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FHWA Fostering Multimodal Connectivity Newsletter

The Federal Highway Administration's (FHWA's) *Fostering Multimodal Connectivity Newsletter* provides transportation professionals with real-world examples of how multimodal investments:

- Make our transportation system safer for all people.
- Promote an inclusive and sustainable economy.
- Reduce inequities across our transportation systems and the communities they affect.
- Address the climate crisis by building more resilient transportation systems.
- Support complete trips and mobility innovation.

This newsletter also showcases how FHWA, and its partners are improving connectivity, accessibility, equity, safety, and convenience for all transportation users, including equitable transportation options for traditionally underserved communities.

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Past issues of the newsletter can be found at the
FHWA's Office of Human Environment Newsletter webpage.

Creating Multimodal Connectivity at Stamford Transit Hub

Frank W. Petise, P.E., Bureau Chief of Transportation, Traffic, & Parking, city of Stamford

The city of Stamford, Connecticut is prioritizing the development of reconstruction projects to enhance multimodal access to the Stamford Transportation Center. This critical connection point is the primary intermodal transportation facility in the city. Every day, tens of thousands of bus and train riders pass through the station for work and leisure.

The Center is the hub of the CTtransit Stamford Division bus system serving several regions of Connecticut, with over three million annual riders. The Center also serves the Metro North New Haven Line and several Amtrak routes, including the Vermonter, the Northeast Regional, and the Acela. It is the second busiest stop on the Metro-North Railroad, surpassed only by Grand Central Terminal, reinforcing its place as a key regional, multimodal hub for residents and employees in Stamford.

To best serve the city, the Center must be easily accessible by all modes of transportation to allow all travelers to utilize the local and regional transit connections. The Center is run by the Connecticut Department of Transportation (CTDOT) and partnered with the city to develop the "Stamford Transportation Center Master Plan" which will renovate and expand the Center and improve local multimodal connections. This effort led to a newly opened parking garage with 92 electric vehicle charging stations, 50 electric bicycle charging stations, and 120 bicycle parking spaces, all linked to the Center with a pedestrian overpass.

Stamford has additional plans underway to create more, and safer connections, between the Center and its surrounding neighborhoods. The city's Transportation, Traffic, and Parking Department received a grant from CTDOT to launch the city's first microtransit service, StamFORWARD, which will connect several neighborhoods with CTtansit and Metro-North. The city also has several roadway reconstruction projects underway to enhance multimodal access to the Station.

On North State Street and Atlantic Street, the city is reconstructing both roadways to have separated two-way cycle tracks, wider sidewalks, and raised crosswalks and using Local Transportation Capital Improvement Program (LOTCIP) funding. The city is also building its first modern roundabout at Greenwich Avenue, Pulaski Street, and Davenport Street with LOTCIP funding. The roundabout includes high-visibility pedestrian crossings at all approaches and is a vital link to the adjacent Stamford Transportation Center.

On Pacific Street, the city is utilizing Transit-Oriented Development (TOD) funding to add curb extensions, raised crosswalks, and a raised intersection to improve safe walking and biking access to the Center.

Figure 1: Entrance to Stamford Gateway Transportation Center. (Source: City of Stamford)

Figure 2: Aerial view of Stamford's first modern roundabout. (Source: City of Stamford)

The Center is surrounded by millions of square feet of Class A Commercial Office Space and thousands of newly constructed apartments. With this significant transit-oriented housing and commercial development, there are thousands of people walking to and from the Center. The city of Stamford works closely with the CTDOT on improving livability and walkability around the Center to support the thousands of daily users.

In addition to the roadway improvements around the Center funded with local money, the Federal Highway Administration (FHWA) has awarded the city of Stamford two grants to support livability and connectivity. The city was awarded $2.1 million from the Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant program and $17 million from the Reconnecting Communities and Neighborhoods (RCN) grant program.

The RAISE funding will be used for the planning and design of West Main Street, aiming to make intersection improvements, traffic signal upgrades, sidewalk improvements, visible crosswalks with shorter crossing distance, separated bike lanes, and enhanced bus boarding island stops. The RCN-funded project will construct 3,000 feet of new greenway connections, rebuild several intersections, and create a new direct pedestrian and bike path to the front of the Transportation Center. These two funding mechanisms jointly focus on improving access to the Stamford Transportation Center for residents of the under-resourced West Side Neighborhood. The West Side was cut off from downtown and the Center by the construction of Interstate 95 and other urban renewal projects. The neighborhood suffered from decades of disinvestment due to historical redlining practices. These federally funded projects will inject vital transportation infrastructure resources into this neighborhood to jump-start its recovery and improve livability.

The transportation connections offered by the Center generate significant economic opportunities for residents of Stamford. Stamford, in partnership with CTDOT and FHWA, is taking a multifaceted approach to reconstructing the roadways around the Center to promote safety, multimodal access, and livability for all.

Riverfront Connectivity Drives Columbia Multimodal Plans

Lucinda Statler, Planning Administrator, City of Columbia

Columbia, the capital of South Carolina, is home to several colleges and universities, including the main campus of the University of South Carolina (USC). The city, university, and state agencies have a long history of coordinated planning to foster growth and connectivity across the city.

In 2007, the City adopted the "Innovista Masterplan" as a result of the partnership between the State, city, university, and land and business owners. The plan represented a shared vision to transform what was then a neighborhood of commuter parking, light industrial use and small-scale office buildings into a dense, mixed-use district with multimodal transportation options that would connect the USC campus, the city's downtown, and the riverfront. The plan envisioned a revitalized Greene Street as the central east/west "spine" of the district, with bicycle lanes, tree-lined sidewalks, and a sculpture park. Greene Street would connect the central business district to a new parkway[1] along the Congaree River to the west, just beyond its current terminus at Huger Street, providing vehicle, pedestrian, and bicycle access to a future riverfront park.

Columbia has experienced challenges developing and implementing multimodal streets due to competing interests in the right-of-way, such as on-street parking and the many high-volume, high-speed downtown thoroughfares. The Innovista plan faced additional physical barriers. The city's downtown and the Congaree riverfront are divided by north/south railroad tracks that serve both CSX and Norfolk Southern freight lines, as well as a major arterial road: Huger Street. The plan called for converting Greene Street into an improved riverfront connector, which would require building a bridge over the rail tracks.

In 2015, Columbia adopted the "*Walk Bike Columbia*" (WBC) master plan, a citywide plan for bicycle and pedestrian connectivity to transit, funded by the Federal Transit Administration and facilitated by the Central Midlands Council of Governments. WBC aligned with the goals of the Innovista Plan and identified the Greene Street corridor and the Columbia Riverfront Gateway as recommended

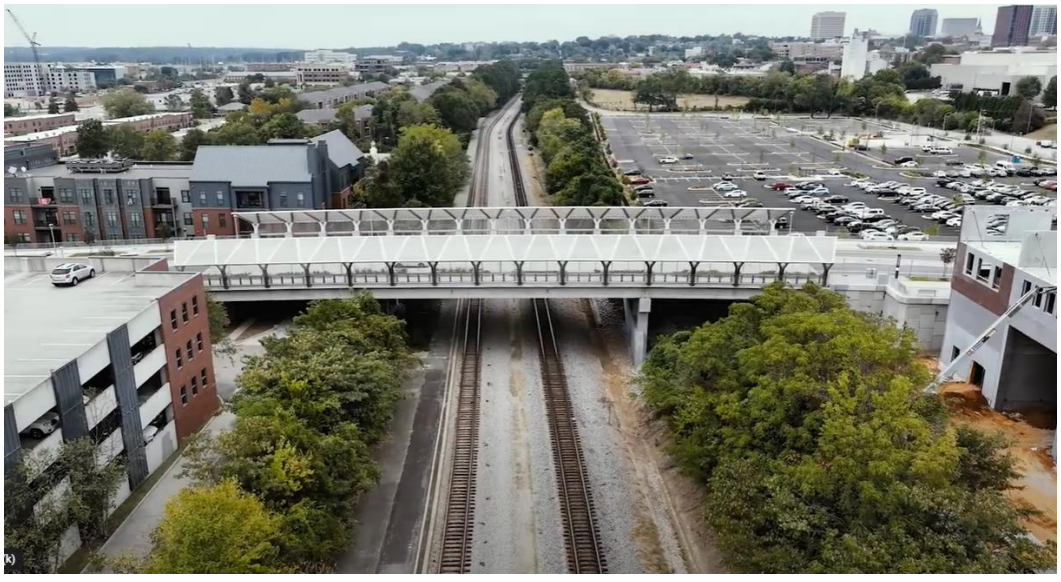

Figure 3: Greene Street extended over the freight rail tracks. (Source: Richland County)

[1] The new parkway is the extension of five blocks of Williams Street along the riverfront, identified in the Innovista master plan as the Congaree River Parkway, and has been at times referred to as the "Williams Street Connector" and since been named the "Columbia Riverfront Gateway" project.

Figure 4: The completed Greene Street bridge over the railroad tracks, looking west. (Source: Columbia Planning & Development Services)

infrastructure projects. The plan emphasizes connectivity with a focus on priorities such as equity and roadway safety. The WBC plan included an extensive public outreach campaign and provided policy and program recommendations to support the development of the micromobility facility network with safety and equity in mind.

With the renewed energy from the WBC, which had both federal support and local input, the Innovista plan moved forward. Columbia and Richland County aligned the city's existing plans with the county's penny tax revenue stream, which was established in 2012 to support transportation projects, to fund the first two phases of design and construction of Greene Street. In 2017, Phase One began with the conversion of Greene Street between Assembly Street and Gadsden Street into a multimodal corridor with bike lanes and wider sidewalks. In 2022, Phase Two added a new $23 million Greene Street bridge across the freight rail tracks. The bridge safely connects cyclists, pedestrians, and drivers from downtown to Huger Street near the river. Without this connection, residents were regularly stuck at grade-level railroad crossings with no secure and reliable way to reach their destination.

The Third Phase of Greene and the construction of the Columbia Riverfront Gateway will require additional funding sources. The inclusion of Innovista projects in the WBC plan, sanctioned by the Central Midlands Council of Governments, was a critical component in receiving $9 million in funding from the State of South Carolina. This funding will support the Columbia Riverfront Gateway project, which includes the construction of the new parkway, with a separated cycle track along the corridor. The completion of these projects will better connect Columbians to the Riverfront Park and the Three Rivers Greenway that lines the Broad, Saluda, and Congaree River linking the region with waterfront recreation.

The consistency of the transportation infrastructure improvement recommendations in multiple plans provided multijurisdictional support to ensure the success of the Greene Street conversion project. The progress made is the result of a shared vision from the city, state, county, and residents. The next phase of the plan is to create a Columbia Riverfront Gateway which will provide the necessary multimodal infrastructure to further implement the vision of the Innovista Masterplan to create a dynamic, safe, and connected downtown neighborhood.

Figure 5: Cyclists crossing the Columbia Canal on the Three Rivers Greenway. (Source: South Carolina Trails)

Revolutionizing Commuter Connectivity: The Vineyard FrontRunner Station

Eric Mason, Program Manager, Utah Department of Transportation

Vineyard, Utah, has taken a significant step forward in innovative urban planning with the introduction of the Vineyard FrontRunner Station. This project, a collaborative effort by the Utah Department of Transportation (UDOT), Vineyard City, and the Utah Transit Authority (UTA), represents a transformative approach to commuter connectivity, community development, and inclusive infrastructure.

Project Initiation and Outcomes

The Vineyard FrontRunner Station is part of the UTA's commuter rail system spanning from Provo to Ogden and connecting key areas to Salt Lake City. A significant factor motivating this project was the large gap between the American Fork and Orem FrontRunner stations. The eight-mile gap between stations was nearly twice as long as the typical four-mile distance between stations along that stretch of rail. This gap was becoming increasingly significant due to the growing population in Vineyard City, between American Fork and Orem. At the time of the project's completion, Vineyard City was the fastest growing city in the state of Utah. The existing and future population in the gap was underserved by rail compared to those who lived in neighboring cities. To address this gap, UDOT, primarily a highway agency, adapted its processes and standards to construct two miles of railroad and a new commuter rail station to increase connectivity in the region to address the gap. The collaborative project aimed to reduce traffic congestion and promote the development of a vibrant, walkable downtown area.

Vineyard City did their part by adopting a comprehensive approach to street design to ensure roads around the station cater to vehicles, pedestrians, cyclists, and public transit users. Improvements included widened sidewalks, added bike lanes, and strategically placed crosswalks to enhance safety and accessibility. The station itself features ADA-compliant elements to ensure equitable access for individuals with disabilities.

This holistic approach not only prioritized the safety and well-being of residents but also fostered a more inclusive and sustainable transportation system. It aligned with FHWA's vision of transportation networks that promote active lifestyles, reduces greenhouse gas emissions, and improves overall quality of life.

The Vineyard FrontRunner Station project was meticulously crafted with a clear vision in mind: to redefine commuter connectivity and community vitality. The process involved extensive stakeholder engagement, robust planning, and innovative design solutions. From the strategic location of the station to the integration of pedestrian-friendly infrastructure, every aspect was thoughtfully curated to optimize the user experience.

As a result of this project, commuters now enjoy expedited travel times, reduced congestion, and enhanced comfort during their journeys. The station energized the new Vineyard Downtown and sparked powerful interest and investment in the community. The addition of the

Figure 6: FrontRunner trains waiting at the newly opened Vineyard Station. (Source: Vineyard City)

Vineyard FrontRunner Station also helped to accommodate and connect the city's growing population.

Enhancing Livability and Economic Growth

The Vineyard FrontRunner Station was designed to enhance livability by connecting residential areas with employment centers and recreational facilities. This connectivity reduced reliance on private vehicles, thereby lowering the environmental burdens caused by single occupancy combustion vehicles. Additionally, the station will catalyze economic growth by supporting a mixed-use downtown development that offers diverse housing options and fosters a thriving commercial ecosystem. As of January 2024, 685 housing units have been built near the FrontRunner station in Vineyard, out of a planned 6,000. The increased foot traffic in the area will benefit local businesses, contributing to Vineyard's economic prosperity.

A fundamental principle of the Vineyard FrontRunner Station project was the promotion of the Federal Highway Administration's (FHWA) Complete Streets concept. Complete Streets are designed to provide safe, convenient, and comfortable travel for users of all ages and abilities, regardless of their mode of transportation.

Compliance with Federal Standards

The Vineyard FrontRunner Station project adhered strictly to the design standards set by the Federal Rail Administration (FRA) and the Federal Transit Administration (FTA). These standards address safety, accessibility, and operational efficiency. Every aspect of the station's design, from platform dimensions to signaling systems, was rigorously evaluated to ensure compliance with FRA and FTA requirements. By meeting these stringent criteria, Vineyard City ensured the safety and reliability of its transit infrastructure, setting a benchmark for future transit-oriented developments statewide.

Lessons for Future Projects

Other communities can draw valuable lessons from Vineyard's success. Key principles included fostering strong partnerships with governmental agencies, following federal agency guidelines, and prioritizing pedestrian-centric design. Emphasizing mixed-use development and sustainable transportation solutions laid the groundwork for vibrant, livable communities. The Vineyard FrontRunner Station can serve as an example for other communities throughout Utah and the United States to emulate as they implement new transit projects.

Figure 7: The FrontRunner connects 15 cities from Ogden to Provo and provides new TOD opportunities. (Source: Vineyard City)

Conclusion

The Vineyard FrontRunner Station exemplifies the power of collaboration, innovation, and forward-thinking urban planning. By focusing on livability, connectivity, and sustainability, Vineyard set a precedent for communities nationwide, demonstrating a brighter, more accessible future is achievable.

Quick-Build Roadway Safety Treatments with Modular Roundabouts

Wei Zhang, Ph.D., P.E., FHWA Office of Safety and Operations

The Virginia Department of Transportation (VDOT) is expanding its use of new materials and quick-build methods to deploy road safety treatments. After successfully piloting a modular mini-roundabout in Annadale, VA made from engineered recycled plastic, VDOT installed three similar roundabouts in Chesterfield, Virginia in 2020 to address safety concerns. Modular roundabouts made without concrete expedite the installation process at intersections and increase safety in the community without incurring higher construction costs associated with installing traditional roundabouts.

Figure 8: An overhead look at the completed modular roundabout at Otterdale Rd/Hampton Park Dr. (Source: VDOT)

VDOT selected three intersections with large pavement footprints that have operational and safety issues. These intersections included Baily Bridge Road and Spring Run Road, Otterdale Road and Harper Mills Parkway, and Otterdale Road and Hampton Park Drive.

The modular roundabout projects in Chesterfield, VA were done under VDOT funding, the construction material was supplied by ZKxKZ, a small business contractor from Massachusetts that developed the modular roundabout product under funding from the U.S. Department of Transportation Small Business Innovation Research (SBIR) Program. SBIR is a program that stimulates technological innovation by utilizing small businesses to meet Federal research needs. The SBIR funding allowed the company, ZKxKZ, to develop and demonstrate their materials which use recycled plastic and can be affixed directly onto good-condition pavement. The modular block systems allow for damaged sections to be removed and replaced quickly and independently.

After VDOT produced the geometric design of the roundabout and handed it over to ZKxKZ, the company's engineering staff performed a fitting design and produced a layout using plastic boards that could be mass-fabricated. The projects took about 18 months to complete, with the installation taking six weeks or less at each of the three sites. The average installation cost per intersection was $462,000 (planning, design, and construction). The entire process decreased time, cost, and disruptions relative to traditional installations, which could take upwards of three years and cost over $2 million per intersection.

All three of the intersections where roundabouts were installed saw a reduction in vehicle crashes. In the three years before the roundabouts were installed, all three intersections saw angle crashes that often resulted in injury. In the two and a half years after the installation of the roundabouts, the intersections have had only fifteen crashes altogether. Of the fifteen crashes, only two resulted in injury.

Figure 8: Traffic signage at the Otterdale Rd/Hampton Park Dr. roundabout. (Source: VDOT)

Modular Roundabouts with Recycled Materials

In 2015, ZKxKZ received Phase I SBIR funds to develop a modular product for constructing mini-roundabout using engineered plastic boards derived from waste plastics. After multiple laboratory trial mix designs in collaboration with the University of Massachusetts Lowell, it was decided to use the same material that had been used for mass-producing railroad ties from recycled drinking plastic bottles and milk jugs. The plastic railroad ties had been used under railroad tracks for many years and have proven their strength and durability under various environmental and loading conditions. The road product also proved durable and could be pre-fabricated for an intersection using mostly identically sized and shaped plastic boards, with a few customized shapes or sizes for end and corner locations. The recycled plastic used to create each modular mini-roundabout kept several thousand pounds of household plastic waste out of landfills. In 2018, under Phase II of the SBIR funds, the company installed two pilot roundabouts, including one in Annandale, VA. The success of that pilot led VDOT to use the materials in the Chesterfield roundabouts.

Mini-Roundabout Considerations

The FHWA mini-roundabout evaluation and deployment project proved that mini-roundabout design can solve serious congestion and safety problems at high-traffic two-lane or three-lane intersections where regular-sized modern roundabouts cannot fit. The higher cost of installation associated with traditional roundabouts makes mini- and modular roundabouts a favorable alternative. Regular sized modern roundabouts often require purchasing more right-of-way, relocation of utilities, and a longer construction time.

Mini-roundabouts fit within the existing intersection footprint, so there is no need for expensive and time-consuming road widening, which may have other impacts on the community. The mini-roundabouts are designed to allow occasional large vehicles to mount the raised central island to make left-turns. The roundabouts have stood up to winter snow and multiple snowplow passes, requiring only routine maintenance and cleaning.

VDOT expanded modular mini-roundabout installation to its Richmond district to provide functionality in the roadway, lower speeds, and reduce crashes at lower cost and on a streamlined timeline. The success of the projects has led to more modular mini-roundabouts being planned across the state of Virginia, including at intersections in Spotsylvania, Virginia, and Stafford, Virginia.

Figure 9: Modular plastic panels in the roundabout central hub. (Source: VDOT)

Announcements and New Resources

The Federal Highway Administration released the following:

- **$108 million in funding** for 85 projects through the Nationally Significant Federal Lands and Tribal Projects and Tribal Transportation Program Safety Fund
- **$64 million in funding** for Safe Streets and Roads for All program grants
- **$60 million in grants** for the Saving Lives with Connectivity: Accelerating V2X Deployment program
- **The Spring 2024 Research Review**
- **Technical assistance report** Separated Bicycle Lanes on Higher Speed Roadways: A Toolkit and Guide
- A **case study** called Enhancing Vulnerable Road User Detection and Volume Data Through the Use of Infrared Thermal Imaging Sensors
- A **case study** on equity in shared micromobility systems Shared Micromobility Pilot Promotes Low-Income Access in Fort Smith, Arkansas
- A **video** on promoting safety culture in transportation agencies. FHWA also has written resources on creating organizational safety cultures.
- **A webinar series** on Equity in Roadway Safety

U.S. DOT released the following:

- **$5 billion in funding** for Large Bridges Projects through the Bridge Investment Program
- **$1.8 billion in funding** for 148 projects through the Rebuilding American Infrastructure with Sustainability and Equity
- **$2.4 million in contracts** to 12 small businesses through the Complete Streets Artificial Intelligence Initiative
- A **report to Congress** titled Decarbonizing U.S. Transportation
- A **deployment plan** for Vehicle-to-Everything (V2X) Technologies Saving Lives with Connectivity
- **A policy statement** on transportation projects and environmental justice
- **Request** for public input on the U.S. DOT Equity Action Plan
- A **webinar series** on Using Data to Effectively Tell Your Community's Story
- Updated **frequently asked questions** for Promising Practices for Meaningful Public Involvement in Transportation Decision-Making Document
- An **update** on Justice40 Goals