

Exhibit D – Research Project Requirement Template

Public Transit Automation and the Future of Service Delivery: Scenario Planning for Operations and Workforce Readiness

Recipient/Grant (Contract) Number: The University of Texas at Austin/Grant # 69A3552344815 and 69A3552348320

Center Name: National Center for Understanding Future Travel Behavior and Demand (TBD)

Research Priority: Improving Mobility of People and Goods

Principal Investigator(s): Alex Karner, PhD

Project Partners: Capital Metropolitan Transportation Authority (CapMetro)

Research Project Funding: \$74,062 project budget

Project Start and End Date: 8/16/2026 – 8/15/2027

Project Description: Public transit agencies are beginning to confront a new generation of automation technologies that will almost certainly alter how service is planned, operated, staffed, and delivered. These technologies include fully automated transit vehicles as well as nearer-term applications in scheduling, dispatching, maintenance, customer information, and operations management. In this project, we will examine how transit automation could reshape the relationship between agency operating costs, service quality, and workforce needs. Labor is one of the largest components of transit operating costs; if automation eventually reduces the marginal cost of service delivery, agencies may be able to consider service models that are difficult to sustain today, including much higher frequencies, longer service spans, more extensive feeder service, and more responsive off-peak operations. At the same time, automation could significantly alter job tasks, training requirements, safety responsibilities, staffing models, and long-term employment opportunities.

The research will combine a national practice review, approximately 20–25 semi-structured interviews, at least two focus groups, and scenario planning. Participants will include transit agency staff, labor representatives, riders, advocates, researchers, consultants, technology developers and vendors, and national transit organizations such as APTA. The work will identify opportunities and risks associated with automation, including potential changes in service frequency, service span, responsiveness, job tasks, training, staffing, safety oversight, procurement, and public communication. It will culminate in a scenario matrix and Automation Workforce Readiness Checklist that help agencies assess automation before pilot testing or deployment.

US DOT Priorities: This project supports USDOT priorities by advancing research that can help transit agencies build safer, stronger, more efficient, and more reliable public transportation systems. It directly addresses emerging technologies by examining how artificial intelligence, automated vehicles, and related operations-management tools may affect transit service delivery. The project also advances research, development, and technology goals by improving coordination between research and practice: it brings together agencies, labor, riders, technology providers, consultants, researchers, and national organizations to clarify implementation risks and readiness needs before technology adoption. The work is applied and potentially transformative because it reframes transit automation as an operations, safety, affordability, and workforce transition rather than only a procurement decision. The project will not produce precise forecasts of cost, ridership, or workforce change; instead, it will provide an evidence-informed scenario framework that agencies can use to compare plausible automation pathways and make more transparent decisions.

Outputs: Expected outputs include: (1) a national scan of public transit automation research, pilots, tools, and practice; (2) approximately 20–25 semi-structured stakeholder interviews; (3) at least two focus groups; (4) one peer-reviewed journal manuscript; (5) at least one conference presentation; (6) an accessible final report; (7) a policy brief or data brief for practitioners; (8) a scenario matrix comparing plausible automation pathways; and (9) an Automation Workforce Readiness Checklist. The scenario matrix will compare incremental operations automation, automated yard or maintenance applications, limited automated passenger-service pilots, and more extensive automated vehicle deployment. The checklist will be a tangible decision-support product that prompts agencies to consider job-task changes, training, safety oversight, staffing, labor-management coordination, procurement, vendor dependency, and customer-support issues. The project will also support partnership building with CapMetro and outreach to national transit organizations, including APTA where appropriate.

Outcomes/Impacts: The project is expected to support more informed decision-making as transit agencies confront emerging automation technologies. By clarifying plausible automation pathways and their implications for service design, operating costs, safety, reliability, and workforce needs, the project results will help agencies avoid treating automation as a narrow technology procurement issue. Instead, they will be better positioned to evaluate how automation could affect long-range service planning, staffing models, training investments, and implementation risk. If automation eventually reduces the marginal cost of operating transit service, findings may help agencies consider how more frequent, flexible, or extensive service could be planned responsibly. At the same time, the project results and tools will help agencies anticipate workforce transitions and identify skills needed for future transit operations. Broader impacts include improved agency readiness, better alignment between technology adoption and operational goals, increased knowledge about automation’s implications for public transportation, and expanded workforce-development capacity in a rapidly changing field.

The project’s outputs will support these goals and impacts. Specifically, transit agencies and professional organizations will be able to use the scenario matrix and Automation Workforce Readiness Checklist to structure internal discussions, evaluate automation pilots, inform procurement decisions, identify training or staffing needs, and anticipate implementation risks before deployment. The project will also contribute to the body of knowledge on transit automation by integrating service planning, workforce planning, and agency readiness in a single framework. The student involved in the project will gain applied research experience in emerging transportation technologies, qualitative methods, and transportation planning.

Final Research Report: A URL link to the final report will be provided upon completion of the project.