Waterfront Development in a Changing Climate

A DVRPC Climate Adaptation Forum | June 20, 2017 | Meeting Summary

Introduction

Rob Graff, the Manager of DVRPC's Office of Energy & Climate Change Initiatives, welcomed attendees. Graff explained that the panel was the third in a series of Climate Action forums, following a forum on Forests, Urban Trees, and Climate Change held in October 2016 and a forum on Climate Change and Public Health held in February 2017. He gave a brief overview of the work that DVRPC is doing related to climate change and waterfront impacts and then outlined the meeting agenda.

Presentations

Michael Tantala, P.E.: "Philadelphia is a Coastal City"

Michael Tantala, P.E. is a Principal with Tantala Associates, a consulting-engineering firm. He presented on his resiliency-related work, explained the coastal hazards facing Philadelphia due to a changing climate, and discussed a studio project with graduate students at the University of Pennsylvania School of Design.

Tantala described "On the Water," a project, he worked on in partnership with the Princeton University School of Architecture. "On the Water" modeled stormwater risk and imagined a "soft infrastructure" for the New York/New Jersey Upper Bay. The project involved the use of GIS-generated models to understand the potential impacts of flooding on infrastructure, ecosystems, and coastal communities.

Tantala also presented on the Structures of Coastal Resilience (SCR) project funded by the Rockefeller Foundation, which assessed the risk of storm surges and proposed resilient designs for urban coastal regions in the North Atlantic, including Norfolk, VA; Atlantic City, NJ; Jamaica Bay, NY; and Narragansett Bay, RI. SCR focused on three principles for flood-resistant design: attenuation of wave energy, protection of flood structures, and planning for controlled flooding. The project used remote sensing to model past flooding events, map storm surges, and calculate water volume to drive design and practice.

Tantala noted that Philadelphia is a coastal city because of its location in the Delaware Estuary. He presented on three thematic trends related to climate change and their impacts on Philadelphia: New Normals, Changing Extremes, and Rising Seas. Tantala argued that the city will see a tenfold increase in tidal flooding events over the next 30 years, from an average of 19 per year to an average of 200 per year. As temperatures increase, precipitation will increase as well, resulting in snowier winters, warmer summers, and rainier wet days. Philadelphia is already experiencing these changes. Tantala argued that future designs have to look 50 to100 years ahead in order to adequately account for the impact of sea level rise on the Delaware and Schuylkill Rivers, which will increase the depth and extent of flooding in

the city. He showed the outcomes of projections using different models, and explained the importance of knowing potential hazards. Lastly, he explained the preparedness, disaster, and recovery process.

Tantala concluded by presenting on "Testing the Waters: Philly Futures," an architectural studio held at the University of Pennsylvania School of Design in spring 2017. In the studio, students were assigned ZIP codes of communities along the waterfront and modeled sea level rise based on three different scenarios: disaster, adaptation, and retreat. They were asked to create design responses for existing structures, infrastructure, and land uses that prioritized different ways of looking at the land-water transition zone.

Kristin Baja, CFM: "Planning, Implementation and Integration in Baltimore City"

Kristin Baja, CFM is the Climate Resilience Officer for the Urban Sustainability Directors Network and was formerly a Climate and Resilience Planner with the City of Baltimore Office of Sustainability. She presented on the hazards faced by Baltimore due to climate change as well as the planning, implementation, and integration work that the city has been doing.

Baja noted that Baltimore is at the base of four major watersheds and is on the Chesapeake Bay, which means that it experiences both riverine and tidal flooding. The city has a unique approach to hazard mitigation planning because it incorporates future-oriented climate adaptation planning with a traditional analysis of past and current events. The result is a comprehensive approach to disaster preparedness (also framed as resilience) that focuses on shocks (single events) as well as stresses (recurring factors). Baja explained some of the specific impacts from climate change on Baltimore, including extreme heat, sea level rise, and tidal flooding, and also mentioned the importance of acknowledging the discriminatory history of past planning practices in the city. The city has decided to use equity as a lens, which entails prioritizing neighborhoods that have historically experienced disinvestment as well as focusing on building proactive partnerships and engaging the community at the beginning of projects, rather than at the end.

Baja then talked about Baltimore's hazard mitigation planning process, which begins with hazard identification, progresses to vulnerability assessment, followed by impacts assessment, and finally plan development. Rather than structure its plan around specific hazards, the city organized recommended strategies and actions around four categories (Infrastructure, Buildings, Natural Systems, and Public Services) to better address the impacts of multiple hazards. Baltimore also focused on mapping historic buildings, conducting engineering studies on critical facilities (e.g. the wastewater treatment plant), and assessing hard and soft infrastructure options along the waterfront. The result was the City of Baltimore Disaster Preparedness Plan, which was adopted unanimously in October 2013.

Baja then talked about the implementation of the plan, which identified 231 actions. The city used a crosswalk strategy to identify overlaps with existing city plans and enhance current planning efforts. She also talked about the city's response to floodplain management, which included changing the flood code regulations. Baltimore now regulates to the extent of the 500-year floodplain citywide and requires critical facilities to be built with three feet of freeboard. The city is also preparing a flood design manual for historic structures. Baja described how options for mitigation are moving away from systems that

require human intervention to multifunctional, automatic solutions. She also recommended that municipalities participate in the National Flood Insurance Program's (NFIP) Community Rating System (CRS), which incentivizes floodplain management activities that exceed the minimum NFIP requirements by reducing flood insurance rates commensurate with reduced flood risk.

Baja concluded her presentation by discussing the integration of climate adaptation planning with capital improvement projects. She also talked about the importance of in-depth staff trainings on climate adaptation and equity and inclusion as well as community outreach strategies that center on peer-to-peer engagement.

Roland Lewis: "Shape Your Waterfront: How to Promote Access, Resilience, and Ecology at the Water's Edge"

Roland Lewis is the President and CEO of The Waterfront Alliance, which is based in New York City and focuses its work on the New York Harbor. He presented on the Waterfront Edge Design Guidelines, a certification program for waterfront development design.

Lewis argued that the key to his organization's success has been building a constituency of organizations that care about the waterfront. He sees Brooklyn Bridge Park as an ideal urban waterfront because it balances access and multifunctionality with habitat and resiliency. Former mayor Michael Bloomberg developed Vision 2020: New York City Comprehensive Waterfront Plan, which recommended increasing the consistency and predictability of waterfront projects. The Waterfront Alliance identified a need for design guidelines since most guidance was proscriptive, rather than prescriptive. As a result, they created the Waterfront Edge Design Guidelines (WEDG), a voluntary, science-based incentive system. Projects are awarded credits through categories such as Site Selection and Planning, Ecology and Habitat, and Operations and Maintenance. The WEDG are used to encourage better engagement, improve practice, and enhance communication between government regulators, professional experts, stakeholders, and other community members. The Waterfront Alliance is currently working with the Soundview neighborhood in the Bronx to implement WEDG and improve its functionality as a resource for communities. They are also working with a variety of funders, including the Rockefeller Foundation and the Doris Duke Foundation, to develop an edition of the WEDG that is applicable to multiple cities.

Helen Ignas: "Tower Bridge at Conshohocken"

Helen Ignas works with the Oliver Tyrone Pulver Corporation where she manages Tower Bridge, a 45-acre, 1.2 million square foot office, hotel and retail development. She presented on her 30 years of experience managing a property located in a floodplain.

Tower Bridge spans the boroughs of Conshohocken and West Conshohocken along the Schuylkill River. It first opened in December 1988 and consists of six office buildings and two hotels. Ignas noted that even though Tower Bridge is a single site, individual properties respond differently to a flood event, which impacts planning. She explained that the Schuylkill River becomes tidal once dams are topped and that flooding is a 12-hour event along that part of the river in Conshohocken. Ignas recommended monitoring flooding in advance using forecasts from the National Weather Service Advanced Hydrologic Prediction Service as well as the U.S. Geological Survey (USGS) and the U.S. Army Corps of Engineers. She noted the importance of following plans already set in place to handle flooding and calling insurance

representatives as soon as possible. She also recommended signing up for automated messaging services, such as the USGS's WaterAlert. Ignas demonstrated the importance of being able to interpret data from multiple sources to understand the potential impacts of flooding and prepare a timely, adequate response.

Thomas Friese, P.E.: "Philadelphia Navy Yard"

Thomas Friese, P.E. is a Senior Engineer in and Division Manager of the Site/Civil Design and Landscape Architecture Division at Pennoni, a multidisciplinary engineering and design firm. He presented on his work at the Philadelphia Navy Yard.

Friese explained that the Navy Yard has been controlled by the Philadelphia Industrial Development Corporation (PIDC) since 2000, when it began developing the property as an office park. The master planning process for the site began in 2004 and was updated in 2013 to encompass five distinct districts. FEMA's Flood Insurance Rate Maps set the development conditions at the Navy Yard due to the threat of tidal flooding. Friese explained that from 2007 to 2015, the FEMA base flood elevation rose from 10 feet to 12 feet, but they want to take into account higher elevations in the master plan due to future impacts from climate change. He also noted that the updated master plan increased building elevations, raised road grades to slope away from the river, and improved on-site stormwater management. Friese concluded by discussing the Philadelphia Water Department's *Green City, Clean Water* plan to improve water quality using green stormwater infrastructure. The master planning process at the Navy Yard was updated to include green streets in the Central Green District that use pervious pavement, underdrains, soils that promote infiltration, and a bioretention basin to capture and filter stormwater runoff.

Selected Questions and Answers

Attendees asked the panelists a wide variety of questions on topics including the source and timing of flooding notifications, the Secretary of the Interior's standards for historic properties, future opportunities to monetize WEDG certification, and the impacts of new development on stormwater management. Some specific questions include:

Q: How do you deal with flooding in existing buildings?
A: Helen Ignas responded that all of the buildings at Tower Bridge are designed to be flooded, so the ground floor is able to take on water. She recommended having a management plan in place for when the buildings will flood, but noted that there is always a new variable, no matter how good a plan is.

Q: Will the Flood Insurance Rate Maps (FIRMs) always be behind current flooding conditions, or will they be able to keep up?
A: Kristin Baja responded that flood maps are going to change more frequently with improved technology and impacts from climate change. She noted that there is a need to look beyond structures to whole systems and areas that will be affected by flooding. Baja recommended adopting higher regulatory standards because doing so decreases flood insurance rates under FEMA's Community Rating System (CRS) program. She also noted that the FEMA minimum flood standards are the same across the country, and to not take local variation into account. As a result, the National Flood Insurance Program is not keeping up with local needs, so it's up to municipalities to adopt higher regulatory standards.

Q: Regarding modeling storm surge in Jamaica Bay, how did it comport with what actually happened during Hurricane Sandy?
A: Michael Tantala responded that the SLOSH model was developed in the 1970s, so it doesn't take into account local variation. With new technology, it's now possible to run hundreds of different scenarios to quantify a 10-year or 50-year event. Sandy was a statistically unique event in terms of where and how it hit because it was both low probability and high consequence. He argued that there is a need for a layered approach to design and intervention that can deal with the different intensity of events.

Q: Are there models that combine storm surge risk with riverine flooding?
A: Tantala responded that currently these are separate models, so it's necessary to do extra work to combine them. Chris Linn of DVRPC mentioned that the CCRUN consortium led by Stevens Institute of Technology is starting to do this work using the ADCIRC system. Baja noted that it's important to look at storm surge and precipitation together.

Q: Are you seeing a change in how developers view the waterfront? Are they reconsidering design? Is there a change in the market?
A: Roland Lewis responded that there is still a booming waterfront real estate market in New York City. He noted that resiliency is often an important quality for marketing waterfront property, so developers incorporate it into their design. Tom Friese agreed that the waterfront is an amenity for developers because people want to have access and are willing to pay for it. Baja mentioned that developers are more likely to invest in flood infrastructure and resilient design if they foresee continued ownership; if the current owner plans on selling shortly after construction ends, they are likely to push back against regulations because they won't own the building when future impacts will be felt.

Q: Is there a possibility to approach waterfront preservation the way we have developed a system for farmland preservation?
A: Baja responded that the Community Rating System (CRS) offers opportunities to earn points for acquiring property in the floodplain and protecting it from development in perpetuity. However, she noted that there is a significant challenge in getting communities to work together.

Q: What will be the impacts from the current presidential administration's policies regarding climate change?
A: Baja responded that she believes there will be massive cuts to funding that could lead to possible risks to public safety. She argued that there is a need for collaboration among local governments, community-based organizations, and private businesses to develop a ground-up approach. Ignas responded that there's already buy-in from developers regarding resilient design due to demand from investors and tenants. She believes that federal policies won't change much in the market response to responsible development, especially if there are foreign investors that have high standards. Lewis responded that the loss of science and research conducted by and funded by the government is the most serious long-term consequence.

Next Steps

Chris Linn, Manager, Office of Environmental Planning at DVRPC, thanked the presenters for illuminating the intersection of waterfront development and climate change. Linn noted that some of DVRPC's ongoing work serves as a way to continue the conversation in the region around these topics. For example, DVRPC hosts the Urban Waterfront Action Group to help developers navigate the waterfront permitting process. Linn mentioned DVRPC's involvement with the Pennsylvania Department of Environmental Protection's Coastal Zone Management (CZM) program, which addresses topics such as waterfront design, public access, and environmental issues. In particular, he noted a current project funded through the CZM to help smaller municipalities in the Pennsylvania coastal zone understand coastal risks. He also discussed the climate adaptation plan that DVRPC did with Chester City as well as the New Jersey Resilient Coastal Communities Initiative, which aimed to help municipalities along the tidal Delaware River understand coastal hazards and vulnerabilities. Linn concluded by talking about DVRPC's involvement in building the region's trail network, the Circuit, which includes many segments of waterfront trails.