



# Improving Assessments Using Python and ArcGIS for Server

Kevin Sadrak, GISP  
Prince William County  
GIS Department



# Overview

The GIS Department created two custom tools.

1. Calculate RPA and FEMA 100 Year Flood areas in a parcel.
2. Calculate zoning areas for split parcels.

The tools are run from the web and they use ArcGIS Server Geoprocessing for the calculations.



# Background

- Started with a simple question and a conversation
- Previously a manual process for both RPA / FEMA boundary acreages and for split zoning.
- First iteration of each tool was created in ~45 minutes



# What makes it work?

- Python
- ArcGIS Server
- ArcGIS Javascript API
- SDE Archiving





# The Web Application RPA / FEMA Calc

SELECT A HISTORICAL VERSION OF  
THE RPA DATA.

CURRENT-DEFAULT

TYPE GPIN(S) OR DRAG A FILE  
WITH GPINS INTO THE INPUT  
BOX.

CALCULATE!

FOR QUESTIONS PLEASE EMAIL:  
[KEVIN SADRAK GIS DEVELOPER](mailto:kevin.sadrak@princewilliam.gov)

#### FEMA RPA Intersect and Union Areas

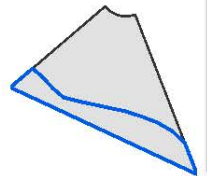
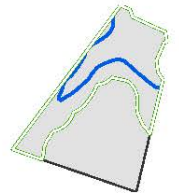
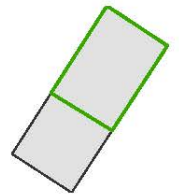
-  RPA and FEMA Area
-  RPA Area
-  FEMA Area
-  Original Parcel

GPIN 8293-56-7144  
0.0606 FROM GIS ACRAGES TOTAL ACRES  
0.037 TOTAL COVERED RPA AND/OR FEMA

GPIN 8293-56-9291  
0.0379 FROM GIS ACRAGES TOTAL ACRES  
0.034 TOTAL COVERED RPA AND/OR FEMA

GPIN 7991-74-9341  
9.0596 FROM GIS ACRAGES TOTAL ACRES  
4.725 TOTAL COVERED RPA AND/OR FEMA

GPIN 7992-40-0820  
2.0069 FROM GIS ACRAGES TOTAL ACRES  
0.626 TOTAL COVERED RPA AND/OR FEMA



PROCESSING STATUS: COMPLETE!



# The Web Application Split Zone Calc

TYPE OR DRAG A FILE WITH  
GPINS INTO THE INPUT BOX.

**CALCULATE!**

FOR QUESTIONS PLEASE EMAIL:

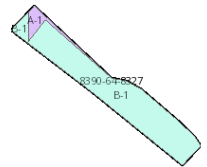
- [KEVIN SADRAK](#)
- [CHRIS WATT](#)

8390-64-8327 0.5876 ACRES

ZONING CASE: REZ1958-0143

**ZONING TYPE A-1:** 0.0425ACRES / 1856.9550FT<sup>2</sup>

**ZONING TYPE B-1:** 0.5451ACRES / 23791.7894FT<sup>2</sup>



PROCESSING STATUS: COMPLETE!



# The Script

- Out of the box modules
  - arcpy, base64, sys, os, json, and traceback

```
arcpy.AddMessage("Total Area of Parcel {1} by Shape: {0}".format(acresOfParcel,row[1]))  
    arcpy.AddMessage ("Total Area of Parcel by DEED_ACREAGE field:  
{0}".format(row[2]))  
    arcpy.AddMessage(" ")  
    if rpaExist:  
        if not row[0].disjoint(rpaFeature):  
            intersectedRPA = rpaFeature.intersect(row[0],4)  
            insertPoly.insertRow([intersectedRPA,"rpaInter"])  
            intersectedRPAAcres=intersectedRPA.getArea(units="ACRES")  
            #get the % difference bewtween the shape insertsect acres, apply that  
to the real acreages  
            percentChangeRPA = intersectedRPAAcres / row[0].getArea(units="ACRES")  
            arcpy.AddMessage("percent change: {0}".format(percentChangeRPA))  
            jsonOutput[row[1] + " " +str(acresOfParcel)][ "RPA" ] = {}
```



# What does it do?

## RPA / FEMA

- Takes a list of PWC GPINs
- Intersects with the RPA and the FEMA Polygons
- Calculates the percent covered by the respective polygons.
- Converts the percentage to the area based on the acreages held by the assessment office.
- Show the users all the values and a map of the results





# What does it do?

## Zoning

- Takes a list of PWC GPINs
- Intersects with the Zoning areas
- Calculates the percent covered by the respective polygons.
- Converts the percentage to the area based on the acreages held by the assessment office.
- Show the users all the values and a map of the results



# How does it work?

## RPA / FEMA

- The user enters a list of GPINS
- Web site calls the Geoprocessing Task (GP)
- THE GP Task performs the calculations
- GP returns back a JSON response with all the calculations
- The web site goes through the returned list and creates the output display
- Historical data is fed by a custom python web page that queries the \_H table of the archive table for the unique dates. The response is in JSON format



# How does it work?

## Zoning

- The user enters a list of GPINS
- Web site calls the Geoprocessing Task (GP)
- GP returns back a JSON response with all the calculations
- The web site goes through the returned list and creates the output display



# What else does it do?

- One of the inputs allows the users to see the historical RPA areas.
- The output results link directly to our CountyMapper web application.



# Where can this go?

- Full automation
- Any other input layer assessments uses could be calculated
- Integration with our Watershed department to show why RPA areas have changed. A changelog display.
- Notification to the user of historical changes



# Demonstration





# Questions

Kevin Sadrak, GISP

ksadrak@pwcgov.org

<http://pwcgov.maps.arcgis.com/home/index.html>