NORTHERN VIRGINIA TRANSPORTATION AUTHORITY

M E M O R A N D U M

TO: Chairman Martin E. Nohe and Members
Northern Virginia Transportation Authority

FROM: Mayor Parrish, Chair, NVTA Finance Committee

DATE: October 6, 2017

SUBJECT: Contract Amendment 2 – TransAction Update Contract

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Purpose: To seek Northern Virginia Transportation Authority (NVTA) approval of the proposed contract amendment to the TransAction Update. The proposed contract amendment will permit the NVTA to access technical resources to timely complete the project modelling necessary for the Congestion Reduction Relative to Cost (CRRC) analysis for the FY2018-23 Six Year Program.

1. **Suggested Motion:** *I move Authority approval of the attached TransAction Update Contract – Amendment 2 (RFP2015-01).*

2. **Background:**
   a. After a competitive procurement process, the Authority approved a contract with AECOM for the update to the Northern Virginia's Long Range Regional Transportation Plan (TransAction Update) on July 23, 2015.
   b. TransAction is Northern Virginia's long range transportation plan guiding the Authority's first Six Year Program.
   c. The TransAction Update technical effort included extensive modelling development.
   d. In order to be eligible for HB 2313 (2013) Regional Revenues, projects must be in TransAction.
   e. The Authority must also give priority to the projects that provide the greatest level of congestion relief relative to cost.
   f. NVTA staff does not currently have the technical capacity to conduct the transportation model based CRRC analysis.
   g. The attached contract amendment incorporates the CRRC process into the TransAction Update contract, to utilize the modelling processes already developed by AECOM for the NVTA.
   h. Future TransAction Update contracts will include this function as part of the base contract.
   i. The cost of the CRRC analysis will be driven by the number of project applications received. However, the cost is not expected to exceed $160,000.
   j. The project budget has sufficient contingency to support the amendment without additional funding being required.

Attachment:
    TransAction Update Contract Amendment 2
    September 11, 2017 AECOM Offer Letter

Coordination:
    TransAction NVTA Finance Committee

Northern Virginia Transportation Authority
The Authority for Transportation in Northern Virginia

NVTA TransAction 2040 Update (RFP #2015-01)

Contract Amendment #2

October 12, 2017

This document defines additional tasks and deliverables related to development of the TransAction 2040 Update. The additional work relates to integrating Congestion Reduction Relative to Cost (CRRC) analysis as part of TransAction 2040 update development.

Task 13 - Congestion Reduction Relative to Cost (CRRC)
This new task requires AECOM to generate congestion reduction estimates for projects submitted for the Northern Virginia Transportation Authority Six Year Program based on the September 11th, 2017 offer letter presented by AECOM.

_____   _____
Monica Backmon   AECOM   (Signature)
NVTA Executive Director

_____   _____
Date   Printed Name

                                                       _____
                                                       Title

                                                       _____
                                                       Date

September 11, 2017

Mr. Keith Jasper
Project Manager
Northern Virginia Transportation Authority
3040 Williams Drive, Suite 200
Fairfax, VA 22031

Dear Mr. Jasper:

Re: NVTA TransAction Program – Project Congestion Reduction Estimates

This letter is in response to NVTA's request for cost estimates for the work required to generate congestion reduction estimates for projects submitted for the Six Year Program. There is a short window of time to accomplish the work and synthesize findings: the projects will be submitted by December 15th and the ratings would need to be completed by February 22nd, 2018

This modeling methodology incorporates findings and insights from TransAction. The Call for Projects can be a strong step toward achieving the potential of the Plan. In aggregate, the benefit of related investments will have a greater effect than the combined individual benefit of stand-alone investments.

AECOM is presenting two methodologies, which can be used separately or combined to develop project congestion reduction estimates. The selection of a single method or combination of methods must be based on the actual project applications received, together with their mode, scale, and geographic location.

For purposes of this proposal we present the following:
1) Conduct a separate model run for each project
2) Combine unrelated projects into sets of model runs

While the second method has potential to introduce minor modeling bias, the time saved by making fewer modeling runs could allow additional modeling to better quantify synergies among proposed projects.

Assumptions:
These estimates assume the plan updates and the HB599 ratings for the TransAction Plan have been completed under the base contract and Amendment 1. The only performance measure required by this analysis is the change in Person Hours of Delay associated with each project for the years 2025 and 2040.

The 2025 model run will be made using the same network as the 2040 run, and the MWCOG Round 9.0 planning forecasts for 2025. This network closely corresponds to the TransAction 'No Build' network. In other words, the network coding for each project will be done once on top of the 2040 'No Build' network and used for the 2040 and 2025 model runs.

An impact area will be defined for each project and the grid-based congestion reduction will be aggregated for the impact area from the 2040 baseline run and the 2040 project-specific run. The change in Person Hours of Delay will be calculated for the impact area. Similar calculations will be performed between the 2025 baseline run and the 2025 project-specific run. The resulting change in Person Hours of Delay by project will be transmitted to NVTA, and NVTA staff will calculate the Congestion Reduction Relative to Cost performance measure for use in the NVTA programming process.

Separate Model Runs for Each Project

Each project will be coded in the 2040 baseline network and run separately through the NoVA assignment process. If the project does not include transit components, the mode choice step will not be executed. A small number of non-transit projects (no more than five) with exceptionally large impact areas may be run through the mode choice process as well to capture the effects of trips shifting to driving. An impact area will be defined for each project and the grid-based delay data will be aggregated for the impact area from the 2040 and 2025 baseline runs and the 2040 and 2025 project-specific runs.

Modeling Tasks	Highway Projects	Transit Projects	Total Hours	Cost Estimate
Discuss Project Details with Agencies	0.5 hours	0.5 hours		
Project Coding	1.5 hours	2.5 hours		
2040 and 2025 Model Runs	3.0 hours	4.0 hours		
Calculate Project Impact Area Delay	1.0 hours	1.0 hours		
Present/document the Results	0.5 hours	0.5 hours		
Project Total	6.5	8.5		
Project Management & Coordination	40			
Baseline Model Run for 2025	8			
Contingency for Analysis Refinements	20			
Estimated Distribution of Projects				
Estimate #1 (100 projects)	70	30	778	$106,892
Estimate #2 (150 projects)	105	45	1133	$154,462

These estimates use an average hourly rate of $134 for staff, and an hourly rate of $200 for Project Management. The marginal cost for testing additional (or fewer) projects will be $871 per highway project, and $1,139 per transit/exceptionally large highway project.

Combining Projects for Model Runs

An impact area will be defined for each project. Projects that don't have overlapping impact areas will be combined into a single network for modeling purposes. The combined projects will be coded on top of

the 2040 baseline network and run through the NoVA assignment process. We estimate that the 100 projects could be grouped into 10 combination sets, although this can only be determined once the specific projects have been submitted. This approach has the benefit that the mode choice model step could be applied to groups of projects, thus saving resources and time. All combined sets will be modeled with the mode choice step. The grid-based delay data will be extracted from the combined run for the impact area of each project from the 2040 and 2025 baseline runs and the 2040 and 2025 combined project runs. Indicative costs for such an approach are as follows:

Modeling Tasks	Highway Projects	Transit Projects	Total Hours	Cost Estimate
Discuss Project Details with Agencies	0.5 hours	0.5 hours		
Project Coding	1.5 hours	2.5 hours		
Calculate Project Impact Area Delay	1.0 hours	1.0 hours		
Present/document the Results	0.5 hours	0.5 hours		
Total	3.5	4.5		
Project Management & Coordination	40			
Baseline Model Run for 2025	8			
Contingency for Analysis Refinements	20			
2040 and 2025 Combined Model Runs (hrs/run)	6			
Estimated Number of Combinations (# runs)	10	(15 for 150 project est.)		
Estimated Distribution of Projects				
Estimate #1 (100 projects)	70	30	508	$ 70,712
Estimate #2 (150 projects)	105	45	728	$ 100,192

These estimates use an average hourly rate of $134 for staff, and an hourly rate of $200 for Project Management. The marginal cost for testing additional (or fewer) projects will be more variable, as it will depend on how many additional/fewer projects are being tested, and if this changes the number of runs. Each run takes an estimated 6 hours or $804, plus $469 per highway project and $603 per transit project.

Analysis of Synergies
Much of the work of TransAction has been to identify transportation needs, customize the mix of recommended solutions, and quantify synergies among projects to produce the maximum benefit. Synergies can be explored under both methods by defining each project combination as a separate "project". In other words, we may get 80 physical projects recommended, but we would evaluate some of these in combination. If we have budget for 100 projects, we could add 20 combinations of the 80 projects to the list of runs.

A first step in this analysis could be to perform a model run in which all of the nominated projects are included, and performance measures calculated. The differences between these performance measures and those gleaned from the individual project analysis (whichever method is selected) could be used to

identify locations where synergies are present and should be analyzed further. The second step would be to test selected groups of projects together, or in specific sequence as desired.

Alternatively, additional "projects" that are themselves comprised of multiple TransAction projects could be tested as part of either of the methodologies described, at the marginal costs listed in this document.
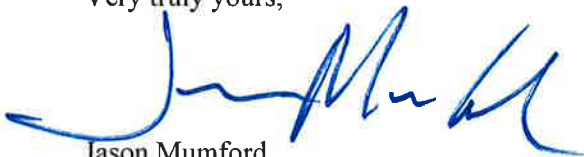
Recommended Approach

The preferred approach must be analytically defensible while providing good information for NVTA programming decisions, and the work must be completed and verified within a two-month window.

From the defensible analytics perspective, Separate Model Runs for Each Project is directly causal, in that all measured impacts are caused by the implementation of the tested project, and it avoids potential impacts from other projects. Combining Projects for Model Runs may have some synergistic issues/biases in the modeling process, but these can be minimized by selecting projects carefully.

Combining Projects for Model Runs would allow NVTA to conduct the primary, independent modeling more efficiently, potentially leaving time and resources for a secondary step that models and illustrates synergistic effects of combined and intentionally sequenced projects. The estimated budgets by method include contingency amounts that could be applied toward this secondary modeling step and coordination with submitting agencies.

If you have any questions or wish to discuss our proposal, I can be contacted by telephone at 703-340-3059 or by email at Jason.Mumford@aecom.com.

Very truly yours,

Jason Mumford
Associate Vice President
AECOM Technical Services, Inc.