

*Using GIS and GPS in Electricity
Network Maintenance: Dowaan Valley
Electricity as a Case Study*

Submitted to:

Dr. Baqer M. AL- Ramadan

Prepared by:

Abdulrahman Hamid

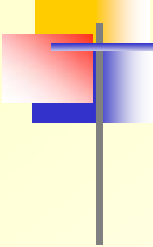
CE Graduate Student – G200805680

g200805680 @kfupm.edu.sa

Outline

- 1. Introduction*
- 2. The Maintenance Problem*
- 3. The Solution*
- 4. The Steps of Project*
- 5. Conclusion*

1. Introduction

- 
- ✿ The data of features location and features descriptive attributes is the important component of GIS studies.
 - ✿ The data which will be used for GIS works is mostly provided from a digitized maps, existing paper maps, and aerial photos or satellites images.
 - ✿ Nowadays the data from GPS can be used to make plans and maps of the studied area and the GPS data can be converted into the GIS more easily.
 - ✿ GIS and GPS have some useful applications for the rapid preparation of plans and maps of small areas.

1.1 Dowaan Valley

- ✿ Dowaan valley is a branch of Hadramout valley. Hadramout valley is located in the south of Arabian Peninsula in the eastern region of Yemen.
- ✿ Most of Dowaan valley towns are located inside the valley, on the banks of the valley.
- ✿ Dowaan people preferred to live in the depth of valley.

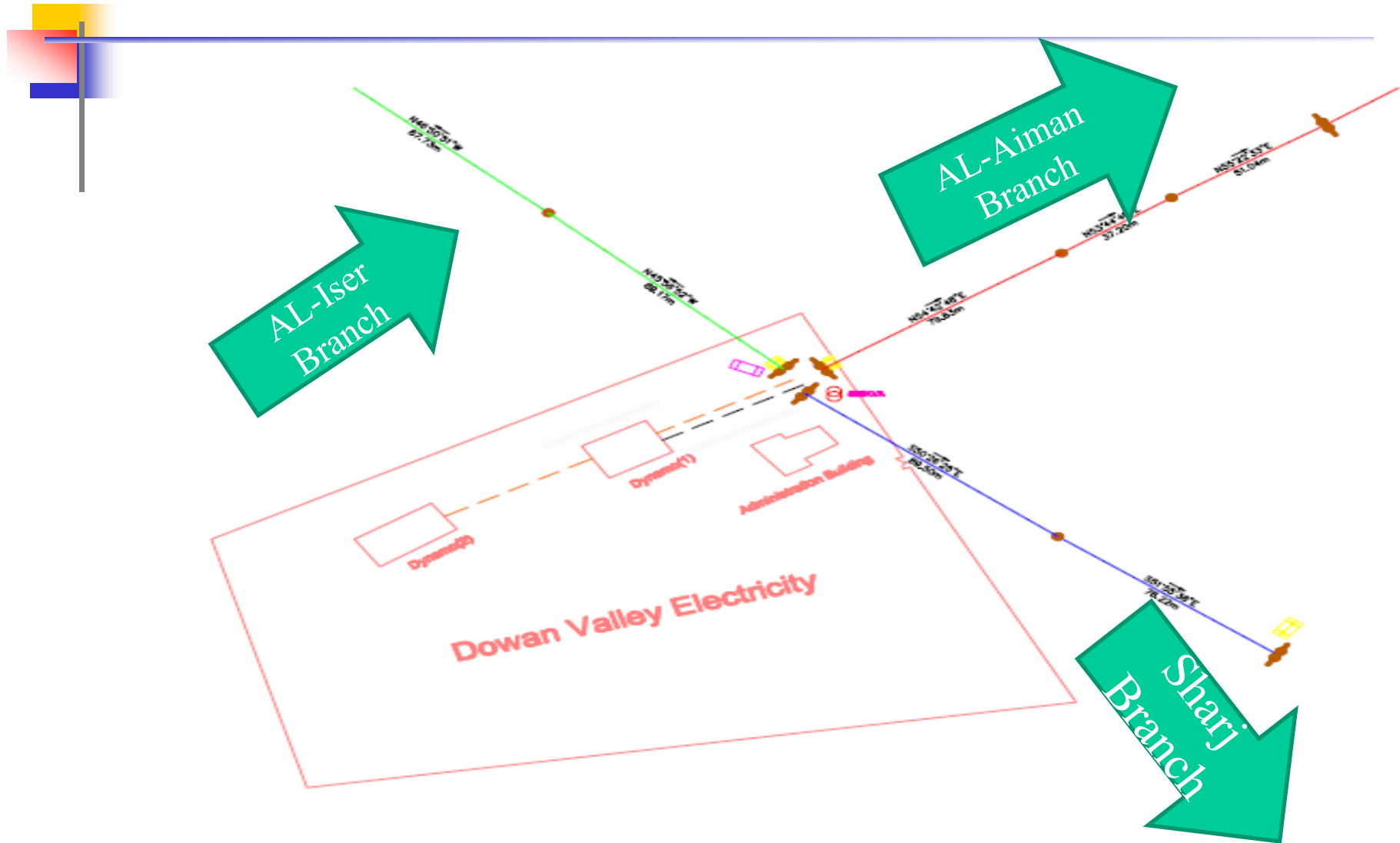


1.2 Dowaan Valley Electricity

- ✿ Dowaan valley electricity has three branches of high voltage line that covering all towns on the banks of the valley.
- ✿ The length of distribution network is approximately 90.807Km.
- ✿ The owner of Dowaan valley electricity is Abdullah Ahmed Bugshan.

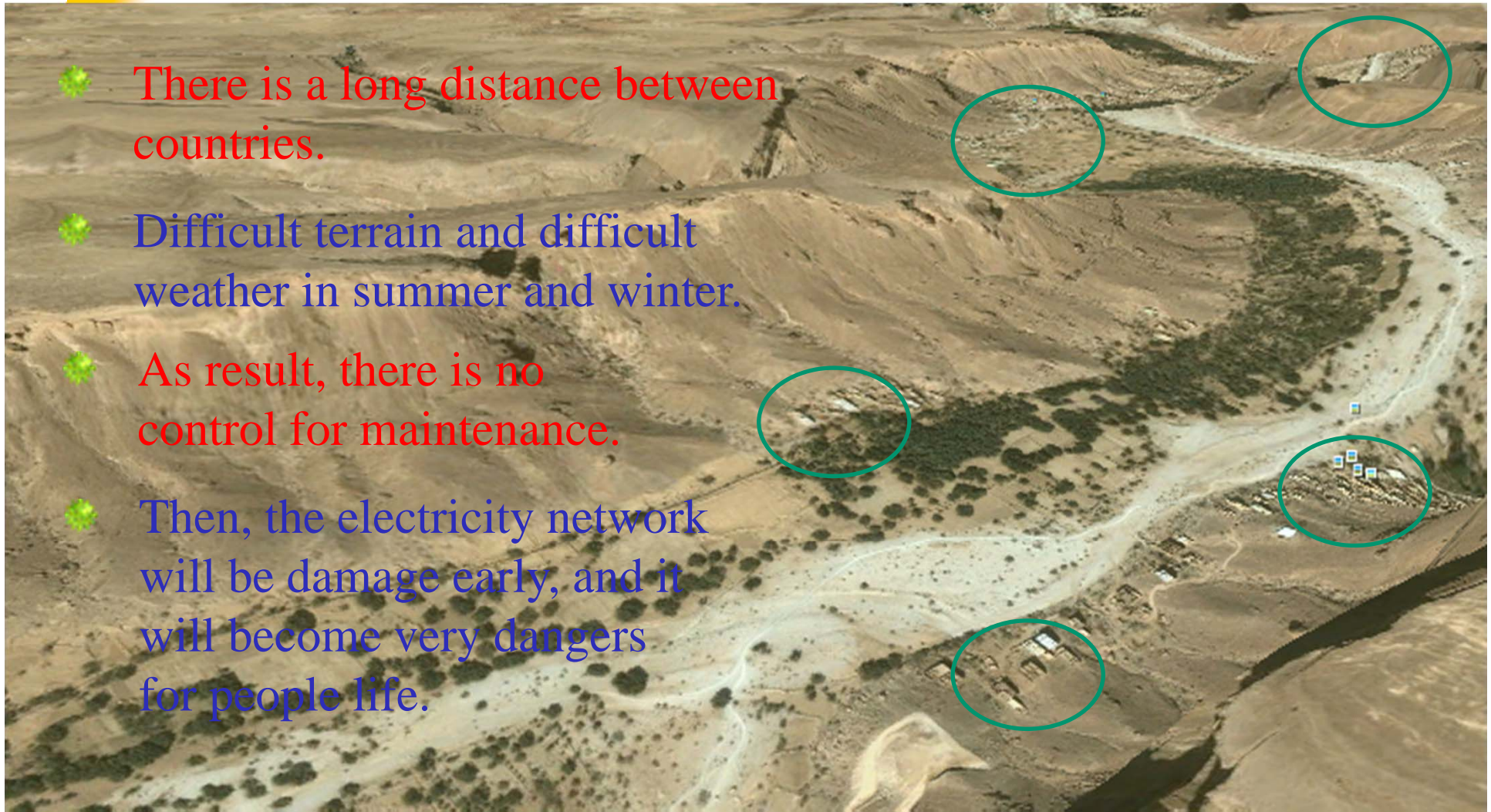


1.3 Dowaan Valley Electricity



2. The Maintenance Problem

- ✿ There is a long distance between countries.
- ✿ Difficult terrain and difficult weather in summer and winter.
- ✿ As result, there is no control for maintenance.
- ✿ Then, the electricity network will be damage early, and it will become very dangers for people life.



3. The Solution

- ✿ Identifying the ways to make early maintenance and decrease the electricity risk of High-Voltage Power Transmission Line in Dowan valley by using GIS/GPS technology.
- ✿ GIS can aid to reduce the risk by finding accurate maps and information about any required location.
- ✿ These maps are the base of many processes which we need to do them for avoiding the risk of High-Voltage Power.

3. The Solution

- ✿ GIS applications have the ability to generate all accumulated data and make it active with users' requirements.
- ✿ GIS technology has the ability to manage the information and represents it with various maps which allow for users to interact with it completely.
- ✿ Besides, GIS provides us to show all accumulated data which are stored in any format for long time as visible layers linked between location data and attributes.

4. The Steps of Project

Collection data

- ✿ The Global Positioning System (GPS) has become an essential tool for GIS users.
- ✿ It is very easy to use, portable and can locate the feature within millimeters to 10 meters.
- ✿ More than 1000 points were collected at the Dowaan area.



Handheld type GPS is used for this study

4. The Steps of Project

Collection Data

- ✿ The points were collected while walking.
- ✿ In this project, I used more than 100 points.
- ✿ The coordinates(x, y, and z) of the points were recorded in the GPS and the attributes of the high voltage line were obtained at the same time.



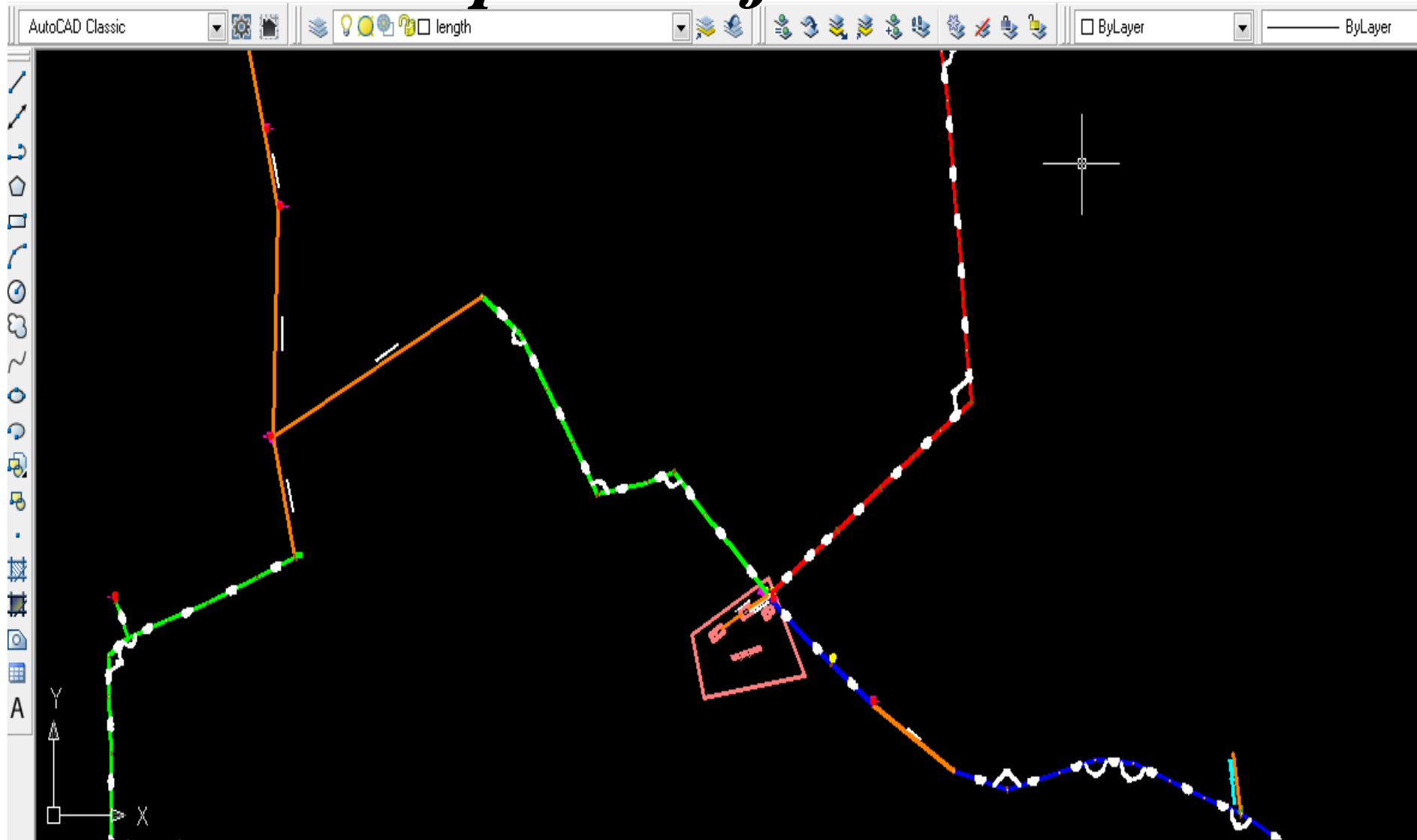
Handheld type GPS is used for this study

4. The Steps of Project

The Preparation of Plan

- ✿ The preparation of Dowaan Valley electricity plan was achieved by using programs such as Excel and Land development.
- ✿ By using the importing command for points in land development, I entered the collected point from Excel.
- ✿ Finally, I connected all points by using ployline command; also I put all attributes of the high voltage line in this plan.

4. The Steps of Project



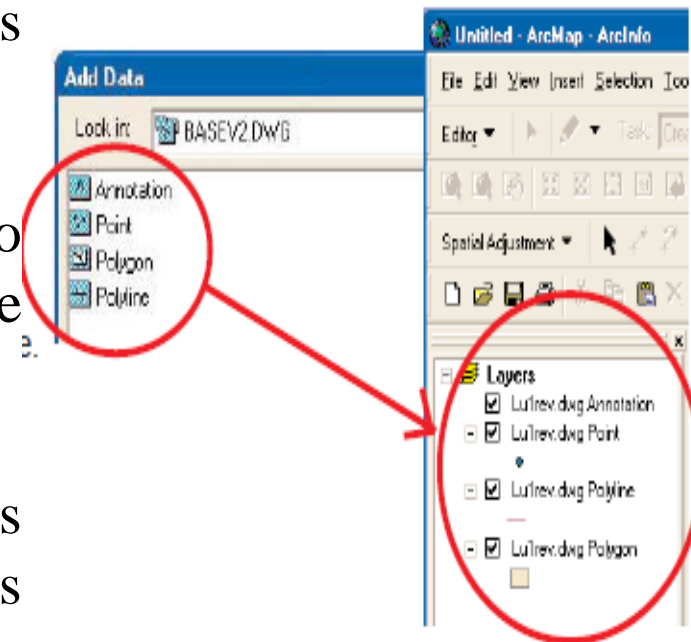
12/6/2011

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4. The Steps of Project

Converting dwgCad Files to GIS

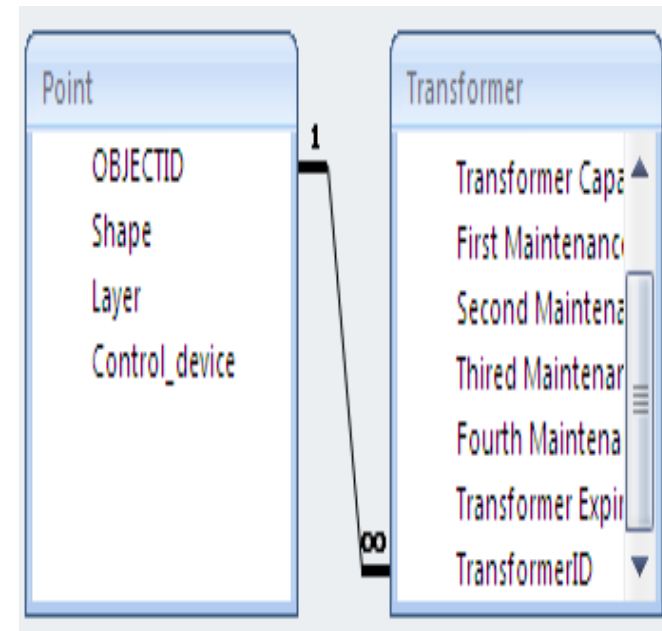
- Delete all unwanted drawing elements - title blocks, borders, legends, etc.
- Only the pertinent drawing elements to be transferred to the GIS database should remain.
- Then we can export cad data as shapefiles. When the blue CAD file is added to ArcMap, the file will be divided into four types of GIS data: point, line, polygon, and annotation.



4. The Steps of Project

Entering the Maintenance Data

- ✿ This aim was a challenge for me.
- ✿ In this project, I used one to many relationships between points table and Transformers table.



4. The Steps of Project

Entering the Maintenance Data

OBJECTID	Shape	Layer	ID	Transformer	Transformer C	First Maintenance	Second Maint	Thired Ma	Fourth Maintenanc	Transformer Expire	Add New Field
7	ing binary data	point									
8	ing binary data	point									
9	ing binary data	point									
10	ing binary data	point									
1	Ba-Karmom(1)	100	06/01/2011	06/04/2011	06/07/2011	06/10/2011	17/10/2018				
* New											
11	ing binary data	point									
12	ing binary data	point									
3	AL-Radhil	200	13/03/2011	15/06/2011	12/09/2011	14/12/2011	11/05/2020				
* New											
13	ing binary data	point									
14	ing binary data	point									
5	Ba-Karmom(2)	50	08/01/2011	08/04/2011	08/07/2011	08/10/2011	11/03/2020				
* New											
15	ing binary data	point									

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GISStest3 - ArcMap - ArcView

File Edit View Bookmarks Insert Selection Tools Window Help

Layer: Support 500

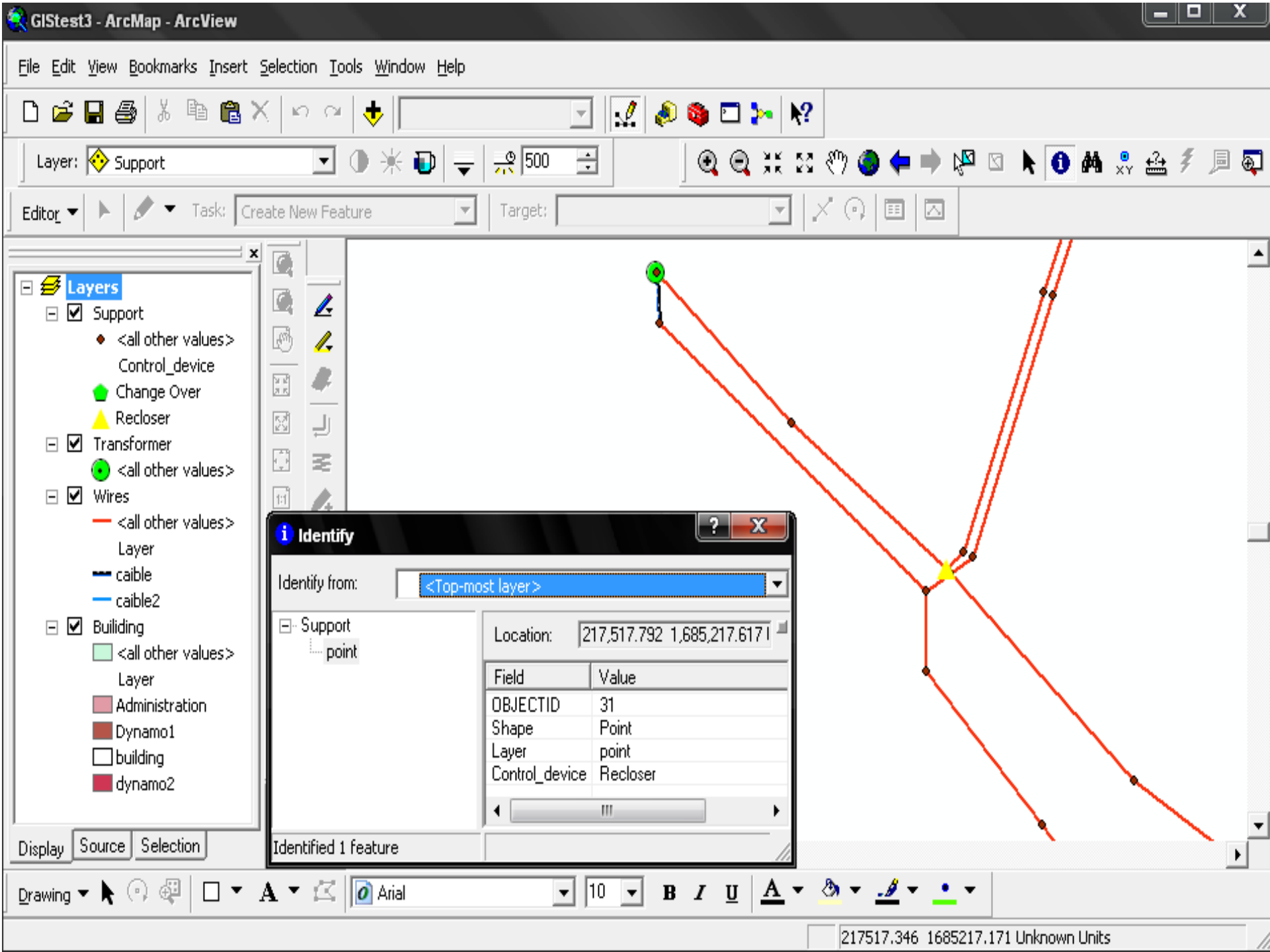
Editor Task: Create New Feature Target:

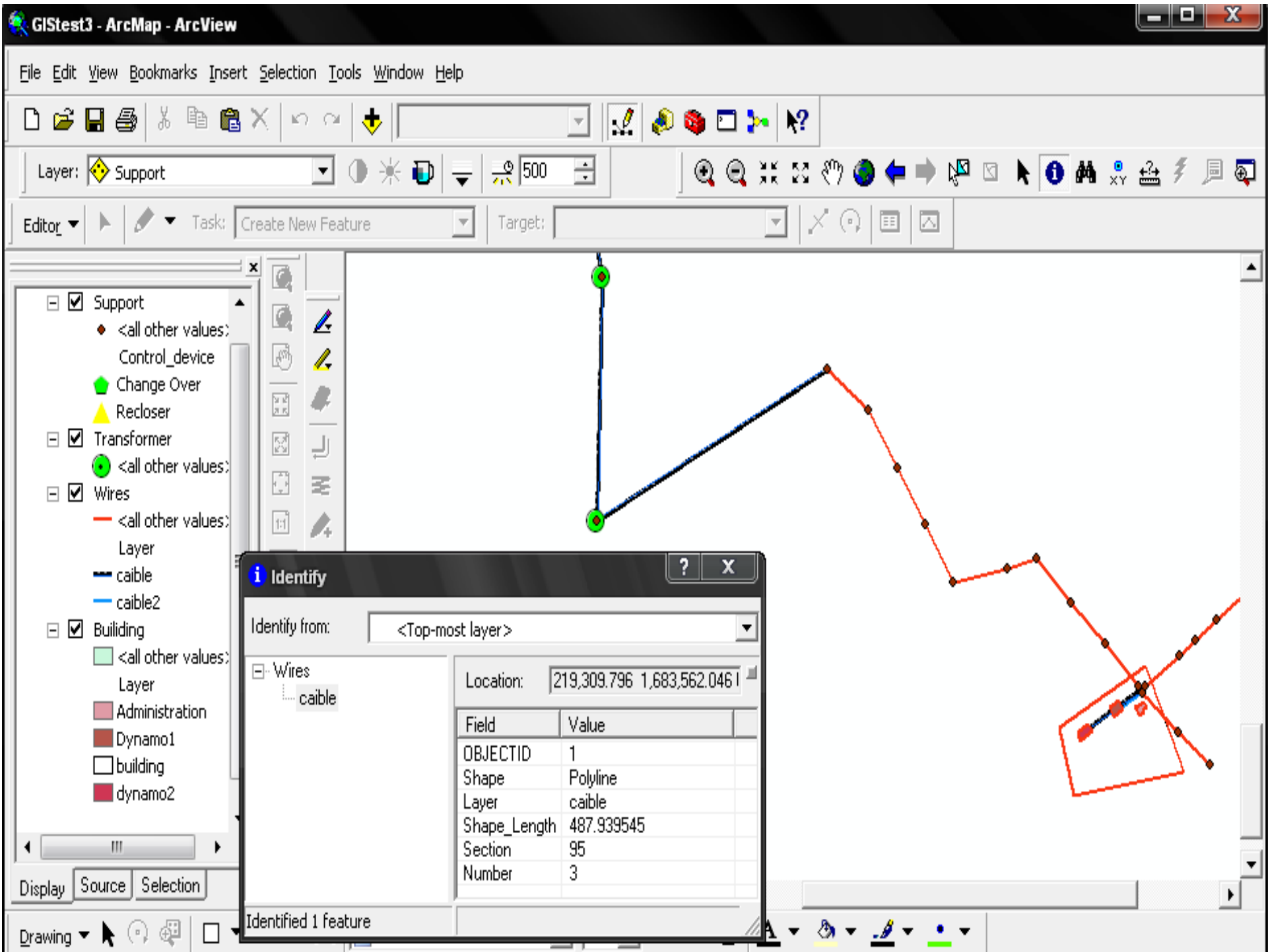
Layers

- Support
 - <all other values>
 - Control_device
 - Change Over
 - Recloser
- Transformer
 - <all other values>
- Wires
 - <all other values>
 - Layer
 - caible
 - caible2
- Building
 - <all other values>
 - Layer
 - Administration
 - Dynamo1
 - building
 - dynamo2

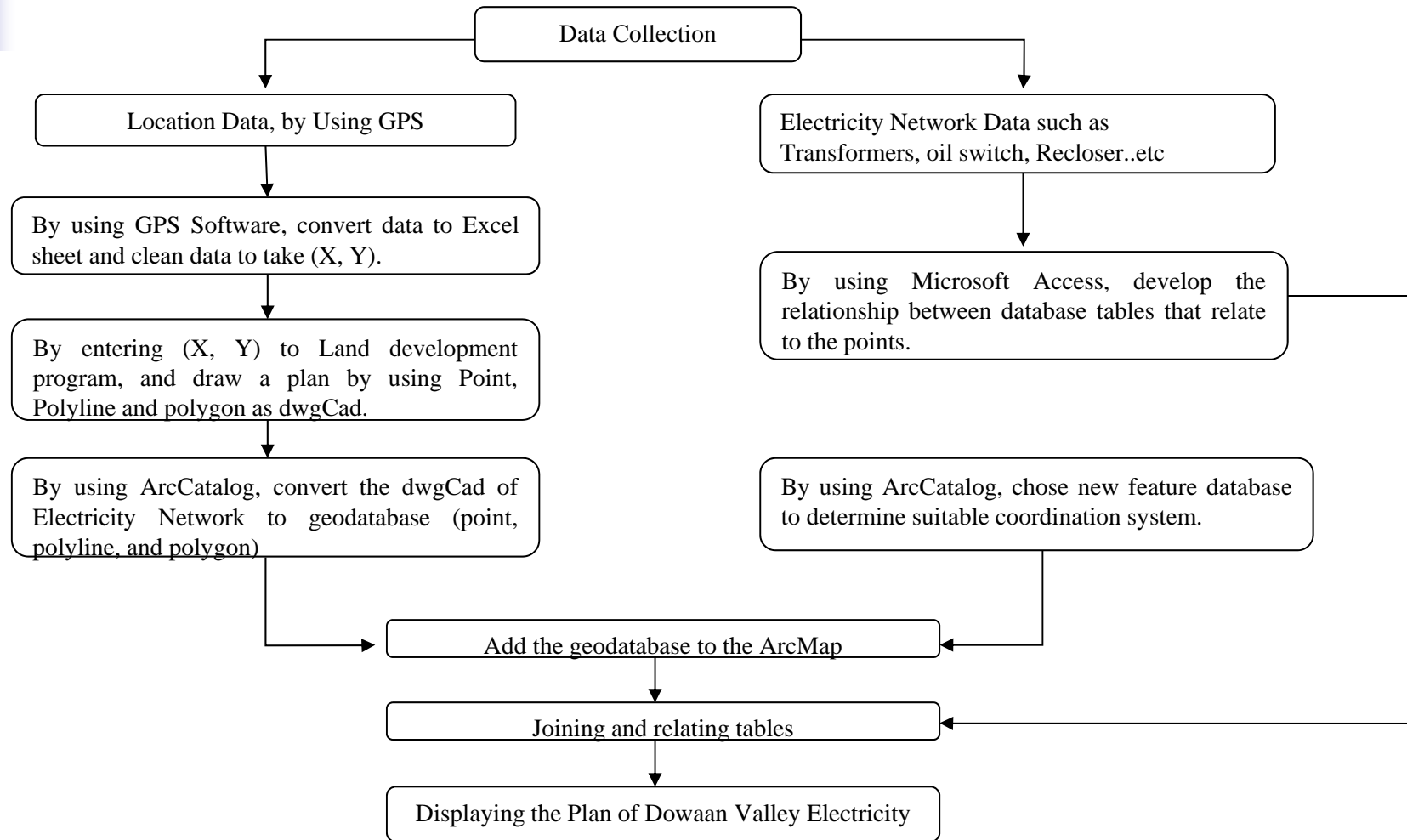
Attributes of Transformer

ID	Transformer Name	(Transformer Capacity(KVA	First Maintenance	Second Maintenance	Thired Maintenance	Fourth Maintenance
1	(Ba-Karmom(1	100	1/1/2011	1/1/2011	1/1/2011	1/1/2011
2	Bugshan Palace	500	1/1/2011	1/1/2011	1/1/2011	1/1/2011
3	AL-Radhil	200	13/1/2011	10/1/2011	12/1/2011	12/1/2011
4	Ba-Zifeen	200	10/1/2011	10/1/2011	10/1/2011	10/1/2011
5	(Ba-Karmom(2	50	1/1/2011	1/1/2011	1/1/2011	1/1/2011
6	AL-Saila	200	1/1/2011	1/1/2011	1/1/2011	1/1/2011
7	Sharkha	100	1/1/2011	1/1/2011	1/1/2011	1/1/2011
8	Medhoon	200	1/1/2011	1/1/2011	1/1/2011	1/1/2011



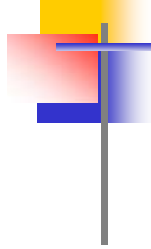


4. The Steps of Project



5. Conclusion

- ✿ GIS technology has the ability to manage the information and represents it with various maps which allow for users to interact with it completely.
- ✿ GIS provides us to show all accumulated data which are stored in any format for long time as visible layers linked between location data and attributes.
- ✿ In the future, I am going to put GIS map in Dowaan valley electricity because I would like to help people to avoid the dangers of electricity.



Thank You

