resources.
5. Aerial Surveys are made from an aeroplane, and for the purpose of mapping the terrain. The control for such a map is obtained from ground surveys, but the details are obtained from aerial photographs. This includes making measurements and interpretations from aerial photographs.
6. Astronomic Surveys are surveys made to determine the latitude, longitude and azimuth from observations to the stars.
7. Mining Surveys are those made to determine survey control for the development of both surface and underground mines within the mining industry, and the determination of volumes in mine production.

8. Computing is a specialised area of surveying where complex computer programs are used to solve problems within the surveying industry.
9. Consulting is another specialised area of surveying where specialist surveyors are hired for a short period of time to advise on the requirements for a specific task or to perform the specific task. The above surveys have a common stem in skills and training. They have little or nothing in common with marine surveys, public opinion surveys, quantity surveys etc.

2.2 The Survey Process

The following sequence of steps is commonly followed when carrying out a survey:

(i) Reconnaissance During the reconnaissance phase, the surveyor will obtain an overall picture of the area that the project will be conducted in. They will select where the control points will be located, the accuracy required for the control, and which survey instruments will be required for the project.

(ii) Measurement and Marking During the measurement and marking phase, the surveyor will perform all the observations in the field required to accurately determine the control points, as well as placing and observing to any temporary points such as wooden pegs. They would also perform any calculations from the observations, such as angular and linear misclose and area and volume calculations.

(iii) Plan Preparation During the plan preparation phase, the calculations that were performed from the field observations would be further enhanced and used to produce the final plans for the project.

Note:

Control – The accepted surveying practice is to work from the whole to the part when establishing control. That is, select a small number of primary control points that cover the whole area and form a well-defined network of figures. These are broken down into a smaller network of figures as required.

Accuracy – Some projects do not require the highest possible accuracy, and, therefore, it is not always necessary to use the highest possible precision. This point is further reinforced by the usual contracting requirement that the job be done in the shortest possible time at the least possible cost. Equipment and techniques to be used need to be carefully considered so that the project is completed according to instructions, using the most appropriate methods.

2.3 Units of Measurement

SI units the most commonly used in surveying being shown below:

Quantity	Unit	Symbol
Length	Kilometer Meter Millimeter	Km M Mm
Area	Square meter hectare	m^2 ha
Volume	Cubic meter	m^3
Angle	Degrees Minutes seconds	° ' "
Mass(Weight)	Kilogram	Kg
Temperature	Degrees Celsius	℃

Table 3Units of Measurement

2.4 Six of the Most Common Surveying Instruments

Surveying is one of the oldest professions, with records of land surveys dating back to ancient Roman times. You might assume that equipment used in the past was rudimentary and crude, but evidence indicates that ancient measuring tools for surveying were developed with surprising accuracy. Romans used an instrument called a groma to "trace on the ground simple and orthogonal alignments necessary to the construction of roads, city, temples, and agricultural lands subdivision1." Since then, surveying instruments have evolved with respect to exponential developments in technology. These days, surveyors use elite electronic equipment in addition to more basic tools to aid in measuring and mapping efforts. Curious to know more about the equipment surveyors use? We have compiled a list of the six most used surveying tools, including:

1. Theodolite: A surveying instrument with a rotating telescope for measuring horizontal and vertical angles to make precise measurements of areas and triangulate the position of objects in a specific area.

2. Measuring tape: A length of tape or thin flexible metal, marked at intervals for measuring size or distance. Surveyors commonly use tape measures (known as measuring wheels) in lengths of over 100 meters3.

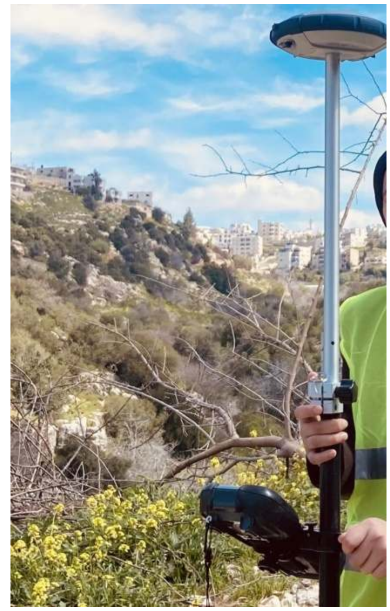
3. Total station: A theodolite that uses electronics to calculate angles and distances and contains an on- board computer to collect data and perform triangulation calculations. This tool is used to record features in topographic surveying or to set out features (roads, houses, or boundaries).

4. 3D scanners: A surveying instrument that can accurately measure and collect data from objects, surfaces, buildings, and landscapes. This tool collects information in the form of point cloud data, which consists of millions of 3D coordinates. These coordinates can be used to create 3D computer-aided design (CAD) models, which can then help analyze topographic features and structures. The high accuracy of 3D scanners helps reduce project costs.

5. Level and rod: A graduated wooden or aluminum rod, used with a levelling instrument to determine the difference in height between points or heights of points above a vertical datum7. This tool is used to establish and verify elevations.

GPS/GNSS:

GPS Accuracy



0-8GPS

it depends. GPS satellites broadcast their signals in space with a certain accuracy, but what you receive depends on additional factors, including satellite geometry, signal blockage, atmospheric conditions, and receiver design features/quality.

For example, GPS-enabled smartphones are typically accurate to within a 4.9 m (16 ft.) However, their accuracy worsens near buildings, bridges, and trees.

High-end users boost GPS accuracy with dual-frequency receivers and/or augmentation systems. These can enable real-time positioning within a few centimeters, and long-term measurements at the millimeter level.

Aspect	GNSS (Global Navigation Satellite System)	GPS (Global Positioning System)
Definition	An umbrella term for all global satellite positioning systems	NAVSTAR Global Positioning System developed by the U.S. Department of Defense
Included Systems	Includes systems like GLONASS (Russia), Galileo (EU), and Beidou (China)	GPS system only
Compatibility	GNSS-compatible equipment can use satellites from various networks, increasing accuracy and reliability	Not all GPS receivers are compatible with GNSS
Main Components	Space (satellites), Ground (control stations), User (receivers)	Space (satellites), Ground (control stations), User (receivers)
Uses	Agriculture, transportation, machine control, marine navigation, vehicle navigation, mobile communication, athletics	Agriculture, transportation, machine control, marine navigation, vehicle navigation, mobile communication, athletics
Development	Includes systems developed by multiple countries	Developed by the U.S. Department of Defense and later made available for civilian use
Availability	Relies on multiple systems to provide more reliable and accurate services	Provides continuous service under any weather conditions

Table 4GPS/GNSS

Point NO.	Description	Easting	Northing	Elevation
RTCM0002		152897.472	101742.161	869.609
1		156932.139	101839.451	846.645
2	as	156930.115	101902.835	844.2
3	as	156930.966	101875.049	839.32
4	as	156834.369	101934.372	828.201
5	as	156785.062	101961.965	815.003
6	as	158725.484	102030.812	799.018
7	as	156699.801	102128.635	787.559
8	as	156724.137	102179.399	793.501
9	as	156781.009	102293.47	801.171
10	as	156799.163	102312.04	802.994
11		156678.076	102030.714	785.728
12		156605.747	102005.307	788.779
13		156572.011	101997.93	787.346
14		156553.691	102008.496	778.818
15		156520.496	102021.791	772.123
16		156479.963	102023.744	770.904
17		156383.096	102083.015	758.91
18		156331.176	102106.233	753.546
19	level	156345.138	102093.761	754.527
20	level	156346.218	102097.116	754.009
21	level	156347.976	102101.855	753.573

*-

Table 5Control point FROM GPS

2.5 Drone survey

A drone survey refers to the use of a drone, or unmanned aerial vehicle (UAV), to capture aerial data with downward-facing sensors, such as RGB or multispectral cameras, and LIDAR payloads. During a drone survey with an RGB camera, the ground is photographed several times from different angles, and each image is tagged with coordinates.

0-9DRONE

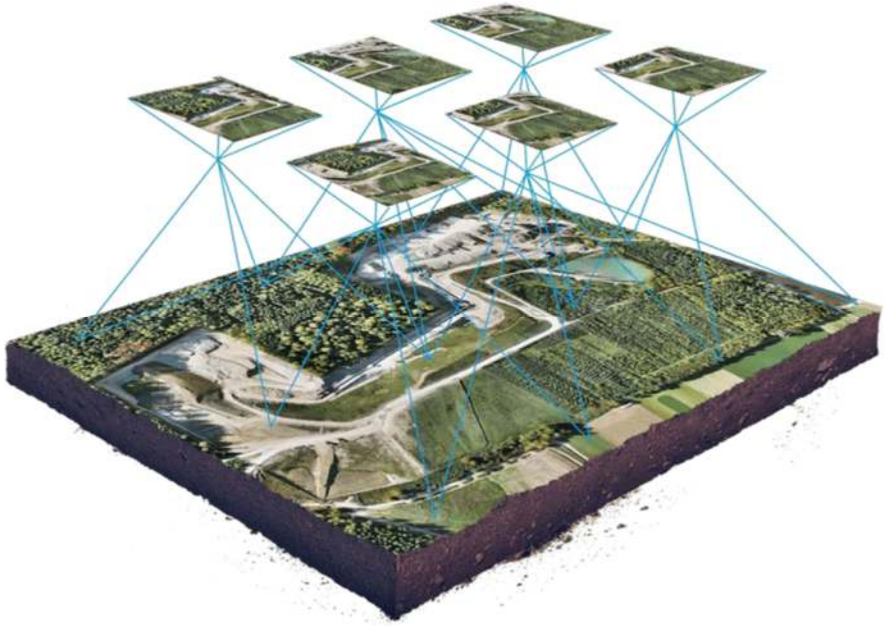


Figure 0-10Photogrammetry images

From this data, a photogrammetry software can create geo-referenced orthomosaics, elevation models or 3D models of the project area. These maps can also be used to extract information such as highly-accurate distances or volumetric measurements.

Unlike manned aircraft or satellite imagery, drones can fly at a much lower altitude, making the generation of high-resolution, high-accuracy data, much faster, less expensive and independent of atmospheric conditions such as cloud cover.

2.6 The benefits of drones in surveying

Some of the benefits of using drones in surveying:

1-Reduce field time and survey costs

Capturing topographic data with a drone is up to five times faster than with land-based methods and requires less manpower. With PPK geo-tagging, you also save time, as placing numerous GCPs is no longer necessary. You ultimately deliver your survey results faster and at a lower cost.

2-Provide accurate and exhaustive data

Total stations only measure individual points. One drone flight produces thousands of measurements, which can be represented in different formats (orthomosaic, point cloud, DTM, DSM, contour lines, etc.). Each pixel of the produced map or point of the 3D model contains 3D geo-data.

3-Map otherwise inaccessible areas

An aerial mapping drone can take off and fly almost anywhere. You are no longer limited by unreachable areas, unsafe steep slopes or harsh terrain unsuitable for traditional measuring tools. You do not need to close down highways or train tracks. In fact, you can capture data during operation without an organizational overhead.

2.7 Uses of drones

1-Land surveying / cartography

Survey drones generate high-resolution orthomosaics and detailed 3D models of areas where low- quality, outdated or even no data, are available. They thus enable high-accuracy cadastral maps to be produced quickly and easily, even in complex or difficult to access environments. Surveyors can also extract features from the images, such as signs, curbs, road markers, fire hydrants and drains.

After post-processing with a photogrammetry software, these same images can produce very detailed elevation models, contour lines and breaklines, as well as 3D reconstructions of land sites or buildings.

2-Land management and development

Aerial images taken by drones greatly accelerate and simplify topographic surveys for land management and planning. This holds true for site scouting, allotment planning and design, as well as final construction of roads, buildings and utilities.

These images also provide the foundation for detailed models of site topography for pre- construction engineering studies. The generated data can also be transferred to any CAD or BIM software so that engineers can immediately start working from a 3D model.

As data collection by drones is easily repeatable at low cost, images can be taken at regular intervals and overlaid on the original blueprints to assess whether the construction work is moving according to plan specification

2.8 Accurate of drone survey

The performance and type of drone, the quality of its components, the camera resolution, the height at which the drone flies, the vegetation, and the method and technology used to geolocate the aerial images can heavily influence the accuracy of drone survey mapping. At this point, it is possible to reach an absolute accuracy down to 1 cm (0.4 in) and 0.7 cm/px (0.3 in/px) GSD under optimal conditions with a high-end surveying drone such as the WingtraOne.

Number of images:	733	Camera stations:	733
Flying altitude:	61.4 m	Tie points:	518,300
Ground resolution:	1.98 cm/pix	Projections:	2,249,293
Coverage area:	1.5 km²	Reprojection error:	0.991 pix

0-112.5Accurate of drone survey

2.9 Drone survey procedure

1. Check before you leave the office

Check the local regulations and make sure that you are allowed to fly your drone at the planned location. Also, make sure that the weather is suitable, meaning no rain, fog, snowfall or strong winds. Check that the battery of your drone and connected devices such as tablets are fully charged and that the memory card of your drone camera has sufficient empty space to capture the entire project.

2. Plan your flight

You can create the survey flight plan with the drone flight planning app on the tablet. For this, just tap and drag the points around the area you want to survey, or import a KML file. Make sure you account for tall objects within the flight plan, as well as altitude differences. If needed, you can adjust flight settings such as altitude, ground sampling distance (GSD), flight direction and images overlap.

3. Set up your flight in the field

During this step, you basically unpack and assemble the drone and make sure that it is ready to take-off in safe conditions. Following the interactive check-

check-list, you will one-by-one check every parameter, like the calibration of the airspeed sensor and making sure the camera lid is removed.

4. Fly and collect images

After pushing the take-off button, the drone autonomously takes off, captures images and lands back where it started. In this step, the operator essentially makes sure that nobody approaches the drone during take-off or landing and that the weather conditions stay optimal for the survey mission.

5. Geotag your images

After one or several flights, import the images into WingtraHub software to geotag them s. Geo- tagging assigns geographical position (X, Y, Z) information to the images either in a separate CSV file or in the images' meta-data.

CHAPTER 3

URBAN PLANNING

3 Planning

The planning process is extremely important for the advancement of countries and their civilizations throughout the ages. It is also crucial for risk and disaster management. Pre-planning helps mitigate negative impacts and reduce the likelihood of disasters through administrative directives and organizations that implement effective and beneficial strategies.

3.1.1 what is planning?

- It is a scientific method that aims to study the achievement of specific goals or improve living conditions, provided that the use achieves the greatest amount of production and helps achieve a great deal of development.
- It includes all types of sources and capabilities available in the country, in the region, and determining how to use these resources and capabilities in planning. It is an absolute topic that can be an economic.

3.1.2 Types and varieties of planning include :

1. precautionary planning: An administrative process through which appropriate procedures are identified, and specific probabilities of events or situations that may threaten society or the environment are analyzed.

2. regional planning: The second level of planning, which is conducted within a specific regional scope, aims to achieve the highest degree of similarity and spatial coordination.

3. strategic developmental and investment planning: It is the planning that works towards achieving development in the targeted region.

4. urban or physical planning: A tool and means to achieve the public interest is through the development of desired future scenarios and visions.

5. local planning: The third level of planning aims to achieve appropriate and comprehensive development for the overall urban and rural life.

6. governmental planning: It represents the influential and affected social, economic, urban, environmental, and other systems.

7. national planning: It represents the highest level of planning and is associated with supreme or central authority.

3.2 Urban or physical planning:

is a tool and means to achieve the public interest for all segments of society, by developing desired future visions and perspectives, distributing activities and land uses in appropriate places and at the right time, thus achieving a balance between development needs in the present and the future, namely achieving what is known as sustainable development.

- **Goals of urban planning**

  - The general goal of urban planning:

The general objective of the Urban Planning Guide is to contribute to a balanced and sustainable development process through modified planning procedures and practices.

  - The specific goal of urban planning:

1. Provide a step-by-step guide explaining how to prepare modified physical drawings, with applied examples.
2. Defining and clarifying the expected results for each stage of planning
3. practical and applied references and tools for all planning steps

  - The stages of local urban planning:

i. Strategic Development Plans.
ii. Structural Organization Plans.
iii. Detailed Plans:

1. Preparation of Detailed Organizational Plans
2. Preparation of Unification and Partitioning Plans
3. Preparation of Executive Plans
4. Preparation of Plans with Special Developmental Goals

- For the first stage of structural planning, the following working groups

1. Assessing the regional situation, the existing urban structure, and land uses.
2. A number of sectorial assessments of related services, which will identify existing conditions, problems and potentials associated with repercussions.
3. On these assessments, all development potentials and challenges are gathered, goals are set and development alternatives are formulated.
4. Concluding and formulating a guiding framework plan for spatial development, specifying the future boundaries of urban areas.

- The comprehensive planning framework consists of three main steps:

1. Describing the regional conditions of the planning area (Figure 3-1).
2. Describing and analyzing the patterns and structure of population centers in the planning area.
3. Documenting and analyzing the current status of land uses, all planning of areas and built-up areas.

- The second stage of structural planning

1. includes the following tasks Preparing a land use plan to direct private and public construction activities within the boundaries of the populated areas identified in Guiding framework plan for spatial development and during the planned expansion.
2. Develop supplemental building provisions to define and detail zoning planning conditions and requirements for construction activities.
3. Preparing additional sectorial procedural plans or programs to ensure the availability of appropriate infrastructure and community services for the regions.
4. Current and future inhabited areas defined by the spatial development guideline framework plan.

- This stage can be implemented with planning in the following ways:

1. Planning initiatives for local authorities: Efforts to organize and strategize for local governing bodies.
2. Preparation for planning individual local initiatives: Setting up plans for specific local projects and activities.
3. Combining two options in advance: For example, creating a joint layout that serves two or more local facilities or designing a layout that accommodates them separately.

- The first task of the second stage of structural planning is Land use plan.

The land use plan should be prepared based on the information that emerged from the coordination between local councils, and it will contain the following information to differentiate between existing and proposed uses:
- Residential areas

- Commercial areas

- Industrial areas

- Agricultural areas

- Community services

- Facilities

- Public parks and open spaces

- Cemeteries

- Traffic and transportation

- Areas with specific interests (e.g., environmental protection zones)

- Historical and archaeological areas

3.3 Classification of the project area lands

Lands are classified based on:

1- Whether they are located within the proposed master plan.

2- Or outside the master plan.

If the land is located within the master plan, it is classified according to the provisions of the regulatory plans approved by the competent committee as follows:

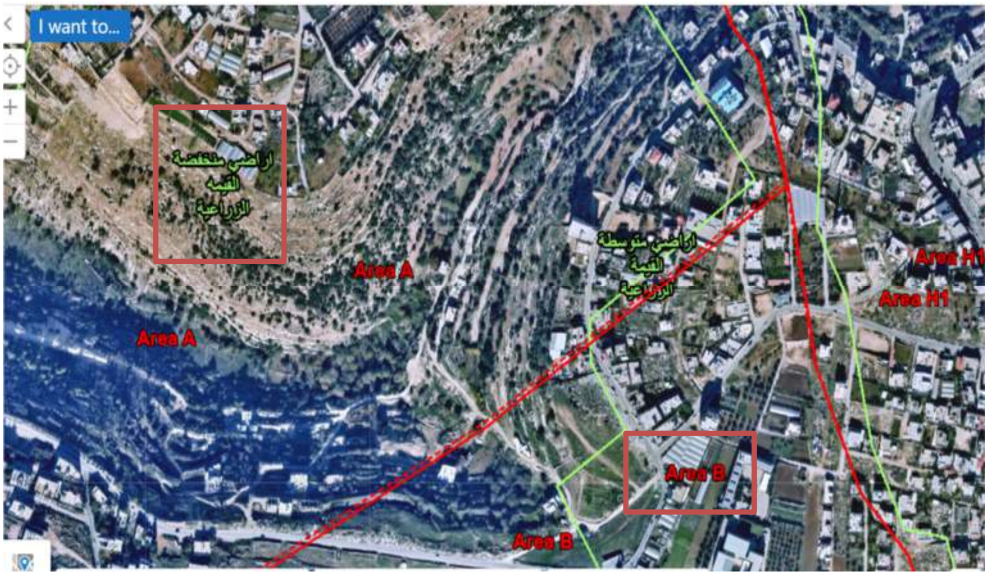
1. Area A
2. Area B
3. Area C

If it is located outside the master plan, it is classified according to the provisions of the regulatory plans approved by the competent committee as follows:

1. Low-value agricultural lands
2. Medium-value agricultural lands
3. High-value agricultural lands

By using the Gemology website, it became clear to us that the area covered by the project is partially within the master plan and partially outside the master plan. The classification of lands within the plan was within Residential Area A

In the land classification system in Palestine, "Residential Area A" is defined as the area designated for residential construction, and is subject to a set of regulatory and supervisory requirements that aim to regulate construction and ensure optimal use of land.



0-1classification OF STYDY AREA

Organizational Requirements for Residential Zone A:

1. Permissible Building Ratio:
   The maximum building ratio is determined based on the land area, and it varies according to the local planning schemes.
2. Setbacks:
   Specific distances must be maintained between the building and the boundaries of the plot on the front, back, and sides to ensure adequate ventilation and lighting.
3. Number of Floors and Height:
   The maximum number of floors and permissible building height in this zone is predefined.
4. Permitted Uses:
   This area is designated for residential purposes, with limited service uses that benefit the local residents, such as small shops or public facilities.
5. Parking Requirements:
   A specific number of parking spaces must be provided per residential unit, in accordance with the set standards.

These regulations aim to achieve balanced urban development and provide a suitable residential environment for citizens.

مادة (4)

أحكام المباني السكنية

1. يسمح بترخيص المباني السكنية الواقعة ضمن الأراضي الزراعية منخفضة القيمة بموجب المخطط الوطني لحماية الموارد الطبيعية والمعالم التاريخية وفقاً للأحكام الآتية:

مساحة القطعة بالمتر	الحد الأدنى لارتدادات البناء بالمتر			الحد الأعلى		
	الأمامية عن الشوارع (م)	الخلفية (م)	الجانبية (م)	لعدد الطوابق للبناء الواحد	لارتفاع البناء (م)	النسبة المئوية السطحية
4000 فأكثر	10	5	5	4	15	%36
3999-1000	7	5	5	4	15	%36
999 فأقل	7	4	4	4	15	%36

0-2Organizational Requirements for Residential Zone A

Low-value agricultural lands:

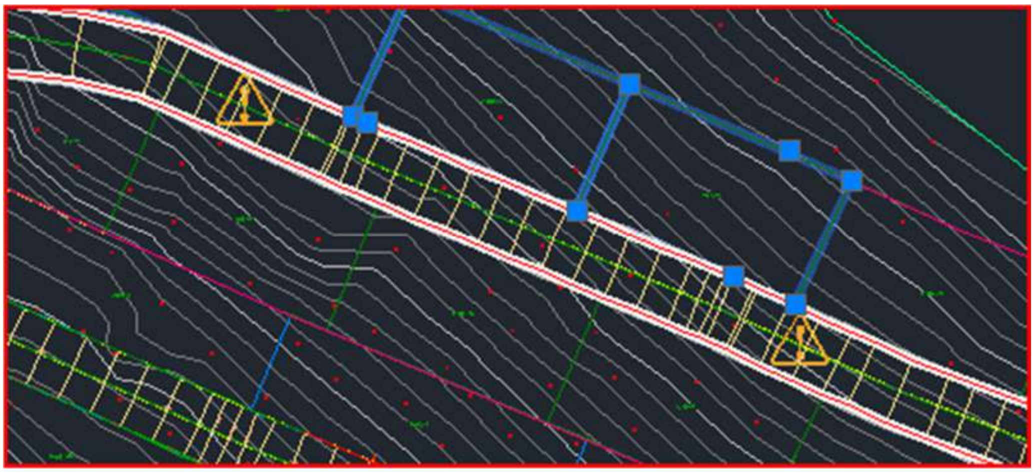
Any land may be divided into plots provided that the area of each plot is not less than one dunum**.**

However, in the project, work was done on a land area of approximately 700 square meters due to the nature of the land, and therefore a letter is submitted with the structural plan to allow approval to shorten the area from 1 dunum to 700 square meters.

Parcel Area Table

Parcel #	Area	Perimeter	Segment Lengths	Segment Bearings
91	700.00m^2	126.53	65.62 165.31 1.01 106.31 17.77 59.10	S24° 14' 54.51"W N65° 45' 05.49"W N77° 09' 07.97"E N81° 08' 21.61"E S88° 43' 45.69"E S65° 45' 05.49"E
92	700.00m^2	110.00	65.62 6.02 108.00 65.62 108.81 6.83	N24° 14' 54.51"E S65° 45' 05.49"E S67° 10' 23.29"E S22° 49' 36.71"W N67° 10' 23.29"W N65° 45' 05.49"W
94	700.00m^2	110.00	65.62 60.10 52.74 65.62 54.73 62.09	N24° 40' 09.12"E S65° 19' 50.88"E S68° 47' 26.02"E S21° 12' 33.98"W N68° 47' 26.02"W N65° 19' 50.88"W

0-3AREA OF LAND IN CIVIL



0-4PARCEL

CHAPTER 4

Geometric Design of Roads

4.1 Geometric design of roads

- Geometric design of roads is a branch of highway engineering that is concerned with the placement of physical elements of a roadway according to standards and constraints.

- The primary goals of geometric design are to improve efficiency and safety while minimizing cost and environmental damage.

- Geometric design also influences the emerging fifth goal called "live ability", which is defined as designing roads to enhance broader societal goals, including providing access to jobs, schools, businesses and housing; accommodating a range of modes of travel such as walking, cycling, transit and automobiles; and minimizing fuel use, emissions and environmental damage.

The geometric design of a road can be divided into three main parts:

1. Alignment
2. Shape
3. Cross-section.

❖ Together, these parts provide a three-dimensional plan of the road.

- **The alignment** : is the path of the road, which is defined as a series of horizontal tangents and curves.
- **The shape**: is the vertical aspect of the road, including the crest and sag curves, and the straight slope lines that connect them.
- **The cross-section** : shows the position and number of vehicle and bicycle lanes and sidewalks, along with their transverse slope or slope. Cross-sections also show drainage features, pavement structure, and other elements outside the geometric design category.

4.2 Design standards

- Roads are designed in conjunction with design guidelines and standards.
- These are adopted by national and sub-national authorities (e.g., states, provinces, territories and municipalities).
- Design guidelines take into account speed, vehicle type, road grade (slope), view obstructions, and stopping distance. With proper application of guidelines, along with good engineering judgment, an engineer can design a roadway that is comfortable, safe, and appealing to the eye.

The primary US guidance is found in A Policy on Geometric Design of Highways and Streets published by the American Association of State Highway and Transportation Officials (AASHTO).

4.3 Profile

- **The profile of a road** consists of road slopes, called grades, connected by parabolic vertical curves.

- **Vertical curves** are used to provide a gradual change from one road slope to another, so that vehicles may smoothly navigate grade changes as they travel.

- **Sag vertical curves** are those that have a tangent slope at the end of the curve that is higher than that of the beginning of the curve. When driving on a road, a sag curve would appear as a valley, with the vehicle first going downhill before reaching the bottom of the curve and continuing uphill or level.

- **Crest vertical curves** are those that have a tangent slope at the end of the curve that is lower than that of the beginning of the curve. When driving on a crest curve, the road appears as a hill, with the vehicle first going uphill before reaching the top of the curve and continuing downhill.

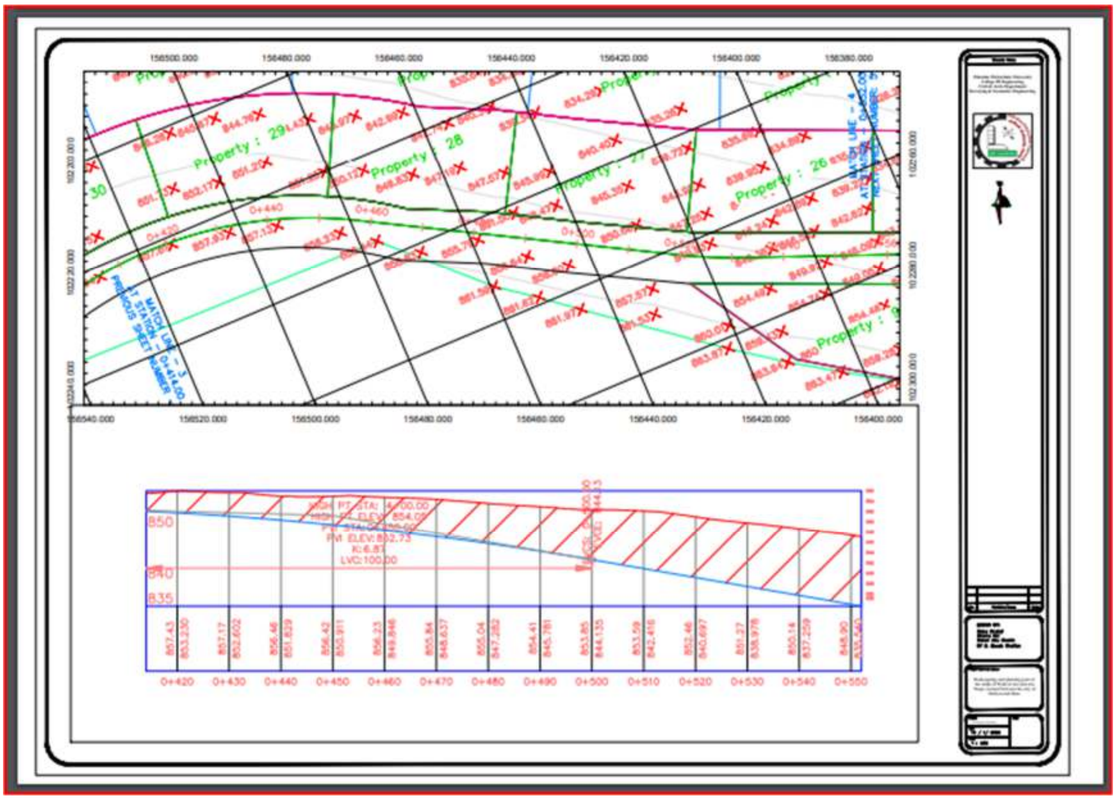


Figure 0-5Profile

- **The profile also affects road drainage.**

4.4 Alignment

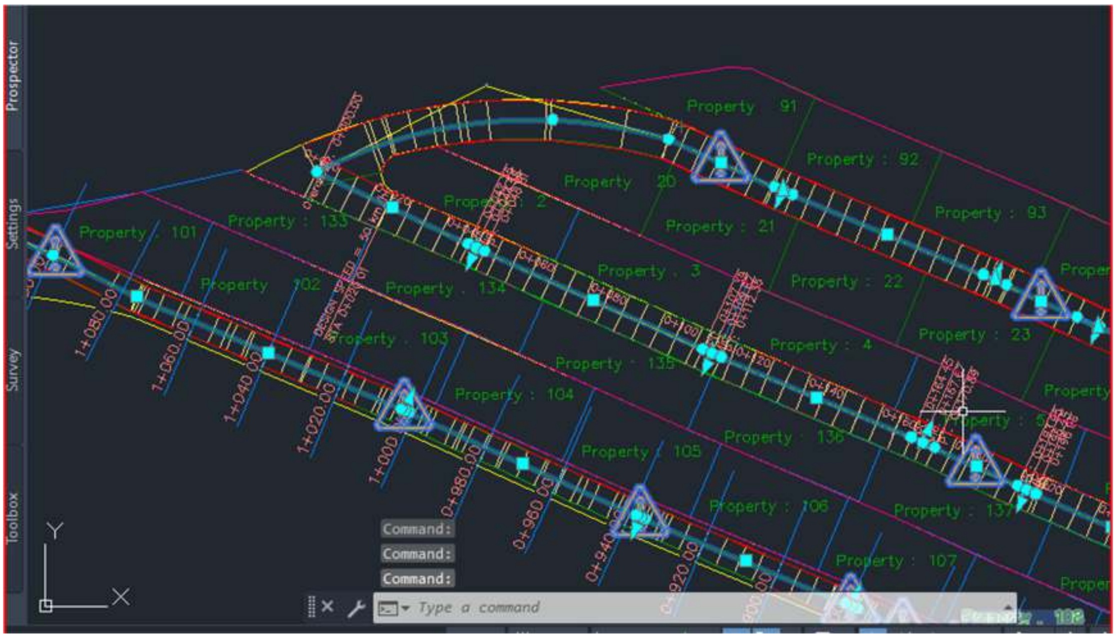
- A horizontal alignment in road design consists of straight sections of road, known as tangents, connected by circular horizontal curves.

- Circular curves are defined by their radius (tightness) and angle of deviation (range). Designing a horizontal curve involves determining the minimum radius (based on the speed limit), the length of the curve, and objects that obstruct the driver's view.

- Using AASHTO standards, the engineer designs a safe and comfortable road.

- If the horizontal curve is at high speed and has a small radius, an increase in elevation (slope) is needed to ensure safety.

- If there is an object obstructing the view around the corner or curve, the engineer must work to ensure that drivers can see far enough to stop to avoid an accident or accelerate to rejoin traffic.



0-64.4 AlignmentIN PROJECT

4.5 Cross Section

A typical cross-section drawing of a roadway.

The cross section of a roadway can be considered a representation of what one would see if an excavator dug a trench across a roadway, showing the number of lanes, their widths and cross slopes, as well as the presence or absence of shoulders, curbs, sidewalks, drains, ditches, and other roadway features.

The cross-sectional shape of a road surface, in particular in connection to its role in managing runoff, is called "crown."

4.6 profiles for project

By understanding how to create and open roads with all their details, the area of land on which the project was to be implemented resulted in 6 roads, including the main and the secondary, with a width ranging between 10-16 meters.

The shape of their profiles was as follows:

:

CHAPTER 5

Results and Recommendations

5. Results and Recommendations :

5.1. Results:

- ✓ Through the project of redesigning and planning the area, we achieved significant outcomes that reflect the benefits of this initiative.
- ✓ New roads were opened, facilitating traffic flow and reducing congestion compared to previous periods.
- ✓ Additionally, the land was divided in a way that ensures optimal use of available spaces, enhancing the quality of life for local residents.
- ✓ It is also noteworthy that green spaces in the area increased ,contributing to environmental enhancement and biodiversity preservation.
- ✓ A survey conducted show the area's residents expressed satisfaction with the new changes.

5.2. Recommendations:

Based on the results obtained, we recommend the following:

1. **Implementing a Monitoring and Evaluation Plan**:

   Establish a mechanism for continuous monitoring and evaluation to ensure the new design remains aligned with community needs. This system should regularly collect data to identify any emerging issues.

2. **Enhancing Community Engagement**:

   It is advisable to conduct regular workshops with local residents to gather their feedback and opinions on the changes. This will help build trust and strengthen community participation.

3. **Outlining Implementation Steps**:

   A comprehensive timeline should be developed for implementing the recommendations, ensuring the necessary funding from government and private entities.

4. **Promoting Collaboration Among Stakeholders**:

   We recommend enhancing collaboration between local governments, NGOs, and local communities to ensure the project’s success and sustainability.

5.3. Future Steps:

Consider expanding the scope of the project to include surrounding areas, increasing the impact on improving quality of life on a larger scale. Awareness programs should also be developed to highlight the importance of preserving green spaces and using them sustainably.

5.4. Challenges:

Despite the positive outcomes, we faced some challenges during project implementation. It is important to analyze these challenges and develop strategies to overcome them in the future.