Regional Technology Plan Executive Summary

The Triangle Region's transit agencies and regional transit partners have worked together to partner toward a unified vision of mobility, efficiency, and improved rider experience through technology integration and regional collaboration. The Regional Technology Plan serves to identify recommendations that can be followed by regional stakeholders with respect to the following transit technology priority areas:

1. Passenger Real Time and Trip Planning Applications;
2. Transit Service Planning Tools;
3. Transit Signal Priority (TSP);
4. Regionally Integrated Payments;
5. Regional GTFS Publishing Standards; and
6. Open Transit Data Portal

Separate chapters have been created to address each Priority Area and each chapter presents regional transit solutions to enhance a rider's ability to travel by transit within *and* across Durham, Orange, and Wake Counties. Each chapter identifies technology tools, standards, recommendations, and a roadmap to use as a resource when considering technology purchases. The memos also include budgetary recommendations to guide planning decisions for the County Transit Plans over the next 4-5 years.

The goal of the recommendations within the Regional Technology Plan is to guide the future deployment of technological solutions for transit agencies that are scalable, interoperable, and sustainable for the region. Recommendations in each memo are focused on the features and capabilities that agencies should consider when procuring transit technologies that can advance the region towards systems that are more interoperable with one another over time. Existing transit technologies are identified in the memos only to highlight current deployments by transit agencies in the region. Recommendations are not intended to direct agencies towards any specific technology vendor, but rather to provide guidance on how technology procurements can be made so that interoperability among the systems can be achieved over time.

A summary of the challenges, opportunities, and recommendations with respect to the technologies discussed within each of the six Priority Area memos is provided on the following two pages. Each technical memo goes into additional detail on these topics for review and consideration by regional stakeholders. A planning-level, budgetary cost estimate of potential technologies that could be deployed in the region concludes this summary.

Priority Area 1: Passenger Real Time and Trip Planning Overview

Challenges	Inconsistent real-time transit information across trip planning apps Limited integration between CAD/AVL systems and trip planning toolsVariability in data quality and vendor support
Opportunities	Promote a single source of real-time transit information for regional travel Expand Transit Royale features to improve trip planning and rider experience Standardize CAD/AVL systems for disruption and detour reporting
Recommendations	Establish GTFS-RT as the standard for real time transit data Monitor data quality in real time feeds using various tools Provide passengers with multiple options for accessing real-time transit information Enhance trip planning with detour notifications and service updates

Priority Area 2: Transit Service Planning Tools Overview

Challenges	Disparate service planning tools Limited regional coordination for service changes and data sharing Lack of standardized metrics for regional tracking
Opportunities	Adopt scalable service planning tools Standardize GTFS to align service planning metrics regionally Integrate microtransit and paratransit services into regional planning
Recommendations	Commit to interoperability in service planning tool integration Develop workflows for regional service planning coordination Leverage statewide contracts Enhance trip planning with integrated data from multiple sources

Priority Area 3: Transit Signal Priority (TSP) Overview

Challenges	Multiple TSP vendors and proprietary systems limit interoperability Inconsistent adoption of standards (e.g., NTCP 1211 for controllers) Limited funding for expanding TSP system
Opportunities	Use NTCIP 1211 to standardize TSP operations across the region Integrate service planning software with cloud-based TSP system for real-time schedule adherence Collaborate with NCDOT on signal controller upgrades
Recommendations	Adopt NTCIP 1211 for future TSP deployments Establish regional TSP working group for interagency collaboration Identify corridors for test TSP interoperability Expand TSP system to support Bus Rapid Transit (BRT) routes

Priority Area 4: Regionally Integrated Payments Overview

Challenges	Variability in fare collection systems and policies across agencies Limited adoption of open payment solutions Minimal integration between fixed-route and microtransit payment systems
Opportunities	Implement open payment solutions for contactless fare collection. Update GTFS to include GTFS-Fares information for each agency. Integrate payment system to include multimodal journeys.
Recommendations	Maintain equitable cash payment options Adopt open payment solutions for fixed route and BRT services Consider off-board validation for BRT routes Explore integration of microtransit and TNC payments into regional payment systems

Priority Area 5: Regional GTFS Publishing Standards Overview

Challenges	Inconsistent stop naming conventions and IDs Lack of standardized workflows for GTFS updates Limited integration between GTFS and GTFS-RT feeds
Opportunities	Develop a standard operating procedure for shared stops and naming conventions Schedule quarterly coordination meetings to align GTFS updates Implement best practices for GTFS creation and validation
Recommendations	Create SOPs for coding shared stops in GTFS Use tools like a Mobility Data Validator to ensure GTFS quality Procure planning software to streamline GTFS generation Separate planning and scheduling tools from CAD/AVL systems for resiliency

Priority Area 6: Open Transit Data Portal Overview

Challenges	Variability in data readiness across agencies Lack of centralized access to regional transit data Concerns about cyber security and data maintenance
Opportunities	Build a centralized portal for GTFS and GTFS-RT feeds Develop interactive dashboards for performance metrics and analysis Collaborate with universities and nonprofits to support research and innovation
Recommendations	Leverage existing data feeds to create a centralized portal Develop a regional open data portal with dashboards and analytics Establish a regional steward to manage the portal Implement cyber security measures to protect data integrity

Planning-Level Budget Recommendations for Transit Technologies in the Triangle Region

A summary of the budgetary recommendations from each of the priority area memos is presented in the table below. Cost ranges are provided where alternative approaches could be taken by transit agencies in the region. These planning level cost estimates can support initial planning efforts and guide agencies as they take next steps with procuring and implementing technologies that can meet the recommendations of the plan to enhance regional interoperability over time.

Priority Areas	Budget Recommendations	Notes on Estimates
1. Passenger Real Time and Trip Planning	Year 1 Costs: $507,525 Annual Costs: $351,600	Based on applications for providing real-time updates of various impacts to transit operations
2. Transit Service Planning Tools	Year 1 Costs: Range from $678,000 to $1,130,000 Annual Costs: Range from $390,000 to $800,000	Ranges include options for use of separate tools or combination of planning tools under one platform
3. Transit Signal Priority (TSP)	Total Costs: Range from $8,025,000 to $9,265,000	Range reflects spread of costs for two different approaches to regional TSP
4. Regionally Integrated Payments	Total Costs: Range from $4,141,890 to $11,918,370	Range reflects low and high end of three different options for the region
5. Regional GTFS Publishing Standards	Total Costs: Range from $68,400 to $266,000	Range is based on prior data from other transit agencies and size of agency vehicle fleets
6. Open Transit Data Portal	Year 1 Costs: Range from $15,000 to $55,000 Annual Costs: Range from $70,000 to $270,000	Range includes costs for alternate approaches to deployment of Open Transit Data Portal in region

The Regional Technology Plan reinforces the need for interoperability across operating partners to address regional mobility goals. Interoperability can enhance regional transit system efficiency and enhance the overall rider experience traveling across the region. Regional mobility rests on each agency's ability to align with agreed upon, policies, procedures, and technological processes to foster an interoperable transit network. Interoperability enhances system efficiency by improving coordination, reducing redundancies, optimizing resources, and developing better experiences for both riders and transit agencies in the region. It creates a more cohesive and reliable network that is better equipped to meet regional mobility needs now and in the future.