



Roadway.3—A Work in Progress Continues

A Town+Gown Working Group Meeting

DCAS Bid Room@One Center Street, 18th floor

Thursday, April 23, 2015, 8:30 a.m. to 10:30 a.m.

A G E N D A

1. Christopher Eshleman/City Council-Finance presents on the life cycle cost benefit model permitting comparison of green infrastructure “add-on” options (bioswales and permeable pavement gutters) to roadway reconstruction projects, completed in connection with his Columbia/SIPA capstone project.
2. Jaime Stein/Pratt presents on fall 2013 Right of Way signage project
3. Roundtable discussion about the complete roadway—side to side and top to bottom—looking toward a cost benefit model and unified communications for all aspects of the complete roadway
 - infographic of the complete roadway
 - conceptual cost benefit model (Mark Seaman/Port Authority of New York and New Jersey)
 - discussion of feasible action and future research opportunities, with associated data issues

The Promise of Viewing the “Whole Street” for Planning, Financing, Budgeting and Communications

Where We Have Been So Far. This working group meeting represents what we hope will be a continuation of a series of action research cycles focusing on feasible actions and additional research to pursue that originated with a 2010-2011 Town+Gown capstone project. This project with NYU/Wagner Capstone students explored how the City might incorporate long-term life cycle cost and full cost/benefit analyses to evaluate proposed environmentally sustainable roadway projects. A Town+Gown symposium event on February 22, 2012, used that project as the foundation to explore where the actual data might reside at agencies to help refine the model developed in the capstone so that it could be used in planning and budgeting.¹ The conversation at that event started with the technical and political aspects of life cycle and cost-benefit analyses in public capital programs and decidedly morphed into a collectively-experienced introduction to the “on the ground” reality of New York City streets. The perception that the City’s roadway infrastructure rarely approaches its technical useful life period for a variety of unresolved reasons, including the volume of cuts made into the roadway on behalf of all the utilities, emerged as one reason rendering the explicit collection of certain life cycle cost data beside the point. Historical practices under the roadway and related policies, involving a complex set of relationships among the City, as owner of the streets on behalf of the public, and the private and public utilities operating beneath those streets, emerged as an area for further research because they appeared to be directly connected to an apparently dysfunctional data environment.

In 2012-2013, extensive legal policy research performed by several Brooklyn Law School clinic students focused on understanding the nature of the regulatory environment in which the private utilities operate. At a follow up Town+Gown symposium event on February 12, 2013,² we began to discuss the implications raised by the complex set of historical legal relationships among the private utilities and the City that are governed by state law and/or public utility regulatory commission law as well as local law and/or agreement by the parties. The current roadway paradigm consists of public ownership of the roadway itself, from the road surface on through to the dirt beneath, in trust for use by the public, with multiple subsurface public uses (mass transit and water and sewer facilities) and multiple private uses that are publicly regulated at federal and state levels and also regulated at the local level via various contract instruments.³ Operational and financial impacts that a multi-purpose utility corridor would impose on a hypothetical horizontally-integrated private utility with multiple commodities separately regulated at the federal and state levels of government revealed systemic elements that either create or exacerbate the conditions for recursive collective action⁴ under the City’s

¹ See

http://www.nyc.gov/html/ddc/downloads/pdf/town_and_gown/1.%20CURRENT_PROGRAM/6.%20PRECIS_3.pdf.

² See http://www.nyc.gov/html/ddc/downloads/pdf/town_and_gown/Symposia/Roadway.2.pdf.

³ These would be franchises, which are a stylized form of contract, as well as regular contracts.

⁴ A problem created by “aggregating multiple individually rational decisions into collectively self-defeating or event self-worsening outcomes” [which can be solved by] the presence of a collective agent empowered to act on

roadways. These systemic elements included multiple commodities and provider entities individually operating within the same constrained physical subterranean spaces and multiple regulation at all levels of government—federal, state and local—of each set of commodity and provider entities. Focusing on the recursive collective action problem through the lens of public policy analysis, the current roadway paradigm creates negative externalities that can be translated quantitatively into costs that cannot be otherwise avoided under the current paradigm. These costs of repeated roadway repairs and roadway reconstruction projects that cannot approach their technical useful lives are financed at the municipal level by taxpayers and the costs of repeated repairs to and expansion of private utility infrastructure (both of which require digging into and repairing the roadway) and protecting existing utility infrastructure during the City’s roadway reconstruction projects, are financed by the same people or entities as utility ratepayers. As with the first symposium, lack of available data retarded continued progress.

Since these projects were completed, however, two Town+Gown projects have been able to move the needle ahead and they are briefly described below. At this working group event, the researchers will present on these projects.

Life Cycle Cost Analysis and Green Infrastructure in New York City. This Columbia/SIPA Capstone project followed in the footsteps of the Town+Gown life cycle cost analysis project for sustainable roadway design discussed above and a Town+Gown life cycle cost analysis project by a University of Buffalo/Planning graduate student, who interned at DDC during the summer of 2012, that attempted to develop a “bottom up” life cycle cost analysis of two sustainable roadway design “add-ons”—bioswales and permeable pavement gutters—to standard roadway reconstruction projects. As the City began to pilot and experiment with such “green infrastructure” elements with the Department of Environmental Protection’s *2010 Green Infrastructure Plan*, data on the two elements began to become available. With the City’s policy of implementing “green infrastructure” aggressively pursuant to a consent decree it signed with the State Department of Environmental Conservation in March 2012, the problem with data that faced the Wagner Capstone Team in 2011 appeared slowly to be resolved with respect to the “green infrastructure” elements of the roadway, and a feasible life cycle cost analysis model was in reach for those roadway elements.

The model was designed in Excel to be both simple and accessible and it incorporated standard capital asset life cycle methodology and theory to permit capital planners and budget analysts to conduct cost effectiveness analysis that would capture discounted initial and life cycle costs, such as operations and maintenance and replacement of various project options *as well as* their physical efficiencies, which, in the case of green infrastructure, would consist of water capture under several rainfall scenarios. Using data from City agencies where available and comparable data from elsewhere as proxies, the model permitted a cost effectiveness analysis, for a one-

behalf of all parties to optimize joint outcomes.” See Robert C. Hockett, *It Takes a Village: Municipal Condemnation Proceedings and Public/Private Partnerships for Mortgage Loan Modification, Value Preservation and Economic Recovery*, Cornell Law School, Legal Studies Research Paper Series, No. 12-12 (<http://ssrn.com/abstract=2038029>), p. 2.

inch rainfall, of a bioswale project in Brooklyn and a permeable pavement project in Queens. In the case of this project, it was not possible to include all benefits nor was it possible to test the range of rain events that are likely, though those limitations would be surmountable were City agencies and oversights to adapt this model for their use. This most recent life cycle project in the series of projects in Town+Gown over the last four years, during which time data has become increasingly available, points in the direction of feasibility of using life cycle modeling in capital planning and budgeting, certainly for green infrastructure and also for all the elements of the roadway.

Making the Invisible Visible. In fall 2013, three teams of Pratt students focused on *Signage for Infrastructural and Public Right of Way Projects in New York City*. Millions of New Yorkers encounter public infrastructure projects in the public right of way (PROW) every day as they navigate the City. Often these projects would benefit from further explanation by the City—the intention of either the design process or the physical manifestation of the project is not directly visible to the passerby. These countless interactions thus represent moments of opportunity for the City to engage, inform and even elicit feedback from its communities. Good signage, a definition explored during this class, can help provide this explanation and render these casual, everyday interactions into teaching moments with the potential to increase public awareness and stewardship. The impact of Superstorm Sandy on the case study neighborhoods—Red Hook, The Rockaways and Coney Island—moved attention from the types of PROW infrastructure construction-related communications, as originally planned, toward several broader directions. Underlying the students’ work was the premise that comprehensive approaches that take both human welfare and resource limitations at the local and global levels into account, are necessary for local planners to build and maintain sustainable communities. The students focused on PROW communications aimed at creating a more sustainable future. With assistance from City agencies and using the types of signage currently in place, the student teams generated prototype design projects aimed at increasing community outreach and education focusing on sustainability in neighborhoods recovering from breaches in resiliency.

The Coney Island project used Kaiser Park as the site for an interactive signage system that would communicate the need for coastal infrastructure in Kaiser Park due to the vulnerable nature of the shoreline and its effect on the community, as well as include public art projects, landscape interventions, earth art and infographics. The Red Hook project used DOT's "Look" campaign, a signage project aimed at increasing environmental awareness in crosswalks, as the foundation for their model to bring attention to green infrastructure projects in Red Hook, providing an educational opportunity for the community to learn about how stormwater is managed, how this management process is impacted during a small or large scale rain event, and what they can do in their everyday lives to ameliorate some of these impacts on the system during rain events. The Rockaways project proposed a connected network of interactive signage resource stations, including wayfinding, emergency response, governmental community outreach, community engagement and education features, to improve communication and preparedness by making climate change preparedness visible, providing valuable climate change-related information while emphasizing community engagement.

Chart of Identified Options as Placeholder for Discussion Purposes

During the course of the research projects summarized above, symposium events and separate conversations, various operational and design options have surfaced as ways to resolve aspects of the recursive collective action problem of the City’s roadways. The following evaluative issues would provide a basis for considering the potential strategies in the chart below:

- Comprehensiveness of solution/relation to geospatial incidence
- Technical feasibility—initial and ongoing
- Implementation
 - Operations/administration
 - coordination within city and among city and utilities
 - enforcement
 - Costs
 - life cycle cost and cost benefit analyses (avoidable costs)
 - Finance
 - public-private infrastructure finance issues

Potential Strategies
<ul style="list-style-type: none"> • <i>Protocols</i>
Defined utility lane protocol (past practice revived as unimplemented Lower Manhattan Utility Raceway concept)
Moratorium period for utility work (emergencies excepted) after road reconstruction; with fines for violation
Mandated cut and repair methodologies by utility contractors

Franchises and contracts revision ⁵
<ul style="list-style-type: none"> • <i>Design/Technology</i>
Multi-purpose utility corridors
Parametric solid modeling (building information modeling) for horizontal structures
Pre-cast pavement slabs
Utilities in sidewalks
City-wide mapping technology as both coordination and governance tool

⁵ Impact of federal regulations (federal pre-emption) makes local contracts between regulated entity and municipality a feasible mechanism to resolve some operational issues under the roadway; historical practice at the City has been varied.