

Table of Contents

The 2020 Urban Area Smoothing Process ..... 2

    Setting up the Map ..... 2

    Identify Qualifying Urban Blocks ..... 2

        Creating the density layers ..... 2

        Identifying the qualified urban blocks: ..... 2

    Smoothing -or- Expanding: ..... 3

        Under-Representation of urban landscapes:..... 3

        Taking a Closer Look ..... 4

The MPO Planning Area (MPA) 25 Year Growth Considerations ..... 7

**APPENDIX A**..... 8

    § 450.312 Metropolitan Planning Area boundaries. .... 8

    Excerpt from: *www2.census.gov/geo/pdfs/reference/ua/Census\_UA\_2020FAQs.pdf* ..... 9

    Federal Register / Vol. 87, No. 57 ..... 9

    Elmore County CAMA map examples ..... 10

## The 2020 Urban Area Smoothing Process

### Setting up the Map

We will need to gather several Census geography features: Census geography boundaries; as well as Places, Pri/Sec Roads, All Roads, 2010 and 2020 Urban Area (UAC); and we will need Population tables and Housing data tables. It would be wise to include the Edges feature class from the Census as well as PLSS lines.

See Appendices for documents (or excerpts thereof) regarding the details on the Smoothing Process. In general we will start with the current Urban Areas and smooth/bridge the jagged areas based upon significant roadways, waterways municipal boundaries and other geographic or governmental boundaries, while paying attention to the Pop or Housing densities.

### Identify Qualifying Urban Blocks

Creating the density layers, we need to first calculate the land base of Census Blocks into Sq.Mi. Per the USCB, the ALAND field is to be used for density calculations. This field is natively stored in Sq. Meters. Therefore you need to multiply the **ALAND20** field by a factor of: **0.0000003861** Next we will need the data tables for Total Population, and Total Households.

square meters  $\times 3.861\text{E-}7$  = square miles  
 $6813086 \times 0.0000003861 = 2.6305325046$

To calculate the densities for each of the blocks we first calculated the Land Area in SqMi. Then, to calculate the Density, the formula will be  $\text{POP} \times 1/\text{SqMi}$  ;  $\text{HH} \times 1/\text{SqMi}$ . Or, Simply  $\text{POP}/\text{CalcSqMi}$  ;  $\text{HH}/\text{CalcSqMi}$ . If you prefer to work without intermediary fields the formula would be simply:  $\text{POP} / \text{ALAND20} \times 0.0000003861$ .

Population Density and Housing Density were calculated for each census block within Autauga, Elmore, and Montgomery counties. After the Density fields were calculated, we were able to select for Blocks that met the criteria for urban inclusion.

- Number of Blocks with POP Density  $\geq 5000$  = 891
- Number of Blocks with HH Density  $\geq 2000$  = 1092
- Number of Blocks with **Either** a **POP Density  $\geq 5000$** , or **HH Density  $\geq 2000$**  = **1343**
  - POP Density  $\geq 5000$  & HH Density  $\geq 2000$  = 640 – Made the cut based upon both POP & HH
  - HH Density  $\geq 2000$  & POP Density  $< 5000$  = 452 – Made the cut based solely upon HH
  - POP Density  $\geq 5000$  & HH Density  $< 2000$  = 251 – Made the cut based solely upon POP

Identifying the qualified urban blocks: In our Tri-County region, more census blocks qualified by their housing density rather than by their population. Of the 1343 qualified census blocks, 640 (48%) qualified as urban by both their population as well as their number of households. 452 (34%) did not have enough population to qualify, But did have a sufficient number of households to qualify. 251 (19%) qualified with sufficient population, even though their number of households were below the minimum threshold. The minimum household (HH) size found among these 251 blocks is 2.6; and the median HH size is 3.4 ppl/HH. At the minimum household threshold of 2000 an average HH size of 2.5 ppl/HH would meet the qualifying population threshold. The findings above would indicate that an increase as small as just one person per HH over the 2.5 minimum is enough to push population into the qualifying range even with an insufficient number of households.

Below, in Figure 1, you can see the highlighted (*magenta*) census blocks that meet the new criteria to be identified as Urban. Most surprising insight from these results was that while Wetumpka is well represented within the blocks that meet new urban criteria, the Census Bureau did not include this area in its 2020 UAC delineation. Wetumpka is well established, and was included in the 2010 UAC (*fig.2*).

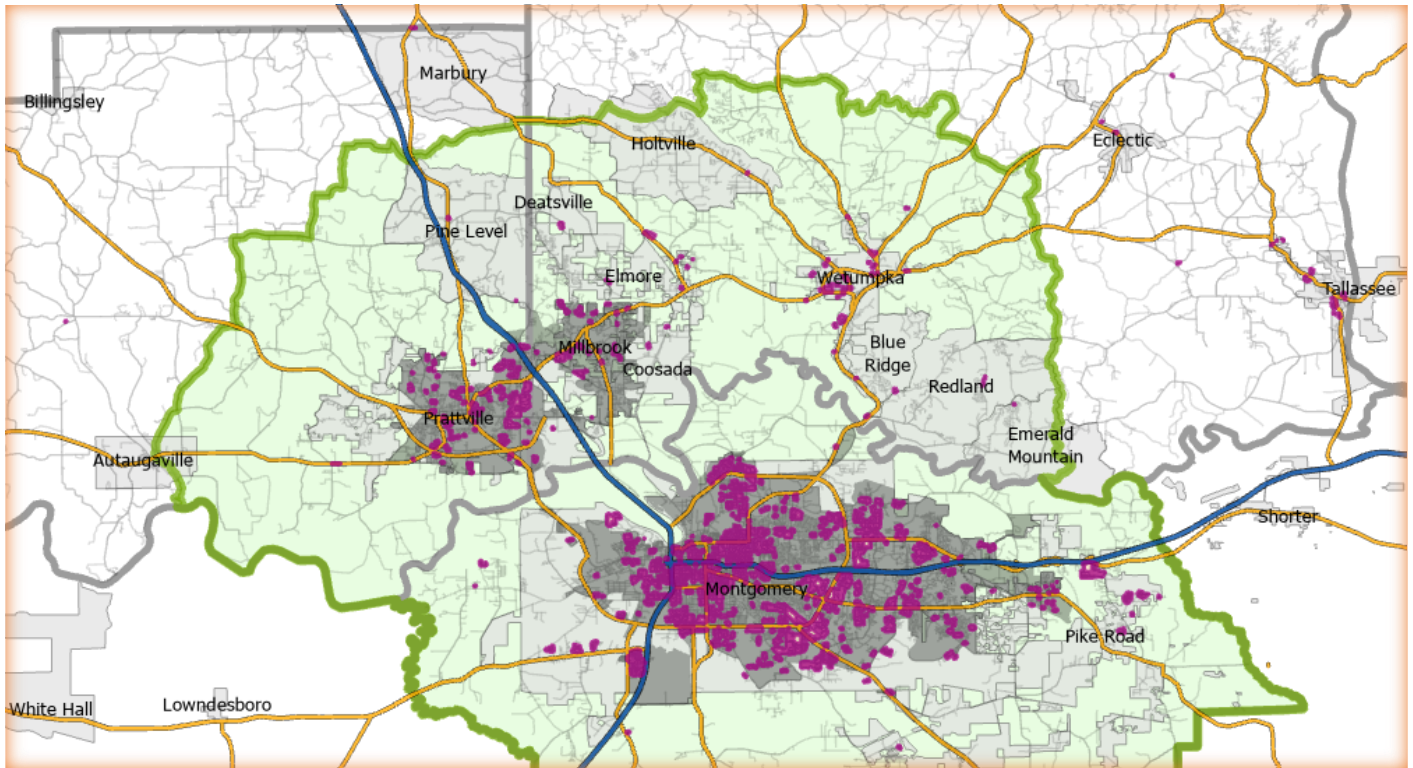


Figure 1. US Census Blocks that meet the criteria for the 2020 Urban Area; Shown within the current Montgomery MPO Boundary. Also shown is the Census UA2020 (dark grey shading)

## Smoothing -or- Expanding:

Our understanding of the Urban Smoothing task at hand, is to consider growth patterns and allow for areas of recent or expected urban growth over the next 10 years to be considered for inclusion within the smoothed 'Urban Core'. Montgomery and Autauga Counties were well represented within the Census identified urban area (UA). Therefore verifying areas we know to be growing with moderate housing density, and smoothing the 2020 urban boundary provided by the USCB was a fairly easy task. However, South Central Elmore County which had urban area per the 2010 census delineation, was not represented within the Census delineated 2020 UA.

Wetumpka has been well established for some time and has many census blocks that meet the 2020 guidelines, yet the Census did not pick any of those blocks up within their 2020 UA delineation, we are not sure why that is. As previously stated, Wetumpka is well established and has been for some time; and in recent years, the other 3 unincorporated communities of Blue Ridge, Redland, and Emerald Mountain have seen significant growth in housing developments. It is for these reasons, and the fact that some of this area was previously identified as urban, that we feel some consideration should be given to these areas and possibly represented in some manner within the smoothed Urban Area.

Under-Representation of urban landscapes: In looking over the landscape of southern Elmore County, we found that due to the irregularity and large size of many rural Census Blocks, areas that are built up with fairly

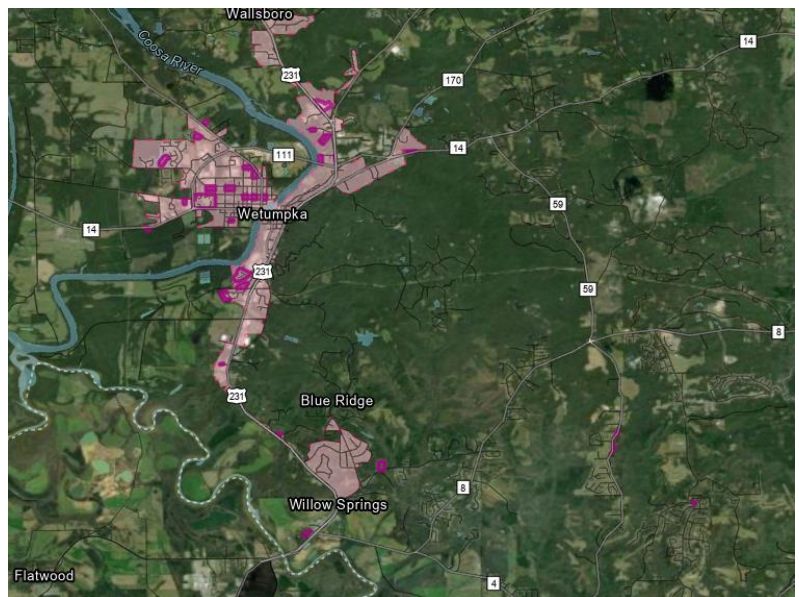


Figure 2. Census 2010 UA in the Wetumpka to Emerald Mountain region. Also seen are the 2020 Qualified Urban Census Blocks.

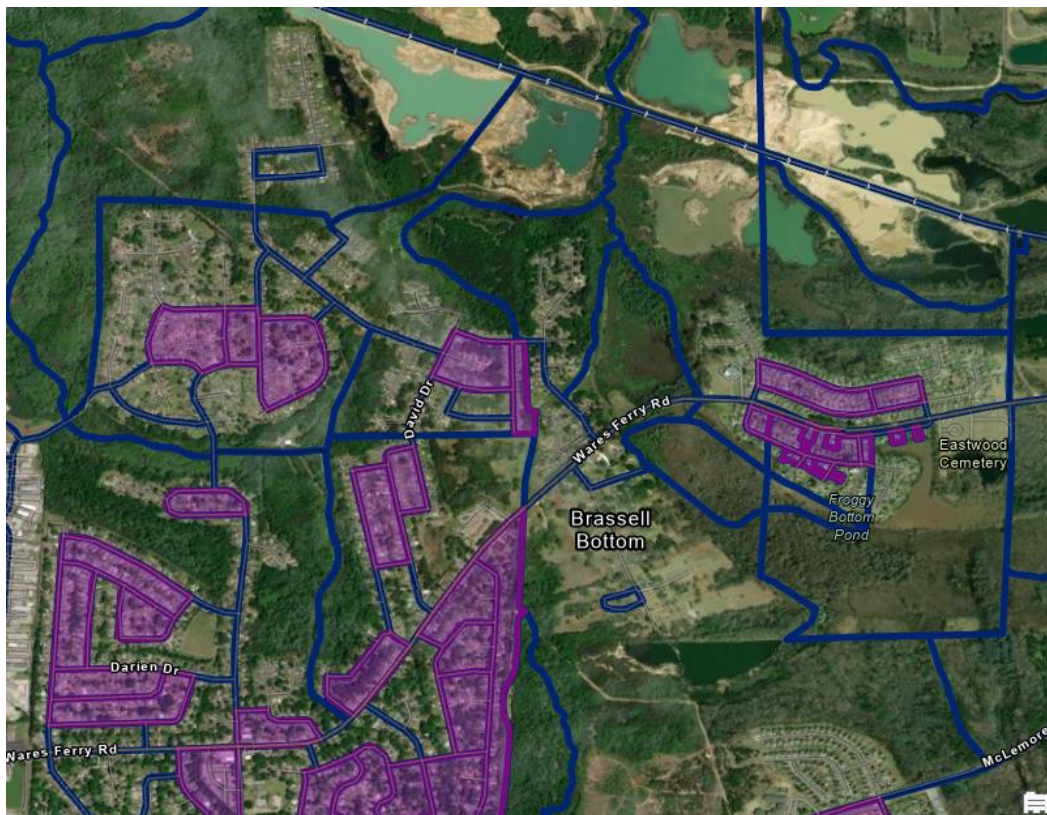


decent housing density were not identified as Urban by the Census Bureau, or our block density calculations. We found several instances where small internal census blocks were being identified as qualifying urban blocks, while the remainder of the development within the larger census block was not being identified as urban (*fig.3 and fig.4*). The undeveloped acreage within large census blocks appears to be diluting the density calculations such that these large blocks are not meeting the new urban qualifications. This same anomaly was seen repeated across all three counties. Clearly we need a better 'grid' for this operation than the greatly varying acreage of census blocks.



*Figure 3. Smaller internal blocks are being identified as qualifying urban blocks. But, large partially undeveloped Census Blocks that are being developed with fairly dense housing, are not being picked up as meeting the current urban qualifications due to the block size. The large agricultural or undeveloped acreage of the Census block dilutes the calculations of housing/population density. This Census block is along the north ROW of Chapel Rd, and just to the west of Wetumpka High School. The housing development is the Cotton Lakes.*

As seen in figure 3, the eastern half of the large census block would appear to be a qualifying urban development. The interior small blocks did meet the criterion, and were identified as urban. However, due to the size of the large outer block, and the undeveloped area it still contains, the largest portion of the Cotton Lakes development was not identified as urban.



*Figure 4. Another example of Under Represented Urban based upon Census Block delineation.*

Figure 4 shows another example of Under-Represented Urban landscapes. In this figure we shaded the interior of the blocks that were identified as urban so that it might offer a bit better view of what is not being identified.

Taking a Closer Look. Given the potential under-representation by qualifying entire census blocks, we chose to look at CAMA data, and



aerial imagery in the vicinity of the US 231 and Rifle Range Rd corridors from Wetumpka to Ware Rd; along the northeaster boundary of Montgomery County. Close examination was made in areas exhibiting a high density of parcel boundaries/Lot lines (*fig.5*). The following considerations guided our observations.

- Urban Qualifiers: 2000 Households/SqMi or 5000 People/SqMi
- **1 SqMi = 640 ac** ∴ For 640 ac to contain 2000 *s.f.* households/lots, lot size would have to be 0.32 ac on average. So any developments with  $\frac{1}{4}$  ac –  $\frac{1}{2}$  ac lots would meet the definition of Urban under the new guidelines. This is something we can test for.
  - An acre is defined as 1x10 chains or 66' x 660ft; which encompasses 43,560 SqFt
  - $\frac{1}{4}$  ac lots would be 10,890 sqft with dimensions like 66' x 165 ft or 75' x 145.2 ft or 90' x 121 ft
  - $\frac{1}{2}$  ac lots would be 14,520 sqft with dimensions similar to 66' x 220ft or 75' x 193.6ft or 90' x 161.3 ft.

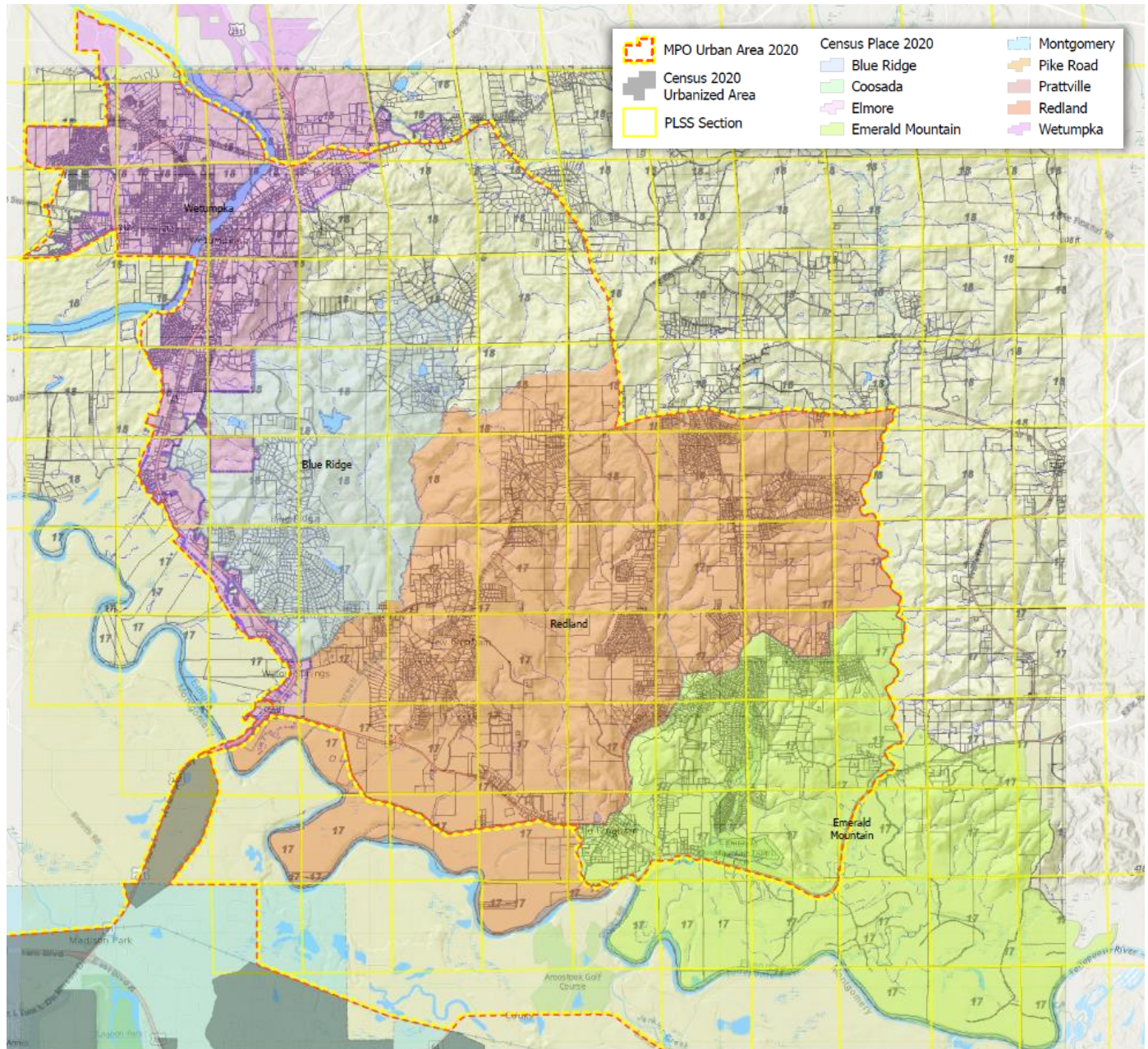


Figure 5. Elmore County CAMA Data exhibiting the relative densities of Housing developments laid within the context of the 2020 MPO Urban Smoothing exercise.

In Both Autauga and Elmore counties we saw a number of new development plans with lot sizes just on the cusp of the new guidelines for urban area qualification (*fig 6*). While still less than ½ ac lots, the average size is greater than the ⅓ ac lot size that marks the break point for urban density based upon Households. While these developments may not meet the threshold based solely upon lot size, these slightly larger lots may likely be occupied by 3 or more individuals as we saw in our earlier computations; and therefore would likely meet the qualification based upon population.

Having examined the lot sizes and aerial imagery, it is our recommendation that the CDPs of Blue Ridge, Redland, and Emerald Mountain, along with Wetumpka be included with our 2020 Urban.

SITE DATA	
TOTAL ACREAGE:	10.06 ACRES
TOTAL LOTS:	16
SMALLEST LOT:	0.40 ACRES
LARGEST LOT:	0.49 ACRES
LF OF STREET:	1,240 LF

Figure 6. Site Data box from a recent plat indicating the Size of the development, number of lots, and range of lot sizes.

Table 1, and Figure 7 below provide the resulting data regarding changes in land base and population between the 2010 and our recommended 2020 UA boundary shapes.

Table 1. A comparison of land base, housing, and population across the MPO Urban Territory; and between the 2010 & 2020 versions.

Region	Total Blocks Tri County 8792	HH	POP	Census Land SqMi	POP/SqMi	HH/SqMi
ELM	304	6,533	15,745	51.366995	306.5	127.2
AUT	1,415	27,401	67,697	91.692342	738.3	298.8
MGM	3,975	99,089	215,848	192.190846	1123.1	515.6
MPO Urban 2020	5,694	133,023	299,290.000	335.250184	892.7	396.8
MPO Urban 2010		N.A.	264,566.7675	290.911853	909.4	N.A.

Difference between 2010 & 2020	34,723	44	(17)
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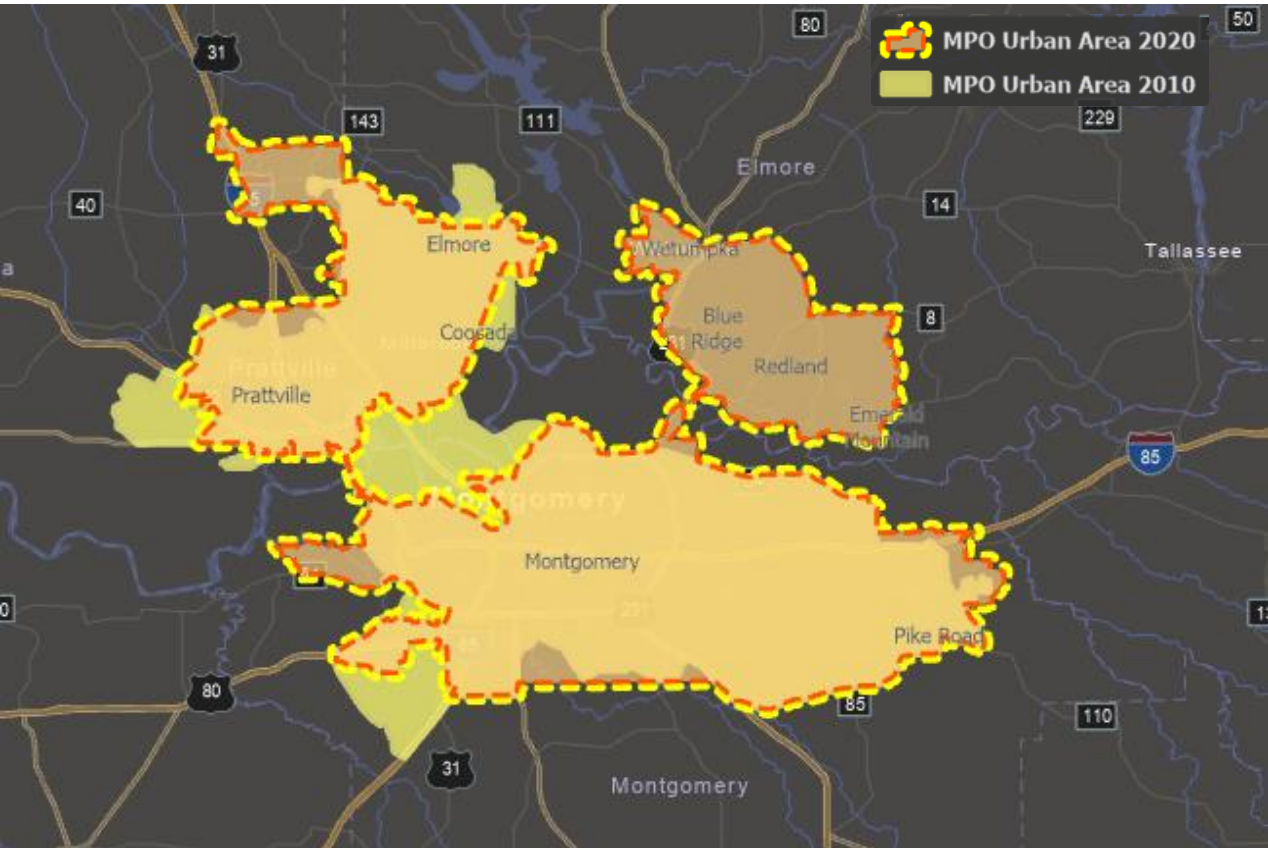


Figure 3. Our recommended 2020 urban boundary in comparison with the 2010 UA boundary.



## The MPO Planning Area (MPA) 25 Year Growth Considerations

Given the recent changes to the Urban Area delineations, and our work on this exercise to update the MPO Urban Core, It is our belief that the current Montgomery MPA Boundary (MPO - Study Area) looks to be sufficient for expected growth over the next 25 years. We have No Recommended changes at this time for our current MPA.

## APPENDIX A

### § 450.312 Metropolitan Planning Area boundaries.

- (a) The boundaries of a metropolitan planning area (MPA) shall be determined by agreement between the MPO and the Governor.
- (1) At a minimum, the MPA boundaries shall encompass the entire existing urbanized area (as defined by the Bureau of the Census) plus the contiguous area expected to become urbanized within a 20-year forecast period for the metropolitan transportation plan.
- (2) The MPA boundaries may be further expanded to encompass the entire metropolitan statistical area or combined statistical area, as defined by the Office of Management and Budget.
- (b) An MPO that serves an urbanized area designated as a nonattainment area for ozone or carbon monoxide under the Clean Air Act ([42 U.S.C. 7401 et seq.](#)) as of August 10, 2005, shall retain the MPA boundary that existed on August 10, 2005. The MPA boundaries for such MPOs may only be adjusted by agreement of the Governor and the affected MPO in accordance with the redesignation procedures described in [§ 450.310\(h\)](#). The MPA boundary for an MPO that serves an urbanized area designated as a nonattainment area for ozone or carbon monoxide under the Clean Air Act ([42 U.S.C. 7401 et seq.](#)) after August 10, 2005, may be established to coincide with the designated boundaries of the ozone and/or carbon monoxide nonattainment area, in accordance with the requirements in [§ 450.310\(b\)](#).
- (c) An MPA boundary may encompass more than one urbanized area.
- (d) MPA boundaries may be established to coincide with the geography of regional economic development and growth forecasting areas.
- (e) Identification of new urbanized areas within an existing metropolitan planning area by the Bureau of the Census shall not require redesignation of the existing MPO.
- (f) Where the boundaries of the urbanized area or MPA extend across two or more States, the Governors with responsibility for a portion of the multistate area, the appropriate MPO(s), and the public transportation operator(s) are strongly encouraged to coordinate transportation planning for the entire multistate area.
- (g) The MPA boundaries shall not overlap with each other.
- (h) Where part of an urbanized area served by one MPO extends into an adjacent MPA, the MPOs shall, at a minimum, establish written agreements that clearly identify areas of coordination and the division of transportation planning responsibilities among and between the MPOs. Alternatively, the MPOs may adjust their existing boundaries so that the entire urbanized area lies within only one MPA. Boundary adjustments that change the composition of the MPO may require redesignation of one or more such MPOs.
- (i) The MPO (in cooperation with the State and public transportation operator(s)) shall review the MPA boundaries after each Census to determine if existing MPA boundaries meet the minimum statutory requirements for new and updated urbanized area(s), and shall adjust them as necessary. As appropriate, additional adjustments should be made to reflect the most comprehensive boundary to foster an effective planning process that ensures connectivity between modes, improves access to modal systems, and promotes efficient overall transportation investment strategies.
- (j) Following MPA boundary approval by the MPO and the Governor, the MPA boundary descriptions shall be provided for informational purposes to the FHWA and the FTA. The MPA boundary descriptions shall be submitted either as a geo-spatial database or described in sufficient detail to enable the boundaries to be accurately delineated on a map.



## Excerpt from:

[www2.census.gov/geo/pdfs/reference/ua/Census\\_UA\\_2020FAQs.pdf](http://www2.census.gov/geo/pdfs/reference/ua/Census_UA_2020FAQs.pdf)

**Q:** How will the classification of census blocks as urban or rural differ from 2010?

**A:** There are two main changes to the criteria that affect the classification of blocks as urban or rural. First, we are using census blocks as the only “geographic building block” throughout the entire delineation, whereas for the 2010 Census delineation process census tracts were utilized in the initial stage and then individual census blocks were analyzed and add to the qualifying census tracts. The use of census tracts at the initial stage improved processing of data, but led to the inclusion of some territory with typically rural land uses; that is, the overall population density of the census tract was high enough to qualify for inclusion in an urban area, with the result that low-density census blocks containing rural land uses were defined as urban. The second change is that we will not be including low-density census blocks that form the hop and jump corridors (resulting in noncontiguous, multi-piece urban areas). Those low-density census block hop and jump connections were included for the 2010 Census as well as in previous decades. Both of these changes will result in blocks no longer qualifying as urban, but will have little impact on the total population/housing unit counts of the urban areas.

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Criteria	Proposed 2020 criteria	Final 2020 criteria
Identification of Initial Urban Area Cores	<del>Census block housing unit density of 385. Use of land cover data to identify territory with a high degree of imperviousness.</del>	Aggregation of census blocks with a housing unit density of 425. Use of land cover data to identify territory with a high degree of imperviousness.
Minimum Qualifying Threshold	<del>An area will qualify as urban if it contains at least 4,000 housing units or has a population of at least 10,000.</del>	An area will qualify as urban if it contains at least 2,000 housing units or has a population of at least 5,000.

## Elmore County CAMA map examples:

Below is an area that was found to have a mixed bag of urban qualifications.

This is the CAMA map area of Figure 3 that was discussed earlier within this document.

