

SOUTH JERSEY TRANSPORTATION PLANNING ORGANIZATION

ITEM 1811-23: Amending the Scope of Services and Approving a Contract Modification for the Ocean Drive (CR 621) Upgrades and Bridge Improvements Local Concept Development Study

PROPOSAL

At its November 13, 2018 meeting, the SJTPO Technical Advisory Committee recommended that the Policy Board amend the originally approved scope of services and approve a modification to the contract for the Ocean Drive (CR 621) Upgrades and Bridge Improvements Local Concept Development Study.

BACKGROUND

On September 25, 2017, with Resolution 1709-32 (Approving the Selection of Michael Baker International, Inc. as the Consultant for the Ocean Drive (CR 621) Upgrades and Bridge Improvements Local Concept Development Study), the Policy Board approved the selection of the consultant with a maximum fee of \$1.25 million. On September 28, 2017 a Subcontract Agreement was fully executed between Michael Baker International, Inc. and the South Jersey Transportation Authority authorizing work to commence on the technical study.

On behalf of Cape May County, SJTPO is overseeing Local Concept Development services for the Ocean Drive (CR 621) corridor. The technical study will identify and compare reasonable alternatives and strategies for the bridges along the Ocean Drive corridor, and ultimately select a Preliminary Preferred Alternative. While SJTPO is responsible for the administration of the Subcontract Agreement, Cape May County Engineering Division and the Bridge Commission serve as the primary technical contacts for this effort.

During the second round of public meetings, Cape May County noted that in a previous bridge project the length of the bridge structure had increased based upon the results of a hydraulic study. To be proactive with this effort, a request was made to add a hydraulic analysis to the scope of services for the existing technical study. Cape May County felt that the analysis is critical to determine the potential hydrodynamic impacts the project may have on the bridges and watershed; and could impact the final configuration of the Preliminary Preferred Alternative.

As such, Michael Baker International, Inc. prepared a revised scope, outlining the proposed technical approach along with an associated cost. The increased scope would result in an additional \$80,000; increasing the total of the contract from \$1,250,000 to \$1,330,000.

This increase will be funded through balances remaining from Task 18/409: Ocean Drive (CR 621) Upgrades and Bridge Improvements Local Concept Development Study, which originally provided \$1,400,000 in FHWA Surface Transportation Program (STP)-Non-Urbanized funding.

While a Contract Modification is required, a request for additional funds from NJDOT is not needed. A letter notifying NJDOT and FHWA of the change in scope and cost will be provided as information only.

November 2, 2018

Ms. Jennifer Marandino
South Jersey Transportation Planning Organization
782 S Brewster Road, Unit B6
Vineland, New Jersey 08361

**Subject: Ocean Drive (CR 621) Upgrades and Bridge Improvements
Local Concept Development Study Concept Development Study
Hydrodynamic Study
Scope of Services and Fee Proposal – Modification No. 1**


Dear Ms. Marandino:

As requested, Michael Baker International, Inc. (Michael Baker) is pleased to submit a Scope of Services and Fee Proposal for the extra effort required to perform a hydrodynamic study for the Ocean Drive Local Concept Development Study.

If you have any questions or require additional information, please call me at (609) 807-9585 or Marty Wade at (609) 807-9524. Thank you for providing us with this opportunity to assist you on this Project.

Sincerely,

MICHAEL BAKER INTERNATIONAL, INC.


Joseph J. Romano, P.E.
Project Manager

Enclosure

The South Jersey Transportation Planning Authority has requested the services of Michael Baker International, Inc. (Michael Baker) to prepare a hydrodynamic study for the Ocean Drive Local Concept Development Study. The following scope of services outlines the technical approach to address coastal hydrodynamic concerns related to the proposed upgrades and bridge improvements along Ocean Drive, NJ. The anticipated scope of services discussed below represents our best understanding of the work required, based on current information.

I. Background

Ocean Drive has three bridges (and one culvert) spanning Mill Creek, Upper Thorofare, Middle Thorofare, and Bennet Creek. The existing bridge and road elevations are below the effective 100-year Base Flood Elevations (BFE) as determined by FEMA (1983). The proposed bridges will be above the effective 100-year BFE. This study proposes to develop a baseline design tool to assess the relative local hydrodynamic impacts due to the new bridge, culvert and roadway designs.

The proposed bridge design at Mill Creek, shown in Figure 1, would raise the road by 4 feet along the marsh. A validated hydrodynamic model can be used as an efficient design optimization tool to address the following concerns:

- 1) The impact of elevating the bridge on storm surge elevations in the immediate project area. The hydrodynamic model can be used to assess if this will significantly impact the FEMA 100-year BFE.
- 2) The results from the numerical model will be useful to assess the viability of the existing flood protection structures such as flood walls.
- 3) Since elevating the bridge may alter the local hydrodynamics, it will have implications on the tidal scour depths around the bridge foundations. This design optimization tool can be used to effectively assess the scour impacts due to different bridge configurations.

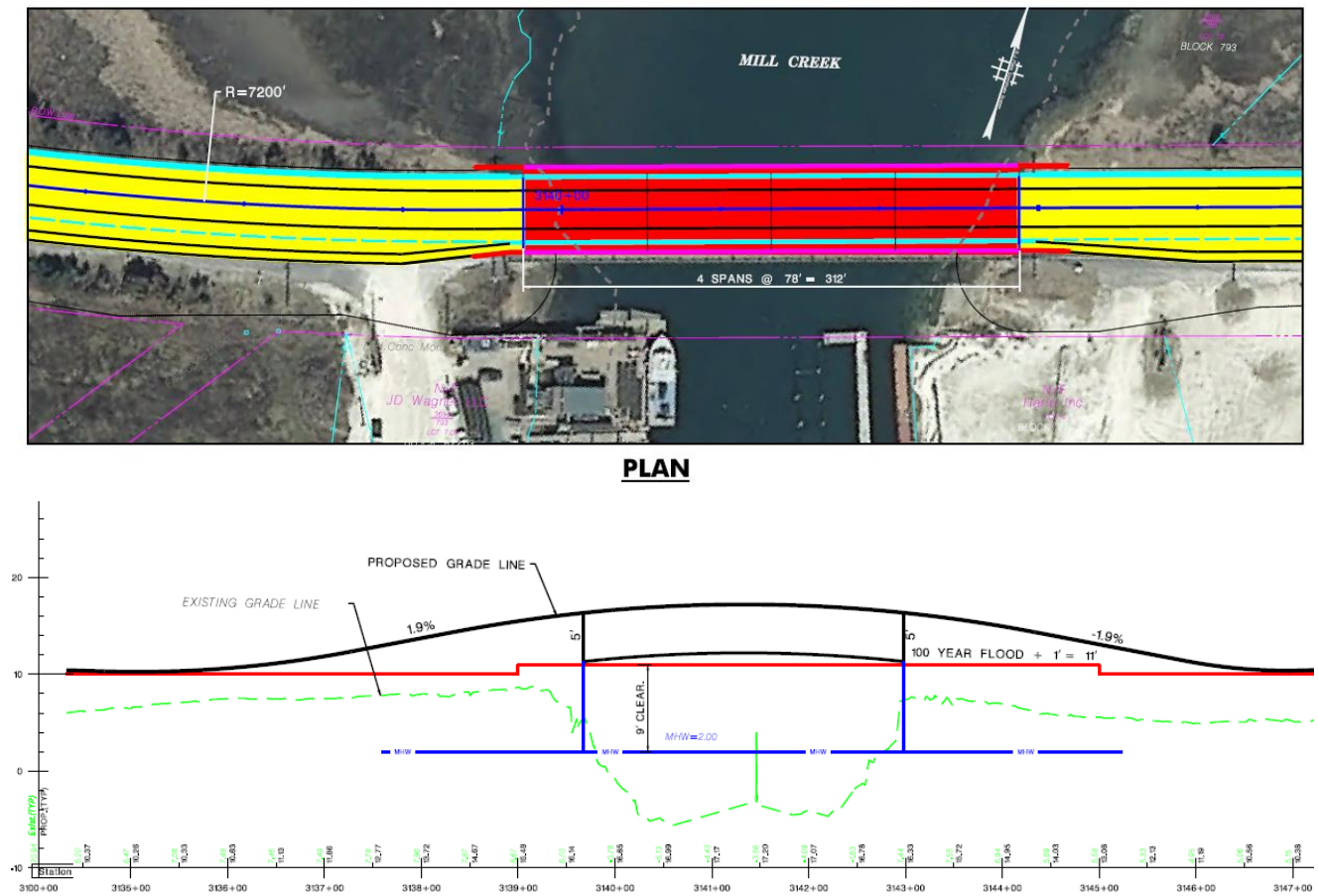


Figure 1 Example of proposed bridge design along Ocean Drive

To develop a numerical design optimization tool, we propose the following tasks:

- Literature and Data Review.
- Hydrodynamic Model Development and Calibration.
- Relative Hydrodynamic and Scour Assessments.

II. Scope of Work

A. Literature and Existing Data Review

Michael Baker's support of this study effort will begin with a comprehensive review of previous studies, reports and metocean data relevant to the project area. Items of interest include data and studies related to:

- 1) Bathymetric and topography data
- 2) Historical observations of tides, winds, waves, and currents
- 3) Historical hurricane data
- 4) The input and output datasets developed as part of the FEMA RiskMap studies (2014).

A critical path to successful completion of this task is the procurement of all the data used in the FEMA RiskMap (2014) studies. This is essential to assess the relative changes to the local hydrodynamics during chosen storm events that would replicate a response similar to a 100-year event.

Deliverables:

- Metocean Data Analysis Report.

B. Hydrodynamic Model Development and Calibration

In this study, a high-resolution mesh will be developed for modeling hydrodynamics around the project area. The modeling framework that is suited to the project area would be ADCIRC, which has been used for the FEMA Region II Coastal Surge Study (FEMA, 2014). The ADCIRC grid from FEMA (2014) will be used as a starting mesh to develop the high resolution hydrodynamic design optimization tool. To reflect the existing conditions within the project area, the most accurate and recent available topographic and bathymetric data collected in the first task will be interpolated onto the mesh we generated to ensure the hydrodynamic model reflects the most updated conditions of the project sites. For each type of data (topographic, bathymetric and land use data), a gap analysis will be completed to identify locations where the data coverage is incomplete or missing. The data collected for each source will be mapped in ArcGIS and checked so the collection of data covers the entire area that will be modeled. For any gaps that are identified, additional data gathering efforts will be made to fill these data gaps.

To validate the performance of the high resolution hydrodynamic model in reproducing storm surge, we propose to implement the model to simulate both astronomical tide and storm surge generated by Hurricane Sandy (2012). The open boundary condition of the high-resolution model will be provided from ADCIRC large model domain run (e.g. EC2015 grid, Szpilka et al, 2016). Figure 2 shows the storm tide results simulated by ADCIRC EC2015 model domain. The modeled results compared favorably with observed data at USGS Cape May Harbor station which is close to the project site. This gives us confidence to use the information from the large model domain run as the boundary condition to force the site-specific high-resolution model developed as a design optimization tool for this study.

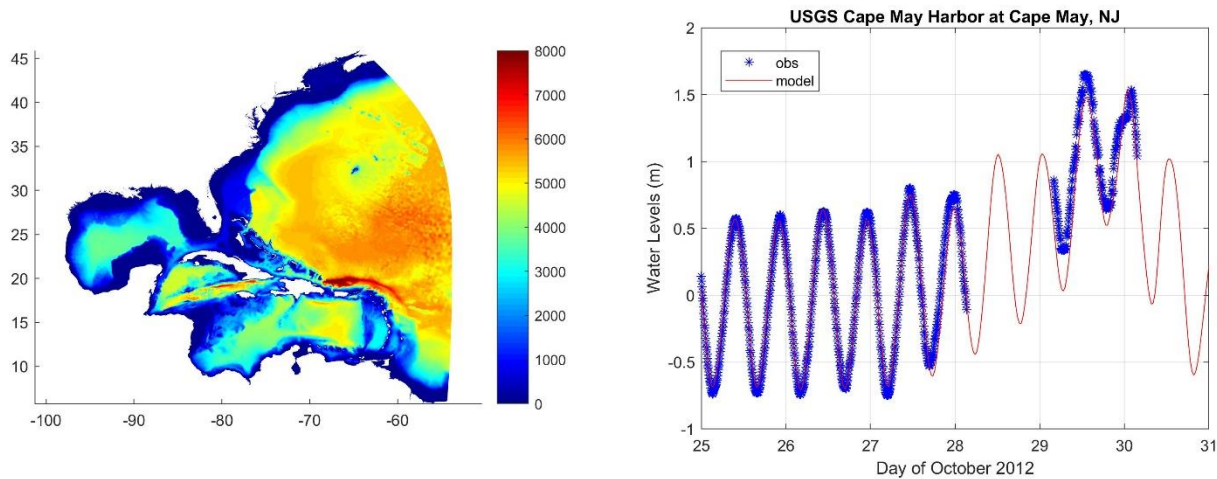


Figure 2 Left: EC2015 grid domain; Right: Observed (blue stars) and calculated (red solid lines) time series of water level (relative to NAVD88) induced by Hurricane Sandy at USGS Cape May Harbor station.

Additionally, the model will be calibrated and validated so the tidal currents are accurately reproduced. This will be performed using the tidal measurements carried out by NOAA between Sep-Nov 2000 at the Cape May Inlet Entrance.

Deliverables:

The Hydrodynamic Model Development Report containing:

- Model Development
- Water Level Validation
- Tidal Current Validation

C. Relative Hydrodynamic and Scour Assessment

In addition to evaluating the model performance, which as proposed above assesses the relative changes to the local storm surge and associated currents at the project site, we propose to conduct a 100-year return period surge simulation to check the impact of concept design on the floodplain.

Establishing a robust statistical determination of the 100-year return period conditions around the project area would require an exhaustive Joint Probability Method (JPM) assessment of the regional cyclonic storm climatology, and the follow-on effort to model many of synthetic storm conditions at the site. Such a study requires huge computational resources and is beyond the scope of what is needed during Concept Development. In lieu of a rigorous JPM assessment, we propose to conduct a high resolution hydrodynamic simulation at the project site with 5 synthetic storm events that provide a response closest to the 100-year surge. The synthetic storm events as well as the open boundary conditions will be selected from the USACE North Atlantic Coast Comprehensive Study (NACCS, Cialone et al., 2015) or the FEMA Region II Coastal Surge Study (FEMA, 2014). The successful completion of this task is dependent on obtaining the aforementioned data from FEMA and USACE.

The synthetic storms will be run with the existing bridge structure and with the proposed design. This will help evaluate the site-specific relative changes to the magnitude of storm surge and associated currents.

Deliverables:

The Hydrodynamic Assessment Report containing:

- Results from 5 Synthetic Storm Simulations with existing bridge configurations
- Results from 5 Synthetic Storm Simulations with proposed bridge configurations
- Assessment of impact of new bridge configuration on water levels
- Assessment of impact of new bridge configuration on currents

Schedule

The draft Hydrodynamic Assessment Report will be delivered within four (4) months of notice-to-proceed.

MICHAEL BAKER INTERNATIONAL
Hydrodynamic Study for the Ocean Drive LCD Study
Cost Proposal

Task Description	Task Lead	QAQC	Senior Coastal Engineer	Coastal Engineer	Total
Task 6 - Ocean Drive Baseline Coastal Modeling Study	80	30	100	400	610
A. Literature Review, Data Collection, and Develop Methodology	20	6	16	60	102
B. Hydrodynamic Model Development and Calibration	20	8	24	100	152
C. Hydrodynamic Model Execution	20	8	40	160	228
D. Reporting - Data Analysis Report, Model Development Report, Hydrodynamic Assessment Report	20	8	20	80	128
TOTAL HOURS:	80	30	100	400	610
Direct Labor Hourly Rate	██████	██████	██████	██████	████
Direct Labor Costs	\$5,840.00	\$2,400.00	\$6,600.00	\$14,800.00	\$29,640.00
Overhead %	143.38%	143.38%	143.38%	143.38%	143.38%
Overhead Cost	██████	██████	██████	██████	██████
Burdened Labor Cost	\$14,213.39	\$5,841.12	\$16,063.08	\$36,020.24	\$72,137.83
<div> <div> Direct Expenses: Printing \$250.00 Travel \$250.00 Misc Expenses \$148.39 </div> <div> Fixed Fee (10%): Total Labor Cost: Total Direct Expenses: </div> <div> \$7,213.78 \$72,137.83 \$648.39 </div> </div>					
				Total Cost:	\$80,000.00
Total Direct Expenses:	\$648.39				

SOUTH JERSEY TRANSPORTATION PLANNING ORGANIZATION

RESOLUTION 1811-23: Amending the Scope of Services and Approving a Contract Modification for the Ocean Drive (CR 621) Upgrades and Bridge Improvements Local Concept Development Study

WHEREAS, the South Jersey Transportation Planning Organization (SJTPO) is the Metropolitan Planning Organization (MPO) designated under Federal law for the southern region of New Jersey including Atlantic, Cape May, Cumberland, and Salem Counties; and

WHEREAS, the Fiscal Year 2018 SJTPO Unified Planning Work Program includes Federal Highway Administration planning funds for this project as Task 18/409; and

WHEREAS, at their September 25, 2017 meeting, the Policy Board approved Michael Baker International, Inc. as the consultant for the technical study with a maximum fee of \$1,250,000; and

WHEREAS a Subcontract Agreement between Michael Baker International, Inc. and the South Jersey Transportation Authority was fully executed on September 28, 2017 with a Notice to Proceed issued on the same date; and

WHEREAS, during this technical effort, Cape May County requested that a hydraulic study be added to the scope of work to be completed during the Local Concept Development phase of the Project Delivery Process; and

WHEREAS, Cape May County felt the analysis is critical to determine the potential hydrodynamic impacts the project may have on the bridges and watershed, potentially impacting the final configuration of the Preliminary Preferred Alternative; and

WHEREAS, the Hydrodynamic Study was not initially contemplated as part of the initial scope of work and would require an amendment to the existing contract; and

WHEREAS, Michael Baker International, Inc. has proposed to develop a baseline design tool to access the relative local impacts due to the new bridge and roadway designs, preparing a revised scope of work and cost for the additional work; and

WHEREAS, the costs associated with amending the scope, as described above, will be \$80,000 above the original contract amount, resulting in a revised maximum fee of \$1,330,000 and

WHEREAS, the additional cost will be funded through available FHWA Surface Transportation Program (STP)-Non-Urbanized funding currently programmed as Task 18/409 within the Fiscal Year 2018 SJTPO Unified Planning Work Program; and

WHEREAS, the amended scope of work and contract modification will not negatively impact the initial needs and objectives of the technical study; and

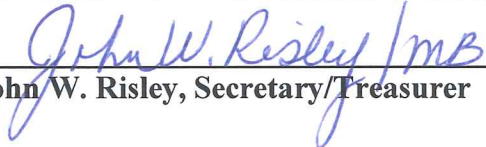
NOW THEREFORE BE IT RESOLVED, that the Policy Board of the South Jersey Transportation Planning Organization hereby approves the attached amended scope of work and

cost, approving the contract modification for the Ocean Drive (CR 621) Upgrades and Bridge Improvements Local Concept Development Study; and

BE IT FURTHER RESOLVED, that the Policy Board requests that the South Jersey Transportation Authority execute the appropriate contractual arrangements with the consultant on behalf of the SJTPO.

Certification

I hereby certify that the foregoing is a correct and true copy of a resolution adopted by the Policy Board of the South Jersey Transportation Planning Organization at its meeting of November 26, 2018.


John W. Risley, Secretary/Treasurer