



# Table of Contents

<b>I. Introduction</b> .....	<b>1</b>
<b>II. Demographics Data Review</b> .....	<b>1</b>
<b>III. Tourism</b> .....	<b>1</b>
A. World Heritage Site Designation – Hopewell Ceremonial Earthworks.....	1
<b>IV. Stakeholder &amp; Public Input</b> .....	<b>2</b>
<b>V. Mapping</b> .....	<b>9</b>
B. Roadway Functional Classification Map .....	9
C. Annual Average Daily Traffic Map.....	10
D. Proposed Roadway Improvements Map .....	10
<b>VI. Access Management Plan</b> .....	<b>16</b>
A. Access Management Summary.....	16
B. Access Management Considerations & Guidelines .....	17
C. Methods for Establishing Access Management Policies.....	18
D. Current Access Management & Transportation Plans / Policies .....	19
<b>VII. Appendices</b> .....	<b>20</b>

## List of Tables

Table 1 – Question #4 Results Summary .....	5
Table 2 – Question #5 Results Summary .....	6
Table 3 – Question #7 Results Summary .....	7

## List of Figures

Figure 1 – Ross County Roadway Functional Classification Map.....	13
Figure 2 – Ross County AADT Volume Map .....	14
Figure 3 – Ross County Proposed Roadway Improvements Map.....	15
Figure 4 - Mobility versus Access .....	16
Figure 5 - Functional & Physical Areas of Intersection .....	18

## I. Introduction

Ohio Valley Regional Development Commission (OVRDC) and the Ross County Commissioner retained Carpenter Marty Transportation (CM) to complete an update of the Ross County Thoroughfare Plan. Previous Thoroughfare Plan updates were mostly completed in house with support provided by the Mid-Ohio Regional Planning Commission (MORPC), OVRDC, and the Ohio Department of Transportation (ODOT). The existing Thoroughfare Plan, completed in 2008, was very comprehensive. Minor amendments to the plan were completed in 2010 and then in 2012. Due to growth in the region, and the completion of several priority projects in the County, the need for a plan update is critical to plan for future infrastructure in Ross County and the City of Chillicothe. This 2021 Thoroughfare Plan update, though minor in nature, will provide Ross County, the City of Chillicothe, and OVRDC with updated data which can be used to support infrastructure investments and prioritization in the future. The plan update includes a review of key demographic data in the County, stakeholder and public input, updated mapping, and an access management plan.

## II. Demographics Data Review

Current demographic data was obtained via the United States Census Bureau from the 2010 census with updated information through 2020, as available. It should be noted that 2020 census data was not available at the time of this Thoroughfare Plan update. Key demographic findings for the County are summarized below.

- Population estimates for July 2019 were 76,666 people. This is down 1.8% from the 2010 Census estimate in 2010 of 78,076. The data shows Ohio population grew 1.3% over the same period.
- The median household income based on 2019 estimates is \$51,092 and the poverty rate is 17.3%.
- The owner-occupied housing rate between 2015 and 2019 was 70.9%, compared to 66.1% in all of Ohio. The median value of owner-occupied units during that time was \$123,800.
- The mean travel time to work between 2015 and 2019 was 25.8 minutes, compared to 23.7 minutes for the state of Ohio.

The supporting data and additional information from the United States Census Bureau can be found in **Appendix A**.

## III. Tourism

### A. World Heritage Site Designation - Hopewell Ceremonial Earthworks

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has recently designated the Hopewell Ceremonial Earthworks sites as World Heritage sites. The Hopewell Ceremonial Earthworks sites include Newark Earthworks State Memorial in Newark, OH, Fort Ancient State Memorial in Warren County, OH, and Hopewell Cultural National Historic Park in Ross County, OH.

The Hopewell Cultural National Historic Park has seen increased, annual visitation over recent years, and the World Heritage designation is expected to further increase visitation numbers at the site. Increases in tourism numbers are also expected to increase traffic volumes and changes transportation patterns near the Hopewell site.

The Ohio University School of Leadership and Public Affairs along with the Ohio History Connection developed an economic impact report in 2018 for the World Heritage designation of the Hopewell site. The report describes expected economic impacts of the World Heritage designation, and provides guidance to ensure local municipalities can maximize the economic impacts of the World Heritage designation by providing additional amenities to tourists of the area.

The report estimates that visitors to the Hopewell Ceremonial Earthworks site will increase 75-100% over the first 2-3 years of designation. The report recommends providing amenities such as bed and breakfasts, local restaurants, and tourism experiences to further support entrepreneurial tourism. These amenities, along with the Hopewell site, must be supported by transportation infrastructure to support the additional traffic volumes. Adequate ingress/egress via vehicular transportation along with trail connections and mobility assistance support, such as handicap accessibility, are vital for success of the touring public. Wayfinding signage and guidance for all modes of transportation should also be provided, with mapping of nearby amenities available online and on site. The sites should be monitored as tourism and attendance increases. Roadway improvements, such as turn lanes, may need to be considered as traffic volumes increase.

## **IV. Stakeholder & Public Input**

A key part of the Thoroughfare Plan update was the formation of a stakeholder group. No one has a better grasp on existing and future conditions of Ross County than a group of residents and people who are in touch with the affected communities. The stakeholder group was vital in providing first-hand experience with daily living in Ross County and clearly identifying transportation issues and concerns.

CM worked with the stakeholder group to develop a survey/questionnaire which was provided to the public. The questionnaire included 13 questions requesting feedback regarding transportation issues, proposed improvements, and growth trends in the County. The questionnaire received a total of 66 responses. The key findings from the public questionnaire are identified below.

- The top issues with transportation in the County are traffic congestion, lack of parking, and high speeds.
- The top locations with transportation issues are Bridge Street in Chillicothe, US-50/Western Avenue, and the US-23/US-35 interchange.
- The top roadways traveled are US-23, Western Avenue, US-35, and Bridge Street.
- Future, major development is expected in the west and north parts of Ross County.

The questionnaire and summary of responses can be seen below.

**Question #1 - Which of the following are the top three issues with the transportation system in Ross County today?**

Traffic congestion was the top answer, with over 77% of the votes. Lack of parking was the second most selected issue, with almost 40% of the votes. Narrow streets came in third, with high speeds and traffic control coming in as close fourth and fifth most popular votes. Multimodal transportation options; underutilization of public transportation due to associated stigmas; access/curb cuts; and automobile dependency were all also concerns, indicated by their double-digit percentage of votes. Planning for autonomous vehicles did not seem to be a major concern among the participant group.

**Question #2 - What roadway improvements do you believe will improve travel in Ross County? Please list in order of importance.**

**Bridge Street**

Bridge Street was the most popular response, appearing in almost half of the responses for this question. Most people noted the congestion and poor traffic flow. Some ideas respondents provided ideas for improvement included reducing curb cuts and combining access points, adding an access road, an additional lane for turning, and adding “no left turn” signs at some locations along Bridge Street. There were a few comments requesting adjustments to the signal timing as well.

**Western Avenue**

Western Avenue was mentioned in many responses to this question. Most people recommended adding additional lanes and turning movement opportunities. Several people expressed the desire to make the City more walkable by extending the sidewalks along Western Avenue.

**Other Improvements**

Several people recommended using the old weigh station ramp from US-23 to start a new interchange in hopes to help promote additional development and help alleviate congestion in the Downtown and Bridge Street areas. Many respondents mentioned the desire to have additional parking in the Downtown area as well as the ability to turn right on red at intersections. Several comments mentioned pothole repair as well.

**Question #3 - Do you believe additional widening and/or other improvements should be implemented for US-50/Western Avenue?**

**Widening**

Almost 70% of responses indicated additional widening and/or other improvements should be implemented for US-50/Western Avenue. The majority of the respondents were interested in US-50/Western Avenue being widened from the Cabbage Hill area to Veterans Parkway.

**Turn Lanes**

Multiple comments mentioned turn lanes, including elimination of the left turn on Gerber Avenue, extension of the two-way left turn lane from Leeds Road to Stoneridge Drive, or addition of a turn lane from Cabbage Hill to Veterans Parkway.

**Sidewalks**

Several mentioned the addition, or continuation, of sidewalks for residents, workers, park-goers, seniors. Specific areas included Central Center to Adena Wellness Center-West and the continuation of sidewalk from Bob Evans past the fast-food restaurants and Kroger “and beyond.”

**Traffic Signals**

Brewer’s Height was mentioned a couple of times, with one person recommending the addition of a traffic light at the foot of Brewer Heights. He/she said it has become a dangerous intersection at rush hour. Two responses mentioned replacing the signaled intersection at Veterans Parkway with a roundabout. Others thought syncing the lights could help.

**Other**

In general, traffic congestion was another popular topic. The addition of signs and a request for a consistent speed limit in the Sunrush area was mentioned. One person mentioned Water Street to Pyleys Lane needs improvement, and another person mentioned the traffic patterns west of Centennial Boulevard needs improvement, and no further details were given.

**Question #4 - Please list the top three major roadways in Ross County that you utilize most frequently. Examples: US-50, US-35, US-23, SR-28, SR-772, SR-104, SR-159. Please list below, including other roadways not included in the example list.**

**Table 1** below shows the primary, secondary, and tertiary roads respondents use.

Table 1 – Question #4 Results Summary

Roadways	Primary	Secondary	Tertiary	Total Votes
US-23	19	11	12	42
US-50/Western Avenue	15	11	6	32
US-35	12	18	11	41
SR-159/Bridge Street	8	7	10	25
SR-772	3	1	2	6
SR-207	2	1	5	8
SR-28	1	0	0	1
CR-550	1	0	0	1
SR-104/High Street	1	11	16	28
Cooks Hill Road	1	1	1	3
US-28	1	1	0	2
Veterans Parkway	0	0	11	11
Marietta Road	0	0	1	1
Pleasant Valley area	0	0	1	1
Eastern Avenue	0	0	1	1

**Question #5 - Have you experienced the following issues on the Bridge Street corridor near the US-35 interchange? If so, what priority would you give to addressing the issue?**

The issue that was most frequently experienced was congestion and backups in the northbound direction. Over 96% of respondents experienced it; 76% of those individuals rate it as a high priority and 24% rate it a medium priority to fix. Other issues that rated in the 90th percentile include congestion and imbalanced lane use in the southbound direction and poor traffic flow at the intersection of Bridge Street & North Plaza Boulevard. **Table 2** below shows the number of respondents that experienced the specified issues and their respective priority levels.

Table 2 – Question #5 Results Summary

Issues	Yes	High Priority	Medium Priority	Low Priority
Congestion and backups in northbound direction	55	38	12	0
Congestion and imbalanced lane use (more vehicles in the right lane than other lanes) in the southbound direction	50	30	12	5
Traffic backing out onto US-35 eastbound from Bridge Street	50	27	12	8
Traffic backing out onto US-35 westbound from Bridge Street	49	22	17	11
Poor traffic flow at the intersection of Bridge Street & North Plaza Boulevard	44	18	12	13
Poor traffic flow at the intersection of Bridge Street & Marietta Road	35	16	21	12
General issues at Bridge Street & Stewart Road	30	14	14	14
General issues at Bridge Street & Pawnee Road	29	6	13	20
Lack of pedestrian and/or bicycle facilities in the corridor	25	5	5	26

Other Bridge Street issues mentioned include signal timings at Bridge Street and Marietta, signal coordination, recommendations to restrict left turns on Bridge Street to only signalized intersections, adding new service roads to connect Bridge Street businesses, and implementing safety measures for pedestrians and cyclists. Other problem areas included left turns at Shawnee Square and River Trace, high speeds, turning into North Plaza, and Main Street congestion during morning/evening commutes. One person mentioned people not following the signs indicating which lanes are through lanes and which are turn lanes.

**Question #6 - What methods would you recommend to better manage traffic operations along Bridge Street in Chillicothe?**

More than 60% of respondents recommended signal timing changes to better manage traffic operations along Bridge Street. Approximately 55% recommended a reduction in the number of access drives. Reducing traffic and multimodal transportation options were both in the twentieth percentile of votes. A few people thought speed limit changes could help. Many people believe a bypass connection of US-35 E to US-23N or access roads, especially for businesses, would be beneficial. A reduction of traffic lights, traffic light synchronization, speed monitoring, the addition of more bike/pedestrian facilities were also mentioned. One person recommended limiting entrances and exits more exclusively to signalized intersections. Another thought it would be beneficial to increase capacity in the northbound direction and improve lane use distribution in the southbound direction.



**Question #7 - Please rank on a scale of 1-10 (10 being the best of the best, 1 being the worst of the worst) how Ross County fares with the following transportation-related items.**

Ross County public transit options and multimodal transportation options ranked the lowest, with most votes being a five out of ten, or lower. **Table 3** below summarizes how other issues ranked.

*Table 3 – Question #7 Results Summary*

	1	2	3	4	5	6	7	8	9	10	Total Votes
Safety	2	0	4	3	9	8	15	9	3	1	54
Infrastructure Maintenance	2	2	8	2	19	8	6	9	2	1	59
Travel Efficiency	3	3	2	7	13	11	10	4	1	2	56
Overall Transportation System	2	1	4	8	19	11	6	7	0	1	59
East of Access to Development	4	2	6	8	9	6	7	5	4	1	52
Infrastructure Quality (pavement, sidewalks, signals, etc.)	3	4	5	6	18	9	7	4	3	0	59
Public Transit Options (bus, car-sharing, etc.)	3	9	6	9	10	7	6	4	3	1	58
Multimodal Transportation Options (biking, walking, etc.)	5	8	10	6	12	5	5	3	2	0	56

**Question #8 - Do you believe existing traffic congestion negatively affects economic development?**

Most responses (75%) answered that they believe existing traffic congestion negatively affects economic development. Comments stated easy access to the highway system, providing safe and non-congested transportation for young drivers and customers, as well as parking for businesses is important.

Several people stated congestion could be a deterrent for current customers, new businesses, and economic development, which could decrease area business and City’s revenue. People provided that they are more likely to seek other businesses if it’s easier to access.

The addition of lanes, and a connector tunnel for pedestrians to cross Bridge Street were both mentioned. There were a couple of people that commented on the importance of walking and biking paths and adequate parking for commerce. Poorly timed signals and too many access points were also mentioned.

**Question #9 - Where in the County do you think new major development will take place in the next 10-20 years? (Select all that apply)**

Almost 75% of respondents think new major development will take place in the Western part of the County. The second most popular response was the Northern part at 62%. There were less than ten responses, each, for the Central, Southern, and Eastern areas.

**Question #10 - Please describe specific areas in the County where you have seen increased development over the last 5-10 years.**

Most people responded that Western Avenue has seen increased development over the last 5-10 years. A few people specifically mentioned the Hospital and Sunrush areas. The second most popular response was Bridge Street, with mentions of the Riffle/Adena Regional Medical Center/Kenworth area. Other general responses included the Northern and Western part and Downtown Chillicothe.

**Question #11 - Please describe where you believe the top 5 most popular travel destinations are within Ross County. These can include shopping areas, entertainment districts, parks, etc.**

The most popular travel destinations comments included shopping; city, state and historical parks; dining; entertainment; and biking and walking trails. Bridge Street, Downtown Chillicothe, and Western Avenue were all mentioned multiple times. Tecumseh, Yoctangee Park, Hopewell Culture National Historic Park, and Adena Mansion & Gardens were all mentioned several times.

**Question #12 - How would you like to see the ATP incorporated into the Thoroughfare Plan update?**

Almost half of the comments mentioned biking or walking paths. In general, people expressed interest in safer and more connected walking and biking paths. One person mentioned the dangerous nature of bicyclists around the railroad underpass. Another person was concerned about the safety of handicapped individuals attempting to travel on sidewalks in front of businesses, noting that tables, chairs, planters, and uneven pavement sometimes prevent them from using it via a wheelchair. Another safety concern is the lighting on Bridge Street for people walking at night.

The most noted areas for walking and biking infrastructure improvements were US-35/Bridge Street, Western Avenue, Shawnee Square area, Pyleys Lane, and the Pleasant Valley area. One person expressed interest in a map of long-term plans for additional shared use paths and connections, particularly the north-south corridor.

Other requests included a dedicated bus lane for major streets, Park & Ride, and incorporating public input and transparency with decisions. Another person thought focusing on highway infrastructure is more important now than economic development.

**Question #13 - Please feel free to comment further about transportation concerns and solutions in Ross County. Additionally, if you have observed transportation solutions in other parts of Ohio that may be beneficial to the Ross County area, please share.**

**Accessibility**

Access was mentioned in several comments, some referencing Bridge Street and others referencing connectors from US-35 east to US-23 north and US-50 to US-23. Intersection improvements were mentioned many times. Several people expressed interest in more roundabouts rather than signalized intersections and others thought syncing the traffic signals would help with traffic flow. One person expressed concern that the time allowed for pedestrian crossings seemed short.

**Walking/Biking Projects**

Multiple people are interested in walking/biking projects, with one person interested in clearing space (i.e. prohibit people parking on sidewalks and double parking in the street when parking is available; clear planters and seating if they block the sidewalk; etc.) for wheelchairs to more easily travel.

**Other**

One idea not previously mentioned in the previous comments throughout the questionnaire was removing old buildings to make municipal parking lots. The desire for additional parking for businesses was mentioned in a few comments. The frequency and timeliness of buses was a concern, with the respondent providing that the system took him/her over an hour to go 2-3 miles. He/she said transportation via the bus system took the majority of the day for only an hour-long appointment.

Speed enforcement was mentioned a couple of times. One respondent is interested in more “Slow Children at Play” signs in neighborhoods. Other topics included pothole repair, widening US-50, and improvements to the safety at Veterans Parkway and US-50.

## V. Mapping

Several transportation maps and/or map updates were included as a part of the Thoroughfare Plan update. Each map is described below, followed by the map figures.

### B. Roadway Functional Classification Map

Highway and street systems form an interconnected roadway network across jurisdictional boundaries to serve the transportation needs of a region. Roadway systems need to provide traffic mobility or land access, with many systems providing a combination of both. The following definitions are presented for each classification of roadway in the County network. The standard industry definitions have been referenced using information from ODOT:

- **Interstate/Freeways** have full access control and limited points of entry at interchanges.

- **Principal Arterials** typically serve major activity centers with higher traffic volumes and longer trips. Principal arterials minimize access to promote a higher level of mobility. These roads also provide a critical connection to minor arterials and collector routes.
- **Minor Arterials** typically have more access and provide an interconnection between principal arterials and collectors. Trip length will be shorter than principal arterials.
- **Collector Roads** serve both mobility and land access within the network. These roads are an important link between the arterial system and local streets and provide access to residential and commercial areas.
- **Local Roads** are designed to provide direct land access from higher level roadways and should not carry through traffic.

The Roadway Functional Classification Map can be seen in **Figure 1** and **Appendix B**.

### C. Annual Average Daily Traffic Map

An annual average daily traffic (AADT) volume map was created using StreetLight Data. StreetLight produces AADT volumes by utilizing cell phone location services, which shows the relative amount of traffic that passes through a user-defined zone. The indexed relative data is then compared to permanent count station data to produce AADT volumes for each roadway segment. Data obtained was an average for the entire year of 2019. The AADT Map can be seen in **Figure 2** and **Appendix B**.

### D. Proposed Roadway Improvements Map

A map of proposed roadway improvements based on growth trends, traffic volume expectations, previous Thoroughfare Plan recommendations, and public input. Below is a list of improvements (proposed unless noted otherwise):

- SR-207 Connector (constructed)
  - New SR-207 segment from US-23 to SR-159 to also link with SR-180
  - This connector provides access to US-23 for drivers northeast of Chillicothe in lieu of Delano Road and Crouse Chapel Road
- Delano Road Improvements (partially constructed)
  - Widen road, correct geometrics, add turn lanes, add signals
  - There is a lack of east/west connector roads in the east and north portions of Ross County. The Delano Road improvements and previously described SR-207 connector would be expected to improve this condition.
- US-50/Western Avenue Widening (partially constructed)
  - Widen road to multiple lanes and utilize access roads as primary means of access
  - This mostly includes providing left turn lanes where needed and encourage access management to restrict new, private access points to signals or public road connections to Western Avenue
- SR-159 Widening

- Widen to multiple lanes and utilize access roads as primary means of access along SR-159 from US-23 to the northeast
- This area has various development types and is sure to continue developing in the future. Private access to SR-159 should be restricted as much as possible.
- SR-104 to SR-159 Connector
  - Additional east/west connector and Scioto River crossing utilizing existing Hopetown Road
  - There are currently no river crossings along an approximately 4 mile stretch between SR-207 and US-35
  - This connection would provide additional development and transportation opportunities north of Chillicothe
- Marietta Road/Rocky Road Connector Improvements
  - East/west connector road improvements to service amenities in eastern Ross County such as wilderness areas and parks similar to the recommendations for SR-207 and Delano Road.
- US-23/Seney Road Interchange
  - Interchange that utilizes former truck weigh station
  - Some infrastructure already exists, but significant improvements would be necessary
- US-23/US-35 Interchange
  - Interchange modifications that permit additional movements such as US-23 south to US-35 west and US-35 east to US-23 north
  - The lack of these movements requires drivers bypassing Chillicothe to exit and utilize SR-207, SR-104, and SR-159
- Bridge Street Improvements (project underway)
  - Additional northbound lane, signal timing/coordination improvements, and access management
  - This is expected to improve progression and safety along Bridge Street
- Improved US-50/US-23 Connectivity
  - Interchange modifications/improvements to allow better connectivity without utilizing Eastern Avenue
  - This is specific to the northbound US-23 to southbound US-50 movement and vice versa
- Massieville Road Extension
  - Extension of Massieville Road to Three Locks Road and/or other improvements to promote access management and improve safety
  - The purpose of this connection would be to further reduce access points along US-23
  - Some existing US-23 at-grade intersections in this area are already planned to be closed or improved
- Industrial Drive Extension (partially constructed)

- Extension southeast with a possible signal installation (if warranted) to promote additional connectivity and developability of industrial corridor
- US-50/SR-772 Connector
  - North/south connector southwest of Chillicothe for additional connectivity, developability and Paint Creek crossing Drivers must currently utilize Blain Highway or downtown Chillicothe to travel between US-50 and SR-772

The Proposed Roadway Improvements Map can be seen in **Figure 3** and **Appendix B**.

Figure 1 – Ross County Roadway Functional Classification Map

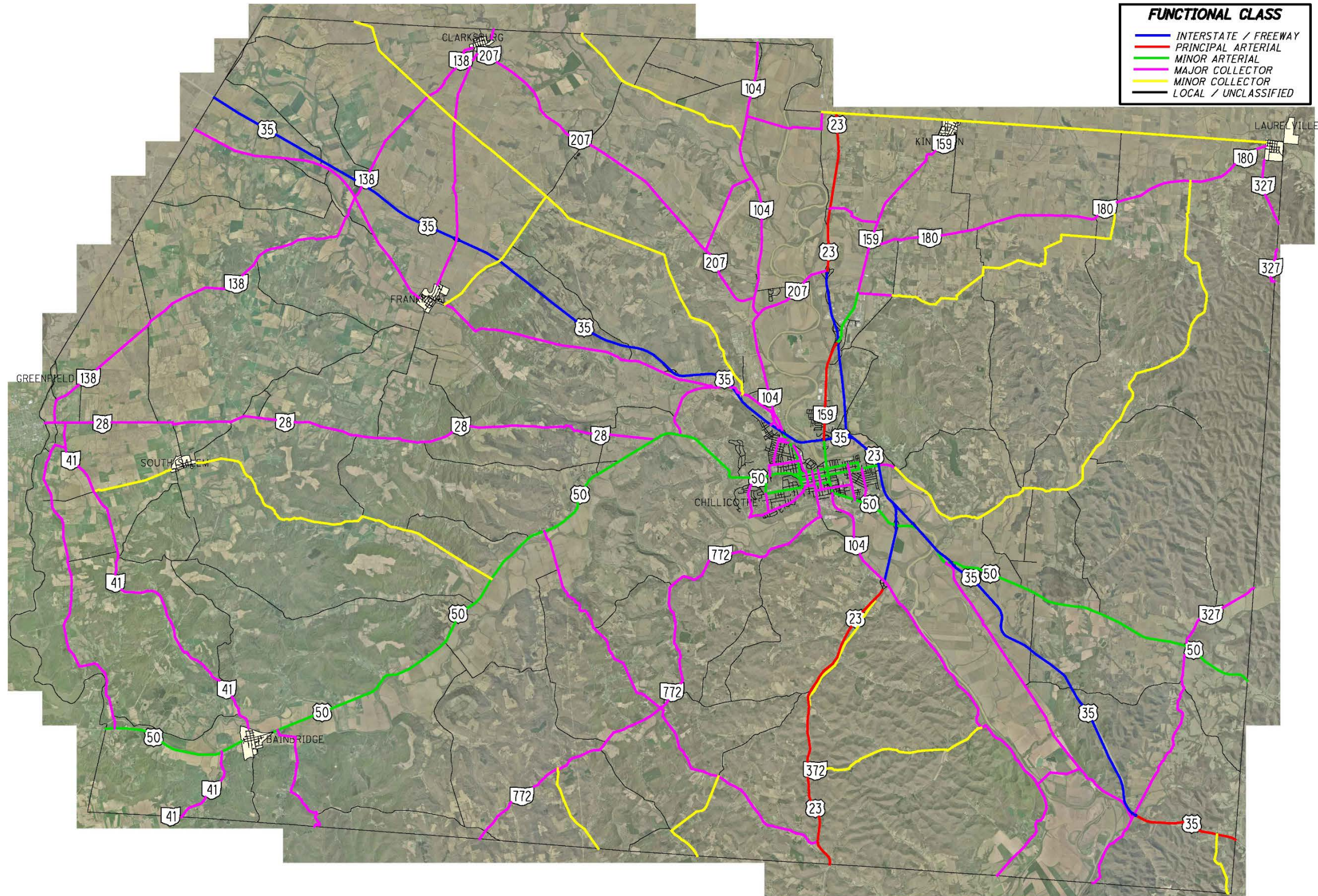


Figure 2 – Ross County AADT Volume Map

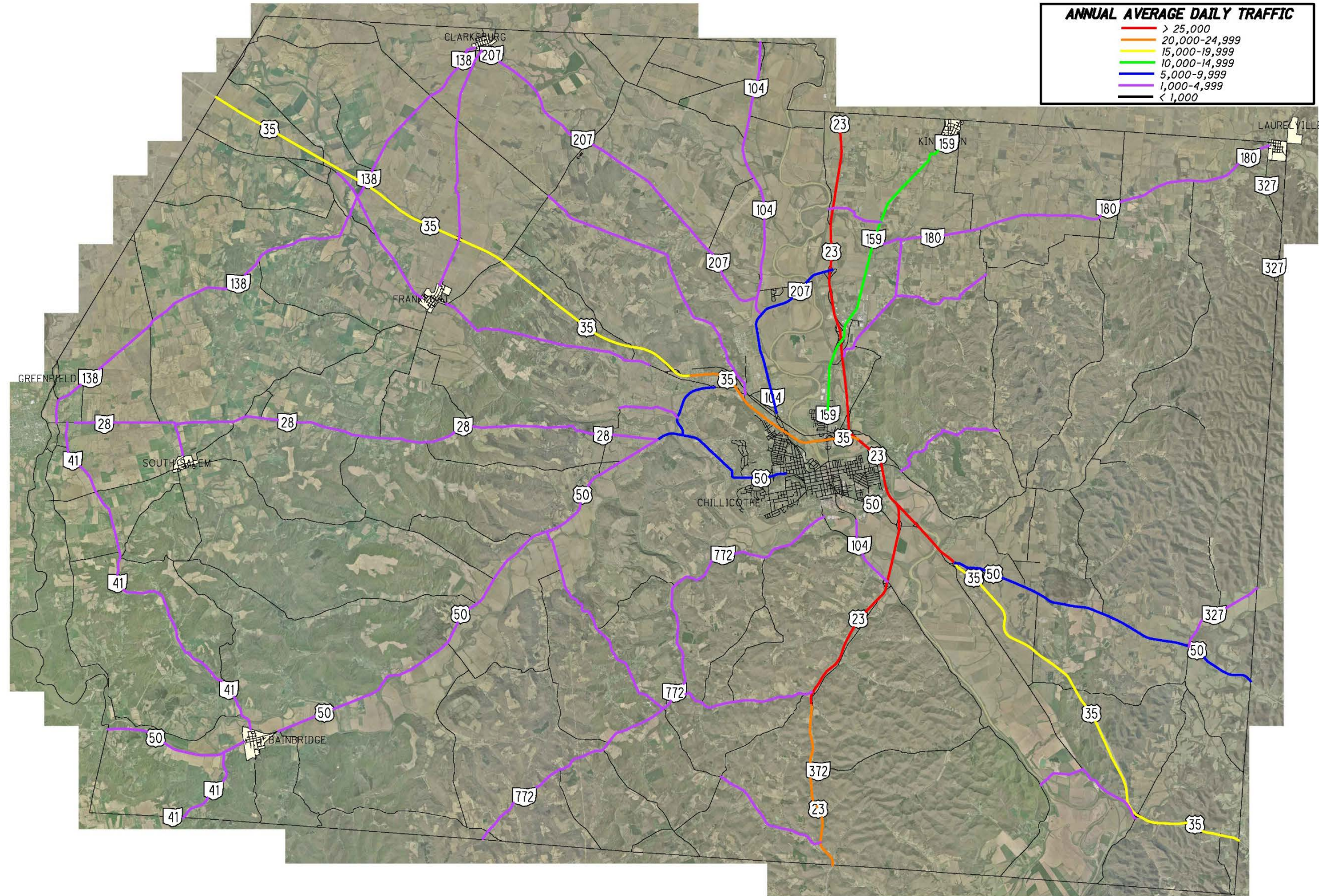
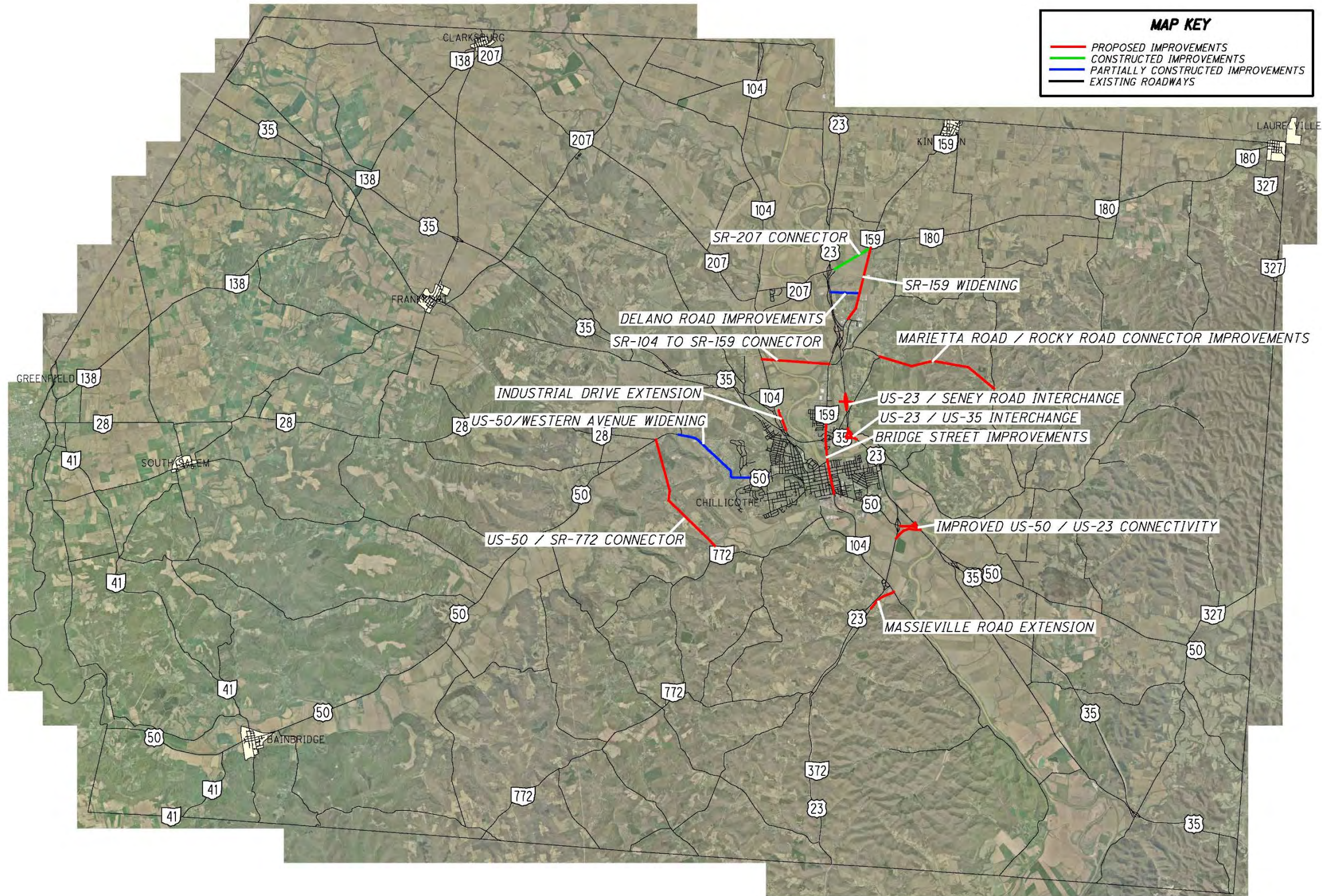




Figure 3 – Ross County Proposed Roadway Improvements Map



## VI. Access Management Plan

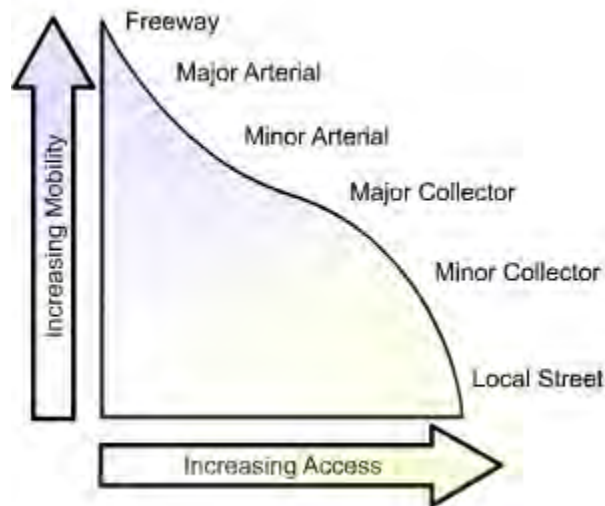
### A. Access Management Summary

Access management is an effective way to increase capacity, manage congestion, and reduce crashes. This is important for growing regions within Ross County, like the City of Chillicothe, which are continuing to see an increase in development, density, and traffic volumes. Overall, access management improves the ability of a roadway to function as intended. FHWA states that access management is a set of tools including the following:

- Increase spacing between signals and interchanges
- Increase driveway spacing but also awareness of driveway location and design
- Use of exclusive turn lanes
- Median treatments such as two-way left turn lanes or physical medians that prohibit turns from access points
- Use of service and frontage roads

All highways and roadways provide traffic mobility, land access, or a combination of both. The primary function of a freeway is to provide mobility with strict access control requirements. Local streets are primarily designed to provide access to properties. Arterial and collector roads fall in between these classifications and provide both traffic mobility and property access. **Figure 4** shows the change in mobility versus access as roadway classifications change.

*Figure 4 - Mobility versus Access*



*Source: FHWA Access Management Principles, 2020*

Many of the best practices from around the country are presented in the *Transportation Research Board Access Management Manual* (TRB Manual). The TRB Manual is used as a

master reference in this report because it focuses many of the ideas and practices into one document. ODOT has also published the *State Highway Access Management Manual* which is generally referenced more in Ohio. Many of the practices from these manuals will be highlighted and recommendations tailored to the needs of Ross County.

Providing the appropriate level of access by roadway type allows agencies to maintain the functionality of the roadway, maintain traffic operations, and improve safety. Access management benefits many stakeholders including drivers, cyclists, pedestrians, businesses, residents, and public agencies. While many businesses equate multiple access points with more customers, surveys have found that customers often avoid high congestion areas. Proliferated access leads to congestion when volumes are high. Some of the negative impacts to a city when access is not well managed include:

- Increases in crashes at driveways, intersections, and roadway segments
- Hazardous conditions for pedestrians and cyclists
- Decreases in roadway and intersection capacity
- Increases in cut-through traffic as drivers avoid congestion
- Difficulty entering/exiting businesses due to congestion created by a high concentration of access points mixed with arterial traffic

## **B. Access Management Considerations & Guidelines**

The FHWA provides several considerations for access management of a corridor. Roadway functional classification, functional areas of intersections, location and number of driveways, the use of medians, and driveway design are all important aspects of providing safe and efficient travel for roadway users. The below guidelines should be referenced and considered for new development and redevelopment in Ross County going forward.

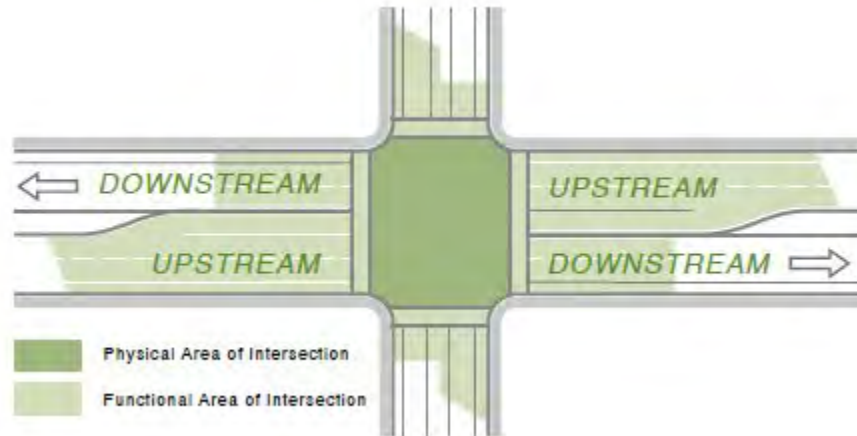
### **Locating Driveways on Appropriate Roadway Functional Classification**

Access should be provided on roadways with the lowest traffic volumes and speeds. This generally improves safety near intersections. These would typically be reserved for Local and Minor Collector roadways. Critical consideration must be given to providing access to Major Collector and Arterial roadways. In general, access to high volume roadways like Major Collectors or Arterials should be reserved for lower volume public roadways unless a traffic study supports an access point at these locations.

### **Limiting Driveways within Functional Area of Intersection**

Access points should not be permitted within the functional and physical areas of an intersection. This will eliminate conflict points in areas where there are queued vehicles and turning movements that reduce perception reaction time. **Figure 5** below shows the functional and physical areas of an intersection.

Figure 5 - Functional & Physical Areas of Intersection



Source: FHWA Access Management in the Vicinity of Intersections, 2010

### **Eliminating Left Turn Movements at Driveways Along High Volume Roadways**

Restricting left turn movements is an effective way to reduce conflicts at intersections and increase safety. FHWA research suggests that approximately 72% of crashes at a driveway involves a left turning vehicle. Full-movement access should be permitted only on low-volume roadways that connect to a high-volume roadway unless otherwise supported by a traffic study. Similarly, the installation of medians along high volume roadways will ensure left turn movements are not completed in high traffic areas.

### **Reducing Driveway Density**

Reducing the number of driveways on any given stretch of road consistently shows reductions in crashes and more efficient travel. Driveway spacing should be increased as traffic volumes are increased. Additionally, roadway functional class can also be used to determine the number of permitted driveways on any stretch of roadway.

## **C. Methods for Establishing Access Management Policies**

Access management is practiced by municipal governments, counties, and state agencies. While the implementation varies by agency, the focus is on planning, regulatory, and design strategies. The TRB Manual provides some of the following methods to establish access management:

- Adopt community-wide policies, directives, and/or guidelines
- Develop local access management regulations and ordinances
- Require acquisition of access rights
- Improve/enhance land development regulations
- Foster development review and impact assessment
- Establish geometric design criteria for drives and intersections

Agencies can develop area-wide or corridor access management plans and programs. These are typically based on roadway classification. Managing access in a community

requires a partnership between planning, zoning, and engineering. Engineering departments also need to maintain a relationship with local Metropolitan or Rural Planning Organizations to be aware of planning and project development on a regional level that affects County operations. Access management programs can develop standards and criteria to be applied based on the roadway classification and land uses. The following types of standards can be developed and utilized when development plans or traffic studies are reviewed or when transportation projects are planned or designed:

- Distance between intersections
- Distance between traffic signals
- Distance between driveways and driveway depth
- Review of drive and intersection placement to minimize conflicts between left turns
- Number of drives per property
- Requirement for turn lanes
- Requirements for median treatments
- Corner clearance of drives outside of intersection functional area
- Cross access with development/redevelopment of properties with closely spaced drives

#### **D. Current Access Management & Transportation Plans / Policies**

##### **Ross County**

Ross County currently has access management polices in place which include general recommendations for access via different classes of roadways:

- Class I roadways include all US routes and State routes within the county that are regulated by the ODOT
- Class II (A) and Class II (B) roadways are major collector and minor collector roads, respectively, that are capable of moderate traffic volumes at moderate speeds
- Class III roadways are low to medium volume roadways that enable more than one direct access per development parcel

The Ross County access management policy provides recommendations for access permitting, design requirements, sight distance, etc. These access management polices can be accessed via Ross County Planning & Building.

Ross County also has a recently implemented an Active Transportation Plan. “Active transportation” is an umbrella term for mobility without the use of a personal motor vehicle. This can include walking, biking, mobility assistance devices such as wheelchairs and scooters, skating, skateboarding, etc. The focus of this plan is to promote opportunities for physical activity and healthy food access by providing safe and reliable transportation choices for all populations in the County. The Active Transportation Plan provides framework for connectivity of parks and trails to other travel destinations in the County. The Ross County Active Transportation Plan can be accessed via the Ross County Health District.

Ross County has also developed the Coordinated Public Transit-Human Services Transportation Plan. This plan was developed and adopted in 2020 and includes identifying community resources, identifying/prioritizing community transportation needs, and establishing a clear plan for achieving shared goals of the community. The plan includes descriptions and locations for major trip generators in the County including healthcare facilities, government facilities, educational facilities, major employers, entertainment facilities, retail hubs, and parks/protected areas. Available transportation access and access shortfalls for these major trip generators are also provided in the plan with recommendations for improvement. The Coordinated Public Transit-Human Services Transportation Plan can be accessed via the Ross County Health District.

**City of Chillicothe**

The City of Chillicothe currently has access spacing requirements within the zoning code which describes number of access points permitted and the spacing requirements between public road intersections and adjacent parcels.

**ODOT**

The ODOT State Highway Access Management Manual provides access requirements and criteria for all US and State routes in Ohio. The manual describes access permit requirements, access categories, driveway design details, intersection spacing requirements, and traffic study requirements. The ODOT State Highway Access Management Manual is the standard for access management in Ohio which should be used as a basis for any access management plans for various municipalities.

**VII. Appendices**

- Appendix A – Demographic Data
- Appendix B – Ross County Updated Mapping

# Appendix A

## Demographic Data































**QuickFacts**

**Ross County, Ohio; Ohio**

QuickFacts provides statistics for all states and counties, and for cities and towns with a *population of 5,000 or more*.

**Table**

All Topics 	Ross County, Ohio	Ohio
<b>Population, Census, April 1, 2010</b>	<b>78,064</b>	<b>11,536,504</b>
 <b>PEOPLE</b>		
<b>Population</b>		
Population estimates, July 1, 2019, (V2019)	76,666	11,689,100
Population estimates base, April 1, 2010, (V2019)	78,076	11,536,751
Population, percent change - April 1, 2010 (estimates base) to July 1, 2019, (V2019)	-1.8%	1.3%
<b>Population, Census, April 1, 2010</b>	<b>78,064</b>	<b>11,536,504</b>
<b>Age and Sex</b>		
Persons under 5 years, percent	 5.6%	 5.9%
Persons under 18 years, percent	 21.2%	 22.1%
Persons 65 years and over, percent	 17.1%	 17.5%
Female persons, percent	 47.8%	 51.0%
<b>Race and Hispanic Origin</b>		
White alone, percent	 90.7%	 81.7%
Black or African American alone, percent (a)	 5.6%	 13.1%
American Indian and Alaska Native alone, percent (a)	 0.3%	 0.3%
Asian alone, percent (a)	 0.6%	 2.5%
Native Hawaiian and Other Pacific Islander alone, percent (a)	 Z	 0.1%
Two or More Races, percent	 2.7%	 2.4%
Hispanic or Latino, percent (b)	 1.4%	 4.0%
White alone, not Hispanic or Latino, percent	 89.7%	 78.4%
<b>Population Characteristics</b>		
Veterans, 2015-2019	5,844	709,287
Foreign born persons, percent, 2015-2019	1.0%	4.6%
<b>Housing</b>		
Housing units, July 1, 2019, (V2019)	32,019	5,232,869
Owner-occupied housing unit rate, 2015-2019	70.9%	66.1%
Median value of owner-occupied housing units, 2015-2019	\$123,800	\$145,700
Median selected monthly owner costs -with a mortgage, 2015-2019	\$1,154	\$1,282
Median selected monthly owner costs -without a mortgage, 2015-2019	\$424	\$479
Median gross rent, 2015-2019	\$741	\$808
Building permits, 2019	12	23,047
<b>Families &amp; Living Arrangements</b>		
Households, 2015-2019	28,802	4,676,358
Persons per household, 2015-2019	2.47	2.43
Living in same house 1 year ago, percent of persons age 1 year+, 2015-2019	85.3%	85.3%
Language other than English spoken at home, percent of persons age 5 years+, 2015-2019	1.9%	7.2%
<b>Computer and Internet Use</b>		
Households with a computer, percent, 2015-2019	87.4%	89.1%
Households with a broadband Internet subscription, percent, 2015-2019	78.7%	82.0%
<b>Education</b>		
High school graduate or higher, percent of persons age 25 years+, 2015-2019	87.6%	90.4%
Bachelor's degree or higher, percent of persons age 25 years+, 2015-2019	15.8%	28.3%
<b>Health</b>		
With a disability, under age 65 years, percent, 2015-2019	16.2%	10.0%
Persons without health insurance, under age 65 years, percent	 7.9%	 7.8%
<b>Economy</b>		
In civilian labor force, total, percent of population age 16 years+, 2015-2019	53.0%	63.2%
In civilian labor force, female, percent of population age 16 years+, 2015-2019	53.0%	59.0%
Total accommodation and food services sales, 2012 (\$1,000) (c)	115,191	20,652,777



Total health care and social assistance receipts/revenue, 2012 (\$1,000) (c)	754,180	80,915,693
Total manufacturers shipments, 2012 (\$1,000) (c)	3,928,513	313,629,976
Total merchant wholesaler sales, 2012 (\$1,000) (c)	D	155,426,023
Total retail sales, 2012 (\$1,000) (c)	938,920	153,553,997
Total retail sales per capita, 2012 (c)	\$12,126	\$13,301
<b>Transportation</b>		
Mean travel time to work (minutes), workers age 16 years+, 2015-2019	25.8	23.7
<b>Income &amp; Poverty</b>		
Median household income (in 2019 dollars), 2015-2019	\$51,092	\$56,602
Per capita income in past 12 months (in 2019 dollars), 2015-2019	\$24,913	\$31,552
Persons in poverty, percent	▲ 15.2%	▲ 13.1%

## BUSINESSES

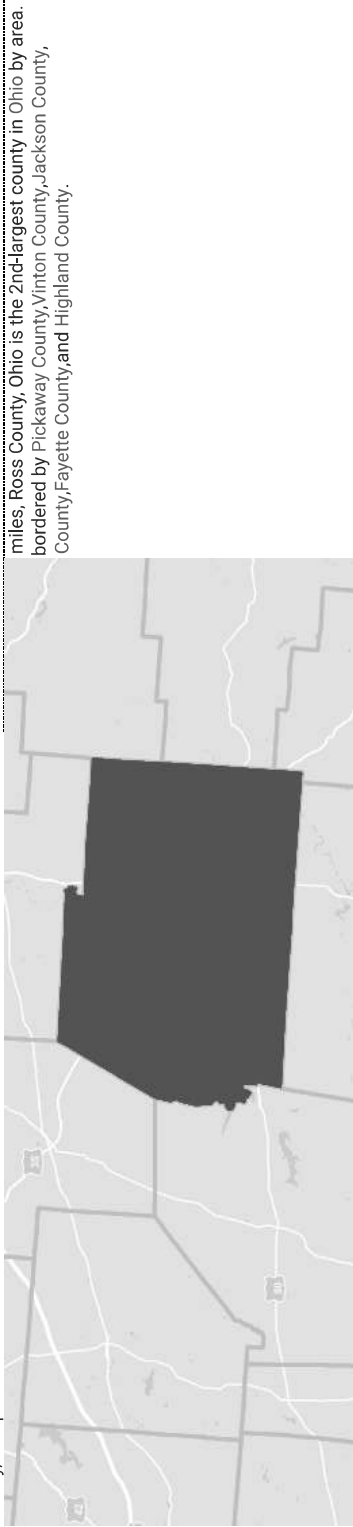
<b>Businesses</b>		
Total employer establishments, 2018	1,218	251,937
Total employment, 2018	23,528	4,878,062
Total annual payroll, 2018 (\$1,000)	1,127,157	236,239,178
Total employment, percent change, 2017-2018	0.0%	1.3%
Total nonemployer establishments, 2018	3,883	802,331
All firms, 2012	5,467	904,814
Men-owned firms, 2012	3,231	510,078
Women-owned firms, 2012	1,543	306,824
Minority-owned firms, 2012	182	122,653
Nonminority-owned firms, 2012	4,985	759,569
Veteran-owned firms, 2012	535	91,316
Nonveteran-owned firms, 2012	4,502	776,193

## GEOGRAPHY

<b>Geography</b>		
Population per square mile, 2010	113.3	282.3
Land area in square miles, 2010	689.19	40,860.69
FIPS Code	39141	39

# Ross County, Ohio

County, or equivalent in Ohio



miles, Ross County, Ohio is the 2nd-largest county in Ohio by area, bordered by Pickaway County, Vinton County, Jackson County, County, Fayette County, and Highland County.



POPULATION  
**76,948**



MEDIAN HOUSEHOLD INCOME  
**\$51,092**



POVERTY RATE  
**17.3%**



BACHELOR'S DEGREE OR HIGHER  
**15.8%**

## People and Population

**Age and Sex**  
**41.0** +/- 0.4

Median age in Ross County, Ohio

**38.1** +/- 0.1

Median age in the United States

Table: DP05  
Table Survey/Program: 2019 American  
Community Survey 5-Year Estimates

## Population by Age Range in Ross County, Ohio

Under 5 years - 5.4%

18 years and older - 78.5%

65 years and older - 16.1%



---

**Veterans**  
**9.7% +/- 0.7%**

Veterans in Ross County, Ohio

---

**7.3% +/- 0.1%**

Veterans in the United States

---

Table: S2101  
Table Survey/Program: 2019 American  
Community Survey 5-Year Estimates

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**Veterans by Sex in Ross County, Ohio**

Male - 93.1%

Female - 6.9%



---

**Foreign Born**  
**1.0% +/- 0.2%**

Foreign born in Ross County, Ohio

---

**13.6% +/- 0.1%**

Foreign born in the United States

---

Table: DP02  
Table Survey/Program: 2019 American  
Community Survey 5-Year Estimates

---

**Foreign Born Population in Ross County, Ohio by County**



Map Survey/Program: 2019 American Community Survey 5-Year Estimates

---

**Language Spoken at Home**  
**1.9% +/- 0.4%**

---

**Types of Language Spoken at Home in Ross County, Ohio**

Language other than English spoken at home in Ross County, Ohio

**21.6%** +/- 0.1%

Language other than English spoken at home in the United States

Table: DP02

Table Survey/Program: 2019 American Community Survey 5-Year Estimates

English only - 98.1%

Spanish - 0.7%

Other Indo-European languages - 0.7%

Asian and Pacific Islander languages - 0.4%

Other languages - 0.0%

## Race and Ethnicity

### Race

**76,948** +/- \*\*\*\*\*

Total population in Ross County, Ohio

**324,697,795** +/- \*\*\*\*\*

Total population in the United States

Table: DP05

Table Survey/Program: 2019 American Community Survey 5-Year Estimates

### Population by Race in Ross County, Ohio

White alone - 90.4%

Black or African American alone - 5.3%

American Indian and Alaska Native alone - 0.0%

Asian alone - 0.5%

Native Hawaiian and Other Pacific Islander alone - 0.0%

Some other race alone - 0.5%

Two or more races - 3.3%

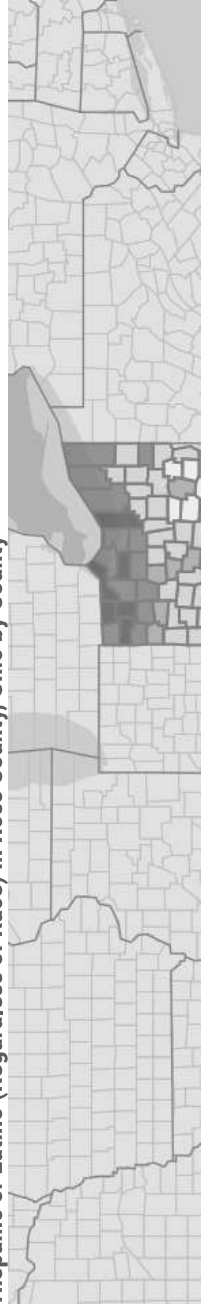
### Hispanic or Latino

**1.3%** +/- \*\*\*\*\*

Hispanic or Latino in Ross County, Ohio

**18.0%** +/- 0.1%

### Hispanic or Latino (Regardless of Race) in Ross County, Ohio by County



Hispanic or Latino in the United States

Table: DP05  
Table Survey/Program: 2019 American  
Community Survey 5-Year Estimates



Map Survey/Program: 2019 American Community Survey 5-Year Estimates

## Families and Living Arrangements

### Households

**28,802** +/- 469

Total households in Ross County, Ohio

**120,756,048** +/- 236,892

Total households in the United States

### Households in Ross County, Ohio by County



Map Survey/Program: 2019 American Community Survey 5-Year Estimates

## Health

### Health Insurance

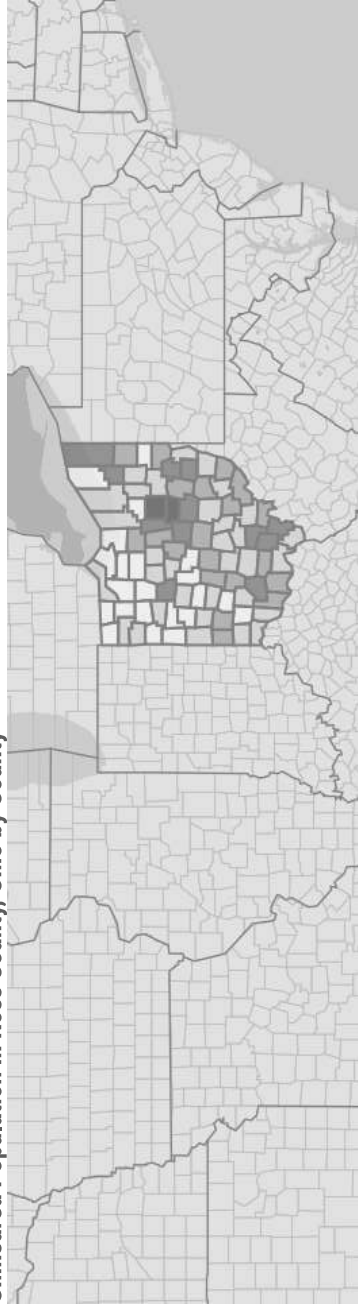
**5.9%** +/- 0.8%

Without Health Insurance Coverage in Ross  
County, Ohio

**8.8%** +/- 0.1%

Without Health Insurance Coverage in the  
United States

### Uninsured Population in Ross County, Ohio by County



Map Survey/Program: 2019 American Community Survey 5-Year Estimates

## Disability

20.7% +/- 1.0%

Disabled population in Ross County, Ohio

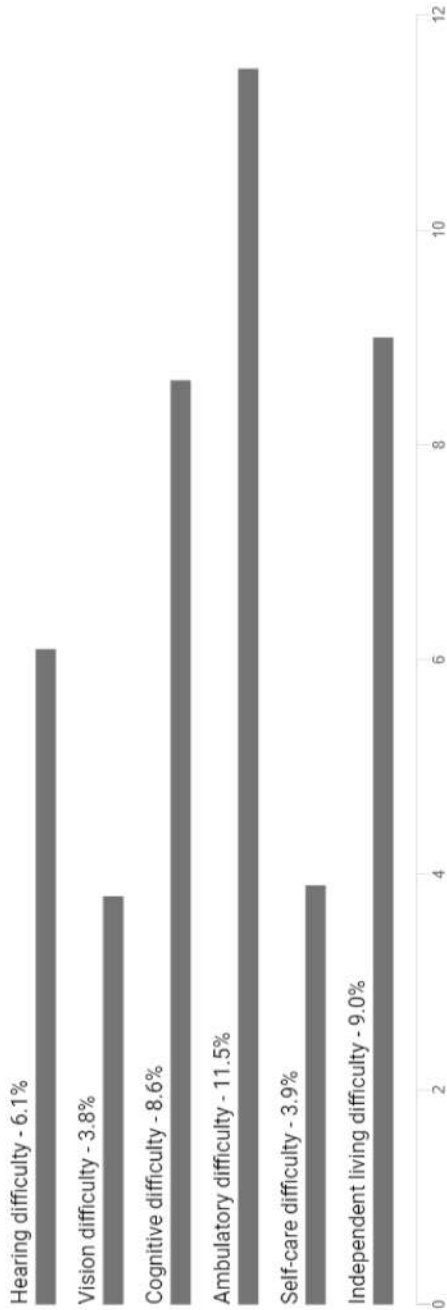
12.6% +/- 0.1%

Disabled population in the United States

Table: DP02

Table Survey/Program: 2019 American Community Survey 5-Year Estimates

## Types of Disabilities in Ross County, Ohio



## Education

### Educational Attainment

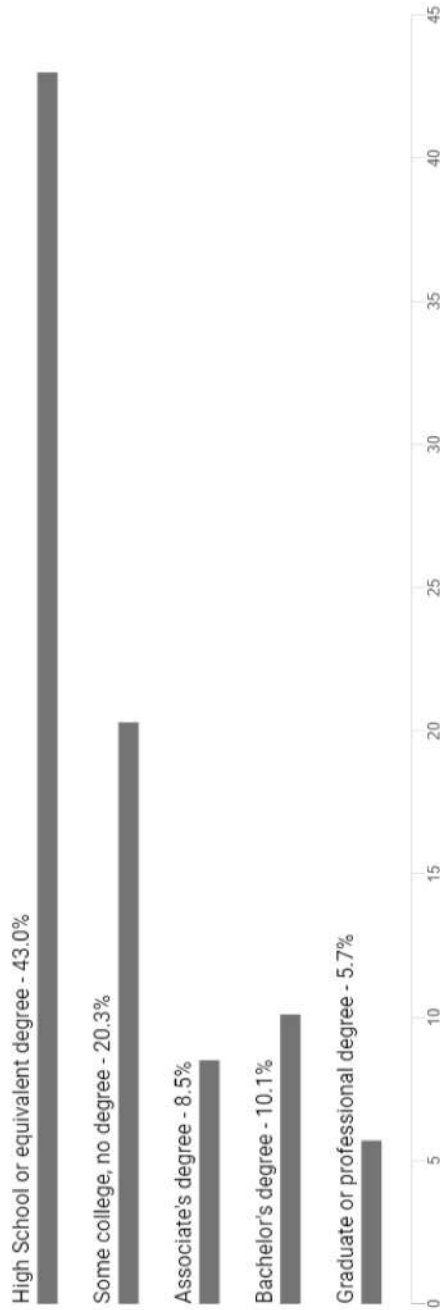
87.6% +/- 1.0%

High school graduate or higher in Ross County, Ohio

88.0% +/- 0.1%

High school graduate or higher in the United States

## Education Attainment in Ross County, Ohio



## Business and Economy

Business Counts

1,213

Total Employer Establishments in Ross County, Ohio by County



Total employer establishments in Ross County, Ohio

**7,757,807**

Total employer establishments in the United States

Table: CB1600CBP  
Table Survey/Program: 2016 County Business Patterns



Map Survey/Program: 2016 Business Patterns

**Expenses and Expenditures**  
**\$1,033,209**

Total annual payroll (in thousands) in Ross County, Ohio

**\$6,435,142,055**

Total annual payroll (in thousands) in the United States

Table: CB1600CBP  
Table Survey/Program: 2016 County Business Patterns

**Annual Payroll by County**



Map Survey/Program: 2016 Business Patterns

**Business and Owner Characteristics**  
**5,467**

Total firms in Ross County, Ohio

**27,626,360**

Total firms in the United States

**Types of Firms in Ross County, Ohio**

Table: SB1200CSA01  
 Table Survey/Program: 2012 Survey of  
 Business Owners



**Sales, Shipments, and Production**  
**\$938,920**

Total retail sales (in thousands) in Ross  
 County, Ohio

**\$4,219,821,871**

Total retail sales (in thousands) in the United  
 States

Table: EC1200A1  
 Table Survey/Program: 2012 Economic  
 Census



**Employment**

**Employment and Labor Force  
 Status**

**49.8% +/- 1.5%**

Employment rate in Ross County, Ohio

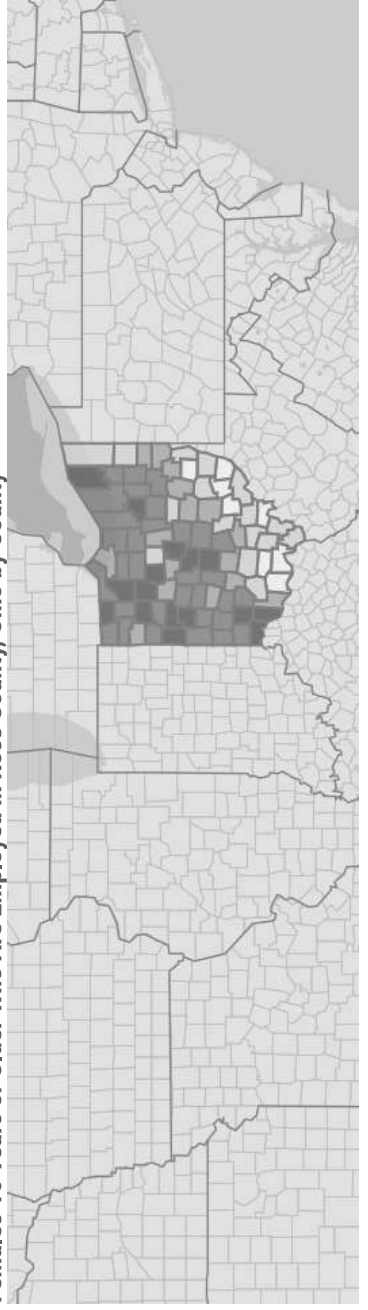
**59.6% +/- 0.1%**

Employment rate in the United States

Table: DP03  
 Table Survey/Program: 2019 American  
 Community Survey 5-Year Estimates



**Females 16 Years or Older Who Are Employed in Ross County, Ohio by County**





### Commuting

**25.8** +/- 1.0

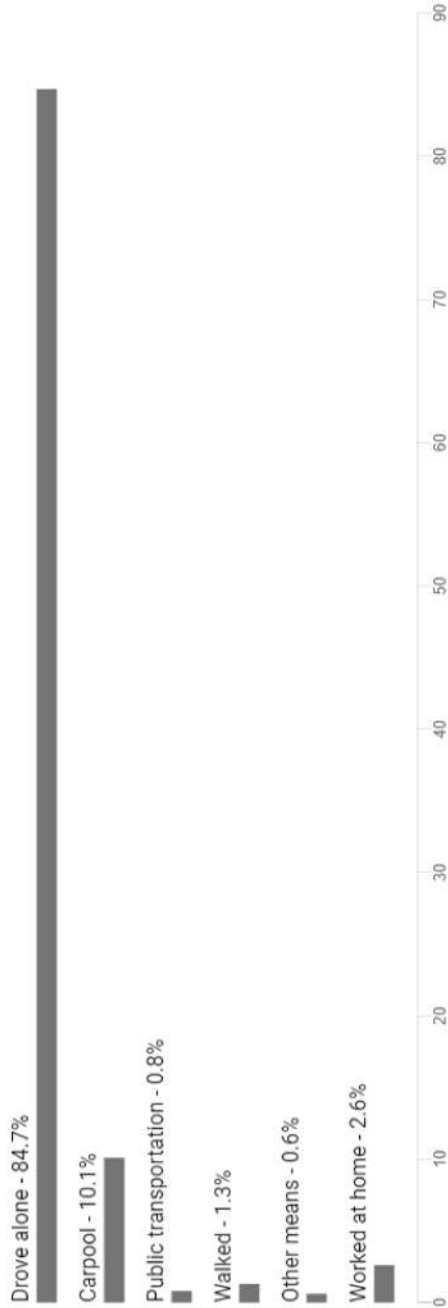
Average commute to work (in minutes) in Ross County, Ohio

**26.9** +/- 0.1

Average commute to work (in minutes) in the United States

Table: DP03  
 Table Survey/Program: 2019 American Community Survey 5-Year Estimates

### Means of Transportation to Work in Ross County, Ohio



### Housing

#### Housing Units

**32,025** +/- 158

Housing units in Ross County, Ohio

**137,428,986** +/- 6,044

Housing units in the United States

Table: DP04  
 Table Survey/Program: 2019 American Community Survey 5-Year Estimates

#### Housing Units in Ross County, Ohio by County



## Homeownership

**70.9%** +/- 1.7%

Homeownership rate in Ross County, Ohio

**64.0%** +/- 0.2%

Homeownership rate in the United States

Table: DP04

Table Survey/Program: 2019 American Community Survey 5-Year Estimates

## Homeownership Ross County, Ohio by County



Map Survey/Program: 2019 American Community Survey 5-Year Estimates

## Housing Value

**\$123,800** +/- \$4,510

Median housing value in Ross County, Ohio

**\$217,500** +/- \$180

Median housing value in the United States

Table: DP04

Table Survey/Program: 2019 American Community Survey 5-Year Estimates

## Median Housing Value in Ross County, Ohio by County



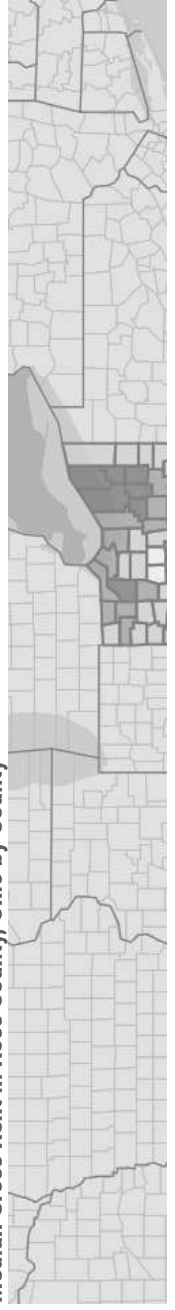
Map Survey/Program: 2019 American Community Survey 5-Year Estimates

## Renter Costs

**\$741** +/- \$28

Median gross rent in Ross County, Ohio

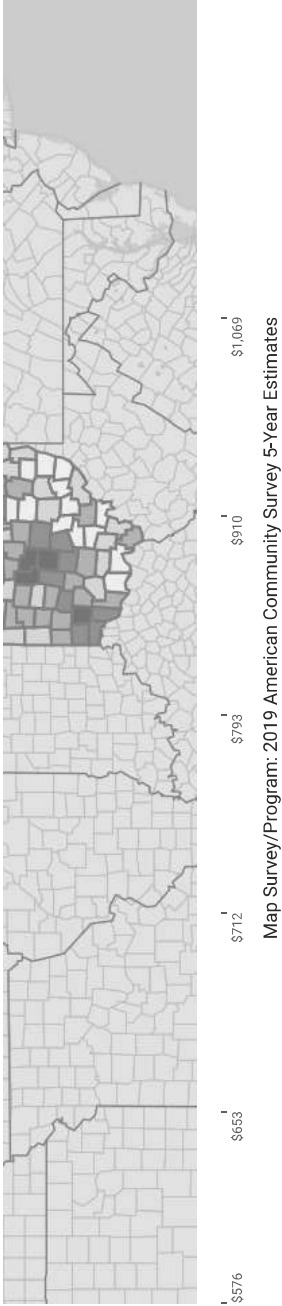
## Median Gross Rent in Ross County, Ohio by County



**\$1,062** +/- \$1

Median gross rent in the United States

Table: DP04  
Table Survey/Program: 2019 American  
Community Survey 5-Year Estimates



## Income and Poverty

### Income

**\$51,092** +/- \$2,111

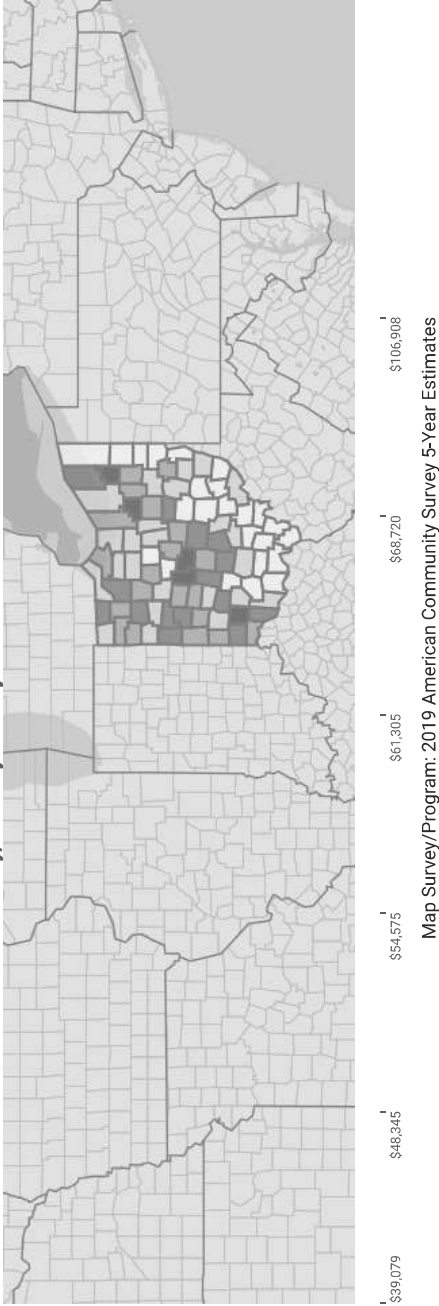
Median household income in Ross County,  
Ohio

**\$62,843** +/- \$135

Median household income in the United  
States

Table: DP03  
Table Survey/Program: 2019 American  
Community Survey 5-Year Estimates

### Median Household Income in Ross County, Ohio by County



### Poverty

**22.0%** +/- 3.0%

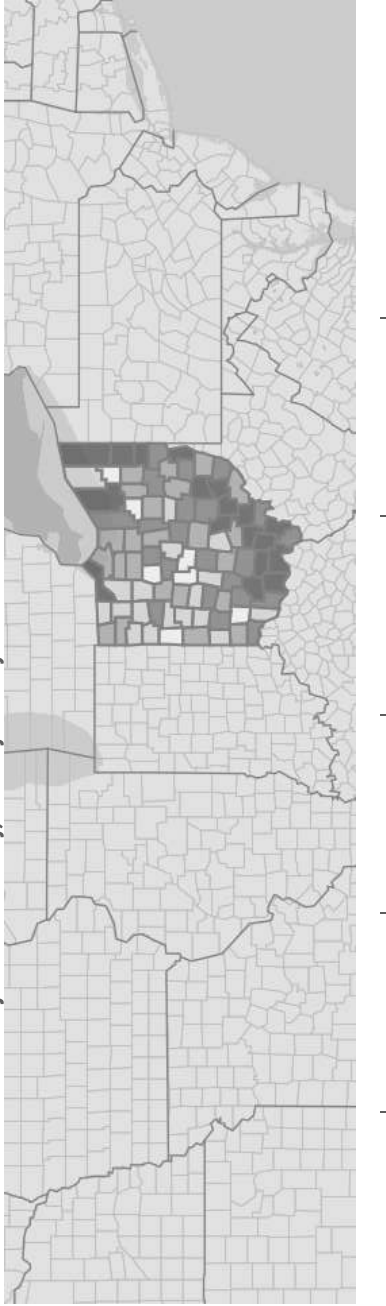
Children under 18 in poverty in Ross County,  
Ohio

**18.5%** +/- 0.2%

Children under 18 in poverty in the United  
States

Table: DP03  
Table Survey/Program: 2019 American  
Community Survey 5-Year Estimates

### Children Under 18 in Poverty in Ross County, Ohio by County



### Median Earnings for Fulltime, Year-Round Workers by Sex in Ross County, Ohio

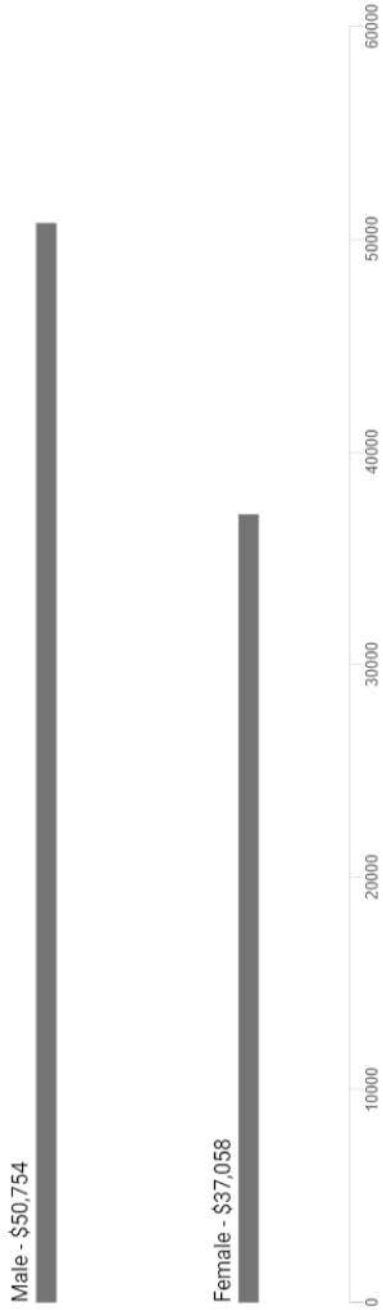
**Earnings**  
**\$37,058** +/- \$2,030

Female median year-round, full-time earnings  
 in Ross County, Ohio

**\$43,022** +/- \$107

Female median year-round, full-time earnings  
 in the United States

Table: S2001  
 Table Survey/Program: 2019 American  
 Community Survey 5-Year Estimates



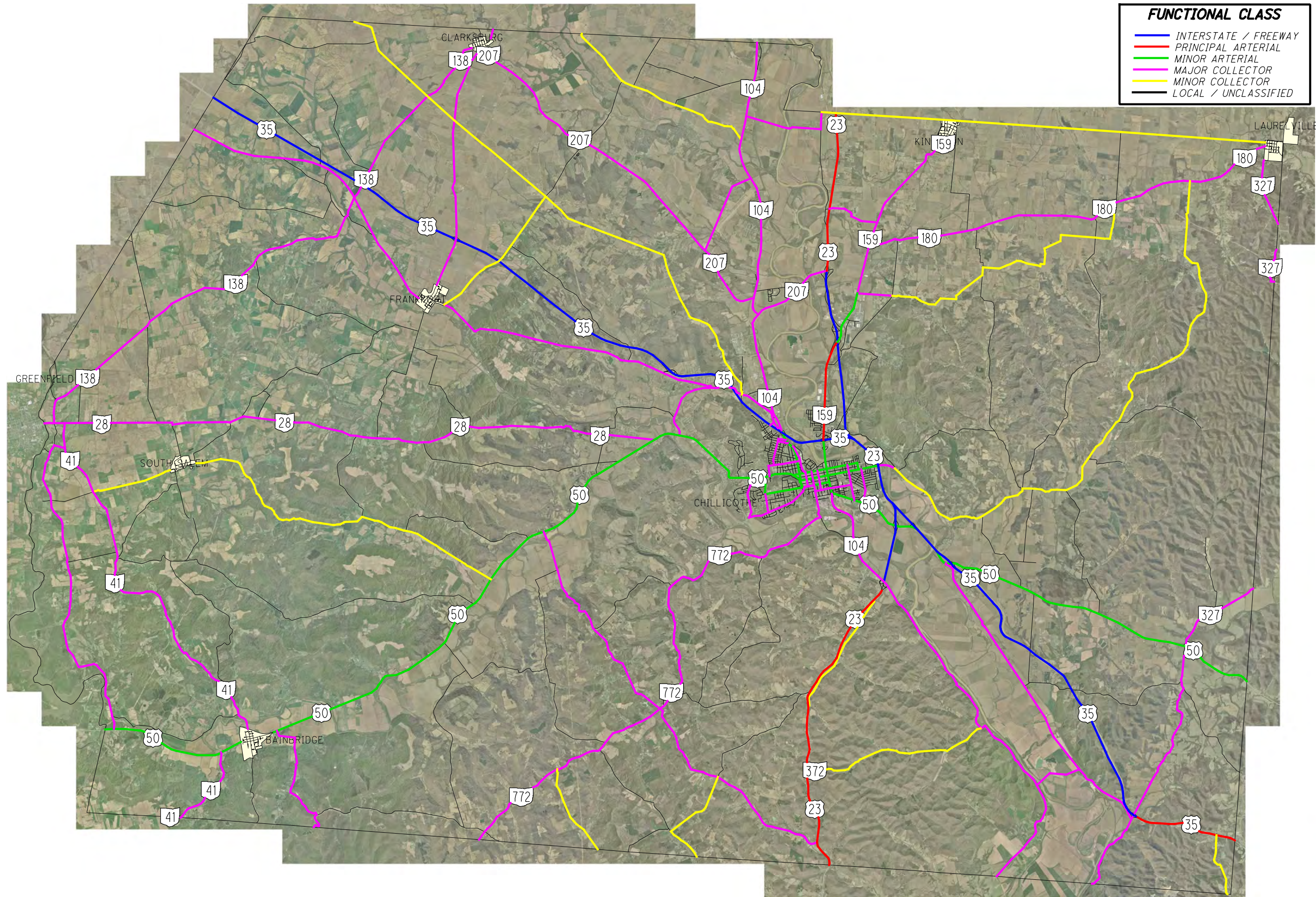
Accessibility | Information Quality | FOIA | Data Protection and Privacy Policy | U.S. Department of Commerce | Release Notes

Measuring America's People, Places and Economy

# Appendix B

## Ross County Updated Mapping





**FUNCTIONAL CLASS**

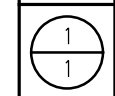
- INTERSTATE / FREEWAY
- PRINCIPAL ARTERIAL
- MINOR ARTERIAL
- MAJOR COLLECTOR
- MINOR COLLECTOR
- LOCAL / UNCLASSIFIED

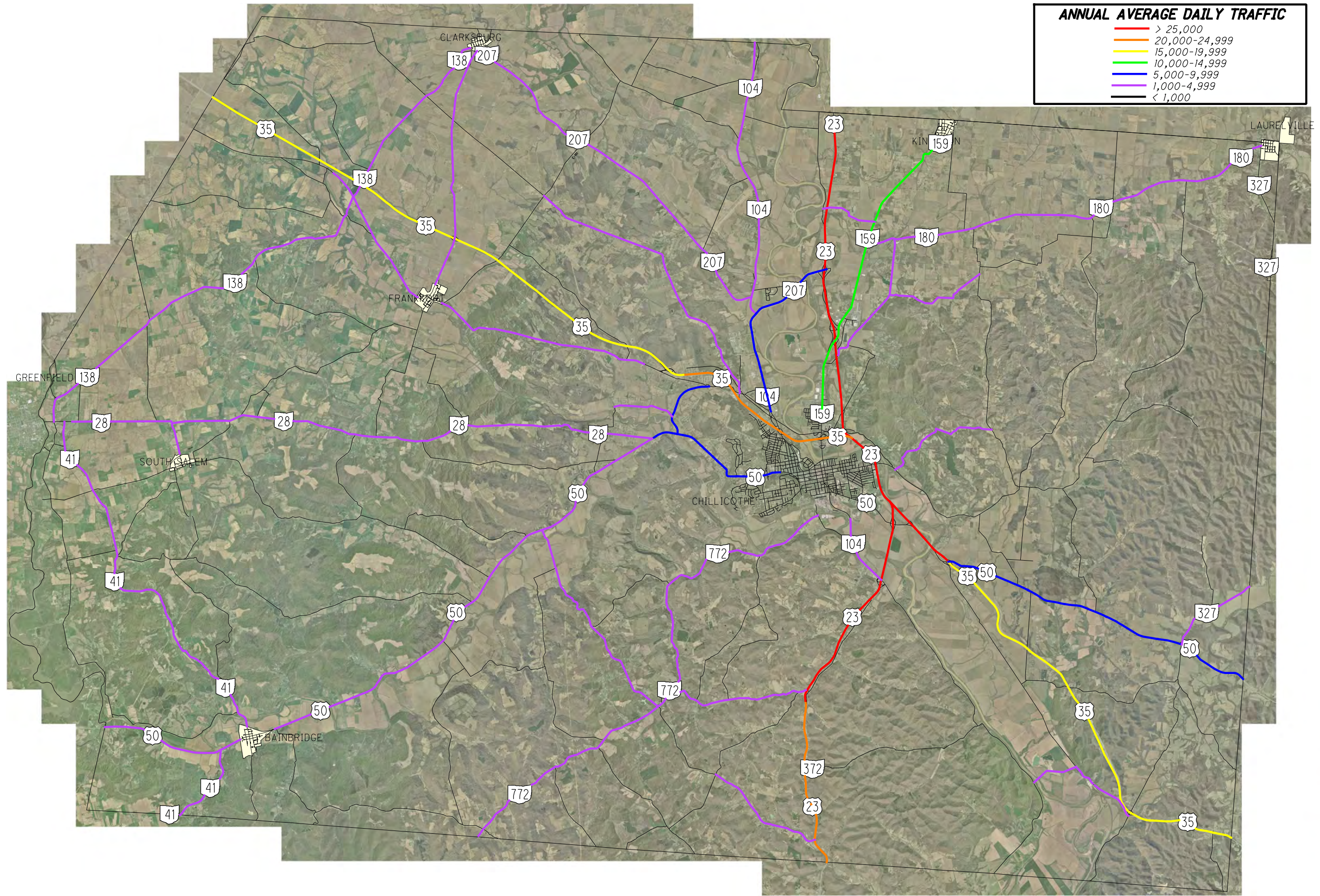
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HORIZONTAL SCALE IN FEET

**ROSS COUNTY THOROUGHFARE PLAN UPDATE  
ROADWAY CLASSIFICATIONS**





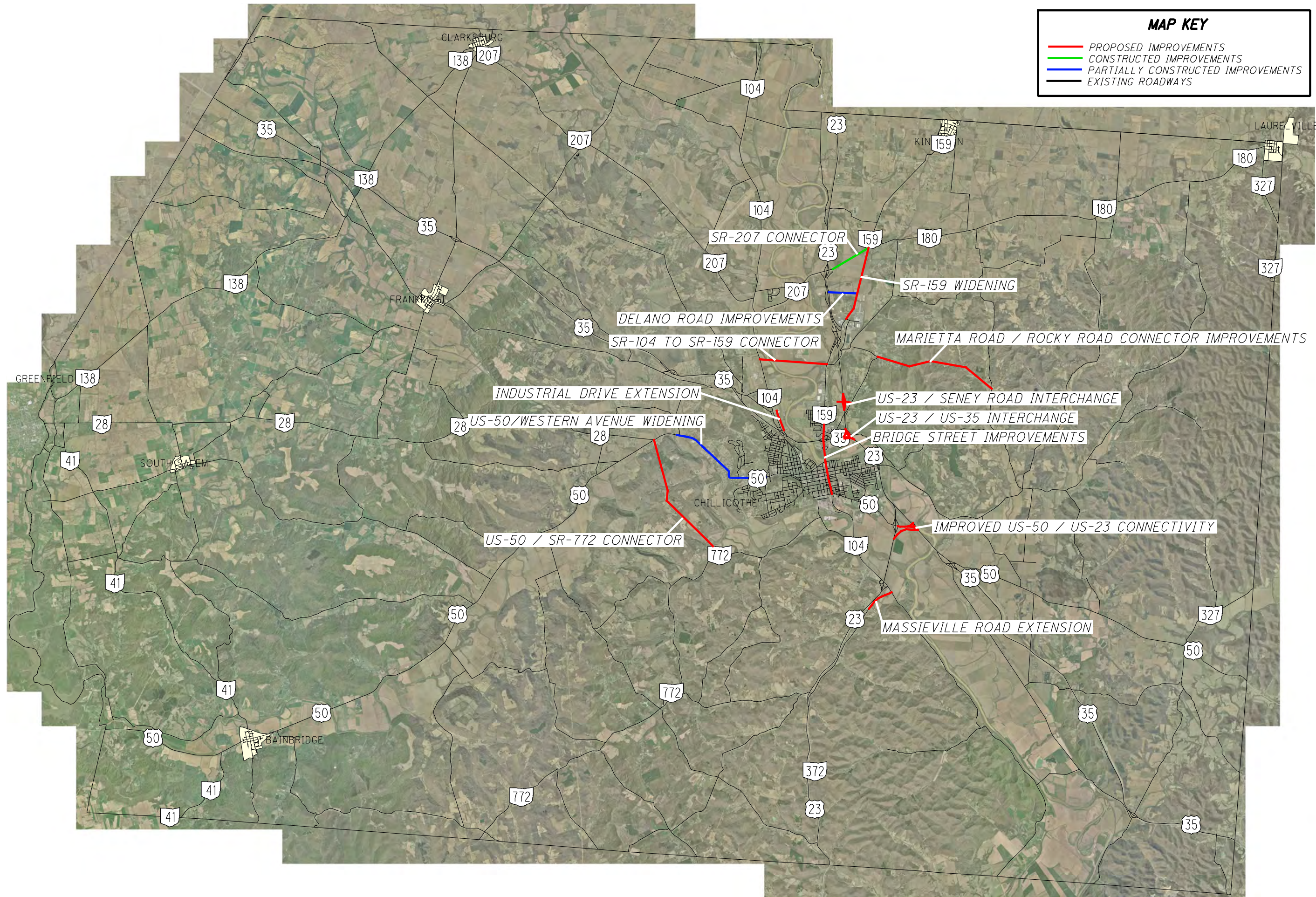
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HORIZONTAL SCALE IN FEET

**ROSS COUNTY THOROUGHFARE PLAN UPDATE  
ANNUAL AVERAGE DAILY TRAFFIC**





**MAP KEY**

- PROPOSED IMPROVEMENTS
- CONSTRUCTED IMPROVEMENTS
- PARTIALLY CONSTRUCTED IMPROVEMENTS
- EXISTING ROADWAYS

CALCULATED  
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HORIZONTAL SCALE IN FEET

**ROSS COUNTY THOROUGHFARE PLAN UPDATE  
ROADWAY IMPROVEMENTS**

