Request for Research Funding for FY 2019-2020			
Requesting Office	Central Office	**Priority**	# of # (projects may not have the same ranking-no ties)
Proposed Title	The Impact of Context and Design Variables on Driver Behavior and Mental Frameworks		
Justification	**Describe the current situation, why the research is needed, and the anticipated benefits of the research.** Although there is significant information regarding how the physics of geometric design factors impact driver behavior on high-speed, single-mode facilities, significantly less information is available to identify the specific design features that psychologically impact driver speed and attentiveness in lower speed contexts. This is critical both for multimodal environments and complete streets transition projects. Where the appropriate speed is communicated by the context of the roadway, speed variability decreases, which reduces the chance of accidents. Consistent with the new Chapter 202 of the Florida Design Manual, specific features will be reviewed to provide empirical evidence of their impact on driver free flow and congested speeds. However, without documented evidence supporting the efficacy and safety of the measures proposed in Chapter 202, acceptance and implementation will suffer. This analysis will provide measurable data that design engineers can rely upon as they design roadways to encourage lower speed behavior. This research will also support the context classification system by uncovering the mental models (schema) that govern driver's selection of behavior, including speed, awareness, and caution. This information can be used to refine the context classification system by identifying the critical features that define each context. The proposed effort can be categorized along three major research modules: **Module 1: Visual Qualitative Analysis of Complete Streets Context** In this module, a series of visual images will be prepared that show varying complete streets contexts with different contextual cues. Drivers with at least 2 years of experience will be asked to group the pictures based on unique driving styles within each group and label each group. Urban Designers will be given the same task but will also be asked to annotate each picture to identify the design features that have the most direct impact on their assessment. The grouping/labeling task will be used to perform a clustering analysis to identify specific driver mental schema that underlie the driver's choice of behavior. These schema will be compared to the FDOT transect categories. The features identified by the urban design group will be categorized using a qualitative analysis. **Module 2: Naturalistic Driving Behavior Analysis** In this module, data from the SHRP2 Naturalistic Driving Study will be used to identify the measured speeds along specific roadway segments within the Tampa study area. Using a multivariate analysis, both the segment's congested and free-flow speeds will be analyzed to identify which variables have the most significant impact. **Module 3: Policy and Design Recommendations** Based on the results of the preceding modules, policy and design recommendations will be provided which will include updates to current design standards, model code language, and decision criteria for application of the design features. **Module 4: Statewide Design Workshops** A series of workshops will be held in each district to communicate the impacts of the research on design protocols both in terms of standard changes and contextual tools both available to the designer and that should inform the design process.		
Impact	**How shall the results impact practice? What are the costs of not doing the research?** Although the revised Florida Green Book and PPM include context sensitive design recommendations, some designers have resisted implementing them because they are both		

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<tr><td></td><td colspan="3">unfamiliar and untested. This research is intended to provide measurements of the speed ranges that are communicated by specific design features. The disconnect created when highway or high-speed design details are applied to low speed contexts causes increased accidents, high speed driving behavior, and decreased driver awareness, which blunts the community's ability to support multimodal activity.
Expected Outcomes
1. Designer comfort and criteria for applying low-speed interventions to appropriate contexts
2. Better driver speed conformity to community goals and increased safety due to lower speed variability
3. Better understanding of how drivers respond to specific design and context variables so that cost-effective strategies can be selected during design or reconstruction.
4. Increased secondary economic investment in multimodal districts due to increased multimodal participation</td></tr>
<tr><td>Affected Offices</td><td colspan="3">Identify any section that will need to be involved in the scoping or conduct of the research, will be affected by implementation of the results, or will need to participate in the implementation process—including OIS, if enterprise/network software application will be a deliverable, and district staff, as appropriate, e.g., through statewide meetings.

The main offices affected by the research will be FDOT's central offices, including systems planning, complete streets, public transit, and safety.</td></tr>
<tr><td>Existing Work</td><td colspan="3">As a minimum, the Transportation Research International Documentation (TRID) and the Research in Progress (RIP) online databases should be reviewed by an expert in the research subject matter to assure research effort and resources shall not duplicate prior or ongoing work. Links to TRID and RIP are available at http://www.dot.state.fl.us/research-center/Related_Sites.shtm.

The research team will include members who have experience in psychological driver analysis using a wide range of modalities as well as experience in machine learning techniques and big-data reduction. Although specific variables have been reviewed in the past, the wholistic impact of a range of context and design variables in a naturalistic setting is unique to this project.</td></tr>
<tr><td>Implementation Requirements</td><td colspan="3">Identify any prerequisites to, requirements for, or barriers to implementing the anticipated results of this research (e.g., new or change to existing specifications, development of production units of prototype device, legislative change); please indicate if multiple phases of work shall be required.

The purpose of this project is to reduce institutional barriers to existing low-speed design features that are intended for complete streets initiatives. Extensive communication of the results to design office personnel and design consultants should be a strong component of this project's implementation plan.</td></tr>
<tr><td>Funding Request</td><td>$225,000</td><td>Anticipated Duration</td><td>2 years</td></tr>
<tr><td>Project Manager</td><td>DeWayne Carver, AICP</td><td>Contracting Method</td><td>Anticipated procurement method (e.g., supplement to existing project, RFP to universities only, RFP to all registered vendors, direct contract with university)
Contract with university</td></tr>
<tr><td>Urgency</td><td>Score 1-5
1= highest, most immediate need

2</td><td colspan="2">All FDOT roadway design projects are recommended for complete streets evaluation and implementation. This research provides a framework for implementing this directive in the most effective way which will help target cost-effective interventions that will increase multimodal use and community investment.</td></tr>
<tr><td>Financial Benefit</td><td>Score 1-5
1=greatest benefit</td><td colspan="2">The project is directly related to evaluation of financial investments for multimodal design – hence, the research will directly contribute to</td></tr>
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	1	efficient investment by the department. Appropriate multimodal design will also increase community investment and economic revitalization.
Implementability	Score 1-5 1=greatest likelihood of and proximity to implementing results 1	With adequate support and feedback from the appropriate offices, this project will provide implementation guidance for low speed environment design that will be used for years to come. All guidance provided will be evaluated based on the potential for implementation both from a practical and financial standpoint.

*Comments should explain and support urgency, financial benefit, and implementability scores.

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