AUBURN • OPELIKA TRANSPORTATION 2050 LONG RANGE PLAN

TECHNICAL REPORT #4

Needs Assessment

LEE-RUSSELL COUNCIL OF GOVERNMENTS

Revised October 2025
DRAFT

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1.0 Introduction

This report discusses transportation needs for the Auburn-Opelika Metropolitan Planning Area (MPA). It is informed by the analysis in Technical Report #2: State of Current System and an assessment of future needs.

Future needs are based on current and forecasted trends, existing plans, and public and stakeholder input.

2.0 Roadway and Bridge Needs

2.1 Roadway Congestion Relief Needs

Based on the population and employment growth that is forecasted to occur by 2050, the Travel Demand Model (TDM) indicates that the number of person trips in the MPA and surrounding area will increase from approximately 500,610 trips per day in 2023 to about 673,864 trips per day in 2050.

Table 2.1 shows the centerline miles that will be added to the roadway network if only the transportation projects that currently have committed funding are constructed. In this scenario, the centerline miles of the roadway network will increase from 729 miles in 2023 to 752 miles in 2050. The table also shows the forecasted change in Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), and Vehicle Hours of Delay (VHD). This data indicates that by 2050, the VMT will increase by approximately 47 percent while the VHT will increase by over 65 percent. However, during this same period, the VHD will increase by nearly 169 percent.

Table 2.1: Travel Demand Impact of Growth and Existing + Committed Projects, 2023 to 2050

Classification	2023 (Existing)	2050 (E+C Projects)	Change	Percent Difference
Centerline Miles of Roadways				
Interstate	21.8	21.8	0.0	0.00%
Principal Arterial	47.7	48.1	0.4	0.78%
Minor Arterial	93.7	99.4	5.7	6.05%
Major Collector	143.6	150.7	7.0	4.90%
Minor Collector	43.0	48.2	5.2	12.07%
Local	378.6	384.0	5.3	1.41%
Total	**728.5**	**752.1**	**23.6**	**3.24%**
Daily Vehicle Miles Traveled (VMT)				
Interstate	1,017,903	1,425,966	408,063	40.09%
Principal Arterial	792,170	1,071,824	279,655	35.30%
Minor Arterial	800,329	1,112,726	312,397	39.03%
Major Collector	461,475	826,231	364,756	79.04%
Minor Collector	65,357	123,920	58,564	89.61%
Local	331,477	544,023	212,546	64.12%
Total	**3,468,711**	**5,104,691**	**1,635,980**	**47.16%**
Daily Vehicle Hours Traveled (VHT)				
Interstate	18,520	33,177	14,658	79.15%
Principal Arterial	19,295	28,937	9,641	49.97%
Minor Arterial	24,126	37,400	13,275	55.02%
Major Collector	12,321	23,930	11,609	94.22%
Minor Collector	1,978	3,817	1,839	92.95%
Local	20,555	32,668	12,113	58.93%
Total	**96,795**	**159,930**	**63,135**	**65.22%**

Classification	2023 (Existing)	2050 (E+C Projects)	Change	Percent Difference
Daily Vehicle Hours of Delay (VHD)				
Interstate	2,907	11,315	8,408	289.2%
Principal Arterial	4,067	8,550	4,483	110.2%
Minor Arterial	4,779	10,921	6,142	128.5%
Major Collector	1,411	4,591	3,180	225.4%
Minor Collector	211	490	280	132.6%
Local	194	593	399	206.0%
Total	13,568	36,460	22,892	168.7%

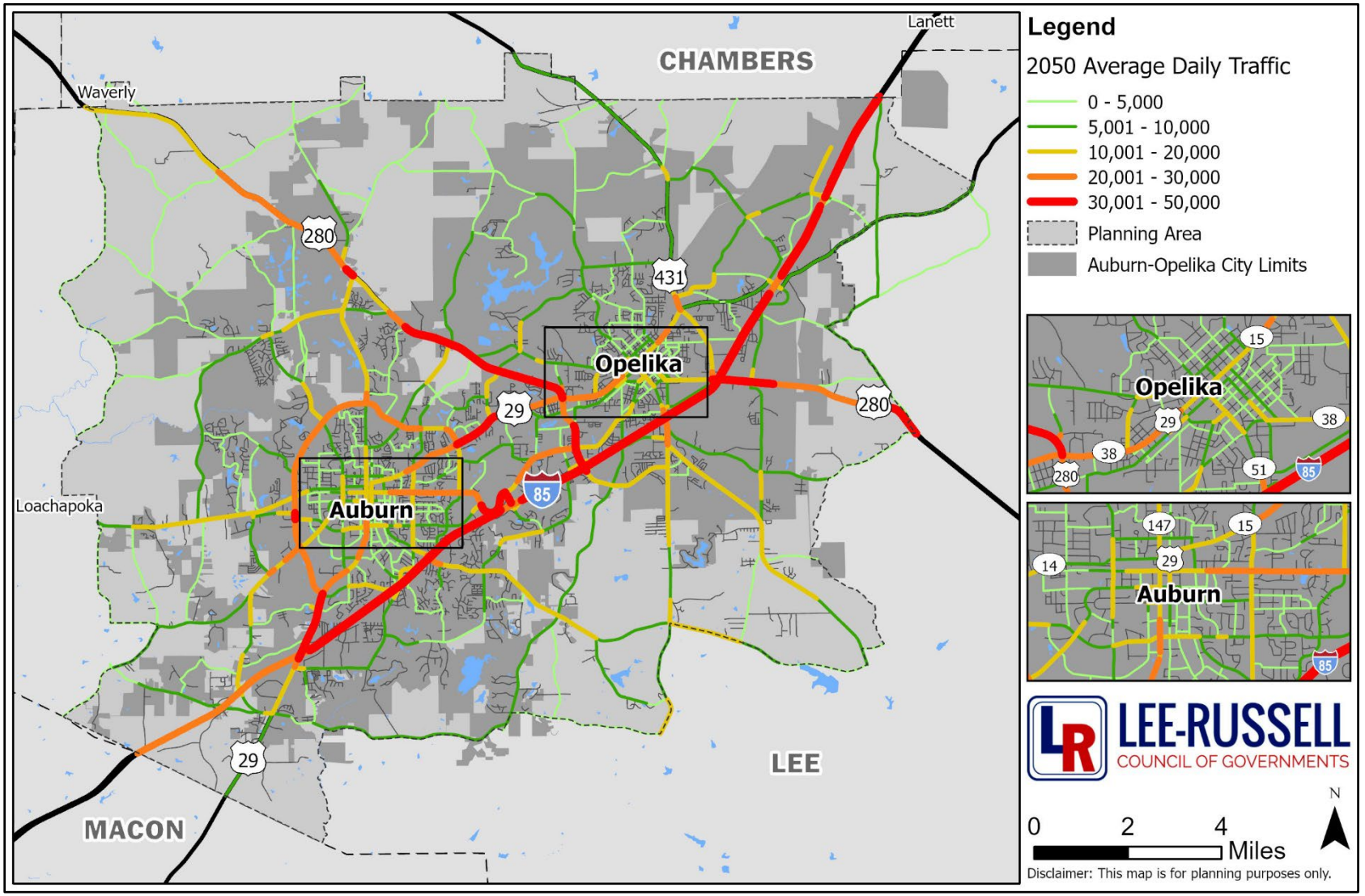
Note: Values above exclude ramps.
Source: Auburn-Opelika MPO Travel Demand Model

Figure 2.1 displays the vehicular traffic in the MPA for 2050 if only the Existing plus Committed (E+C) projects are implemented. The number of roadway segments that experience a Volume to Capacity (V/C) ratio of 1.0 or greater would increase significantly by 2050, as illustrated in **Figure 2.2**.

Not all congested street and highway segments should be widened with additional through lanes or turning lanes. In urban settings, it may be more appropriate to consider Intelligent Transportation System (ITS) improvements or Travel Demand Management (TDM) strategies. Congestion may also be reduced by improving pedestrian, bicycle, and/or transit conditions that will encourage alternative means of transportation. These strategies are discussed in *Technical Report #5: Plan Development*.

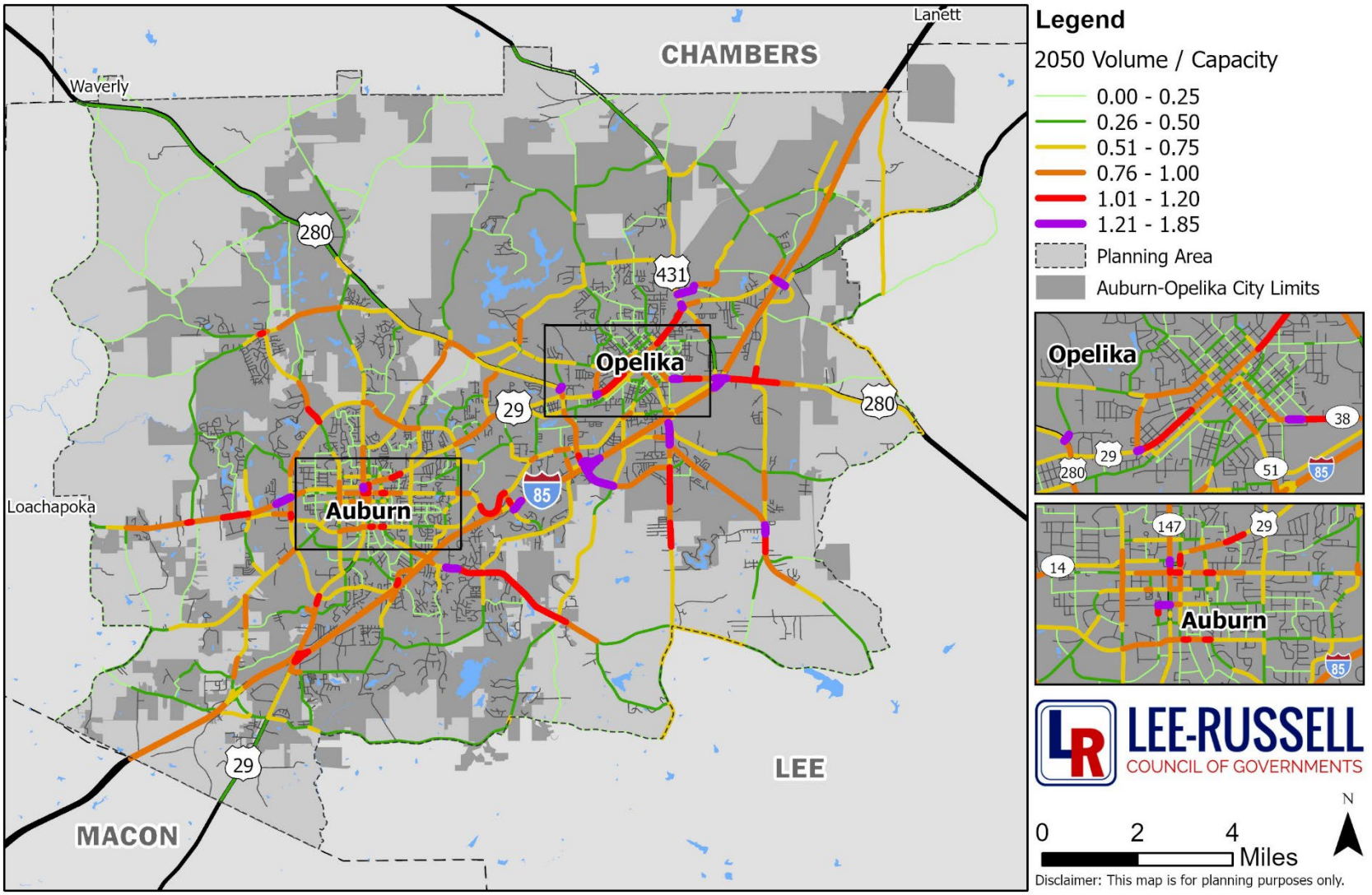
Source: Microsoft Stock Images

Figure 2.1: Average Daily Traffic on Roadways, 2050



Source: Auburn-Opelika MPO Travel Demand Model

Figure 2.2: Future Volume to Capacity, 2050 (Existing + Committed)



Source: Auburn-Opelika MPO Travel Demand Model

Public and Stakeholder Input

During the public and stakeholder involvement process, respondents were asked to identify the roadways and intersections that they felt were most congested. The list below describes the areas that were most often identified:

- US 280 at Tiger Town Pkwy
- Moores Mill Rd
- N Donahue Dr/S Donahue Dr
- Shug Jordan Pkwy
- SR-15 (2nd Ave)
- I-85 at US 280 Interchange
- Magnolia Ave at S College St
- Glenn Ave at S College St
- Richland Rd
- S Dean Rd

Intersection and Corridor Recommendations

The locations in **Table 2.2** were identified through public involvement and engineering review. Observed issues and recommendations to address the intersection needs are also included in the table.

Table 2.2: Recommended Intersection/Interchange Improvement Projects for Congestion

Location	Limits	Observed Issues	Short-term Solution	Long-term Solution
US 280	at Tiger Town Pkwy	Large turning volume for retail and shopping center; proximity to other major intersections; short merging lanes leaving Tiger Town Pkwy; congestion along • Tiger Town Pkwy during both periods • US 280, Enterprise Dr, and Frederick Rd during PM peak	Signal retiming; improve ITS	Improve pedestrian infrastructure; conduct intersection study
Moores Mill Rd	At Ogletree Rd/Hamilton Rd	Multiple businesses near intersection; short left turn lanes along Moores Mill Rd; congestion along • Moores Mill Rd, Ogletree Rd, and Hamilton Rd during PM peak • Moores Mill Rd westbound during AM peak	Signal retiming; improve ITS	Extend left turn lanes along Moores Mill Rd; add dedicated right turn lanes on Moores Mill Rd eastbound and Ogletree Rd; conduct access management study
N Donahue Dr/S Donahue Dr	W Samford Ave to Loachapoka Rd/Bragg Ave	Volume of traffic from students; short turn lanes along Donahue Dr at various intersections; multiple driveways along Donahue Dr; road closure along W Samford Ave; railroad crossing north of Railroad Ave; congestion along • Donahue Dr, W Magnolia Ave, W Samford Ave, and W Glenn Ave during both periods • Intersections of Donahue Dr at Loachapoka Rd/Bragg Ave, W Glenn Ave, W Magnolia Ave, and W Samford Ave during both periods	Signal retiming; improve ITS; improve striping	Extend left turn lanes at congested intersections; conduct corridor study
I-85	at US 280 Interchange	Nearby shopping center; short merge lane on Interstate Dr and I-85 eastbound ramp to US 280; congestion along • US 280 and Enterprise Dr during PM peak • I-85 ramps, Tiger Town Pkwy, and Gateway Dr during both periods	Signal retiming; improve ITS	Extend merge lanes; add another lane to the I-85 southbound off-ramp; conduct interchange study
SR-15	Veterans Pkwy to US 431	Multiple businesses along SR 15; short left turn lanes along SR 15 at Veterans Pkwy and N 30th St; lanes drop from 4 to 2 at Pleasant Dr; congestion along • Intersections of SR 15 at Airport Rd, Pleasant Dr, N 10th St, N 6th St, and US 431 during PM peak • Intersection of SR 15 at US 431 during AM peak • US 431, 1st Ave, and Ave B during AM Peak • SR 15, US 280 southbound, US 431, and1st Ave during PM peak	Signal retiming; improve ITS; improve striping	Add dedicated right turn lanes along SR 15 at Veterans Pkwy, N 20th St, Pleasant Dr, and N 10th St; extend left turn lanes; improve pedestrian infrastructure; conduct access management study

Location	Limits	Observed Issues	Short-term Solution	Long-term Solution
Shug Jordan Pkwy	N Donahue Dr to N College St	Short right turn lane at intersections of Shug Jordan Pkwy at N Donahue Dr and N College St; Short left turn lanes along Shug Jordan Pkwy at N College St; congestion along • Intersections of Shug Jordan Pkwy at N Donahue Dr and N College St during both periods • Shug Jordan Pkwy, N College St, N Donahue Dr southbound, and E University Dr during AM peak • Shug Jordan Pkwy and E University Dr westbound during PM peak	Signal retiming; improve ITS; improve striping	Extend left turn lanes at congested intersections; extend right turn lanes; conduct corridor study
S College St	Samford Ave to Bragg Ave	Road closures on W Samford Ave; proximity to Auburn University; multiple businesses along S College St; presence of on-street parking; lane drop from 4 lanes to 2 lanes between Magnolia Ave and Mitcham Ave; railroad crossing south of Warrior Ct; short left turn lanes at various intersections; congestion along • S College St, Donahue Dr, Samford Ave, Glenn Ave, and Magnolia Ave during both periods • Ross St and Gay St during PM peak • Intersections of S College St at E Thach Ave, Magnolia Ave, Glenn Ave, and Samford Ave during both periods	Signal retiming; improve ITS; improve striping	Extend left turn lanes; add dedicated right turn lanes where possible; conduct corridor study
Richland Rd	Richland Elementary School to Will Buechner Pkwy	Presence of Creekside Elementary and Richland Elementary Schools; nearby tennis center; recent residential development; congestion along • Richland Rd during both school periods	Improve ITS; add dedicated right turn lane on Richland Rd to Richland Elementary School east driveway; extend right turn land on Richland Rd to Creekside Elementary School north driveway; improve pedestrian infrastructure	
S Dean Rd/N Dean Rd	Moores Mill Rd to SR 15 (Opelika Rd)	Presence of Auburn Jr. High School and Dean Road Elementary School; number of driveways along Dean Rd; short student drop-off at Dean Road Elementary School; railroad crossing south of SR-15; congestion along • S Dean Rd and E Samford Ave during both school periods • Intersections of Dean Rd at E Glenn Ave, SR-15, and Annalue Dr during PM peak • SR-15, E Glenn Ave, S College St, and E University Dr duiring PM peak	Signal retiming; improve ITS; improve striping	Add center turn lane along Dean Rd especially near schools; extend student pick-up/drop-off lane at Dean Road Elementary School; improve pedestrian infrastructure; conduct study near railroad crossing

Source: Auburn-Opelika MPO, NSI

2.2 Roadway Maintenance Needs

Pavement Maintenance

Few of the MPA's roadways have poor pavement conditions; however, all segments are likely to experience maintenance needs that will lead to decreased safety or emergency roadway repairs which can increase congestion. In addition, pavements in fair condition will eventually fall into poor condition before the plan's horizon year of 2050. Figure 3.7 in *Technical Report #2: State of Current System* displays the pavement conditions of the NHS monitored roadways within the MPA. In the short-term, attention should be given to roadway segments with long stretches of poor pavement. In the MPA, these segments include various areas along I-85 and SR-147.

Bridge Maintenance

The state of current system analysis revealed that less than 2.5 percent of bridges within the MPA are in poor condition. Two of the bridges in poor condition were identified as being on the National Highway System.

Addressing the needs of these bridges will improve safety, reduce maintenance costs, and avoid future bridge shutdowns. Bridges are rated by the National Bridge Inventory based on the conditions of the following categories:

- Decks
- Superstructure
- Substructure
- Stream Channel and Channel Protection

A bridge is in poor condition if any of the above categories are rated "Poor". Some of these deficient bridges may be improved via this plan or through other transportation projects, such as a roadway widening. Other bridges could be improved through line-item funding for operations and maintenance. These bridges are recommended for improvements as funding becomes available. Local agencies should continue to train designated employees in the bridge inspection process so that monitoring activities can be maintained through staff turnover.

2.3 Roadway Safety Needs

Nearly 17,600 crashes occurred between 2019 and 2023 within the MPA. These crashes include 55 fatal crashes and 246 serious injury or suspected serious injury crashes. Recommendations for reducing the most common types of crashes are outlined below.

The highest number of crashes in the MPA were rear-end crashes, comprising over a third of collisions.

Reducing Rear-End Collisions

Rear-end collisions can be attributed to several factors, such as:

- driver inattentiveness
- large turning volumes
- slippery pavement
- inadequate roadway lighting
- crossing pedestrians
- poor traffic signal visibility
- congestion
- inadequate signal timing
- an unwarranted signal

In general, the recommendations for reducing rear-end crashes include:

- Analyzing turning volumes to determine if a right-turn lane or left-turn lane is warranted.
    - Providing a turning lane separates the turning vehicles from the through vehicles, preventing through vehicles from rear-ending turning vehicles.
    - If a large right-turn volume exists, increasing the corner radius for right-turns is an option.
    - Requiring new developments on higher speed roads or with higher intensity developments to install turn lanes can help standardize this practice.
- Checking the pavement conditions.
    - Rear-end collisions caused by slippery pavement can be reduced by lowering the speed limit with enforcement or by providing overlay pavement, adequate drainage, grooved pavement, and/or a “Slippery When Wet” sign.
- Verifying that roadway lighting is sufficient for drivers to see the roadway and surroundings.
- Determining if there is a large amount of pedestrian traffic.
    - Pedestrians crossing the roads may impede traffic and force drivers to stop suddenly.
    - If crossing pedestrians are an issue, options include installing or improving crosswalk devices and providing pedestrian signal indicators.
- Checking the visibility of the traffic signals at all approaches.

    - To provide better visibility of the traffic signal, options include installing or improving warning signs, overhead signal heads, 12" signal lenses, visors, back plates, or relocating/adding signal heads.
- Verifying that the signal timing is adequate to serve the traffic volumes at the trouble intersections.
    - Options include adjusting phase-change intervals, providing or increasing a red-clearance interval, providing progression, and utilizing signal actuation with dilemma zone protection.
- Verifying that a signal is warranted at the given intersection.
- Enforcing hands-free driving.

Reducing Side Impact / Angle Crashes

Angle crashes were the second most common within the MPA. These crashes can be caused by several factors, such as:

- restricted sight distance
- excessive speed
- inadequate roadway lighting
- poor traffic signal visibility
- inadequate signal timing
- inadequate advance warning signs
- running a red light
- large traffic volume

In general, the recommendations for reducing side impact and angle collisions include:

- Verifying that the sight distance at all intersection approaches is not restricted.
    - Options to alleviate restricted sight distance include removing the sight obstruction and/or installing or improving warning signs.
    - Requiring new driveways and access points to be installed where there is clear line of sight and sight distance can be met is a proactive way to achieve clear visibility.
- Conducting speed studies to determine whether speed was a contributing factor.
    - To reduce crashes caused by excessive speeding, the speed limit can be lowered with enforcement, the phase change interval can be adjusted, or rumble strips can be installed.
- Verifying that roadway lighting is sufficient for drivers to see the roadway and surrounding area.
- Checking the visibility of the traffic signal at all approaches.
    - To provide better visibility of the traffic signal, options include installing or improving warning signs, overhead signal heads, 12" signal lenses, visors, back plates, and/or relocating or adding signal heads.
- Verifying that the signal timing is adequate to serve the traffic volumes.
    - Options include adjusting phase change intervals, providing or increasing a red-clearance interval, providing progression, and/or utilizing signal actuation with dilemma zone protection.

- Verifying that the intersection is designed to handle the traffic volume.
    - If the traffic volumes are too large for the intersection's capacity, options include adding one or more lanes and retiming the signal.
- Conducting a roundabout study.
    - By design, roundabouts reduce the likelihood of angle collisions.

Reducing Other Collision Types

The remaining representative crash types can be attributed to incidents involving animals, backing up, bicycle/pedestrian encounters, fixed objects, head on collisions, jackknifing, rollovers, running off the road (the third most common crash type in the region), and vehicle defects. Recommendations for increasing safety and reducing the number of crashes for these crash types include:

- Determining if the speed limit is too high or if vehicles in the area are traveling over the speed limit.
    - Reducing the speed can reduce the severity of crashes and make drivers more attentive to their surroundings.
- Verifying the clearance intervals for all signalized intersection approaches and ensuring that there is an "all red" clearance.
    - For larger intersections, it is particularly important to have a long enough clearance interval for vehicles to safely make it through the intersection before the light turns red.
- Checking for proper intersection signage, especially if the roadway geometry may be confusing for the driver.
- Verify that all one-way streets are marked "One-Way", and "No Turn" signs are placed at appropriate locations.
- Verifying that pavement markings are visible during day and night hours.
- Verifying that the roadway geometry can be easily maneuvered by drivers.
- Evaluating left and right turning volumes to determine if a right turn and/or left turn lane is warranted.
- Verifying that roadway lighting is sufficient for drivers to see roadway and surroundings.
- Checking the visibility of the traffic signals from all approaches.
- Verifying that lanes are marked properly and provide turning and through movement directions, as well as signage that indicates lane configurations.
    - These directions will prevent cars from dangerously switching lanes at the last minute thereby reducing crash potential.

Stakeholder and Public Input

During the public and stakeholder involvement process, respondents were asked to identify the roadways and intersections with the most safety issues based on their perception. The

locations that were most often identified are listed below and are potential candidates for additional safety studies within the MPA.

- I-85
- US 280
- SR-15
- SR-169 at SR-51
- University Dr
- Martin Luther King Blvd

3.0 Public Transit

This section provides an overview of the Lee Russell Public Transit (LRPT) system and recommendations to meet the different challenges related to public transit within the planning area as identified in the State of the Current System Report.

In 2023, a Transit Development Plan Recommendations report was presented to the Lee-Russell Council of Governments. In that report, two concepts were presented for Lee County. The first concept divided Lee County into East and West microtransit zones with a fixed route shuttle connecting downtown Auburn and downtown Opelika. The second concept did not include the fixed route shuttle and offered only the two microtransit zones.

3.1 Transit System Overview and Recommendations

Based on the analysis of Auburn-Opelika's transit data compared to its peer average and considering the two concepts from the Transit Development Plan, the following recommendations will improve service efficiency, financial sustainability, and ridership:

Fare System Implementation - Reintroduce a Fare Structure

Since LRPT currently generates no fare revenue, reintroducing a fare system is essential for financial sustainability. Even a low fare could significantly contribute to offsetting operating costs.

> **Recommendation**: Consider implementing a tiered or discounted fare structure for students, seniors, and low-income riders.
>
> **Action**: Begin with a pilot fare program in high-demand routes to gauge rider response and fine-tune the system before full-scale implementation.

Improve Ridership Productivity - Increase Boardings per Revenue Mile and Revenue Hour

LRPT has low productivity in terms of boardings per revenue mile (0.13) and revenue hour (0.46) compared to its peer group. This data suggests that the system could be better utilized.

> **Recommendation**: Optimize future routes to focus on areas with higher potential ridership. Focus on service frequency during peak hours in densely populated or highly trafficked areas and possibly reduce service in areas with consistently low demand.

Action: Use data analytics or community feedback to identify "hot spots" where service is needed or where current service can be optimized (e.g., better alignment with job centers, educational institutions, or shopping hubs).

Enhance Service Efficiency - Optimize Operational Costs

LRPT is already efficient in terms of operating costs per vehicle mile, vehicle hour, and boarding. The following recommendation can maintain or even improve this efficiency.

Recommendation: Regularly monitor and optimize fuel consumption, vehicle maintenance schedules, and staffing levels to keep operating costs low.

Action: Invest in technologies like route optimization software or GPS tracking to better track and manage operations in real-time, reducing idle time and unnecessary detours.

Focus on Marketing and Outreach - Boost Ridership with Targeted Campaigns

With a lower boarding per capita compared to the peer group, LRPT should invest in marketing and outreach to boost awareness and increase ridership.

Recommendation: Launch targeted marketing campaigns to promote transit use, especially among college students, seniors, and low-income communities. Highlight the affordability, environmental benefits, and convenience of using public transit.

Action: Partner with local universities, employers, and civic organizations to promote the transit system, offering discounted or free trial rides to encourage new riders.

Expand Service to High-Demand Areas - Target Areas with Higher Demand

Given the lower population density in Auburn-Opelika, the service area could benefit from expanding service to areas with higher potential demand or underserved areas.

Recommendation: Expand or modify routes to serve new or growing developments, commercial districts, or underserved residential areas where demand might increase.

Action: Conduct surveys or community outreach to better understand where people would like to see improved service, and design routes that match actual demand.

Enhance Partnerships and Alternative Revenue Streams - Diversify Revenue Sources

Since farebox recovery is not in place, LRPT could explore other revenue-generating options.

Recommendation: Seek partnerships with local businesses, universities, or public-private partnerships to secure additional funding. For example, offer advertising

space on buses, create corporate or institutional sponsorships, or collaborate with local governments on grants.

Action: Explore grant opportunities for transit development, sustainable energy investments (e.g., electric buses), or capital improvement projects.

Monitor and Improve Service Flexibility - Implement Flexible/On-Demand Transit

In a lower-density area like Auburn-Opelika, on-demand or flex routes could be a more cost-effective solution than fixed routes, especially during off-peak hours.

Recommendation: Implement a pilot program for on-demand transit services (e.g., app-based rideshare options like microtransit) to cover less dense areas or provide first-mile/last-mile connectivity.

Action: Use technology platforms for on-demand ride scheduling and route matching to reduce empty vehicle miles and improve service efficiency during low-demand times.

Explore Infrastructure Improvements - Enhance Accessibility and Infrastructure

Accessibility and infrastructure are key factors in improving the user experience.

Recommendation: Invest in improving transit stops to make them accessible and well-lit. Provide amenities like seating or shelter. Additionally, adding bike racks on buses or at stations can increase convenience and attract riders.

Action: Prioritize high-traffic or high-need areas for infrastructure upgrades to make transit more appealing.

Analyze and Adjust Farebox Recovery Rate - Monitor Farebox Performance and Adjust Strategy

The lack of fare revenue is a clear issue. Over time, LRPT should evaluate the financial performance of the fare structure and adjust if needed.

Recommendation: Aim for a modest farebox recovery rate by setting a long-term goal for a sustainable fare structure that helps fund operations.

Action: Review the effects of the initial fare structure on ridership and revenue and adjust accordingly to balance cost recovery with ridership retention.

Overall Strategic Focus - Sustainability

By implementing a fare system and optimizing operational efficiency, LRPT can become more financially sustainable in the future.

Ridership Growth: Use marketing, targeted outreach, and route optimization to help increase ridership and improve productivity.

Community Engagement: Involve the community in decision-making through surveys or advisory committees to better align services with local needs.

By making these improvements, LRPT can enhance its service, boost ridership, and provide long-term sustainability while maintaining the high cost-efficiency it currently enjoys.

4.0 Bicycle and Pedestrian

4.1 Infrastructure/Facility Needs

A large, mostly connected, network of bicycle routes, sidewalks, and shared pathways exists within the MPA. These facilities are located throughout the planning area on functionally classified roadways and within local neighborhoods. The MPO recognizes the importance of connected bicycle and pedestrian facilities and supports the development of pedestrian focused facilities along all existing and proposed roadways where right-of-way and safety permit. In addition to the non-motorized transportation set-aside required by the transportation bill, the MPO and its partner agencies can set aside additional MPO funding or seek additional funding sources[1] and grants to improve existing sidewalk infrastructure, reconstruct facilities to meet ADA standards, and close gaps within the pedestrian network.

Future bicycle and pedestrian facility needs and projects were included in the *Auburn-Opelika Bicycle and Pedestrian Plan (The Plan)* which the LRTP supports and uses to guide its recommendations. The projects were identified as those most needed to improve the overall bicycle and pedestrian network within the planning area. These projects, once developed, will reduce gaps in the system and improve connectivity to the existing bicycle and pedestrian network, major employment area, retail shopping centers, the transit system, schools, colleges, and parks. *The Plan* referenced the *Auburn Comprehensive Plan 2030 (dated 2011)* which placed importance on pedestrian travel by proposing to increase connectivity to already established sidewalks and identify new locations for pedestrian facilities. Bicycle travel was also discussed with a proposal to increase the current 34 miles of existing bicycle infrastructure to 117 miles of infrastructure.

Needs

The AOMPO LRTP supports the efforts undertaken to develop *The Plan*. This plan combines that plan's findings and recommendations with those developed using the LRTP's safety analysis.

Growing Demand for Active Transportation

The residents within the MPA desire safe and convenient walking, bicycling, and other non-motorized transportation options in the region which reflects a growing desire for healthier

[1] https://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.pdf

lifestyles and alternatives to car-dependent travel.

Need for Collaboration

The region has a strong but spread-out bicycle and pedestrian network with gaps in connectivity. These gaps are partially due to the geographic spread of the region but also reflect how different agencies and jurisdictions within the region coordinate. The MPO and its partner agencies can more efficiently address the needs of bicyclists and pedestrians by taking a collaborative approach to maintenance schedules, identification of unsafe areas, and funding solutions.

Limited Infrastructure Connectivity

While the existing portions of the network have a significant presence in their immediate vicinity, they largely serve portions of a jurisdiction, individual neighborhoods, or a selection of city blocks. Existing infrastructure and connectivity gaps make it challenging for residents to safely bicycle or walk between communities, schools, workplaces, and recreational areas. As population and employment within the region increases, facilities will need additional capacity or greater connectivity.

Based on the information within *Technical Report #2: State of Current System*, gaps within the region exist in the following locations:

- Opelika, North of US 29
- Opelika, bounded by US 280, US 29, Auburn St, and I-85
- Auburn, bounded by Moores Mill Rd, US 29, E University Dr, and I-85

The gaps listed above constitute the largest areas where little or no bicycle and pedestrian facilities are available and where people may want to travel for recreation and work. The remaining gaps in the region's non-motorized network occur between existing infrastructure and are gaps in connectivity.

4.2 Infrastructure/Facility Recommendations

The following recommendations are proposed to improve the bicycle/pedestrian network and its associated facilities.

Develop a Connected Network

The MPO and its partner agencies can prioritize the development of a connected network of safe and accessible bicycle and pedestrian infrastructure throughout the region. This network should connect communities, schools, workplaces, and key destinations. The first step is to connect the existing groupings of infrastructure to one another. Addressing the largest gaps as discussed in the previous section is a medium-term need that will further

enhance connectivity within the region and provide greater access between the Cities of Auburn and Opelika.

Prioritize Safety

Additionally, the non-motorized network would benefit greatly from safety improvements to existing infrastructure, including traffic calming measures, high-visibility crosswalks, and bike lanes. These improvements can mitigate safety risks for vulnerable road users. The MPO should work with its member jurisdictions to determine high-risk locations and potential solutions that should be considered.

Implement a Multimodal Approach

The region should consider a multimodal approach to transportation by promoting the use of public transit, walking, and bicycling as complementary modes of travel to traditional vehicular travel. The development of a multimodal network can reduce the number of vehicles on the roadway, lower congestion, increase safety, and improve air quality.

4.3 Maintenance

Maintenance is, and will always be, a major challenge for any type of transportation infrastructure. However, it is incumbent upon all jurisdictions responsible for these facilities to maintain their functional viability. As bicycle and pedestrian facilities are added to the MPA's transportation network, they must be designed in compliance with ADA requirements. Additionally, older facilities may require repairs, maintenance, and/or updates to comply with ADA standards.

In addition to maintaining or developing maintenance schedules for bicycle and pedestrian facilities, local jurisdictions should begin identifying funding sources for annual facility maintenance. Failure to have dedicated funding sources in place for maintaining existing and future infrastructure can result in degradation of these facilities to the point of rendering them unusable and useless to the traveling public who may depend on them to access everyday needs. If local jurisdictions determine there is a lack of available funding for maintenance, they should explore alternative maintenance strategies through partnerships with other organizations and the creation of maintenance programs such as "Adopt-a-Trail". Adopt-a-Trail programs allow groups such as bicycling/running clubs and homeowner associations to be responsible for the maintenance of an identified segment of a bicycle or pedestrian facility.

4.4 Safety and Security Needs

Safety

States and MPOs are required to set targets and report annual progress regarding the number of non-motorized fatalities and serious injuries as described in Performance Measure 1 of the federal transportation performance management requirements. The existing safety performance of the AOMPO's planning area is discussed in *Technical Report #2: State of Current Systems* and *Technical Report #3: Transportation Performance Management*.

Traffic crashes between motorists and non-motorized users of the transportation system can be caused by the lack of effective safety infrastructure. However, distracted driving plays an even more significant role in these types of incidents. Distracted driving is any activity that diverts attention from driving, including:

- talking or texting on a phone or device
- eating and/or drinking
- talking to people in the vehicle
- "rubber necking"
- operating entertainment
- navigation systems

Studies have shown that 3,308 people in the United States died in motor vehicle crashes involving distracted driving in 2022. In most cases, addressing driver inattentiveness could have a more profound impact on reducing automobile crashes than infrastructure improvements.

[2]

Distracted walking can also be a contributing factor to crashes involving pedestrians. While texting and driving is a known danger, distracted walking results in more injuries per mile than distracted driving. Though injuries from car crashes involving texting are often more severe, physical harm resulting from texting and walking occurs more frequently as pedestrians step into the roadway unaware of oncoming traffic. Both drivers and pedestrians share equal responsibility to pay attention to their surroundings to reduce their chances of being involved in a crash.

[2] https://www.nhtsa.gov/risky-driving/distracted-driving

To improve safety for both bicyclists and pedestrians, local jurisdictions within the AOMPO planning area can coordinate with ALDOT and local police departments to obtain detailed crash records that aid in identifying high crash locations and identify safety measures that, when implemented, will have the greatest impact on reducing the total amount and severity of crashes. This process can also include identifying high crash locations between motorists and bicyclists/pedestrians with assessments made to determine:

- the primary causes for the repeated incidents,
- appropriate safety countermeasures that are suitable to address the underlying causes of the problem, such as
    - traffic calming measures (i.e., road diets or raised crosswalks),
    - improved signage,
    - pavement markings,
    - signalization at intersections, or
    - education programs designed to prevent future crashes.

Additionally, the MPO can conduct a corridor or intersection safety study when it considers other improvements to the roadway infrastructure such as:

- road diets,
- geometry changes,
- signal retimings to accommodate pedestrians,
- installation of new pedestrian signals,
- intersection restriping to renew or add crosswalks where appropriate,
- installation of lighting, and
- construction of sidewalks at the intersection.

Security

In addition to safety concerns, there are also numerous security concerns to a bicycle and pedestrian network including but not limited to:

- the possibility of criminal attack,
- theft, and
- vandalism.

These concerns are primarily along portions of shared use bicycle and pedestrian paths that are isolated from the roadway right-of-way. To provide a greater sense of security for users of shared use paths, project engineers and managers should strongly consider incorporating additional security features in the development of all new facilities which can include

increased lighting, cameras, and emergency phone boxes placed at strategically located areas along each facility.

The MPO and member jurisdictions should also consult with local law enforcement agencies to request that officers periodically patrol these facilities. Increasing law enforcement presence is a major factor in deterring crime before it happens. Local advocates willing to participate should consider the feasibility of organizing bicycle and pedestrian safety watch groups to intermittently patrol the facilities. Even if law enforcement officials periodically patrol shared use facilities, it is impossible to guarantee they will always be on-site during an emergency. A safety watch group provides a secondary deterrent to crime when law enforcement officials are unavailable.

Implementing prevention measures to aid in reducing theft and vandalism of support facilities along bicycle and pedestrian corridors is also a need. Installing Closed Circuit Television (CCTV) systems to constantly monitor high value support facilities would diminish the potential of these assets from being stolen or vandalized. Additionally, providing physical barriers, such as fencing, limits access to these areas and serves as an additional security deterrent.

4.5 Recommended Short-Term Non-Motorized Projects

Since the region has an existing non-motorized network that largely needs to focus on connectivity more than gaps, the LRTP supports the projects proposed in the *Auburn-Opelika Bicycle and Pedestrian Plan* and the priorities contained within it. These projects allow the region to focus primarily on creating connections from smaller communities to larger and more established communities to provide a comprehensive network that connects various jurisdictions and people within the planning area.

5.0 Freight Analysis and Needs

Freight needs vary by mode, and mobility, safety, and asset conditions for each freight mode must be considered in future transportation planning and implementation. In addition, the impact of the freight modes themselves on the local infrastructure is also important and should be considered.

Freight projections from the Freight Analysis Framework (FAF) indicate that commerce and trade will continue to grow throughout the MPA from 2023 to 2050 which will lead to an increase in freight tonnage, value, and transported volume. This increase in freight traffic will lead to increased congestion as more vehicles are needed to move goods from one mode or location to another.

Projects in the MPA that address freight needs can improve the region's safety and economic competitiveness.

5.1 Freight Transported by Truck

This section summarizes future freight truck movement and needs. As the movement of goods via trucks increases, so does the number of heavy vehicles on the roadways.

When considering freight moved by trucks, planners should consider future:

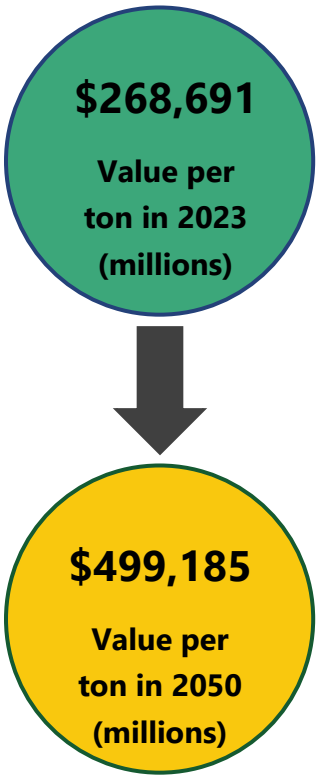
- truck volumes,
- truck congestion,
- adequate truck parking,
- roadway designs that accommodate trucks, and
- pavement and bridge conditions.

Trucking can be considered the lifeblood of day-to-day living because it is vital to transporting goods from one place to another. These trips are responsible for most of the distance between the first-mile (origin) of goods and the last-mile (destination) where products are sold or delivered. Trucks that haul freight are a heavy user of the roadways, and these vehicle loads put a large strain on the infrastructure, both physically and

operationally. The infrastructure needs to be resilient enough to handle these large, heavy vehicles while providing adequate capacity, reliable service, and sufficient facilities.

Commodity Flow Growth

According to the FAF 5, the truck mode within the "Rest of Alabama" region (which accounts for the MPA) is expected to increase the tonnage transported by about 42 percent, while the value of freight is expected to more than double. The truck commodity flow growth for the region is displayed in **Table 5.1**.



Infrastructure Impacts

Roadway Volumes

The roadways with the highest freight truck traffic in 2023 are shown in *Technical Report #2: State of Current System*. As additional commodities are transported throughout the region and trips increase from 2023 through 2050, these roadways are expected to see an increase in truck traffic as well. **Figure 5.1** displays the anticipated growth in freight truck traffic while **Figure 5.2** shows the MPA's estimated 2050 truck volumes on its roadway network.

High truck volumes indicate locations where pavement conditions are most likely to be impacted by heavy vehicles. Locations with a high volume/capacity ratio indicate not only congestion but also potential bottlenecks. **Figure 5.3** displays the MPA's roadway network by truck volume and volume/capacity ratio. Areas within the MPA that are anticipated to have a high volume/capacity ratio and significant number of trucks include:

- I-85 Ramps
- US 280/Gateway Dr
- US 280/SR-38
- SR-15
- SR-169
- SR-51
- E Glenn Ave
- Lake Gandy Rd
- S College St
- Moores Mill Rd
- Shelton Mill Rd

Pavement and Bridge Conditions

Poor pavement conditions can result in increased wear and tear on all vehicles which and can increase the operating costs for heavy vehicles. Additionally, heavy vehicles greatly contribute to the degradation of pavement and bridge conditions, creating a cycle of damage to infrastructure and vehicles alike. Within the MPA, nearly 53 percent of pavements are in Fair condition and will need preventative maintenance to avoid moving to

Poor condition in the future. Additionally, roadways anticipated to see the greatest truck traffic growth should be monitored so that pavement conditions on those routes can be maintained in, or brought up to, Good condition. These locations include I-85, US 280, US 431, and SR-147.

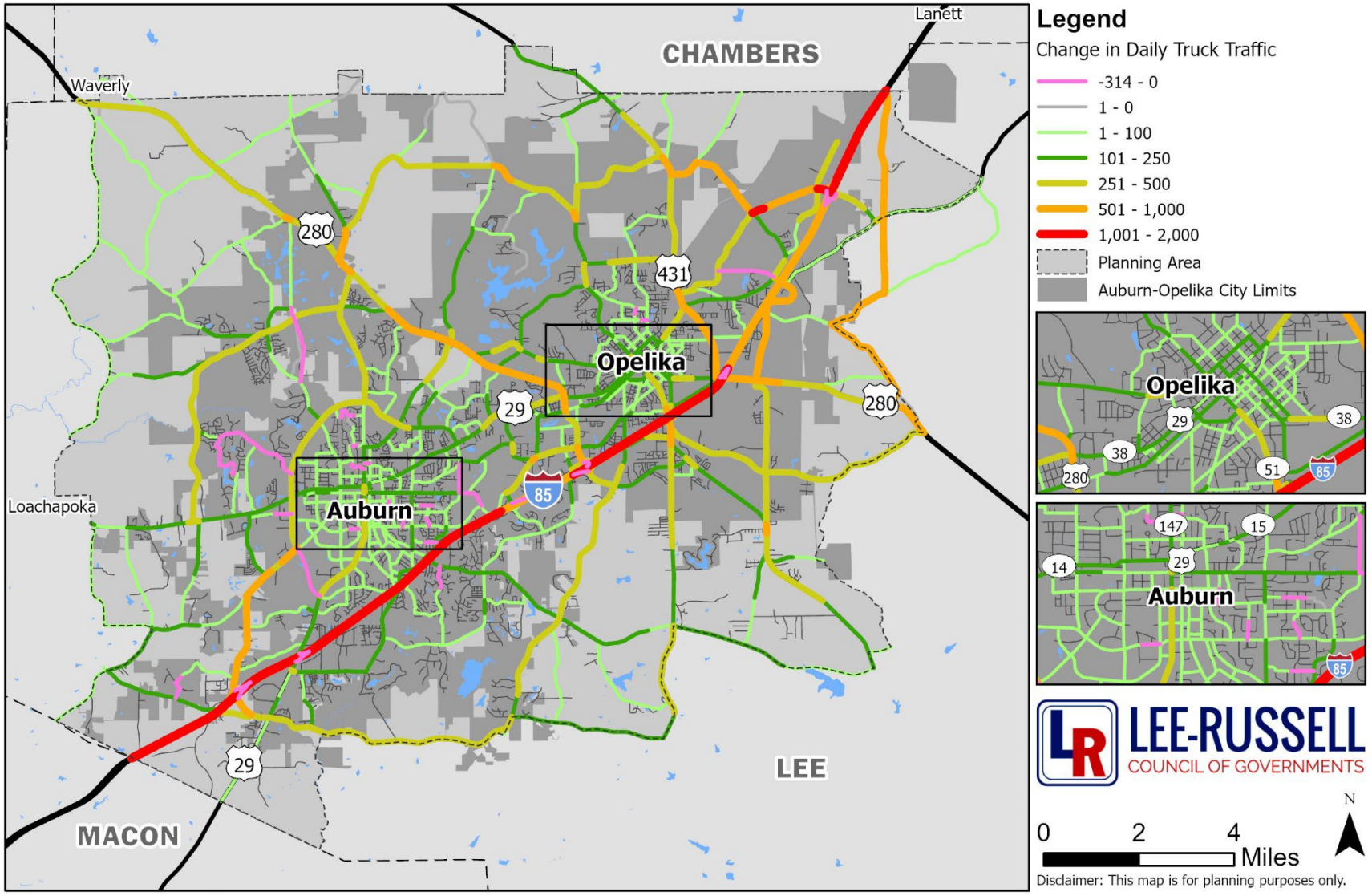
Bridge conditions should be monitored to ensure that bridges can handle the increases in freight traffic and that bridges with low vertical clearances require trucks to detour to avoid the risk of striking the bridge infrastructure which can result in bridge and road closures.

Table 5.1: Changes in Rest of Alabama Commodity Flows by Truck, 2023-2050

Rest of Alabama Region								
Direction	Tons (Thousand)				Value ($ million)			
	2023	2050	Change	Percent Change	2023	2050	Change	Percent Change
Inbound (Interstate)	136,029	198,438	62,410	46%	113,932	215,444	101,513	89%
Inbound (Intrastate)	87,342	116,314	28,972	33%	35,874	63,309	27,435	76%
Outbound (Interstate)	146,780	211,699	64,919	44%	118,885	220,432	101,546	85%
Total	370,151	526,451	156,300	42%	268,691	499,185	230,494	86%

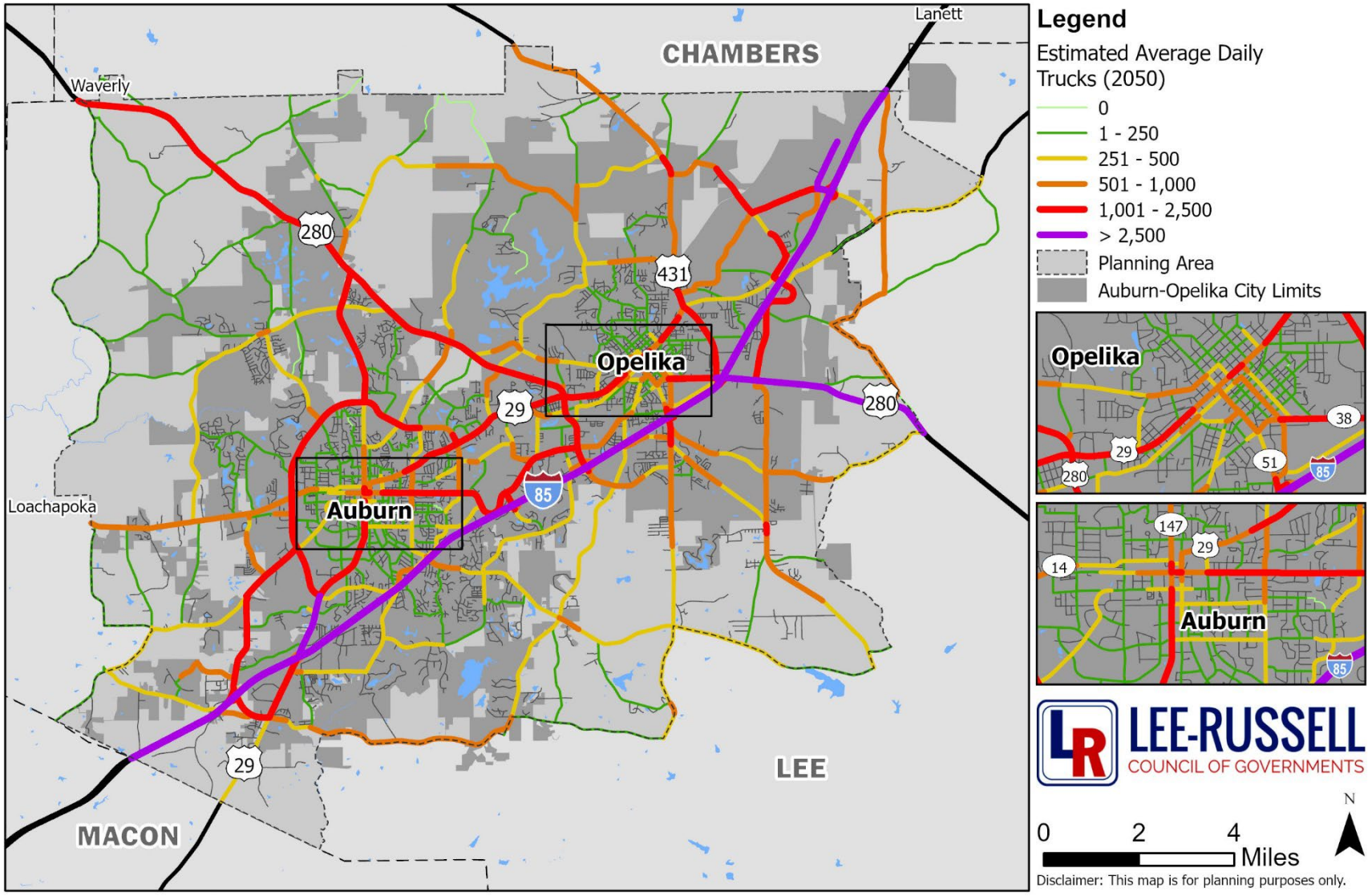
Source: Freight Analysis Framework 5.5, 2024

Figure 5.1: Freight Truck Growth, 2022-2050



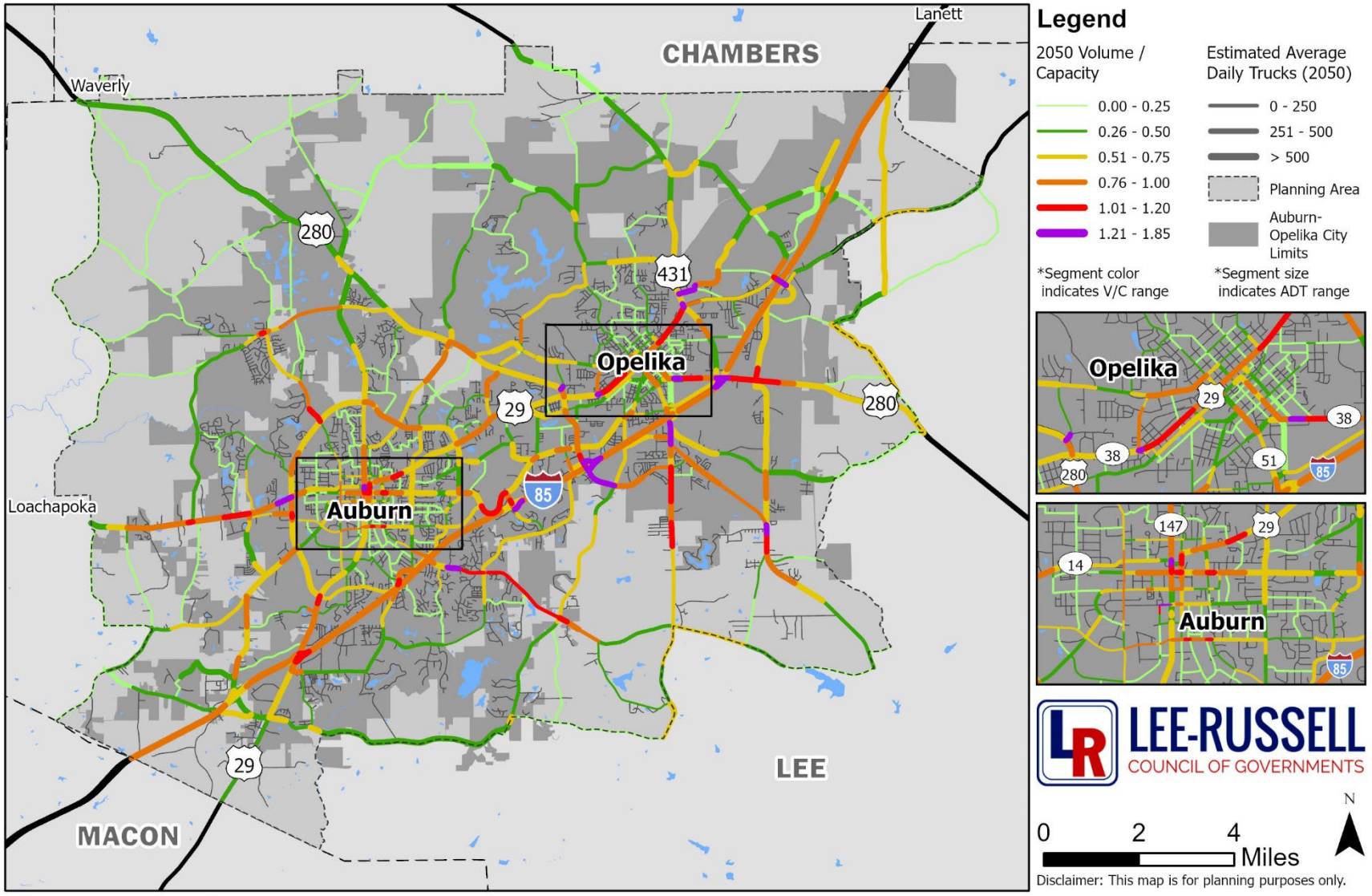
Source: AOMPO Travel Demand Model

Figure 5.2: Freight Truck Traffic, 2050



Source: AOMPO Travel Demand Model

Figure 5.3: Congested Freight Truck Corridors, 2050



Source: AOMPO Travel Demand Model

Reliability

Through roadway infrastructure legislation, FHWA established a freight performance measure to capture truck travel time reliability on the MPA's Interstate highway system: the Truck Travel Time Reliability (TTTR) index[3].

Travel time reliability refers to the consistency or predictability in travel durations observed daily and/or across various times of the day. It holds considerable importance for a wide range of transportation system users including motorists, public transport passengers, cargo providers, and air passengers. Both leisure and business travelers place high value on reliability as it enables them to plan their journeys accurately in terms of departure and arrival times. The Truck Travel Time Reliability Index is a tool designed to evaluate the reliability of freight transportation. By analyzing data concerning truck speeds and travel time reliability, this metric aids in pinpointing and quantifying significant bottlenecks for freight trucks on Interstate highways[4].

The 2024 TTTR within the MPA is 1.15. The state's freight performance measures and the MPO's progress toward them are discussed in *Technical Report 3: Transportation Performance Management*.

To further enhance freight truck reliability, several actionable items can be introduced:

- Truck Parking[5]
    - Expansion of Truck Parking Facilities - Developing additional safe and secure truck parking areas along key freight corridors to reduce illegal parking and provide drivers with adequate rest facilities.
    - Real-Time Parking Information Systems - Implementing technology that provides drivers with real-time information concerning available parking spaces to reduce time spent searching for parking.
- Dedicated Freight Routes[6]
    - Establishment of Dedicated Freight Lanes - Creating exclusive lanes for freight trucks on heavily trafficked routes to reduce congestion and improve travel

[3] https://www.fhwa.dot.gov/tpm/rule/pm3/freight.pdf
[4] https://ops.fhwa.dot.gov/publications/tt_reliability/TTR_Report.htm
[5] https://ops.fhwa.dot.gov/Freight/infrastructure/truck_parking/index.htm
[6] chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.transportation.gov/sites/dot.gov/files/2020-09/NFSP_fullplan_508.pdf

time reliability.
    - Designated Freight Corridors - Identifying and designating specific corridors that prioritize freight movement and provide smoother and faster transit for goods.

- Implementing New Technologies[7]
    - Intelligent Transportation Systems (ITS) - Deploying ITS solutions such as real-time traffic monitoring, dynamic message signs, and smart traffic signals to optimize traffic flow and reduce bottlenecks.
    - Advanced Vehicle Technologies[8] - Encouraging the adoption of advanced vehicle technologies, including automated driving systems and vehicle-to-infrastructure (V2I) communication, to enhance safety and efficiency.
    - Freight Data Analytics - Utilizing big data and analytics to monitor freight movement, predict traffic patterns, and make data-driven decisions to improve overall reliability.

Progress in these areas should be continually monitored and reported in subsequent technical reports.

Safety

The increase in truck traffic is also likely to increase heavy vehicle crashes. All crashes can result in delays and increased operating costs for freight truck traffic. However, crashes involving heavy vehicles, especially those that involve hazardous chemicals, often result in a greater amount of congestion when compared to a crash between passenger vehicles.

Safety recommendations that can significantly contribute to reducing the frequency and severity of crashes involving heavy vehicles in the MPA are shown in **Figure 5.4**[9]. Implementing the following proposed safety recommendations can significantly contribute to reducing the frequency and severity of crashes involving heavy vehicles thereby enhancing overall road safety in the Auburn-Opelika MPA.

[7] https://www.gao.gov/products/gao-23-105740

[8] https://www.volpe.dot.gov/our-work/infrastructure-systems-and-technology/advanced-vehicle-technology

[9] https://www.fmcsa.dot.gov/ourroads/tips-truck-and-bus-drivers

Figure 5.4: Recommendations for Reducing Heavy Vehicle Crash Frequency and Severity

- **Enhanced Driver Training** - Implement mandatory advanced driver training programs focusing on defensive driving techniques, hazard recognition, and safe driving practices specifically tailored for operators of heavy vehicles.
- **Regular Vehicle Maintenance** - Establish stringent maintenance schedules for heavy vehicles to ensure all safety-critical components, such as brakes, tires, and lights, are in optimal condition.
- **Speed Management** - Enforce stricter speed limits for heavy vehicles in high-risk areas and consider the use of speed governors to automatically limit the maximum speed of heavy vehicles.
- **Fatigue Management** - Introduce comprehensive fatigue management programs, including mandatory rest breaks and monitoring of driving hours to prevent driver fatigue.
- **Collision Avoidance Technology** - Encourage the adoption of advanced driver-assistance systems (ADAS) such as automatic emergency braking, lane departure warning, and blind-spot detection in heavy vehicles.
- **Improved Roadway Design** - Enhance roadway infrastructure by improving signage, lighting, and adding dedicated lanes for heavy vehicles where feasible to reduce interactions with smaller vehicles.
- **Public Awareness Campaigns** - Conduct regular public awareness campaigns to educate all road users about the limitations and safety practices associated with sharing the road with heavy vehicles.
- **Data-Driven Enforcement** - Utilize crash data analytics to identify high-risk locations and times for heavy vehicle crashes and deploy targeted enforcement and safety measures in those areas.
- **Incident Response Training** - Provide specialized training for emergency responders on handling incidents involving heavy vehicles to ensure swift and safe resolution of accidents.
- **Collaborative Stakeholder Engagement** - Foster collaboration between government agencies, trucking companies, and safety organizations to continuously evaluate and improve heavy vehicle safety policies and practices.

5.2 Freight Transported by Rail

This section summarizes future freight moved by rail and its impact on the infrastructure.

Commodity Flow Growth

The FAF data shows that freight moved by rail is expected to increase by nearly 66 percent from 2023 to 2050. This increase will result in either additional rail cars or an increase in the

number of rail trips. Additional maintenance will be needed along these facilities, and an increase in the duration and/or frequency of traffic stops is expected when trains cross over a roadway.

Infrastructure Impacts

Future rail capacity and needs can be measured in many ways. Actual volumes and capacities are not known for all rail segments within the MPA. Consequently, it is difficult to forecast future capacity utilization rates and needs by segment. The MPO and its partner agencies can consider several things when planning for the future of freight moved by rail.

Weight Limits

Consistent railroad weight capacity is important to maintain freight rail movement efficiency and cost advantage. Shippers on rail lines that exceed the standard 286,000-pound gross carloads may either be forced to use trucks, increasing the load on the roadway infrastructure, or to break loads inefficiently, increasing the number of freight trips and traffic stops. The mainline railroads in the MPA accommodate the industry standard of 286,000 pounds. No information is available for lines that branch from the main lines.

Traffic Control and Signaling

A traffic control system, called Positive Train Control (PTC), is designed to automatically stop a train before certain incidents occur. The PTC systems are integrated command, control, communication, and information systems for controlling train movements with safety, security, precision, and efficiency. PTC must be designed to prevent the following:

- Train to train collisions
- Derailments caused by excessive speed
- Unauthorized movements by trains onto sections of track where maintenance activities are occurring
- Movement of a train through a track switch left in the wrong position

The MPO and its rail partners can consider incorporating the following actions to support the implementation and ongoing maintenance of PTC technology in the region:

- Coordination and Advocacy
    - Collaborate with local rail operators, regulatory agencies, and stakeholders to provide a coordinated and efficient rollout of PTC technology.
    - Advocate for the adoption of PTC technology on rail lines within the MPA to enhance rail safety and operational efficiency.
- Funding Support

    - Assist rail operators in identifying and applying for state or federal funding opportunities to support the implementation of PTC technology, including grants, loans, or other financial assistance programs.
    - Explore opportunities for leveraging MPO funds or partnerships to help offset the costs associated with PTC implementation and maintenance.

- Emergency Response Planning
    - Collaborate with emergency response agencies and first responders to develop comprehensive emergency response plans specific to incidents involving trains equipped with PTC technology.
- Public Outreach and Education
    - Raise public awareness about the benefits of PTC technology for rail safety and the community at large through outreach campaigns, public meetings, and educational materials.
    - Engage with local schools, community organizations, and media outlets to promote understanding and support for PTC implementation efforts in the MPA.

By incorporating these actionable items into their plan, the MPO can actively support and facilitate the successful implementation of PTC technology on rail lines within their jurisdiction and contribute to enhanced rail safety and operational effectiveness in the region.

Safety

Between 2019 and 2024, the study area experienced four crashes involving automobiles and trains. In addition to injuries and fatalities that can result from these crashes, these incidents can result in significant delays for all road and rail users and increased operational costs for freight. The MPO can work with its local rail partners to continue promoting railroad safety in the MPA.

Highway-Railroad Crossings

Technical Report #2: State of Current System shows that there are 50 public highway-rail grade crossings within the MPA. Of those crossings, three possess only passive warning devices which include cross bucks, warning signs, regulatory signs, and/or pavement markings. The MPO and its local rail partners can work together to add active crossing devices to these locations to improve safety. Active crossing devices include bells, flashing lights, and gates.

5.3 Freight Transported by Air

Historically, only a small amount of freight is typically shipped by air. However, the commodities transported by air tend to be high-value and time sensitive. Additionally, airports tend to serve as distribution and manufacturing hubs.

The MPA has one airport: the Auburn University Regional Airport. It is located two miles east of Auburn and four miles west of Opelika. The airport is owned by Auburn University[10] and was formerly known as Auburn–Opelika Robert G. Pitts Airport. It does not offer commercial flights, and little freight is transported by air within the region. The nearest airports to the MPA with commercial operations are:

- Columbus Airport (40 miles away via US-280 in Columbus, Georgia)
- Montgomery Regional Airport (60 miles away via I-85 in Montgomery, Alabama)
- Hartsfield–Jackson Atlanta International Airport (100 miles away via I-85 in Atlanta, Georgia)
- Birmingham–Shuttlesworth International Airport (115 miles away via US-280 in Birmingham, Alabama)

Since a very small amount of freight is moved through this airport, no recommendations are made to improve this mode.

5.4 Freight Transported by Waterway

This section summarizes future waterway freight conditions. The Alabama State Port Authority (ASPA) stands as the representative of Alabama's publicly managed deep-water terminals. These terminals cater to a wide range of cargoes, including general cargo, containers, over-dimensional items, and bulk goods. This essential infrastructure plays a pivotal role in sustaining more than 134,600 jobs and contributing a substantial economic impact of $22.4 billion to the state. This impact continues to expand and evolve, reflecting the importance of port cities to the state economy.

Commodity Flow Growth

Commodity data, tonnage, and operations information is not readily available in the MPA. However, as freight continues to grow, so will the amount that arrives at ASPA. To deliver freight from the port to other areas within or outside of the region, it will need to be transported by other modes, most likely by truck. The MPO and its partner agencies can

[10] https://auoairport.com/

monitor pavement conditions to keep them in Good condition.

5.5 Freight Transported by Pipeline

This section summarizes future freight pipeline commodity flow movement and needs. The MPA doesn't have a major pipeline network. However, Alabama's pipeline network consists of natural gas and other fossil products, crude petroleum, and gasoline pipelines. According to ALDOT, Alabama's pipeline network is mainly concentrated near the Port of Mobile and passes through the central and northern portions of the state.

Commodity Flow Growth

Although information on needs and pipeline conditions is not publicly available, the FAF data can be used to understand the projected growth in pipeline commodity flow between 2023 and 2050. According to this data, the anticipated change in tonnage of pipeline freight is about 30 percent, reflecting both the steady demand for natural gas and crude oil and the efficiency of pipelines in transporting these commodities.

Infrastructure Impacts

Pipelines are typically private investments, and pipeline needs and conditions are not publicly available. Nonetheless, pipelines provide additional freight capacity since they handle liquid bulk, such as crude oil and natural gas, that would need to use other surface transportation modes if pipelines did not carry these commodities. Most often, this transport is done by truck and means that additional truck trips are likely to occur on the region's roadways. Roadways that service pipeline facilities can be monitored by the MPO and its partner agencies to keep pavements in Good condition and minimize congestion.

6.0 ITS and Emerging Technologies

6.1 ITS Needs

Technical Report #2: State of Current Systems shows that the Auburn-Opelika area's ITS program is composed of:

- Closed-Circuit Television Cameras (CCTV Cameras)
- Dynamic Message Signs (DMS)
- Advanced Traffic Signal Controllers
- Vehicle Detection (VD)

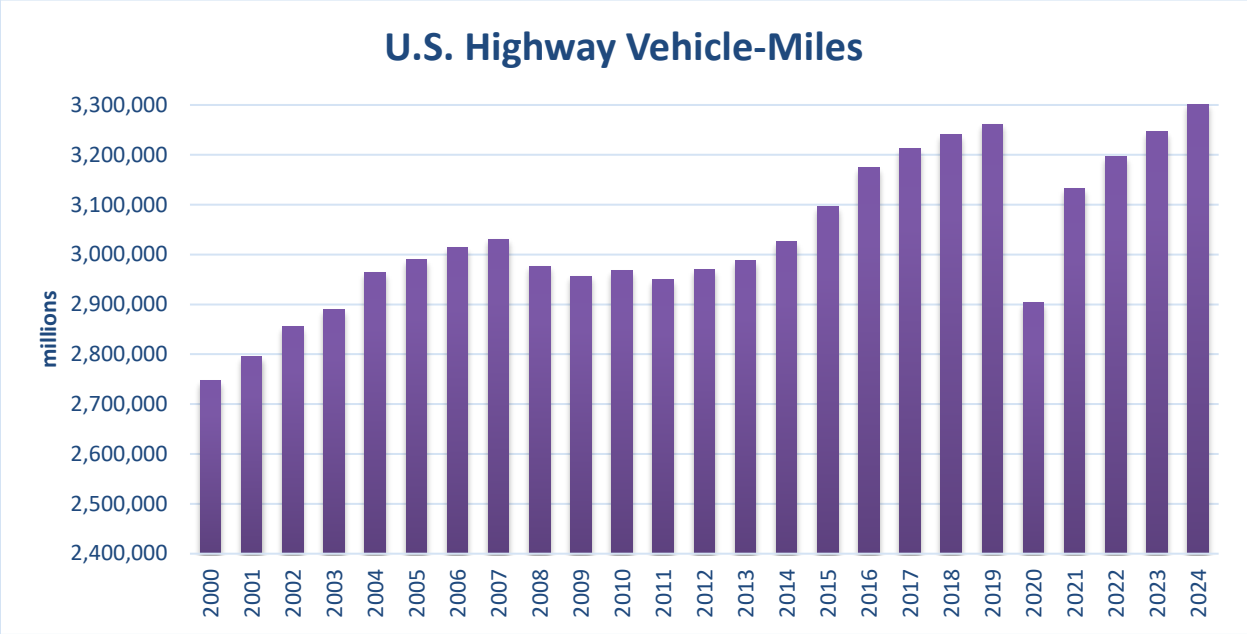
While these devices create a basis to construct a robust Intelligent Transportation System (ITS) network, there is no Regional ITS Architecture in place for the Auburn-Opelika MPA. It is recommended that the AOMPO develop a Regional ITS Architecture Plan, in coordination with ALDOT, based around the existing ITS infrastructure and incorporate anticipated needs. This plan can detail additional ITS devices that can be implemented along with their funding, maintenance, and deployment.

6.2 Emerging Technologies

Emerging trends in transportation are shaped through multiple factors to include environmental concerns and urbanization. However, in recent years, technological innovation and consumer behavior have been the most significant factors influencing the change in transportation trends.

The direct impact of COVID-19 and the limitation of travel and quarantine requirements is not currently visible compared to the years following the pandemic. However, the pandemic has caused a significant shift in travel patterns and transportation behaviors. 2024 presented the first year for the Vehicle Miles Traveled (VMT) to exceed pre-pandemic numbers. The USDOT Bureau of Transportation Statistics provides the historic VMT data with partial data availability for 2024. However, using the available year to date data for 2024, the total annual VMT numbers are presented in the following chart.

Figure 6.1: U.S. Highway Vehicle-Miles (2000-2024)



Sources:
https://www.fhwa.dot.gov/policyinformation/tables/vmt/vmt_forecast_sum.cfm
https://www.bts.gov/content/us-vehicle-miles

The significant shift in travel behavior during the COVID-19 pandemic influenced an increase in the ability to work from home and online shopping and home delivery. Thus, reducing passenger vehicle trips and increasing commercial vehicle miles. In addition, due to the need to meet the increased demand for online shopping and the need for expedited shipping, companies have incrementally shifted to Just-in-Time delivery. This shift has contributed to the increase in goods on the road with less dependency on warehouse storage. As a result, this change resulted in a need for technological innovation to enhance connectivity and automation for all levels of the process including transportation and mobility of goods. The same source by USDOT shows the forecasted rate of increase of single-unit trucks to be 1.9% per year through 2050 compared to 0.4% for light-duty vehicles.

Recent trends in transportation technology provided several tools that influence ITS and Transportation Systems Management and Operations (TSMO) applications. Several emerging trends are highlighted below.

Traffic Signal Optimization and Coordination

The ability to control signal timing to adapt and reflect real time demand for traffic capacity has continuously been the focus of signal modernization and optimization projects. Recent

advances in technology enhanced the ability to optimize traffic signal timing and signal timing coordination between signalized intersections.

Traffic signal optimization and coordination have benefited from the advancement in traffic detection, edge processing and visual analytics, connectivity between traffic signals and transportation management centers, and Artificial Intelligence (AI) supported cloud processing platforms.

The cities of Auburn and Opelika have continued to upgrade the traffic signal systems and gradually modernize the transportation system along key streets and corridors. The current transportation system network can greatly benefit from the use of systemwide adaptive traffic signal controls by using real time detection. At the same time, transportation agencies should prepare for the use of systemwide analytics software and decision support systems capable of monitoring signal performance metrics and providing automated and responsive scenarios to transportation system operators.

Vulnerable Road User Safety Applications

Recent advances in detection technologies have been able to increase the accuracy of traffic detection to include vulnerable road users. LiDAR detection, along with microwave radar detection sensors and video detection devices using visual analytics and equipped with edge processing, have enabled a multitude of safety applications. Nationwide, transportation agencies have been focusing more on reducing roadway fatalities with a vision to eliminate fatalities on the roadways, also known as Vision Zero. The transportation industry continues to realize advancement in technology and innovate more affordable options in transportation safety projects. This trend, combined with the increase in processing power, is very likely to continue for the foreseeable future.

The local transportation agencies within the Auburn-Opelika area can greatly benefit from the joint effort with local research institutes by researching new and upcoming technology to serve transportation projects. Such coordination can target funding opportunities on the federal and state levels that can be used to serve the local needs for deploying signal modernization projects that are capable of safety applications to serve vulnerable road users.

Real-Time Traveler Information Systems

Road users have developed increasing dependence on traffic information. Such dependence has provided for a certain level of expectation to traffic information that is accurate, reliable, and real time. Most traveler information systems that provide real time information for travelers has been dependent on a level of estimation using data shared by system users

that is corrected based on historical data. Local agencies have an advantage over such systems with the ability to provide true real-time traffic information. In addition, local agencies can share planned events with travelers that can influence decision-making.

The transportation agencies must continue to realize the potential use of available data and continue to coordinate between stakeholders to enhance its accuracy. When the data is combined with enhancing traffic detection and the ability to disseminate traveler information, transportation agencies will be ready to implement systemwide active traffic management strategies.

Real-time traveler information systems can deliver traffic updates, incident alerts, and travel time estimates using localized devices similar to Dynamic Message Signs. In addition, several broadcast systems have enabled the ability to disseminate information to travelers using area wide methods and third-party platforms such as Waze and Google Maps. Also, an increase in the deployment of localized and area specific text message notifications, similar to the ALDOT (ALGO) Text Alert notification system, has been occurring.

Integrated Corridor Management (ICM)

The transportation network in the Auburn-Opelika area provides for a corridor transportation system along I-85 and SR-15 including arterial connectors. The transportation network can greatly benefit from integrated corridor management strategies knowing that the whole corridor network is affected by traffic changes on individual corridor elements. Therefore, the coordination between stakeholders in the area and the integration of the corridor systems is the first key to enabling ICM strategies. Multiple transportation agencies and departments have started implementing cross agency programs to achieve a more efficient way of managing resources represented in Regional Transportation/Traffic Operations Programs.

Network-Based Connected Vehicle (CV) Applications

Connectivity between vehicles and other vehicles and infrastructure has grown continuously as a need. Concurrently, CV Technology has been facing uncertainty due to the availability of the radio spectrum introduced by the change in Federal Communications Commission (FCC) rulemaking. In addition, auto manufacturers and transportation agencies have been slow to deploy CV technology into vehicles due to the high cost of the devices and industry uncertainties. These conditions have caused several technology providers to start deploying connected vehicle applications that are not reliant on deployed CV devices. While connected vehicle devices use the 5.9 GHz radio frequency and local network processing, network-based connected vehicle applications are able to use handheld and mobile tablet

devices and sensors. By connecting the local devices to cloud based platforms, technology providers are able to deliver connected vehicle applications at a lower cost. However, such CV applications are only as reliable as the network and internet connectivity. With the increase of network connectivity and reliability, network-based CV applications can become comparable to the real-time connectivity available from the CV2X onboard and roadside units.

In addition, network-based applications provide a solution to the limitation of the CV2X bandwidth caused by the reduction of the CV band from 75 to 20 MHz. Currently, this limitation does not present problems to CV technology due to the limited deployment of the CV2X applications. However, the 20 MHz band available on the 5.9 GHz frequency has been continuously criticized for the potential inability to support the fully connected vehicle system using the available CV applications. Therefore, a fully functional CV network system is expected to use all available communication mediums including the 5.9 GHz wireless spectrum and other means of connectivity using network-based CV applications.

Automated Vehicles

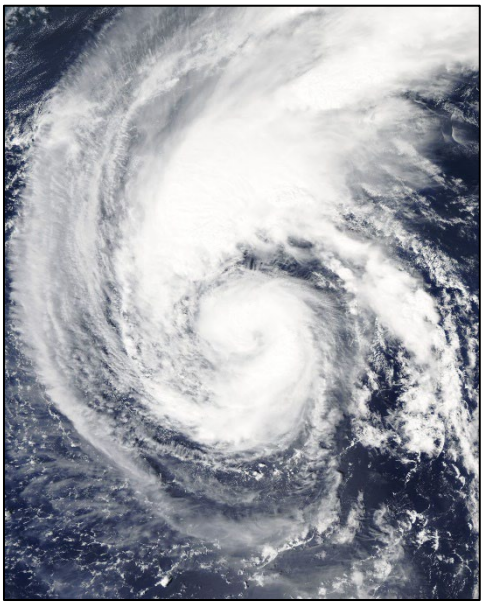
The use of automation in vehicles continues to evolve. It is anticipated that partially automated vehicles will continue to enter the fleet in coming years. Fully automated vehicles may also become common during the life of this LRTP. The Auburn-Opelika area can prepare for these vehicles by staying informed about these technologies and continuing to upgrade their infrastructure to better accommodate these vehicles.

7.0 Resiliency, Stormwater Mitigation, and Tourism

7.1 Transportation System Resilience

Within the context of the LRTP, resilience is the ability of transportation systems to withstand or recover from extreme or changing conditions. Resilience also includes a system that can continue to provide reliable mobility and accessibility throughout the region as conditions change. Consequently, resiliency in the transportation system must consider weather, natural disasters, or human-induced events.

A major concern for transportation system resiliency is rising temperatures due to recent climate change. These temperatures result in increased heat levels for which roadway pavements were often not designed thereby creating a need for costly and unexpected repairs that affect how people and goods can move. Additionally, temperatures have increased storm intensity, with "Superstorms" such as Hurricanes Katrina, Sandy, and Harvey becoming a more regular occurrence. Additionally, localized flooding has worsened across the country.



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This section builds upon existing county and city plans to define a comprehensive means to establish resilience in the Auburn-Opelika regional transportation system. Through the identification of high-risk areas within the MPA, appropriate mitigation and maintenance strategies may be selected to sustainably reduce the effects of hazardous weather events.

Existing Policies and Considerations

Lee County Natural Hazard Mitigation Plan (2015)

The Lee County Natural Hazard Mitigation Plan[11] identifies regional hazards which impact

[11] https://ema.alabama.gov/wp-content/uploads/2017/05/lee-county-plan.pdf

the people and property in Lee County:

- Drought/Heat Wave
- Earthquakes
- Flood
- Hail
- Lightning
- Sinkholes
- Thunderstorms (includes strong wind)
- Tropical Depressions/Tropical Storms/Hurricanes
- Tornadoes
- Wildfire
- Winter Storms (includes ice storms and heavy snow)

This plan discusses the integration of hazard mitigation into the local planning framework supported by a detailed assessment of municipal hazard mitigation capabilities.

City of Auburn Hazard Mitigation Plan (2023)

The City of Auburn Hazard Mitigation Plan was approved by the Risk Analysis Branch, Mitigation Division, and Federal Emergency Management Agency (FEMA). It details the development of system-wide resilience in response to the changing conditions impacting the City of Auburn. The assessment includes goals of reducing the effects that hazards have on people and property in Auburn and offers a baseline understanding of the resilience of the City's systems, institutions, cultural and historic resources, and businesses. This document serves to plan and prioritize future mitigation projects within the City of Auburn[12].

7.2 Regional Considerations

The MPO is the agency responsible for transportation policy development, planning, and programming within the MPA and considers transportation resiliency needs related to several potential events that can impact the regional transportation network.

High Wind Events

The MPA can experience severe thunderstorms that produce damaging winds. Additionally, there is a risk for tornadoes within the MPA since it is located in the Southern United States, a region particularly vulnerable to tornadoes. Although the MPA is located inland from the Gulf of Mexico and the Atlantic Ocean, tropical systems can still bring high winds to the region which can affect transportation systems.

[12] https://www.auburnwa.gov/city_hall/emergency_preparedness/local_hazards

Floods

Within the MPA, flooding hazards are typically in the form of flash flooding. Recent high intensity, short duration storms are becoming common and can result in flash floods. These events can trap motorists and deposit large amounts of water on the impervious surfaces of the roadways. This water eventually becomes surface runoff that can pool and damage a roadway's substructure. As the soluble rock breaks down, it can lead to the development of sinkholes and other potential disasters that can negatively affect roadways and other infrastructure.

Snow and Ice

The MPA, like most of the Southeastern United States, does not usually experience significant winter weather. However, even a small amount of winter precipitation (snow and ice) can have a significant impact on the MPA's transportation system since icy conditions can result in road and bridge closures. In addition, many drivers lack driving experience in these conditions, increasing safety concerns.

Temperature Extremes

The MPA is located in an area that is classified as Humid, Subtropical (Cfa), according to the Köppen Climate Classification System, with average daily high temperatures reaching into the nineties in July and low temperatures dropping to the lower forties in January. Both temperature extremes can affect transportation systems with extremely high temperatures affecting the integrity of the pavement and extremely low temperatures causing road and bridge closures due to icing.

7.3 Resiliency Action Plan

Resilience in transportation relies on key objectives such as data analysis, targeted remediation, and preventive maintenance. A multifaceted approach to developing an efficient and sustainable transportation system is required.

Identification of High-Risk Areas

To establish a transportation system which is resilient to the effects of extreme weather events, it is necessary to study historical climate data from the region. By compiling details from topographic maps, government documents, and local studies, a dataset can be built that identifies and tracks areas repeatedly impacted by natural disasters.

Additionally, it is important to consider site characteristics that may contribute to weather impacts such as debris, vegetation, or damaged infrastructure. After analyzing all variables

which affect a site's susceptibility to disturbance, the mitigation strategy best tailored to area-specific needs should be selected for implementation.

Mitigation Strategies

A favorable practice is to avoid constructing new infrastructure in previously defined high-risk areas. However, to support infrastructure that is already located within areas susceptible to natural hazard impacts, several strategies can be considered to address various regional issues.

In areas possessing large numbers of repetitive loss properties, of low elevation level, or in prominent flood zones, flooding concerns can be mitigated through storm water mitigation and construction adaptation methods. While these locations are not publicly available, the AOMPO can coordinate with local agencies, emergency management groups, and the Federal Emergency Management Agency to identify these locations.

Stormwater Mitigation

As an area grows and changes, its land use and infrastructure change as well. These changes affect how precipitation events, which produce stormwater and eventually runoff, affect roadways, homes, groundwater, rivers, streams, and more.

The overall effect of stormwater is heavily influenced by land use and development. Development removes previously pervious areas such as grass, wetlands, and wooded areas and replaces them with impervious surfaces such as:

- new roadways,
- sidewalks,
- driveways and foundations in new subdivisions, and
- parking lots for businesses and shopping centers.

Source: pxfuel.com

The increase in impervious surfaces can decrease runoff time and lead to additional flooding where existing drainage systems are poor or have insufficient capacity for the increased runoff. A significant rainfall event in an urban area within a short amount of time can cause flooding in a municipality. Flooding from stormwater can result in property damage and environmental and public health hazards through contaminants leeching into new areas via the stormwater.

Without proper drainage and stormwater mitigation efforts, new transportation projects can potentially worsen existing stormwater issues which concerns the MPA due to its existing flood risk. With well-planned, coordinated efforts and the use of "green infrastructure" design, transportation projects can be better integrated into the natural environment and decrease the chances of detrimental stormwater runoff issues. In some cases, stormwater drainage may even be improved.

Green Infrastructure

Green infrastructure is a cost-effective approach to managing weather events while providing added benefits to the community.

Rain that falls on impervious areas will collect or drain toward the lowest point until it travels to pervious areas or man-made facilities such as gutters, storm sewers, and other man-made collection systems. During this time, runoff may collect trash, bacteria, and other pollutants from the urban environment and introduce them to the community at large, creating health risks. Green infrastructure uses vegetation, soil, and other elements to mimic a more natural environment, treating stormwater at its source and using the ground and plants as filters to eliminate potential pollutants.

A natural environment approach to development positively affects a community's stormwater drainage system by slowing runoff and reducing stormwater discharge to mitigate flood risk. Green infrastructure may also decrease the size of the drainage system needed and reduce the overall cost of materials, maintenance, and future repairs. **Figure 7.1** shows effective examples of green infrastructure that can be implemented, including:

- permeable pavements,
- bioswales or vegetative swales,
- green streets and alleys, and
- green parking.

Source: ensia.com

Figure 7.1: Green Infrastructure Examples

Source: https://www.epa.gov/green-infrastructure/

Additionally, green infrastructure can be applied not only to transportation development but also to commercial buildings and residential homes. Private property owners can implement green infrastructure practices such as:

- installing green roofs,
- increasing tree cover,
- landscaping with rain gardens and bioswales, and
- capturing rainwater using rain barrels and cisterns.

As a result, commercial and residential property owners may experience the following benefits:

- Cash back opportunities
  - Tax credits
  - Stormwater fee credits
  - Rebates
  - Development incentives
- Reduced flood damage
- Lower energy and infrastructure costs
- Higher retail sales and property values

Green Infrastructure Transportation Related Strategies

The following strategies can be implemented by the MPO and its partner agencies to develop and implement green infrastructure.

- During the project design, minimize impervious surfaces and alterations to natural landscapes.
- Promote the use of "green infrastructure" and other Low-Impact Development (LID) practices. Examples include:
    - rain barrels
    - rain gardens
    - buffer strips
    - bioswales
    - replacement of impervious surfaces on property with pervious materials such as gravel or permeable pavers
- Encourage local agencies to adopt ordinances that include stormwater mitigation practices such as landscaping standards, tree preservation, and "green streets."
    - Greenville County's Stormwater Management Ordinance[13] in South Carolina is an example.
- Develop a Standard Urban Stormwater Mitigation Plan (SUSMP) at multiple levels including state, regional, and municipal.
    - A SUSMP is a useful tool where municipalities put into writing the requirements for stormwater control measures for development or even redevelopment.
    - An example SUSMP adopted by Los Angeles County, California can be found at susmp_rbfinal.PDF (ca.gov).
- Incorporate Low-Impact Development practices into a SUSMP as an effective method of reducing a development's impact on its environment.

Additional Stormwater Strategies

- Educate residents, business owners, elected officials, and developers on the impacts of stormwater and how they can assist with stormwater runoff mitigation.
    - The MPO can work with local agencies and partners to develop promotional material that can be posted on social media, MPO and jurisdiction websites, and in public places.

[13] AN ORDINANCE (greenvillecounty.org)

- Identify areas most likely to flood during heavy storm events and prioritize mitigation efforts in those areas and areas upstream of them.
    - These efforts can be conducted in coordination with the Lee County Hazard Mitigation Plan.
- Develop emergency response measures that feature specified contract mechanisms in place for asset repair.
- Adopt open space preservation plans which will balance land use and local developments with preservation and conservation of the existing open space.
- Establish stormwater fees to support the funding of stormwater management projects and practices.
    - This example excerpt is from the City of Takoma Park, Maryland Ordinance No. 2024-08[14].

> "For Fiscal Year 2025, a Stormwater Management fee shall be imposed on real property based on the revised fee structure established in Fiscal Year 2022. All properties will be billed using the same fee structure. The fee has a base rate of $25 per 500 square feet of impervious surface, calculated to be an amount sufficient to fund the Stormwater Management expenditures established by this Ordinance."

- Reduce the number of impervious surfaces on residential, commercial, and public properties, and offer incentives to encourage the use of pervious surfaces.
    - Example incentives include:
        - Grants
        - Stormwater fee discounts
        - Rebates and installation financing
        - Awards and recognition programs
        - Development incentives such as decreased fees, expedited permitting, and zoning upgrades

<u>Flooding and High Wind Event Mitigation</u>

The following construction adaptation methods can be utilized to support infrastructure in regions vulnerable to flooding and high wind events such as tropical storms, hurricanes, and tornadoes.

[14] FY25 Stormwater Budget Adoption - 2nd Reading (takomaparkmd.gov)

- Bridge scour countermeasures
- Resizing culverts and widening bridge openings
- Cable and tower damping on bridges
- Raising vulnerable segments of the roadway
- Detention and retention basins
- Floodgates and stormwater pump stations

Figure 7.2: Construction Adaptation Method Examples

In addition, locally adopted floodplain ordinances can help keep incompatible development out of floodplains.

Snow and Ice Mitigation:

In Southern climates, it is more common for ice or snow on roads to be mitigated through road salting. However, it is important to note that salting roads with traditional rock salt may contaminate drinking water supply, increase soil erosion, endanger wildlife, and jeopardize nearby properties.

More sustainable alternatives include calcium chloride, brine solutions made from agriculture byproducts (i.e. beet juice, molasses, corn, and soybean oil), or an overall

reduction in the amount of sodium chloride used. The MPO can coordinate with ALDOT and local jurisdictions to explore using new alternatives.

Maintenance

Continued maintenance of transportation assets fortifies system resilience to external damage. Examples of advantageous maintenance practices include:

- Prioritize sites especially susceptible to natural hazard effects when implementing infrastructure updates.
- Coordinate with ALDOT and partner agencies to increase inspection frequency of bridges and roadways to determine that infrastructure is structurally sound and that erosion from storms has not degraded it.
- Design sufficient drainage systems for the infrastructure and conduct regular inspections to reduce chances of roadways contributing to runoff that can lead to pooling.
- Implement tree trimming in high-risk areas to proactively mitigate downed tree occurrences.

It is beneficial to adopt a wide range of preventive measures combining natural, constructed, and policy and education-based mitigation strategies. Being proactive maximizes the chances that the infrastructure can support regional weather impacts while limiting risks to structural integrity and public safety.

7.4 Tourism

Not all trips within the region are for the purposes of work, school, or shopping. Leisure and tourism trips often make use of the MPA's roadways, transit, and bicycle/pedestrian facilities. Tourism promotes economic vitality and can be a driver of regional development. The Auburn-Opelika area has a variety of tourist attractions and activities for tourists to enjoy. Many states are now encouraging people to "become a tourist within their own state" and to travel to other local areas. Several potential means by which travel and tourism might be encouraged within the MPA are listed below.

Tourism Overview

Tourism plays an increasingly important role in economies as jobs shift into the service and information sectors and as an expanding middle class travels more frequently[15]. The

[15] https://www.oecd.org/en/publications/2018/03/oecd-tourism-trends-and-policies-2018_g1g87153.html

Alabama Department of Tourism maintains its own website (https://tourism.alabama.gov/). This site introduces travelers to tourist destinations, identifies a variety of activities within the state, and provides trip planning resources. The Auburn-Opelika tourism webpage can be found at: https://www.aotourism.com/.

Welcome Centers

Welcome Centers are among the first sights that greet travelers when entering a new state. There is one Tourist Information Center within the MPA. The Auburn-Opelika Tourist Information Center provides a variety of services and resources such as maps, brochures, and visitor guides.

Tourism Attractions and Amenities

The region offers diverse tourist attractions and contains a variety of cultural, outdoor, and retail venues. The MPA boasts a college-town feel with modern hospitality, trails, and restaurants. It also contains a mixture of attractions such as:

- The War Eagle Run Fest
- Auburn-Opelika Art Showcase
- Auburn-Opelika Football
- Chewacla State Park

The region also offers high-quality dining, farmers markets, trendy craft foods, and retail. The highest concentration of restaurants and bars are located within Downtown Auburn.

To accommodate more tourists visiting the region, several new hotels have opened throughout the MPA within the last five years including:

- Graduate Auburn
- The Laurel Hotel & Spa
- Staybridge Suites Auburn

Tourism Needs

Many amenities and attractions are found near major roadways and are accessible by car. Transportation upgrades can improve mobility for tourism activity in other locations throughout the region. Several examples include:

- Wayfinding - Signs and electronic maps can help visitors easily find their way around the region and can be used for different modes of transportation. Wayfinding can be particularly useful along pedestrian and bicycle paths to guide riders or pedestrians to nearby tourist attractions.
- Expanded Public Transportation - Many attractions are located in the MPA's downtown areas. With a large concentration of destinations, public transit plays an important role. While Lee-Russell Public Transit (LRPT) currently serves this area,

riders would benefit from an increase in service to make trips more convenient. Additionally, bus service could expand further into the region to reach retail and restaurant options in the surrounding suburban areas that may not be accessible to visitors without vehicles.

- Expanded Sidewalks and Bike Facilities - The concentration of attractions and hotels in the downtown areas make walking and bicycling viable transportation modes. In less dense areas outside the inner cities, recreational multi-use paths can attract visitors. Improving and expanding sidewalks, bike lanes, and pathways in major tourist areas will improve visitor mobility and reduce the need for additional vehicular traffic.