

GIS: Geographic Information Systems

Module 6: Creating Vector Data

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Center for Digital Scholarship

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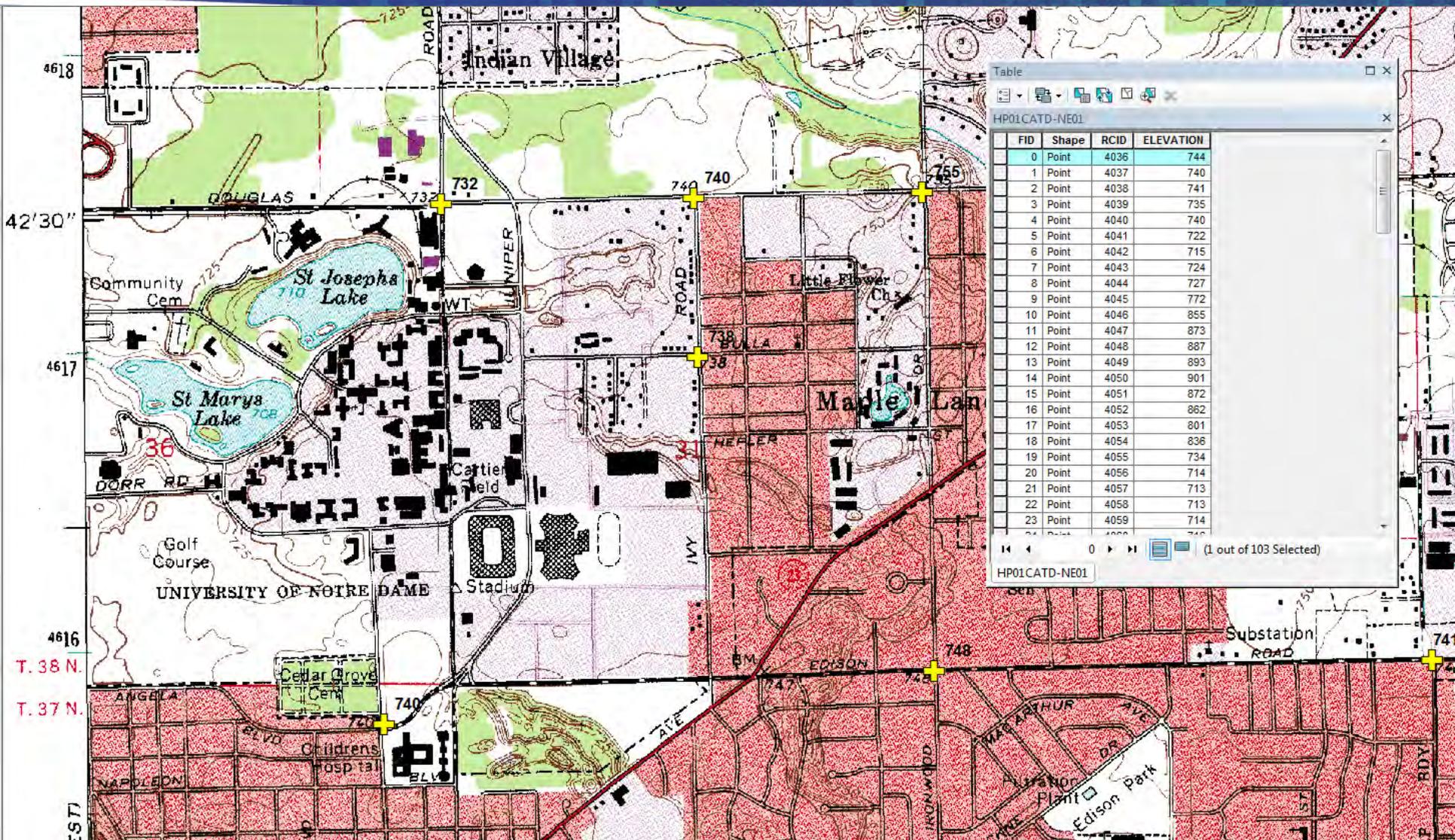
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Examples: Point Data

- Elevation points
- Settlements as points
- Data collection points
- GPS coordinates

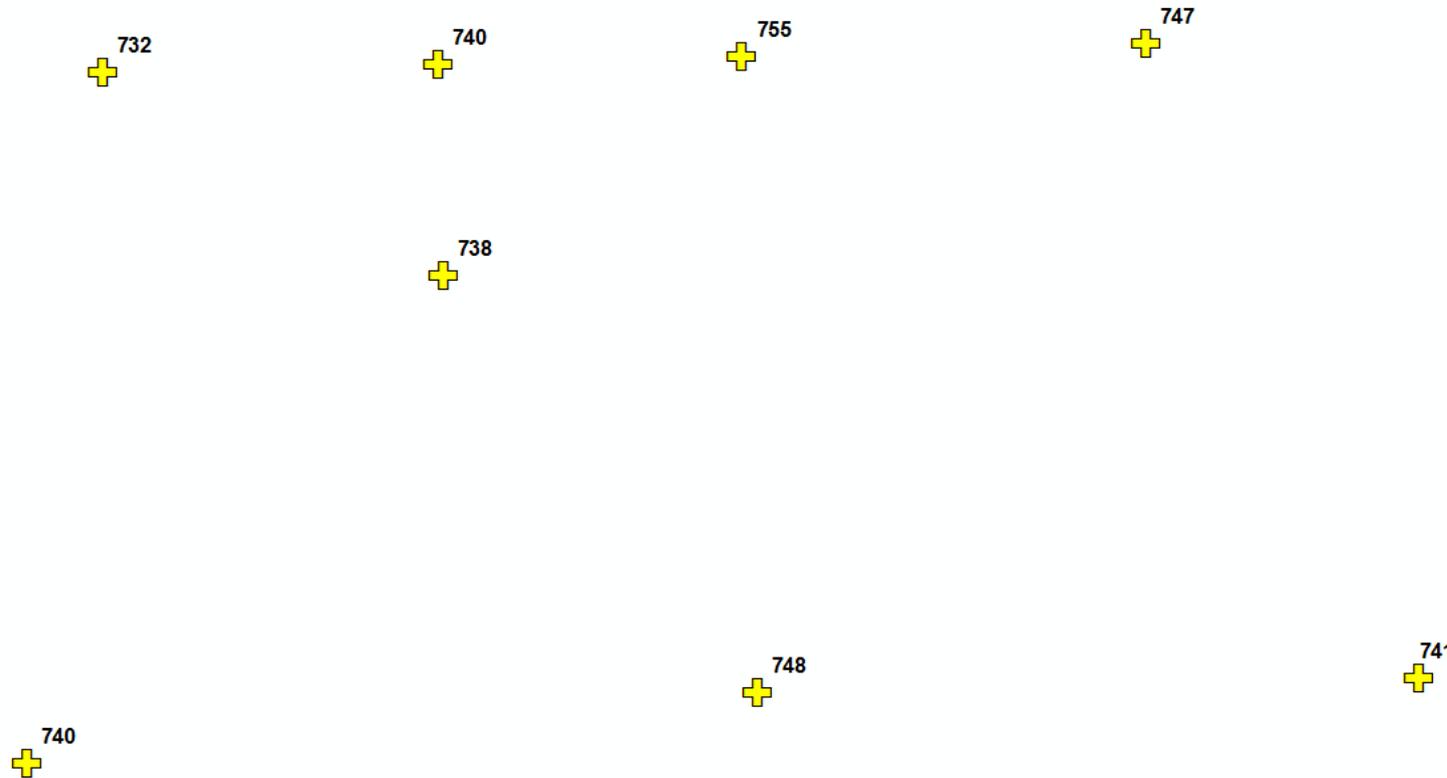
Creating Point Features: Spot elevations

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Creating Point Features: Spot elevations

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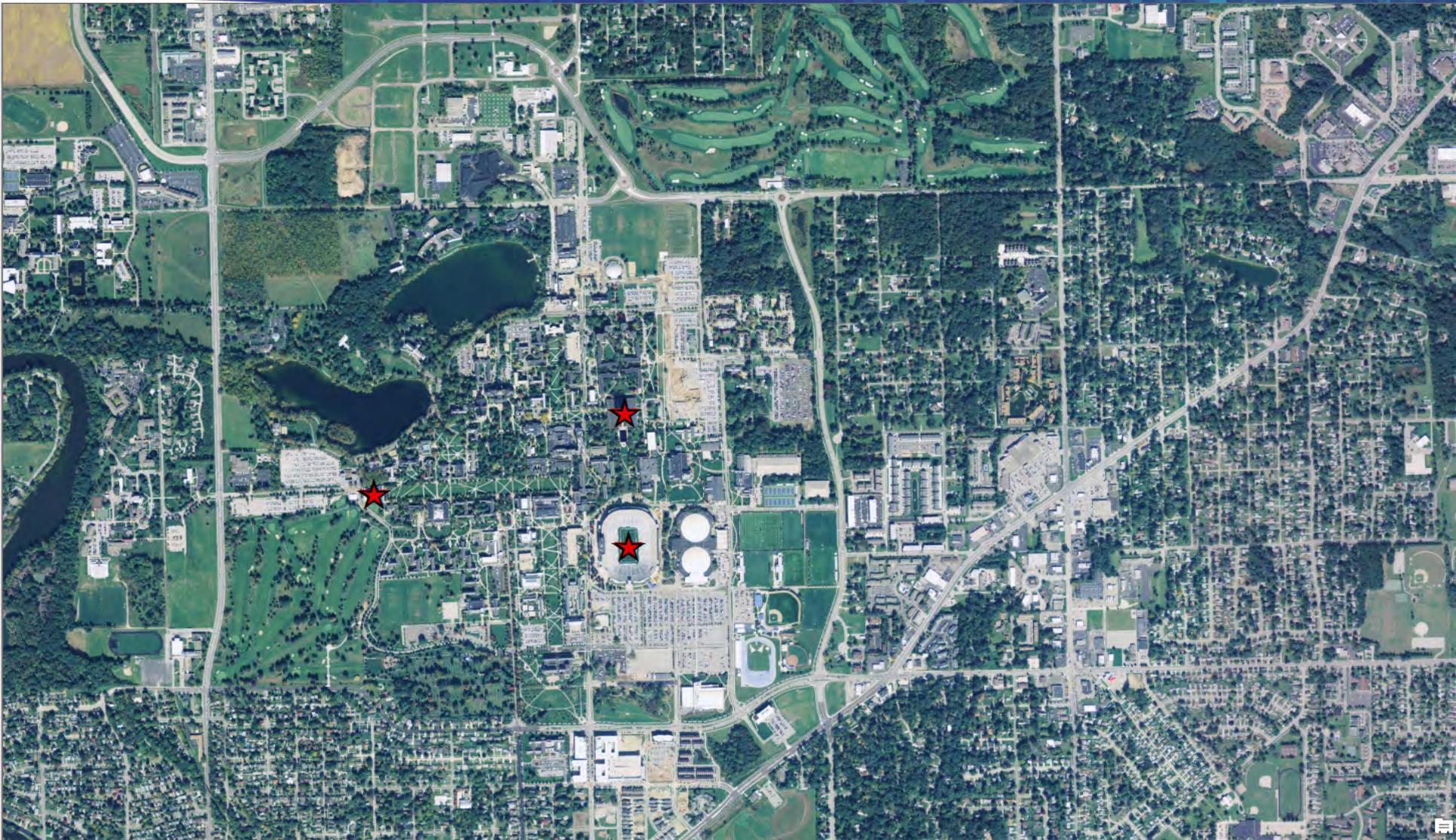
Creating Point Features: From Imagery

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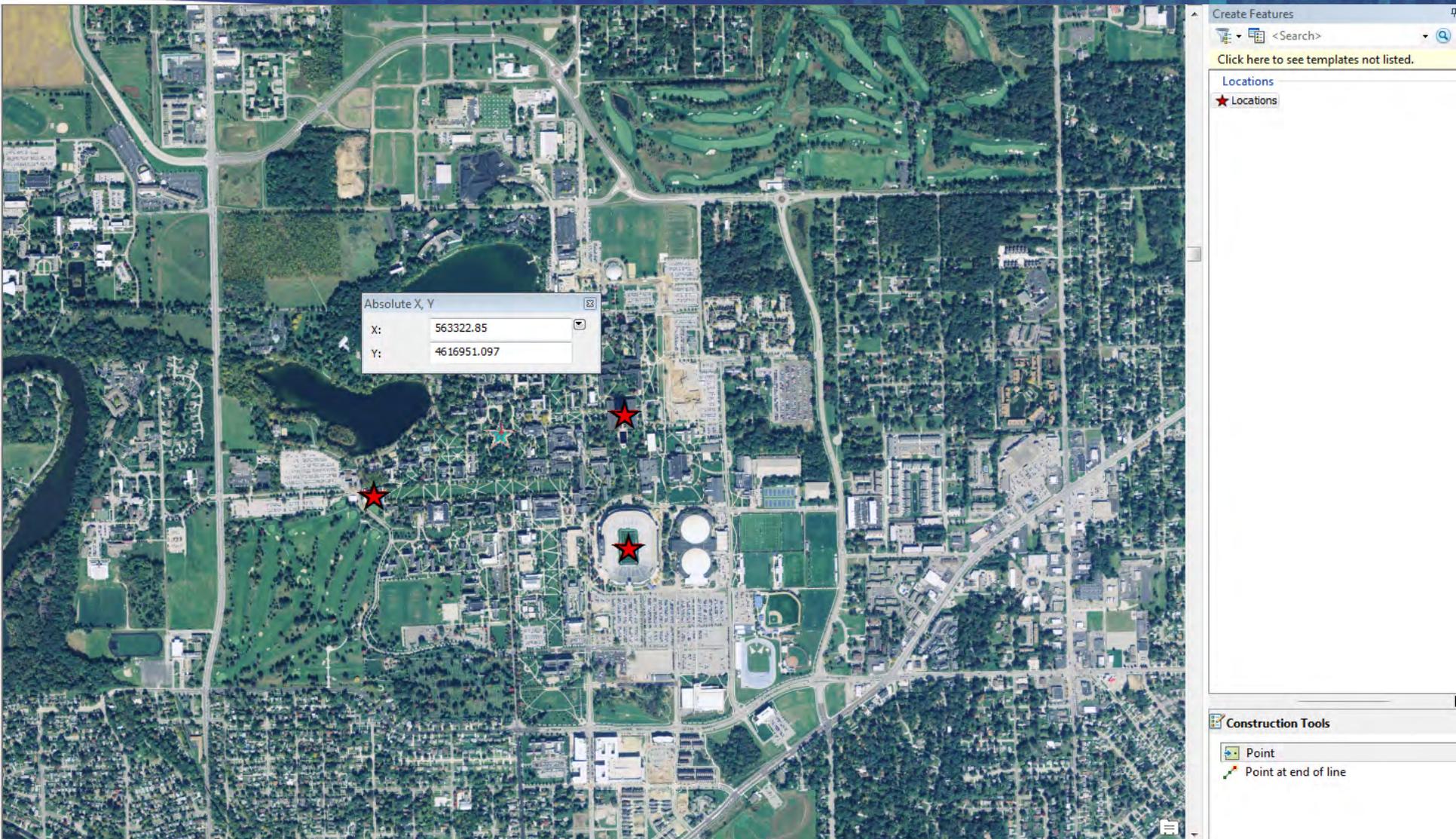
Creating Point Features: From Imagery

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Creating Point Features: From GPS Data

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Creating Point Features: From a table

Water_Sites.csv - Excel

Matthew Sisk

	A	B	C	D	E	F	G	H	I	J	K
1	STATION	LOCATION	COUNTY	STATE	LON	LAT	Northing	Easting			
2	174035	WHITE RIVER AT PERKINSVILLE	HAMILTON	INDIANA	-85.9625	40.14695	4444583	588371			
3	174324	WHITE RIVER AT ANDERSON	HAMILTON	INDIANA	-86.0372	40.10528	4439887	582056			
4	174896	MADISON-DELAWARE CNTY,E.ANDERSON	DELAWARE	INDIANA	-85.5878	40.12917	4443050	620321			
5	CHDF05	CALUMET HARBOR-ALONG CHICAGO AREA CDF DIKE 14+00	LAKE	INDIANA	-87.5242	41.73153	4620102	456407			
6	CHDF06	CALUMET HARBOR-ALONG CHICAGO AREA CDF DIKE 25+00	LAKE	INDIANA	-87.5242	41.72806	4619716	456405			
7	CHDF07	CALUMET HARBOR-ALONG CHICAGO AREA CDF DIKE 37+00	LAKE	INDIANA	-87.5242	41.72389	4619254	456402			
8	CHDF08	CALUMET HARBOR 1800FT FROM CHICAGO AREA CDF DIKE	LAKE	INDIANA	-87.5178	41.72806	4619713	456937			
9	2BBL10000	BIG BLUE RIVER	HANCOCK	INDIANA	-85.6922	39.70362	4395680	612114			
10	2BBL10002	BIG BLUE RIVER	RUSH	INDIANA	-85.6158	39.70834	4396302	618655			
11	2BBL10003	BIG BLUE LAKE	RUSH	INDIANA	-85.5828	39.72778	4398504	621455			
12	2BBL10005	BIG BLUE RIVER	HENRY	INDIANA	-85.4036	39.90306	4418218	636462			
13	2BBL10007	BIG BLUE LAKE	HENRY	INDIANA	-85.6158	39.93834	4421831	618260			
14	2BPR10000	BIG PINE CREEK	WARREN	INDIANA	-87.2903	40.3175	4463038	475337			
15	2BPR10005	BIG PINE CREEK	WARREN	INDIANA	-87.3197	40.41556	4473931	472874			
16	2BPR12001	MUD PINE CREEK	WARREN	INDIANA	-87.3442	40.41473	4473847	470800			
17	2BVR10000	EAST FORK WHITEWATER RIVER	FRANKLIN	INDIANA	-85.0031	39.43362	4366800	671865			
18	2BVR10005	EAST FORK WHITEWATER RIVER	UNION	INDIANA	-84.9142	39.63389	4389203	679000			
19	2BVR13001	SILVER CREEK	UNION	INDIANA	-84.9753	39.6	4385321	673841			
20	2BVR20003	BROOKVILLE LAKE	FRANKLIN	INDIANA	-84.9981	39.51223	4375535	672101			
21	2BVR20004	BROOKVILLE LAKE	UNION	INDIANA	-85.002	39.57528	4382526	671612			
22	2BVR20006	BROOKVILLE LAKE	FRANKLIN	INDIANA	-84.9972	39.47223	4371097	672271			
23	2BVR20010	BROOKVILLE LAKE	UNION	INDIANA	-84.9972	39.53195	4377726	672124			
24	2BVR20012	BROOKVILLE LAKE	UNION	INDIANA	-85.0028	39.55834	4380644	671582			
25	2BVR20016	BROOKVILLE LAKE	UNION	INDIANA	-84.9889	39.60278	4385603	672665			
26	2BVR20018	BROOKVILLE LAKE	UNION	INDIANA	-84.9845	39.63055	4388675	673110			

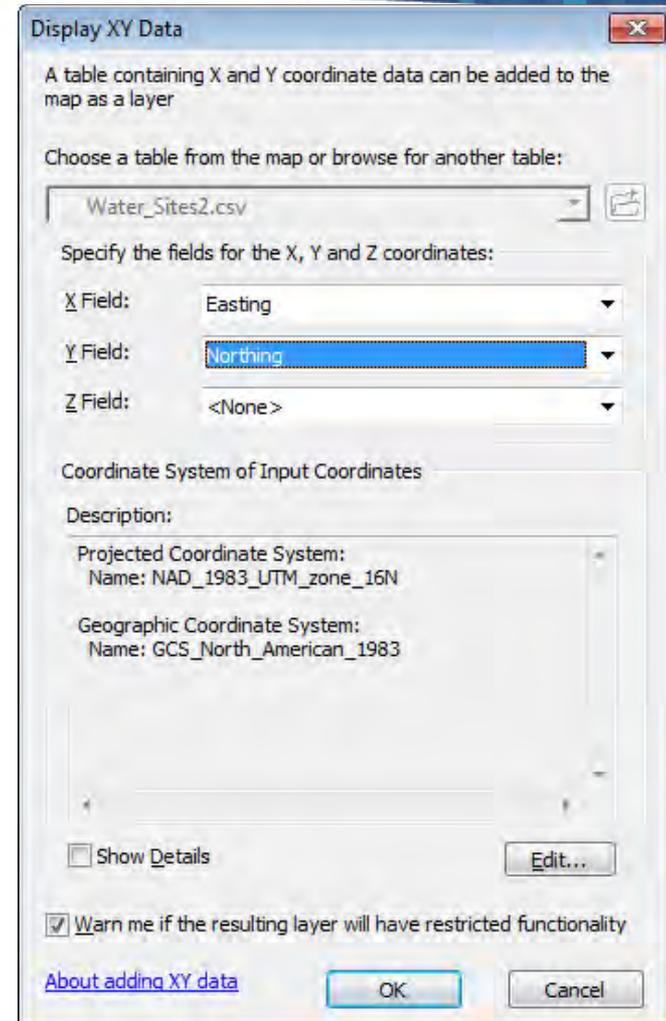
Water_Sites

READY

100%

Creating Point Features: From a table (Excel, DBF)

- Point shapefiles can be created from table
 - Excell
 - DBF
 - Comma or tab delimited text files

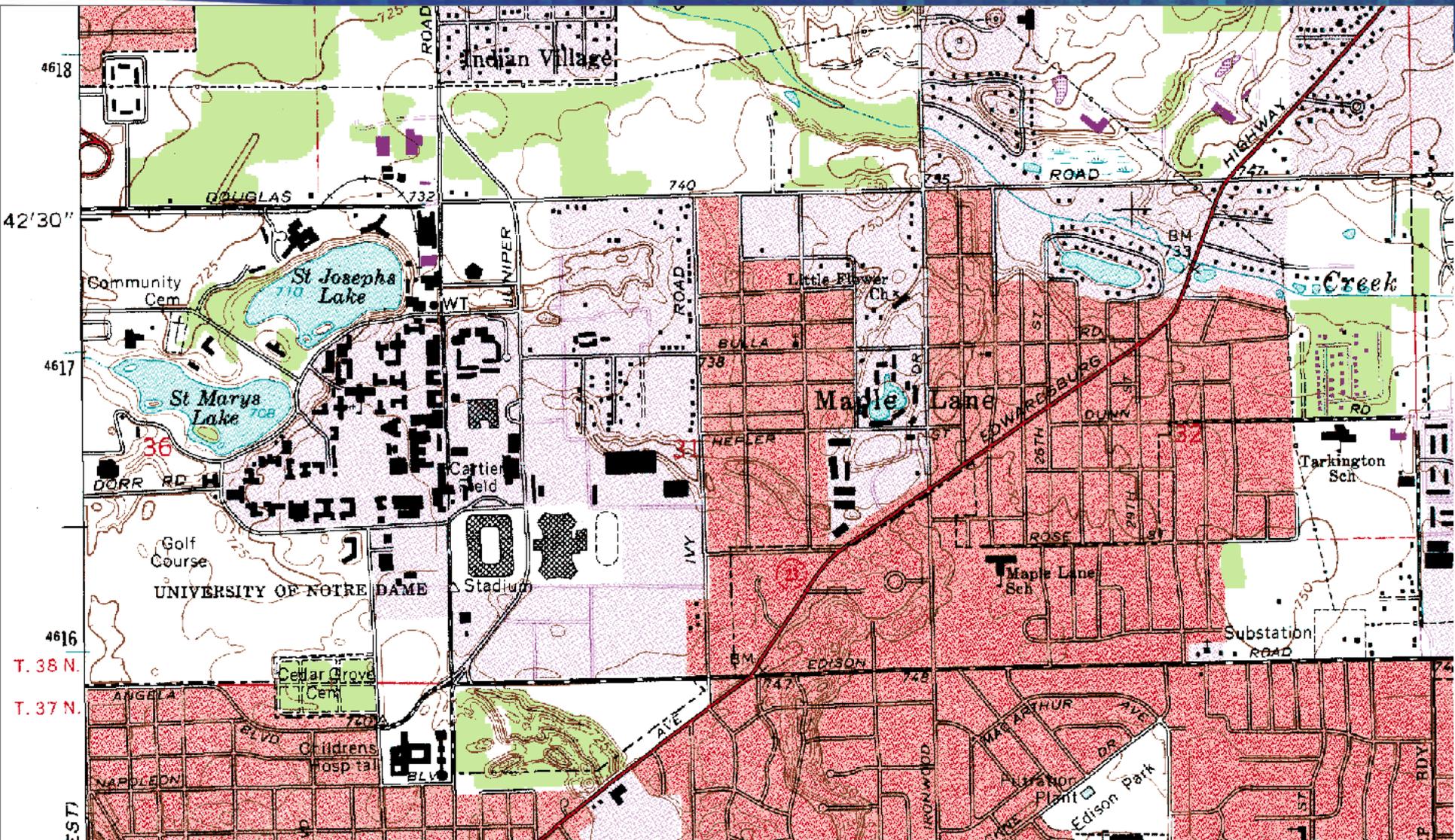


Examples: Polyline Data

- Contour lines
- Rivers and Streams
- Roads

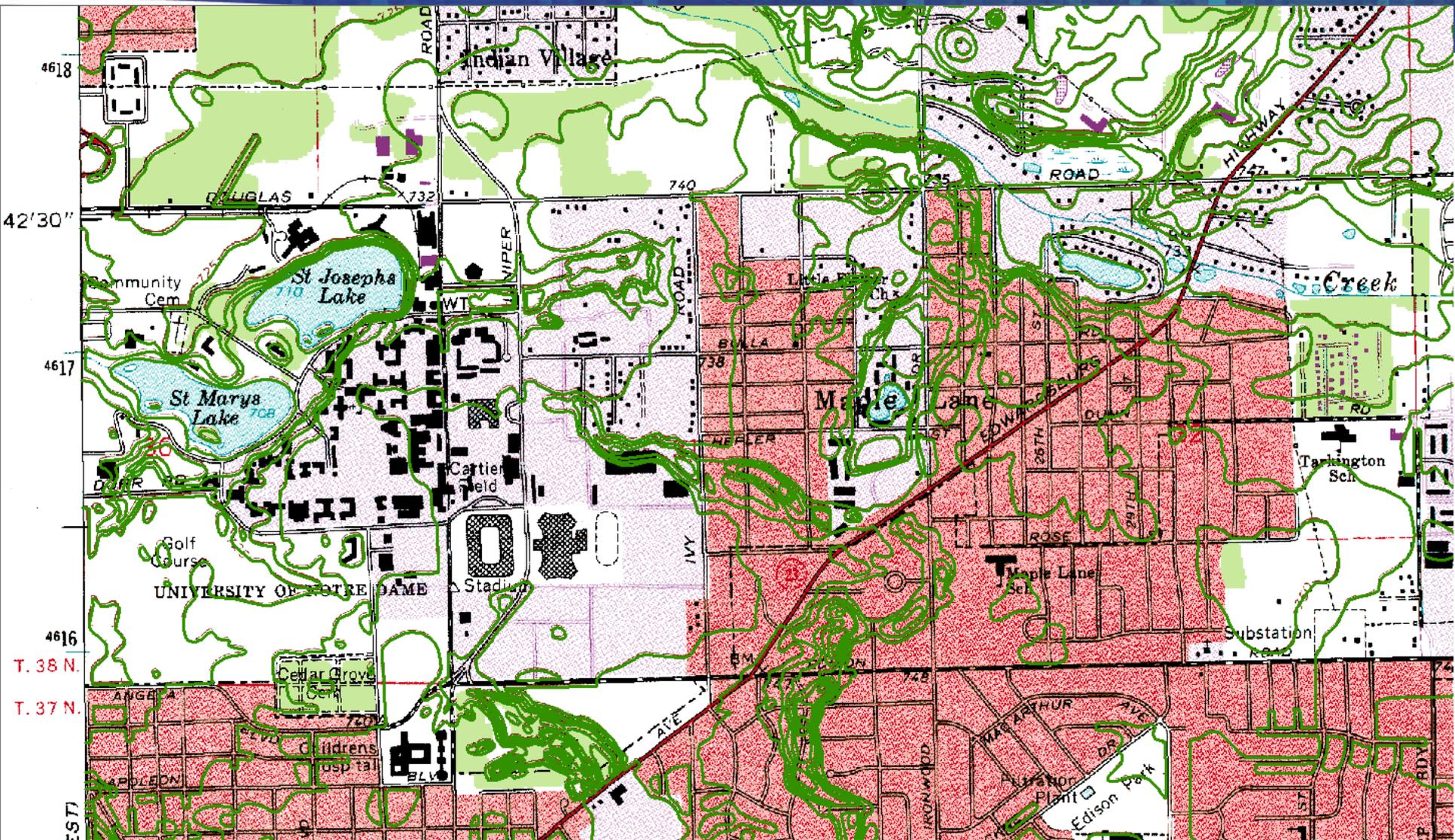
Creating Polyline Features: Contours from a Georeferenced Map

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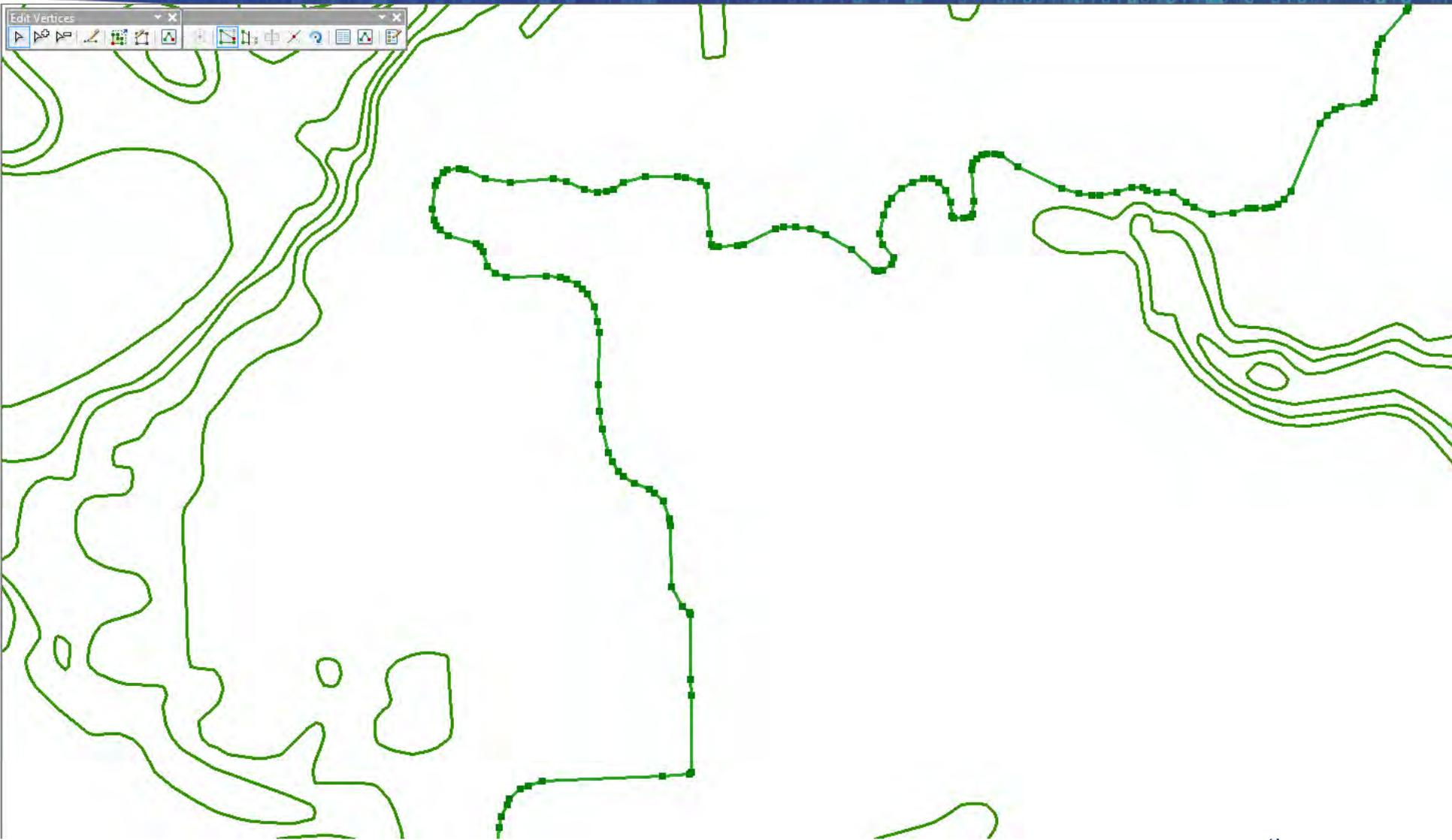
Creating Polyline Features: Contours from a Georeferenced Map

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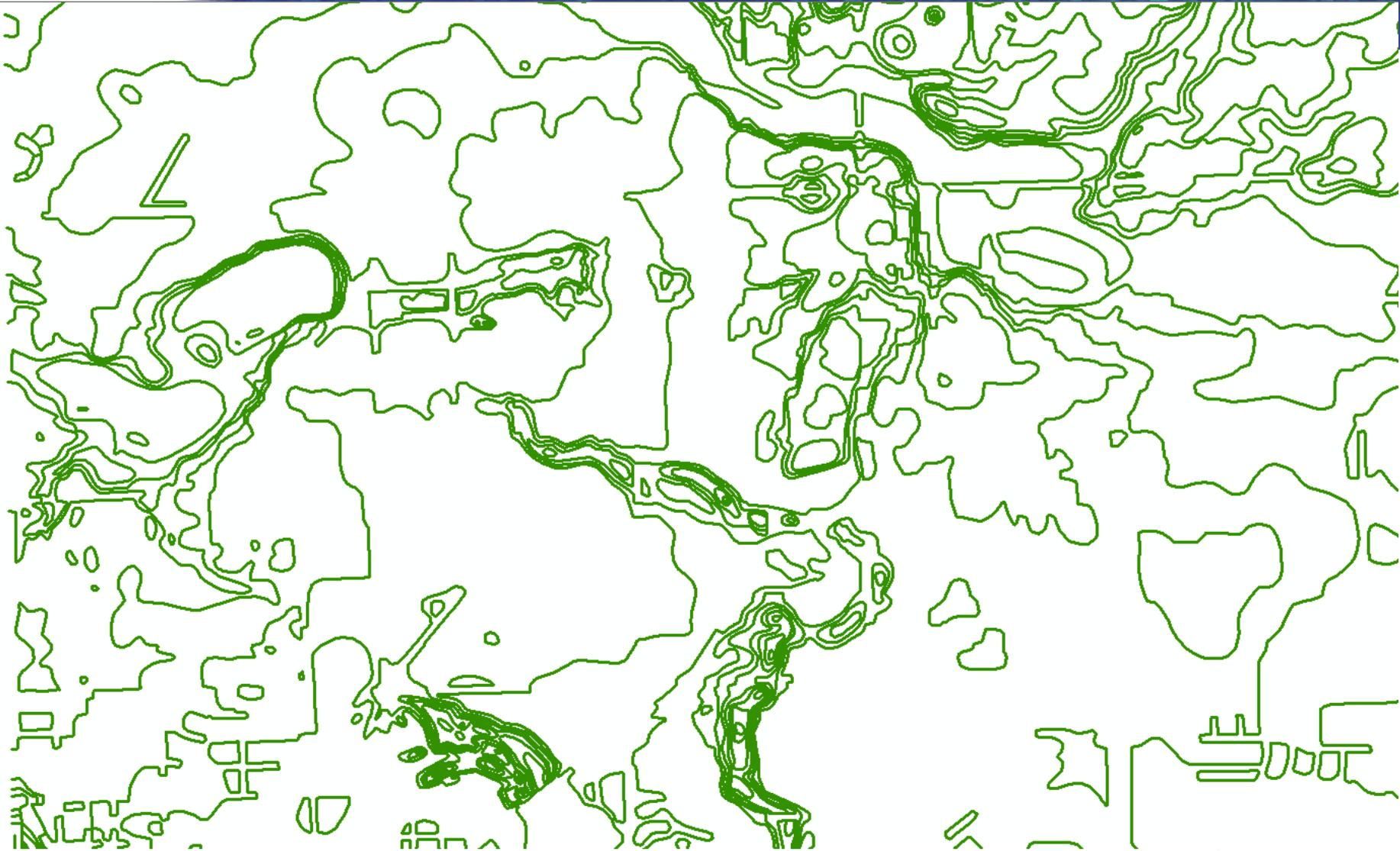
Simulating a curve using polyline segments

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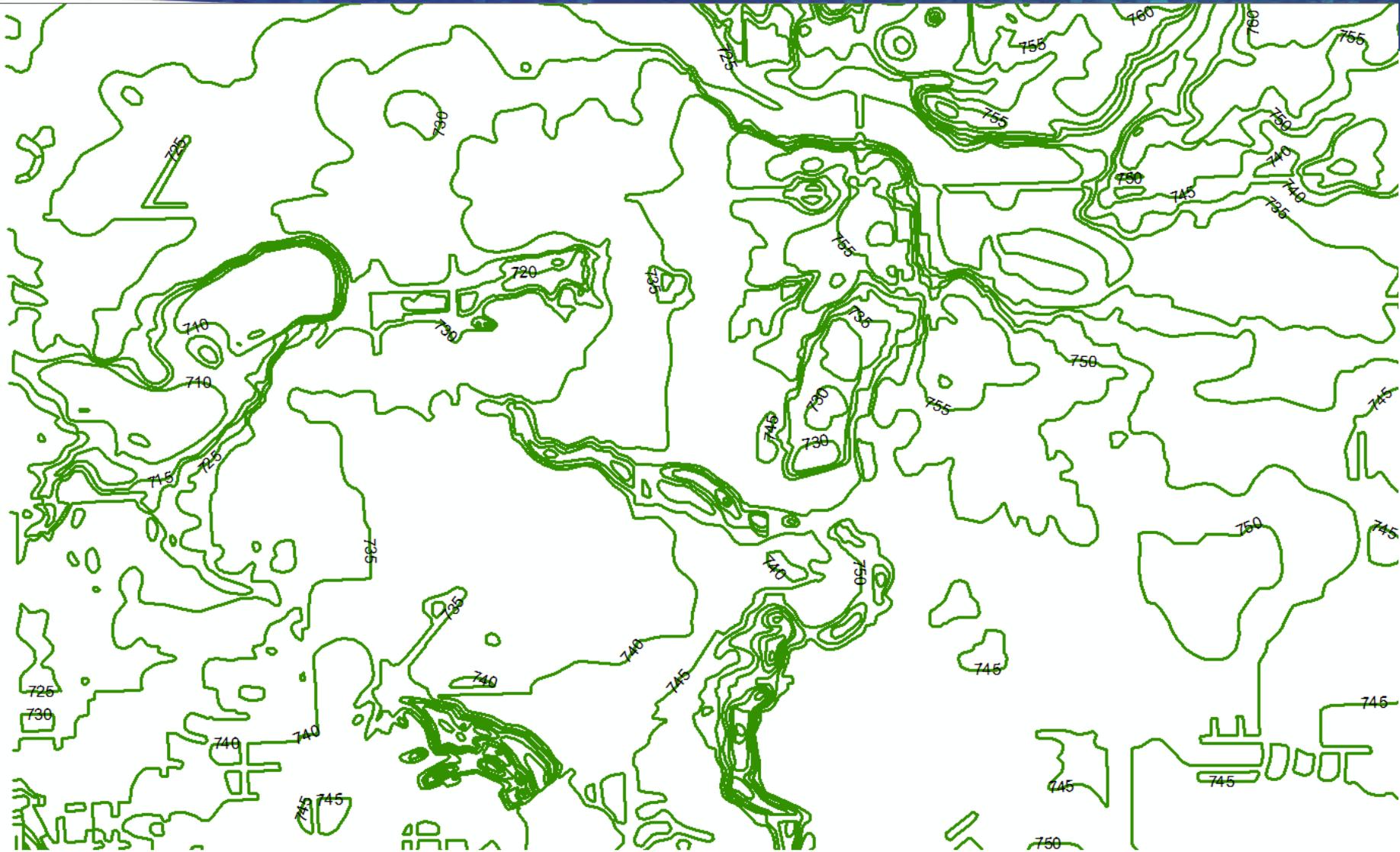
Creating Polyline Features: Contours from a Georeferenced Map

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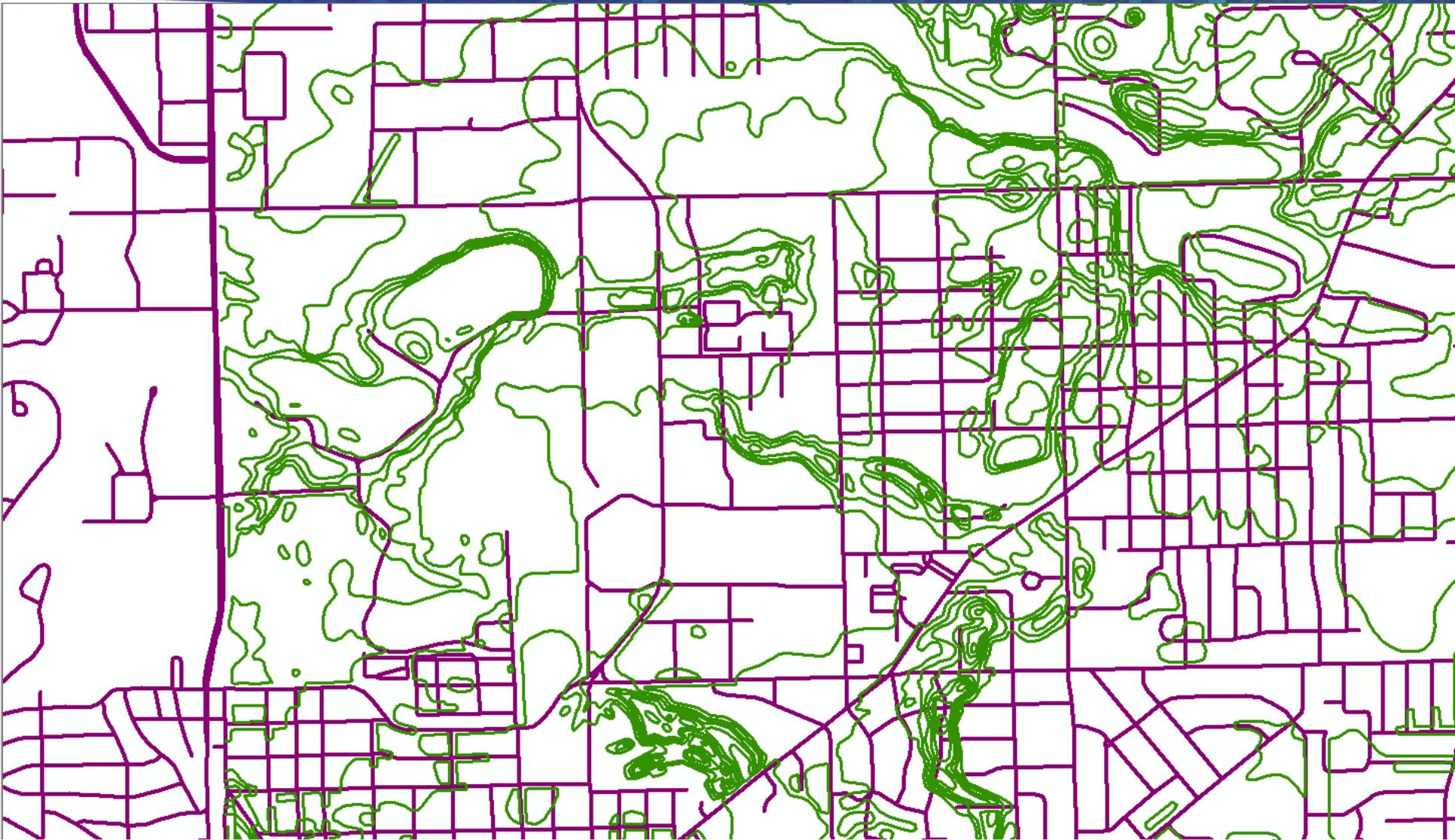
Creating Polyline Features: Contours from a Georeferenced Map

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Creating Polyline Features: Roads from Map Data

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Creating Polyline Features Using GPS-collected Data

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Creating Polyline Features Using GPS-collected Data

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A tracklog is a series of GPS points taken every few seconds



Creating Polyline Features Using GPS-collected Data

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They can then be converted
into a polyline

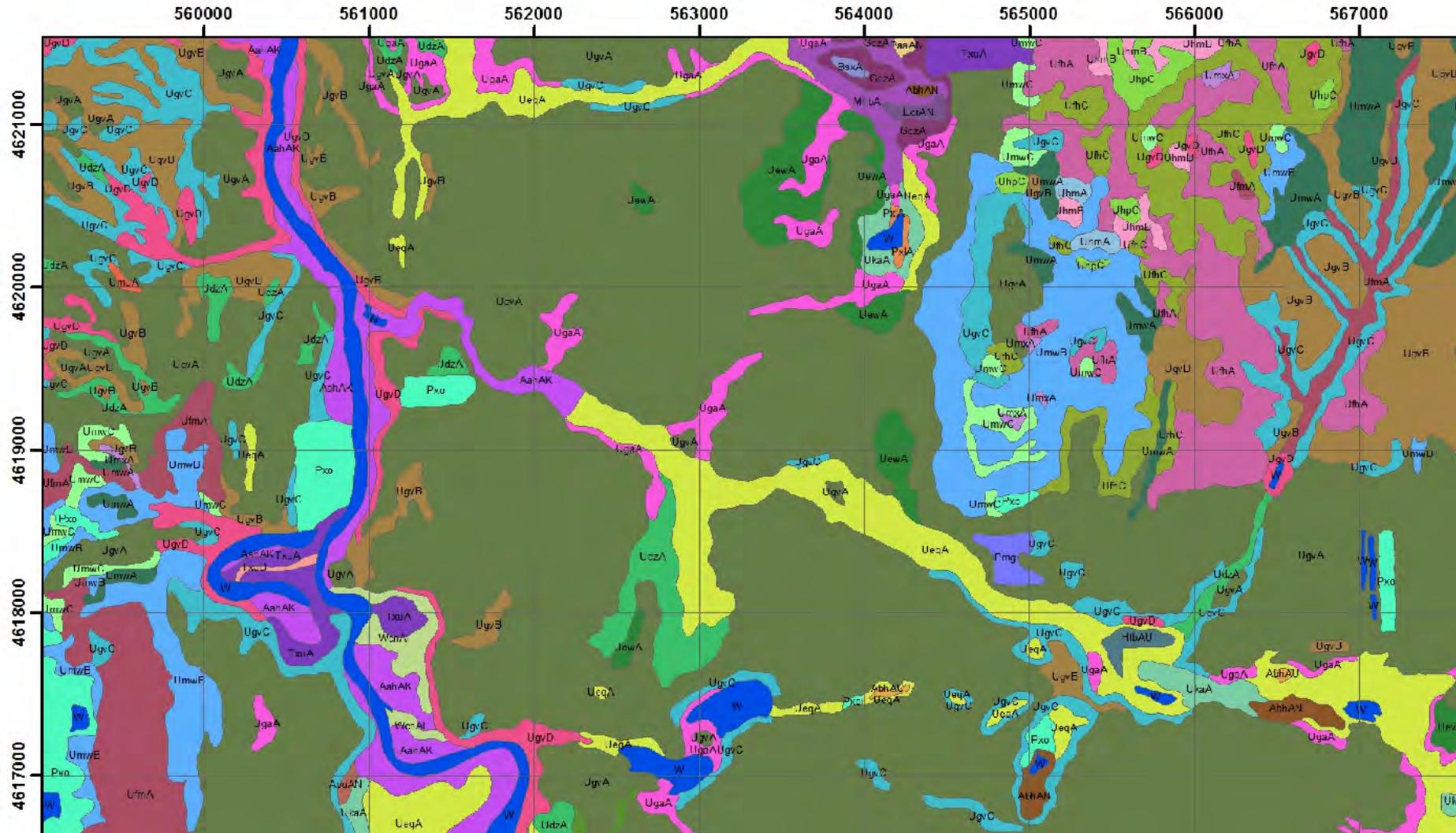


Examples: Polygon Data

- Soil Maps
- Land Use
- Settlements
- Architectural plans

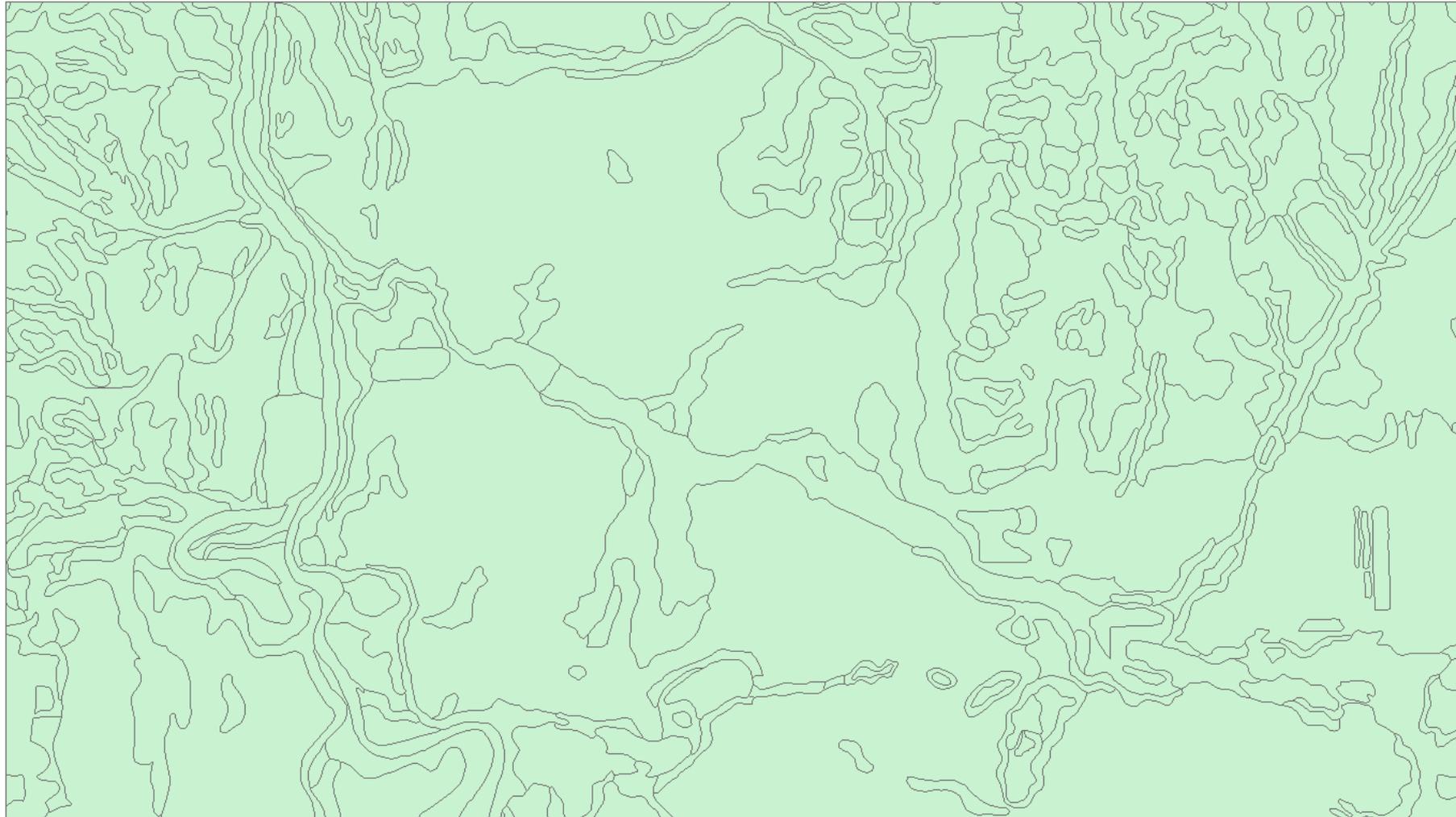
Creating Polygon Features Using Georeferenced Map data

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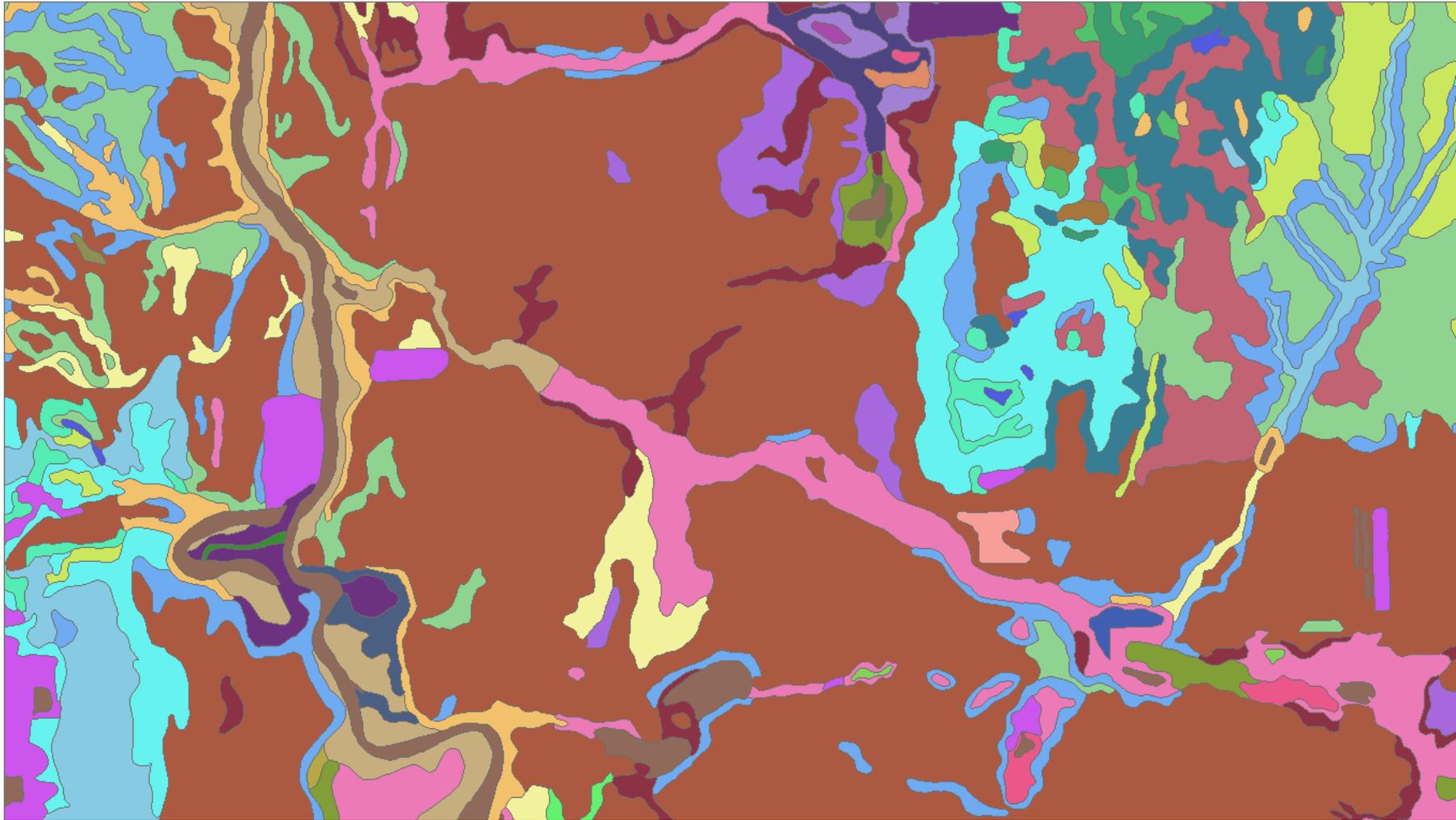
Creating Polygon Features Using Georeferenced Map data

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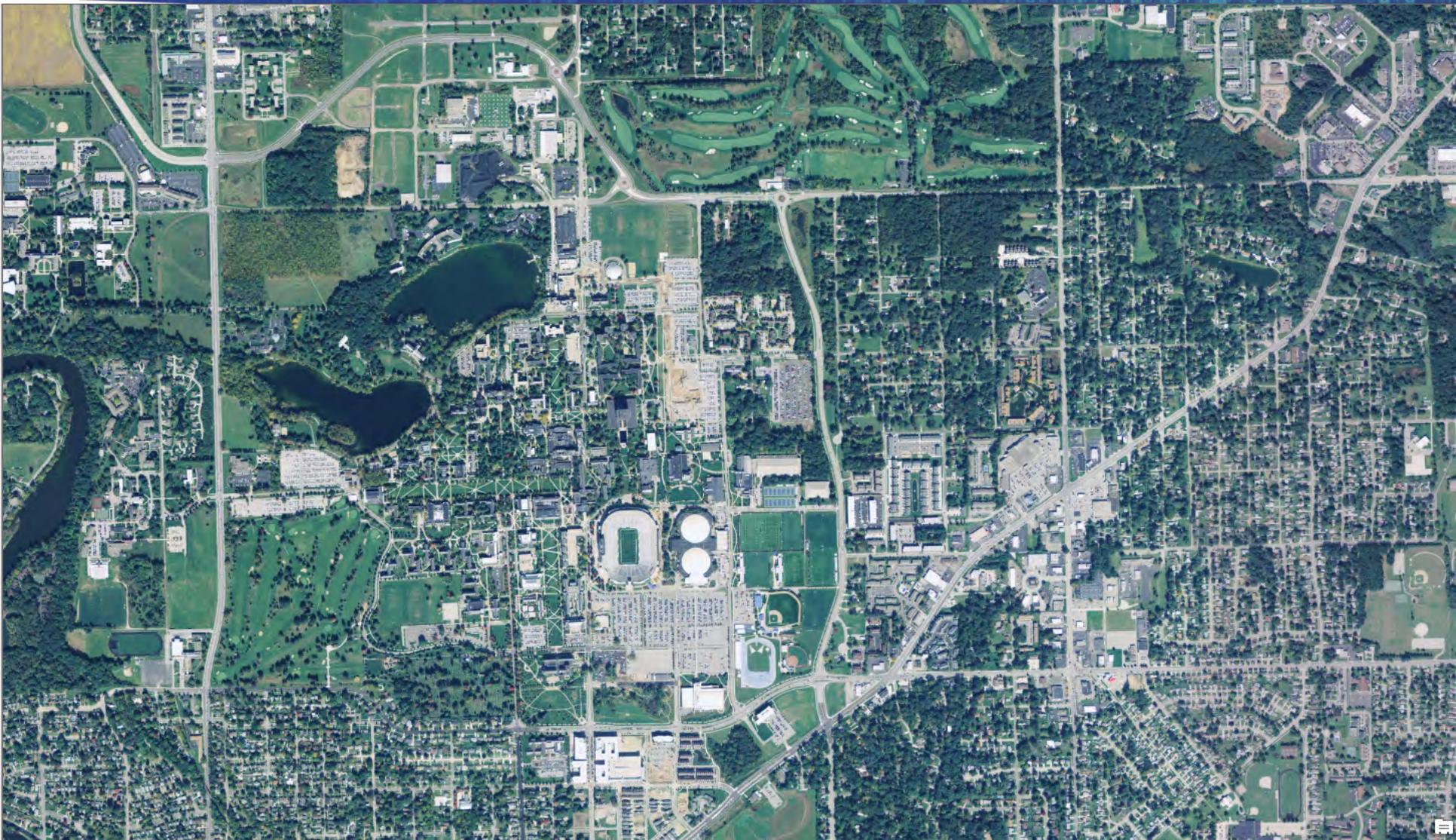
Creating Polygon Features Using Georeferenced Map data

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Creating Polygon Features Using Georeferenced Imagery

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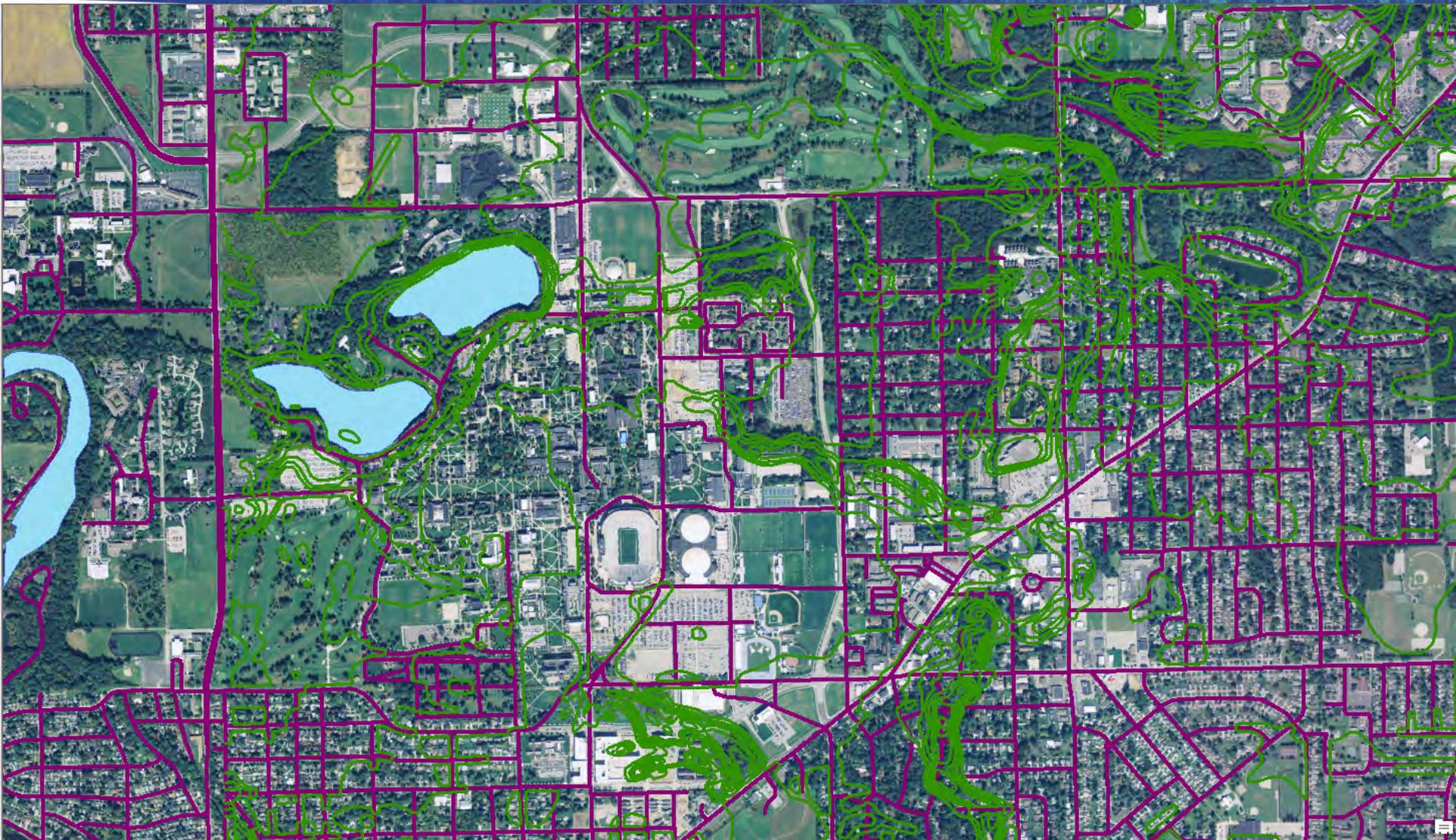
Creating Polygon Features Using Georeferenced Map data

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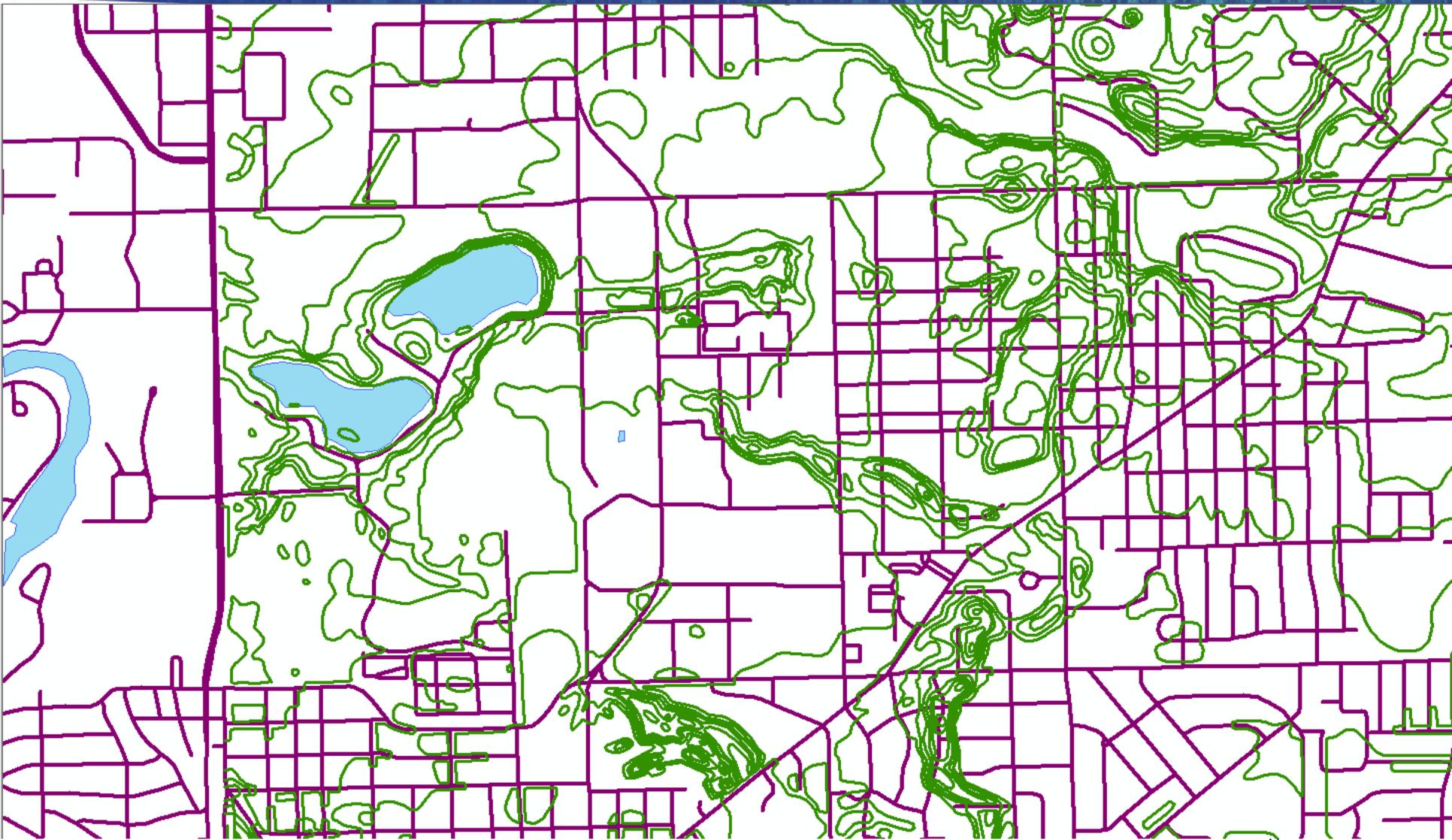
Creating Polygon Features Using Georeferenced Map data

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Creating Polygon Features Using Georeferenced Map data

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Editing Vectors in ArcMap

Step 1: Create a shapefile

- Create a shapefile to hold the features
 - Must decide what type (point, polyline, polygon) in advance
- **Point** files are made up of individual points.
- **Polyline** files have nodes at each end and a series of vertices that shape the line.
- **Polygon** files have a series of vertices with lines between them. These define the shape of the polygon

Step 2: Add fields

- Add fields to store data in the attribute table for each feature
- This can be done either before or after editing
- Each field in the attribute table must be of a specific type

FID	Shape*	COLLEGES_	COLLEGES_I	INSTID
0	Point	100	101	400000
1	Point	89	90	300000
2	Point	285	287	500000
3	Point	155	156	400000
4	Point	258	260	500000
5	Point	251	253	500000
6	Point	0	0	0
7	Point	272	274	500000
8	Point	87	88	300000
9	Point	104	105	400000
10	Point	6	6	200000

Add Field

Name:

Type:

Field Properties

Precision	0
Scale	0

OK Cancel

ArcGIS Data Types

a. Short Integer:

Numeric values without fractions (eg 1, 40, 23,098) between -32,768 and 32,767

b. Long Integer:

Numeric values without fractions (eg 1, 40, 23,098) of almost any length. These take up more storage space and should only be used if necessary.

c. Float:

Numeric values with fractions with less than 7 digits

d. Double

Numeric values with fractions (eg 1.33, -1.09, 453, 222.1232) of any length.

e. Text:

Names or other text.

f. Date:

Date stored in the format yyyy-mm-dd.

ArcGIS Data Types

- **Precision:**
 - The maximum number of digits that can be stored in a field
- **Scale:**
 - The number of decimal places for Float and Double types
- A value of 0 for either defaults to the maximum

Step 3: Begin editing

- Begin an editing session in ArcMap and choose settings
 - Snapping: The cursor will jump to known points.
 - You can set the:
 - Tolerance: how close the cursor must be to snap
 - Layers to snap to

Step 4: Create new features

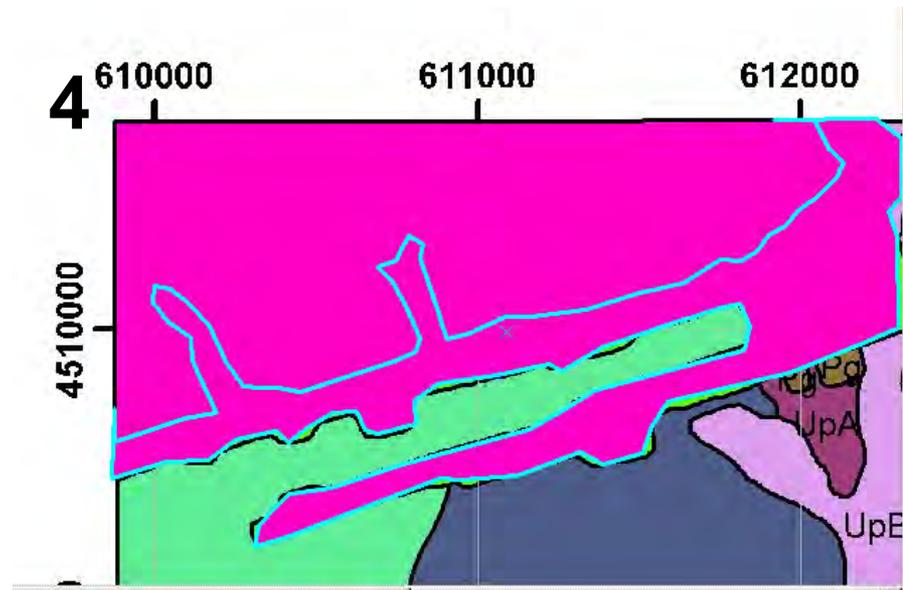
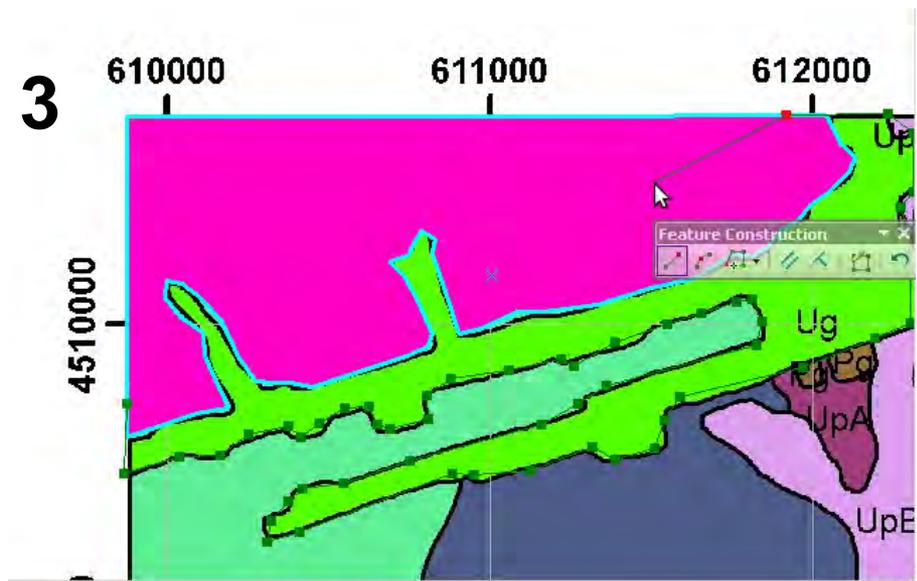
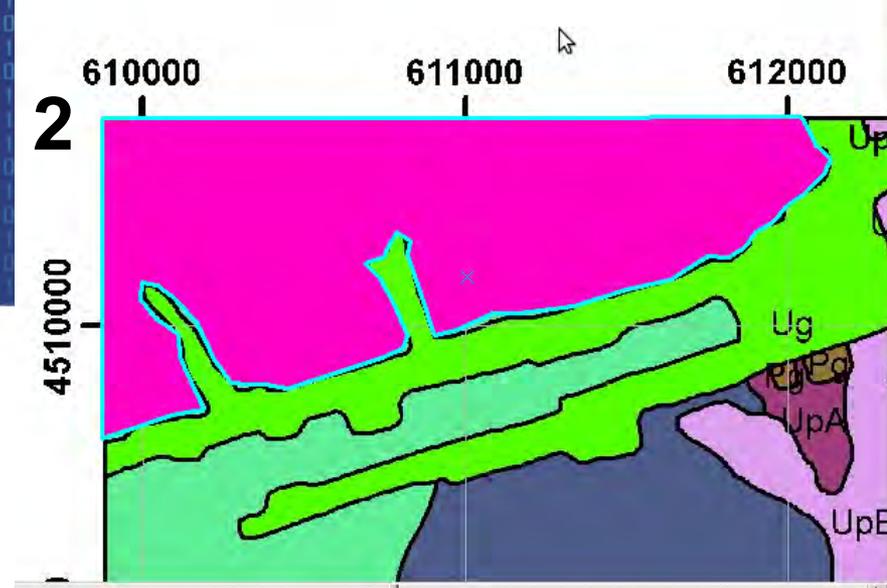
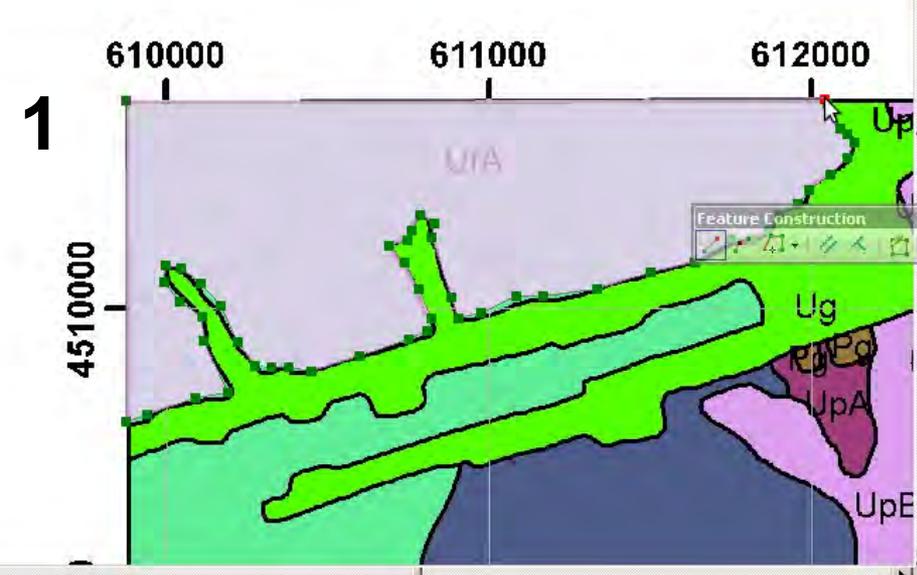
- Points: Either clicking or enter coordinates
 - Can also move existing points
- Polylines: A series of vertices (points) ended by a double click
 - These vertices can be selected and edited to change the shape of the line.

Step 4: Create new features

- Polygons: A series of vertices (points) ended by a double click, which then fills the inside as a individual feature
 - When making polygons that cover the entire area you should never retrace the same part
 - Can lead to many small errors
 - Instead either create new polygons by tracing the area relative to a known edge (Auto-complete Polygon) or create one feature that is the whole area and then cutting it into pieces

Editing Polygon files

- By accretion:
 - Begin by drawing the largest polygon you can find.
 - Then add other polygons to it.
 - DO NOT leave empty areas between areas you have edited, they can be very difficult to fix.
 - Island polygons can be complicated—you need to cut them out from the background.



Editing Polygon files

- By deletion:
 - Create a polygon of the entire area
 - Then keep cutting out the polygons into ever smaller pieces.

