

**GEORGIA DOT RESEARCH IN PROGRESS**  
**Office of Performance-based Management and Research**

2/9/2021

Research Project Number	Project Title	Principal Investigator	University / Consultant	GDOT Research Manager	GDOT Technical / Implementation (T/I) Manager	Research Technical Advisory Group (RTAG)	Starting Date	Completion Date	Objective	
1	20-25	Virtual Public Involvement (VPI) Guidance for Encouraging Public Participation and Soliciting Feedback During the Transportation Planning Process.	Baabak Ashuri	GA Tech	Sunil Thapa	Douglas Chamblin	Policy/Workforce	12/18/20	09/18/22	Develop a standard VPI process on ArcGIS Hub, the predetermined platform by GDOT, that can be institutionalized in GDOT, and which encourages public participation and solicits feedback during the transportation planning and project development process.
2	20-24	AERMOD, RLIN, and RLINEXT Case Study Analyses in Atlanta, Georgia.	Randall Guensler	GA Tech	Sarah Lamothe	Sarah Lamothe	Policy/Workforce	11/05/20	09/5/2021	Perform AERMOD microscale dispersion modeling for an entire Atlanta I-75/I-575 Northwest Corridor (NWC) subarea, including freeway corridors, managed lanes, connecting arterials, and intersections serving the NWC system.
3	20-23	Development of an Apple App for GDOT AASHTOWare Project.	Tyler Ley	OSU	Sunil Thapa	Christopher J Collins	Mobility	09/18/20	10/18/21	Develop a mobile App to work with CTAG that can help the GDOT engineers with archiving, tracking, and sharing the concrete sample data.
4	20-21	A Forecast of State Motor Fuel Revenues: The Effect of New Technologies and the State Vehicle Fleet Mix on Georgia Motor Fuel Receipts.	Laura Wheeler	GA State	Sunil Thapa	Joshua Waller; George Christensen	Policy/Workforce	09/01/20	03/01/22	Produce a Georgia-specific forecast of state motor fuel receipts. The forecast will be produced assuming several alternative scenarios of vehicle mix, state population, and fuel prices for the 2021-26 and 2021-40 periods.
5	20-20	Tacit Knowledge Model to Support Knowledge Capture and Transfer in GDOT.	David A. Guerra-Zubiaga	KSU	Sarah Lamothe	Provita Mungin	Policy/Workforce	08/26/20	08/26/23	Create a tacit knowledge model and to identify, organize, and categorize tacit knowledge to reuse complex experiences gained from previous projects in GDOT.
6	20-19	Recommendations for Future Specifications to Ensure Durable Next Generation Concrete.	Kimberly Kurtis	GA Tech	Sarah Lamothe	Monica Flournoy; Peter Wu	Mobility	08/25/20	08/25/23	Review current best practices for developing and implementing performance-based specs for concrete for transportation projects; to review available test methods and criteria for performance; to quantify savings to the state comparing prescriptive and performance specs; and to generate guidelines for incorporating PBS as an option in Sections 430, 439, and 500.
7	20-18	Recommendations for Extension in Service Life of ASR-Affected Concrete.	Kimberly Kurtis	GA Tech	Sarah Lamothe	Peter Wu	Mobility	08/18/20	08/18/23	Provide a review of and best practices of current ASR-affected concrete technology; develop condition assessment approaches and determine further reaction and damage potential; and develop combined material and structural repair strategies to extend the service life of ASR-affected technologies.
8	20-17	Enhancing the Accuracy of Construction Cost Estimates for Major Lump Sum (LS) Pay Items and Generating a More-Accurate List of Pay Items Throughout the Design Development Process.	Baabak Ashuri	GA Tech	Sarah Lamothe	Sam Woods; Erik Rohde	Mobility	07/02/20	07/02/22	Enhance the accuracy of Lump Sum (LS) pay item estimates throughout various stages of design development; and create a more-accurate list of projects pay items and associated quantities, especially during early phases of design development.

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9	20-16	Development of Training Modules to Increase Usage and Understanding of Agency-Wide Software Programs.	Stephan Durham	UGA	Brennan Roney	John Hancock; Beau Quarles	Mobility	08/27/20	11/27/22	Develop a training program using modules for the GDOT staff in learning and fully implementing agency-wide software programs.
10	20-15	Recommendations for Nondestructive Testing (NDT) of Concrete Components for Performance-Based Specifications.	Laurence J. Jacobs	GA Tech	Sarah Lamothe	Monica Flournoy; Peter Wu	Mobility	08/20/20	02/20/22	Document the availability and the use of concrete NDT tools by transportation agencies; study the critical concrete material properties and suitable acceptance criteria for performance-based concrete material specifications; understand the underlying physics and sensitivity of candidate NDT tools; and validate the most promising NDT tools.
11	20-14	Guidelines for Incorporation of Cement Stabilized Reclaimed Base (CSRb) in Pavement Design.	Jayhyun Kwon	KSU	Brennan Roney	Phillip Snider	Mobility	08/26/20	08/26/22	Improve the reliability of the current GDOT pavement design procedure for CSRb and to provide a recommendation for the steps necessary for the verification and calibration of CSRb into MEPDG.
12	20-13	Community-Augmented Rapid-response to Events (CARE) Integrated Crisis Communication System.	John E. Taylor	GA Tech	Sunil Thapa	Larry Barnes	Asset Management	08/18/20	08/18/23	Establish a crisis rapid-response communication system, which is augmented with location-specific social and community data and integrated with current GDOT crisis identification and response communication processes.
13	20-12	Incorporating Resilience Considerations in Transportation Planning, TSMO and Asset Management.	Adjo Amekudzi-Kennedy	GA Tech	Sarah Lamothe	Habte Kassa	Asset Management	08/25/20	08/25/23	Develop and apply approaches for implementing resilience efficiently across Georgia's transportation system the organization, Georgia Department of Transportation, its institutions – policies, business processes, plans and procedures, and the physical transportation system, including its smart components.
14	20-11	Towards the Implementation of a Geotechnical Asset Management Program in the State of Georgia.	Jorge Macedo	GA Tech	Sunil Thapa	Kalen Jones; Mary Cooley	Asset Management	08/18/20	02/18/23	Create a Geotechnical Asset Management (GAM) system for the state of Georgia to effectively track current and future geotechnical assets, reduce ongoing maintenance costs, and improve the decision making for upgrade and replacement.
15	20-10	Development of Drone-Assisted Pavement Profile Mapping: Near-Surface Void Detection Application.	Javier Irizarry	GA Tech	Brennan Roney	Ernay Robinson Perry	Asset Management	08/13/20	02/13/22	Develop and test a drone-assisted workflow to be employed in planning road pavement maintenance work as well as post-maintenance work quality assessment with the specific aim of identifying near surface voids.
16	20-09	Development of Drone-Assisted Highway Mowing Operations Planning, Monitoring, and Verification Capabilities.	Javier Irizarry	GA Tech	Brennan Roney	Ernay Robinson Perry	Asset Management	08/18/20	02/18/22	Develop and test a drone-assisted workflow to be employed in planning, monitoring, and performance verification of maintenance tasks to provide GDOT personnel with periodic status reports of work performed by mowing contractors.
17	20-03	Adequacy of DSRC in 5.9 GHz Band for GDOT's Connected Vehicle Infrastructure.	Seungmo Kim	GA Southern	Sunil Thapa	Andrew Heath	Safety	05/30/20	05/30/21	Investigate the feasibility of the remaining 10 MHz (i.e., 5.896-5.905 GHz) for operation of GDOT's connected vehicle infrastructure and impacts of possible coexistence with C-V2X on the performance of GDOT's connected vehicle infrastructure.

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18	20-01	Real-Time Network Assessment and Updating Using Vehicle-Locating Data.	Iris Tien	GA Tech	Sarah Lamothe	Larry Barnes	Mobility	07/02/20	07/02/21	Use collected data to inform the relevant parties of state of the network, particularly with regards to what is passable and what is not, with data that is continually updated in real-time. The project will aggregate information from multiple vehicles and translate it into something that is more useful for someone to use that open route.
19	19-27	Strategies and Resources for Strengthening the Implementation of the Construction Quality Acceptance Firm (CQAF) Model in the Innovative Project Delivery Environment.	Baabak Ashuri	GA Tech	Sarah Lamothe	Darryl D. VanMeter	Policy/Workforce	11/18/19	03/31/21	Enhance the understanding of the CEI industry regarding the increasingly important role of the CQAF in the innovative project delivery environment.
20	19-26	Curve Safety Improvements Using Mobile Device and Automatic Curve Sign Detection (Ph. II).	James (Yichang) Tsai	GA Tech	Brennan Roney	Sam Harris	Safety	10/18/19	05/18/21	Develop and critically assess a method that integrates low-cost mobile devices and artificial intelligence to establish a live, sustainable curve sign inventory.
21	19-21	Use of Ground Penetrating Radar Technology to Assess and Monitor Pavement Structural Conditions for Improved Pavement Maintenance and Rehabilitation Strategies.	Sonny Kim	UGA	Brennan Roney	Ian Rish	Mobility	11/18/19	05/18/21	Establish GIS/GPS/CVR enabled mapping, including actual locations (from GIS), pavement profiles (from GPR), GAB/subgrade densities (computed from machine-learning algorithms), and surface images (from CVR), for Critical State Routes in Georgia.
22	19-17	Enhanced Network-level Curve Safety Assessment and Monitoring Using Mobile Devices.	James (Yichang) Tsai	GA Tech	Brennan Roney	Andrew Heath	Safety	07/30/19	07/30/21	Develop method to assess network-level curve safety conditions safely and cost effectively by collecting and analyzing vehicles' GPS trajectory and kinematic data using intra-agency, crowdsourced, low-cost mobile devices to critically calibrate and validate developed algorithms for computing curve radii, superelevation, and BBI.
23	19-16	Improvement of Climate Data for Use in MEPDG Calibration and Other Pavement Analysis -- Phase II.	Stephan Durham	UGA	Sunil Thapa	Ian Rish	Asset Management	08/15/19	02/15/21	Evaluate impact longwave radiation has on pavement performance and the utility of MERRA-2 in providing such data to improve pavement performance predictions through MEPDG.
24	19-14	Evaluation of Guardrail Performance in High-Risk Accident Zones on Georgia Roadways and Identification of Alternative Barriers.	Xiaoming Yang	GA Southern	Brennan Roney	Frank Flanders	Safety	08/11/19	08/11/21	Identify designated number of representative high accident zones in Georgia and evaluate type and effectiveness of barrier system deployed in that area.
25	19-13	Coordinated Anti-Congestion Control Algorithms for Diverging Diamond Interchanges (DDIs).	Sam Coogan	GA Tech	Sunil Thapa	Ben Lempke	Mobility	07/30/19	04/30/21	Develop actuated traffic control algorithms for coordinated anti-congestion control of DDIs and their surroundings to develop closed-loop, data-driven and model-free control strategies that provide guarantees on performance.

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26	19-12	Cognitive Attention and Traffic Crashes: A Study of Countermeasures in Two Intersections and One Roadway Section.	Junan Shen	GA Southern	Brennan Roney	ED David Adams	Safety	09/16/19	03/16/21	Propose a methodology to evaluate the effectiveness of countermeasures of traffic safety based on drivers' cognitive attention and safe performance through a case study on a curve section.
27	19-11	Safety and Illumination of Rural and Suburban Roundabouts (Phase II).	Michael Rogers	GA Tech	Sunil Thapa	Robert Graham	Safety	09/06/19	12/06/21	Provide project-level guidance on the type and extent of active illumination and/or passive retroreflective treatments for roundabouts and approaches.
28	19-10	Flash Tracking Implementation Guidelines Complementing Existing Design Build Manual.	Pardis Pishdad-Bozorgi	GA Tech	Sunil Thapa	Darryl D. VanMeter	Policy/Workforce	08/15/19	08/15/21	Develop Flash Tracking implementation guidelines to complement existing Design-Build (D-B) Manual.
29	19-09	Entrusted Engineer-in-Charge: A New Critical Position in the Design-Build Team to Enhance the State of Practice in Engineering Design Decision-Making in the Innovative Project Delivery Environment.	Baabak Ashuri	GA Tech	Sunil Thapa	Darryl D. VanMeter	Policy/Workforce	07/30/19	08/15/21	Elevate state of engineering decision-making practices in D-B environment through exploring opportunities offered by new leadership position in Design-Build team, Entrusted Engineer-in-Charge.
30	19-07	Investigation and Guidelines for Drilled Shaft Excavation Inspections.	Adam Kaplan	KSU	Brennan Roney	Michael Murray	Mobility	10/18/19	04/18/21	Provide the Georgia Department of Transportation with guidelines for engineers to inspect dry caisson excavations prior to placing concrete.
31	19-06	LRFD Procedure for Driven Piles with Pre-Drilling on Rock.	Soonkie Nam	GA Southern	Brennan Roney	Ryo Farrow	Policy/Workforce	09/16/19	09/16/21	Identify and document the relationship between the load capacity of piles installed with pilot holes into rock and their design parameters and develop a reliable LRFD design procedure.
32	19-05	Phase II: Enhancement and Restoration Interventions for Bird-Long Island Shoreline Alternatives: Design and Modeling for Stewardship.	Jon Calabria	UGA	Brennan Roney	Pamela Baughman	Asset Management	07/30/19	03/18/21	Examine several design alternatives and interventions to manage ecological and cultural resources on Bird-Long Island by using data gathered during Phase I.
33	19-04	Phase II: Investigation and Guidelines for Best Practices of Mass Concrete Construction Management.	Yong Cho	GA Tech	Sarah Lamothe	Donn Digamon	Mobility	07/26/19	01/25/22	Improve and validate the mass concrete thermal management methods (e.g., passive or active cooling) and decision-making tools developed from the Phase I research against GDOT's real-world mass concrete construction projects.
34	19-03	Sustainable Waste Management through the Beneficial Use of Dredge Materials in Partnership with the City of Savannah.	Celine Manoosingh	GA Southern	Sunil Thapa	Ralph Daniell	Policy/Workforce	08/26/19	08/26/21	Assess feasibility of dredge material for applications of interest to GDOT and the City of Savannah.
35	19-01	Improved Disaster Management through Automated Damage Assessment Using Unmanned Aerial Vehicles (UAVs).	Rami J. Haddad	GA Southern	Brennan Roney	Larry Barnes	Safety	11/18/19	11/18/21	Develop an automated damage assessment system for the state's emergency management system.

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36	18-33	VISSIM Simulation Guidance.	Michael Hunter	GA Tech	Brennan Roney	Landon Perry	Policy/Workforce	12/11/18	04/11/21	Understand state-of-practice in VISSIM™ model development and key issues related to VISSIM™ use by GDOT and its consultants; and develop a guidance document suitable for use in reviewing GDOT VISSIM™ models in model development.
37	18-15	Safety Performance Metric for Decision Making Process.	Kari E. Watkins	GA Tech	Brennan Roney	Ed David Adams	Safety	11/07/18	03/07/21	Develop metric(s) to assess speed-related component of safety and relate to design elements and roadway context, facilitating decision-making for safety improvements.
38	18-10	Meeting the 21st Century Surveying/Geomatics Education Needs of GDOT and Georgia.	David Scott	GA Southern	Brennan Roney	Benney Waldon	Policy/Workforce	12/11/18	06/11/21	Provide solution to lack of (1) surveying-geomatics (S-G) education availability for place-bound students and traditional residential students; and (2) availability of new and existing GDOT staff properly educated in S-G.
39	18-08	Improvement of the Georgia Statewide Travel Demand Model (GSTDM) - Phase 2.	Giovanni Circella	GA Tech	Sarah Lamothe	Habte Kassa	Mobility	05/06/19	05/06/21	Improve the model components in the Georgia Statewide Travel Demand Model to better account for temporal variation of travel demand during the 24-hour period currently covered by the model.
40	18-07	Best Practices and Specifications for Massive Concrete Drilled Shafts.	Lauren Stewart	GA Tech	Sarah Lamothe	Steve Gaston	Policy/Workforce	09/25/18	07/25/21	Understand implementation and performance issues; quantify thermal conditions; utilize ongoing thermal research and other states' best practices for application and demonstration; and recommend practices for GDOT.
41	18-05	Updated Layer Coefficients for GDOT Flexible Design.	Sonny Kim	UGA	Sunil Thapa	Ciprian Donisa	Mobility	10/25/18	09/25/21	Evaluate layer coefficients of pavement materials in use and provide updated values for those materials; and to develop SOP to estimate layer coefficients for new materials.
42	18-04	Determination of Equivalent Single Axle Load (ESAL) Factor for Georgia Pavement Design.	Sonny Kim	UGA	Sunil Thapa	Robie Cunningham	Mobility	10/25/18	07/25/21	Develop method to calculate truck ESAL factor using data from permanent WIM sites; apply method to develop new truck ESAL factors for flexible/rigid pavements; adjust MEPDG traffic default inputs if needed; and develop SOP to maintain and update ESAL factors post-project.
43	18-03	Development of Concrete Material Property Database for Pavement ME Input.	Sonny Kim	UGA	Sunil Thapa	Phillip Snider	Mobility	10/25/18	02/25/21	Develop concrete material input database for concrete pavement design; perform sensitivity analysis of concrete mixture properties with different quarry materials; investigate effects of concrete properties on pavement performance; evaluate effect of design input levels on pavement performance predictions; and, develop SOP that helps maintain and update Materials Input Library post-project completion.
44	18-02	Impact of Construction Loads on Steel Diaphragm Bridge Design.	Lauren Stewart	GA Tech	Sarah Lamothe	Steve Gaston	Policy/Workforce	09/25/18	03/25/21	Understand loads during construction; measure effect of these loads; quantify these loads using computational models; draft recommended practices; and recommend standardized steel diaphragm designs based on appropriate loading conditions, span lengths and beam types.

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45	18-01	Development of GDOT Ultra-High Performance Concrete for Bridge Deck Closure Pours.	Lauren Stewart	GA Tech	Sarah Lamothe	Dexter Whaley	Asset Management	04/05/18	04/05/21	Develop an ultra-high-performance concrete based on locally available materials with sufficient direct tensile strength, ductility, and toughness under tensile loads.
46	17-22	Optimizing Design of GDOT Post Construction Stormwater BMPs for Performance while Minimizing Right-of-Way Acquisition and Peak Flows.	Susan E. Burns	GA Tech	Sarah Lamothe	Brad McManus	Asset Management	08/29/17	08/28/21	Provide data that aids in modification of the GDOT drainage manual for the selection criteria specified to implement low-maintenance stormwater BMPs.
47	17-19	Critical Assessment of High-Friction Surface Treatment (HFST)'s Long-term Performance in Georgia under Different Roadway Conditions.	James (Yichang) Tsai	GA Tech	Brennan Roney	Ian Rish	Asset Management	10/05/17	10/05/21	Develop a guidance document that addresses the components needed for a proactive HFST monitoring and maintenance program.
48	17-04	Economic Impact of Bicycling in Georgia.	Shatakshee Dhongde	GA Tech	Sarah Lamothe	Jack Anninos	Policy/Workforce	09/06/17	06/30/21	Analyze how bicycling and related activities benefit Georgia's economy, providing a consistent framework to evaluate costs and benefits of proposed bicycle projects.