MD Phase 6 Land-Use Development

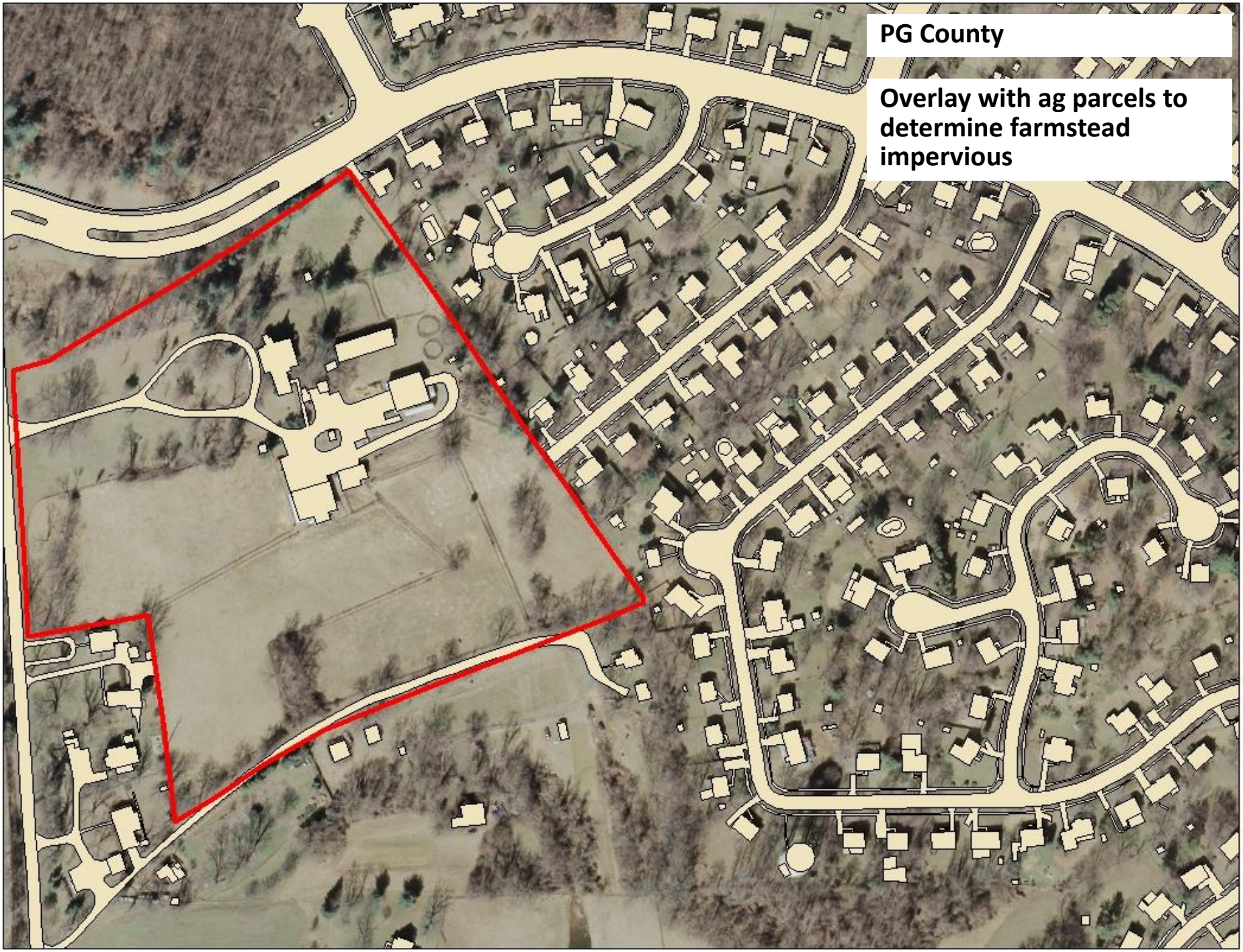
- By October, 2015 MD will have estimates for:
  - Impervious surfaces
    - Roads, Other developed, and farmstead
  - Tree Canopy
  - Forest
  - Wetlands
    - Tidal, floodplain, and headwater
- By October 2015, MD hopes to have estimates for:
  - Turf grass

MD Phase 6 Land-Use Development

- Guiding principle
  - Leave accuracy of data from local jurisdictions intact and build off
    - Most accurate data available
    - Build by-in for model from local jurisdictions
- Data similar among groups of counties, but differs among groups
  - Different methods/county, based on specific data
- Most important LU to get “correct” in Phase 6 model:
  - Impervious surface
  - Why?
    - MS4 permitting implications
- County impervious surface data:
  - 2005-2011 condition planimetric data
    - Leave data in tact for 2005-2011
    - If missing certain impervious features, compliment
    - Project to Phase 6 baseline: 2012

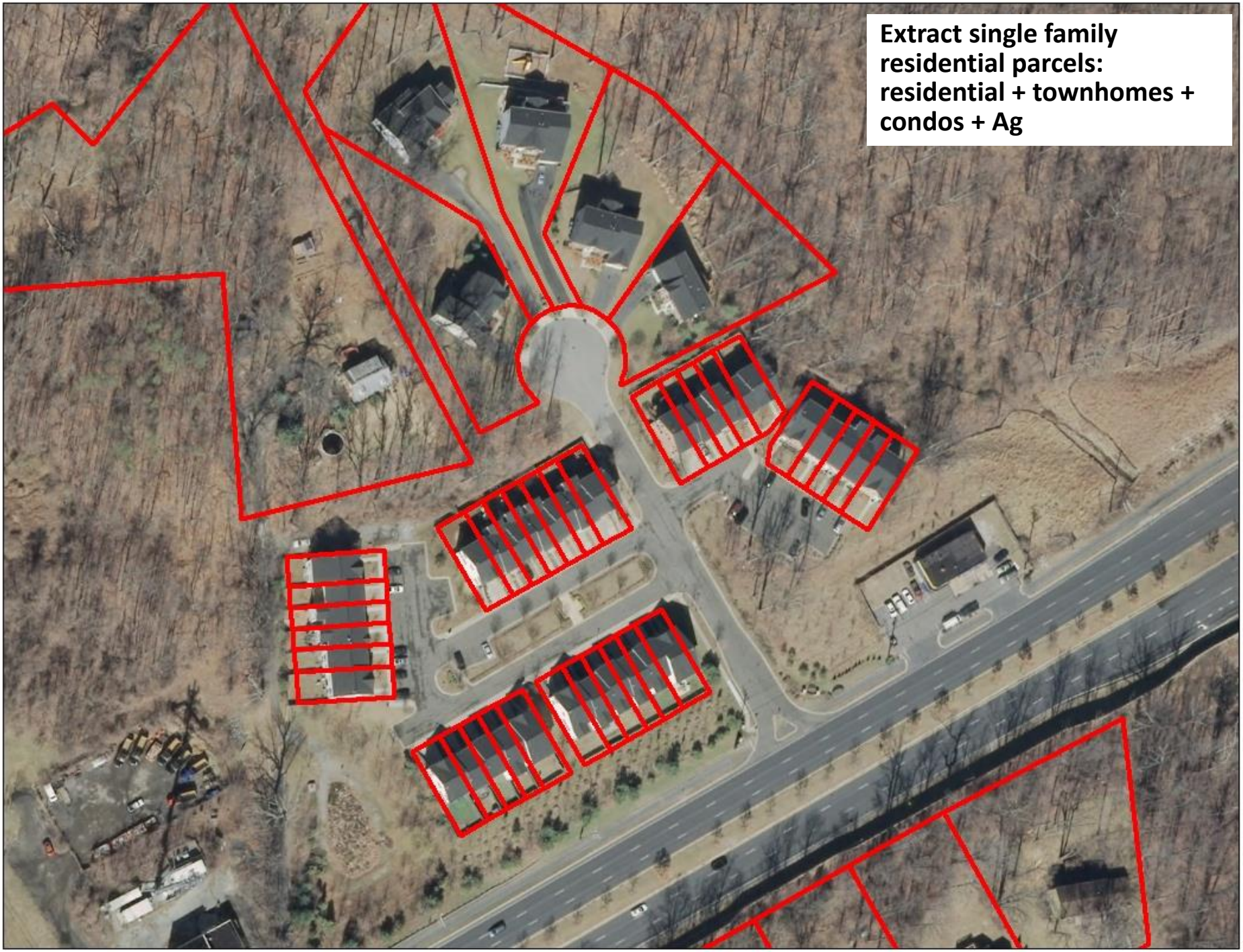

PG County

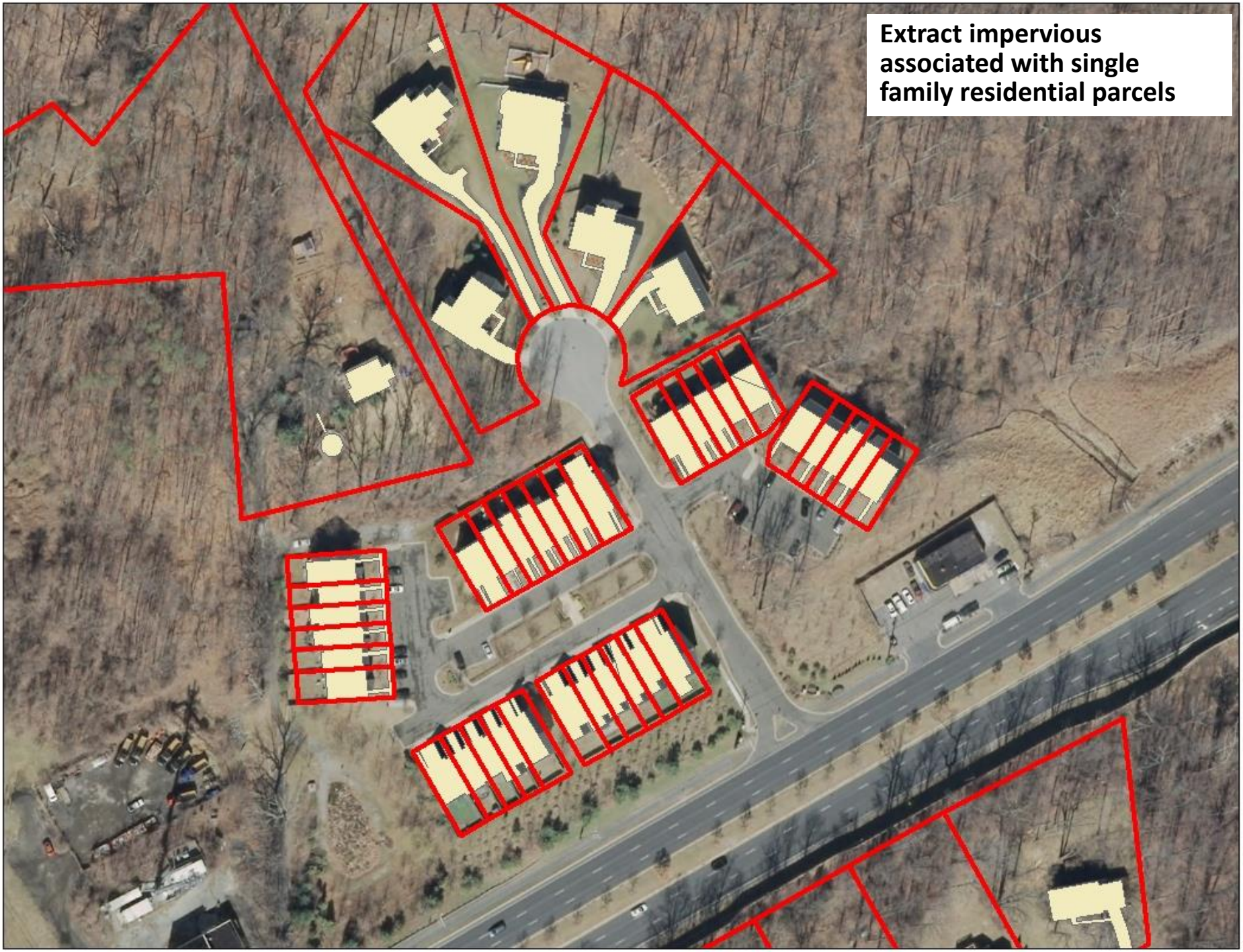

PG County
Complete planimetric impervious dataset: 2008

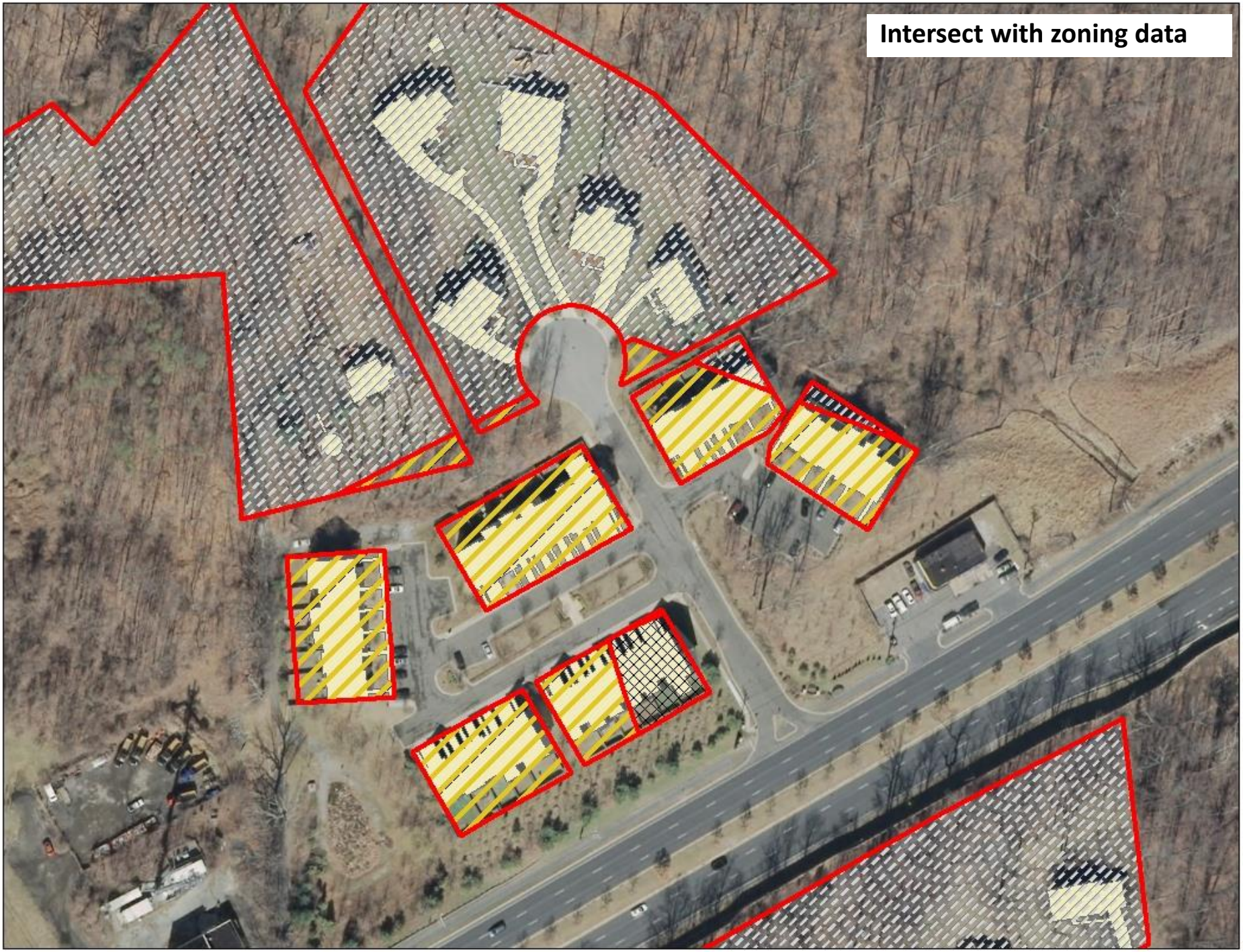

PG County
Overlay with ag parcels to determine farmstead impervious

Prince George's County

- Complete planimetric impervious surface dataset: 2008
- Need to get to 2012 conditions
- Best available data
  - # of single family residential parcels developed between 2008-2012 (MDP tax assessment data)
- Method
  - Calculate % impervious for developed, residential parcels in 2008
  - Project to 2012 based on increase in developed, residential parcels
  - Account for increase in impervious surface associated with roads
    - Road:parcel impervious, 2008
  - Account for growth in non-residential development
    - Non-residential:residential growth, 2002-2010
    - Non-residential % impervious


Extract single family residential parcels: residential + townhomes + condos + Ag


Extract impervious associated with single family residential parcels


Intersect with zoning data

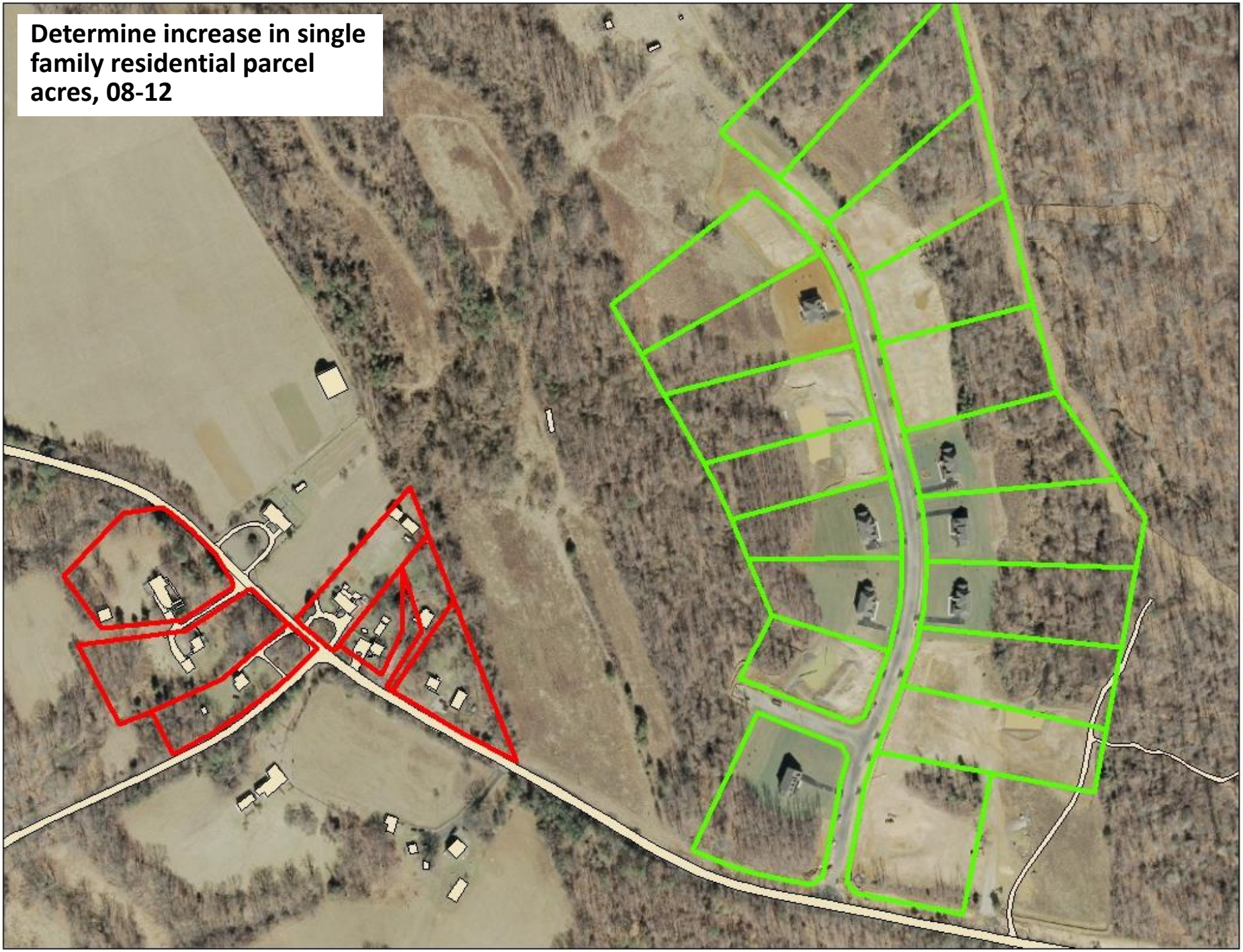
Impervious Coefficients

- % impervious, 2008
- % impervious/residential parcel type/zone
- Impervious varies by type of parcel and by zone

County	Residential Parcel	Zone	Total Acres - 2008	Impervious Acres - 2008	Impervious %
Prince George's	Residential	LOW DENSITY RESIDENTIAL	21734.69250890000	3978.58396175000	18%
Prince George's	Residential	MEDIUM DENSITY RESIDENTIAL	22040.23107730000	5379.899084	24%
Prince George's	Residential	MIXED USE	219.35324687200	49.70758244470	23%
Prince George's	Residential	MUNICIPALITY	109.80234018900	28.16596652450	26%
Prince George's	Residential	VERY LOW DENSITY RESIDENTIAL	5748.08797694000	594.65809880500	10%
Prince George's	Town Home	LOW DENSITY RESIDENTIAL	182.01933818600	88.33898789940	49%
Prince George's	Town Home	MEDIUM DENSITY RESIDENTIAL	818.14253235700	391.44293907400	48%
Prince George's	Town Home	MIXED USE	7.40895096378	4.48023035433	60%
Prince George's	Town Home	MUNICIPALITY	46.36661304490	22.24100925030	48%
Prince George's	Town Home	VERY LOW DENSITY RESIDENTIAL	11.26708238490	6.13286959493	54%

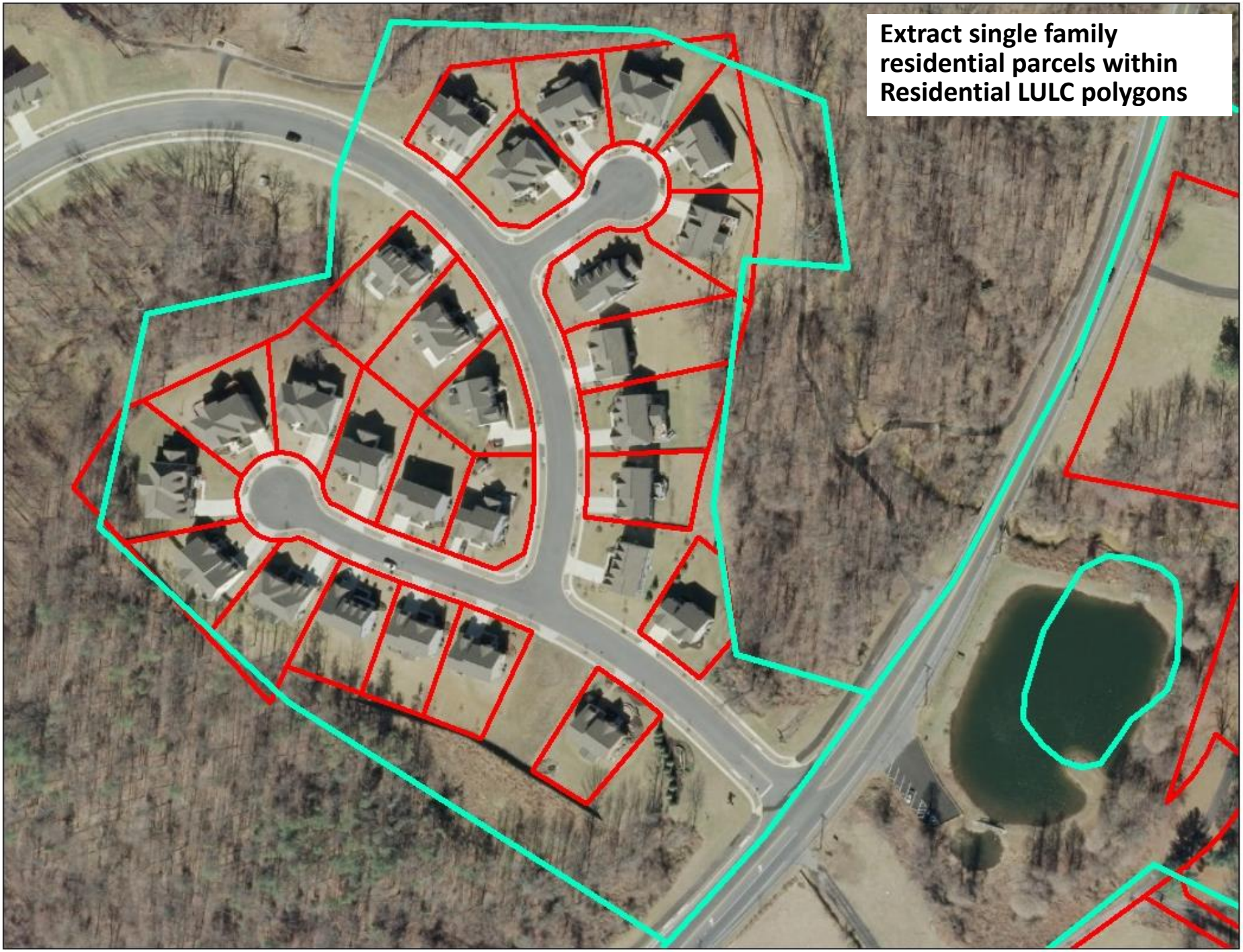
Residential Parcel Impervious 2012

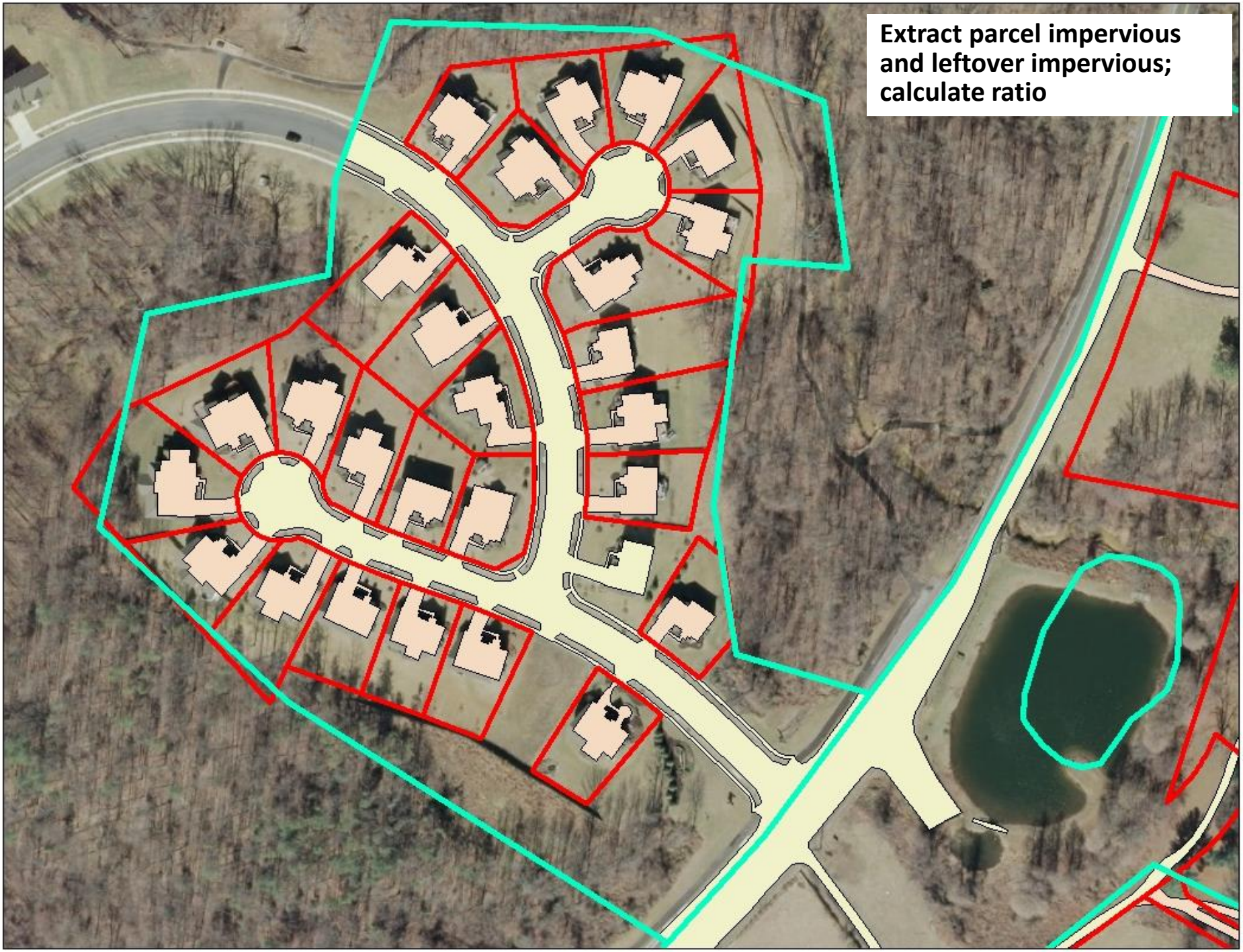
- Query number of single family residential parcels built between 2008-2012
- 2012 parcel imp. = (Δparcel acres, 08-12) x (imp. %)
  - Where,
    - Δparcel acres, 08-12 = increase in single family residential parcel acres/parcel type/zoning category
    - Imp. % = impervious coefficient/parcel type/zoning category

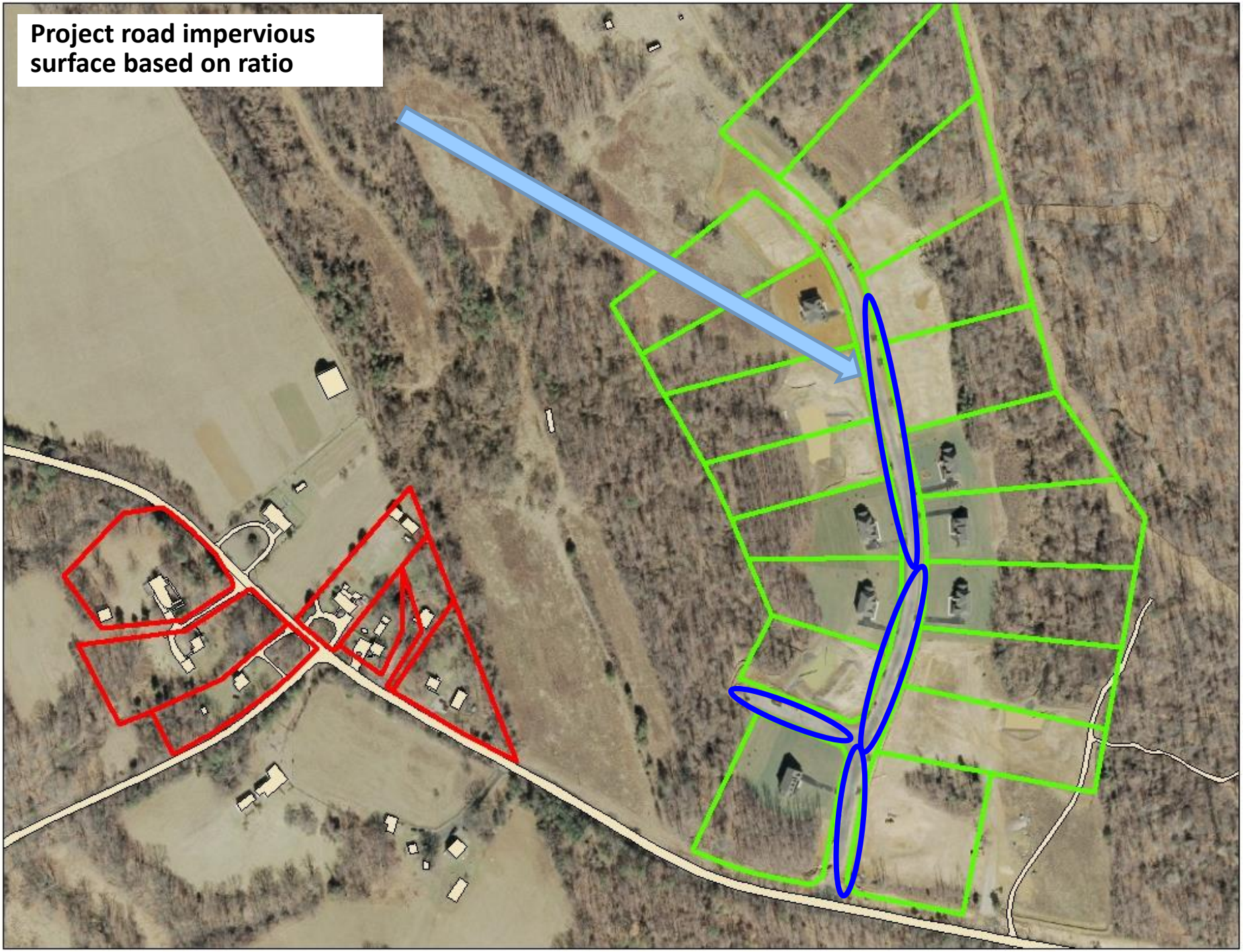

Determine increase in single family residential parcel acres, 08-12

Estimate Road Impervious

- Issue:
  - Parcel impervious coefficients do not account for impervious surface associated with roadways
- Solution:
  - Within MDP residential LULC polygons, calculate ratio of residential parcel impervious to leftover impervious
    - Leftover = roads
    - i.e., parcel imp. acres/leftover imp. acres


Extract single family residential parcels within Residential LULC polygons


Extract parcel impervious and leftover impervious; calculate ratio


Project road impervious surface based on ratio

MDE Maryland Department of Planning

Estimate Non-residential Impervious

Historic Trends			
	Acres		
MDP Land-Use	*2002*	*2010*	*Δ2002-2010*
Low Density Residential	23,522	26,349	2,827
Medium density Residential	49,841	53,261	3,421
High Density Residential	12,985	13,759	773
Commercial	8,942	9,662	720
Industrial	7,762	8,424	662
Institutional	13,639	14,265	626
Open Urban	7,379	7,386	7
Large Lot Agriculture	1,701	1,943	242
Large Lot Forest	7,739	8,698	959
Residential Totals	95,787	104,010	8,223
ΔResidential/ΔCommercial			11
ΔResidential/ΔIndustrial			12
ΔResidential/ΔInstitutional			13
ΔResidential/ΔOpen Urban			1,264

1. Calculate long term trend ratio, residential/non-residential development

2. Apply ratio to increase in single family residential parcels built, 08-12

Land-River Segment	ΔResidential Parcel Acres	ΔCommercial Acres	ΔIndustrial Acres	ΔInstitutional Acres	Δopen Urban Acres
A24033PL0_4510_0001	1.946377833	0.176943439	0.162198153	0.149721372	0.001539856

County	Land-Use	Total Acres	Impervious Acres	Impervious %
Prince George's	Commercial	9,476	5,676	59.90%
Prince George's	Industrial	8,370	4,324	51.66%
Prince George's	Instiutional	14,076	5,014	35.62%
Prince George's	Open Urban	7,297	676	9.27%
Notes				
Total Acres do not include residential parcel area				

3. Calculate impervious coefficient for non-residential parcels, 2008 planimetric impervious data

4. Apply coefficients

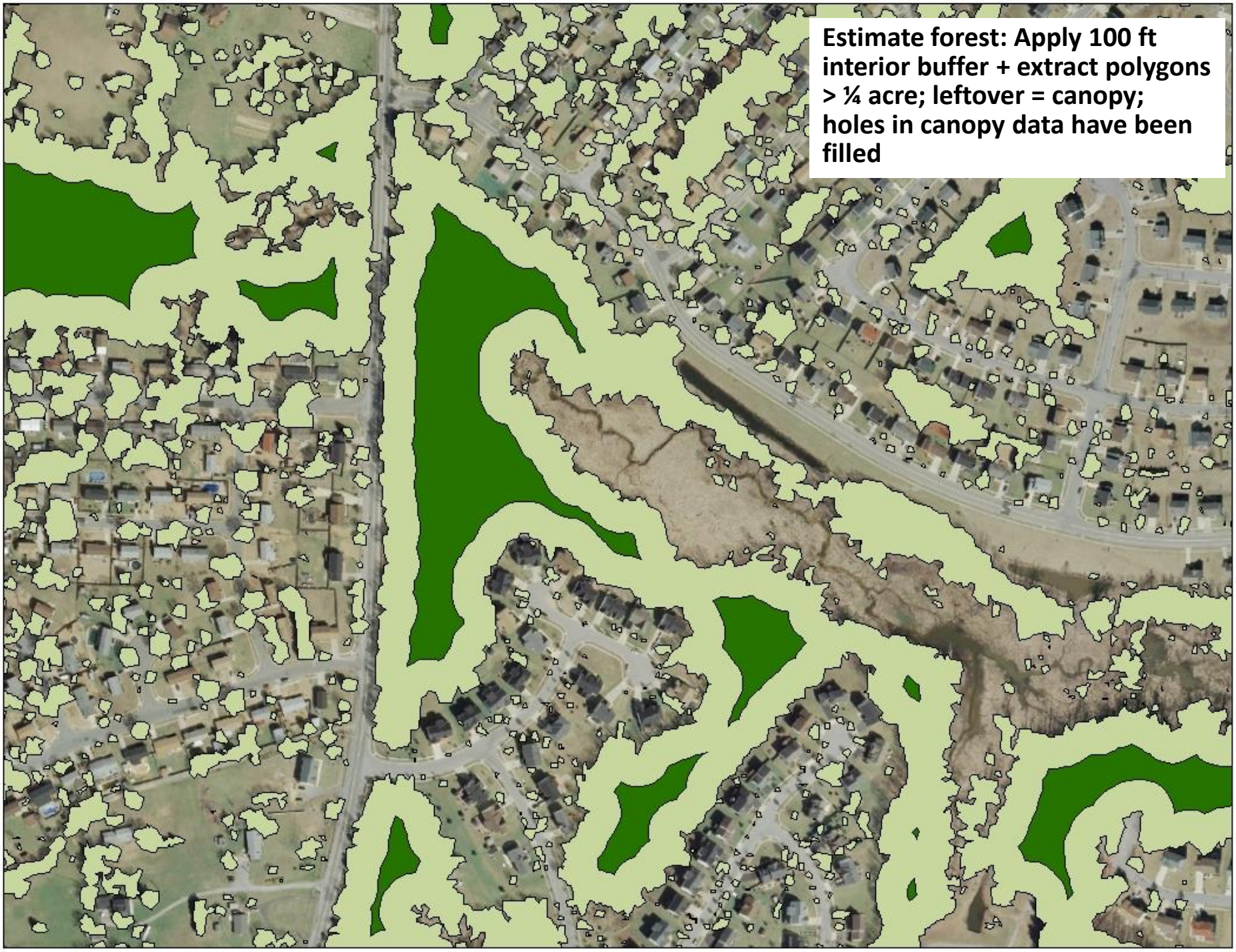
ΔCommercial Impervious Acres	ΔIndustrial Impervious Acres	ΔInstitutional Impervious Acres	ΔOpen Urban Impervious Acres
0.105281346	0.083791566	0.053330753	0.000142745

Forest/Canopy

- Forest definition
  - ¼ acre minimum size
  - 100 foot interior buffer
- Rationale
  - Maryland DNR Forest service
  - MDE stormwater and wetlands programs
- Canopy definition
  - Leftover canopy cover
- Data
  - UMD 2013 statewide 1 m canopy cover and local jurisdiction data
- Spatial intricacies
  - Covert to polygons
    - Why? Because of criteria
  - Aggregate polygons – fill holes in canopy (areas are really forest)
  - Treat forest edge as canopy


PG County Example


Statewide 1 m canopy cover


Estimate forest: Apply 100 ft interior buffer + extract polygons > ¼ acre; leftover = canopy; holes in canopy data have been filled

Wetlands

- Following Quentin's methods
- Data
  - NWI data
  - MD DNR data
  - DFIRMs
- Classes
  - Tidal
  - Floodplain
  - Headwater