# The Road Processing Goes on Forever

Transportation Corridor Grading Automation with Python

Presented by:

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# Introductions









Generating Actionable Data Automating with Python Using ArcGIS Online

## Workflow

- Overlay proposed ROWs on top of data sets and count, measure, and estimate
- Enter the data into a spreadsheet with formulas
- Relay results to clients and stakeholders

## Issues:

- Very tedious and error-prone
- SPREADSHEETS
  - Fragile data storage
  - No real visuals or analytics to explain results
  - Easy to get multiple versions
- All data and results are basically thrown away when new possibilities come up or data changes





### Source the data

Acquire the relevant datasets

What is required to generate

 FEMA Floodplains, Parcel Data, Building Footprints, etc

## Manipulate the Information

 Determine which geoprocessing tools will be used

## Understand the needs



Using ArcGIS Online

## Benefits of Python

- Allows for iterative logic tools (for/while loops, if statements)
- Allows for inclusion of functions available in other
   Python Libraries (os, numpy, re, etc)
- Easily Repeatable once script is written

## ArcGIS Notebooks

- Built off Jupyter Notebooks
- Able to run Python Code
   within ArcGIS Pro Project
- Easily Shareable

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Generating Actionable Data Automating with Python

# Creating the Suitability Matrix

- Worked with engineering team to create grading ranges for each dataset that was manipulated
  - 50 homes displaced was a 1, while 5 homes displaced or less was a 5
- Summarized and weighed scores
- Final Values were both assigned to Route feature and Excel output

Western Caldwell County Transportation Study Alternatives Evaluation Criteria Data											
	Weight	Yellow	Red	Purple	Blue	Green	Light Blue	Gray	Maroon	Pink	Orange
Mobility/Engineering											
Route Length (mi)	3	9.49	9.96	10.16	8.39	11.10	10.19	10.22	9.59	9.79	7.95
Western Terminal	5	4	5	5	2	4	5	5	4	4	1
Eastern Terminal	5	2	5	5	1	5	5	5	4	5	2
Land Use											
Parcels Impacted	3	90	119	107	38	156	121	95	99	117	28
Residential Displacements	5	5	32	2	6	56	6	2	1	16	4
Commercial Displacements	5	0	1	0	0	20	0	0	0	2	0
Other Displacements	4	2	4	1	3	3	2	1	1	6	0
Number of railroad crossings	3	1	0	0	0	0	1	0	1	1	0
Prime Farmland Impacted	3	190.40	230.85	238.35	114.57	247.42	239.25	244.93	174.92	219.20	170.53
Impacts to Fire Departments	2	0	0	0	0	0	0	0	0	0	0
Number of Roadway Crossings	2	9	13	14	9	28	13	11	18	17	7
Environmental											
Archaeological & Historic Resource Pr	3	3	4	6	1	7	5	4	5	3	0
Impacts to Petroleum Storage	3	0	0	0	0	2	0	0	0	0	0
Stream Crossings (#)	3	8	10	11	13	10	10	12	9	11	9
Wetlands impacted (acres)	4	2.95	1.35	1.67	6.00	1.60	4.46	2.14	3.52	4.47	3.24
Waterbodies impacted	4	1.72	0.00	0.26	3.28	0.17	0.41	0.32	2.22	0.26	0.93
Floodplains/Floodways (acres)	4	21.41	30.21	29.28	42.07	42.09	44.42	31.64	23.59	44.17	49.53
Utilities											
Oil/Gas Pipeline crossings	2	6	6	6	2	6	6	6	6	6	3
Transmission power line crossings	3	2	3	4	3	5	6	3	4	2	2

Using ArcGIS Online

# • Pushing to AGOL

- Encountered issue with trying to automatically publish results to AGOL
  - Dashboards and other applications would break if we overwrote the published feature
- Used Delete and Append functions to keep Dashboards online
  - Written into the script no manual effort needed



# ArcGIS Online

Mapping and analysis: location intelligence for everyone

Generating Actionable Data

**Final Solutior** 

Using ArcGIS Online

# • Viewing our Results

- Dashboard
  - Provided way to visualize both routes, data used, and results all in one page
- Public Engagement App
  - Built off Crowdsource Reporter tool
    - Provided opportunity from public to provide feedback on possible routes and view grading



# Conclusion

### **Results and Benefits**

- Increased efficiency and accuracy of data
- Repeatable solution that provides an easier way to consume the results
- Utilize our skills and introduce new ideas to our organization
- Collaborate with our partners and clients to better understand their needs

# QUESTIONS?

# Contacts

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