



NORTH CAROLINA

Department of Transportation



NCDOT's Integrated Mobility Division (IMD) – **Multimodal Updates**

February 15, 2023



Integrated Mobility Division
N.C. DEPARTMENT OF TRANSPORTATION

Agenda

- **Quick Overview of Some Current Planning and Innovation Initiatives**
- **Safety Trends and Resources – Daniel Carter, PE, NCDOT’s Traffic Safety Unit**
- **IMD Updates**
 - Grant programs – discretionary grants, feasibility studies, planning grants, safe routes to school (SRTS), bicycle helmets, transportation demand management (TDM)
 - Complete streets
 - CASSI
 - Micromobility strategy
 - Transit visioning
- **Challenges and Lessons Learned from Public Microtransit Pilots in North Carolina – Kai Monast, Ph.D., NC State - ITRE**



Current Planning and Innovation Initiatives



Discretionary Grants

IMD partners with locals to apply for USDOT grants

Upcoming: FY 2023 RAISE grant deadline – February 28, 2023



Multimodal Planning Grants

Existing and new grants program Call for projects – April 10 deadline

Develops multimodal plans, bicycle plans, and pedestrian plans (exploring options for access to transit plans and microtransit feasibility studies)



Feasibility Studies

25 studies awarded

Projects to start in spring 2023

Shared use paths and sidewalks – complements planning studies and supports local governments in the implementation of projects



Safe Routes to School

Non-infrastructure programs

Grants to be announced in April 2023

Supports programs and activities that focus on education, enforcement, encouragement and evaluation elements



Multimodal and Mobility Data

Bicycle, pedestrian, and transit data (+ safety data from NCDOT's Safety Unit)

Improve data warehousing and advance standards, specifications, governance, and interoperability for multimodal and mobility data – including for the statewide bicycle and pedestrian counting and transit data programs



CASSI

Connected Autonomous Shuttle Supporting Innovation (CASSI)

Evolving to include more vehicle types and use cases including testing and integrating autonomous vehicles in fleets to provide safe, reliable, and useful transit service



Micromobility

Micromobility strategy

Survey – February 14 (deadline – March 8)

Research to determine status of micromobility in North Carolina, interest in micromobility and potential role that NCDOT can play in supporting local micromobility options.



Bike Helmet Initiative

22K Helmets / 290 Groups in 2023 Grants to be announced in April 2023

Distributes helmets to underprivileged children by government and non-government agencies since 2007



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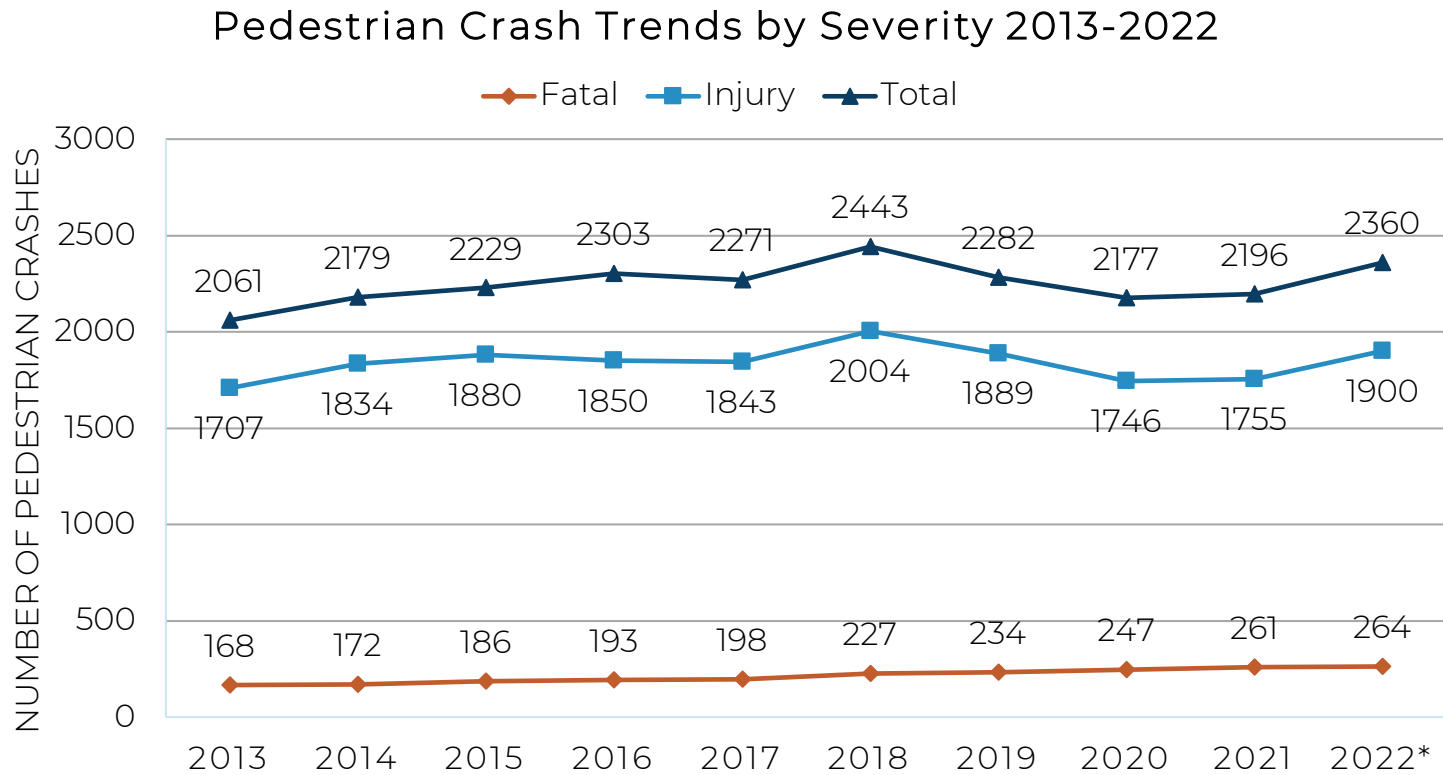
Pedestrian Crash Trends

Daniel Carter, NCDOT Traffic Safety Unit

2/15/23 IMD Webinar

Connecting people, products and places safely and efficiently with customer focus, accountability and environmental sensitivity to enhance the economy and vitality of North Carolina

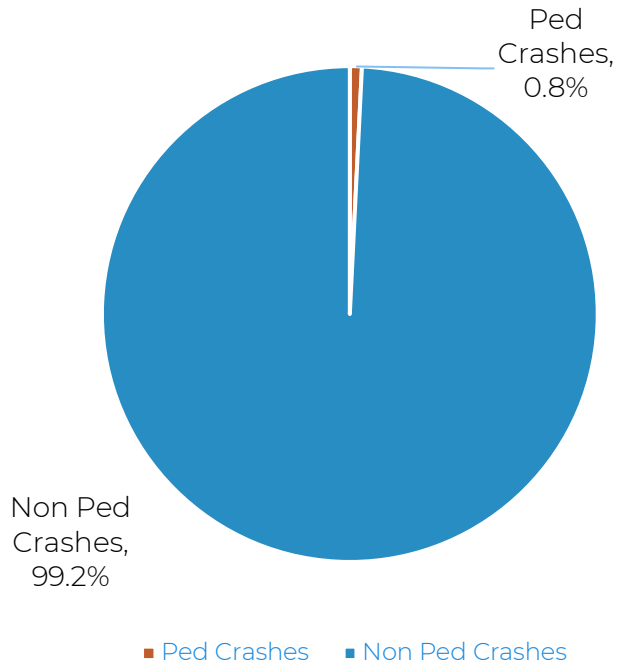
Pedestrian Crash Trends



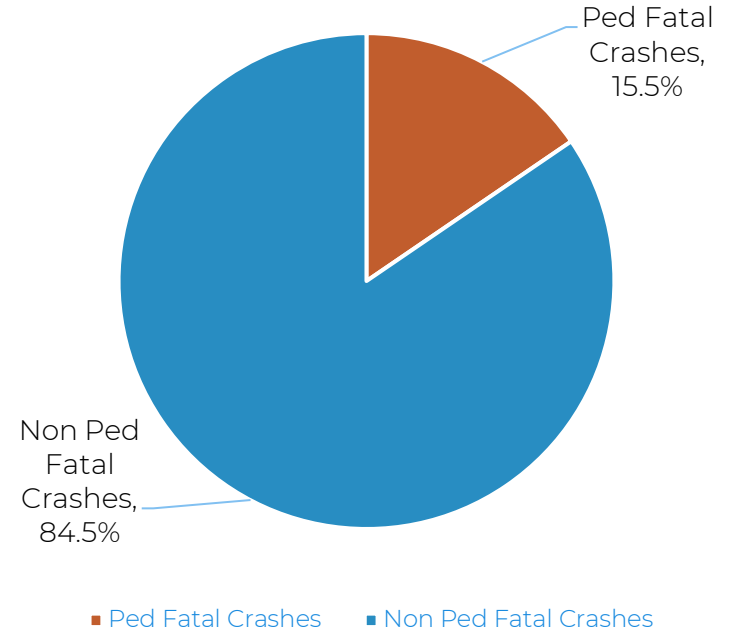
* Preliminary

Pedestrian Crashes vs All Crashes

Total Statewide Crashes



Statewide Fatal Crashes



Pedestrian Crashes by Light Condition

	Total	Fatal and Serious Injury
Daylight	48%	26%
Dark - Lighted Roadway	24%	27%
Dark - Roadway Not Lighted	22%	42%
Other	5%	5%
Total	100%	100%

Pedestrian Crashes by Crash Type

	Total	Fatal and Serious Injury
Crossing Related	52%	47%
Walking Along Roadway	16%	16%
Other	32%	37%
Total	100%	100%

Pedestrian Crashes by Relation to Intersection

	Total	Fatal and Serious Injury
Non-Intersection (on or along the roadway and more than 50 ft away from an intersection)	59%	75%
Intersection (within the intersection proper or within the crosswalk area)	28%	15%
Intersection-Related (outside the intersection crosswalk area but within 50 ft of the intersection)	13%	9%
Total	100%	100%

Online Resources

Pedestrian and Bicyclist Crash Dashboard

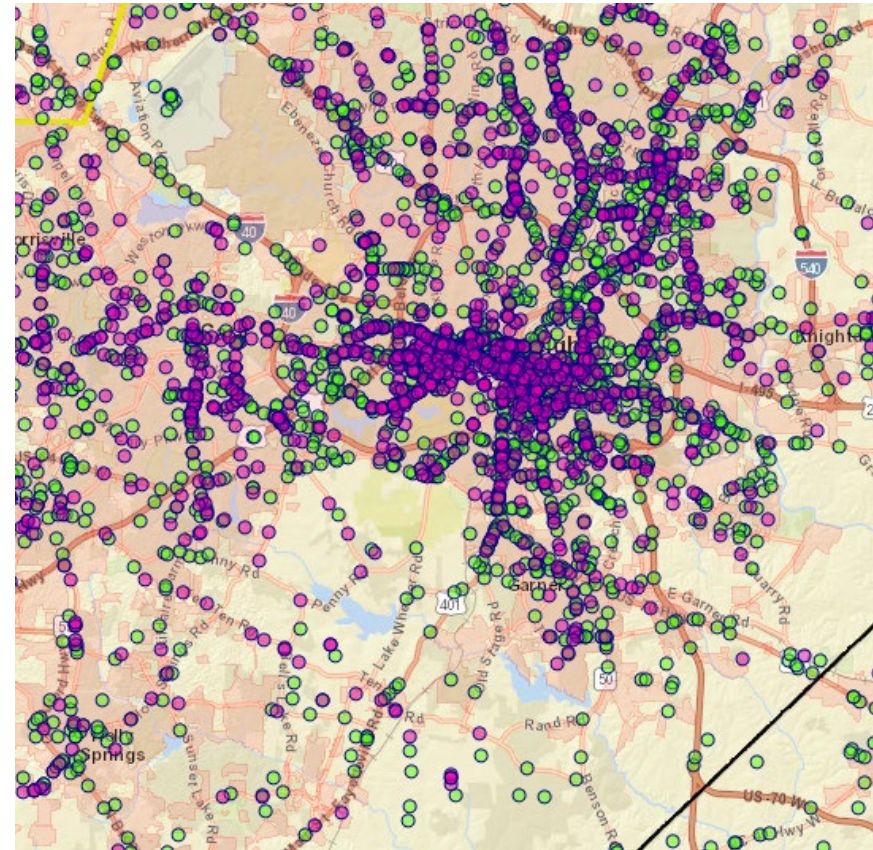
<https://ncdot.maps.arcgis.com/apps/dashboards/78046d11cabd4658a4d45b88c52ab8af>

Pedestrian and Bicyclist Crash Map

<https://ncdot.maps.arcgis.com/home/webmap/viewer.html?webmap=b4fcdc266d054a1ca075b60715f88aef>

Pedestrian and Bicyclist Crash Data Download (shapefile)

<https://ncdot.maps.arcgis.com/home/item.html?id=2a18016d2f1c469cb2edf5cc53e36f32>

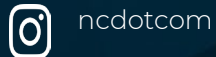
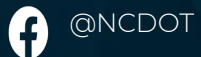
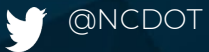


Contact Us

Daniel Carter

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919-814-4949



Thank you!



IMD Grant Assistance Program

Since 2019, IMD has assisted ten partners across North Carolina with winning awards for over \$72M in grant funding.

Grant Name	Project Name/Description	Year Applied	Award Amount
Human Trafficking Awareness & Public Safety Initiative Grant	Combating Human Trafficking in North Carolina through Bus Operator Training and Public Awareness	FY 2019	\$120,000
Bus and Bus Facilities Grants	Bus and bus facility construction and renovations for seven transit systems	FY 2019	\$17,275,000
Mobility for All	Technology & Transportation Partnership to Improve Rural Service for Underserved Populations Pilot	FY 2020	\$280,000
Accelerating Innovative Mobility (AIM) Project	Transforming Public Transit in Wilson with Rural On-Demand Microtransit	FY 2020	\$250,000
FY 2020 Helping Obtain Prosperity for Everyone (HOPE)	Mountains to Sea: Electrifying North Carolina's Transit Fleets	FY 2020	\$122,048
FY 2020 FTA Transit Oriented Development (TOD) Planning	Connecting Rural and Urban Triangle Communities Through Equitable Transit Oriented Development	FY 2020	\$900,000
RAISE	High Point on the RISE	FY 2021	\$19,800,000
RAISE	PARTNERS (Rutherfordton and Spindale)	FY 2022	\$20,040,000
RAISE	S-Line Mobility Hub Planning	FY 2022	\$3,400,000
Rural Surface Transportation	Mobility for Everyone, Everywhere in North Carolina	FY 2022	\$10,400,000
			\$72,587,048

IMD Grant Assistance Program

Examples of upcoming USDOT key competitive grant opportunities include:

Opening Date	Grant Program	Operating Administration/Office	Closing Date (to be added for each program after the NOFO is issued)
11/30/2022	<u>Rebuilding American Infrastructure with Sustainability and Equity (RAISE)</u>	Office of the Secretary	2/28/2023
1/09/2023	<u>Areas of Persistent Poverty</u>	Federal Transit Administration	3/10/2023
1/27/2023	<u>Buses and Bus Facilities</u>	Federal Transit Administration	4/13/2023
1/27/2023	<u>Low or No Emission Vehicle</u>	Federal Transit Administration	4/13/2023
Winter/Spring 2023	<u>Promoting Resilient Operations for Transformative, Efficient, and Cost Saving Transportation (PROTECT) – Discretionary</u>	Federal Highway Administration	
Apr-23	<u>Safe Streets and Roads for All Grant Program</u>	Office of the Secretary	
May-23	<u>Transit-Oriented Development Pilot Program</u>	Federal Transit Administration	
Spring 2023	<u>Multimodal Project Discretionary Grant Opportunity (Mega, INFRA, and Rural)</u>	Office of the Secretary	
Late Spring 2023	<u>Reconnecting Communities Program and Neighborhood Access and Equity Grant Program</u>	Office of the Secretary/Federal Highway Administration	
Summer 2023	<u>Railroad Crossing Elimination Program</u>	Federal Railroad Administration	
Fall 2023	<u>Consolidated Rail Infrastructure & Safety Improvements Grant Program</u>	Federal Railroad Administration	
Fall 2023	<u>Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program</u>	Office of the Secretary	

Keep an eye out for upcoming calls for projects and let IMD know if you have a project that is a good candidate for a grant. IMD can help evaluate your project and offer technical assistance.

Paved Trails & Sidewalks Feasibility Study Grant Program

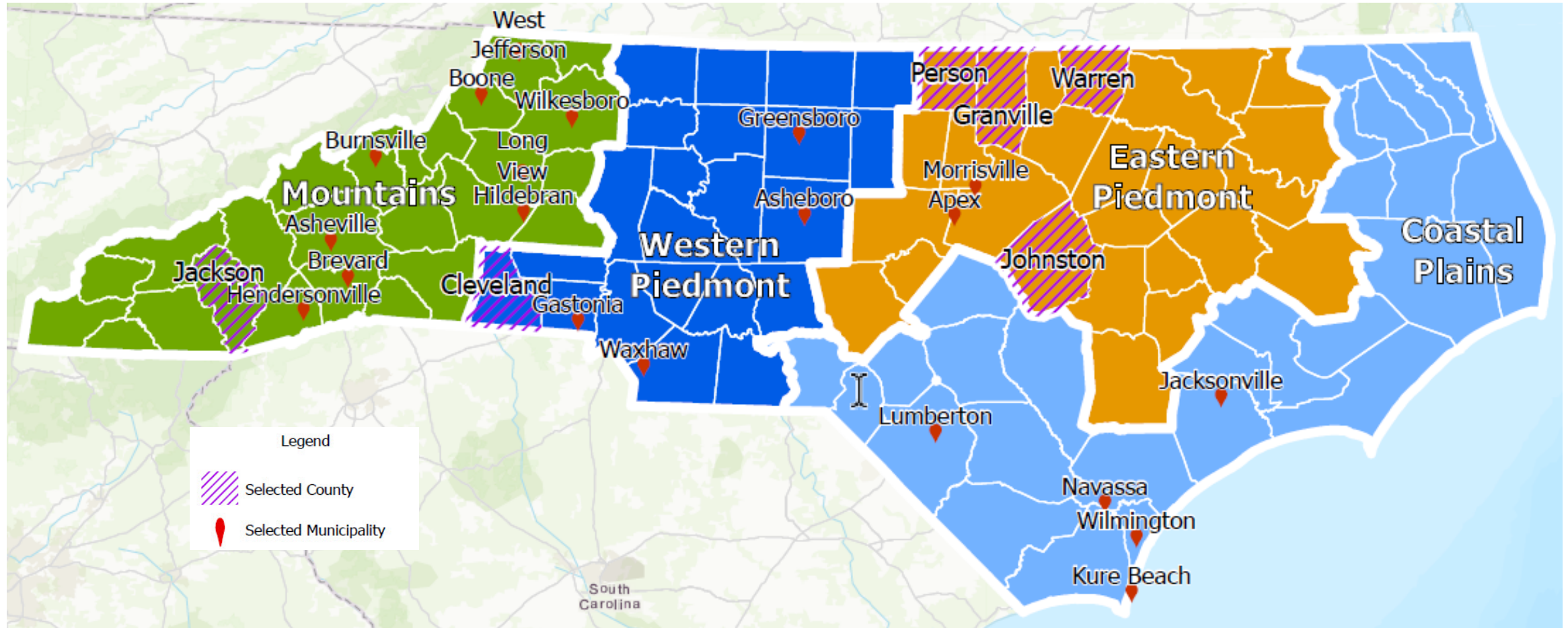
- Pipeline of projects – planning, feasibility, funding, design/acquisition, construction
- Types of projects selected: paved trails, greenways, sidepaths, sidewalks
- Applicants - local governments, regional planning agencies, non-profits
- 59 applications / 25 awarded
- ~\$5M requested / ~\$2.5M awarded
- Study components:
 - Community engagement
 - Existing condition analysis
 - Environmental, utility, right-of-way and other considerations
 - Alternative evaluation
 - Recommended alignment, cost estimate
 - Implementation plan
- Studies will start in spring 2023



[Feasibility Study Program](#) (link)

Paved Trails & Sidewalks Feasibility Study Grant Program

Selected Communities



Multimodal Planning Grant Program

Grant Info

- February 9, 2023 – [Call for Applications](#)
- April 10, 2023 – application deadline
- Eligible applicants: all NC municipalities and counties with less than 100,000 population
- Local match required
- Consultant lead + IMD Regional Planner support
- Award notification – late spring / early summer

Plan Types

- Bicycle, Pedestrian, or Combined (Bike + Ped) Plan
- Project Acceleration Plans for small towns (< 10,000 population)
- Multimodal Network Plans for LGA's with existing fixed-route or deviated fixed-route transit service
- Existing Bike or Ped Plan Update

Since 2004, the program has funded more than 250 municipal and county plans totaling approximately \$8 million in grant funds.

Safe Routes to School – Non-Infrastructure Grant Program

- Funds local SRTS coordinators, materials for marketing and education, action plans, school events and more
- Eligible participants – local governments, school districts, regional planning agencies, etc.
- Call for applications ended on Monday, February 6th for one to three-year grant programs
- Funded with TAP and legacy SAFETU funds
- Applications are currently under review - over \$5.2 million in grant requests
- Anticipate award announcements in April 2023



Bicycle Helmet Initiative

- To promote helmet usage, support local bicycle activities, distribute helmets to low-income children to reduce fatalities/injuries
- Eligible participants – local governments, police/fire departments, parks and recreation departments, health departments, community centers, churches and non-governmental groups
- Call for applications ended on Friday, February 3rd - applications are currently under review
- New record of 290 applications submitted and over 22,000 helmets requested in the program
 - 2022 – 262 awardees and 20,075 helmets
 - 2021 – 165 awardees and 11,925 helmets
- Anticipate award announcements in April 2023



Transportation Demand Management (TDM) Grant Program

- General purpose – convenient travel options to reduce single occupancy vehicles/VMT and to enhance accessibility
- Strategies – public transit, bike/walk, rideshare/vanpool, telework, MaaS, education/marketing employer programs
- Funds staff salaries to administer regional TDM programs, marketing efforts/activities, and planning activities (including development of a TDM plan)
- Eligible participants – regional transit or planning agencies responsible for TDM-related activities
- Call for applications opens today (February 15) and closes on March 17.
- Anticipate award announcements in May 2023

[TDM Program](#) (link)

TDM APPLICATION OVERVIEW AND GUIDANCE



– Program Background

Transportation Demand Management (TDM) programs promote the use of all transportation options available, rather than defaulting to single occupant vehicle use. Included among these travel options are carpooling, vanpooling, teleworking, transit, bicycle, flexible work hours, compressed work weeks, and parking policies/pricing structures. The NCDOT Integrated Mobility Division (IMD) funds TDM programs to support the provisions of the Ambient Air Quality Improvement Act of 1999, Senate Bill 953, which addressed concerns over ground level ozone pollution from motor vehicles and the need to deal with increasing vehicle miles traveled (VMT) and NOx emissions. The bill established a goal of reducing the growth of commuter vehicle miles traveled (VMT) in the state by 25% from 2000 until 2009 and that goal was achieved. NCDOT continues to make strides in TDM to achieve even more.

– Who Can Apply?

Public organizations responsible for promotion of TDM activities, which may include providing services such as carpool/vanpool matching and vehicles for use in vanpooling may apply.

Urban and Rural areas in the state interested in a TDM program (but are not currently receiving state TDM funds) should contact Nick Morrison, Transportation Planner, at (919) 707-2608 or via e-mail at nemorrison@ncdot.gov to discuss planning requirements for establishing a TDM program.

– Timeline & Required Documents

Completed FY 2024 TDM applications must be submitted through the [Enterprise Business System \(EBS\)](#) no later than Friday, March 17th, 2023.

All required documents must be completed and uploaded to the "FY 2024 Application" in EBS.

The Application Checklist can be found as a part of this application package and may be downloaded from [IMD's website](#).

The document type is listed under Urban Grants. The completed checklist should be uploaded along with other attachments in EBS.

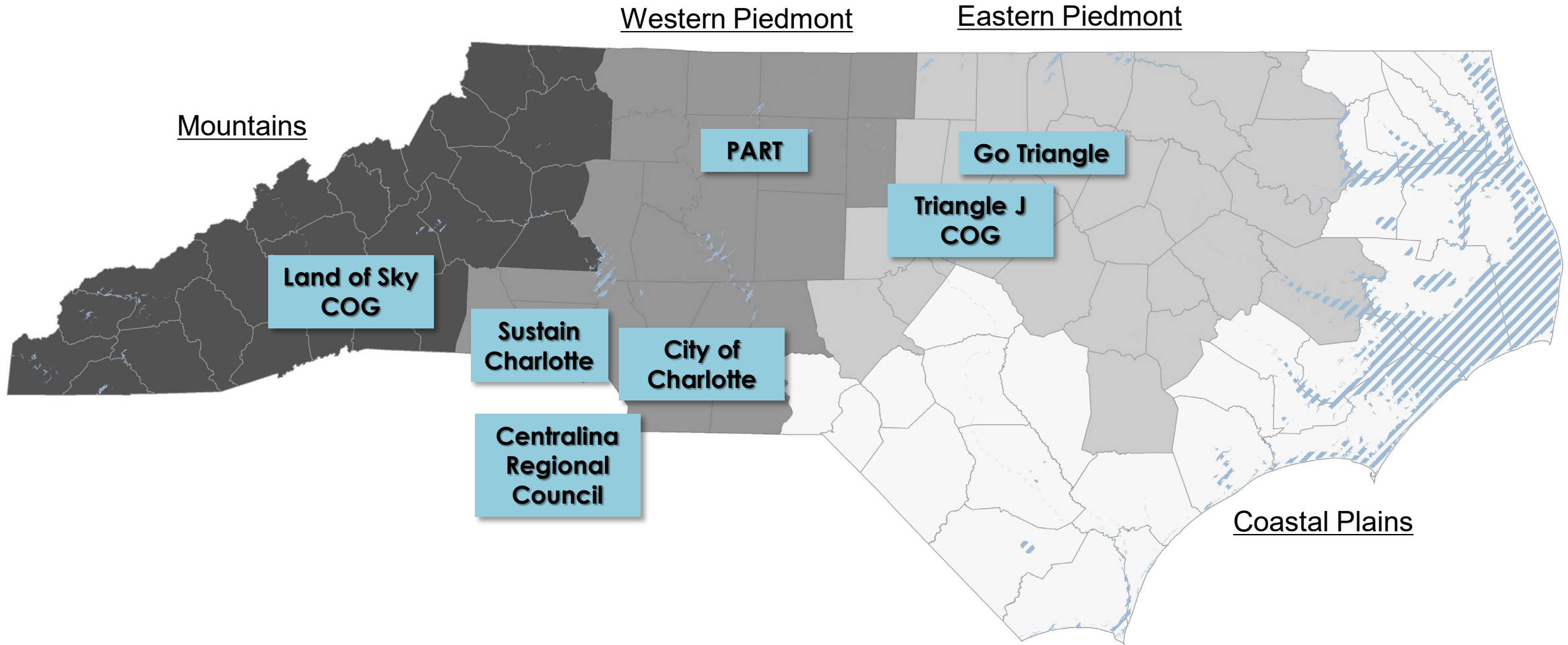
Naming Convention

Please name each individual file by the naming convention OrganizationName.FY.DocType (for example; NameofTDMProgram.FY2024.PublicHearingNotice). After all the required documents are completed and scanned, they may be uploaded to the application. **Please do not zip these files together.**

Note: Do not submit the application without all of the required documents attached. Use the Application Checklist as a guide. Applicants will receive a confirmation when NCDOT receives the application.

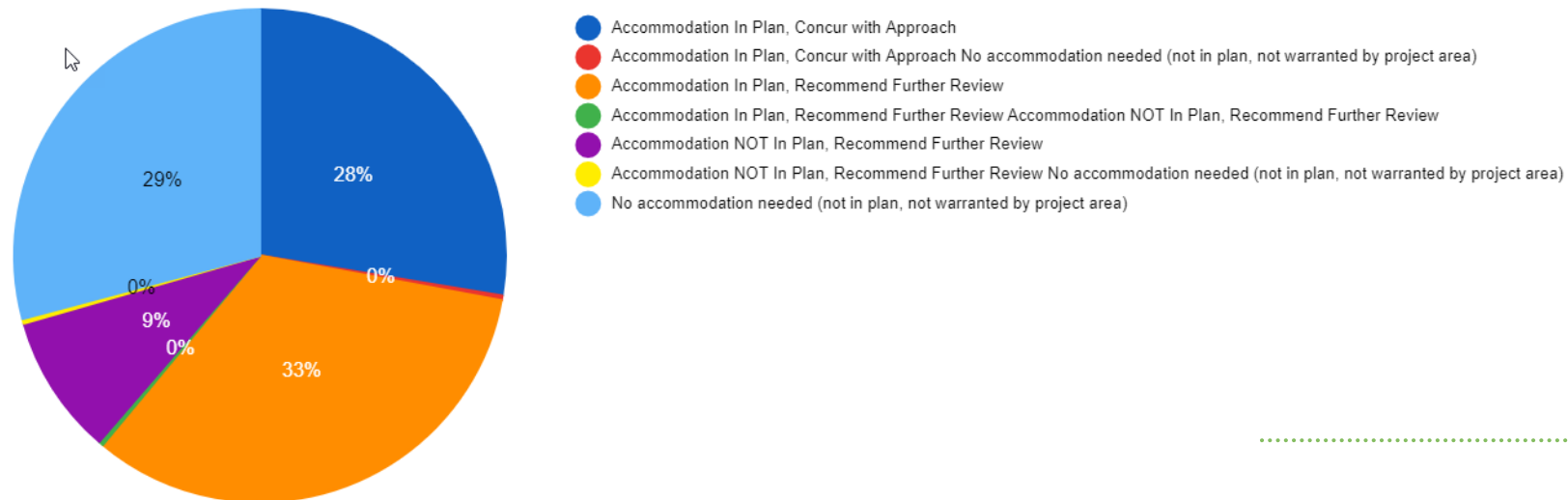


Currently Funded TDM Partners



Complete Streets Updates

- Continue to review projects in Stages 1 and 2 of project development
 - Recent presentations include:
 - December ACEC conference presentation
 - February PMU (Project Management Unit) Call training
 - NCSU Highway Engineering Concepts Semester Project
- Statewide team completed over **500 reviews** in 2022
- Maintenance project (HMIP) review guidance for complete streets is nearing completion
- Additional guidance for cost and maintenance responsibilities from 2022 workgroups is still under development
- NCDOT participating in Smart Growth America's Rural Complete Streets Workgroup funded by the CDC.



CASSI Advances Shared Autonomous Mobility Technologies in NC

NCDOT's **Connected Autonomous Shuttle Supporting Innovation (CASSI)** is a program (not a product) that **demonstrates the capability of shared autonomous vehicles** to prepare for the future of mobility and enhance public transportation services.



CASSI evaluates how autonomous vehicles can best be used by riders with different needs and in different environments.

Examples include:

- Transit applications such as first mile/last mile solutions
- Connected vehicle infrastructure

CASSI is Evolving to Include Latest Technological Advancements

CASSI includes the **continued demonstration of novel-design, low-speed autonomous shuttles** and the **testing and integration of autonomy-enabled conventional vehicles** into high quality, on-demand transit services.

Novel-design, low-speed automated vehicles



(3) Completed Projects
2020-2021



NPS Report

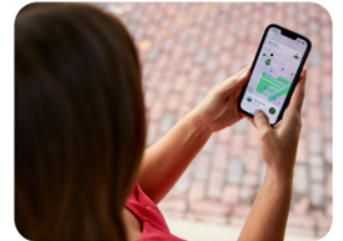


USDOT Report



(2) Planned Projects
2023

Autonomy-enabled conventional vehicles



Connected, Rural, Equitable, and Autonomous Transportation for Everyone (CREATE)

FY 2022 USDOT Advanced Transportation Technology and Innovation Program Grant Application



Grant Application Information 15

CASSI in Cary's Bond Park

March 6 – June 2, 2023

Weekdays from 10 a.m. to 4 p.m. on four-stop route

NCDOT has partnered with the Town of Cary to bring a novel-design, low-speed autonomous shuttle to Bond Park through the CASSI program.

Manufactured by France-based Navya and operated by Lake Nona, Florida-based Beep, the shuttle relies on LiDAR, cameras, and GPS technology to navigate on a fixed route.

Facts about the autonomous shuttle:

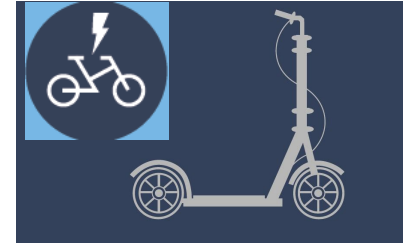
- There is no cost to ride
- Transports up to 8 people and an attendant
- Wheelchair accessible
- Fully electric
- Operates at speeds up to 12 mph

townofcary.org/cassi



ncdot.gov/cassi

Micromobility Strategy



- IMD led research project with the purpose to:
 - Understand the current scale, practice and interest in micromobility services in North Carolina
 - Determine NCDOT's role with regards to policy, regulation, safety, data management, equity, funding and more
- Study focusing primarily on electric-powered transportation devices, including e-bicycles (+ shared human-powered bicycles), e-scooters, and similar
- Benefits – 1st/last mile, reduced vehicle trips, accessibility, etc.
- Challenges – parking of device, safety, regulatory challenges, etc.
- Survey of municipalities, MPOs/RPOs, universities/community colleges – survey launch date = **February 14**
- Deliverables – Summary infographic document and final action-oriented report outlining recommendations and strategies to guide NCDOT in the integration of micromobility in plans, programs, policy and practice.

Challenges and Lessons Learned from Public Microtransit Pilots in North Carolina

Dr. Eleni Bardaka¹, Dr. Kai Monast², Subid Ghimire¹,
Juan Wang¹, Waugh Wright², and Jeremy Scott²

¹ Department of Civil, Construction, and Environmental Engineering,
North Carolina State University (NCSU)

² Institute for Transportation Research and Education (ITRE), NCSU

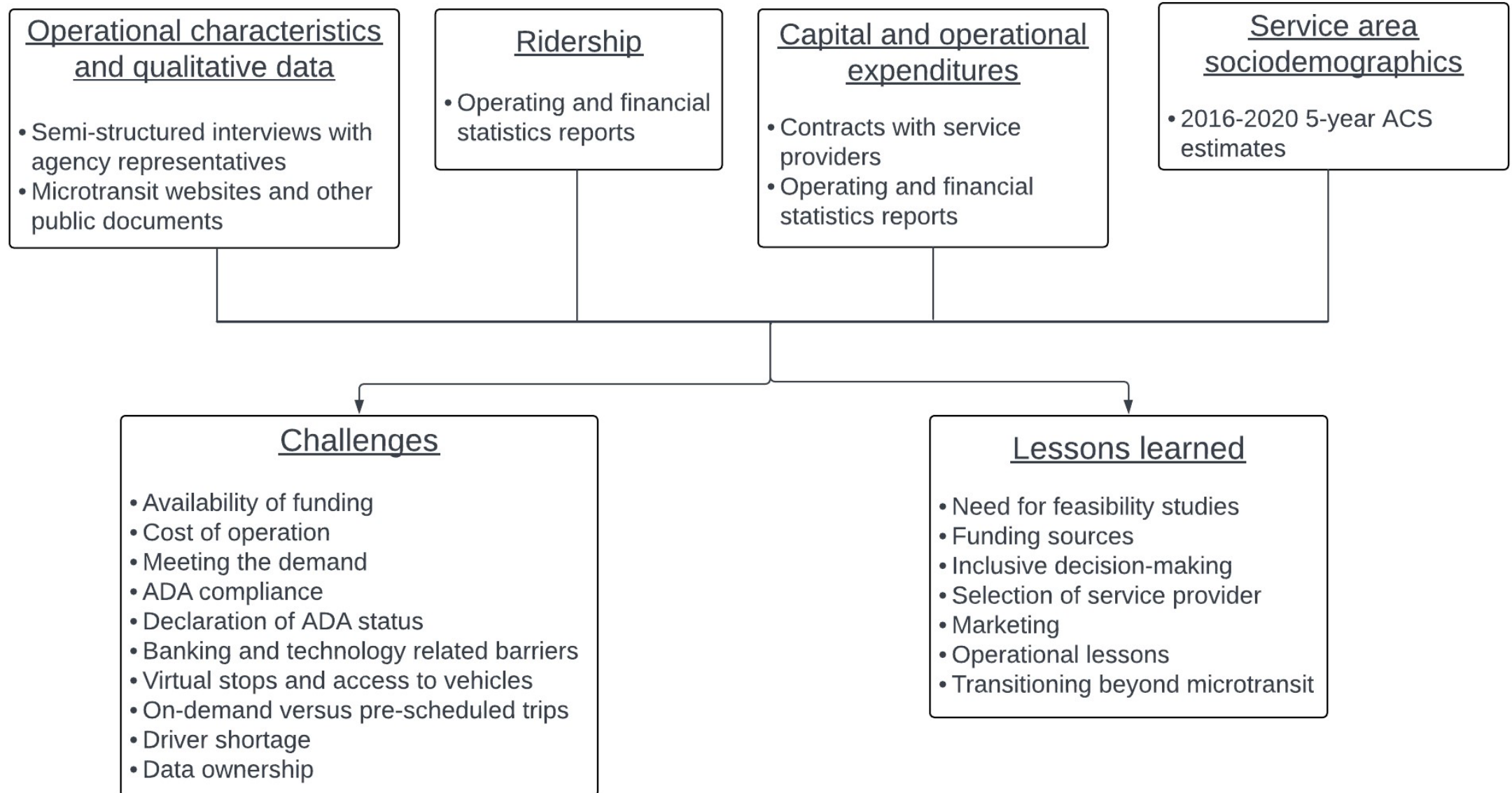
What is microtransit?

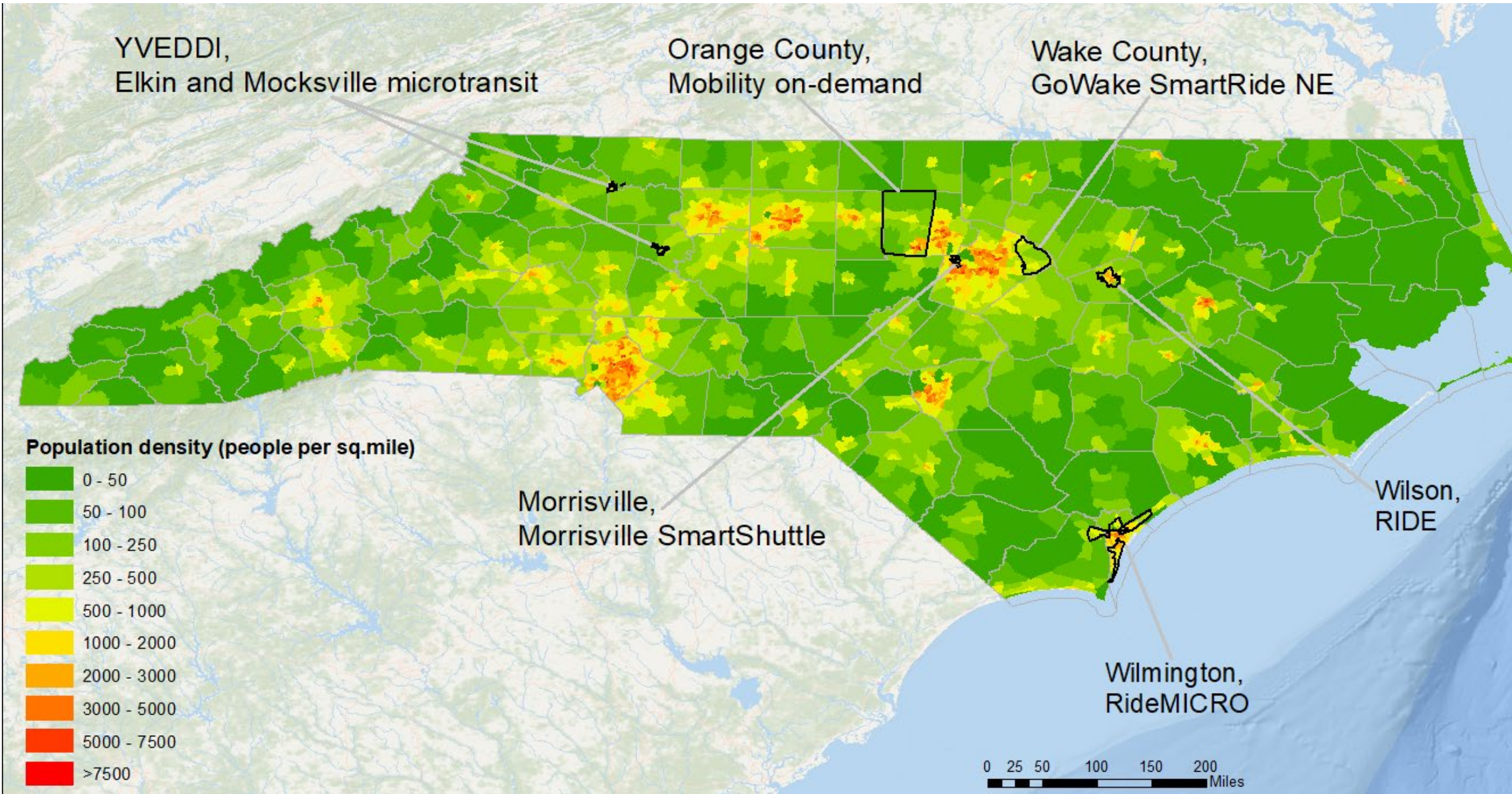
- A **shared**, technology-enabled, **public transportation** system with flexible routing options developed based on real-time trip demand and origin-destination patterns
- Trip scheduling, real-time vehicle tracking, and fare payment are incorporated into a **smartphone application**
- **No designated path**, usually flexible pick-up and drop-off locations



Research objectives

- Consolidate the experience of the six transit agencies in NC that have implemented microtransit
- Discuss the challenges they faced during planning and implementation and the lessons learned
- Examine the cost of microtransit systems through analysis of the operational expenditures and the contracts public agencies formed with service providers.

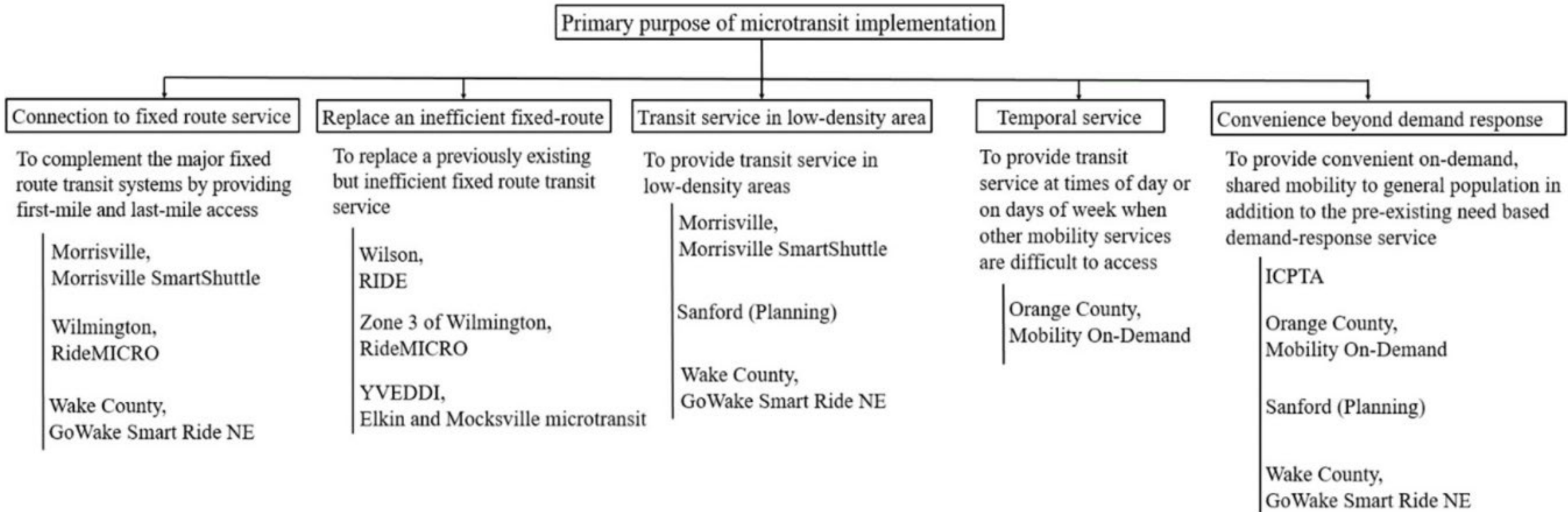




Service delivery models

- **Turnkey** model: technology, vehicles, drivers, and operations through a single contract with one private provider
- **Separate contracts** for technology, drivers, or vehicles with different entities
- **Technology acquisition** model: the public agency owns the vehicles and ensures that vehicle operators are available while contracting with a private service provider to obtain the technology

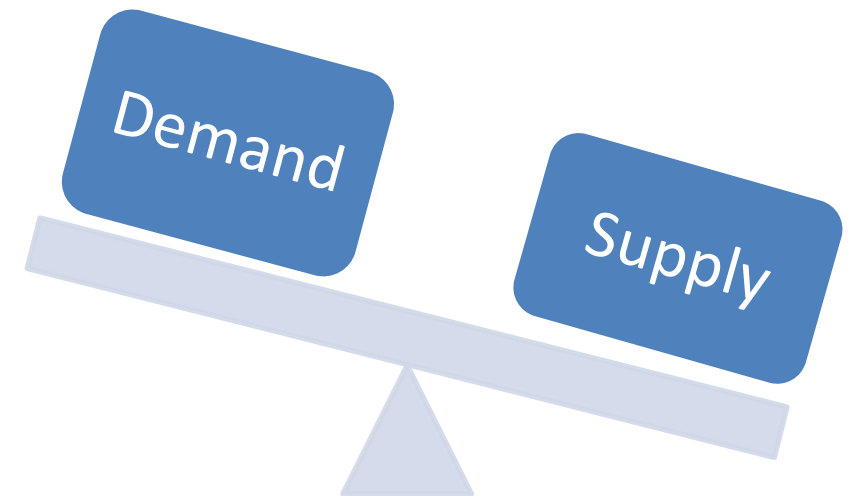
Purpose of Microtransit Implementation



Planning and implementation challenges

Meeting the demand

- Most effective with constant, low demand
 - No big peaks (e.g. shift work)
- Funding governs the operation hours, the fleet size, and the number of drivers
- Surge pricing is not an equitable method of managing demand
- Vehicles are usually underutilized
 - Low proportion of trips are shared with another booking



Planning and implementation challenges

- **Funding availability and sustainability**
 - Impacts on funding formulas
 - 5307 -> depends on local allocation process
 - 5307 GA -> no impact, based on population and service area size only
 - 5311 -> no impact
 - SMAP -> potential loss of \$ if fixed route ends
 - Other funding sources may emerge
 - Impacts on discretionary capital funding
 - Funding processes for 5307 and 5311 in NC are not built for capital cost of contracting
 - Most systems were funded as pilots through one-year grants

Planning and implementation challenges

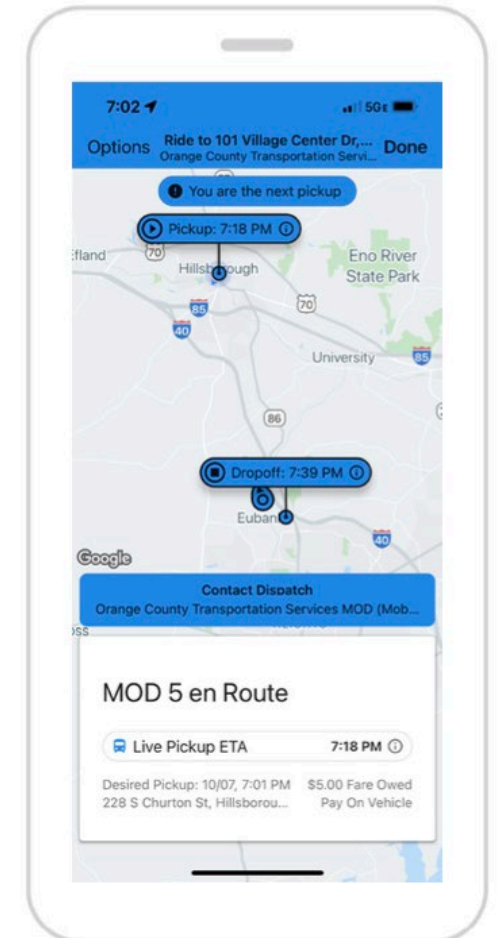
- **ADA compliance**

- If microtransit replaced a fixed route system, the requirement for ADA paratransit is removed
- Equivalent service to individuals with disabilities
- Different process for scheduling, limited ADA certified operators, limited numbers of ADA compliant vehicles



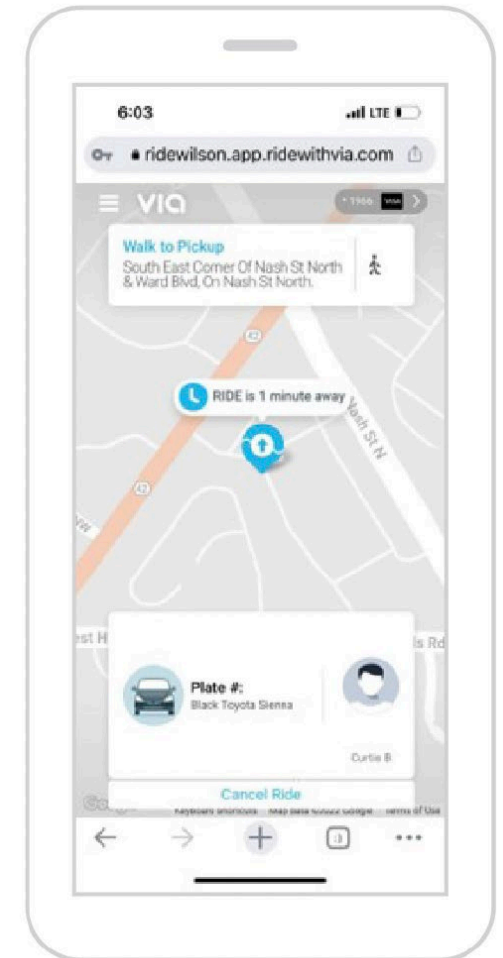
Planning and implementation challenges

- Banking and technology related barriers
 - Call centers are important
 - Most trips requested by phone in Wilmington and Wake
 - Trip requests may require electronic form of payment



Planning and implementation challenges

- Virtual stops and access to vehicles
 - Users walk a certain distance from their location to access the service
 - Algorithms can be ignorant to the local traffic and pedestrian infrastructure and ask users to walk across unsafe conditions
 - Drivers intervene to avoid unsafe circumstances




Lessons learned

- Selection of service delivery model

- Previous experience with public transportation?
- Vehicles and drivers already available?
- Budget
- Consider pros and cons

- Selection of service provider

- Provider experience
- Be meticulous with contracts, require adequate detail; **data ownership**
- **Marketing** is essential 
- Transitioning to a new provider is challenging

Considerations

- In addition or in replacement
- Equity
- Bank accounts
- Stop type
- Stop location
- Pre-scheduling option
- ADA
- Technology access/skills
- Wait times
- Pilot funding
- Sustainable funding
- Existing operators

6.4. RideMICRO (Wilmington)

PILOT PHASE

General information

- **Service area:** Four distinct zones covering areas in Brunswick, Pender, and New Hanover Counties
- **Project type:** Microtransit
- **Turnkey:** Yes
- **Technology provider:** Bus.com (subcontractor: Moovit)
- **Vehicle provider:** Bus.com
- **Driver provider:** Bus.com (subcontractor: Daniel's Tours)
- **Project administration:** Wilmington (leader) cooperates with Brunswick Transit System Inc and Pender County
- **Data ownership:** Moovit
- **Service start date:** October 11, 2021 (first zone)
- **Service hours:** Zones 1 & 2: Mon - Fri 6:30 AM - 10:00 AM and 12:00 PM - 7:00 PM; Zones 3 & 4: Mon - Fri 6:00 AM - 8:00 PM, Sat 8:00 AM - 6:00 PM, Sun 9:00 - 5:00 PM

Fare structure

- **Payment:** App, cash, or ticket books
- **Fare:** \$2/trip
- **Discount:** The first month for each zone is free
- **Credit card:** Required unless passes are purchased

Scheduling

- **To schedule:** App (Moovit), telephone, or website (at least 1 hour before trip)
- **ADA requests:** App (Moovit), telephone
- **Pre-schedule:** Allow to pre-schedule trips a week in advance
- **Stop locations:** Around 3,000 fixed stops within the service area (zone 4 has common stops with zone 2 and zone 1 for transfer)
- **Wait time:** Maximum accepted wait times is 30 minutes

Project timeline



Wilmington microtransit service area map

Wilmington's on-demand microtransit service, RideMICRO, operates in four areas to provide convenient mobility options within the zones and connections to fixed routes.

Funding

- North Carolina Department of Transportation ConCPT Grant (\$600,000) (State)
- Community Grant (\$100,000) (Local)

Service area socio-demographics

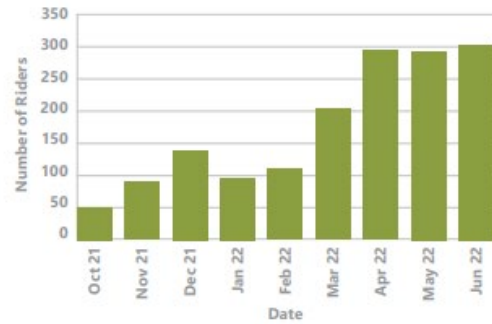
Total population: **125,800**
 Population density: **1,238** persons per sq mile



Zero-vehicle households **5%** Vehicle deficient households **4%**

16% Non-white
 12% Below poverty
 12% Non-ambulatory

Ridership

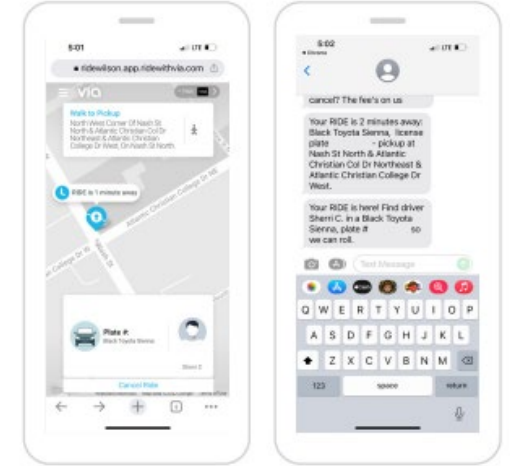


Fleet

- **Fleet size:** 5
- **Vehicles operating in maximum service:** 5 (up to 3 vehicle for New Hanover and Brunswick Counties, up to 2 vehicles for Pender County)
- **Fleet ownership:** Bus.com
- **ADA compatible:** One ADA accessible vehicle serves all 4 zones

Marketing

- Limited resources spent on marketing
- Participated and presented in meetings
- Used social media platforms and press releases



App screenshots



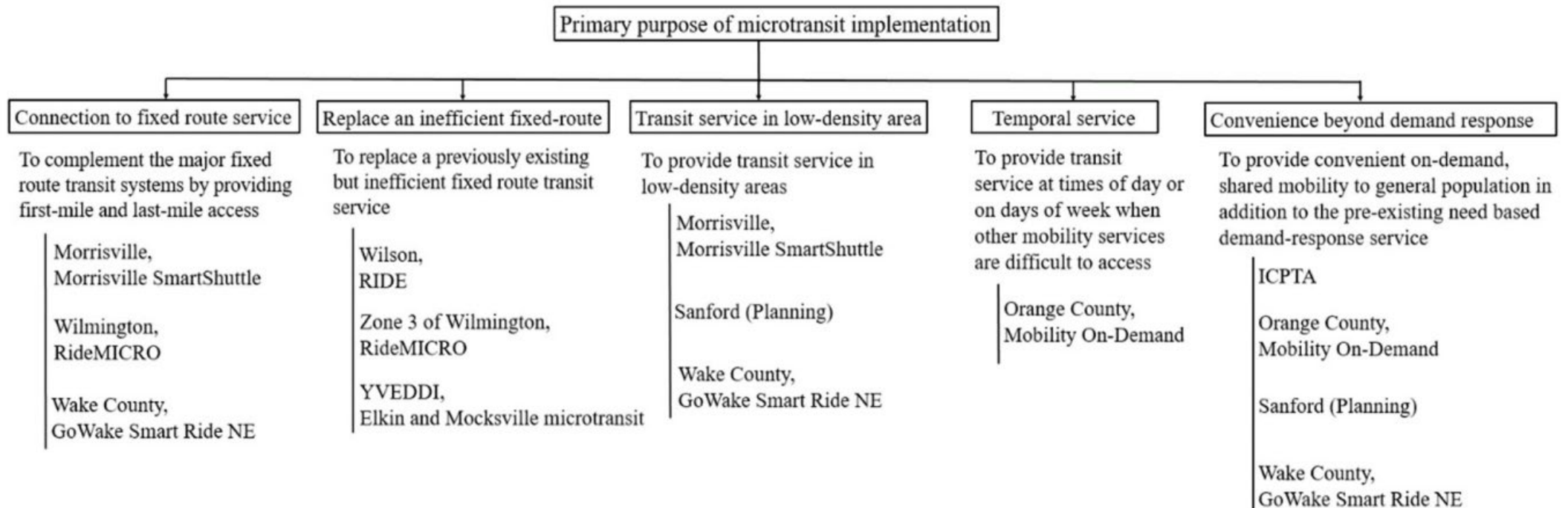
Microtransit vehicle



Microtransit driver

Contacts

- Dr. Eleni Bardaka ebardak@ncsu.edu
- Dr. Kai Monast kai_monast@ncsu.edu





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[Link for IMD Multimodal Updates Webinars](#)
– Slides and Recordings



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