# FY 23 Regional TDM Strategies and Work Program


Strengthening Mobility in Our Communities

Transportation Demand Management Initiative for the Piedmont Triad

BGMPO
Burlington - Graham Metropolitan Planning Organization

PART
piedmont authority for regional transportation

HPMPO

GREENSBORO URBAN AREA MPO
METROPOLITAN PLANNING ORGANIZATION

Winston-Salem Urban Area Metropolitan Planning Organization (MPO)

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# FY 23 Piedmont Triad Regional TDM Initiatives

As of July 1, 2022

**INTRODUCTION**

This is the second year of the Regional TDM Initiative. Several regional media campaigns and surveys were completed during FY 22. Additionally, the regional stakeholder group met quarterly with smaller groups working on specific projects. The initiatives in each annual work program are designed to:

- ✓ reduce vehicle miles travel;
- ✓ reduce $CO_2$ and particulate emissions; and
- ✓ increase mode share in the Piedmont Triad.

The FY 22 work program was driven by objectives outlined in a NCDOT-IMD Rideshare funding grant held by the Piedmont Triad Regional Transportation Authority (PART). In early 2022 the regional TDM partners began discussing a work program supported by but existing outside the NCDOT Rideshare Grant.

A VMT Reduction Study, completed by NCDOT and Stanc in April 2021, provided a comprehensive list of TDM strategies and their impacts on VMT. The Regional TDM partners used this list to document strategies currently in place, locally and regionally. Then it looked for gaps and ideas for expanding TDM strategies in the region. This process and the objectives outlined in the FY 23 NCDOT-IMD Rideshare Grant applied for by PART informed the collective thoughts of the regional TDM partners which led to the development of this FY 23 Work Program.

**FY 23 REGIONAL TDM INITIATIVES**

During FY 23 the Regional TDM Initiative Stakeholder Group will focus on the following five initiatives.

**Administration of TDM Initiative:** Continue to focus on the established TDM working group for the Piedmont Triad. This group was created in response to the FY22 TDM Rideshare Grant, which identified regional TDM strategies and initiative in coordination with local MPOs, transit agencies, and municipalities. A TDM Initiative was developed by committee members and endorsed by several local agency TAC boards. The plan focused on a variety of TDM strategies outside the traditional employer and commuter outreach activities. The regional TDM partners plan to continue working through 2022 to finalize elements of the original initiative. At the same time opportunities to integrate NCDOTs new Annual TDM Plan focus on marketing and outreach strategies into future initiatives is being discussed.

**Alternative Travel Training Education:** Continue to support the promotion of alternative modes of transportation based on the regional TDM strategies established with partner agencies (MPOs, Transit Agencies, Municipalities, and Counties). Majority of these efforts are promoting alternatives to the public in our 10 County region. This involves the continuation of having a “1 stop shop” for general citizen input that is provided by the Regional Call Center.

**Regional Vanpool Program:** PARTs key strategies for FY 23 will be post-pandemic promotion of the regional vanpool program. The majority of the NCDOT Rideshare grant will be used to support reestablishing this program. Dedicated staff have been deployed to focus on vanpool activities and extensive outreach activities are planned.

**Ride Matching and Mobility Support Services:** Social media campaigns will be implemented to encourage registration in the STRNC platform and promoting the Triad's Mobile and Smartcard faring system. These two services will provide online convenience for persons wanting to carpool and take transit. The regional call center provides traveling information with a focus on public transportation. To improve and broaden communications online chat and text services will be implemented and promoted through a social media campaign.

**Mobility as a Service:** As mobility options continue to grow in the Piedmont Triad each service and location tends to provide its own means to connect people with the service. Integrating all these service into one platform, one method of trip planning and fare payment is one goal of Mobility as a Service or MaaS. During FY 23 efforts will be made to increase public transportation ridership through the deployment of technology to simplify trip planning, payment, and execution on a uniform platform. Employee pass programs across transit agencies and local governments will be established. The digital faring platform, UMO, will be expanded and a common AVL platform will be integrated across all fixed route transit systems.

The following as a descriptive list of work program objectives and targets for the initiatives:

## 1 Administration of TDM Initiative

1.1 Hold quarterly meetings with TDM work group participants.
1.2 Invite statewide partners to present on their TDM program structure and initiatives to TDM working group.
1.3 Expand the scope of the regional partnership and prepare for the FY 24 TDM Grant
- 1.3.1 Expand efforts to include economic development entities and business organizations.
- 1.3.2 Coordinate with regional partners to identify specific local TDM activities and funding to incorporate in FY24 TDM grant.

## 2 Recruitment of Travelers into Non-SOV Modes

2.1 Vanpool Outreach and Education Program
- 2.1.1 Refer to Section 5 Regional Vanpool Program

2.2 Regionwide Transit, Bike, Commute Promotions
- 2.2.1 Solicit projects from regional partners on a quarterly basis to promote TDM specific activities for their local jurisdiction.
- 2.2.2 Serve as a marketing resource for PARTs regional partners supporting and/or coordinating at least 4 activities over the course of the year.
- 2.2.3 Work closely with our regional partners including PART Board of Trustee members, MPO/County/City representatives, and economic development associations.
- 2.2.4 Work closely with local chamber of commerce and industry associations to identify employers that meet the target audience.

2.3 Tools for Employers and Commuters
- 2.3.1 Utilize the STRNC platform to support vanpool formation and other rideshare activities.
- 2.3.2 Provide information on the internet about multi-modal travel and commuter programs within the region.
  - *2.3.2.1 Continue to review and update city and MPO web sites for information about all mobility options.*
  - *2.3.2.2 Expand regional information on landing page (triadtransit.org) established for "Chance to Win" survey to cover all modes and commuter programs.*
- 2.3.3 Explore commuter programs opportunities with Colleges and Universities
  - *2.3.3.1 Research college and university TDM programs across the nation.*

*2.3.3.2 Survey local colleges and universities.*
*2.3.3.3 Develop potential options for a Triad program and promotion of STRNC.*
*2.3.3.4 Coordinate with transit partners and implement program.*

2.3.4 Develop a program for PART, DCTS, HPT, GTA and WSTA that would allow for free rides on all agencies for employees.

*2.3.4.1 Develop a strategic plan/outline for a pilot with transit agency employees*
*2.3.4.2 Coordinate discussions with Transit partners.*
*2.3.4.3 Implement program by September 1, 2022.*

## 3 Regional Vanpool Program

3.1 Update the employer outreach process including the creation of a list of target employers, a database to track activities, and outreach mediums.

3.2 Implement a LinkedIn campaign about vanpooling targeting decision makers in Triad companies.

3.3 Outreach Targets

3.3.1 Contacting at least 30 employers per quarter.

3.3.2 Coordinate at least 2 presentations a month to local community organizations, economic development entities, chamber of commerce organizations, municipal partners, trade associations, etc.

3.3.3 Hold 3 events monthly to promote the vanpool program.

3.3.4 Increase the number of vanpools by 20%.

## 4 Ride Matching and Mobility Support Services

4.1 Alternative Travel Training Education

4.1.1 Implement social media campaign encourage registration in the STRNC platform.

4.1.2 Implement a social media campaign promoting the Triad's Mobile and Smartcard faring system.

4.2 Regional Call Center

4.2.1 Implement online chat and text services for regional call center. Implement a social media campaign promoting the new services to the public.

## 5 Mobility as a Service

5.1 Coordinate Regional AVL Deployment and Workflow Integration.

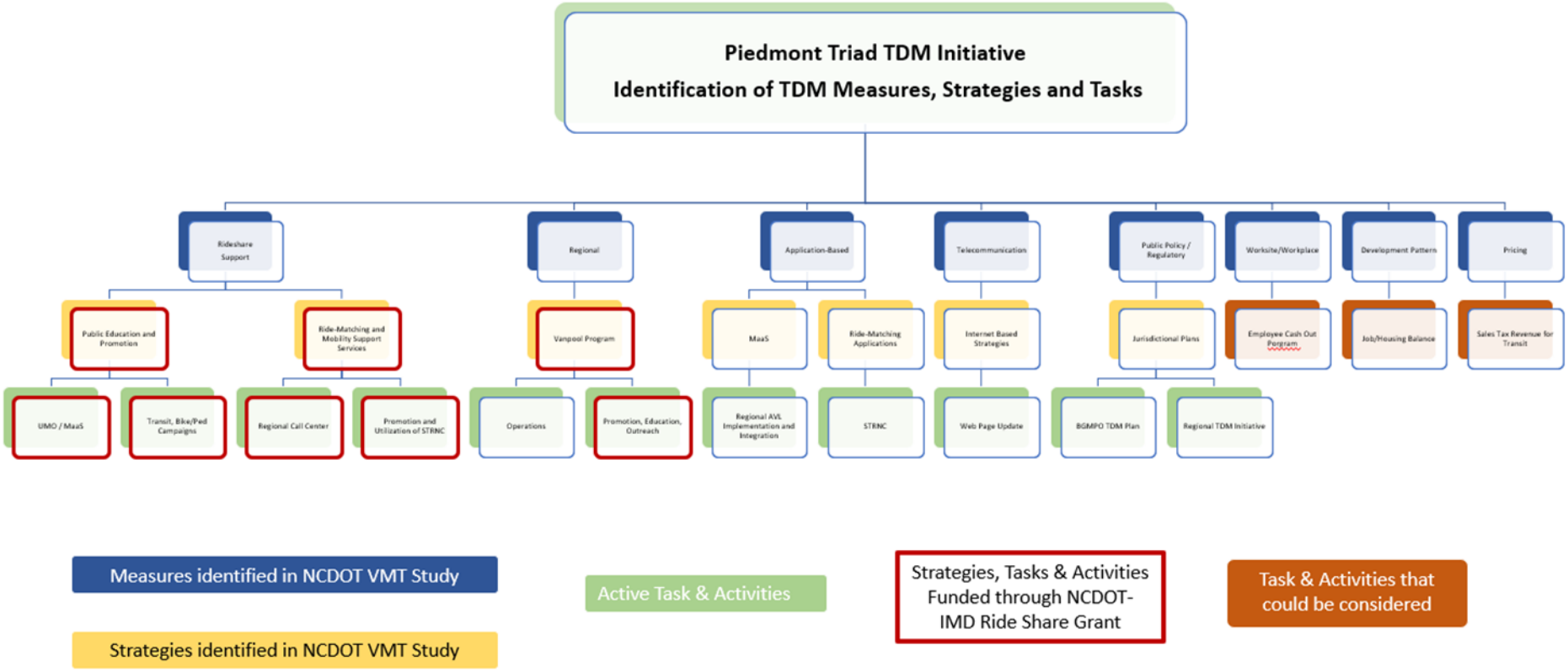
5.2 Implement regional trip planning and real-time vehicle location web and app-based portals.

5.3 Explore the benefits standardized of route planning and GTFS development for Piedmont Triad fixed route transit systems.

5.4 Continue to promote digital fare payment system across region.

**Categorizing Work Program Strategies**

This diagram summarizes and categorizes current and future TDM initiatives. It identifies strategies supported by the NCDOT-IMD Rideshare Grant. All other strategies are incorporated into agency work programs and funded through a variety of sources.



**Regional Scorecard and Potential Future Strategies**

The chart below serves as the framework for future work plan development and highlights all the active strategies in the region. Following the charts there is a description of each strategy. These charts and descriptions were derived from the NCDOT VMT Reduction Study.

| **TDM STRATEGY IMPLEMENTATION BY ORGANIZATION**<br><br>**Status**<br>P = Planning<br>D = In Development<br>M = Manages/Maintains<br><br>**Application**<br>R = Regional<br>L = Local / Agency Specific | Piedmont Authority for Regional Transportation | Burlington-Graham MPO | Greensboro MPO | High Point MPO | Winston-Salem MPO | Region Type | Types of Trips Targeted | Potential Application Locations | Implemented By |
|---|---|---|---|---|---|---|---|---|---|
| **Worksite/Workplace** | | | | | | | | | |
| Employee Parking Cash-Out Program | | | | | | Urban Suburban | Commuter | Urban City and Town Centers | State Private |
| Transportation Management Associations | | | | | | Urban Suburban Rural | ALL | Any | County/Local MPO/RPO Private |
| Alternative Work Schedules | | | | | | Urban Suburban Rural | Commuter | Any | State Private |
| Remote Work Policies | L | | | | | Urban Suburban Rural | Commuter | Any | Private |
| **Regional** | | | | | | | | | |
| Park and Ride Lots | M / R | R | R | R | R | Suburban Rural | Commuter | Urban City and Town Centers | State County/Local Transit Agency |
| Alternative Mode Sharing | | | | | | Urban Suburban | All types, typically short trips | Dense residential areas and universities | State County/Local Private MPO/RPO |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Carsharing[1] | M / R | R | R | R | R | Urban Suburban | Infrequent car trips | Dense residential areas and universities | Private |
| Flexible Public Transit | | | | | | Suburban Rural | All trips, particularly disabled, elderly and visitor trips | -- | State County/Local Transit Agency MPO/RPO |
| Public Transit | M / R | L | L | L | L | Urban Suburban | All | Urban Suburban | State County/Local Transit Agency MPO/RPO |
| High Occupancy Vehicle (HOV) Facilities | | | | | | Urban Suburban | All, primarily commuter | Suburban and urban highways, office parks | State County/Local Private |
| Non-Motorized Mode Support | | M / L | M / L | M / L | M / L | Urban Suburban | All | Dense commercial centers, residential area, downtowns, recreation areas | State County/Local MPO/RPO |
| Vanpool Program | M / R | R | R | R | R | Urban Suburban Rural | Commuter | Urban and suburban area | State County/Local Transit Agency MPO/RPO Private |
| **Telecommunication** | | | | | | | | | |
| Internet Based Strategies | | | | | | Urban Suburban Rural | Non-commuter | Statewide | State / Private |
| Information Service: Broadband Expansion | | | | | | Urban Suburban Rural | Commuter trips School trips Some trips to access services | Urban areas Suburban areas Rural areas Tribal lands | State, County, Local Gov't / Private |
| Telecommuting/Telework | | | | | | Urban Suburban Rural | Commuter trips | All areas | State, County, Local Gov't / Private |
| **Development Patterns** | | | | | | | | | |
| Providing Affordable Housing | | | | | | Urban Suburban Rural | Commuter | Tourist areas Urban Areas | County, Local Gov't / Private |
| Complete Streets | | | | | | Urban Suburban Rural | All | All | State, County, Local Gov't MPO/RPO |
| Transit-Oriented Development | | | | | | Urban Suburban | All | Cities and along rail and bus rapid transit routes in suburbs | State, County, Local Gov't Private Transit Agency |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Connectivity | | | | | | Urban Suburban | All | Urban and suburban neighborhoods | State, County, Local Gov't MPO/RPO |
| Development Impact Mitigation | | | | | | Urban Suburban | Dependent on development | Universities as well as urban and suburban areas | State, County, Local Gov't MPO/RPO |
| Jobs/Housing Balance | | | | | | Urban Suburban Rural | Commuter trips School trips Some trips to access services | Urban areas Suburban areas Rural areas Tribal lands | State, County, Local Gov't MPO/RPO |
| Compact Employment and Activity Centers (Multi-story, Mixed Use) | | | | | | Urban Suburban | All, except freight | n/a | State, County, Local Gov't MPO/RPO Private |
| Compact Residential Development | | | | | | Urban Suburban | All, except freight | n/a | State, County, Local Gov't MPO/RPO Private |
| Downtown Revitalization | | | | | | Urban | All | n/a | State, County, Local Gov't MPO/RPO Private |
| **Public Policy / Regulatory** | | | | | | | | | |
| Access Priority/Restriction (Car-Free Zones) | | | | | | Urban | Primarily commuter trips | Urban city centers, congested commuter, and transit routes | State, County, Local Gov't Transit agency |
| Trip Reduction Ordinances | | | | | | Urban Suburban | General ordinance - all trips. Employer-based trip reduction program - commuter trips | Statewide Urban Areas | County, Local Gov't |
| Jurisdictional TDM Plans | M / R | M / L | | | | Urban Suburban Rural | All | Urban areas Suburban areas Rural areas | Local Gov't MPO/RPO |
| **Pricing** | | | | | | | | | |
| Gas Tax Increase | | | | | | Urban Suburban Rural | All | Statewide | State Gov't |
| Parking Pricing | | | | | | Urban | Commuter trips, short trips between parking facilities | Urban centers, town centers | State, County, Local Gov't Private |
| Road Pricing and Condon Pricing | | | | | | Urban Suburban Rural | All, but primary peak period trips | High volume corridors and urban city centers | State, County, Local Gov't |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| VMT Fee Tax | | | | | | Urban Suburban Rural | All trips | Statewide | State Gov't |
| **Application-Based** | | | | | | | | | |
| Mobility as a Service | D / R | D / R | D / R | D / R | D / R | Urban Suburban | All, except freight | Cities and nearby suburbs | State, County, Local Gov't Transit Agency |
| Ride-Matching Applications (Share the Ride NC or STRNC) | R | R | R | R | R | Urban Suburban | All | Urban and Suburban Areas, Towns, universities | State Gov't Transit Agency |
| **Support** | | | | | | | | | |
| Compact Development/Clustering | | | | | | Urban Suburban Rural | All | All | State, County, Local Gov't |
| Facility Amenities | | | D / L | | | Urban Suburban | All | Universities, large employers | State, County, Local Gov't |
| Mobility Hubs | | | | | | Urban Suburban | All | Urban, Suburban | State, County, Local Gov't Private Transit Agency |
| Guaranteed Ride Home | M | ? | M | M | M | Urban Suburban Rural | Commuter trips | Areas with alternative transit options | Private, MPO/RPO Transit Agency |
| Alternative Mode Rebates/Incentives | | | | | | Urban Suburban Rural | Primarily commuter trips | Employment sites, universities, cities, and municipalities | State, County, Local Gov't Private |
| Vanpool Fare Subsidies | M / R | | | | | Urban Suburban Rural | Commuter | Any existing or starting vanpool program | State, County, Local Gov't MPO/RPO Private |
| Parking Management | | | | | | Urban | Commuter trips, short trips between parking facilities | Urban city centers, town centers | State, County, Local Gov't Transit Agency |
| Transit Fare Subsidies | | | | | | Urban Suburban Rural | All | Locations with a significant transit presence | County, Local Gov't Transit Agency |
| Public Education and Promotion | M | M | M | M | M | Urban Suburban | All | Large urban regions, towns, commercial centers, universities | State, County, Local Gov't Transit Agency |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Ride-matching and Mobility Support Services | M / R | R | R | R | R | Urban Suburban Rural | Primarily commuter trips, also recurring trips | Suburban areas, Towns, Low density rural areas | State Gov't Transit Agency |

# Description of TDM Measures

## Worksite/Workplace

### Employee Parking Cash-Out Program

Many employers provide theiremployees a "free" parking space. Parking cash-out allows employees to opt out of using this space in exchange for payment which may be used to purchase transit fares, or in some programs,kept as cash. The program is typically administered monthly, but some daily cash-out programs do exist.

The cost of providing parking toemployees is high. According to WGI, the 2019 average construction cost for a parking spot in a parking structure in Charlotte was $18,122. A surfacelot parking space would be less but would likely cost between $2,000 and $3,000 per space.

In addition to the constructioncosts, annual operation and maintenance can add about $300-$500 per year ($2013) per space,and the initial land costs can alsobe high, particularly in a dense urban area.

### Transportation Management Associations

Transportation Management Associations (TMAs) are independent groups that coordinate transportation services, usually in partnership with government entities. TMAs can consist of private citizens, employers, business owners, developers, or other stakeholders. Coordinated services can include ride-matching, employer shuttles, shared parking, paratransit, travel alerts, safe routes to school/work, bike sharing, or carsharing. TMAs can also be a valuable channel for communicating and marketing new TDM measures.

TMAs cover defined geographic areas and can have a mix of voluntary and compulsory membership. Required membership can be part of zoning and variance agreements. Voluntary membership rationale includes the economic growth seen in areas with TMAs and the ability to have a formal stakeholder voice. TMAs are not for profit and funding can be a mix of private funding like membership fees and
public funding.

### Alternative Work Schedules

Traditional work schedules consist of working an 8-hour day, 5 days a week typically Monday through Friday from about 8 AM to 5 PM. An alternative work schedule varies these work hours to spread the typical 40-hour work week over different hours of the day and sometimes for fewer days per week. If the 40 hours are spread over a shorter week, reductions in commuter VMT can be achieved. For example, if a commuter works 10 hours per day for 4 days per week, instead of 8 hours per day for 5 days per week, they reduce their weekly commuter VMT for this trip type by 20 percent. If they spread two weeks of work (80 hours) over 9 days instead of 10 days, a 10 percent reduction in commuter VMT can be achieved.

## Regional

### Park and Ride Lots

Park and ride facilities are parking lots where commuters can park their personal vehicles and transfer
to a "higher occupancy" transportation mode such as light rail, bus, or carpool vehicles.

Park and ride facilities are typically adjacent to a transit station and/ or a highway to allow for an easy connection between modes. Park and ride lots may be maintained by the Department of Transportation or other public agency and monitored by local law enforcement to prevent vehicle theft and overnight parking. Lots may also be converted from existing underutilized or unutilized lots like shopping centers.

### Alternative Mode Sharing

Alternative mode sharing is a service in which non-automobile vehicles (typically bicycles or scooters, non-motorized or electric) are available to individuals to either rent for a fee or reserve for free. Some sharing programs require that vehicles be taken from and returned to docking stations, while other programs allow customers to drop off vehicles at the end of their journey.

In the latter instance, vehicles are equipped with a GPS device that allows potential customers to see where available vehicles are on a smart phone application and allows the sharing company to locate their assets when maintenance is required. Some sharing services require customers to pre-register an account, while others just require a credit card to unlock the bicycle or scooter. Vehicles may have to be re- distributed throughout the day to ensure that the

available vehicle supply meets the demand.

## Carsharing

Carsharing is a car rental service that can replace vehicle ownership. Cars are available in mainly residential areas, and users can "rent" the car by the hour, adhering to pick-up and drop off protocols. There is usually a fixed charge associated with the rental and a per-hour charge. This rental model allows customers to make longer distance car trips without owning a car. Other trips made by the customer would typically be made via transit or walking (or other alternative travel mode). Most carsharing is facilitated through smartphone apps.

In the US, there are primarily two types of carshares available: For-profit private vehicle rental companies oriented toward local residential use (Zipcar) and Peer-to-peer services, in which owners list their vehicles for rent for short periods (Turo).

## Flexible Public Transit

Flexible public transit services are a hybrid of traditional, fixed route bus service and demand response (or paratransit) service. The objective is usually to provide the benefits of public transit to those who cannot safely complete the first mile/last mile of their trip, live in sparsely populated rural areas, are senior citizens, or have a disability. Typically, passengers contact the agency offering the service to reserve their trip. There are multiple examples of a flexible public transit service, including:

- Route deviation: The service has a defined path and schedule, but the vehicle may deviate from the path to pick up or drop off riders. Maximum deviation varies by service and can range from a quarter of a mile to a mile.
- Point deviation: The service has a defined area of service and stops, but no defined path.
- Demand-Responsive Connector: The service is effectively demand response, except that it has scheduled stops at public transit stations. In this way, it provides a means to access transit stations without having to drive or walk to the station.

## Public Transit

Public transit is a set of transportation modes available to the public that maintain a published schedule on an established route on which passengers pay a fee and travel together. Examples of public transit include buses, light rail, commuter rail, subway, ferries, and trollies. Public transit is most effective where it can be used by the most people. For this reason, transit is most prevalent in urban areas, in suburban areas that can bring commuters into city offices, and on college campuses

## High Occupancy Vehicle (HOV) Facilities

High Occupancy Vehicle (HOV) facilities are exclusive facilities for vehicles that qualify as an HOV, typically requiring at least two or three occupants including the driver. These facilities provide an inherent benefit to passengers in HOVs compared to passengers in non-HOVs. A common HOV facility is an HOV lane on a limited access highway. The goal of these lanes is to allow HOVs to travel faster in their separate lane from non-HOVs during periods of traffic congestion. HOV lanes may or may not: operate as a standard general-purpose lane outside of peak commuting periods, provide continuous access with general purpose lanes, or have separate structural elements from the general-purpose lanes. HOV lanes may also be on highway on-ramps with ramp meters; by being separated at the meter, HOVs can "queue jump" in front of non-HOVs. Another HOV facility is HOV parking which reserves desirable spots (typically closest to the destination building) in a lot or garage for HOVs.

## Non-Motorized Mode Support

Non-motorized modes of transportation include walking and biking. These modes can be recreational or for conveyance. Non-motorized mode support focuses on strategies to support and encourage walking or biking. This can include installing and maintaining sidewalks and bike lanes, increasing connectivity, public education and promotion campaigns of non-motorized modes, bicycle parking, bicycle racks on buses, pedways, and Safe Routes to School or work programs. This strategy could be used to support other strategies like Complete Streets

## Vanpool

Vanpools are a type of transit where a group of 5 to 15 people share a van to travel

together from a common community location, such as a park-and-ride lot or a transit station, to a place of work. Types of vanpool programs include:

- **Owner/operator arrangements** where an employee-owned vehicle is used for vanpooling. The owner must check with his or her insurance carrier regarding liability issues. Costs are shared among the commuters.
- **Employer sponsored programs** where the vehicle is owned by the employer or operated through a lease with a private vanpool vendor. Employers would typically provide maintenance, insurance, and other support services.
- **Third party lease programs** are facilitated via a monthly lease between the vanpool participants and a third- party vanpool vendor. The vendor provides the vehicle, maintenance, insurance, and other support services.

## Telecommunication

### Internet Based Strategies

Internet-based strategies may reduce VMT by providing online service as substitutes to making trips to a physical location. These can include services from both private and public sources. Internet-based private services include online banking/financial services, telehealth, online retail, online fitness instruction, online secondary education, and general customer service. Internet-based public services can include some DMV services, court services, parking services, tax services, permitting, notary, voter registration, transit ticketing, and record requests. Successful online services are clear and easy to use, run on well-supported web platforms, and are frequently accompanied by telephone services to provide human clarification when needed.

Planning organizations can encourage other public agencies to move eligible services online, or even formalize online based service prioritization in the form of

### Information Service: Broadband Expansion

Broadband is defined by the FCC as reliable high-speed internet with download speeds of at least 25 megabits per second. Broadband internet can be delivered through digital subscriber line (DSL), cable modems, fiber, wireless, satellite, and broadband over powerline. Broadband coverage is a key aspect of facilitating teleworking and distance learning. State efforts to expand broadband access are primarily focused on connecting broadband to homes and small businesses

### Telecommuting/Telework

Telecommuting or telework is a telecommunications strategy that uses the internet as an alternative to traditional commutes to work in a single occupancy vehicle. The employee can work from home using high-speed internet rather than commuting into an office. Telework allows for more flexible schedules and may reduce the burden on commuting. It may also reduce vehicle miles traveled, especially during rush hour. Telework can be part of a successful employer rewards program to avoid peak road congestion.

## Development Patterns

### Providing Affordable Housing

Affordable housing programs are administered by government agencies to provide subsidized rental homes for low-income households. Typically, a tenant in an affordable housing unit pays monthly rent equal to 30 percent of their monthly income.

These programs allow low-income workers to live closer to their jobs, even if their jobs are in areas with high property values. In urban areas, such as Raleigh or Charlotte, affordable housing may bring low-income workers close enough to their downtown jobs that they walk, bike, or take mass transit to work. In tourist areas, it may allow service workers to live closer to where they work.

### Complete Streets

Complete Streets is a concept that designs streets to be comfortably used by all types of users, not just cars. Ideally, complete streets provide infrastructure that can be used by people walking and biking, using transit and driving in cars. They are designed to operate safely for all users, regardless of age, ability, or mode of transportation. Complete streets may include sidewalks and crosswalks, accessible pedestrian signals, curbs and curb extensions, median islands, bike lanes, special transit lanes, comfortable and easily accessible transit stops, narrower travel lanes, and other measures

### Transit Oriented Development
A Transit-Oriented Development (TOD) is a compact, mixed-use community centered around a transit station that, by design, invites residents, workers, and shoppers to drive their cars less and ride mass transit more. Since these mixed-use developments are densely developed, they also promote walking and other non-motorized modes of travel. Generally, TODs within a half mile of the actual transit station are the most successful in achieving travel mode shifts from cars.

### Connectivity
Connectivity refers to the density of connections and directness of links in roadway networks. A well-connected network has many intersections and short blocks with minimal dead-ends or cul-de-sacs. Travel distance decreases and route options increase as connectivity increases. Increased connectivity allows for more direct travel between destinations. Connectivity can apply both internally to streets within a neighborhood or area and externally to other arterials and other neighborhoods. Connectivity is most applicable in high-density urban or suburban areas. It is best implemented by local governments, transportation management associations, developers, or neighborhood associations. A common example of connectivity is a fused grid street design, which uses public squares at the end of cul-de-sacs to provide pedestrian and bicycle connections.

### Development Impact Mitigation
Development Impact Mitigation is a strategy in which government entities require developers to mitigate the traffic impact their projects will cause when they are fully built and generating traffic. These measures are meant to ensure that the transportation network can handle the additional demand developments may cause. Some measures the developer may take, such as widening roads or converting a non-signalized intersection to a signalized intersection, encourage driving to the development and do not reduce VMT. Other measures, however, such as providing bicycle storage, a comfortable bus shelter, or new transit routes encourage people to take alternative modes to the development which reduces VMT compared to if those measures are not enacted.

### Jobs/Housing Balance
Jobs/Housing Balance is the concept that VMT can be greatly reduced if the quantity and quality of housing in an area matches the employment opportunities in that area. The reduction is a result of reducing the required distance traveled between an individual's residence and workplace. Jobs/ Housing Balance has also been correlated to higher TDM program adoption rates, especially carpooling.

Balance is achieved by stimulating either housing or job production in areas that are out of proportion. Strategies that encourage housing production include economic inducement, infill housing, parking reduction requirements, brownfield redevelopment, transit-oriented development, finance reform, tax credits, mixed use development, and zoning revisions. Strategies that encourage job production include targeted education/ research, community-based job training, venture capital investment, airport investment and promotion, and fiber optic cable

### Mixed Land Use
Mixed Land Use is a zoning strategy in which multiple land uses are intermingled within a zone. Land uses include residential, commercial, entertainment, and institutional uses. This strategy can reduce the distance between homes and workplaces and other destinations, which encourages people to drive shorter distances and possibly switch to either walking or bicycling. Mixed Land Use provides travelers the opportunity to "bundle" trip purposes. For instance, if a business office is adjacent to a grocery store, office workers may go grocery shopping after work, thereby removing the need to make a separate grocery shopping trip on the weekend.

## Public Policy/Regulatory

### Access Priority/Restriction
Access priority and access restriction are public policy and regulatory strategies that focus on prioritizing transit and other modes of transportation over single-occupancy vehicles. There are several types of access priority and restriction:

- Route deviation: The service has a defined path and schedule, but the vehicle may deviate from the path to pick up or drop off riders. Maximum deviation varies by service and can range from a quarter of a mile to a mile.

- Transit lanes that give priority to transit. These include segregated bus lanes which are fully separated from the main road and reserved for transit and queue jump lanes which enable transit to overtake queuing vehicles at a signal.
- Transit signal priority uses technologies to reduce the time at traffic signals for transit vehicles.
- Car-free streets or car-free zones limit personal vehicle access. Some cities in Europe have banned cars in city centers.

### Trip Reduction Ordinance

A Trip Reduction Ordinance is a requirement adopted by a state, region, or city to manage congestion and reduce vehicle miles traveled by promoting alternatives to single-occupancy vehicles. Most of these ordinances date back to the 1990s when the US Congress passed the Clean Air Act, endorsing trip reduction ordinances to increase non- automobile travel. Trip reduction ordinances include programs that require developers to reduce the drive-alone rate for their developments as well as state or city mandated employer-based programs to reduce the drive-alone rate among commuters.

A common form of trip reduction ordinance is an employer-based trip reduction program. These programs are implemented by employers to reduce single- occupancy employee commuting trips. The employer program can include any of a variety of TDM measures including employer- subsidized transit passes, company-run vanpool services, or employer-run shuttle service to transit stations. 250 employees are often the minimum number of employees needed to participate in the program.

## Pricing

### Gas Tax Increase

Gas taxes or fuel taxes are apricing strategy commonly used tofund highway and roadway facility maintenance. All US states and the US federal government have a gas tax. In North Carolina, the gas tax varies with state population and energy prices. Some states allow local governments to levy additional fuel taxes. Many states are now revising the definition of fuel to include non-gas alternative fuels.

### Parking Pricing

Parking pricing refers to charging a fee to park in public (municipal) lots and curbside spaces and private lots. Types of parking pricing strategies that could potentially reduce VMT include:

- Price on-street parking. This could encourage people to use alternative modes of transportation.
- Price parking so that it is equal to or greater than the cost of transit to encourage transit use.
- Have a local parking pricing plan that charges similar fees for parking at a given time. This can be applied on a static basis or can be demand-responsive, charging based on the demand. The goal of demand responsive parking pricing is to charge a price that is low enough that the driver will decide to park there without further "circling" for cheaper spots, but also high enough that customers are likely to leave quickly, allowing their space to be occupied by another vehicle. A parking pricing strategy for employers would be to charge employees for parking in the employer owned lots.

### Road Pricing and Cordon Pricing

Road Pricing means that vehicles are charged a fee to use a roadway. Traditional road pricing includes toll roads and other toll facilities such as toll bridges and tunnels. Congestion Pricing, sometimes referred to as Value Pricing, is a subset of Road Pricing and levies differential tolls depending on the time of day such that fees for use are higher during congested periods. Congestion Pricing can be applied on traditional toll facilities as well as in Express Lanes, which are tolled lanes adjacent to free lanes. Some Express Lane facilities allow high occupancy vehicles over a certain occupancy requirement to travel for a reduced rate or for free, thereby encouraging ridesharing. In Cordon Pricing, a toll is paid by a vehicle to enter an "area" such as a downtown.

### VMT Fee or Tax

Vehicle Mileage Traveled (VMT) fees are levied based upon the average mileage that a vehicle is driven in a set period (year) and are envisioned as a replacement for gas taxes. Gas taxes, which tax the user on a per gallon basis, have been the main source of income for the nation's transportation

funding. Unfortunately, officials have been reluctant to increase the gas tax, and because fuel efficiency and alternative fuel vehicle use have increased and because fuel costs have also not increased at the rate of inflation, receipts have not increased with inflation. VMT fees or taxes are more equitable, as users pay directly for the miles they travel and those that have more gas dependent vehicles are not disproportionately shouldering the burden. Depending on the rate of the fee levied, VMT fees or taxes could result in fewer miles driven, reducing overall VMT.

## Application-Based

### Mobility as A Service

Mobility as a Service (MaaS) is the combination of most (if not all) transportation modal options into one application (app). The objective of MaaS is to provide community members with a central app that they can use for all trip planning in a region, with the app providing intermodal trip options for customers' trips from their initial origin to their destination. The apps may have inputs for the customer trip characteristics, such as whether they are traveling with heavy equipment or if they are using a wheelchair. Some MaaS apps may offer subscription packages, in which payment to the MaaS app could include transit fares, bikeshare costs, and a credit with Transportation Network Companies (TNCs) such as Uber or Lyft.

### Ride-Matching Applications

Mobile ride-matching (or ridesharing) applications help travelers find other travel partners for trips. These applications may focus on matching carpoolers for recurring commuter trips, however, most app-based ride matching focuses on dynamic carpooling allowing users to arrange ad-hoc rides on demand or on very short notice. These travelers may include customers of a Transportation Network Company (TNC) for single events (or trips), or intercity travelers with private cars making the same trip. These ride matching applications consider their customers' origin, destination, and schedule to determine what potential carpools or drivers are compatible with them.

## Support

### Compact Development/Clustering

Compact development is recognized as dense development; residential areas with high ratios of residents per area and employment areas that have high ratios of jobs over an area. Clustering is defined as locating related activities close to one another. Concentrated residential and employment areas can provide density needed for successful transit services and ridesharing to occur between the two. Clustering necessary services (schools, groceries, municipal services) near or within residential areas or employment centers can promote trip chaining and non-motorized trip making (walking).

### Facility Amenities

Facility amenities include a wide variety of services that support alternative modes like walking, biking, and transit. They can include long and short-term bike parking, bicycle storage, bicycle maintenance facilities (tire pumps and light tools), electric recharging, changing and restrooms with shower facilities, pedestrian shade/cooling stations, transit stop shuttles, or satellite parking with shuttle service. Amenities are usually most appropriately located at trip-end or trip-start points. These locations include apartment complexes, office buildings, consumer businesses, banks, schools, etc. These amenities are usually provided as an incentive to attract residents, patrons, students, or employees.

### Guaranteed Ride Home

For those who typically use alternative transportation modes (carpooling, transit, bicycling), Guaranteed Ride Home programs reimburse preregistered commuters for taxi or Transportation Network Company (TNC) service fares when emergencies arise. One obstacle to using alternative transportation modes is that the modes are generally less flexible than driving to work alone; carpooling requires all members to depart at the same time, public transit may be unavailable outside of peak hours, and bicycling may be unsafe or prohibited in some areas after sunset. If commuters know that they can take a taxi or a TNC vehicle at no extra expense should an emergency occur, they would be more likely to utilize alternative transportation modes.

Typically, participants must be pre-registered to partake in a Guaranteed Ride program. They must take an alternative form of

transportation to work and must have an emergency to utilize the program. Depending on the program, qualifying emergencies include:

- Injury, illness, or crisis for the program participant or family member;
- Supervisor requests that the participant works overtime; and
- The driver of the participant's carpool has an emergency.

## Incentive Programs

Incentive programs provide an additional monetary, convenience, or intangible incentive to individuals who adopt certain TDM measures or behaviors. Generally, incentive programs provide an extra "push" to increase adoption rates of implemented TDM measures. Alternatively, incentives can be provided for individuals who reduce their personal VMT, regardless of how they achieved that goal. Successful incentive programs usually incorporate elements of "gamification", competition, or social recognition.

Cash incentives could be in the form of micro-payments, scheduled lottery-style drawings, or instant "scratch-off" style winnings. Other monetary incentives could include gift cards, vouchers, or high value coupons, which are usually for local businesses. Monetary incentives are usually earned by either gaining "entries" to win or exchanging "points" that are accrued over time. An example would be gaining an entry for a $100 weekly lottery for every mile logged biking with an app, or alternatively gaining one "point" for every biking mile logged and exchanging 100 points for a $10 gift card to a local bike shop. Successful monetary incentive programs partner with private businesses and organizations to carry the financial cost of incentives.

## Parking Management

Parking Management strategies are policies and programs that produce more efficient use of parking resources. Parking management strategies can reduce development costs, increase affordability, encourage multi-modal planning, encourage use of alternative modes, and reduce VMT. Common parking management strategies include:

- Shared Parking: a parking facility serves multiple users and destinations. This is most successful if different destinations have different peak periods. Some examples are shared parking rather than reserved spaces, shared parking among destinations, public parking facilities, and in lieu fees. Reducing available parking inherently promotes less vehicle use/increased use of alternative travel modes.

- Remote Parking: Remote or satellite parking is the use of off-site parking facilities. This can be shared parking or park and ride lots. Employers or destinations need to provide incentives to encourage motorists to use distant facilities.

- Unbundled Parking: Parking is rented or sold separately from residential or office space. This is a popular policy in transit-oriented developments.

## Public Education and Promotion

Public education and promotion strategies focus on promoting and educating the public on TDM measures and non-vehicular modes of travel. Effective public education and promotion requires delivering different messages to different people, with an emphasis on people who are most likely to change their behavior. Public education and promotion campaigns should emphasize benefits to participants. Partnerships with other institutions, municipal agencies and private companies can be beneficial to these marketing programs. A report from the Victoria Transport Policy Institute found that consumer surveys indicated that around 25-50% of drivers would consider using travel alternatives and are interested in learning about them.

## Ride-Matching Services

Ride-matching services help potential carpoolers or vanpoolers find other travel partners for regularly scheduled, routine trips. It is a common part of commuter trip reduction programs. It often accompanies a rideshare program. Ride-matching services are more effective over larger areas, and these are more effective if there is one regional ride-matching program. Small ride-matching programs may use ride notice boards or match potential partners by hand. Larger programs may use computerized matching systems that match travelers based on origin, destination, and schedule. Ride-matching is common for commuter trips but can be used for recurring recreational trips,

trips to medical appointments, or trips to and from school.

## Transit Fare Subsidies

Transit fare subsidies are funds used to directly offset the individual cost for riders to take transit and can come in many forms. Discounts can be offered to low-income households, individuals with disabilities, youth, or seniors to improve mobility. Providing discounts to these groups to make transit their most affordable option also helps transit systems maintain a viable level of ridership. Discounts can also be offered to high frequency riders to promote commuting via transit.

A discounted rate can be provided to employers or schools who provide transit passes to their employees or students. This is usually when an employer or school provides an unlimited transit pass to employees or students and then the employer or school pays the transit authority either a greatly reduced per trip fare or an agreed upon lump sum per participating employee or student. These kinds of discounts can incentivize individuals to change their commuting mode and provide a way for employers to attract and maintain employees or property managers to attract and
keep tenants.

## Vanpool Fare Subsidies

Vanpool fare subsidies are funds that are used to directly offset the individual cost for commuters to participate in a vanpool program. Subsidies can be paid out directly to commuters in the form of a refund or can be paid out to the vanpool organizing agency/company and passed onto the commuter in the form of a discount. Subsidies can also be offered to existing vanpools that are experiencing fluctuation in ridership by monetarily "filling" empty seats while waiting for new members to prevent the vanpool from dissolving. Determining if a vanpool is qualified for a subsidy is usually based on the county of their origin and/or destination.

Subsidizing vanpool fares can help attract the needed riders to achieve these goals. Providing vanpool subsidies can also make vanpooling an affordable option for low-income commuters, with base rates for vanpools being around $150 per month per rider, though rates vary widely based on distance and number of occupants.