MENNA ELMINSHAWY

20217011

[DATE]

[COMPANY NAME]

[Company address]

GIS Lab. Assignment 4

The eventually existing zones of technical, social, or environmental constraints for renewable energy development were identified within the scope of the SESA studies.

The objective of the GIS based Suitability Analysis is to create a dataset with three different zones of suitability regarding the construction of wind turbines:

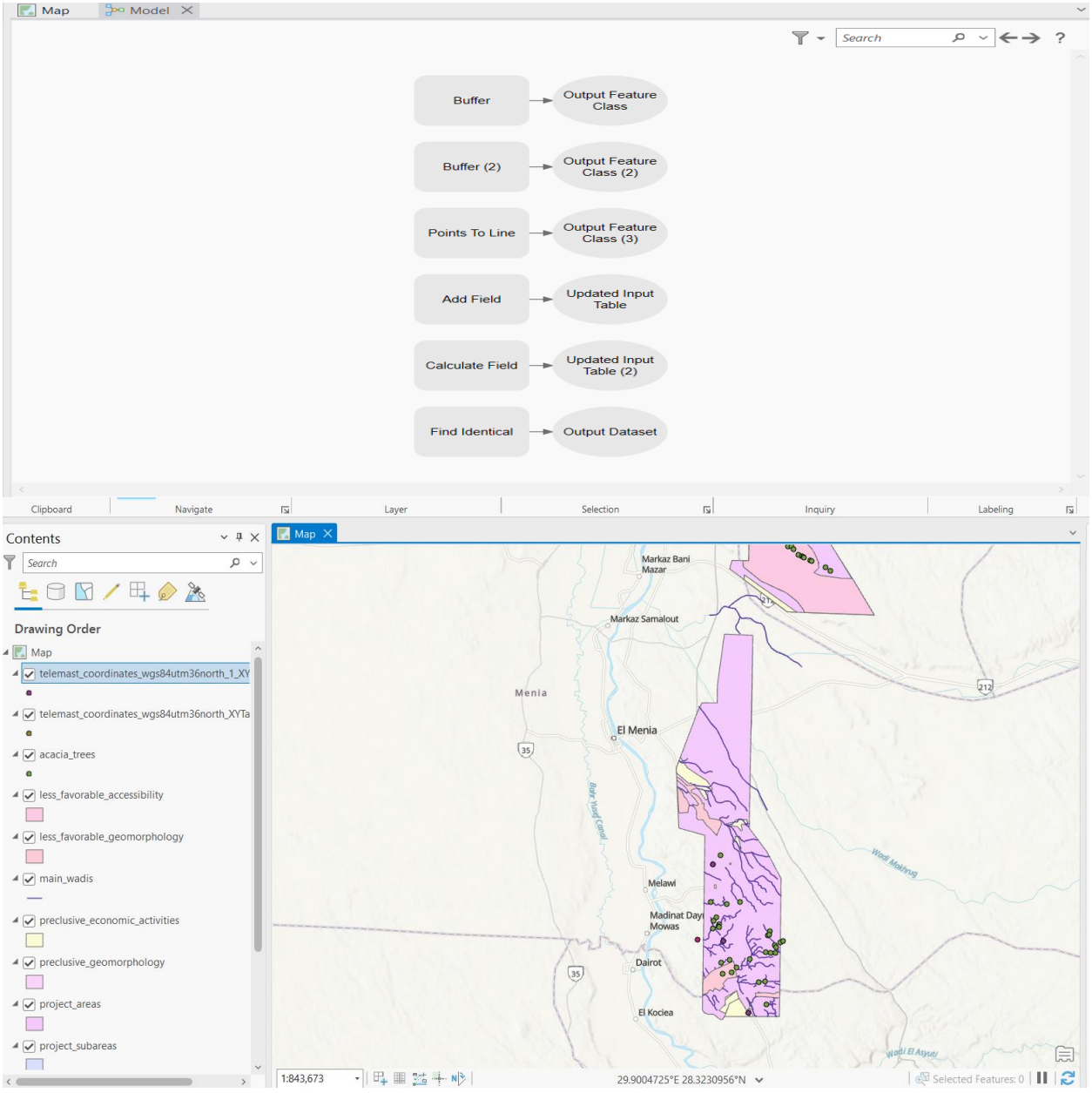
- **Preclusive zones**
- **Unfavorable zones**
- **Zones without restrictions**

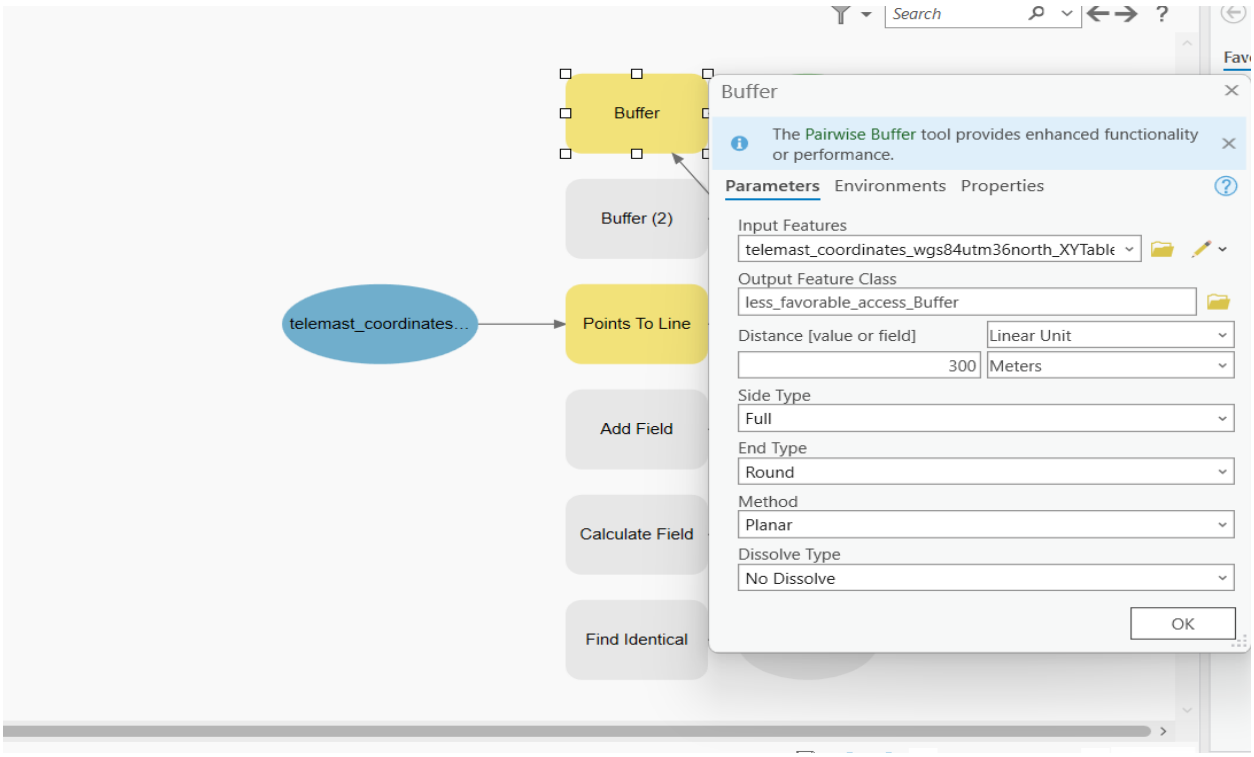
These zones can be defined from the following table

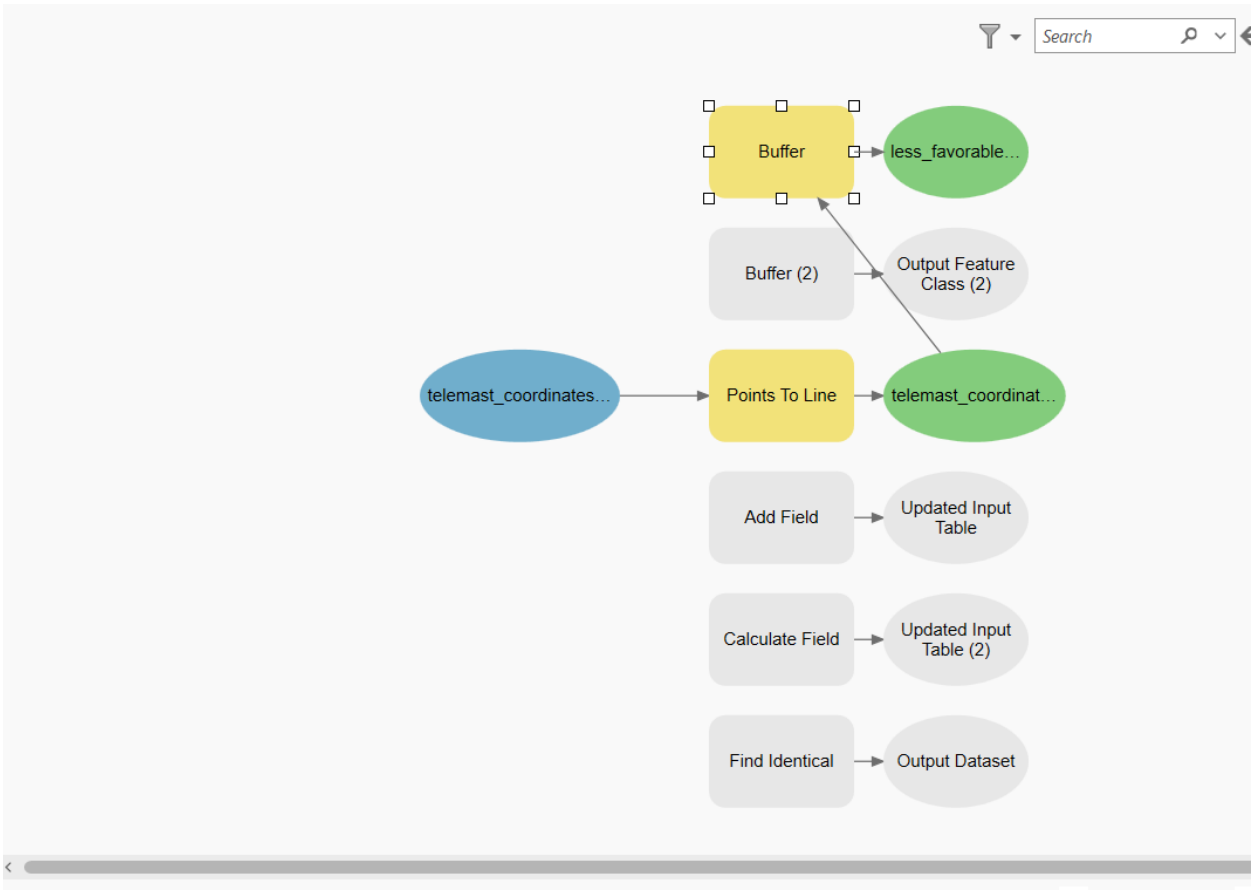
Parameter	Preclusive	Unfavorable
Competing Landuse	- Land already used as farm-land or obviously already under development - Existing service areas (e.g. road houses) - Industrial areas (e.g. asphalt plant, gravel plants, marble or quartzite mining)	-
Infrastructure	Transmitter corridor (300 m to each side from direct distance line are considered)	-
Cultural Heritage	Clearance distance of 3 km to royal tombs	-
Geomorphology	Unstable escarpments, steep slopes of >100%	-
	-	Complex terrain with deep wadis and limited plateau areas
Habitats	-	Wadis of importance as a habitat for plants & animals (100m buffer distance)

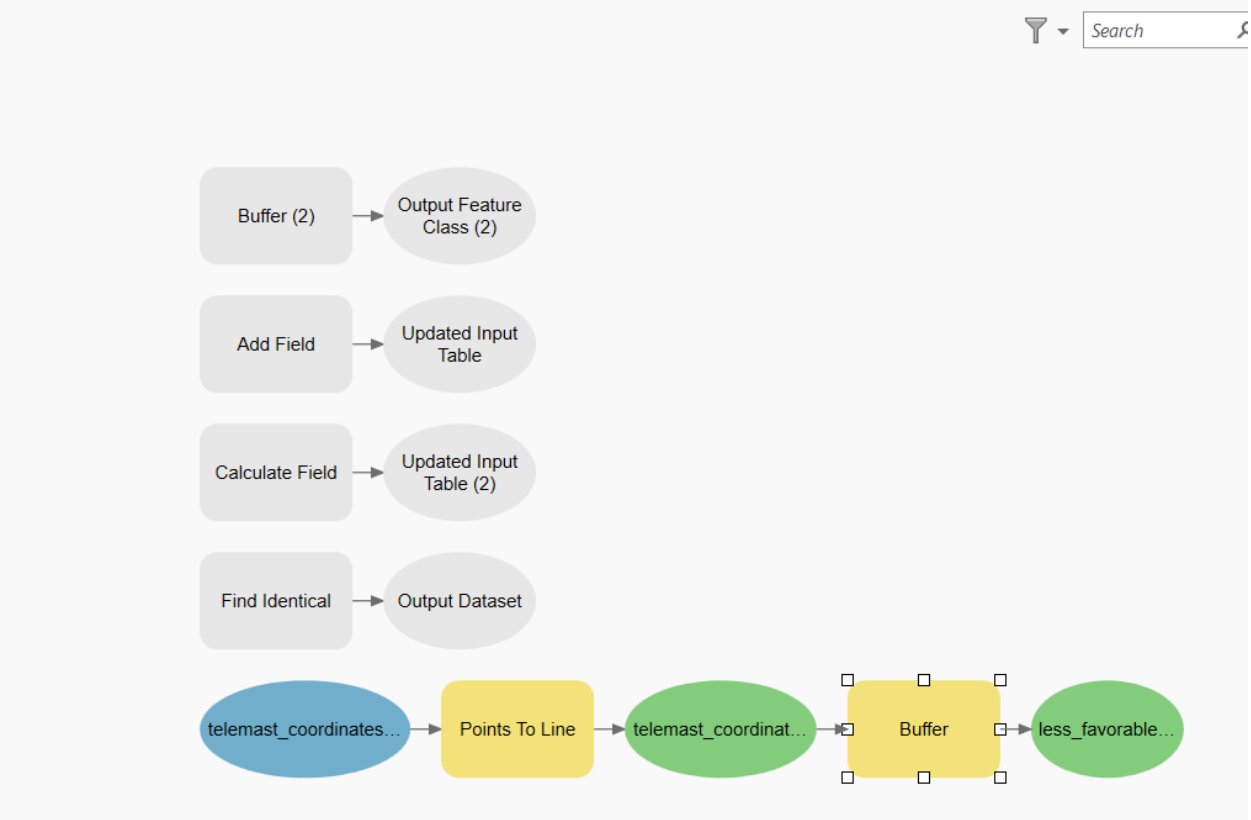
Exercise 1: Create a tool to obtain a feature class with preclusive areas

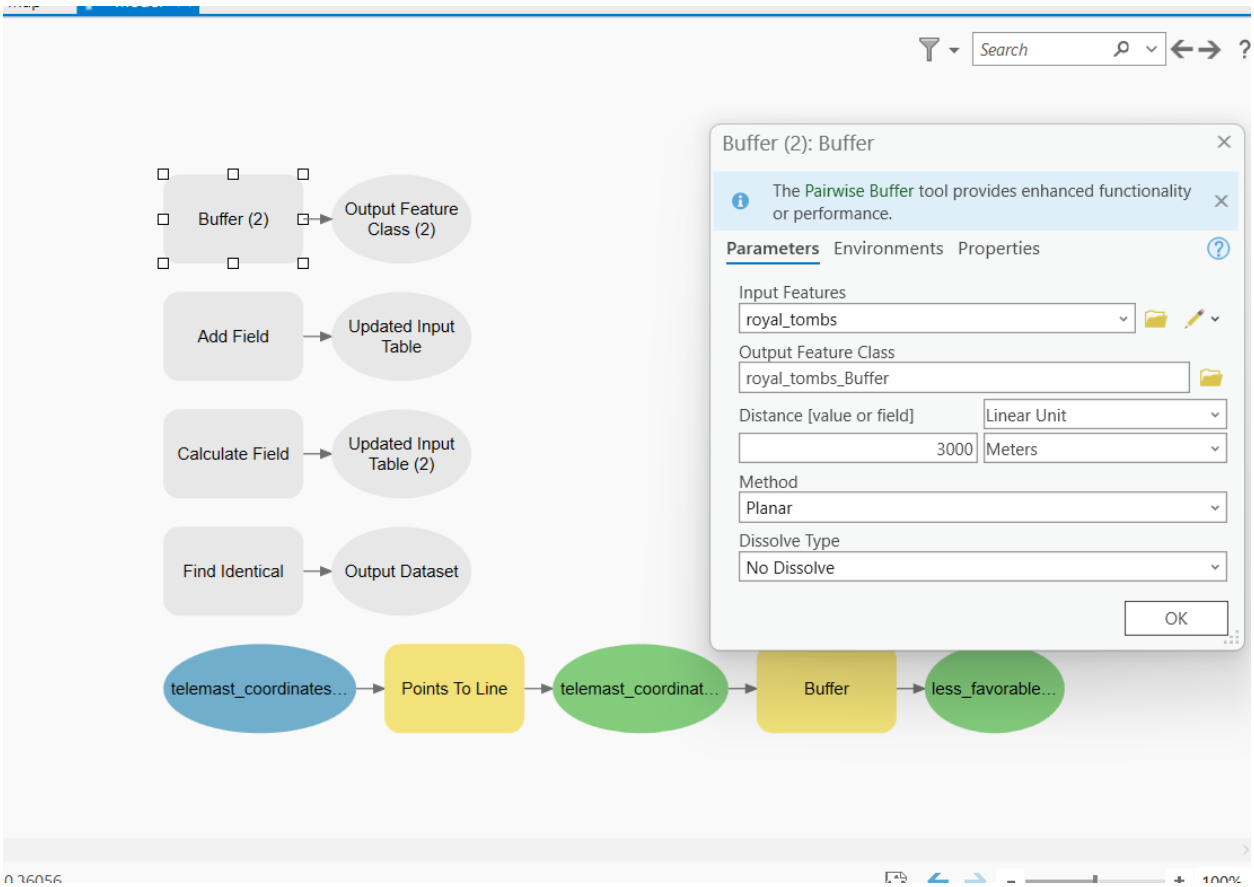
- Create a new model tool named **"Exercise1"**
- Build a model for the following workflow:
  - **"royal_tombs"** buffered with **3000 m**
  - **"telemasts_PointsToLine"** buffered with **300 m**
- the both **Output Datasets** should be overlayed with the **"*Merge*"** tool together with the datasets **"preclusive_geomorphology"** and **"preclusive_economic_activities"**
- ***Add Field*** to the Merge Output Dataset named **"Zone"**
- Use the ***"Calculate Field"*** function to **attribute all features** with **"preclusive"** (field "Zone")

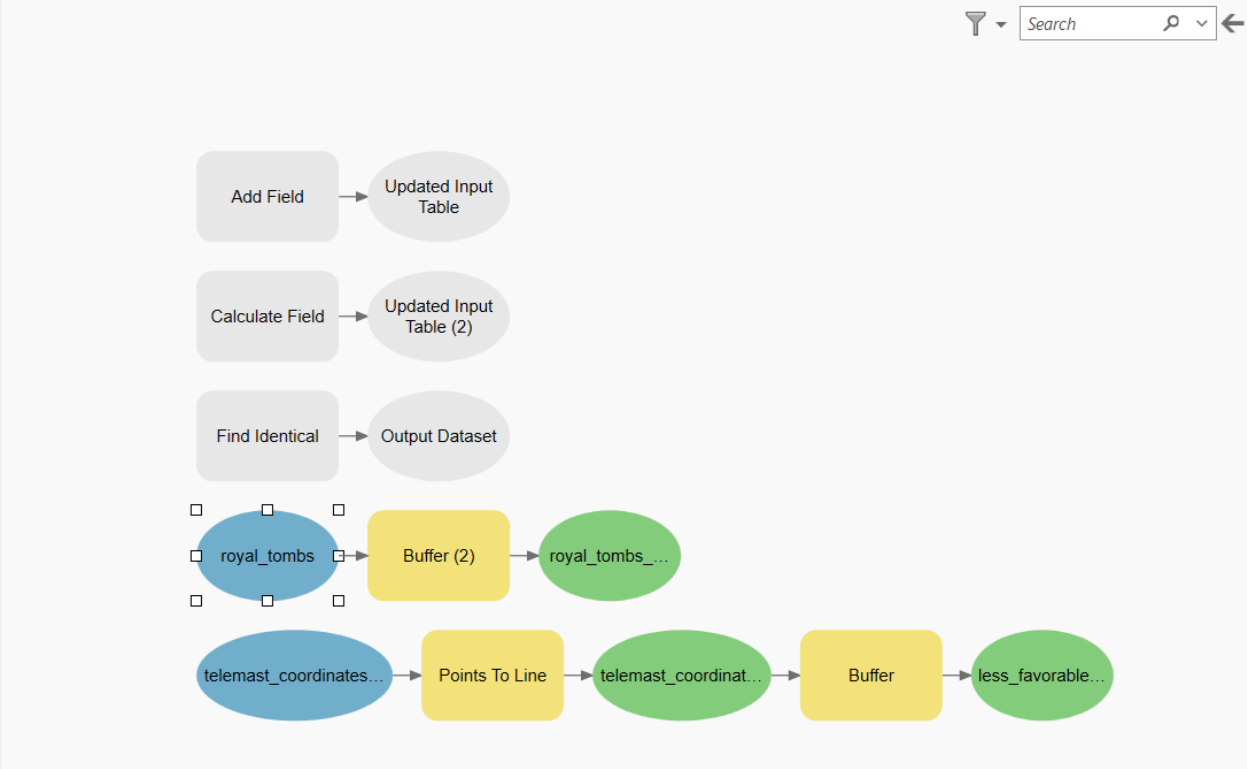


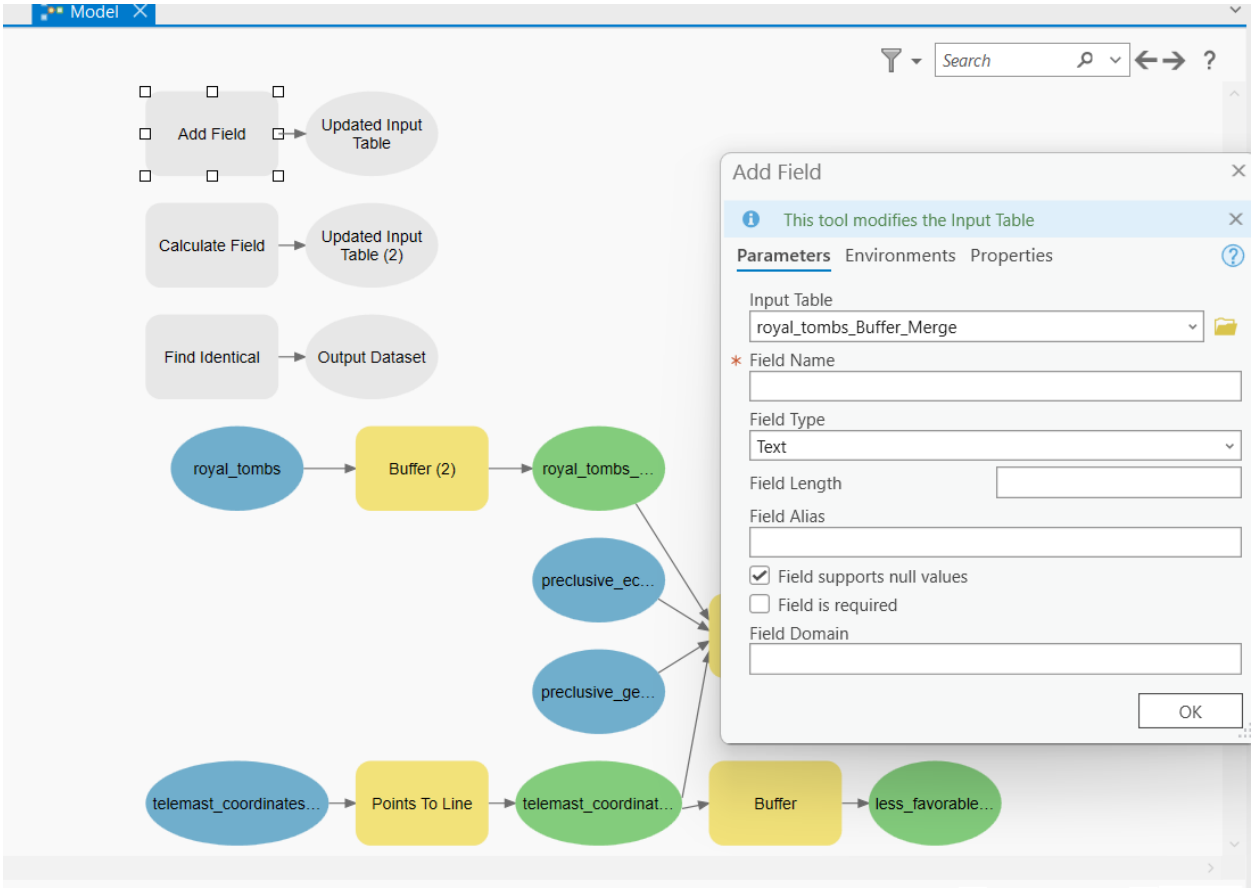

Search
Buffer
Buffer (2)
telemast_coordinates...
Points To Line
Add Field
Calculate Field
Find Identical
Buffer
The Pairwise Buffer tool provides enhanced functionality or performance.
Parameters
Environments
Properties
Input Features
telemast_coordinates_wgs84utm36north_XYTable
Output Feature Class
less_favorable_access_Buffer
Distance [value or field]
Linear Unit
300
Meters
Side Type
Full
End Type
Round
Method
Planar
Dissolve Type
No Dissolve
OK

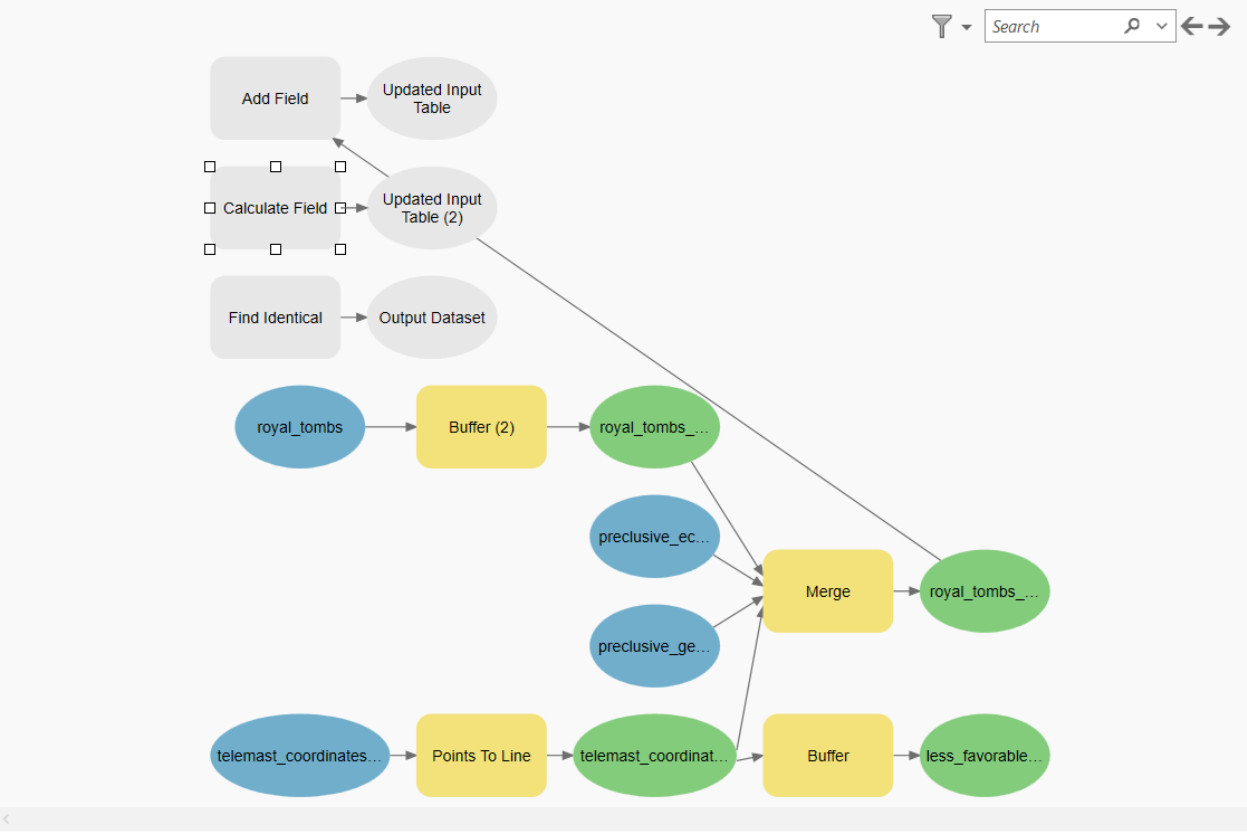

Search
Buffer
less_favorable...
Buffer (2)
Output Feature Class (2)
telemast_coordinates...
Points To Line
telemast_coordinat...
Add Field
Updated Input Table
Calculate Field
Updated Input Table (2)
Find Identical
Output Dataset

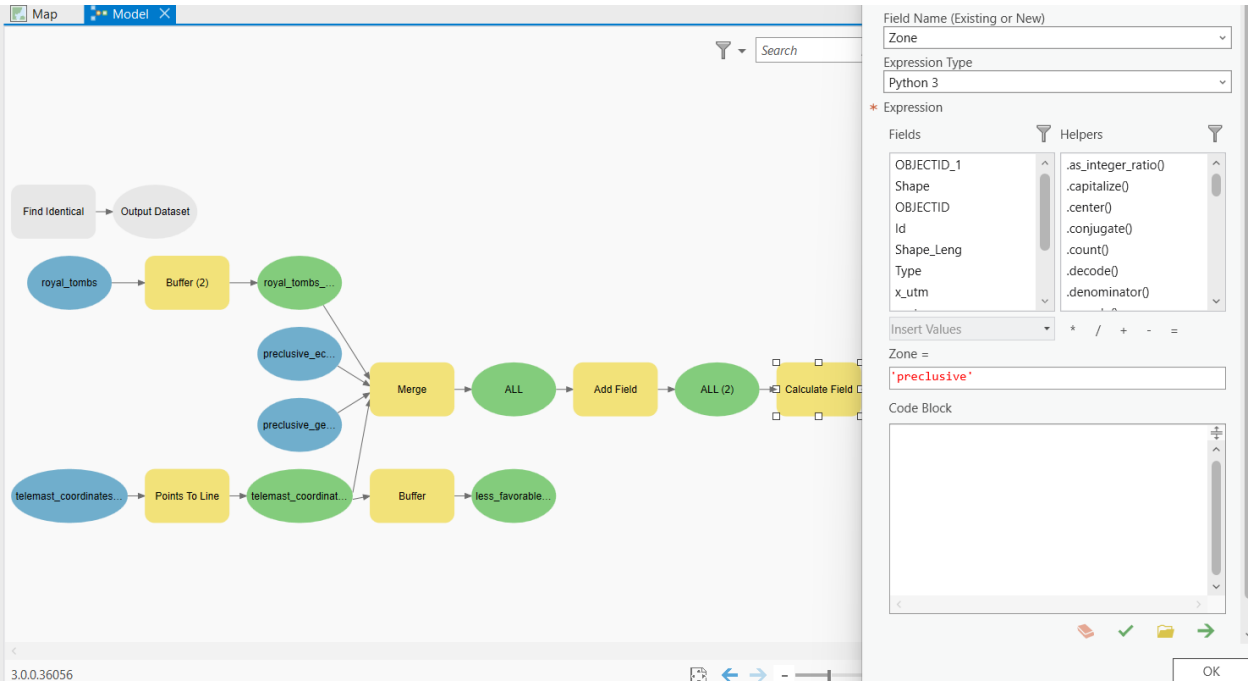

Search
Buffer (2)
Output Feature Class (2)
Add Field
Updated Input Table
Calculate Field
Updated Input Table (2)
Find Identical
Output Dataset
telemast_coordinates...
Points To Line
telemast_coordinat...
Buffer
less_favorable...

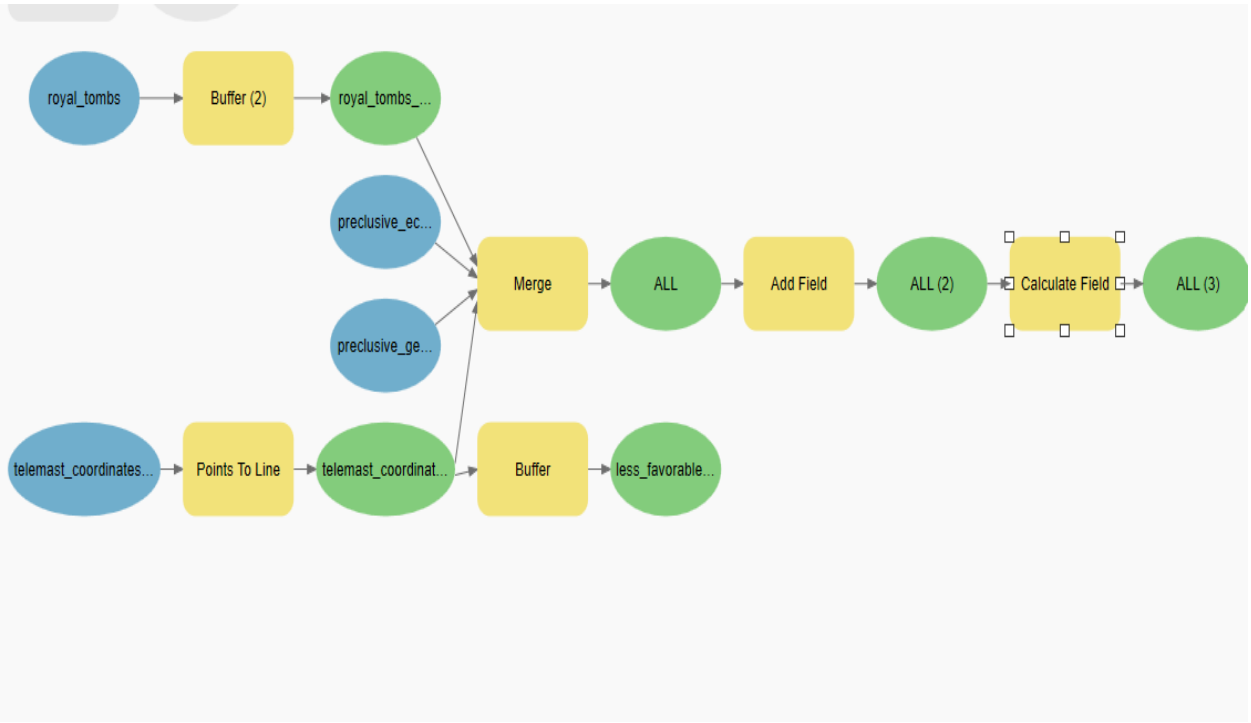

Search
Buffer (2)
Output Feature Class (2)
Add Field
Updated Input Table
Calculate Field
Updated Input Table (2)
Find Identical
Output Dataset
telemast_coordinates...
Points To Line
telemast_coordinat...
Buffer
less_favorable...
Buffer (2): Buffer
The Pairwise Buffer tool provides enhanced functionality or performance.
Parameters
Environments
Properties
Input Features
royal_tombs
Output Feature Class
royal_tombs_Buffer
Distance [value or field]
Linear Unit
3000
Meters
Method
Planar
Dissolve Type
No Dissolve
OK

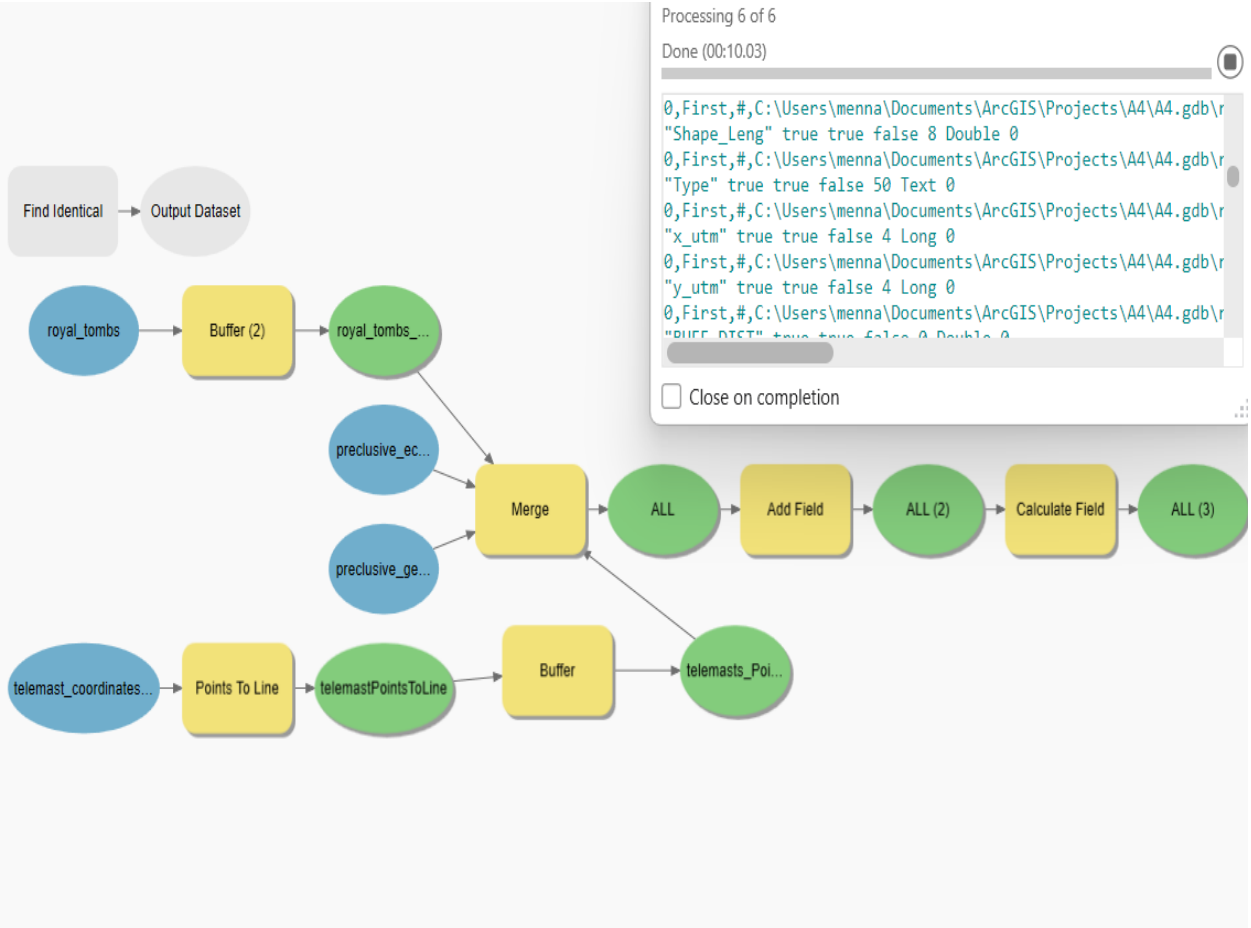

Search
Add Field
Updated Input Table
Calculate Field
Updated Input Table (2)
Find Identical
Output Dataset
royal_tombs
Buffer (2)
royal_tombs_...
telemast_coordinates...
Points To Line
telemast_coordinat...
Buffer
less_favorable...

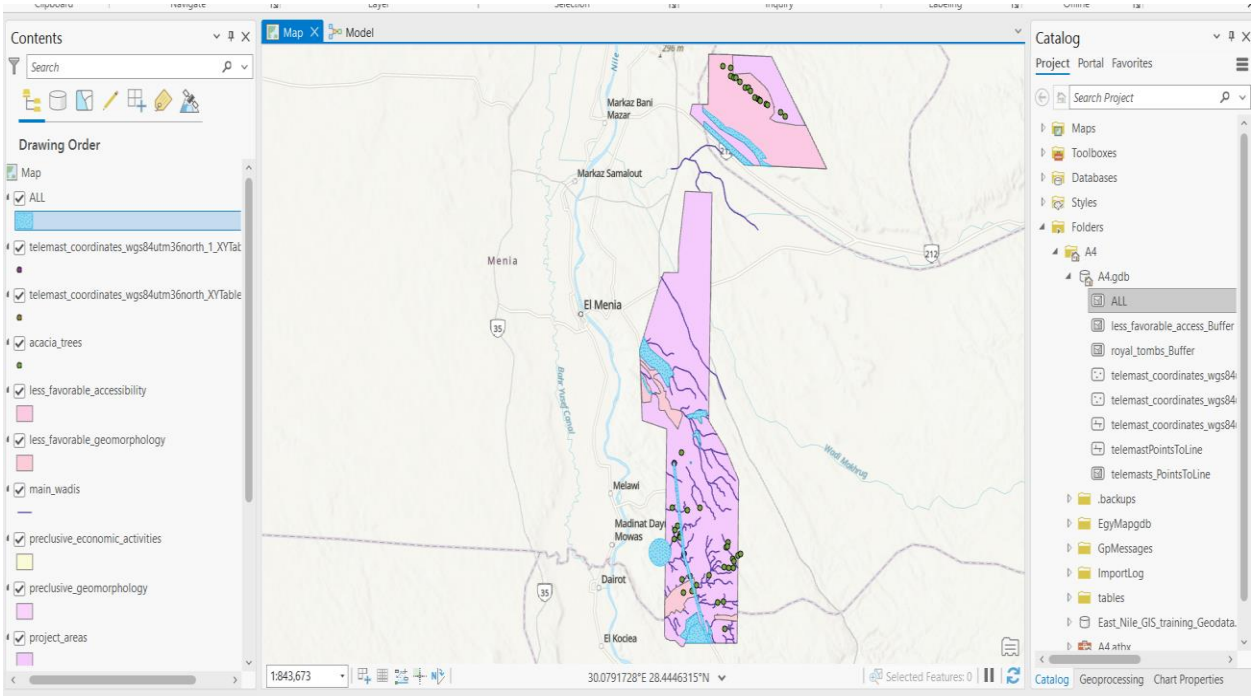

Model
Search
Add Field
Updated Input Table
Calculate Field
Updated Input Table (2)
Find Identical
Output Dataset
royal_tombs
Buffer (2)
royal_tombs_...
preclusive_ec...
preclusive_ge...
telemast_coordinates...
Points To Line
telemast_coordinat...
Buffer
less_favorable...
Add Field
This tool modifies the Input Table
Parameters
Environments
Properties
Input Table
royal_tombs_Buffer_Merge
Field Name
Field Type
Text
Field Length
Field Alias
Field supports null values
Field is required
Field Domain
OK

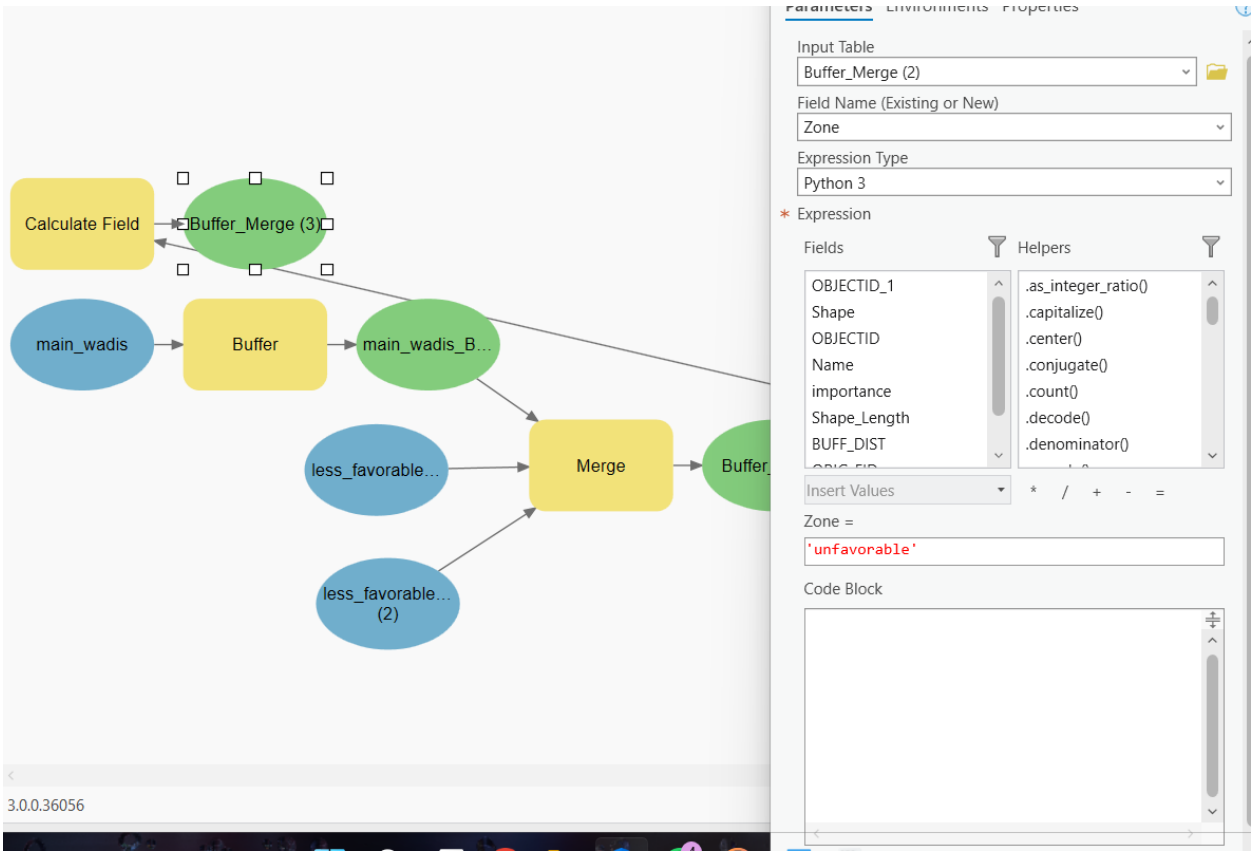

Search
Add Field
Updated Input Table
Calculate Field
Updated Input Table (2)
Find Identical
Output Dataset
royal_tombs
Buffer (2)
royal_tombs_...
preclusive_ec...
preclusive_ge...
Merge
royal_tombs_...
telemast_coordinates...
Points To Line
telemast_coordinat...
Buffer
less_favorable...

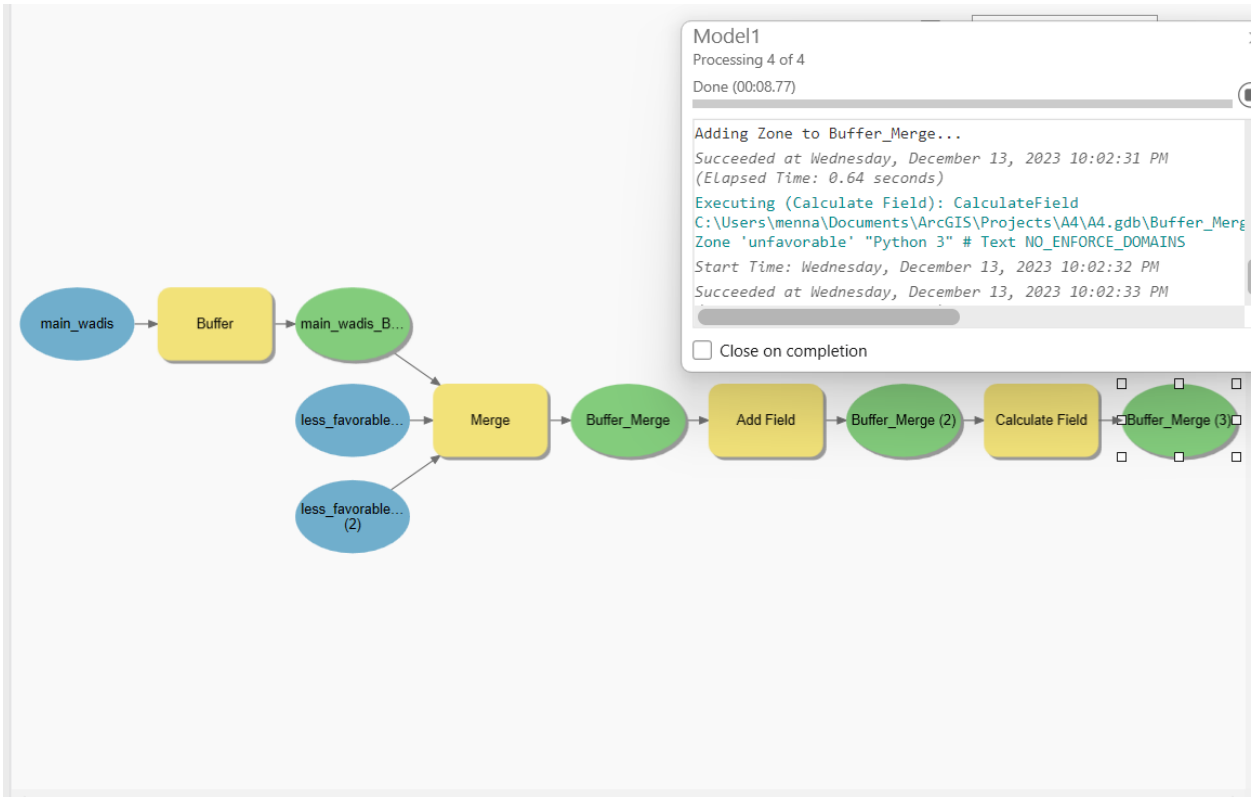

Map
Model
Search
Find Identical
Output Dataset
royal_tombs
Buffer (2)
royal_tombs_...
preclusive_ec...
preclusive_ge...
Merge
ALL
Add Field
ALL (2)
Calculate Field
telemast_coordinates...
Points To Line
telemast_coordinat...
Buffer
less_favorable...
3.0.0.36056
Field Name (Existing or New)
Zone
Expression Type
Python 3
Expression
Fields
Helpers
OBJECTID_1
Shape
OBJECTID
Id
Shape_Leng
Type
x_utm
.as_integer_ratio()
.capitalize()
.center()
.conjugate()
.count()
.decode()
.denominator()
Insert Values
* / + - =
Zone =
'preclusive'
Code Block
OK

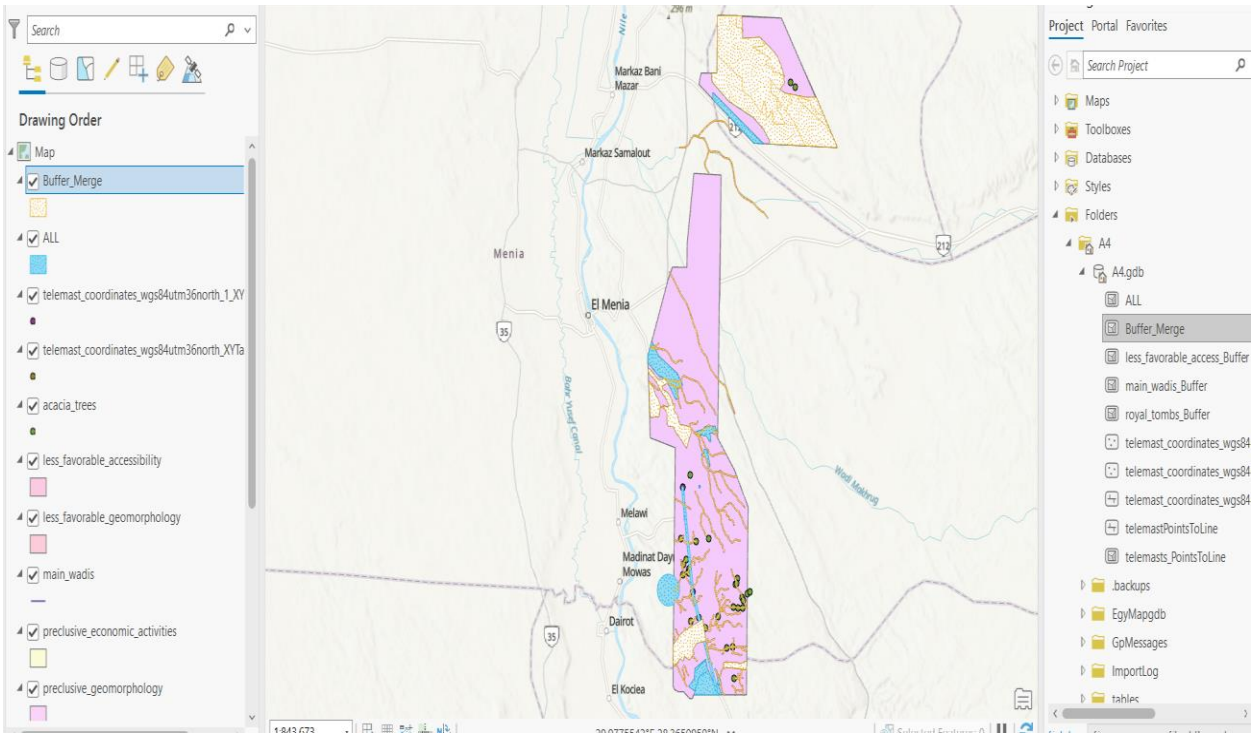

royal_tombs
Buffer (2)
royal_tombs_...
preclusive_ec...
preclusive_ge...
Merge
ALL
Add Field
ALL (2)
Calculate Field
ALL (3)
telemast_coordinates...
Points To Line
telemast_coordinat...
Buffer
less_favorable...


Processing 6 of 6
Done (00:10.03)
0,First,#,C:\Users\menna\Documents\ArcGIS\Projects\A4\A4.gdb\r
"Shape_Leng" true true false 8 Double 0
0,First,#,C:\Users\menna\Documents\ArcGIS\Projects\A4\A4.gdb\r
"Type" true true false 50 Text 0
0,First,#,C:\Users\menna\Documents\ArcGIS\Projects\A4\A4.gdb\r
"x_utm" true true false 4 Long 0
0,First,#,C:\Users\menna\Documents\ArcGIS\Projects\A4\A4.gdb\r
"y_utm" true true false 4 Long 0
0,First,#,C:\Users\menna\Documents\ArcGIS\Projects\A4\A4.gdb\r
Close on completion
Find Identical
Output Dataset
royal_tombs
Buffer (2)
royal_tombs_...
preclusive_ec...
preclusive_ge...
Merge
ALL
Add Field
ALL (2)
Calculate Field
ALL (3)
telemast_coordinates...
Points To Line
telemastPointsToLine
Buffer
telemasts_Poi...


Contents
Drawing Order
Map
ALL
telemast_coordinates_wgs84utm36north_1_XYTat
telemast_coordinates_wgs84utm36north_XYTable
acacia_trees
less_favorable_accessibility
less_favorable_geomorphology
main_wadis
preclusive_economic_activities
preclusive_geomorphology
project_areas
Map
Model
Markaz Bani Mazar
Markaz Samalout
Menia
El Menia
Melawi
Madinat Dayr Mowas
Dairot
El Kocïea
1:843,673
30.0791728°E 28.4446315°N
Selected Features: 0
Catalog
Project
Portal
Favorites
Search Project
Maps
Toolboxes
Databases
Styles
Folders
A4
A4.gdb
ALL
less_favorable_access_Buffer
royal_tombs_Buffer
telemast_coordinates_wgs84
telemast_coordinates_wgs84
telemast_coordinates_wgs84
telemastPointsToLine
telemasts_PointsToLine
.backups
EgyMapgdb
GpMessages
ImportLog
tables
East_Nile_GIS_training_Geodata
Catalog
Geoprocessing
Chart Properties


Calculate Field
Buffer_Merge (3)
main_wadis
Buffer
main_wadis_B...
less_favorable...
Merge
Buffer_
less_favorable... (2)
3.0.0.36056
Parameters
Environments
Properties
Input Table
Buffer_Merge (2)
Field Name (Existing or New)
Zone
Expression Type
Python 3
Expression
Fields
Helpers
OBJECTID_1
Shape
OBJECTID
Name
importance
Shape_Length
BUFF_DIST
.as_integer_ratio()
.capitalize()
.center()
.conjugate()
.count()
.decode()
.denominator()
Insert Values
* / + - =
Zone =
'unfavorable'
Code Block


Model1
Processing 4 of 4
Done (00:08.77)
Adding Zone to Buffer_Merge...
Succeeded at Wednesday, December 13, 2023 10:02:31 PM
(Elapsed Time: 0.64 seconds)
Executing (Calculate Field): CalculateField
C:\Users\menna\Documents\ArcGIS\Projects\A4\A4.gdb\Buffer_Merg
Zone 'unfavorable' "Python 3" # Text NO_ENFORCE_DOMAINS
Start Time: Wednesday, December 13, 2023 10:02:32 PM
Succeeded at Wednesday, December 13, 2023 10:02:33 PM
Close on completion
main_wadis
Buffer
main_wadis_B...
less_favorable...
less_favorable... (2)
Merge
Buffer_Merge
Add Field
Buffer_Merge (2)
Calculate Field
Buffer_Merge (3)

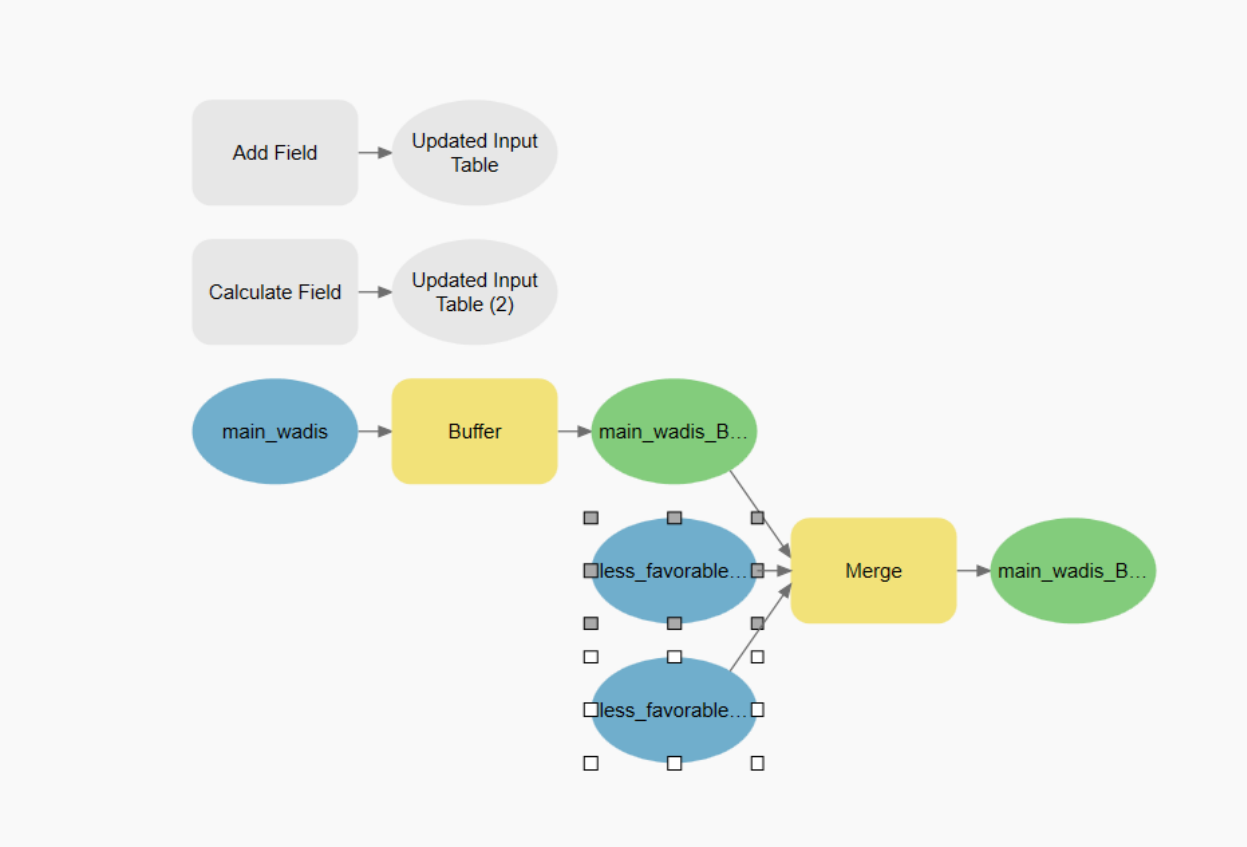

Drawing Order
Map
Buffer_Merge
ALL
telemast_coordinates_wgs84utm36north_1_XY
telemast_coordinates_wgs84utm36north_XYTa
acacia_trees
less_favorable_accessibility
less_favorable_geomorphology
main_wadis
preclusive_economic_activities
preclusive_geomorphology
Markaz Bani Mazar
Markaz Samalout
Menia
El Menia
Melawi
Madinat Dayr Mowas
Dairot
El Kociea
Project
Portal
Favorites
Search Project
Maps
Toolboxes
Databases
Styles
Folders
A4
A4.gdb
ALL
Buffer_Merge
less_favorable_access_Buffer
main_wadis_Buffer
royal_tombs_Buffer
telemast_coordinates_wgs84
telemast_coordinates_wgs84
telemast_coordinates_wgs84
telemastPointsToLine
telemasts_PointsToLine
.backups
EgyMapgdb
GpMessages
ImportLog
tables

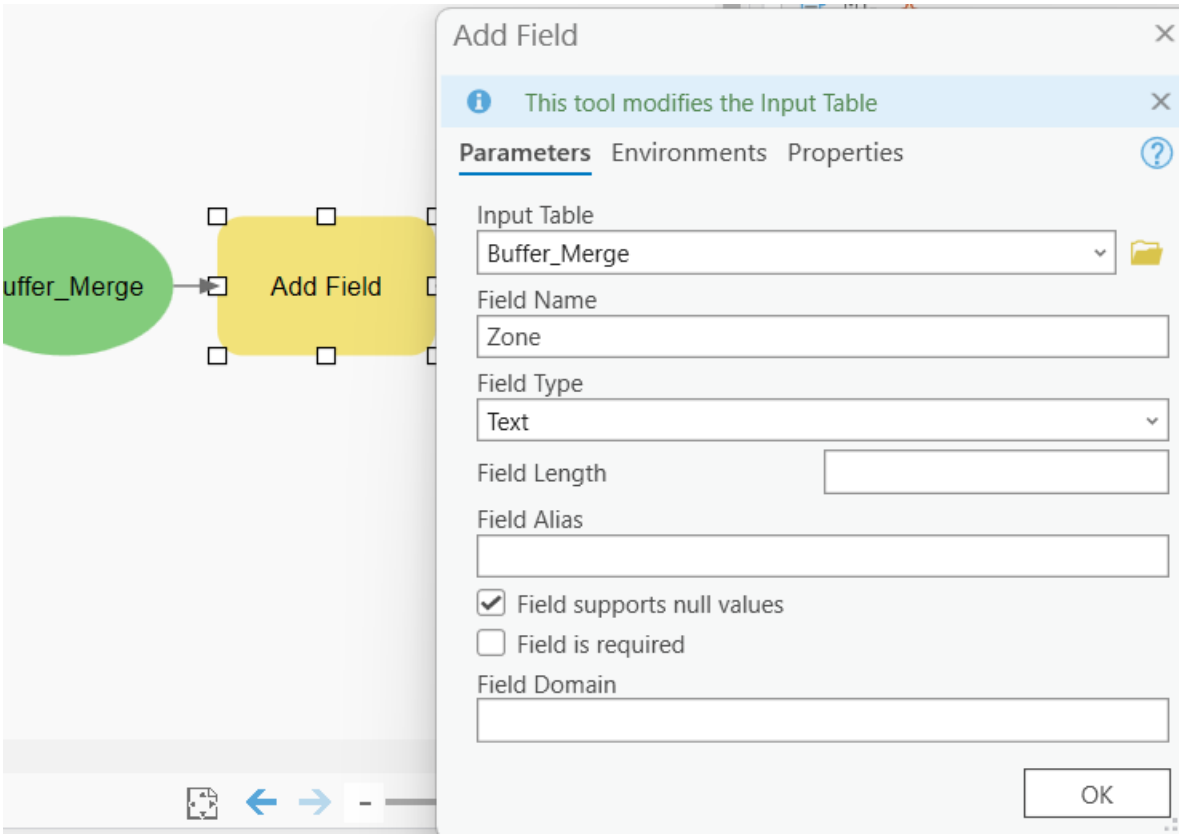
Create an arc toolbox called "my first arc toolbox" contains the following models and tools

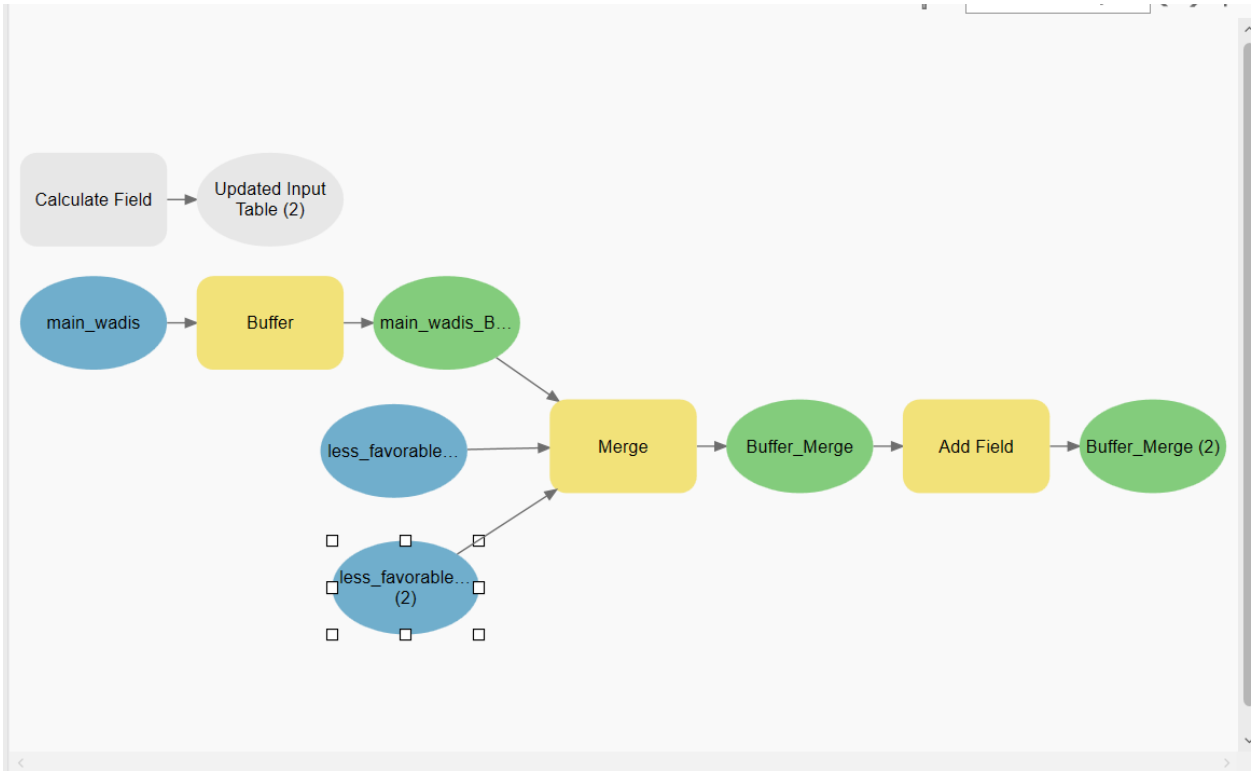
Exercise 2: Create a tool to obtain a feature class with unfavorable areas

- Create a new model tool named **"Exercise2"**
- Build a model for the following workflow:
  - "main_wadis_of_importance" buffered with 100 m
  - "Merge" the Output Dataset with the datasets "less_favorable_geomorphology" and "less_favorable_accessibility"

- Add Field to the Merge Output Dataset named "Zone"
- Use the "Calculate Field" function to attribute all features with "unfavorable" (field "Zone")

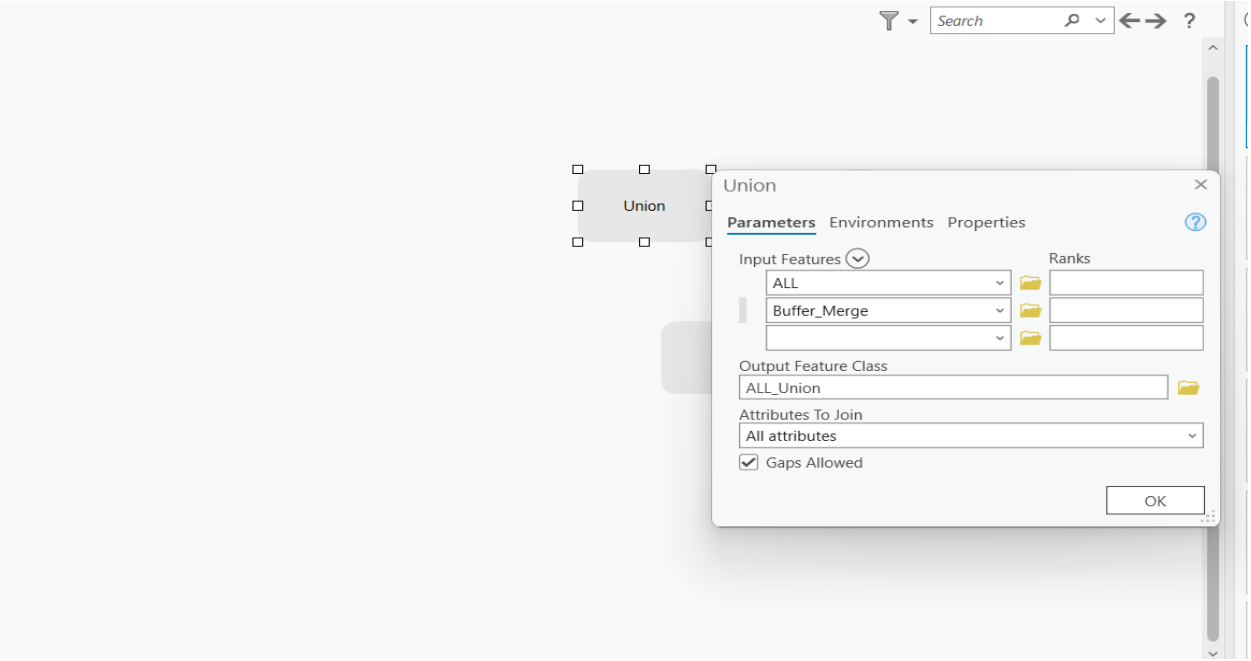


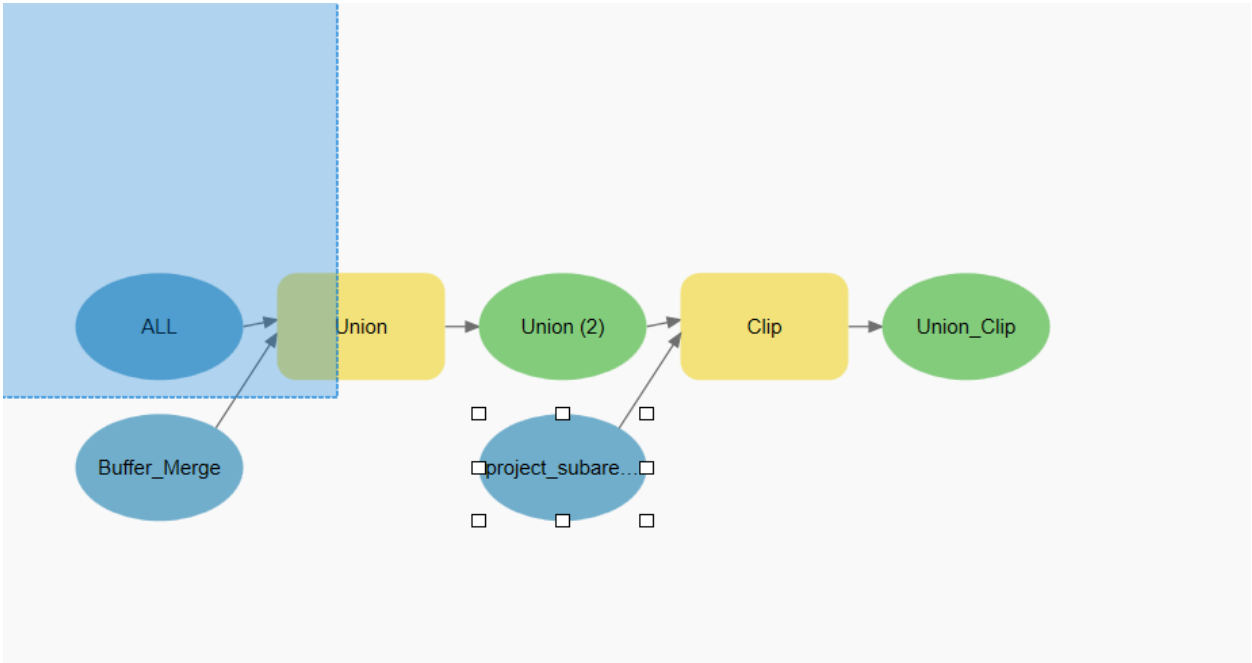

Add Field
This tool modifies the Input Table
Parameters
Environments
Properties
Input Table
Buffer_Merge
Field Name
Zone
Field Type
Text
Field Length
Field Alias
Field supports null values
Field is required
Field Domain
OK
uffer_Merge
Add Field

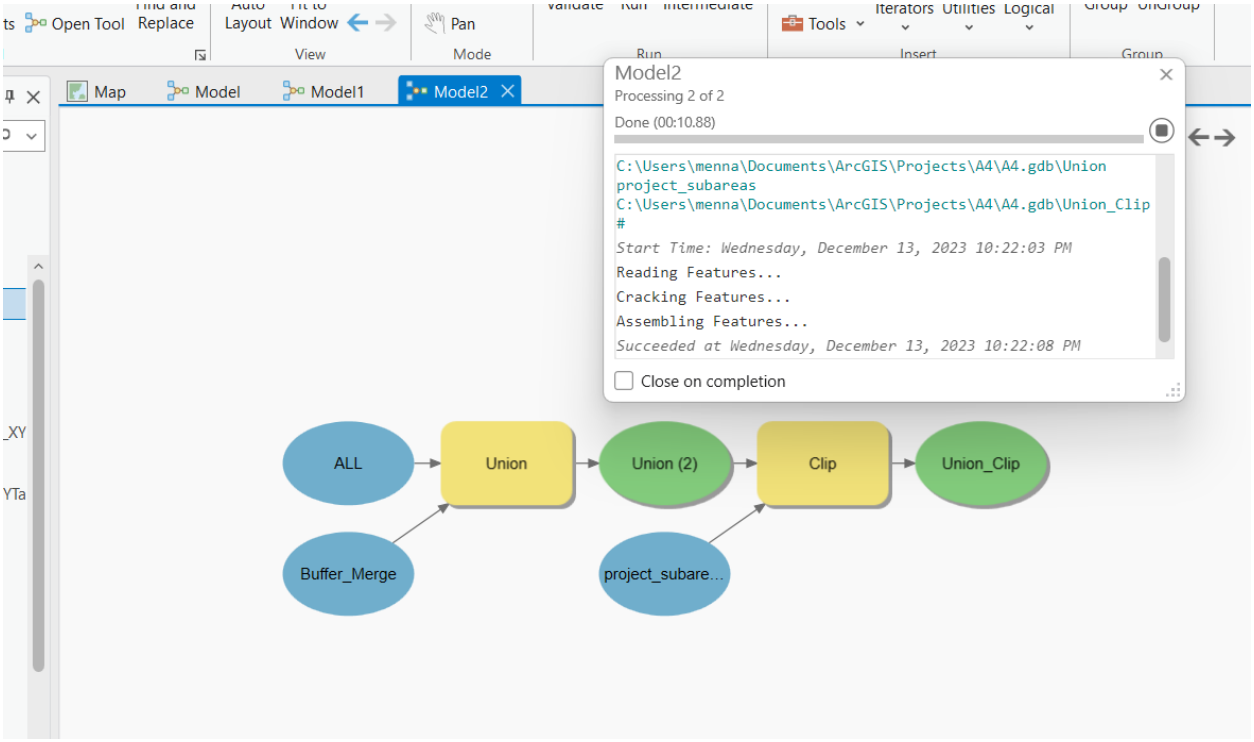

Calculate Field
Updated Input Table (2)
main_wadis
Buffer
main_wadis_B...
less_favorable...
Merge
Buffer_Merge
Add Field
Buffer_Merge (2)
less_favorable... (2)

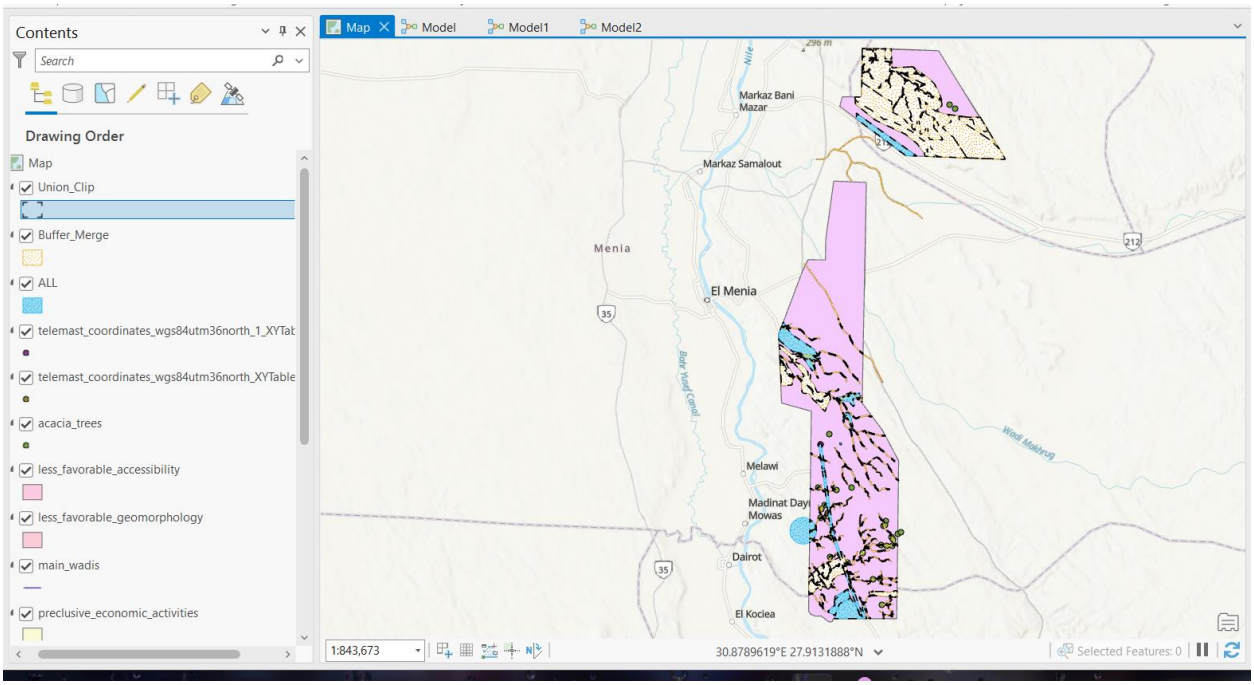
Exercise 3: Integrating a model within a model Create a tool to obtain a feature class with all preclusive & unfavorable areas:

- Overlay the Output Datasets of both previous models using the tool “Union”
- Clip the Union Output Dataset to the “project_subareas”
- Add the result to Display






Open Tool
Replace
Layout
Window
Pan
View
Mode
Tools
Iterators
Utilities
Logical
Insert
Map
Model
Model1
Model2
Model2
Processing 2 of 2
Done (00:10.88)
C:\Users\menna\Documents\ArcGIS\Projects\A4\A4.gdb\Union
project_subareas
C:\Users\menna\Documents\ArcGIS\Projects\A4\A4.gdb\Union_Clip
#
Start Time: Wednesday, December 13, 2023 10:22:03 PM
Reading Features...
Cracking Features...
Assembling Features...
Succeeded at Wednesday, December 13, 2023 10:22:08 PM
Close on completion
ALL
Union
Union (2)
Clip
Union_Clip
Buffer_Merge
project_subare...


Contents
Search
Drawing Order
Map
Union_Clip
Buffer_Merge
ALL
telemast_coordinates_wgs84utm36north_1_XYTat
telemast_coordinates_wgs84utm36north_XYTable
acacia_trees
less_favorable_accessibility
less_favorable_geomorphology
main_wadis
preclusive_economic_activities
Map
Model
Model1
Model2
Markaz Bani Mazar
Markaz Samalout
Menia
El Menia
Melawi
Madinat Dayr Mowas
Dairot
El Kociea
1:843,673
30.8789619°E 27.9131888°N
Selected Features: 0