EXHIBIT F

UTC Project Information	
Project Title	Equitable Dynamic Pricing for Express Lanes
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Funding Source(s) and Amounts Provided (by each agency or organization)	$ 19,193.92 (CATM)
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Agency ID or Contract Number	69A3551747125
Start and End Dates	02/01/2021 - 12/31/2021
Brief Description of Research Project	Congestion pricing implementations such as express lanes mitigate traffic congestion by internalizing the congestion externality in travelers' costs while generating much-needed revenue for infrastructure projects. Dynamic tolls on express lane facilities raise equity concerns: do these facilities leave the economically-disadvantaged travelers worse off? Real-world case studies reveal that express lane usage is more impacted by factors other than income such as travelers' residential location and urgency of travel purpose. However, the choice of dynamic tolls can significantly skew the distribution of benefits towards travelers' who are already well off. For example, tolls as high as $47 on express lanes in Virginia might be too high for low-income travelers to afford. Similarly, revenue-maximizing tolls exhibit an jam-and-harvest (JAH) phenomenon where the regular lanes are unintentionally jammed in earlier time periods to harvest more revenue later, which can cause inequitable outcomes. In this research, we analyze the equity concerns posed by express lanes in the design of dynamic tolls. Methodologically, we will contribute to the state-of-the-

	art equity considerations for express lanes by (a) quantifying the factors that contribute to JAH as an unintended consequence of tolling and (b) identifying variables for a system-level measurement of equity and creating component lane-choice and traffic flow models to measure those variables in our modeling framework. Building on the choices of component models such as lane choice and traffic flow models, toll-optimization methods are used to optimize differential toll prices such that the equity gap is minimized.
Describe Implementation of Research Outcomes (or why Not implemented) Place Any Photos Here	The formulation has been developed. Preliminary findings indicate that the extent of JAH is highly sensitive to travel demand and lane choice models. Data collection and detailed analysis of policy guidance are currently in progress.
Impacts/Benefits of Implementation (actual, not anticipated)	The research findings will help us determine the design of tolls should considering system-wide impacts and how differential prices and discounts should be used to reduce equity concerns posed by express lanes. Furthermore, the project will create unique insights into discussions surrounding equity in dynamic congestion pricing and will also expose involved undergraduate and graduate students to the state-of-the-art methods for bringing equity discussions in modeling process.
Web Links • Reports • Project Website	Will be provided on project completion