



Final Report

How Agency Practitioners Understand and Implement Transportation Equity in Delaware's Capital Expenditure Process

Philip Barnes

University of Delaware

Phone: 302-831-7010; Email: pbarnes@udel.edu

Andrea L. Pierce

University of Delaware

Email: alpierce@udel.edu

Calaia S. Jackson

University of Delaware

Email: calaia@udel.edu

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Acronyms

ADA – Americans with Disabilities Act

CTP – Capital Transportation Program

COT – Council on Transportation

DBE – Disadvantaged Business Enterprise

DelDOT – Delaware Department of Transportation

DTC – Delaware Transit Corporation

EFA – Equity Focus Area

FHWA – Federal Highway Administration

FTA- Federal Transit Administration

MPO – Metropolitan Planning Organization

PPC – Project Prioritization Criteria

PROTECT – Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation

RAISE – Rebuilding American Infrastructure with Sustainability and Equity

SDOT – State Department of Transportation

TIGER – Transportation Investment Generating Economic Recovery

TTF – Transportation Trust Fund

WILMAPCO – Wilmington Area Planning Council

Abstract

Equitable outcomes are an increasingly important expectation for expenditures by state Departments of Transportation, yet little is known about the methods and practices used to incorporate the amorphous concept of equity into budgetary decision-making on infrastructure. This research project employs semi-structured interviews with key personnel in the Delaware Department of Transportation (DelDOT) and local Metropolitan Planning Organizations to illuminate their conceptualization of equity and how it influences capital expenditures for the state's transportation systems. Utilizing a pre-existing framework for understanding transportation equity, our findings indicate that key personnel in DelDOT both conceptualize and operationalize the idea along three main lines: Fair Share (communities are involved in planning, infrastructure supports non-drivers, and investments are distributed across the state), Inclusivity (infrastructure and mobility systems prioritize accessible options for individuals with special needs), and Social Justice (areas with low-income and minority communities are prioritized for investments, minority-owned businesses receive support for procurement and contracting). The mechanisms through which equity becomes operationalized in capital expenditures include federal requirements and funding, project identification and planning processes, DelDOT's homegrown Equity Analysis Tool, Project Prioritization Criteria used to rank and sort candidate projects, and DelDOT's Disadvantaged Business Enterprise Program.

Introduction and Research Scope

State Departments of Transportation (SDOTs) must expend scarce federal and state dollars to build, operate, and maintain their infrastructure and related transportation systems. The limited funds available for system capital improvements are less than the overall need, so SDOTs must decide how to allocate these limited financial resources and prioritize investments geographically and across modes. In doing so, they balance program and project costs with multiple and sometimes competing objectives such as safety, mobility, system effectiveness, economic development, environmental impact, greenhouse gas emissions, and equity. Generally, this decision-making method is termed multi-criteria decision analysis, and many frameworks and models systematically assist with program/project selection and prioritization (Kabir et al., 2014; Yannis et al., 2020).

Within these multi-criteria frameworks, the equity criterion has historically been deprioritized relative to others but is increasingly recognized as a critical objective with respect to transportation and infrastructure spending. The Biden Administration's Justice40 Initiative established a goal that at least 40% of the benefits from federal government resources and programs, including those administered by the U.S. Department of Transportation, flow to disadvantaged communities (The White House, 2021). Consistent with the Justice40 Initiative, the U.S. Department of Transportation recently developed an Equity Action Plan and centered equity as a Department-wide strategic goal to reduce inequalities and injustices across the transportation sector (U.S. Department of Transportation, 2022b). Furthermore, the Department's most recent Research, Development & Technology Strategic Plan lists equity assessments, and in particular "analytic tools and frameworks to inform and evaluate decisions that support the equitable treatment of all individuals and communities," as a critical research need (U.S. Department of Transportation, 2022c). Yet equity is understood differently by stakeholders, and

as a concept it resists easy definition and quantification (Stone, 2012). A universal or even consensual metric for equity is elusive. This reality is a challenge for SDOTs, where the technocratic nature of financial decision-making collides with the interpreted, contested, and qualitative nature of transportation equity.

The Delaware Department of Transportation (DelDOT), like other SDOTs, operates in this administrative environment. DelDOT maintains two budgets: one for capital improvements (mostly roadways and transit) and another for operations (Majeski, 2022). Within the capital budget, opportunities exist for expenditures to generate outcomes that enhance transportation equity for specific groups. Some elements of DelDOT's capital expenditure processes, including information on how equity considerations are incorporated, are publicly available. For example, DelDOT's Capital Transportation Program (CTP) ranks and prioritizes candidate projects for capital investment by utilizing multiple criteria with data on a community's income and minority status and, all else being equal, gives preference to low-income and majority-minority communities (DelDOT, 2020). Beyond this, the operationalization of equity and how the concept is incorporated into DelDOT's capital expenditure process is difficult to ascertain with publicly available information. This lack of public documentation challenges the Department as it seeks to improve accountability to the transportation system's users and impacted communities.

Assessments and evaluations of equity in transportation planning and transportation outcomes exist in the research corpus (see Literature Review), but few efforts have investigated the manifestation and operationalization of equity in the capital expenditure process. Budgets in general, and capital expenditures in particular, are statements of policy intent and priority because they are a synthesis of political, economic, social, and technical reality.

This research project has two main goals. First, it seeks to illuminate how key personnel involved in developing, managing, influencing, and implementing DelDOT's capital expenditures personally define and conceptualize transportation equity. Second, the research aims to identify and assess if, and how, these concepts become operationalized and their practical effect on DelDOT's capital budget expenditures. These goals underpin the research questions: 1) How do key personnel involved in DelDOT's capital expenditure process conceptualize transportation equity, and 2) How does the concept of transportation equity impact DelDOT's capital expenditures?

Regarding the second goal, this research is not intended to be a comprehensive survey of all the ways in which equity impacts DelDOT capital expenditures across all project types. Such an undertaking is beyond the scope of this research. However, the research does intend to reveal the most significant opportunities for transportation equity to intersect with and potentially impact DelDOT's capital expenditures. For clarity, simplicity, and feasibility, this research focuses exclusively on transportation equity in DelDOT's capital expenditures and not on the Department's revenues. Furthermore, this study will not quantitatively or spatially analyze how DelDOT incorporates equity into capital expenditure decision-making and will refrain from investigating or evaluating equity considerations within the Department's operating budget. Finally, because the research approach is largely descriptive and an attempt to document the primary ways in which equity is manifested in DelDOT's capital processes and outcomes, it avoids interpreting and evaluating those processes and outcomes according to subjective categories such as "authentic equity" and "performative equity" (McCullough & Erasmus, 2024).

DelDOT's Capital Expenditures and Budgetary Process

DelDOT is the State of Delaware's executive branch department responsible for maintaining roadways, overseeing the state's E-ZPass system, and operating the Division of Motor Vehicles and Delaware Transit Corporation (DTC). Features of DelDOT make it unique relative to other states' Departments of Transportation. First, as noted, DelDOT is responsible for DTC (aka DART First State or simply DART), the sole public transit provider covering the entire state. DTC runs local and intercity bus transit in Delaware and helps fund the Philadelphia region's commuter rail service to northern Delaware. DTC also provides paratransit services throughout the state. The second aspect of DelDOT that makes it somewhat unique is that it is responsible for building and maintaining approximately 90% of the state's road network. This percentage is significantly higher than most other SDOTs (DelDOT, 2024a).

With respect to budgeting, DelDOT must develop a biennial capital expenditure plan, known as the Capital Transportation Program (CTP), and work through the state's Council on Transportation (COT) to adopt it. The COT is an advisory panel to the Department that is composed of 9 governor-appointed members who come from a combination of business and community interests. Members serve 3-year terms. The COT has five main responsibilities: 1) advise and approve the state's long-range transportation plan, 2) approve weighted criteria to prioritize projects for Delaware's CTP, 3) approve and adopt the state's CTP, 4) approve highway realignments, and 5) comment on certificates for public transportation carriers (taxis, rail, some buses, etc.) (DelDOT, 2013).

Determining the Amount of DelDOT's Capital Budget Expenditures

Each state has the authority to define what counts as a capital expenditure in their state budgets. Consequently, there is great variability in what is considered a capital expense at the state level (NASBO, 2014). At DelDOT, capital construction projects, equipment, information technology, and land acquisition qualify as capital expenditures. In the transportation sector, construction costs include expenses paid to prime and subcontractors for new projects. Contrary to what is published in the NASBO (2014) report describing state capital and operational budgeting frameworks, deferred maintenance, routine maintenance, and repairs on transportation infrastructure in Delaware are mostly funded through DelDOT's capital program.¹

The funds that get directed to DelDOT's capital expenditures are acquired through federal and state sources. On the federal side, funds are apportioned to Delaware through more than twenty-five formula-based Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) programs. Additional federal revenue for capital investment can be allocated via competitive (discretionary) grant programs. These formula and competitive programs are renewed, sunset, and created through the federal transportation laws and their reauthorizations. The most recent such law, the 2021 Infrastructure Investment and Jobs Act (also known as the Bipartisan Infrastructure Law) boosted the number of programs and availability of federally apportioned and discretionary funds to states.

¹ This statement was confirmed via personal communication with DelDOT's Director of the Division of Finance (July, 2024).

Federal funds often come with “strings attached.” Typically, the expenditure of federal funds requires a match from the states, often an 80:20 ratio. For every \$4 of federal funding allocated, states must allocate at least \$1 of their own funds. Regarding eligible expenses for federal funds, states are supposed to remain faithful to the spirit, intent, and goals of the formula and competitive programs. For instance, a new formula program created through the Infrastructure Investment and Jobs Act is the Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program. The PROTECT Program’s purpose is to make states’ surface transportation systems more resilient to the effects of climate change and natural disasters. Since it is a surface transportation program, states should not use apportioned PROTECT funds on airports and ferry services, for example.

DelDOT’s annual state contribution to its capital budget is financed through the state’s Transportation Trust Fund (TTF) and is determined through a multi-stage process. First, revenue projections are generated for the next eight years by DelDOT’s Division of Finance and approved by the Delaware Economic and Financial Advisory Council. These revenue projections are based on an analysis of TTF history and expected trends, and they form the total revenue target for the agency. In practice, the TTF collects revenue through various sources including motor vehicle fuel tax, motor vehicle document and registration fees, tolls, motor carrier fees, fareboxes, investment earnings, a \$5M allocation from the state’s General Fund, and other miscellaneous transportation revenues. In fiscal year 2023, these revenue sources generated \$628.7M for Delaware’s TTF (DelDOT, 2023b, p. 104). Using the annual revenue projection/target, funds are distributed from the TTF via a priority system. The first to receive TTF disbursement is debt service obligations on outstanding bonds. Next, TTF disbursements are allocated toward DelDOT and DTC operations. Whatever is left after the debt service and operational costs are covered is used for DelDOT’s capital programs and expenditures.

Capital Transportation Program (CTP)

Every two years DelDOT must put together a CTP that lists the capital projects it hopes to finance with a combination of state and federal funds. The CTP is Delaware’s Statewide Transportation Improvement Plan, which is required by federal regulations and preserves DelDOT’s eligibility for receipt of FHWA and FTA money. A draft of DelDOT’s CTP, covering the next six fiscal years, is prepared using project proposals from the state’s MPOs, local governments, and the public. The CTP contains five types of projects: “state of good repair” projects, which are primarily paving and maintenance projects of existing DelDOT assets; dedicated funding from FHWA or FTA that can only be spent on specific projects; small projects to improve system management and operation; projects that DelDOT is required to implement via federal or state regulations/statutes; and prioritized projects according to TITLE 29 CHAPTER 84 § 8419 of Delaware State Code.

Prioritized projects in this fifth category go through a distinct process to determine suitability for funding and implementation. The process begins with a quantitative ranking (technical score) of candidate projects using “Project Prioritization Criteria,” which will be discussed in greater detail later in the analysis section of this report. Subsequently, all projects are assessed on their readiness as well as their eligibility for federal and/or state funding. The CTP is then drafted, presented for an extensive public comment period, revisions are made, and final approval is granted by the COT. After the COT votes to approve the CTP, it is presented to the Governor

and the General Assembly for inclusion in the state's bond bill, which passes through the Joint Capital Improvement Committee. In summary, the CTP contains the projects that DelDOT intends to be the recipients of capital expenditures.

Literature Review

The integration of equity in transportation planning and infrastructure is critical for promoting social justice and equitable access to mobility systems. Equity in transportation goes beyond just equal access to services; it involves ensuring that all individuals, regardless of their race, socioeconomic background, education level, disability status, or any other protected category, have fair and inclusive access to transportation services. This literature review examines conceptual frameworks and practical applications of transportation equity.

Conceptualizing Equity: Existing Frameworks

Often, the equity criterion used in public policy, planning, and administration denotes a fair distribution of resources, such as tax revenues among intended recipients, known as distributional equity (Stone, 2012). What is considered fair is socially negotiated and lies at the heart of political debate. Definitions of distributional equity range from providing equal amounts of available resources to everyone to providing unequal amounts based on membership in categories, such as “advantaged” versus “disadvantaged.” The concept becomes increasingly controversial since decision-makers never have the resources to satisfy everyone's demands, and administrators must decide how to make tough decisions that may favor one recipient or group over another. As equity has increased in salience within the transportation field, the concept has faced the same political debates over what kind of equity is most important and how we ensure equitable outcomes.

Equity in general, and transportation equity in particular, can be horizontal and vertical (Litman, 2024; Van Dort et al., 2019). Horizontal equity involves treating like populations alike according to need and ability, where the distribution of benefits and costs is similar among similar groups. Vertical equity involves treating unlike populations differently according to need and ability, where the distribution of benefits favors those with higher needs or lower abilities. In the transportation context, horizontal equity could involve providing a consistent level of service on every roadway so that all road system users face similar costs and benefits. This horizontal equity frame dovetails with the “user-pays principle,” where the cost of use is borne by its users through taxes, fees, and tolls, and users should get what they pay for. By contrast, vertical equity may require additional services for users facing physical or mental disabilities, poor English proficiency, low income, or zero-car households, among other characteristics (Litman, 2024; Van Dort et al., 2019).

Emerging research related to Justice40 has produced other theoretically-driven frameworks for evaluating equity in transportation. For example, Yarbrough and Smith-Colin (2024) have advanced a “6+1 D” typology that focuses on how transportation justice and equity are manifested. The framework can be applied to identify and address injustices at various scales within a transportation project's lifecycle. The framework draws on social theories of justice and equity to delineate how experiences of transportation injustice are constituted over time in

structural, institutional, community, and individual domains. Yarbrough & Smith-Colin define transportation injustice as being experienced through “six D’s”: disinvestment, disrespect, disenfranchisement, dismissal, distress, and dispossession. To move from injustice to justice, the framework suggests “one D,” deliberation, as a strategy for achieving transportation justice through “accountable engagement between groups.” Transportation equity itself is a multidimensional concept (with distributive, recognition, procedural, epistemic, restorative, and reparative elements) and is rooted in insights from theories of reparative justice.

Litman’s Conceptual Framework

Todd Litman (2024) offers a notable framework that provides guidance for framing transportation equity (see Table 1). As noted above, Litman conceptualizes equity in two broad categories: horizontal and vertical. Within these broad categories, he further identifies five separate types of transportation equity. Within the horizontal equity umbrella, Litman defines Fair Share and External Costs, while the vertical equity category includes Inclusivity, Affordability, and Social Justice types of transportation equity. These five types of transportation equity merit further elaboration.²

The Fair Share type of transportation equity can be expressed in transactional terms with the basic understanding that everybody receives a share of public resources proportional to their contribution to the public body that administers resources. This fundamental framing of equity forms the principle of user charges in transportation funding debates, especially around vehicle taxes, tolls, and fees. Litman also argues that a more modern conceptualization of Fair Share transportation equity recognizes the importance of including non-drivers in the community of system users. Individuals who cannot or prefer not to drive automobiles (pedestrians, cyclists, transit users, etc.) still utilize transportation systems and should be afforded a system that is proportional to their contributions to public works projects.

While these first two Fair Share equity manifestations are *distributional* in nature, there is a third manifestation that is *procedural*, namely that individuals, groups, communities, and stakeholders who are affected by transportation systems should be given an opportunity to engage in discussions of planning, implementing, and operating those systems. Procedural equity can influence distributional outcomes and the allocation of costs and benefits of transportation systems.

Litman’s second type of horizontal equity, what he terms External Costs, recognizes that transportation systems produce negative externalities on both users and non-users that need to be mitigated and minimized. Pollution from the transportation sector is a classic example of one such externality, so an External Cost conceptualization of transportation equity grounds itself in minimizing the causes of pollution and compensating or redressing the consequences of pollution on individuals and communities. Congestion, inconvenience, and travel delay are other

² The five types of transportation equity identified by Litman—Fair Share, External Cost, Inclusivity, Affordability, and Social Justice—will be capitalized for the remainder of the report whenever they are used to refer specifically to Litman’s conceptual framework. If any of these terms are used in a general sense, they will receive standard low case spelling.

externalities from transportation systems that should be mitigated and minimized according to an External Cost framing of transportation equity.

One of Litman's vertical equity types is termed Inclusivity. As an equity concept, the Inclusivity lens focuses on basic and accessible transportation systems for groups and individuals with different mobility needs and abilities, particularly regarding access to essential goods, services, and activities. To be inclusive, transportation systems should enable and facilitate mobility options for all, including the disabled, non-drivers, children, the elderly, and other groups who have unique needs. Inclusive systems also connect individuals to essential destinations and make those destinations accessible to everyone regardless of need or ability. Similar to the Fair Share framing of transportation equity, Inclusivity supports multimodal systems that provide mobility options for non-drivers.

Affordability is a second type of vertical transportation equity. For Litman, Affordability centers on the financial cost of accessing and using transportation systems relative to disposable income and people's ability to pay. Litman takes a broad view of the concept of Affordability, incorporating not only immediate transportation costs such as fuel prices, tolls, and transit fares, but also considers social and spatial patterns that impact transportation costs. These include land use and housing density and an individual's relative proximity to transportation systems and essential services. Affordable transportation systems, from a vertical equity perspective that considers ability and need, should privilege disadvantaged users with low-cost modes and offer public support and resources where needed. Additionally, public expenditures on transit and transit-friendly development are known to be a good way to promote equitable outcomes (Bailey & Grossman, 2023).

Social Justice is the third type of vertical equity. Social Justice is concerned with structural inequities like racism, classism, sexism, and other forms of discrimination and social marginalization. Litman notes that a Social Justice approach to transportation equity recognizes the challenges faced by these disadvantaged groups, the intersectionality of identities, and the disparate outcomes in opportunity and livelihoods that are afforded by transportation systems. Furthermore, Litman adds a *restorative* lens to the Social Justice concept by noting that transportation systems are directly responsible for placing excessive burdens and costs on marginalized groups, thus contributing to further marginalization, and should therefore seek to atone for this historical legacy in ways that uplift and improve conditions in these communities.

Table 1: Five-part transportation equity framework developed by Litman (2024)

Transportation Equity Type	Horizontal or Vertical	Transportation Equity Principles
Fair Share	Horizontal	Users receive a service proportional to their contributions, consider non-drivers, engage the public and impacted communities
External Costs	Horizontal	Mitigate and minimize negative externalities
Inclusivity	Vertical	Serve users according to need and ability, prioritize multimodal systems and mobility options
Affordability	Vertical	Support users who have little ability to pay, consider indirect costs of social, spatial, and land use patterns
Social Justice	Vertical	Prioritize structurally disadvantaged and underserved groups, restore justice to communities burdened by previous transportation decisions

Equity in Transportation Planning Processes

State and regional transportation agencies play a critical role in advancing equity through comprehensive planning and implementation strategies that promote equitable transportation policies and use of resources. Barajas et al. (2022) assess how transportation agencies advance equity in their plans and processes, highlighting successful strategies. Krapp et al. (2021) discuss equity-oriented criteria for project prioritization within MPOs, providing a framework for agencies to enhance equity.

Various decision-making frameworks and tools can assist with incorporating equity considerations into transportation planning and infrastructure development. Kabir et al. (2014) review multi-criteria decision-making methods for infrastructure management, highlighting their relevance for equitable planning. Yannis et al. (2020) provide a state-of-the-art review on decision-making in the transport sector, emphasizing the need for comprehensive evaluation tools. LeClair et al. (2023) discuss a web-based tool for incorporating social equity in infrastructure planning, showcasing innovative methodologies. Understanding how practitioners apply these tools to facilitate equitable decision-making processes can ensure that transportation investments benefit all communities.

Effective evaluation and impact assessment methods are crucial for identifying mobility needs and ensuring equitable transportation investments. Bocarejo and Oviedo (2012) highlight the importance of transport accessibility and social inequities in evaluating transportation projects. Mollanejad and Zhang (2014) discuss the incorporation of spatial equity into road network design, providing a framework for equitable infrastructure development. Mottee et al. (2020) critique technical approaches in transport planning, emphasizing the need for social

considerations. Lucas et al. (2022) propose a mixed methods approach to the social assessment of transport infrastructure projects, providing comprehensive evaluation tools.

Practitioner Experiences Implementing Equity in Transportation

From a public policy and administration perspective, practitioners who design and implement policies are an integral link between agency mission objectives and equitable outcomes. Existing research on transportation agency practitioner experiences is limited. The existing research, however, points to a need to identify how agency practitioners comprehend and implement equity and justice (Cantilina et al., 2021; Mottee, 2022; Sen, 2008; Yarbrough & Smith-Colin, 2023). Particularly in discretionary decision-making like budgeting and project prioritization, existing research suggests that while agencies have policies to advance transportation equity, and practitioners generally think transportation equity is important, how strategies are implemented is varied and inconsistent (Krapp et al., 2021). This leads to recommendations for improved data availability and targeted policies and programs that promote rather than hinder equitable participation in planning (Barajas et al., 2022; Cantilina et al., 2021; Litman, 2024; Yarbrough & Smith-Colin, 2023). Overall, the studies highlight practitioner experiences, challenges, and opportunities for implementing equity in transportation planning to underscore the need for fostering a culture of equity within transportation agencies (Barajas et al., 2022; Mottee, 2022; Sen, 2008; Yarbrough & Smith-Colin, 2023). They argue for more robust data and a more comprehensive approach to equity evaluation that considers both the potential benefits and burdens of projects while emphasizing the importance of meaningful community participation in the planning process (Barajas et al., 2022; Cantilina et al., 2021; Geitebruegge, 2024; Yarbrough & Smith-Colin, 2023).

Research Gap

Taken together, there is a noted research gap surrounding how practitioners understand and operationalize transportation equity (Yarbrough & Smith-Colin, 2023). More is known about how MPOs incorporate equity in their transportation planning efforts than about SDOTs, especially concerning project prioritization and selection processes (Barajas et al., 2022; Krapp et al., 2021). As of last year, twelve U.S. SDOTs, including Delaware, had published prioritization criteria that included equity in evaluating all projects, and another fourteen states include equity in evaluating non-roadway projects (Bailey & Grossman, 2023). Nevertheless, the specifics of how equity is understood by those SDOTs remain understudied.

There is a related research gap around the operationalization of transportation equity through the budgetary process, particularly in relation to capital outlays. For instance, recent research on the drivers of transportation spending does not mention equity, fairness, or justice (Alm & Dronyk-Trosper, 2021). The practical mechanisms SDOTs utilize to translate the concept of transportation equity into spending on physical infrastructure and, consequently, real-world impacts are not fully understood.

Methodology

This project employs a single case study design to investigate the phenomenon of a SDOT conceptualizing and operationalizing equity in transportation, using Delaware as the study case. As a single case study, any implications from this research are limited to the Delaware case. Nevertheless, the results and implications can be compared with prior research from SDOTs and MPOs.

Data Collection

To understand how equity influences DelDOT capital expenditures, semi-structured interviews were used as the primary data collection method.³ A four-part questionnaire was developed and administered consistently to all interviewees (see Appendix). Questions in the first part elicit responses to the interviewee's personal definition and conceptualization of equity in transportation. The second part asks the interviewee to describe how equity influences DelDOT capital expenditures, specifically related to their roles and responsibilities within the Department. The third part asks interviewees to offer their professional opinion on the main barriers to incorporating transportation equity in capital expenditures. This third part was included to inform the discussion of the results and to illuminate possible new avenues for future research. The fourth part of the questionnaire facilitates the snowball sampling approach used in this study, where the interviewee is asked to recommend other potential interviewees inside and outside DelDOT.

Because the research investigates the impact of equity on DelDOT capital expenditures, it was vital to speak to a targeted group of informed individuals in the Department. To generate the initial slate of interviewees, the researchers leveraged their professional experience and connections to identify key personnel in leadership roles at DelDOT who are intimately involved in the capital budget process. Emails were sent to those individuals, the research scope was explained, and interviews were requested. All initial interview requests were granted, and the snowball sampling led to 13 completed interviews, conducted from January to June 2024. Ten interviews were conducted with key capital planning and budgeting personnel at DelDOT, with three additional interviews conducted with their counterparts at Delaware's two MPOs. Each interview lasted approximately one hour and was conducted in person or via video conference, depending on schedule and availability. All interviews were audio-recorded and transcribed using voice recognition software, and the transcripts were manually edited for clarity and readability.⁴

Data Analysis

This analysis is based on qualitative content analysis, which is an appropriate technique when the meaning of certain terms like equity must be interpreted by the researcher (Schreier, 2012). Consistent with top-down content analysis using template or deductive coding (here using a

³ The Institutional Review Board at the University of Delaware reviewed the interview protocol and provided an exemption determination in January 2024: [2137510-1] *Understanding the Role of Equity in Delaware Department of Transportation Capital Expenditures*.

⁴ This project is subject to a Data Management Plan, approved by the SMARTER Center in 2023.

priori codes) all interview transcripts were coded independently by two of the three co-researchers using Litman's (2024) five-part framework for the types of transportation equity (Krippendorff, 2019; Miles et al., 2020; Stemler, 2001). Specifically, Litman's framework was used to code interviewee answers to the two primary research (and interview) questions: 1) how do the key personnel conceptualize transportation equity, and 2) how does transportation equity influence and shape DelDOT's capital expenditures?

No specialized coding software was used. Relevant portions of the text within the transcripts were tagged with Litman's five codes using the Comment feature in a word processor program. To establish intercoder agreement, the two researchers compared their independently coded transcripts, and differences were verbally discussed and resolved, generating one set of reconciled coded transcripts (Campbell et al., 2013; Garrison et al., 2006). Throughout the coding process, the researchers discussed the challenges of applying Litman's framework and noted how those challenges were resolved.⁵ The final coded sections of text and the *a priori* codes were then extracted for further analysis.

To facilitate the analysis, the researchers adopted a Microsoft Excel-based workbook created by the Centers for Disease Control. The tool and related coding schemes were originally developed for use in epidemic responses and natural disasters (e.g., analyzing notes, transcripts, social media posts, etc.), but it also includes a customizable coding scheme that can be adapted to other types of inquiry using text-based data (Nestor, 2023). This tool was selected because it allowed the researchers to implement best practices such as "remain[ing] close to and deeply rooted in the data" by hand-transcribing lines of interview transcripts into a systematic workspace and applying codes for each segment (Saldaña, 2013, p. 37).

While coding, the researchers recognized that interviewees would often use a particular example of transportation equity multiple times throughout the interview, or return to a common equity concept at various points in the discussion. Each time these examples and/or concepts appeared in the transcript, the researchers would code it regardless of whether it was a new or repeat occurrence. It was also common to hear different interviewees articulate the same examples and practices of transportation equity. Therefore, an analysis of code frequency was eschewed in this research to avoid counting the same content multiple times. Rather, the researchers evaluated the codes by agreeing that there were concepts and expressions of transportation equity that were emphasized heavily by certain interviewees and, in some cases, multiple interviewees. These emphasized concepts and examples of operationalized equity were initially identified when the researchers worked through the process of intercoder agreement.

To confirm the points of emphasis, the researchers utilized the code spreadsheet where it was possible to sort by code and identify how many speakers conceptualized or gave examples of operationalized transportation equity in the same (or similar) ways. The spreadsheet also allowed the researchers to filter and identify useful quotations from the interviewees that represented these points of emphasis.

⁵ Of particular note, the researchers agreed to code interviewee references to bicycle, pedestrian, and mobility modes for non-drivers as both Fair Share and Inclusivity.

Results

This section presents the research results, broken into two subsections corresponding to the two main research/interview questions. The first subsection describes how key personnel at DelDOT and the local MPOs personally conceptualize and define transportation equity. The second subsection presents the various ways in which equity in transportation is operationalized through the capital expenditure process at DelDOT. Select quotations are reproduced to support the analysis. The quotations were modified only to remove personally identifiable information to maintain the confidentiality of our research participants while still retaining the meaning and the essence of their statements. The selection and use of a quotation were based on two criteria: (1) it is well-reasoned and articulated, and (2) it succinctly encapsulates the findings.

Conceptualizing Equity in Transportation

Interviewees were asked how they personally define the concept of “equity in transportation,” and their extensive responses were often assigned multiple codes. Overall, the responses centered on three types of equity within Litman’s five-part framework: Fair Share, Inclusivity, and Social Justice. Each of these equity types was referenced by eleven of the thirteen interviewees. Mentions to the other two parts of the framework - External Costs (two interviewees) and Affordability (three interviewees) - were less prevalent.

Fair Share

Eleven interviewees cited the Fair Share type of transportation equity when asked to define the concept. Within that horizontal equity type, three sub-elements of Fair Share were articulated by most of the interviewees: 1) geographic distribution of funding to ensure that all areas of the state receive transportation investments rather than concentrated pockets; 2) engaging stakeholders and communities in project planning and implementation; and 3) transportation systems and associated networks for non-drivers are essential for many individuals and communities and are worthy of significant investment. Referencing the second sub-element of Fair Share, one interviewee said, *“Equity in transportation is making sure their voices are heard in the transportation planning process, and making sure that the results are what they need for their communities.”* Notably, the transactional formulation of Fair Share where you “get what you pay for” was only articulated once by one interviewee.

Inclusivity

Eleven interviewees noted that transportation equity is related to inclusion and connection. Within Inclusivity, there were three sub-elements that were frequently cited: 1) all members of the traveling public should have efficient and proximate *access to* the transportation system and *access within* that system to critical services and destinations; 2) a transportation system must ensure that all community members, regardless of ability or special need, have a minimum level of freedom of movement; and 3) non-drivers should have safe and available mobility modes. One interviewee encapsulated the first two sub-elements of Inclusivity when they noted that transportation equity means:

Everyone can get anywhere they need to go. There are no barriers to anyone being able to do that. Equity means all the elements of a transportation system, regardless of the person's ability, regardless of their location, all of those things should not be hindrances to people being able to access transportation and to get to where they need to be for themselves, their family members.

As noted, many interviewees also referenced the importance of developing and maintaining a transportation system that provides opportunity and mobility options for the non-driving public. Many elderly individuals, people with disabilities, and the youth cannot drive but still need a system that caters to their ability to walk, bike, or take transit. As one interviewee said, transportation equity:

Is making sure that folks have opportunities to access transportation...If you own a car, your needs are going to be a little bit different than if you don't, and you rely on walking, biking, or transit. Or if neither of those are an option, and you need to use our paratransit services, for instance, because you don't have the physical abilities to be able to do any of those things. And so making sure that folks have the opportunity to use transportation in whatever means they need to help them get to other opportunities, whether it be work, or education, or health care, or recreation.

Social Justice

Eleven interviewees centered Social Justice in their responses when asked to define and conceptualize equity in transportation. There was an overwhelmingly common aspect to interviewees' Social Justice framing, namely that transportation equity means supporting and uplifting disadvantaged and under-resourced groups and communities. Race (non-white) and income (low income) were often cited as defining characteristics of disadvantaged and under-resourced groups. As one interviewee put it, transportation equity, *"as I understand it, it's applying funds toward areas that have been traditionally underserved from a transportation funding perspective."*

The second aspect of Litman's Social Justice framing—utilizing transportation systems and related investments to restore justice to communities harmed by past decisions and projects—was less well represented by interviewees. However, the interviewee quoted above later referenced the how Interstate 95 carved through minority areas of Wilmington, Delaware:

In the early sixties, mid-sixties, when the interstate program was started they mostly started right in downtown urbanized areas, and they would take a two or three block wide swath, and take that down. And so you literally had state DOTs bulldozing communities.

Operationalizing Equity in Transportation

This section presents the techniques and methods by which transportation equity is operationalized in DelDOT's capital programs. In each instance, the mechanism for incorporating transportation equity into capital projects is defined and discussed, and the type(s)

of transportation equity represented by the mechanism is identified. Similar to the findings of the preceding section, interviewees mostly provided examples of the Fair Share, Inclusivity, and Social Justice types of transportation equity offered by Litman (2024).

As noted above, the following summary is not intended to identify and describe every mechanism that DelDOT uses to advance transportation equity in its capital expenditures. However, the summary does represent the interviewees' points of emphasis (based on multiple interviewees articulating the same mechanism or individual interviewees continually returning to or referencing the mechanism). These emphasized points are assumed to correspond to the most significant opportunities for transportation equity to intersect with and potentially impact DelDOT's capital expenditures.

Federal Requirements and Funding

Interviewees frequently spoke about certain federal requirements that mandate that DelDOT incorporate elements of transportation equity into its capital program, particularly because the program is federally funded. For example, Title VI of the Civil Rights Act (1964) stipulates that the funding recipient, in this case DelDOT, is prohibited from discriminating based on race, color, or national origin. Similarly, the National Environmental Policy Act (1969) and 1994's Executive Order No. 12898 requires DelDOT to conduct environmental analyses of certain projects and include assessments of impacts on low-income and minority communities (DelDOT, 2024b). This is consistent with the Social Justice type of transportation equity. In all instances, the Department implements broad public engagement practices, which is a Fair Share type of transportation equity, to ensure no groups are systematically excluded from capital project decision making. As DelDOT (2024b) mentions on their website:

Effective transportation decision-making depends on understanding and properly addressing the unique needs of different socioeconomic groups. [Title IV and Executive Order No. 12898] protect diverse segments of the population which have been traditionally underserved within the transportation decision-making process. The FHWA requires that each state have approved procedures to carry out public involvement/public hearing programs. DelDOT strives to provide for early and continuing opportunities for public involvement during project development. For federal-aid projects, public workshops are held where individuals can vote on project alternatives and express concerns about potential environmental and social impacts.

Similarly, the Americans with Disabilities Act (ADA, 1990) stipulates that DelDOT, as a recipient of federal funds, must ensure that its infrastructure is designed and installed as ADA-compliant so individuals with disabilities can access the system and enjoy the benefits of mobility. This mechanism to include Inclusive transportation equity into capital spending includes inspecting projects as they are being constructed to ensure the infrastructure is built to ADA standards. One interviewee noted:

And what that looks like on our federally funded projects, our capital projects, is as those projects are being implemented, that means that we're going out ensuring that the sidewalks and curb ramps and those items are ADA

compliant...They go out and take a look at that, and if there are issues with it being compliant, it is documented and there are discussions between the contractor and our staff on how we can make sure that things are now being brought into compliance.

In addition to federal laws targeting the inclusion of certain communities and stakeholders, federal grants can stipulate that particular underserved and marginalized groups or areas receive the benefits of funding. For example, the U.S. Department of Transportation (2024) administers the discretionary Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant program where “a large percentage of grants support regions defined as historically disadvantaged or areas of persistent poverty.” In 2016, DelDOT applied for and was awarded a grant through the predecessor of the RAISE program, the Transportation Investment Generating Economic Recovery (TIGER) grant program. The funding was used to develop and construct a new commuter rail station and transit hub in the northern Delaware community of Claymont, which is an economically challenged area that was served by a non-ADA compliant rail platform (Owens, 2023). Indeed, one interviewee called the Claymont Transportation Center—financed in part by the federal TIGER grant—an “80 million dollar ADA project,” which represents the Inclusive (ADA accessibility) and Social Justice (investing in disadvantaged communities) types of transportation equity.

Project Identification, Planning, and Design

Within the capital budgeting and expenditure process, before any projects are selected for funding, there is an open call from DelDOT for candidate projects. DelDOT solicits projects from the public, local and county governments, and the MPOs. Sometimes, though not always, submitted project ideas will already have some preliminary planning work completed, either by DelDOT themselves, an MPO, or a local authority. If preliminary planning is completed, planners will have frequently engaged with community members and/or groups in the project area to understand the need and purpose of the project. At project inception, before projects are accepted by DelDOT for review and consideration, affected communities can be involved in planning and project scoping. Furthermore, DelDOT accepts project ideas directly from the public. The Fair Share type of transportation equity is present at this stage because the public and affected people are involved in planning and have an opportunity to shape a project’s need and purpose.

Additional Fair Share expressions of transportation equity are present after DelDOT selects capital projects for funding. Projects that successfully come through the prioritization process (see subsection below) may or may not have preliminary planning completed and may or may not have a well-defined project scope and need. If projects do not have substantial preliminary work done, DelDOT’s design team must engage with affected communities and stakeholders to understand their needs, concerns, and expectations for the project. DelDOT must still engage even when there is a clear purpose and need. As one interviewee said:

So when we go out to groups and...talking to the public, and that might be business owners, property owners, road users from the area, people that are using it. And so you have to weigh all of that. So when you have this purpose and need, you kind of have that initial discussion with those people and say, “This is

the purpose and need. What do you guys see as to what would be a solution here?” So then, sometimes it could be generated solutions, not just by the transportation official, but it could be something that one of those users, or one of those people might actually give you the idea of what to look at and what to research.

Equity Analysis Tool

In 2022, with encouragement from DelDOT leadership, DelDOT’s Division of Transportation Resiliency and Sustainability developed a state-specific Equity Analysis Tool (DelDOT, 2022a). The tool itself is a map that incorporates several datasets and applies a methodology to spatially define Delaware’s Equity Focus Areas (EFA). The datasets utilized in the tool include American Community Survey data (block group level data on race, poverty status, household income, age, and English proficiency) and Delaware land use data delimiting residential areas.⁶ Incorporating this data into a geographic information systems model, DelDOT defines EFAs as either “Moderate” or “Significant” depending on whether the underlying Census data meets particular thresholds. Accordingly, DelDOT (2022a) considers an EFA as “Moderate” if any one of the following conditions is true:

- Percentage of the population in poverty is greater than the state average, AND Blacks or Hispanics or Asians or American Indians are greater than 3 times the state average
- Combined population percentage of Blacks, Hispanics, Asians, and American Indians is greater than 2 times the state average
- Percentage of population in poverty is greater than 2 times the state average
- Mean household income is less than or equal to \$45,958 (65.49% of State mean household income)
- Language isolation is greater than or equal to 15% and less than 25%

DelDOT (2022a) considers an EFA as “Significant” if any one of the following situations is true:

- Percentage of population in poverty is greater than 2 times the state average, AND Blacks or Hispanics or Asians or American Indians are greater than 3 times the state average
- Combined population percentage of Blacks, Hispanics, Asians, and American Indians is greater than 90%
- Percentage of population in poverty is greater than 3 times the state average
- Mean household income is less than or equal to \$28,070 (40.0% of State mean household income)
- Language isolation is greater than or equal to 25%

The tool was developed to help inform infrastructure investments and decision making in the Department, provide information for public outreach and engagement, and to identify

⁶ DelDOT identifies age as an input into the Equity Analysis Tool but age is not a threshold variable used to define an Equity Focus Area.

“disadvantaged communities” that conform to the spirit and intent of the federal Justice 40 Initiative (DelDOT, 2022a).

Although DelDOT developed the Equity Analysis Tool with the intent of informing infrastructure investments in ways that enhance equity, there is currently no official internal procedure on how the tool itself should be applied to rank or select capital projects (DelDOT, 2022b). One interviewee said:

We don't currently have a policy. We have a directive to utilize this tool, and we're pushing the use of the tool. But there isn't a DelDOT policy specifically. The Federal funds that we receive, there is Justice 40 related to the receipt of Federal funds. But Justice 40 doesn't say 40% of financial [expenditures]. It says overall benefits, right? And so how do you measure that? And some of our disadvantaged communities and Equity Focus Areas do not sit on federally eligible roads. And so you can't equate a benefit to a dollar in some instances. We have to be creative about how we approach that.

However, DelDOT staff in multiple Divisions—especially the Division of Transportation Resiliency and Sustainability, the Division of Planning, and the Division of Transportation Solutions (responsible for the bridge and paving programs)—are actively exploring opportunities to formally integrate the Equity Analysis Tool into their capital programs and across the different capital project categories. For example, in the following subsection on the project prioritization criteria, the Equity Analysis Tool is explained even though it is not currently operational.

From a transportation equity perspective, the data used to create the Equity Analysis Tool aligns with two vertical equity types: Inclusivity and Social Justice. Inclusive transportation equity means that all members, regardless of special need, are accommodated by transportation systems and infrastructures. The English proficiency data, and the corresponding language isolation threshold in the Equity Analysis Tool model, represent this inclusive transportation equity. The other data on race, poverty, and household income, and the corresponding thresholds, represent a Social Justice type of transportation equity, since minorities and communities of lower socioeconomic status are traditionally disadvantaged by transportation systems.

Project Prioritization Criteria

DelDOT and two of Delaware’s MPOs covering New Castle and Kent Counties developed a set of weighted project prioritization criteria (PPC) that are integrated into models that rank and compare candidate projects against each other (DelDOT, 2020; Dover/Kent County MPO, 2022; WILMAPCO, 2008). This is done to prioritize projects for the CTP given the financial limitations of the capital budget. All else being equal, the projects that receive the highest overall “technical score,” as determined by the models and their weighted PPC, are deemed to be most worthy of funding. Because DelDOT is the implementing agency, their model supersedes the MPO models. The MPOs perform their own ranking and submit their candidate projects, in ranked order, to DelDOT for inclusion in DelDOT’s model under a “local priority” criterion. In both DelDOT and the MPO models, some of the PPC are data-driven quantitative criteria and others are qualitative, with scores determined by an advisory council. For example, in DelDOT’s

latest model, the safety criterion uses crash data while the environmental impact criterion is assigned a numerical score following a discussion of projects by key DelDOT staff.

DelDOT's capital project prioritization process is a state requirement. According to TITLE 29 CHAPTER 84 § 8419 of Delaware State Code, the DelDOT must

Establish a method of determining current needs and costs of the entire multi-modal transportation requirements in the State which will be utilized in allocating capital funds for the Capital Transportation Program... [DelDOT must also] establish a formula-based process which shall be used for setting priorities on all Department transportation projects and which shall consider, but not be limited to the following: Safety, service and condition factors; social, economic and environmental factors; long range transportation plans and comprehensive land use plans; and continuity of improvement.

Notably, the language in the state code says project priority criteria "shall [i.e. must] consider... safety, service and condition factors; social, economic, and environmental factors." Although the language makes mention of "social factors," there is no explicit requirement that transportation equity must be a criterion for capital project prioritization.

However, there are PPC within DelDOT and the MPO's models that are equity-centric. One of the state's two MPOs, the Wilmington Area Planning Council (WIMAPCO), has a model with criteria for environmental justice and transit justice, and higher scores are assigned to those criteria based on whether a candidate project improves environmental quality in low-income/high minority areas or enhances non-motorized and transit options in mobility constrained areas, respectively (WILMAPCO, 2008). In this example, the environmental justice criterion operationalizes the Social Justice type of equity since it prioritizes capital projects in underserved and marginalized communities. The transit justice criterion, on the other hand, operationalizes both Fair Share and Inclusivity types of transportation equity since it prioritizes capital projects that enhance system accessibility (the Inclusivity type) options for non-drivers (the Inclusivity and Fair Share types). In DelDOT's model, there is a criterion for social and health impacts (DelDOT, 2020). DelDOT uses data from the federal Environmental Protection Agency's EJScreen tool and prioritizes capital projects in areas with high percentages of low-income and minority populations. This is another example of the Social Justice type of transportation equity. Similar to WILMAPCO's transportation justice criteria, DelDOT also has a multi-modal and accessibility criteria that prioritizes capital projects that provide additional opportunities for pedestrians, cyclists, and mobility-constrained communities, which aligns with the Fair Share (non-drivers) and Inclusivity (access, multi-modal) types of transportation equity.

During the interviews, an additional expression of transportation equity was identified in DelDOT's model that is not explicitly represented in their PPC. Within the "economic impact" criteria, Delaware's three counties are compartmentalized such that projects in a particular county only compete against other projects in the same county. This was done in a spirit of fairness because candidate projects in New Castle County, the state's most urban and economically prosperous county, would easily outcompete projects in the other two rural counties on this criterion. An interview mentioned:

Each county will have a project that ranks high every single year, at least within this category. If we put it into a statewide competition, nobody can compete with the projects happening in New Castle County simply because of their wealth, their size. It's just that simple. That is how economics works.

Thus, there are Fair Share (even geographic distribution across the state) and Social Justice (economic development for disadvantaged counties) components of transportation equity embedded in the economic impact criteria.

Interviewees also indicated that DelDOT is exploring changes to their PPC and model. One expected change is to transition to a more data-driven project prioritization model where the qualitative criteria become quantitatively scored. Second, there is conversation among staff about if, and how, the Equity Analysis Tool could be leveraged and integrated into the model (Steinebach, 2024). Third, DelDOT is considering adjusting the weights of the different PPC. If they were to increase the weights for the criteria that explicitly or implicitly prioritize equity (social and health impact, multi-modal and accessibility impact, economic impact), then capital projects and related expenditures would further enhance transportation equity (Krapp et al., 2021).

Disadvantaged Business Enterprise Program

Originally started in 1980 as a program to support minority- and women-owned businesses, the U.S. Department of Transportation (2022a) oversees the Disadvantaged Business Enterprise (DBE) Program and requires states receiving federal transportation funding to support increased participation of “disadvantaged businesses” in state and local procurement and contracting. Accordingly, DelDOT (2017, p. 8) runs their DBE program out of their Office of Civil Rights and defines a disadvantaged business as:

A for-profit small business concern that is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

DelDOT’s (2023a, p. 1) program recently established a Fiscal Year 2023-2025 “overall DBE goal of 14.19%,” meaning that percentage of the total dollars spent on FHWA-funded projects (for fiscal years 2023 through 2025) should flow to prime and subcontractors who are registered DBEs. To help meet that goal, DelDOT’s DBE program will establish a DBE goal on a per-project basis and include the expected percentage of DBE participation in the request for proposals. The prime contractors who are awarded the projects, assuming they are not DBEs themselves, are able to access the Civil Rights Office-maintained database of registered DBEs which lists the kinds of services and products they offer. Prime contractors must then make a good faith effort to achieve the project DBE goal by soliciting bids from the registered DBE subcontractors. DelDOT’s DBE program also does outreach and training sessions to both prime contractors and the DBEs themselves about how the DBE program works, how to navigate its

processes and meet its goals, and match prime and subcontractors to ensure greater receipt of capital expenditures by DBEs.

Based on DelDOT's definition of a DBE as one owned by groups who are "socially and economically disadvantaged," their DBE program is a clear operationalization of the Social Justice type of transportation equity.

Discussion

It is notable that key personnel at DelDOT and Delaware's MPOs define and operationalize transportation equity in similar ways, specifically along Fair Share, Inclusivity, and Social Justice lenses. This suggests that the agency's conceptual frameworks for transportation equity align with their efforts to put the concept into practice. It also suggests, as noted below, that there is room to further enhance transportation equity along External Cost and Affordability lines.

Unpacking the Conceptualization of Transportation Equity

When prompted, interviewees mostly conceptualized transportation equity in terms of Fair Share, Inclusivity, and Social Justice, while External Cost and Affordability were less well represented. There were scattered mentions of the importance of mitigating the negative externalities of the transportation system, such as reducing pollution in communities and travel time for users, but these references to an External Cost form of equity were rare. Similarly, with Affordability, there were very few mentions of transportation equity that referenced a financial cost to using/accessing the system. DelDOT does operate bus transit and paratransit services in Delaware through DART but only one interviewee was directly involved in that part of the Department. The other interviewees were administrators—planners, engineers, and designers—who had positions of authority but were not intimately involved with setting transit prices and subsidies or otherwise influencing financial/fare policies that would affect transportation affordability. It is therefore unsurprising, given the sample for this research, that the Affordability type of equity was rarely mentioned.

Consistent with the amorphous interpretation of what transportation equity means in theory and practice, there was a lack of specificity whenever equity was mentioned outside of the explicit prompt to define the term. Previous research by Barajas et. al (2022) arrived at a similar result. In this research, interviewees would frequently use the word "equity" during the interview, and the expression served to mean generally fair transportation outcomes. For the most part there was a presumption that the term could be used unambiguously. However, some interviewees voiced their own struggle to understand the concept and began to deconstruct the contested nature of equity (Stone, 2012). One interviewee quipped, "Whose equity are we talking about?" while another said:

Different groups can experience different transportation inequities. So, it is important that equity analyses examine these groups separately—by race and ethnicity, by class, age, physical ability, et cetera—and identify the unique transportation inequities that they experience.

Regarding the Social Justice type of transportation equity, interviewees conceptualized it largely in terms of improving outcomes for historically underserved communities. In addition to this element, Litman's framework also defines Social Justice in restorative ways, such as by rectifying harms committed in the past by transportation planners and administrators. With the exception of the interviewee quoted earlier in the paper who referenced bulldozing communities in Wilmington, DE to clear space for the construction of Interstate 95, restorative transportation justice was absent from interviewees' framing. This is consistent with research from Van Dort et al. (2019, p. 24) who find that administrators are more "focus[ed] on addressing broad social inequalities by means of improvements to the transportation system than on redressing inequities directly created by the transportation system itself."

Unpacking the Operationalization of Equity in Transportation

One of the most common techniques employed by SDOTs to advance transportation equity is to engage diverse stakeholders in the planning phase of transportation projects (Barajas et al., 2022). When viewed through the Fair Share lens of transportation equity offered by Litman, this research arrives at a similar conclusion, as nearly all interviewees highlighted efforts undertaken by DelDOT and the MPOs to solicit and amplify the voices of underrepresented and marginalized communities. Although there are challenges to reaching and hearing from marginalized groups (see next subsection on Barriers to Transportation Equity), interviewees highlighted that the COVID-19 pandemic forced DelDOT to become creative with virtual meetings and strategies for dialoguing with the public. One interviewee contended DelDOT's engagement efforts became more effective with a shift to virtual formats:

We were actually getting a much, much wider group of people. Sort of the general public. They don't have an hour, you know, every eight weeks to come out to [an in-person] workshop or a working group. But they do have 45 min to click on a virtual meeting and hear the slides that we're showing and, you know, hear some of what their neighbors are saying. So I think honestly, the public involvement basically tripled...And with our Public Input software, we're able to have three slides and then some type of a process for "Well, how do you feel about that? How would you rank these three things?" It's a way of assessing what is important to them as a two-way virtual meeting.

In some ways, DelDOT could be considered a leader among peers when it comes to advancing equity through capital expenditures. As noted earlier, DelDOT's project prioritization criteria, which were last updated in 2020 before the federal Justice40 initiative was launched, already includes three criteria that advance transportation equity: multi-modal mobility and access, social impact and public health, and economic competitiveness. Research by Krapp et al. (2021, p. 188) found that just over half of MPO project prioritization criteria in their sample include at least one equity element, with no MPO including more than three. In addition to the existing criteria that feeds their project prioritization process, DelDOT is also planning to incorporate their Equity Analysis Tool and increase the weight of the category within the model (Steinebach, 2024). Thus, DelDOT's efforts are comparable to the leading MPOs when it comes to advancing transportation equity through its project prioritization criteria. Considering that MPOs were found to be ahead of SDOTs in fostering transportation equity programs and activities, DelDOT's efforts and ambitions are notable (Van Dort et al., 2019, p. 21).

Barriers to Transportation Equity

Despite DelDOT's desire and attempts to operationalize equity in capital expenditures, interviewees highlighted a number of challenges that directly impede such efforts. This subsection discusses the barriers to transportation equity that were articulated by multiple interviewees.

Data Barriers

The ability to procure, maintain, and utilize useful equity-related data was cited by a number of interviewees as a concern. This is a particularly salient challenge since DelDOT intends to transition the project prioritization criteria and project ranking process in a quantitative direction, and they also intend to leverage the Equity Analysis Tool to inform capital decision-making. Regarding the PPC, several interviewees identified data availability, granularity, and quality as a challenge. This finding is consistent with previous research on efforts to operationalize transportation equity in planning and capital projects (Bailey & Grossman, 2023; Barajas et al., 2022; Cantilina et al., 2021; Geitebruegge, 2024; Yarbrough & Smith-Colin, 2023).

The quality and reliability of economic, demographic, land use, and mobility data were all singled out by multiple interviewees as being questionable. If DelDOT cannot procure high quality data, their project prioritization model will generate project recommendations in ways that misallocate scarce resources and produce suboptimal outcomes from a transportation equity lens. One interviewee said, with specific reference to the PPC and the kind of equity-relevant datasets that might feed into DelDOT's model:

The problem with a lot of the...data is they collect it whenever they feel like it, or whenever some foundation gives them extra money....That's a lack of consistency that we cannot accept. We cannot accept that it will be collected whenever you want to, or maybe once every five years. And because of privacy issues, we need data to not be at the county level. We can accept at the zip code level, and smaller than zip codes is even better.

Even if the data are high quality and at the appropriate spatial scale, it is difficult to determine how particular capital projects or investment decisions will impact transportation equity. For example, with the Equity Analysis Tool, the data and the tool are not predictive and there is uncertainty around whether a particular capital project's outcomes will enhance transportation equity. One interviewee summed up this challenge by saying:

We are doing projects in high poverty areas, high areas of minorities, or high areas of English as a second language, whatever thing you want to pick. There's a little bit of an assumption that those folks don't leave those areas to go do things. And so, yes, you might live in an Equity Focus Area, but you work in a non-Equity Focus Area, and you have to get to that location, and we haven't quite cracked how you address that. Let's just say we do everything in the Equity Focus Areas. There's sidewalks, there's great pavements, there's great bridges, there's transit, there's all of these things. Are we done working? Have we made the lives of those folks better? Well, yeah, while they're doing things in their neighborhood, but

when they leave their neighborhood, you get to the road that has lots of potholes, and it causes you to need tire realignments. So I think there's still a little bit of work to be done because we can't just say, "Here's the [Equity Focus] Area, and we want to make sure that this is good, and then everything's good," because that's not really true.

Public Engagement Barriers

Another challenge to incorporating transportation equity that was cited by many interviewees was a disparity in the public's and DelDOT's capacity, particularly with certain communities, to substantively engage one another during planning, design, and implementation phases of a project. There are several aspects of this public engagement challenge, as expressed by the interviewees, that merit further discussion.

First, multiple interviewees highlighted the critical importance of engaging in dialogue with underrepresented groups and communities in the planning process and how those dialogues are useful and effective at steering projects in directions that deliver more equitable outcomes. Procedural equity, where stakeholders have an opportunity to influence policy and administrative choices, is closely related to the distribution of scarce resources, thus public engagement can directly shape future distributional decisions about where and how benefits and costs of infrastructure investments accrue to different groups. Yet despite interviewee acknowledgement of the value of broad-based public participation processes, they lamented practical and logistical barriers to executing engagement opportunities that attract and amplify underrepresented voices, with ultimately negative consequences for transportation equity.

The following are examples of practical public engagement challenges that were highlighted by multiple interviewees: low-income individuals may have jobs that require them to work outside of normal business hours and hence may not be available to participate in evening workshops; families with young children may not have the financial or social resources to provide child care coverage in order to attend a public meeting; non-native English speakers might be limited in their ability to participate in English-only events; and undocumented immigrants may be wary of interacting with government agencies. Other underrepresented populations face unique logistical challenges to participation, as one interviewee said:

I think the biggest barrier for us is on the outreach. For example, we're doing a project that's all about biking and walking and connectivity to daily services. And we know that there is an unhoused population who are solely reliant on walking and biking and public transportation. But to get to those folks and really have them tell us what their needs are is practically impossible... And we have an Amish population and...they are a shared road user. And yet getting to them and really being able to engage in a conversation and hearing what their needs are, and understanding what their barriers are... It's not like we're sending them an email, right?

As a corollary, interviewees likewise spoke about well-resourced groups and communities having excess capacity to engage and ultimately shape the directions and outcomes of transportation projects, often in ways that are incompatible with transportation equity. One

interviewee is quoted as saying the “civic elite” are frequent and powerful voices at public meetings, workshops, and other engagement opportunities. According to some interviewees, these well-resourced individuals and communities are also better connected politically and can operate outside of traditional public engagement efforts:

And it winds up that those loudest voices that are, you know, reaching out through the political streams and are not the ones who are challenged from an equity standpoint. They're the ones who are empowered and probably in pretty good shape from a transportation standpoint, they just know how to work the system.

Although this research offers no empirical evidence to support the interviewee claims, their assertions that marginalized groups are underrepresented in the public engagement processes while well-resourced groups are overrepresented aligns with the literature of public engagement processes generally and of transportation planning processes in particular (Innes & Booher, 2004; Karner et al., 2020; Karner & Marcantonio, 2018; Linovski & Baker, 2023).

Conclusion and Next Steps

Equity as a policy value involves two primary elements: a procedural element (how interested or affected stakeholders are involved in decision-making) and a distributional element (how decisions confer benefits and spread costs across different groups, especially historically disadvantaged or disenfranchised populations).

This project explored how key personnel in DelDOT conceptualized and operationalized equity in their decision-making for capital expenditures. The findings suggest there is congruence between their conceptualization of transportation equity and the practical mechanisms employed to alter capital spending in ways that deliver equitable processes and outcomes. Additionally, the interviews revealed procedural and distributional elements that guided decision-making. However, the primary focus on equity in capital expenditures appeared to be distributional and specifically addressed the accessibility needs of underserved populations and disadvantaged communities. Where discussed, the procedural element largely illuminated conventional processes transportation agencies use to engage stakeholders. As described above, the analysis highlights interviewee concerns about the inclusiveness of these processes in reaching disadvantaged or disaffected populations, especially in soliciting the voices of persons not typically heard in state transportation planning and design processes.

Next steps would further investigate and systematically evaluate equity in the public engagement processes used in state transportation planning and project design. For example, some states have taken the deliberate step to compensate their participants for their time engaging in transportation planning, including this item in their state’s public involvement plan (Bailey & Grossman, 2023). This next project would extend beyond Delaware to include other states within the mid-Atlantic region, allowing cross-state comparisons in engagement processes, practices, and effectiveness. Importantly, this evaluation would not critique state agencies’ operations, only characterize their processes in a constructive fashion that could further enhance equitable engagement. This evaluation is lacking in transportation planning scholarship and practice (Litman, 2024).

Additionally, future comparative research could engage more directly with the design and operationalization of equity assessment tools to be used within the SDOT's project prioritization and budgeting processes. This research highlights that DelDOT is currently engaged in a deliberative process regarding how to best incorporate its EFAs in project prioritization. Other transportation planners are also actively developing their own equity assessment tools, as noted by panelists at the 2024 Transportation Research Board's Advancing Transportation Equity Conference (Eggleston et al., 2024). Further comparative learning across states as to the specifics could be beneficial. Potential funders could be enlisted to support regular data collection and updates, to address the concerns as to data quality and availability as mentioned above.

Another avenue for future research could be to investigate the societal outcomes of the operationalization of equity in the capital expenditure process, as suggested by one of the research participants. Are communities "better off" from an equity perspective following equity-informed capital investments? Such outcome assessments are difficult given that many other factors influence equity outcomes besides transportation investments, and the impacts of investments take time to manifest. Nevertheless, careful deliberation on how to properly assess the outcomes of equity-informed activities within the state could be a valuable exercise to guide further data collection and analysis processes.

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Appendix

PART 1: Thinking about Equity

1. What is your name and title?
 1. How long have you been at DelDOT/MPO and how long have you been in your current role?
 1. How would you describe your current role? What are your responsibilities?
2. For you, what does equity in transportation mean?
 1. Where does this definition/understanding come from? (personal, institutional, external, etc?)
 1. Are there other elements/dimensions of equity in transportation that you haven't already mentioned or talked about that you want to mention before we move on?

PART 2: Operationalizing Transportation Equity

1. How do you (and/or your team) incorporate transportation equity as a criterion in your capital budget requests? (alternatively: How do you incorporate transportation equity as a criterion to influence the capital budget?)
2. Can you provide examples?
3. Are there barriers (institutional, regulatory, political, etc.) that limit the incorporation of transportation equity as a criterion to influence capital budget expenditures?

PART 3: Next Steps

1. Who else at DelDOT should we be speaking to about this?
2. Is there anyone outside of DelDOT that we should be speaking to? Maybe at the MPOs or other state agencies?