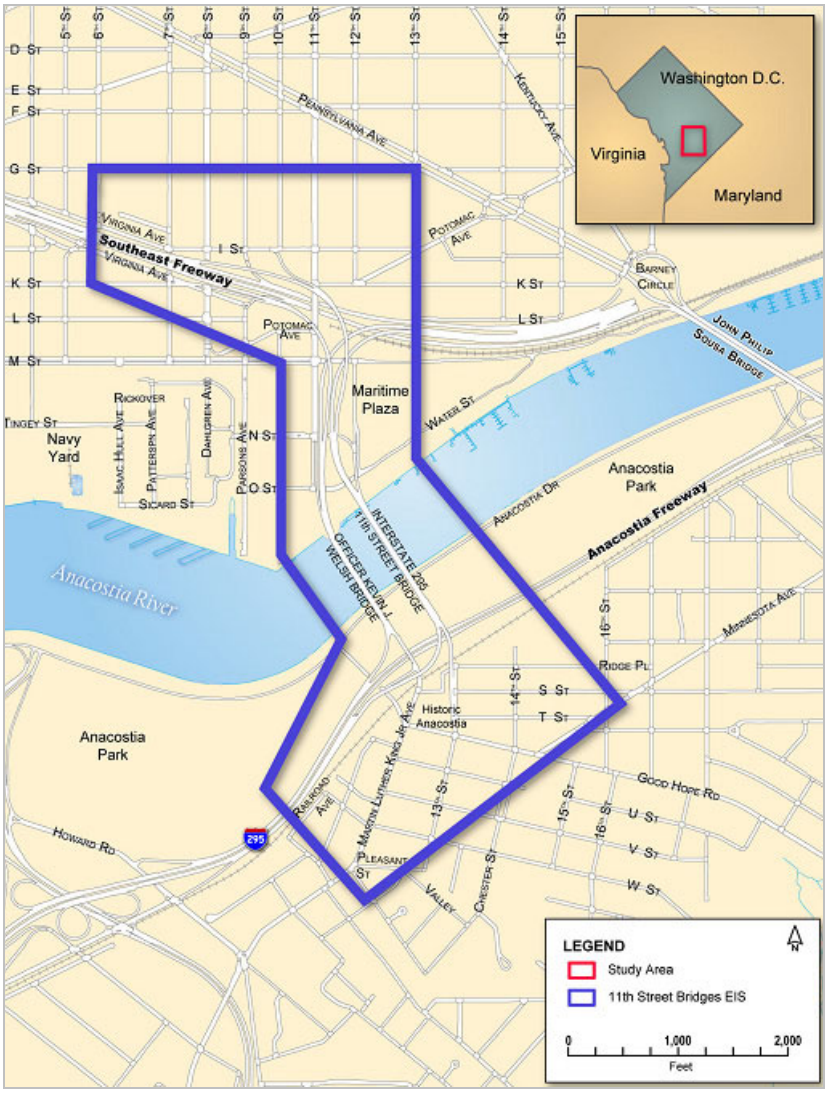
11TH STREET BRIDGES, WASHINGTON DC

Case Study Introduction

Project Overview

The District Department of Transportation (DDOT) and the Federal Highway Administration (FHWA) initiated the 11th Street Bridges project in 2005 to improve the highway connection between the Southeast/Southwest Freeway (I-695) and the Anacostia Freeway (I-295 and DC-295) in southeast Washington DC. The project study area is shown in Figure 1. The project was to replace obsolete infrastructure, provide missing freeway connections to improve traffic flow to and from downtown Washington DC, discourage cut-through traffic on neighborhood streets, improve local access, and better link land uses across the Anacostia River.

Figure 1: Map of the 11th Street Bridges study area



When the Southeast/Southwest Freeway was built in the mid-1960s, regional plans expected it to extend across the river and then join the Anacostia Freeway. However, those plans were abandoned, and today there is no direct connection between the Southeast/Southwest Freeway and the Anacostia Freeway to the north of the 11th Street Bridge complex. Traffic, therefore, is forced to use neighborhood streets to access the 11th Street Bridge complex and cross the Anacostia River. The result is increased traffic on local neighborhood streets, such as Martin Luther King, Jr. Avenue, Good Hope Road, Pennsylvania Avenue, and Minnesota Avenue.

The 11th Street Bridge/Anacostia Freeway interchange does not allow traffic east of the Anacostia River to enter the Anacostia Freeway at this location. Drivers may cross the 11th Street Bridge toward downtown Washington DC or return, but they cannot enter or leave the Anacostia Freeway without taking neighborhood streets to adjacent interchanges at Pennsylvania Avenue, Howard Road, or South Capitol Street.

Because the project involves reconfiguring the ramps on either shore but does not involve adding capacity to the freeway system, the project termini are where the ramps merge back into the existing freeway.

DDOT and FHWA signed the Draft Environmental Impact Statement (DEIS) in June 2006, the Final Environmental Impact Statement (FEIS) in September 2008, and the Record of Decision in July 2009. Construction of the $300 Í ÊÌÌÉÏ Î project is now under way (as of March 2010).

Planning History

The 11th Street Bridges project is a key component in District of Columbia's plans to revitalize the Anacostia riverfront. In March 2000, federal and District agencies signed an agreement forming the Anacostia Waterfront Initiative (AWI) to transform the Anacostia River into a revitalized urban waterfront. The AWI brought together 20 federal and District agencies that own or control land along the Anacostia River to sign the AWI Memorandum of Understanding, creating a partnership between the federal and District governments to transform the Anacostia River waterfront. With Washington DC's downtown nearly built out, the city is growing eastward toward and across the Anacostia River. The District is committed to recentering its growth along the Anacostia River and improving long-neglected parks, environmental features, and infrastructure in the area. The 11th Street Bridges project falls within the context of the AWI and other planning activities within the project area.

The AWI fostered a number of transportation studies, one of which was the Middle Anacostia River Crossings Transportation Study (MAC Study). The study was undertaken to evaluate traffic conditions and to recommend options to improve bridge and bridge and roadway connections between the 11th Street and John Philip Sousa Bridges to enhance mobility on both sides of Anacostia River. The study proposed several short- and long-term improvements that include completing the 11th Street Bridge ramps to I-295, reestablishing Barney Circle as an actual circle, separating the interstate (regional) traffic from the local traffic, riverfront access improvements, signage improvements, and pedestrian improvements. The findings and recommendations in the MAC Study formed the basis of the 11th Street Bridges' alternative development and evaluation process.

Purpose and Need

The purpose of the 11th Street Bridges Project is fourfold:

- Reduce congestion and improve the mobility of traffic across the Anacostia River on the 11th Street Bridges and on the local streets in the area.
- Increase the safety of vehicular, pedestrian, and bicycle traffic in the Anacostia neighborhood.
- Replace deficient infrastructure and roadway design.
- Provide an alternative evacuation route and routes for security movements in and out of the nation's capital.

The following transportation needs are to be met by the project:

- Improve Access and Reduce Congestion—Provide missing access to the Anacostia Freeway. Reduce volume of freeway traffic that spills onto the neighborhood streets due to current traffic patterns.
- Enhance Safety—Provide safe pedestrian and bicycle access across the river and to the Anacostia waterfront. Correct roadway design elements that reduce safety and result in congestion. Reduce number of vehicular crashes in the project interchanges.
- Correct Design Deficiencies—Replace bridges that are functionally and structurally obsolete. Improve signage in the project area to reduce confusion.
- Augment Homeland Security—Upgrade evacuation route for the nation's capital and area military installations.

Travel Forecasting Summary

The Metropolitan Washington Council of Governments (MWCOG) model was used to generate traffic forecasts for the 2030 design year. The MWCOG model, which simulates transportation and land use conditions in the greater Washington DC region, encompasses more than 4,000 square miles. The model was developed to provide a basis for predicting the overall expected travel trends in future years, based on planned land-use development and highway network scenarios at the regional level. MWCOG's model, which uses Version 2.1D #50 of Citilab's TP+ program, meets USEPA requirements for air quality conformity analysis. It incorporates land use assumptions from MWCOG's Round 6.4A. The Cooperative Forecasting Program, administered by the MWCOG, enables local, regional, and federal agencies to coordinate planning using common assumptions about future growth and development in the region. Each series of forecasts, or "round," provides land use activity forecasts of employment, population, and households by five-year increments. Each round covers a period of 20 to 30 years. Round 6.4A represented the most recent land use forecast available at the time the travel forecasting work was carried out.

DDOT obtained a copy of the MWCOG model for use in forecasting the 11th Street Bridges traffic volumes. Forecast traffic volumes from the model were used for traffic operational analyses, air quality conformity analyses, and traffic noise analyses. The traffic forecasts were used to assess and compare travel conditions under a No-Build Alternative and each of the build alternatives. The following traffic/transportation analyses were completed for each of the alternatives:

- Prediction/modeling of future traffic and travel patterns
- Analysis of future traffic operations
- Comparison of access changes to key land uses or areas
- Analysis of travel times
- Evaluation of vehicular safety considerations
- Evaluation of impacts to pedestrians
- Evaluation of impacts to bicyclists
- Evaluation of impacts to transit operations
- Evaluation of impacts to freight

Case Study Illustration of the Guidance

The 11th Street Bridges project provides a good illustration of one of the key consideration contained in FHWA's *Guidance on the Application of Travel and Land Use Forecasting in NEPA*. It was clear to the project team from the start that while MWCOG's regional model can be effective in answering big-picture questions, it would be ineffective, without modification, in answering such project-specific questions as "What will be the effect of adding missing freeway connections to traffic volumes east and west of the Anacostia River?" Performing the upfront work, using the latest available data to refine the part of the regional model within the

project study area, convinced DDOT, FHWA, and USEPA that the team was able to credibly compare alternatives in a forecast setting. This allowed the project team to proceed through the alternatives development and refinement phase in an efficient manner and to keep the fast-paced study on schedule. This case study emphasizes consideration 2 of the guidance: Suitability of Modeling Methods, Tools, and Underlying Data.

Key Consideration 2 of the Guidance: The Suitability of Modeling Methods, Tools, and Underlying Data

Age of Forecasts, Models, Data, and Methods

The first travel demand model was run in 2004 under DDOT's MAC Study, before the start of the 11th Street Bridges EIS. This gave DDOT enough data to determine that the best solution to the inefficient connections between the east and west sides of the Anacostia River in the study was to reconfigure the 11th Street Bridges interchange (rather than building a flyover at Pennsylvania Avenue, which had been proposed in the past).

In 2005, DDOT hired CH2M HILL to develop an EIS to evaluate replacing the 11th Street bridges and reconstructing the east-side interchange. For the DEIS, the travel demand model was run with the 2005 version of the MWCOG model. The MWCOG model network was refined for the 11th Street Bridges Study to represent future roadway networks based on transportation projects in MWCOG's 2004 update to the Constrained Long-Range Plan and major projects in the FY2005–2010 Transportation Improvement Program. Both plans represented the most current information available at the start of the 11th Street Bridges project. The land use and other inputs to the MWCOG model were not changed for the purpose of the study. Because DDOT committed to no new net capacity on the system as a result of the 11th Street Bridges project, the emphasis was placed correctly on travel demand rather than land use. During the preparation of the DEIS, a new MWCOG model had been released with new land forecasts, so the project's travel demand model was run again using the 2007 model. The project's FEIS, ROD, and Interchange Justification Report were completed with the data from the 2007 model.

Calibration, Validation, and Reasonableness Checking of Travel Models

As noted, the MWCOG model simulates transportation and land-use conditions for a region around Washington DC encompassing more than 4,000 square miles. To allow a meaningful comparison between the traffic impacts of the project's Build and No-Build alternatives within the study area, which constitutes a very small area within the regional model, the project team identified the boundaries of an area (subarea) that would be the focus of the project's travel demand modeling efforts.

After receiving the 2005 version of the 2030 no-build model from MWCOG for the subarea identified above, the project team performed a quality check on the data within the subarea. The initial step in the quality check was to review documentation MWCOG published (*FY-2004 Network Documentation: Highway and Transit Network Development*, November 17, 2004) that listed all the roadway network assumptions in the model. In addition, the project team reviewed the Constrained Long-Range Plan, the Transportation Improvement Program, and DDOT's AWI Transportation Master Plan for consistency and to determine which projects were included in the 2030 no-build forecast. The review uncovered the fact that the MWCOG model included all regional programs identified in the Constrained Long-Range Plan and Transportation Improvement Program, but no projects from the AWI Transportation Master Plan. The Master Plan lists 16 transportation projects, including the 11th Street Bridges and South Capitol Street Bridge projects, in the AWI study area and a proposed construction sequence. Because of limitations in funding and the expectation that not all these projects will affect traffic patterns or demand, it was determined that most of the Master Plan's projects should not be included in the forecast traffic models. The two exceptions were the 11th Street Bridges and South Capitol Street Bridge projects, which are major improvements with dedicated funding and expected significant changes to the travel patterns in the AWI area. After coordination with FHWA, MWCOG, and USEPA, it was agreed that the 11th Street Bridges Project 2030 no-build model would be modified to

include the assumed completion of the South Capitol Street Bridge Project. Likewise, the South Capitol Street Bridge Project 2030 no-build model roadway network would be modified to include the assumed completion of the 11th Street Bridges Project.

After resolving the range of projects to include in the 2030 no-build network, the team analyzed the roadway network in the immediate study area (subarea) and identified discrepancies between the MWCOG model roadway network and the study area roadway network. This was done by comparing data on the local road network contained in the project's *Existing Conditions Report* to the model's roadway network. The project team updated the subarea network by adding links and nodes not present in the regional model, modifying the number of lanes on network links, and incorporating (or removing) turn prohibitions at intersections.

Following the initial cleanup described above, the subarea model was plugged back in the MWCOG regional model, and the model was run to check the output against existing conditions in the study area. The final revisions to the subarea model were then made. At that point, the project team was able to code the 2030 build networks using the revised 2030 no-build network and make modifications reflective of the roadway designs for the project's four build alternatives.

Refining the MWCOG model to reflect the transportation system characteristics within the 11th Street Bridges study area was critical to developing a no-build model that the project team and regulatory agencies trusted to reasonably represent the traffic impacts of the build alternatives. Without the modifications made by the team, the gross level of detail in the regional model would not have been able to identify the traffic performance distinctions among relatively similar build alternatives. As noted in the DEIS, all build alternatives "provide the same basic traffic service by providing eight freeway lanes and four local lanes over the Anacostia River along the same basic alignment as the current crossings. They all achieve separation of freeway traffic from local street traffic, and they all provide a safe river crossing for pedestrians and bicyclists. Every build alternative is designed to provide direct ramp connections, which do not currently exist, from the Anacostia Freeway north of 11th Street to I-295 over the Anacostia River. Every build alternative provides common ramp and access schemes for traffic west of the river."

For projects such as the 11th Street Bridges that base purpose and need, in part, on addressing traffic deficiencies (improve access and reduce congestion; provide missing access to the Anacostia Freeway; reduce volume of freeway traffic that spills onto the neighborhood streets due to current traffic patterns), the inability to draw reliable traffic differences among alternatives eliminates traffic performance as an alternative screening consideration and makes it uncertain whether the alternatives ultimately serve purpose and need.

Additional Background and Sources

FEIS and ROD

The FEIS was produced as a two volume set. Chapter 4, *Purpose and Need*, 5, *Alternatives*, and 8, *Traffic and Transportation Analyses,* of the FEIS were sources of information for this case study. Appendix B of Volume 2, Traffic and Transportation, was also a reference.

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Documents available online at: *http://www.theanacostiawaterfront.com/11thstreet-library.jsp*

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