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VIA ELECTRONIC MAIL & UPS March 30, 2012

Mr. Michael P. Anderson
Project Director
New York State Dept. of Transportation
4 Burnett Boulevard
Poughkeepsie, New York 12603

Re: Riverkeeper, Inc. Comments on the Draft Environmental Impact Statement for the Tappan Zee Hudson River Crossing Project

Dear Mr. Anderson:

On behalf of our client, Riverkeeper, Inc. (Riverkeeper),[1] the Pace Environmental Litigation Clinic, Inc. respectfully submits the following comments on the Draft Environmental Impact Statement (DEIS) to the Tappan Zee Hudson River Crossing Project, released January 20, 2012.

Riverkeeper has been involved in the Tappan Zee Bridge replacement proposals since the scoping on the initial 30-mile corridor revitalization plan in the early 2000s, when the project was named the "Tappan Zee Bridge/I-287 Corridor Project," and is committed to continuing its active involvement in the decision-making process as the project progresses.

As the leading advocates for protection of the Hudson River and the unique resources of the Hudson River Valley, Riverkeeper is extremely concerned about this project and its potential environmental impacts. The environmental, economic, and social implications of most of the alternatives presented are enormous and will substantially impact the Hudson River as well as the communities and environment of Rockland and Westchester Counties for many decades. The DEIS is practically and legally deficient and contrary to the requirements of NEPA and

[1] Riverkeeper is a member-supported, not-for-profit organization, dedicated to protecting the Hudson River and its tributaries, and to safeguarding the drinking water supply for New York City. Since 1966, Riverkeeper has used litigation, science, advocacy, and public education to end pollution, restore ecological health, and revitalize waterfront use and access. For more information please visit www.riverkeeper.org.

SEQRA, particularly since the scope of the project has been modified to only include a four-mile span, as opposed to the originally intended plan of the 30-mile I-287 Corridor. The current four-mile Tappan Zee Hudson River Crossing proposal as described in the DEIS is likely to result in uninformed decisions in the environmental review process, insufficient public participation, and inadequate goals and funding. In addition, the DEIS has failed to adequately consider and respond to many of the substantive issues that Riverkeeper raised in its November 15, 2011 Scoping Comments, which are hereby incorporated by reference into these Comments.

For the reasons explained below, Riverkeeper respectfully requests that the lead agencies issue a Supplemental DEIS that contains, at minimum, the following information: (1) an adequate analysis of all the reasonable and feasible alternatives that are raised in these Comments; (2) a complete analysis of the financial costs associated with a replacement bridge that includes mass transit; (3) an adequate assessment of all the environmental impacts of the projects that have been reserved for study at a later time, such as the inclusion of mass transit, improvements to adjacent highway segments, and the demolition of the existing structure; (4) financial analysis of the costs of mass transit; (5) a final Biological Opinion pertaining to the Atlantic Sturgeon upon issuance by NMFS; and (6) the information of the designation of critical habitat for the Atlantic and Shortnose Sturgeon.

I. The 60-Day Time Period Designated to Submit Comments on the DEIS is Wholly Insufficient, Violates the Public's Right to Meaningful Participation, and is Contrary to the Express Purposes of NEPA and SEQRA.

A. The sheer immensity and complexity of the DEIS warrants a Comment period longer than 60 days.

While Riverkeeper appreciates the additional fifteen days that the New York State Department of Transportation (NYSDOT) has given the public to comment – extending the original comment period from March 15 to March 30, 2012 – sixty days is still a wholly insufficient amount of time to properly review the DEIS and provide substantive and useful comments in light of the enormity and complexity of this project. By all rights, the lead agencies should have at least doubled the comment period for a project of this scale. The project has immense implications for the region's environment and growth, and requires a careful, comprehensive assessment of the environmental impacts and legitimate design and construction alternatives. The DEIS contains over 1,800 pages – including appendices – which discuss complex technical and scientific information, including engineering, ecological, and environmental studies and data that are relied on by lead agencies in an attempt to justify the alternatives considered/eliminated, and the DEIS' conclusions.

In order to meet the Project's stated goals of (1) ensuring the long-term vitality of the Hudson River Crossing; (2) improving the transportation operations and safety on the crossing;

and (3) maximizing the public investment in a new Hudson River crossing,[2] it is imperative that the public be given an appropriate amount of time to meaningfully review the lengthy DEIS – in all its complexity – to be able to adequately assess the study methodologies, assumptions made, and conclusions made before providing the type of meaningful comments to lead agencies that NEPA and SEQRA expect. For a project of this size and scope, sixty days is wholly insufficient to accomplish this goal. Riverkeeper notes that a coalition of elected officials, including the mayors of Nyack and Tarrytown and Westchester County Executive Astorino, sent a letter to Governor Cuomo several days before the close of the comment period, requesting an extension of the comment period so that local residents and elected officials could more fully review and respond to the DEIS. As of the time of the filing of Riverkeeper's comments, the Governor's office had not formally responded to the request.

Further, during the public meetings held in West Nyack and Tarrytown on February 28 and March 1, 2012, respectively, citizens were limited to only two minutes to give oral comments and make public statements. Especially for the many citizens who do not have the resources or other means to submit formal written comments, these public meetings represented the only opportunity to have their voices heard on their legitimate concerns regarding the project. The extreme shortness of the amount of time provided to meaningfully comment on an 1,800-page document of this complexity indicates not only lead agencies' unwillingness to suitably consider public participation, but more so, gives the public the impression that that the Final Environmental Impact Statement (FEIS) has essentially already been written and that the lead agencies are merely going through the motions to create the illusion of meaningful public participation without earnestly considering and addressing the public input they receive.

In addition, the Pace Environmental Litigation Clinic (PELC) and Riverkeeper have filed several state Freedom of Information Law (FOIL) and federal Freedom of Information Act (FOIA) requests with the relevant federal and state agencies, including the New York State Department of Transportation (NYSDOT), New York State Thruway Authority (NYSTA), New York State Department of Environmental Conservation (NYSDEC), Federal Highway Administration (FHWA), Army Corps of Engineers, and National Oceanic and Atmospheric Administration (NOAA), for information that we believe to be critical to our meaningful assessment of the DEIS. However, with the single exception of the Army Corps, we have not been provided any of the requested materials by the date of this filing, even though our open records requests were submitted 42 days before the comments deadline date of March 30. In fact, NYSDOT and NYSTA recently notified PELC that it will not be able to provide the requested documents until April 25, 2012, and April 30, 2012, respectively, long after the expiration of the deadline to submit these Comments. It obviously undermines the public participation tenets of NEPA and SEQRA for the lead agencies to purport to provide the public with an "opportunity" to submit comments and feedback but withhold requested records to

[2] *See* TAPPAN ZEE HUDSON RIVER CROSSING PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT AND SECTION 4(f) EVALUATION (January 2012), at 1-7 [hereinafter DEIS].

which the public has a right and that would allow the public to fully assess the DEIS's assumptions and conclusions.

The fact that the Project has been "fast-tracked" with funding from the federal government and supported by the Governor's office should not excuse the lead agencies from providing for open and robust public participation. For a project such as this whose planning has been in the works for over a decade, it does a tremendous disservice not only to the public, but to the project itself, to bring to a halt the very processes that are intended to improve the project and ensure the practical and environmental feasibility of the final alternative selected in the Final Environmental Impact Statement.

B. The "Design-Build" process does not allow for meaningful public review because most engineering, aesthetic, and design features will ultimately be chosen by the contractor.

The DEIS does not propose a final structure design for the bridge. Rather, it merely suggests potential design options (long span vs. short span; cable-stayed vs. arch) that will ultimately be decided later by the Design-Builder that is awarded the construction project. Essentially, the DEIS asks for public comments on a bridge design that has not been finalized yet and lead agencies ask the public to "trust us." It is difficult if not impossible for the public to comment on a "moving target" of this nature, where we are completely unable to assess the impacts of the final bridge design and provide feedback on those contractor decisions.

Indeed, as indicated in the Request for Proposals (RFP), issued to the four pre-qualified bidders on March 9, 2012, "[t]he Proposer is *not limited to the concept designed in the draft Environmental Impact Statement* [] and is encouraged to innovate to develop Crossing and landings solutions . . ."[3] While Riverkeeper understands that qualified Design-Builders have significant levels of expertise and experience on construction projects such as this one, the substantial amount of discretion ultimately given to contractors to modify the final design elements of the project has a high potential to defeat the purpose of the NEPA and SEQRA environmental review process.

II. The Narrowed Scope of the Project from the Original I-287 Corridor Project to the Current Tappan Zee Hudson River Crossing Project Fails to Consider the Project's Original Purposes and Improperly Relies on Data Intended for a Wholly Different Project That Was Never Subject to Public Scrutiny.

The original project considered regional transportation needs within the I-287 corridor, to alleviate traffic congestion between Port Chester and Suffern. If the original purpose of the project was to improve regional infrastructure, then it would follow that a plan that does not

[3] *See* New York State Thruway Authority, *Request for Proposal, Instructions for Proposers* (March 9, 2012), at 1, *available at* http://www.thenewtzb.ny.gov/bidprocess/rfp-instructions.pdf (emphasis added).

include mass transit, or alternatives to low-occupancy vehicles, would fall short of recognizing the future needs of the region. On October 12, 2011, both the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) rescinded the Notice of Intent for the Tappan Zee Bridge/I-287 Corridor Project[4] and issued instead a Notice of Intent for the Tappan Zee Hudson River Crossing Project.[5] If the proposed action is now limited to maintaining the "link in the regional and national transportation network,"[6] then it fails to consider the project's original purposes – improved infrastructure, reduced congestion, and safety. While maintaining the Tappan Zee link across the Hudson River is surely of critical importance for regional transportation, the project must contemplate the need for smart growth, and the environmental review must thoroughly analyze the project's impacts on the entire I-287 Corridor and the region.

Further, the DEIS purports to rely heavily on data and analyses that were prepared under the scope of the original 30-mile I-287 Corridor Project, which was only released in the 2008 scoping documents and was never part of a formal DEIS. As such, these data were never subjected to public scrutiny and are now being improperly relied upon by lead agencies to justify the conclusions in the DEIS. The DEIS also does not provide any factual support for its statement that the life span of the Rehabilitation Alternative would only be 50 years.[7] In fact, the Tappan Zee Bridge/I-287 Environmental Review Newsletter states that the rehabilitated bridge "would be expected to last up to 150 years."[8]

III. The Lead Agencies Have Not Included an Adequate Analysis of the "Reasonably Foreseeable" Project Alternatives in the Draft Environmental Impact Statement.

The lead agencies have only considered two alternatives for this Project in the DEIS: the No Build Alternative and the Replacement Bridge Alternative.[9] They have eliminated from consideration without sufficient justification the Rehabilitation Alternative, Tunnel Alternative, and Single Structure Alternative.[10] In fact, NEPA actually *requires* that an Environmental

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[4] *See* Rescinded Notice of Intent: Environmental Impact Statement, Tappan Zee Bridge/I–287 Corridor Project (Rockland and Westchester Counties, New York), 76 Fed. Reg. 63,346 (October 12, 2011).

[5] *See* Notice of Intent: Environmental Impact Statement, Tappan Zee Hudson River Crossing Project (Rockland and Westchester Counties, NY), 76 Fed. Reg. 63,343, 63,344 (October 12, 2011).

[6] *Id.*

[7] *Id.*

[8] New York State Dep't of Transportation, TAPPAN ZEE BRIDGE-I-287 ENVIRONMENTAL REVIEW NEWSLETTER 4 (Autumn 2008), http://www.tzbsite.com/tzb-library/pdf-library/pdf-newsletters-handouts/newsletter-autumn2008.pdf.

[9] *See* DEIS at 2-1.

[10] *Id.*

Impact Statement include a "no action alternative,"[11] and so one of the two options that the lead agencies chose to explore as an alternative for this Project was mandated by law. Under this unfortunately restricted assessment, this leaves only the project sponsors' preferred alternative of the Replacement Bridge as the only "reasonable alternative" studied. The DEIS is wholly void of a reasoned elaboration for the elimination of other project alternatives.[12] Of the entire 1,800-page DEIS, only three and one half pages are devoted to discussing the "alternatives considered and eliminated." This constituted an outrageous and egregious violation of the intent, letter and spirit of binding federal and state environmental review requirements.

Furthermore, the justification provided in the Scoping Information Packet, released on October 2011, for dismissing the Rehabilitation Alternative is that the Scoping Summary Report for the Tappan Zee Bridge/I-287 Corridor Project concluded that "the Rehabilitation Alternative would not be prudent and should be eliminated from further consideration."[13] First of all, the Tappan Zee Bridge/I-287 Corridor Project is recognized as a new and different project under the law. That project involved approximately 30 miles of Interstate 287 between Hillburn/Suffern, Rockland County, New York and Port Chester, Westchester County, New York, including the Tappan Zee Bridge over the Hudson River. Second, the Federal Highway Administration and the Federal Transit Authority issued a Rescinded Notice of Intent to prepare an Environmental Impact Statement for the proposed Tappan Zee Bridge/I-287 Corridor Project.[14] Therefore, the lead agencies never issued a DEIS on that Project on which the public could comment. The fact that the lead agencies are now relying on information that was never subject to a public review and comment period means that the lead agencies are effectively eliminating the public's participation in meaningful decision-making regarding the reasonable alternatives for this Project. This is contrary to the intent of both NEPA and SEQRA, which both outline explicit procedures to include the public's participation in the environmental review process.

IV. The DEIS Fails to Take a "Hard Look" at Legitimate Alternatives and Does Not Provide a Reasoned Elaboration for Rejecting the Alternatives that They Did, and Did Not, Consider in the DEIS.

The DEIS fails to take the required "hard look" at all of the project alternatives. In order to satisfy the "hard look" test under SEQRA, "the discussion of alternatives must be 'at a level of

[11] 40 C.F.R. § 6.207(d)(2) (2011).

[12] *See, e.g.*, Rochester v. United States Postal Serv., 541 F.2d 967, 973 (2d Cir. 1976) (finding that an environmental impact assessment "which gave no consideration whatever to the environmental effects associated with the contemplated [action] . . . fell short of the type of reasoned elaboration which must be required to support an administrative determination . . . under the National Environmental Policy Act.").

[13] Tappan Zee Hudson River Crossing Project Scoping Information Packet (October 2011), at 2-2 [hereinafter October 2011 Scoping Information Packet].

[14] Rescinded Notice of Intent, Environmental Impact Statement, Tappan Zee Bridge/I-287 Corridor Project (Rockland and Westchester Counties, New York), 76 Fed. Reg. 63,346 (Oct. 12, 2011).

detail sufficient to permit a comparative assessment of the alternative discussed.'"[15] The DEIS does *not*, however, include such a detailed discussion that would allow a sufficiently comparative assessment of the alternatives for this Project. Of the thousands of pages contained in the DEIS, a mere three and one half pages are devoted to discussing the Rehabilitation, Tunnel, and Single Structure Alternatives. In no way does this summary dismissal constitute the level of detail sufficient to permit a truly *comparative* assessment of the alternatives. Furthermore, the purpose of SEQRA's requirement that an Environmental Impact Statement include the "reasonable alternatives to a proposed project is [that this aids] the public and government bodies in assessing the relative costs and benefits of the proposal. To be meaningful, such an assessment must be based on an awareness of all reasonable options other than the proposed action."[16] The public is incapable of being made fully aware of all the costs and benefits associated with the reasonable alternatives to this Project – namely, Rehabilitation, Tunnel, and Single Structure—because the DEIS summarily dismisses these alternatives without fully weighing the costs and benefits of each alternative. The failure to take a hard look at all of these alternatives constitutes an error of law and arbitrary and capricious agency action.

NEPA requires that "'the agency take a "hard look" at the environmental consequences before taking a major action. In other words, [NEPA] prohibits uninformed . . . agency action.'"[17] NEPA further mandates that the Environmental Impact Statement for a proposed project include a rigorous exploration of all reasonable project alternatives.[18] It states, in pertinent part, that the Environmental Impact Statement should

> present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decisionmaker and the public. In this section agencies shall:
> (a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated;
> (b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits;
> (c) Include reasonable alternatives not within the jurisdiction of the lead agency.
> (d) Include the alternative of no action;
> (e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless

[15] MYC New York Marina, L.L.C. v. Town Bd. of Town of E. Hampton, 842 N.Y.S.2d 899, 906 (Misc. 3d 2007) (quoting Aldrich v. Pattison, 486 N.Y.S.2d 23, 35 (App. Div. 1985).

[16] Webster Assocs. v. Town of Webster, 59 N.Y.2d 220, 228 (N.Y. 1983).

[17] Citizens' Comm. to Save our Canyons v. Krueger, 513 F.3d 1169, 1178 (10th Cir. 2008) (quoting Utah Shared Access Alliance v. U.S. Forest Serv., 288 F.3d 1205, 1207-08 (10th Cir. 2002).

[18] 40 C.F.R. § 1502.14 (2011).

another law prohibits the expression of such a preference;
(f) Include appropriate mitigation measures not already included in the proposed action or alternatives.[19]

The three and one half page section included in the DEIS entitled "Alternatives Considered and Eliminated"[20] does *not* comply with NEPA's requirement to provide a full, detailed analysis of the project alternatives: the level of analysis that is required in order to make a fully informed decision. Nor does it even meet NEPA's requirement to "briefly discuss" the reasons for eliminating alternatives. The lead agencies' decision-making process violates NEPA because they have not taken the required "hard look" at all of the reasonable alternatives to this Project.

A. Rehabilitation Alternative

The DEIS does not provide sufficient explanation for why rehabbing the existing bridge would not be a reasonable alternative. The DEIS does not provide any factual support for its statement that the life span of the Rehabilitation Alternative would only be 50 years.[21] In fact, the Tappan Zee Bridge/I-287 Environmental Review Newsletter states that the rehabilitated bridge "would be expected to last up to 150 years."[22] There has been no explanation for this change in position. Without providing any basis in fact for how the lead agencies have determined the life span of a rehabilitated Tappan Zee Bridge, the public remains in the dark on this important issue, and the DEIS' unexplained and unsupported conclusions constitute impermissible arbitrary and capricious agency action.

The DEIS further states that the "construction duration for the Rehabilitation Alternative would be one year longer than for a replacement bridge," and that the Rehabilitation Alternative "would cost $2.5 to $2.7 billion more than the Replacement Bridge Alternative."[23] Again, the lead agencies provide *no* information to explain or support how they reached these conclusions. Simple logic would suggest that rehabilitation would cost less and take less time than constructing an entirely new bridge to cross the Hudson River. The lead agencies must provide factual support for these findings regarding the project alternatives.

The DEIS discusses the "uncertainty" that is associated with rehabilitation projects, which have the potential to increase the construction costs and duration of the Rehabilitation

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[19] *Id.*

[20] DEIS at 2-14.

[21] *Id.* at 2-15.

[22] New York State Dep't of Transportation, TAPPAN ZEE BRIDGE-I-287 ENVIRONMENTAL REVIEW NEWSLETTER, 4 (Autumn 2008), http://www.tzbsite.com/tzb-library/pdf-library/pdf-newsletters-handouts/newsletter-autumn2008.pdf.

[23] DEIS at 2-15.

Alternative.[24] However, there is always uncertainty associated with any construction project—regardless of what type of infrastructure is being built—and there is most certainly the possibility of unforeseen costs and cost overruns with the Replacement Bridge Alternative as well.[25] Take the "Big Dig" Project in Boston as an example, which was just completed in 2003: the project wound up costing $14.6 billion, after the cost estimate for the project was $2.6 billion at the start of planning, and it was completed five years later than scheduled. Such potential, unforeseen costs of building a new Tappan Zee Bridge are not considered in the DEIS.[26]

Finally, the DEIS does not include an adequate discussion of the environmental impacts of building a new bridge, as opposed to rehabilitating the current bridge. The DEIS merely states the Rehabilitation Alternative "would be expected to result in many of the same environmental impacts of a replacement bridge" because it "would involve both upland and in-water construction activities,"[27] but it does not expand on this statement. The DEIS does not include enough details or rationale to explain how the rehabilitation of the current bridge would result in the same environmental impacts of the current bridge. In the absence of information to the contrary, it is reasonable to conclude that all of the activities that would be involved in constructing the new bridge (including, among other things, demolishing the existing bridge, extensive dredging across the Hudson River, and pile installation, and the noise and vibration associated with it) would likely result in more harmful impacts to the environment than simply rehabilitating the existing Tappan Zee Bridge. However, because the Rehabilitation Alternative has been insufficiently studied and reported, the public has no meaningful way to assess these conclusions in the DEIS.

B. Tunnel Alternative

The DEIS does not include an analysis of the environmental impacts of building a tunnel, in comparison to those of building a new bridge. These environmental impacts include differences in air impacts, differences in river impacts including ecosystem and water quality (since the bridge would be totally removed from the river, and the river would essentially return to its natural state), and the effects on surrounding municipalities with respect to locations of connections to the Thruway. A tunnel would remove all traffic from the surface, which would, in turn, have dramatic effects on air pollution via scrubbing, noise pollution, visual blight, and weather-caused problems.

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[24] *Id.*

[25] *Boston's 'Big Dig' open to public: Tunnel project is five years behind schedule, billions over budget*, MSNBC.COM (Dec. 20, 2003, 8:30 PM), http://www.msnbc.msn.com/id/3769829/ns/us_news/t/bostons-big-dig-opens-public/#.T3TjzhzU2lc.

[26] *See id.*

[27] DEIS at 2-15.

Furthermore, the DEIS states that the Tunnel Alternative would take longer to construct than the Replacement Bridge Alternative and that it would cost $3.4 billion more than the Replacement Bridge Alternative ($8 billion as compared with $4.6 billion).[28] There is absolutely no support for either one of these conclusions in the DEIS (or anywhere), and the DEIS's summary conclusion that a tunnel would not be prudent based on cost differences would constitute an error of law and arbitrary and capricious action by the lead agencies.

The lead agencies clearly rely on tunnel construction costs as a reason to eliminate this alternative. However, they have not fully explored all feasible tunnel design options. They base their information regarding the Tunnel Alternative on a July 2007 study entitled *Alternatives Analysis for Hudson River Highway Crossing*,[29] which was never made available for public review and comment. That 2007 study only assessed the option of having five separate tubes with two lanes each or an immersed tunnel with two chambers.[30] The study did not consider the feasibility of constructing other technologically advanced and modern tunnel alternatives, such as a large diameter tunnel. In October 2009, the Chinese government completed construction on the Shanghai Yangtze River Tunnel-Bridge, the world's largest tunnel-bridge combination.[31] The total combined length of the tunnel-bridge complex is 15.8 miles, of which 5.56 miles constituted a two-tier, six-lane, two-rail large diameter tunnel.[32] The total cost for the *entire* project – including the 10-mile long bridge and 5-mile long tunnel – was $2.006 billion, and the entire project took four years to complete.[33]

Even though it is acknowledged that U.S. labor costs are likely higher than Chinese labor costs for a similar bridge construction project, it is clear from the example of the Shanghai Yangtze River Tunnel-Bridge—a project on a far larger scale than the proposed Tappan Zee project—that a large diameter tunnel *could* be a reasonable and feasible project alternative in terms of meeting the project's stated goals (ensuring the long-term vitality of the crossing; improving transportation operations and safety; and maximizing the public investment).[34] However, the DEIS again does not even mention a large tunnel alternative, and fails to include any comprehensive study or provide a reasoned elaboration—including cost and time bases—for eliminating such an option. The failure to study and assess a potentially reasonable and feasible alternative, and instead only consider a 1950s-style tunnel option like that discussed in the DEIS,

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[28] *Id.*

[29] *Id.*

[30] DEIS at 2-15.

[31] *See* Wen Wei Po, T*he Shanghai Yangtze River Bridge, the world's largest tunnel bridge opened to traffic on 31 October*, NEWS.QQ.COM, Oct. 31, 2009, *available at* http://news.qq.com/a/20091031/000115.htm.

[32] *Id.*

[33] *Id.*

[34] *See* DEIS at 1-7.

renders the DEIS legally defective. These options should be reconsidered in a Supplemental DEIS.

C. Single Structure Alternative

Among the reasons included in the DEIS for why the lead agencies have eliminated the Single Structure Alternative are the following: the Single Structure Alternative would require that the existing bridge remain in use for a longer period of time, it would cause more property to be needed at the landings, and it would cause there to be piers in the river during construction.[35] However, the DEIS provides absolutely no explanation for any of these statements. Again, without a clear explanation of how the lead agencies made certain findings, and without access to factual information upon which the agencies' determination was based, the public cannot reasonably be expected to provide comprehensive comments on the DEIS. Furthermore, if anything, it would be reasonable for the public to expect that *more* property would need to be acquired for the Replacement Bridge Alternative, which proposes twin bridge structures, because the 40-foot gap between the bridge structures would make the total width of the bridge and approaches wider.

Further, the DEIS' stated concern for redundancy as one of the primary reasons for replacing the bridge is not a fully sufficient justification for reaching the conclusion that a twin structure should be constructed over a single structure in the event of closures. There are 17 other bridges spanning navigable channels in the New York metro area – many of which are currently being retrofitted with seismic upgrades even though those respective bridges are older and nearly equal in magnitude than the current Tappan Zee Bridge, such as the Brooklyn Bridge, Manhattan Bridge, Queensboro Bridge, Bruckner Expressway, Roosevelt Island Bridge, and others.[36] This fact demonstrates that NYSDOT seems to be employing a double standard when it comes to rehabbing the current bridge versus building new bridges, considering that bridge rehabilitations on bridges older than the Tappan Zee are routinely being done, including for seismic retrofits. If seismic concerns are one of the primary reasons for not choosing the Single Structure alternative,[37] and there is the capability of bringing the current Tappan Zee Bridge up to seismic engineering standards, why is there no discussion in the DEIS of the relevant costs for doing so? Lead agencies are holding the Tappan Zee Bridge to a double standard.

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[35] *Id.* at 2-17.

[36] *See* NEW YORK CITY DEP'T OF TRANSPORTATION, INNOVATIONS AND ACCOMPLISHMENTS: 2006 BRIDGES AND TUNNELS ANNUAL CONDITION REPORT (2006), http://www.nyc.gov/html/dot/downloads/pdf/bridgerpt06_2.pdf. *See also* New York City Dep't of Transportation, New York City's Harlem River Bridges: The Reauthorization of the Transportation Equity Act for the 21st Century (Jan. 2004), *available at* http://www.nyc.gov/html/dot/downloads/pdf/harlemrvbdrpt.pdf.

[37] *See generally* DEIS at 2-16 to 2-17.

D. Replacement Bridge Option Without the Inclusion of Mass Transit

The DEIS fails to include a replacement bridge option with mass transit at the outset of the bridge's operation. Short of summarily stating at numerous points throughout the DEIS that the Replacement Bridge Option will "not preclude future mass transit," the DEIS otherwise provides no reasoned elaboration whatsoever why mass transit is not being considered as a reasonable alternative or explain why mass transit must be eliminated. Without mass transit, any replacement bridge will be obsolete from day one.

In the previous I-287 Corridor Project, the four alternatives considered included new commuter rail (CRT) and Bus Rapid Transit (BRT) service along the 30-mile corridor between Suffern, New York and Port Chester, New York.[38] Indeed, two years ago, the NYSDOT Scoping Summary stated that, "Mass transit offers the *only* realistic means of addressing the requirements of improving mobility in the corridor."[39] It appears that the sole factor used for eliminating mass transit in the current project is the purported cost. Lead agencies have planned to spend $5.2 billion dollars on the new action, even though studies commissioned by the lead agency for the prior action in 2009 found that the cost of two spans *with* BRT would cost $5.2 billion.[40] It is impossible to reconcile this 2009 estimate with the vague reasons presented in the DEIS for not including mass transit in the new project.[41] The DEIS does state that, with respect to building the preferred alternative in a manner that would not preclude future mass transit:

> There would need to be additional strengthening of the initial bridge structures . . . at a cost of approximately $200-$300 million. [Future] construction of transit infrastructure would cost an additional approximately $500-$700 million. . . . This additional strengthening and the future construction of a transit corridor within the gap [between the two spans] would be much less expensive than the cost of a new transit bridge over the river, which would cost approximately $2-$3 billion.[42]

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[38] *See* DEIS, Appendix A-1, at 3.

[39] NYS Dep't of Transportation, Scoping Summary Report (May 2009), *available at* http://tzbsite.com /tzb-library/pdf-library/pdf-scoping-closure/pdf-scoping summary_200905/Scoping%20Summary% 20Report%2020090528.pdf (emphasis added).

[40] 2009 ALTERNATIVES ANALYSIS FOR REHABILITATION AND REPLACEMENT OF THE TAPPAN ZEE BRIDGE REPORT, at 73.

[41] 2011 SCOPING INFORMATION PACKET, at 1-2 ("In 2011, while advancing financial analysis, it was determined that funding for the corridor project [bridge replacement, highway improvements, and new transit service] was not possible at this time. The financing of the crossing alone, however, was considered affordable. Therefore, it was determined that the scope of the project should be limited, and efforts to replace the Hudson River crossing independent of the transit and highway elements should be advanced").

[42] DEIS at 2-6.

Here, again, the DEIS asks the public to "trust us"—it merely states these cost estimates without providing any studies or analysis to support these expected costs. To conclude that mass transit is not a reasonable and feasible alternative because "funding for the Tappan Zee Bridge/I-287 Corridor Project (components including bridge replacement, highway improvements, and new transit service) was not financially feasible at this time"[43] without providing more, constitutes a legally defective decision by lead agencies under SEQRA.

It is frankly ridiculous to assert that installing mass transit will cost nearly *double* the amount that it would cost to construct an entire four-mile long bridge. If it would cost $10.1 billion in 2012 (as the State alleges) to include mass transit now—in conjunction with the ongoing development and construction of the new Tappan Zee Bridge—it is entirely reasonable to assume that it would cost significantly more to install mass transit on the new bridge, once it is operable and construction activities have ceased. The lead agencies repeatedly assert that the bridge will not "preclude mass transit," but they have completely failed to consider the practicalities or increased expenses of including mass transit at a later date when funding "might" be available. They have also completely failed to consider the costs to the public of *not* including a mass transit component in the current project. Moreover, to suggest that mass transit might be added to the new bridge at some undeterminable time in the future after it has been constructed and becomes operable completely ignores one of the current project's stated goals to "improve transportation operations and safety;"[44] construction to build mass transit adjacent to or on the new bridge once the bridge has become operational would likely cause substantial traffic delays, and create significant logistical difficulties for commuters and residents of Westchester and Rockland Counties. Quite simply, the DEIS provides no evidence that mass transit will not be precluded by the project given the political, environmental, or financial difficulties of putting off building mass transit until the future.

Mass transit was a reasonable and feasible alternative then, and continues to be a reasonable and feasible alternative that must be studied now. The public investment in the crossing should be maximized, and it will be most cost effective if mass transit is incorporated now versus at some indefinite future time. In the Twenty-First Century, with rising population and development growth in the surrounding Westchester, Rockland, and Orange County communities, mass transit provides an efficient and viable means for improving mobility, reducing congestion, reducing fuel consumption, reducing our carbon footprint and improving air quality, providing economic and investment opportunities and providing additional travel options to commuters.[45] If a Replacement Bridge is really the only reasonable option, then it *must* be an option that includes mass transit.

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[43] *Id.* at 1-2.

[44] *See id.* at 1-7.

[45] *See, e.g.*, Am. Public Transportation Association, *Public Transportation Benefits*, http://www.apta.com/mediacenter/ptbenefits/Pages/default.aspx (last visited March 29, 2012).

V. The DEIS Falsely Assumes That the Bridge Replacement Alternative Will Not Generate Any Additional Volume or Capacity on the Bridge.

Throughout the DEIS, lead agencies rely on the assumption that "The Replacement Bridge Alternative would not generate additional traffic volumes across the Tappan Zee crossing as compared to the No Build Alternative."[46] Lead agencies repeatedly use this faulty assumption to short circuit, limit, or wholly avoid studying the environmental impacts to critical components discussed in the DEIS, such as transportation, air quality,[47] energy and climate change,[48] and indirect and cumulative effects.[49] The complete failure to properly study these vital environmental impacts renders the DEIS legally defective.

In making this assumption, the DEIS relies solely on an October 26, 2011 "AECOM Future Capacity Memorandum,"[50] which analyzes whether the increase in capacity due to the addition of a fourth off-peak lane over the bridge could increase off-peak direction traffic in the corridor (westbound in the AM peak and eastbound in the PM peak), resulting in potential traffic and related impacts along the corridor. In determining that the existing three off-peak direction lanes are not the controlling capacity constraint to future off-peak direction traffic flows in those periods, the Memorandum acknowledges that "peak traffic volumes coming over the bridge would grow substantially over this 37-year period."[51] Nonetheless, the Memorandum *solely* considers the effect of vehicle speeds on the bridge to determine capacity ("speeds would remain essentially the same over the bridge. . . . [which] indicate that volumes will be less than capacity in all conditions, and therefore that there will be reserve . . . capacity over the existing 3-lane bridge into Rockland County through 2047, with virtually no constraint to traffic flows."[52]).

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[46] *See* DEIS at 4-1.

[47] *See id.* at 11-1 ("Since the project would not increase overall traffic volumes . . . , the analysis [of effects on Air Quality] focuses on changes in roadway and bridge configuration which may affect air quality and nearby residential locations and other land uses.").

[48] *See id.* at 13-1 ("[Because] the Replacement Bridge Alternative would not increase traffic volumes or reduce vehicle speeds . . . [t]herefore, fuel consumption and greenhouse gas emissions would be largely unaffected by the Replacement Bridge Alternative.").

[49] *See id.* at 21-1 ("Since the proposed bridge replacement is not expected to alter regional mobility or capacity, and is in an area with well-established land use patterns, it is not expected to result in new induced or indirect effects.").

[50] *See generally* AECOM Future Capacity Memorandum, DEIS Appendix B-5.

[51] *Id.* at 2.

[52] *Id.*

While it appears to be true that traffic flow of the Tappan Zee Bridge will be controlled to an extent by the processing capacity of the adjacent highway segments and toll plazas,[53] the DEIS' analysis completely fails to consider how other factors besides vehicle speed and processing capacity can add to an increased volume or capacity across the bridge. First, it fails to consider whether there will be an increase in suburban/urban sprawl development and resident population in Rockland and Westchester counties *because of* the existence of a new bridge that provides for greater mobility and fewer traffic delays across the Hudson River; rather, the DEIS assumes population and employment growth based on current figures involving the existence of the current bridge. A rapidly developing sprawl of Westchester, Rockland, and Orange Counties can reasonably lead to an increase in commuter volume and traffic across the Tappan Zee Bridge; however, the public is unable to know this for sure because the DEIS has failed to consider or study the effects of a Replacement Bridge and how it might increase sprawl development. Without this needed analysis as to how a Replacement Bridge might affect urban and suburban development, and in turn, capacity on the bridge, the DEIS' conclusions regarding volume capacity are arbitrary and capricious.

Second, such increased development from the construction of this new bridge could, in turn, increase impermeable surface coverage, which would cause more runoff to enter surface waters in the Hudson River watershed, as opposed to being absorbed into soil and groundwater, possibly triggering water quality issues. This would include increased point sources, due to the construction of new storm water and sewage outfalls to accommodate the increased capacity of a larger population, as well as general storm water runoff from non-point sources, which will flow into surface waters because of the increased impervious ground coverage. In addition, the effects of suburban sprawl should not be limited to Rockland and Westchester Counties. Orange County municipalities discharge into tributaries of the Hudson River as well, and so the lead agencies should study the suburban sprawl impacts on water quality as far away as Orange County. The failure to assess the potential consequences of water runoff renders the DEIS' conclusions regarding volume capacity completely inadequate.

Third, the DEIS does not assess whether additional truck and commercial cross-Hudson traffic will be diverted from the George Washington Bridge/I-95 corridor to the new Replacement Bridge/I-287 corridor, given the reduced roadway grade, improved mobility, and access that a new bridge promises to bring between New England and locations west of the Hudson. If truck and commercial traffic is added to a new Replacement Bridge crossing, additional non-accounted volume will be added. The DEIS fails to assess the reasonably foreseeable additional impacts of diverted truck traffic on the replacement bridge, rendering the DEIS conclusions factually and legally inadequate.

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[53] *See* DEIS at 4-14 ("Future volumes on the bridge are controlled by the constrained highway network in Rockland and Westchester Counties (i.e., lane reductions and grades in Rockland County and weaving and merging at interchanges in Westchester County) and not the throughput of the bridge itself.").

Finally – and most certainly – the DEIS ignores the fact that the new Replacement Bridge Alternative *will* add capacity to the bridge every day that a breakdown or accident would otherwise occur. A detailed explanation of why the DEIS' assumptions that no new capacity will occur is false can be found in the technical report of our consultant, Brian T. Ketcham, P.E, which are incorporated in their entirety into these Comments and may be referenced at Exhibit 1 hereto. The following elements of the proposed replacement bridge option are determinative in proving that capacity will be increased on a new replacement bridge: the widening of all lanes to the standard 12-foot width, especially when heavy trucks are accounted for; reducing the roadway grade below three percent, which will help facilitate traffic flow and vehicle speed, especially for heavy trucks; and the addition of breakdown lanes on the right side and shoulders on the left side. *See* Exhibit 1, at 5. Where a breakdown or accident on the current Tappan Zee Bridge occurs, significant delays and congestion result, which allows for fewer total vehicles to travel across the bridge during the length of the delay. On a new replacement bridge that offers wider lane widths, breakdown lanes and separate shoulders in each direction, and a reduced and flattened roadway grade over the main span of the bridge, traffic speed and flow will most definitely be facilitated in the event of a breakdown or accident. A facilitated traffic flow allows many more vehicles to travel across the bridge at any given time – particularly when cars would otherwise be stalled on the current bridge on accident or breakdown days – increasing the bridge's capacity. The failure of the DEIS to base its conclusions regarding bridge volume or capacity on this simple and elementary concept demonstrates the arbitrary and capricious manner of the lead agencies' technical analysis and/or the lack thereof.

Prior to the issuance of any Final Environmental Impact Statement (FEIS), lead agencies *must* therefore properly assess and study the impacts of transportation, air quality, and energy and climate change that they failed to consider in the DEIS because of the demonstrably false assumption that there will be no increased volume or capacity on the Replacement Bridge Alternative.

VI. The Project Is Inconsistent with the Executive Order No. 24 Requiring New York State Reduction in Greenhouse Gases of 80% by 2050.

By Executive Order, on August 6, 2009, Governor David Paterson declared, in part, that, "New York . . . should work collaboratively with the federal government to develop and implement plans and policies that will achieve reductions in greenhouse gas emissions in the United States . . . ."[54] The aim is to reduce greenhouse gas emissions in the State of New York by 80% from 1990 levels by 2050. To reach this goal, the Order creates a Climate Action Council (on which the Commissioner of the New York State Department of Transportation ["NYSDOT"] sits) that is responsible for developing a Climate Action Plan. As part of their duties, the Council is to "identify and assess short-term and long-term actions to reduce greenhouse gas emissions and adapt to climate change across all economic sectors, including industry, *transportation*, agriculture, building construction and energy production . . ." (emphasis

[54] N.Y. Exec. Order No. 24 (August 6, 2009), *available at* http://www.dec.ny.gov/energy/71394.html.

added). Since the Commissioner of NYSDOT sits on the Council, it would work against the Commissioner's obligations to the Council to approve a project that does not provide for mass transit. If New York State is to attain its greenhouse gas reduction goal by 2050, transportation projects *must* consider ways of reducing the use of low-occupancy vehicles and expanding mass transit options. This is especially true given the importance of the Tappan Zee Bridge to regional and national transportation networks and economies, and the fact that a new crossing will likely divert additional commercial truck traffic from the George Washington and Newburgh-Beacon Bridges to the new bridge. The current proposal of an eight-lane bridge for automobiles without inclusion of any mass transit options is clearly inconsistent with the goals enumerated in Executive Order No. 24.

VII. The Draft Environmental Impact Statement's Failure to Include a Plan for the Inclusion of Mass Transit on the Tappan Zee Bridge, Its Lack of Discussion Regarding Potential Future Improvements to Adjacent Highway Segments, and Its Minimal Discussion of the Impacts of Demolishing the Existing Bridge All Constitute Illegal Segmentation.

Conducting a separate and independent environmental review process for projects that should be considered in conjunction with the current project constitutes segmentation and violates both NEPA and SEQRA law. SEQRA states:

> For the purpose of determining whether an action [will have significant adverse impacts on the environment], the lead agency must consider reasonably related long-term, short-term, direct, indirect and cumulative impacts, including other simultaneous or subsequent actions which are:
> (i) included in any long-range plan of which the action under consideration is a part;
> (ii) likely to be undertaken as a result thereof; or
> (iii) dependent thereon.[55]

SEQRA further provides:

> Actions commonly consist of a set of activities or steps. The entire set of activities or steps must be considered the action, whether the agency decision-making relates to the action as a whole or to only a part of it. Considering only a part or segment of an action is contrary to the intent of SEQR. If a lead agency believes that circumstances warrant a segmented review, it must clearly state in its determination of significance, and any subsequent EIS, the supporting reasons and must demonstrate that such review is clearly no less protective of the

[55] N.Y. COMP. CODES R. & REGS. tit. 6, § 617.7(c)(2) (2012).

> environment. Related actions should be identified and discussed to the fullest extent possible.[56]

Furthermore, interpretation of NEPA law provides, "Segmentation is to be avoided in order to 'insure that interrelated projects[,] the overall effect of which is environmentally significant, not be fractionalized into smaller, less significant actions."[57]

By omitting from the DEIS a plan for the inclusion of mass transit on the Tappan Zee Bridge, a discussion regarding potential future improvements to adjacent highway segments, and a full report of the impacts of demolishing the existing bridge, the lead agencies have failed to take into account the cumulative impacts of interrelated projects, and have thus acted contrary to NEPA and SEQRA requirements.

A. Mass Transit

As the public comments submitted on the DEIS will surely demonstrate, there is a *very* strong public demand for mass transit on the Tappan Zee Bridge.[58] Nonetheless, the lead agencies have chosen to segment their environmental review of the feasibility of mass transit until an uncertain date in the future. Indeed, the DEIS broadly discusses potential ways that mass transit can be incorporated in the future – notwithstanding potential engineering feasibility concerns with the preferred mass transit option, building a mass transit line in the gap between the two Replacement Bridges. Presumably, if lead agencies are considering mass transit in the DEIS and proposing options for how to add it on later, then a bridge with mass transit is a reasonable alternative that can and must be analyzed now. Lead agencies should not be excused from providing a detailed and robust study at the present time, or from allowing the public to meaningfully comment on a vital aspect of the project that is central to many citizens' concerns.

The DEIS raises two alternative forms of mass transit for the bridge: bus rapid transit service along the corridor between Suffern and Port Chester and a commuter rail service between Suffern and the Metro-North Hudson Line in Tarrytown.[59] However, there is currently *no* concrete proposal for how mass transit might be incorporated into the Tappan Zee Hudson River Crossing Project. In fact, the DEIS states, "The implementation of any of these options for future

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[56] *Id.* § 617.3(g)(1).

[57] Town of Huntington v. Marsh, 859 F.2d 1134, 1142 (2d Cir. 1988) (quoting Taxpayers Watchdog, Inc. v. Stanley, 819 F.2d 294, 298 (D.C. Cir. 1987).

[58] Khurram Saeed, *Rockland residents, lawmakers pack Tappan Zee Bridge hearing, demand mass transit*, THE JOURNAL NEWS, Feb. 29, 2012, http://www.lohud.com/article/20120229/NEWS03/302290062/Rockland-residents-lawmakers-pack-Tappan-Zee-Bridge-hearing-demand-mass-transit?odyssey=mod%7Cnewswell%7Ctext%7CNews%7Cp.

[59] DEIS at 2-6.

transit modes would require a separate and independent environmental review process when and if a proposal for transit services is foreseeable and financing is available."[60]

The construction of mass transit on the Tappan Zee Bridge – whichever form it may take – is an action that is included in the long-range plan for the Tappan Zee Bridge, and so its impacts must be considered within the Environmental Impact Statement for this Project.

Furthermore, the lead agencies are relying on data regarding the inclusion of mass transit that was studied in the I-287 Corridor Project. The data released in these 2008 scoping documents were never part of a formal DEIS, though, and so they have never been subject to public scrutiny. It is utterly insufficient for this Environmental Impact Statement to not disclose to the public all of the costs and benefits of incorporating, or declining to incorporate, mass transit into this Project.

B. Potential Future Improvements to Adjacent Highway Segments

It is very likely that reconstruction of the existing Tappan Zee Bridge will have an effect on the bridge's adjacent highway segments. In fact, the I-287 Corridor Project included in its analysis the reconstruction of these adjoining stretches of highway. However, the DEIS for this Project does not adequately take into account the potential for such reconstruction, and so these projects would require separate environmental reviews. The technical report of our consultant, Brian T. Ketcham, P.E (Exhibit 1 hereto) supports Riverkeeper's concern that the improvement of adjacent highway segments is likely to accompany the building of this new bridge. Mr. Ketcham writes that the State has abandoned the road improvements it recommended in earlier I-287 corridor studies, and that, despite this abandonment, the problems do still exist and will need to be addressed.

As stated above, SEQRA provides that an Environmental Impact Statement *must* consider the impacts of subsequent actions that are likely to be undertaken as a result of the current project.[61] And NEPA provides that the environmental effects of interrelated projects need to be considered together. By failing to include an analysis of the surrounding highway segments in the DEIS, the agencies have failed to look at all of the foreseeable impacts related to this Project. The lead agencies must go back and take into account the impacts of potential future improvements to the bridge's adjacent highway segments in a Supplemental DEIS.

C. Demolition of Existing Bridge

The DEIS contains an extremely brief description of the process and impacts of demolishing the existing bridge. The option of preserving the existing bridge for some beneficial

[60] *Id.*

[61] N.Y. COMP. CODES R. & REGS. tit. 6, § 617.7(c)(2).

purpose is not discussed in the DEIS. Demolition of the existing Tappan Zee Bridge constitutes an action that will be undertaken as a direct result of constructing the new bridge, and so, pursuant to SEQRA, the Environmental Impact Statement must fully consider the impacts of this action. The DEIS's cursory discussion of the impacts of demolition on the Hudson River and nearby communities is woefully insufficient, and does not provide a full evaluation of the impacts to the Hudson River as a result of this demolition. The extent of the in-river impacts from demolition are not addressed, leaving the public without enough information to assess the cumulative impacts of building a new bridge and tearing down the old one.

New York Courts have held that the lead agencies of a project subject to SEQRA requirements must consider *all* phases of a project concurrently in the Environmental Impact Statement.[62] Therefore, the lead agencies need to provide an adequate analysis of the environmental impacts of demolishing the existing bridge in order to comply with SEQRA's requirements. An agency decision to not study such environmental impacts in a fundamentally dependent aspect of a project prior to the issuance of a DEIS that is open to public comment, but rather hold off on studying the environmental impacts until after the issuance of the DEIS or FEIS, constitutes impermissible segmentation.

VIII. The DEIS Fails to Provide A Financial Analysis That Supports Its Contention that the Replacement Bridge Option is the Best Option that "Maximizes the Public Investment."

It is apparent to anyone who has read the DEIS or followed the development of this project over the past decade that costs have become an increasing concern for the State. Indeed, the DEIS bases the proposed rejection of reasonable feasible alternatives such as Rehabilitation and Tunnel, in large part, on costs: "the Rehabilitation Alternative with two bridges would cost $2.5 to $2.7 billion more than the Replacement Bridge Alternative;[63] "Compared to the Replacement Bridge Alternative, the Tunnel Alternative would . . . entail a higher cost ($8 billion as compared to $4.6 billion)."[64] While financial infeasibility can be a valid reason for rejecting an alternative, that rejection must be based on hard data and financial analyses conducted by the lead agencies and project sponsors, and disclosed to the public. Despite these statements in the DEIS related to the estimated costs of project alternatives, however, no data is provided anywhere in the DEIS to support these estimates. The failure to include such verification constitutes an arbitrary and capricious action by the State in making conclusions based on no sound or supporting data.

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[62] *See* Sutton v. Board of Trustees of Endicott, 505 N.Y.S.2d 263 (App. Div. 1986).

[63] DEIS at 2-15. Nowhere in any of the present or past scoping documents or studies is there a discussion of a Rehabilitation option involving two bridges. This description of the higher cost of $2.5 to $2.7 billion for the Rehabilitation option thus appears to be erroneous if it is basing that analysis on a rehabilitation of two bridges rather than one.

[64] *Id.*

In addition, the public has been provided with no information related to how this new bridge will be paid for. While the State has indicated that it plans to seek a federal loan of up to $2 billion, Governor Cuomo has also indicated that a large percentage of the project will be funded by toll-backed bonds.[65] Charles Komanoff, a transportation and energy economist and policy analyst and co-founder of the Carbon Tax Center, conducted an independent financial analysis that demonstrates just how extreme the rise in tolls to pay for the bridge may be. Mr. Komanoff's report is incorporated in its entirety into these Comments and may be referenced at Exhibit 2 hereto.[66] Analyzing sixteen different scenarios of bridge cost and usage, covering a range of assumptions for four key parameters, Mr. Komanoff has determined that there will be an immediate toll *increase* (above the current $4.75 E-Z Pass toll charge) average of $10.15, with a true range of prospective toll *increases* between $6.15 and 15.75.[67] These will be by far the highest bridge toll fares in the entire Tri-State area. In addition, the implications of these massive toll hikes will not only be felt by commuters travelling across the Tappan Zee Bridge, but these costs will likely also be off-loaded onto other New York State Thruway segments, the New York State DOT budget or other parts of the State's general fund, or onto the Metropolitan Transportation Authority or the Port Authority.[68] The fact that the lead agencies have not conducted any level of financial analysis even close to that of Mr. Komanoff's report (or, if they have, have not made it available to the public), indicates a complete failure to properly assess the financial implications of a project of this scale, in violation of NEPA and SEQRA.

IX. The Issuance of the RFP Prior to the Issuance of the Draft Environmental Impact Statement Indicates that the State Has Essentially Already Chosen its Project Alternative Without Properly Considering Public Comments.

The Request for Proposals (RFPs) was issued to the four pre-qualified bidders on March 9, 2012, prior to the original Comments deadline date of March 15, and prior to the current deadline date of March 30. Proposals are due on July 27, 2012. While the State has not given a precise date for when it might issue its Final EIS, officials have indicated that the state aims to submit the final environmental impact statement to the federal government by sometime in July.[69] So, it is safe to say that the Design-Builders' proposals, whatever they may be, will not

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[65] *See* Judy Rife, *Toll Hike Likely on New Tappan Zee*, TIMES HERALD-RECORD, Mar. 6, 2012, *available at* http://www.recordonline.com/apps/pbcs.dll/article?AID=/20120306/BIZ/203060330/-1/SITEMAP.

[66] Charles Komanoff, A BRIDGE TOO BIG?: NEW YORKERS' TOLL FROM A 15-LANE TAPPAN ZEE BRIDGE (Mar. 26, 2012), *available at* http://komanoff.net/cars_II/Bridge_Too_Big.pdf [hereinafter Exhibit 2, Komanoff].

[67] *See* Exhibit 2, Komonoff, at 2.

[68] *Id.* at 3.

[69] *See* Kate Hinds, *Residents Raise Concerns as Tappan Zee Bridge Construction Looms*, WYNC.ORG, Feb. 28, 2012, http://www.wnyc.org/blogs/wnyc-news-blog/2012/feb/28/new-tappan-zee-bridge-construction-looms-residents-air-worries/.

be based on any draft or final environmental impact statement that will be issued, but will only address the substantive criteria and project requirements laid out to them by the State in the RFP. Given the high level of detailed specificity provided to the bidders in the RFP, coupled with the otherwise enormous amount of discretion given to the Design-Builders to alter the project's features, as discussed *supra*, in Section I-B, the timing and coordination of the RFP process and Environment Impact Statement process makes clear that lead agencies have already identified the final elements and conclusions of this project as they will appear in a FEIS, and that public comments will not become a part of the final proposals as prepared by Design-Builders.

As part of the proposal submissions, Design-Builders are required to submit an "Initial Demolition and Removal Plan" that shall include a description of the Design-Builder's plans for: "(a) Any necessary phasing in the demolition of the existing bridge in relation to construction, including any proposals for salvage; (b) Any elements to be demolished and removed in staging areas; (c) A staging plan and specific means that the Proposer intends to use in order to maintain and if necessary replace the existing toll plaza; (d) A staging plan and specific means that the Proposer intends to use in order to maintain and if necessary replace the existing NYSTA maintenance and operation facilities."[70] This Initial Demolition and Removal Plan will not be subject to public comment, and the respective plan of whichever Design-Builder awarded the contract will provide the direction for how the bridge will be demolished. The public must be able to properly comment on the demolition processes and provide meaningful feedback to lead agencies on the environmental impacts of demolition activities in the event that the proposer's Initial Demolition and Removal Plan fails to adequately mitigate for environmental impacts.

Although New York State courts have held that agencies are free to participate in "preliminary planning and budgetary processes necessary to the formulation of a proposal for action,"[71] those activities are limited so that they "do not commit the agency to commence, engage in or approve such action . . . [unless] SEQRA [is] complied with before any proposal is accepted or contracts are signed."[72] In coming to that conclusion, the court remarked that "[i]t was the intention of the [New York] Legislature 'that environmental factors be given consideration [] as early as possible in the formulation of a proposal for an action . . . that point must be *prior to the acceptance of any proposal* or the signing of any contracts. One of the fundamental purposes of SEQRA is the consideration of alternatives."[73] As previously noted, lead agencies' fast-tracked actions, arbitrary and capricious conclusions, and elimination of reasonable alternatives without taking a "hard look" violates the relevant provisions of NEPA and SEQRA. Because the environmental factors have not fully been considered, and the State

[70] *See* New York State Thruway Authority, Design-Build Project Instructions to Proposers (Mar. 9, 2012), § B1.1.6 [hereinafter RFP Instructions].

[71] Nassau/Suffolk Neighborhood Network v.Town of Oyster Bay, 513 N.Y.S.2d 921, 134 Misc. 2d 979, 981 (N.Y. App. Div. 1987).

[72] *Id.* at 982.

[73] *Id.* at 983.

must conduct additional studies – which must be made open to public comment – the State may not ultimately award the Design-Build contract until a fully fleshed out and final decision can actually be made in the Final FEIS (after the issuance of the Supplemental DEIS requested throughout these Comments). Without it, the instructions to bidders and level of detail provided in the RFP all but indicates that the State has essentially already chosen its final end-product, as would appear in the FEIS, and it has failed to first consider public input as required by NEPA and SEQRA.

X. The DEIS Ignores the Historic, Scenic, Aesthetic, and Recreational Value That This Part of the Hudson Valley Represents to Surrounding Communities.

A. The two replacement bridge designs are massive structures that would mar the beauty of the Hudson Valley for generations.

Although the current Tappan Zee Bridge is an established feature of the Hudson River visual landscape, the new bridge options are on an entirely new scale that cannot reasonably be compared with the presence of the current bridge. Quite simply, we are not comparing "apples to apples" as the DEIS suggests here, but rather "apples to watermelons." The bridge replacement options – the long span vs. short span and cable-stayed vs. arch support – are not only more elaborate and much wider than the current Tappan Zee Bridge, but also much taller and more intrusive. The Cable-stayed option could lead to four towers that each stand over 572 feet tall, roughly half the height of the Eiffel Tower, and *almost twice the height* of the current Tappan Zee Bridge (293 feet). This is equivalent to placing a 50-story building in the middle of the Hudson. Actually, it will mean placing *four* 50-story buildings in the middle of the Hudson River! The arch structure option is slightly better (at 372 feet), but it still suffers from the similar defect of massive ugliness as the cable option.

B. The direct visual impacts of the Replacement Bridge Alternative on nearby residents of Rockland and Westchester counties have been underestimated by the DEIS.

The DEIS characterizes the visual changes to the bridge's appearance and design under the Replacement Bridge Alternative as "discernible to viewers who have varying degrees of sensitivity to the change."[74] Not only is this characterization insulting to residents who have made the villages of Nyack, Orange, Grand View-on-Hudson, and Tarrytown their homes precisely because of the scenic views and tranquility that the majesty of the Hudson River provides, but it is also fails to reveal the lead agencies' assessment of how the magnified scale of the Replacement Bridge Alternative will reach a greater number of residents along the coastlines. Additionally, even though the "closest and most sensitive viewers," i.e., the residents at the Quay Condominiums and on Van Wart Avenue and Hudson Place, would "continue to have views of a highway with a toll plaza,"[75] the grand scheme of the massive new bridge structures would be

[74] *See* DEIS at 9-18.

[75] *See id.* at 9-23 to 9-24.

even more magnified and uglier than what they already have. Again, the DEIS's use of the "apples to apples" comparison is legally misguided and factually incorrect.

C. The DEIS fails to assess mitigation and discuss ways to minimize the visual impacts to local residents.

The DEIS does not explain why "measures to avoid, minimize, rectify, or reduce the impact as well as compensate for the impact, have not been identified."[76] An admission of a failure by the lead agencies to create and identify mitigation remedies does not excuse lead agencies from their legal responsibility to mitigate impacts.

D. The DEIS does not model and forecast how the construction of a series of taller and wider bridges with a thicker understructures and wider widths between piers will alter wind patterns on the Hudson River, which may affect recreational boaters and sailors.

Each year, thousands of sailors and boaters use the navigable waters around and under the current Tappan Zee Bridge for recreational purposes. The Tappan Zee immediately north of the existing Tappan Zee Bridge is the site of regularly scheduled sailing races on many weekday evenings and every weekend of the sailing season. These races are conducted on race courses that approach within ¼ mile of the existing Tappan Zee Bridge. Prevailing afternoon winds on the Hudson during the summertime are southerly seabreezes. The existing Tappan Zee Bridge causes a wind shadow in these southerly breezes which can adversely affect sailing competitions in the Tappan Zee. Replacement of the existing bridge with two wider structures will have a further adverse impact on sailing conditions for this important Hudson Valley recreational resource. Riverkeeper requested in its Comments on the Scoping Documents of the Tappan Zee Bridge Environmental Impact Statement (Nov. 15, 2011) that a discussion of this topic be included in the DEIS. However, the DEIS has failed to study and discuss the impacts that construction activities and the presence of the Replacement Bridge Alternative will have on wind patterns, which will directly and significantly affect racing sailors' use and enjoyment of the public waters. The adverse impacts on wind conditions on the Tappan Zee must be modeled and included in the environmental impact statement for an intelligent assessment of the adverse impacts on this recreational resource.

E. The DEIS fails to adequately consider impacts on historic and cultural resources in the construction area and vicinity around the Tappan Zee Bridge.

As a result of the proposed project, there will be several significant and irreversible impacts to the historical and cultural resources of the surrounding Westchester and Rockland county communities. While the lead agencies have attempted to consider the impact of the project on historic and cultural resources pursuant to Section 106 of the National Historic

[76] *See id.* at 9-27.

Preservation Act (NHPA),[77] they have done so inadequately, while mischaracterizing the importance and significance of the historic and cultural splendor of the lower Hudson Valley.

The DEIS quickly dismisses the potential adverse impacts the project will have to many historic and National Registry-eligible properties, such as Lyndhurst, Sunnyside, the Irving Historic District, the South End Historic District, and others.[78] Without providing more detail, the DEIS dismisses these adverse impacts by stating in conclusory language, for instance, that "the proposed project would not diminish the integrity of the resource's setting or otherwise adversely affect the historic character of the property" and that the "replacement bridge would not change aspects of [the property's] setting that contribute to the historic significance nor would it diminish the integrity of the property's significant historic features."[79] Essentially, the DEIS implies that the visual presence of a significantly larger bridge, not to mention the added noise and traffic that will be brought to the region due to potentially increased bridge volumes, is not a significant enough factor to determine the historic or cultural adverse impacts. It is an affront to the historic and cultural majesty of the region to dismiss the way that the new Replacement Bridge might adversely impact these priceless resources.

XI. The DEIS Has Not Adequately Studied The Adverse Impacts Associated With Hazardous Materials, and Does Not Explain How Engineering Controls Will be Employed to Control Resuspension of PCBs, Metals and Other Toxins.

In assessing the environmental impacts of the construction of the Replacement Bridge Alternative and demolition of the existing Tappan Zee Bridge, the DEIS focuses its study area on the existing Tappan Zee Bridge and adjacent upland parcels on both sides of the Hudson River. Notably, this study area does not include a review or study of hazardous materials, such as polychlorinated biphenyls (PCBs) and metals in the water itself or subsurface sediments. The level of disruption of this ecosystem has not been fully analyzed, and the DEIS does not discuss how construction, dredging, or demolition activities might cause resuspension of PCBs, metals and other hazardous materials located in the river sediments. The DEIS merely states that "Construction of the Replacement Bridge Alternative would not result in any adverse impacts to workers or the surrounding communities because a variety of procedures would be implemented to manage hazardous materials."[80] These statements are purely conclusory and self-satisfying

[77] Providing that federal agencies must consider the effect of their actions on any properties listed on or determined eligible for listing on the National Register of Historic Places (NR) and afford the federal Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings, and determine in consultation with the State Historic Preservation Office (SHPO) whether the proposed action would have any adverse effects on the characteristics of a property that qualify it for the NR. *See* DEIS at 10-1.

[78] *See, e.g.,* DEIS at 10-27 to 10-32.

[79] *Id.*

[80] *See* DEIS at 18-110; *see also* DEIS at 17-1 (providing that "project operation would not result in adverse impacts because the potential for exposure to any such materials in the subsurface (i.e., soil and

proclamations that provide no reasonable assurances to the public that studies have been conducted and that appropriate measures to protect against contamination and resuspension will be installed *prior to* the commencement of construction and dredging activities. More to the point, the DEIS does not explain *how* these "variety of procedures" will work to "limit or control" exposure, or how they will protect against contamination and resuspension of PCBs. Rather, all the DEIS promises is that "subsurface investigations [will be] done to understand the nature of potential contaminants."[81] The DEIS does not explain when or where these subsurface investigations will be conducted. Without such information, it is impossible for the public to review the methods proposed to be employed and provide meaningful comments to lead agencies.

As the EPA and NYSDEC have learned through their site remediation and cleanup efforts of PCB-contaminated sites in the Hudson River at the General Electric Site in the Upper Hudson River and the BP-ARCO Site in Hastings-on-Hudson, New York, the importance of fully characterizing the sedimentation before conducting in dredging and other construction activities cannot be underestimated. Containment and prevention of PCB and metals resuspension can be difficult during dredging activities in deep water, but the DEIS has largely failed to consider and plan for such exigencies in order to protect the Hudson River ecosystem from resuspension of PCBs, metals, and other hazardous contaminants.[82]

XII. The DEIS Fails to Properly Assess the Impacts of Constructing a New Bridge and Demolishing the Old One on the Hudson River Ecosystem.

A. Endangered Species

The Hudson River provides a habitat for both the federally listed endangered Shortnose Sturgeon and the Atlantic Sturgeon-New York Bight Distinct Population Segment, which has recently been listed by the National Marine Fisheries Service (NMFS) as an endangered species.[83] These two species are in addition to other fish populations in the Hudson River that

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groundwater) would be limited and controlled following construction, and any hazardous materials used, stored or disturbed as part of operation would be properly managed to avoid the potential for exposure.").

[81] *Id.*

[82] Dredging will result in the release of PCBs, metals and other contaminants into the water column. Once disturbed, they will then be available for uptake by biota: an important environmental exposure concern. *See* Todd S. Bridges et al., *The Four Rs of Environmental Dredging: Resuspension, Release, Residual, and Risk*, U.S. Army Corps of Engineers: Engineer Research and Development Center, 2 (2008), http://el.erdc.usace.army.mil/elpubs/pdf/trel08-4.pdf.

[83] The Atlantic Sturgeon was listed as an endangered species on Feb. 6, 2012. *See* Final Rule, Endangered and Threatened Wildlife and Plants; Threatened and Endangered Status for Distinct Population Segments of Atlantic Sturgeon in the Northeast Region, 77 Fed. Reg. 5880 (Feb. 6, 2012), *available at* http://www.nmfs.noaa.gov/pr/pdfs/fr/fr77-5880.pdf.

are also in decline, such as the American Shad.[84] The proposed Project, including both building the new bridge and demolishing the old bridge, is clearly a regional scale public works project that would involve a *substantial* amount of construction work in the Hudson River. The DEIS, however, does not adequately consider the full and potentially devastating effects of the construction and dredging that will occur on the Hudson River ecosystem in the Tappan Zee area, particularly on the endangered Shortnose and Atlantic Sturgeon. The lead agencies should issue a Supplement to the DEIS that includes the final Biological Opinion ("BO") from NMFS (addressing the Shortnose and Atlantic Sturgeon), information on the critical habitat of these endangered species (once determined), and the results of the Pile Installation and Demonstration Project. This will provide the public with an opportunity to comment and provide input on the assessment of impacts to the River, and any proposed mitigation measures, as well as alternative approaches that could avoid any adverse impacts (e.g., alternative construction methods). In order to comply with NEPA, the Final EIS for this Project should not be issued until a Supplement is issued for public comment. The new information described above must be fully considered by the lead agencies in their preparation of the final EIS, and a responsiveness summary included in the FEIS that includes the lead agencies' responses to all comments on the DEIS and any Supplements that are issued.

1. Section 7 Consultation Process

Section 7 of the Endangered Species Act (ESA) requires federal agencies to coordinate with the U.S. Fish & Wildlife Service (FWS), in consultation with NMFS, for actions that may affect listed species or their designated habitat. 50 C.F.R § 402.12 provides that formal consultation is required if it is determined that a project may affect listed species or a critical habitat.[85] Page 6 of the Biological Assessment states that the overall effects of the Project are likely to adversely affect both the Shortnose and Atlantic Sturgeon. Therefore, the Federal Highway Administration (FHWA) is responsible for initiating this Section 7 Consultation process, pursuant to the Endangered Species Act, and must comprehensively assess the impacts of the bridge proposal on Shortnose and Atlantic Sturgeon and their habitats.

FHWA has begun the consultation process, in compliance with Section 7(c) of the Endangered Species Act, by preparing a Biological Assessment, which address the proposed action and its potential impact to the Shortnose Sturgeon and Atlantic Sturgeon. The next step of the formal consultation process requires NMFS to review all relevant information, evaluate the current status of the relevant listed species, evaluate the effects of the proposed action and cumulative effects on the listed species, formulate an opinion regarding whether the proposed

[84] *See* Richard M. H. Seaby & Peter A. Henderson, *The Status of Fish Populations and the Ecology of the Hudson*, 28 (April 2009), http://www.riverkeeper.org/wp-content/uploads/2009/06/Status-of-Fish-in-the-Hudson-Pisces1.pdf; *see also State bans Hudson River shad fishing*, THE KINGSTON DAILY FREEMAN, March 18, 2010, http://www.dailyfreeman.com/articles/2010/03/18/news/doc4ba1ac47e1232790359872.txt

[85] 50 C.F.R. § 402,12(a) (2011).

action is likely to jeopardize the continued existence of the listed species, formulate discretionary conservation recommendations that would reduce or eliminate the impacts of the proposed action on listed species, formulate a statement concerning any incidental take of the listed species,[86] and formulate an opinion regarding any reasonable and prudent alternatives to the proposed project and reasonable and prudent measures that could be taken.[87] Formal consultation concludes when NMFS issues a "biological opinion."[88]

The lead agencies may not finalize the Environmental Impact Statement for this Project without first concluding the ESA Section 7 consultation process. Again, the Section 7 consultation process requires that NMFS make a determination that the construction of this bridge is "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species."[89] The lead agencies may not proceed and finalize this Environmental Impact Statement before this determination by NMFS has been made, because if it is found that this Project *will* likely jeopardize the continued existence of the Shortnose and Atlantic Sturgeon, or that an incidental take permit needs to be issued for the harming of either of these species, then certain conditions will need to be placed on how the Project may proceed. Furthermore, the fact that the Section 7 consultation process has not been completed means the public has not been given the opportunity to review the Biological Opinion and provide comments. Once this has occurred, then the final Biological Opinion should be included in a supplemental DEIS for the Tappan Zee Hudson River Crossing Project, which should then be put out for public comment of its own. Only then will there be meaningful public participation on the issue of the impacts of this Project on these two endangered species in the Hudson River. This final Biological Opinion should also be included in the Final EIS for this Project.

2. Designation of Critical Habitat

Section 4 of the Endangered Species Act provides that a species' critical habitat must be determined at the time of its listing.[90] Critical habitat for Shortnose Sturgeon has not been designated, despite the species being listed over forty years ago.[91] Critical habitat also has not

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[86] A statement from NMFS concerning any incidental take must specify the amount or extent of the impact, any "reasonable and prudent measures that the Director considers necessary or appropriate to minimize such impacts," and any "terms and conditions (including but not limited to, reporting requirements) that must be complied with by the Federal agency or any applicant to implement [such] measures." 50 C.F.R. § 402.14(i) (2011).

[87] *See* 50 C.F.R. § 402.14(g) (2011).

[88] *See* 50 C.F.R. § 402.14(l).

[89] 16 U.S.C. § 1536(a)(2) (2006).

[90] 16 U.S.C. § 1533(a)(3)(A)(i).

[91] Shortnose Sturgeon were listed as endangered on March 11, 1967 under the Endangered Species Preservation Act of 1966, the predecessor to the Endangered Species Act of 1973. *See NOAA Fisheries*

been designated for the New York Bight Distinct Population Segment ("DPS") of Atlantic Sturgeon. In its February 6, 2012 public notice of the Atlantic sturgeon listing, NMFS announced that it was soliciting information from the public that could help inform its designation of habitat for listed DPS populations in the Northeast region.[92] NMFS also indicated it would issue further public notices regarding critical habitat designation in the future.

An endangered species' "critical habitat" will include "the specific areas . . . (I) essential to the conservation of the species and (II) which may require special management considerations or protection."[93] Accordingly, the designation of either or both of these species' critical habitats may require there to be special management considerations within the area in which the new Tappan Zee Bridge is to be constructed. If this occurs, then the current plan for construction could quite possibly need to be altered, or additional mitigation measures implemented, in order to meet such special management considerations. Designation of critical habitat within the area affected by the Tappan Zee bridge replacement project would require additional alteration and supplementing of the DEIS. In order to avoid the risk of damaging, destroying or permanently altering habitat before this determination is made, the lead agencies should not issue a final EIS until NMFS has determined the critical habitat for both species.

B. Dredging Impacts

This Project proposes to include dredging a channel across the Hudson River on a magnitude that has never before been seen. It is estimated that construction of the short span option would result in a total of 1.68 million cubic yards of material being removed during dredging, and 1.74 million cubic yards for the long span option.[94] The extent of the dredging that would occur as a result of this Project is going to destroy or cause long-term damage to significant areas of habitat that is critically important to many of the River's native species and it will likely be fatal to individual Shortnose and Atlantic Sturgeon. Dredging will also certainly cause the loss of benthic macroinvertebrates and their habitat.[95]

Furthermore, this extensive dredging across the Hudson River would result in the resuspension of contaminants in the River. As discussed above, the DEIS does not discuss how the dredging activities might cause resuspension of PCBs, metals, or other contaminants trapped in the river sediment. The Biological Assessment prepared by FHWA concludes that "while

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Office of Protected Resources, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, http://www.nmfs.noaa.gov/pr/species/fish/shortnosesturgeon.htm (last visited March 29, 2012).

[92] *See* Final Rule, Endangered and Threatened Wildlife and Plants; Threatened and Endangered Status for Distinct Population Segments of Atlantic Sturgeon in the Northeast Region, 77 Fed. Reg. 5880 (Feb. 6, 2012), *available at* http://www.nmfs.noaa.gov/pr/pdfs/fr/fr77-5880.pdf.

[93] 16 U.S.C. § 1532(5)(A)(i) (2006).

[94] DEIS, Appendix H-5, Dredged Materials Management Alternatives, at 2.

[95] *See* DEIS at18-82.

dredging and armoring of the bottom will result in a temporary reduction in foraging opportunities [for the Shortnose and Atlantic Sturgeon], the project will not jeopardize the continued existence of the shortnose or Atlantic sturgeon populations of the Hudson River." However, this is a conclusory statement and is not adequately explained with specific or reliable data.

In the Fact Sheet prepared by NMFS to accompany the listing of Atlantic Sturgeon as Endangered, NMFS lists dredging as one of the primary threats to the New York Bight population.[96] According to NMFS, dredging can displace individual sturgeon while it is occurring, and affect the quality of the habitat afterwards by altering depth, sediment characteristics and prey availability.[97] In the case of this project, NYSDOT is proposing to dredge a massive, deep channel across the Hudson River that will transect the river and any habitat in the area, and will remain for at least four years, which does not even include the time it will take to demolish the existing bridge.[98] Clearly, a dredging project of this magnitude is likely to result in severe impacts to individual sturgeon and any habitat that is in the area affected by this project. NMFS notes that, at the time of the listing, only 870 adult spawning age Atlantic sturgeon were known to remain in the Hudson River. This alarmingly low number is one to two orders of magnitude lower than historic population levels.

The DEIS further acknowledges that dredging activities have been "identified as [one of] the most significant threats to the viability of Atlantic sturgeon populations."[99] However, the lead agencies are inexplicably not planning to incorporate alternatives to dredging into the plan for construction of the bridge. The DEIS only briefly mentions two alternate construction methods that could be utilized in an effort to avoid the need to dredge an access channel across the River: (1) the use of overhead gantries for the construction of foundations and (2) the implementation of a full-length temporary trestle for access.[100] The reason the lead agencies give for rejecting this second option is that construction of these foundations would be "expensive and time-consuming."[101] Yet, the DEIS includes no analysis of the costs of these alternate construction methods in comparison to dredging. In fact, the cost of dredging could range between $17 and $297 million depending on whether placement of dredged material in the HARS is authorized.[102] If placement in the HARS is not authorized, the relative "expense" of

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[96] *See Atlantic Sturgeon New York Bight DPS Fact Sheet*, NOAA FISHERIES SERVICE, http://www.nmfs.noaa.gov/pr/pdfs/species/atlanticsturgeon_nybright_dps.pdf (last visited March 29, 2012).

[97] *Id.*

[98] *See* DEIS at 18-6.

[99] DEIS, Appendix F-4, Biological Assessment, at 18.

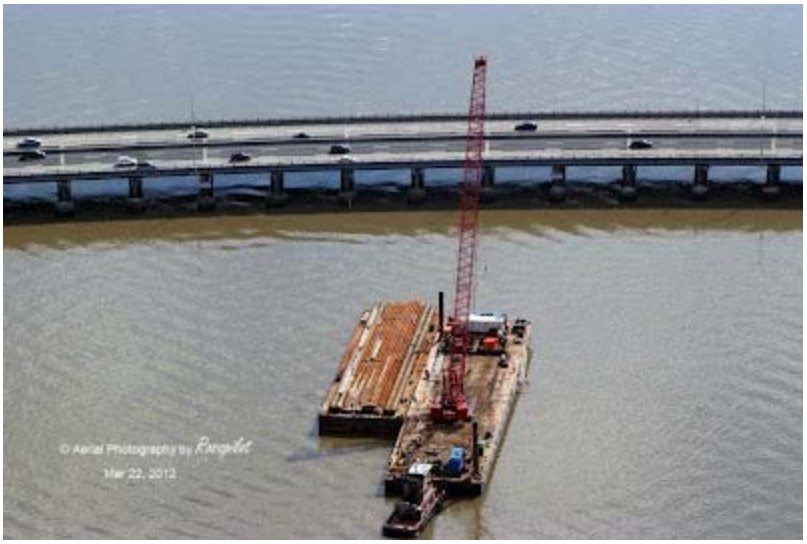
[100] DEIS at 18-6.

[101] *Id.*

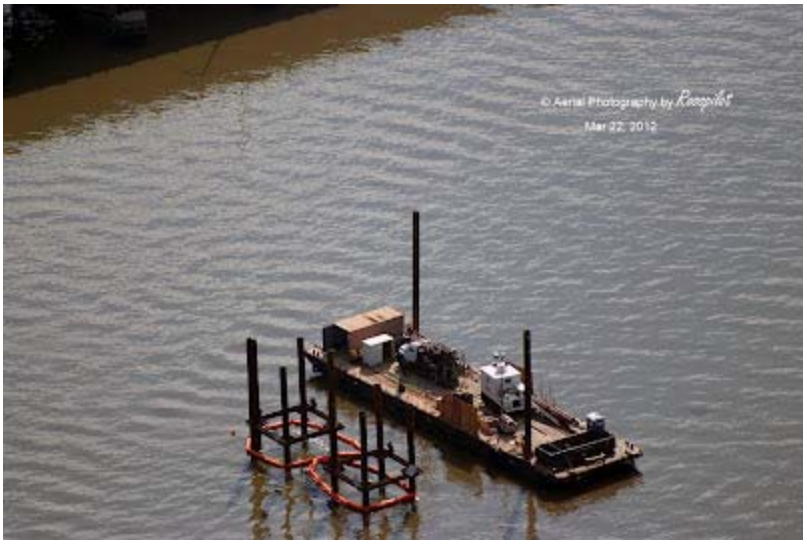
[102] DEIS, Appendix H-5, Dredged Materials Management Alternatives, at 10.

alternatives to dredging would change significantly. Therefore, again, the public is not able to evaluate the true costs and benefits of all the alternatives. While time and money are certainly important considerations to take into account in the context of any construction project, sometimes these costs are worth the benefit of protecting our natural environment, including the protection of federally-listed endangered species. The lead agencies must provide additional information to the public on the costs of these alternate construction methods, and they must fully explain why alternate dredging practices were rejected in the DEIS.

The current project- related activity occurring in the Hudson River near the Tappan Zee Bridge supports Riverkeeper's concerns regarding the inadequate consideration of dredging alternatives. The images below, taken last week, show a crane barge, deck barge with steel pilings aboard, and a tending tugboat, conducting pile driving tests as part of the Pile Installation and Demonstration Project ("PIDP") described in Section XII (C) below.



This equipment is driving test piles for the "Pile Installation Demonstration Project" (PIDP), seen in the image below.



The depth at low tide at this location is 8 feet. These images demonstrate that heavy pile driving equipment and tugs can operate within the existing depths available next to the bridge.

C. Pile Installation and Demonstration Project

The DEIS is also deficient in that it does not include finalized information on the extent of the harm that will occur to the fish population, as a result of the noise and vibration from pile installation in the River. It is stated in the DEIS that NYSDOT and NYSTA will undertake a Pile Installation and Demonstration Project (PIDP) and "will install and test the structural performance of a number of piles of varying diameters and monitor the efficacy of various noise attenuation measures," but the data from these test programs is not going to be shared with the

public before the Final EIS for this Project is released, and it is unclear how or whether this information will be considered in the preparation of the Final EIS.[103] If the PIDP project results show that impacts from pile driving on sturgeon and other species are more severe than anticipated, the lead agencies have not explained in the DEIS how they will revise existing mitigation measures, or propose new mitigation, to reduce these impacts. In addition, the public will not have the ability to review and comment on these data, due to the fact that the PIDP was not undertaken with enough lead time for the results of the study to be included in the DEIS (which was hurriedly issued by the lead agencies a mere two months after the deadline for the public to submit scoping comments). Riverkeeper hereby requests that the results of the PIDP be included in a supplemental DEIS that is released for public comment, and integrated into the NEPA and SEQRA process prior to the issuance of a Final EIS and SEQRA findings. Without a Supplement the lead agencies would be effectively eliminating the legally-mandated public participation component of the environmental review process on this critical issue.

D. Impacts to Designated Essential Fish Habitat

The DEIS fails to adequately analyze project impacts to designated Essential Fish Habitat (EFH). The designation of EFH is required by the Magnuson-Stevens Fishery Conservation Management Act[104] and is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The Mid-Atlantic Fisheries Management Council (MAFMC) is tasked with designating EFH within the Hudson River and has designated EFH for thirteen species within the Tappan Zee Bridge Project area.[105]

In analyzing the impacts to EFH caused by the dredging of the access channel the DEIS states that "dredging activities for the project have the potential to remove benthic macroinvertebrates including oyster beds, and the food and resources they provide to other aquatic resources. Approximately 165-175 acres of bottom habitat—including about 5.3 acres of NYSDEC regulated littoral zone tidal wetland and 160-170 acres of open water benthic habitat would be dredged…"[106]

The DEIS concludes that dredging would result in a **sizable loss** (emphasis added) of bottom habitat and temporary alteration of this habitat could affect foraging opportunities."[107] The DEIS dismisses these "sizable losses" by stating that "benthic communities found in environments with a great deal of variability such as estuaries generally have high rates of

[103] DEIS at S-10.

[104] 16 U.S.C. § 1801—1883 (as amended by the Sustainable Fisheries Act of 1996).

[105] DEIS, Appendix F-3, Essential Fish Habitat, at 26.

[106] *Id.* at 31.

[107] *Id.* at 75.

recovery from disturbance, because they are adapted to disturbance."[108] The DEIS concludes that dredging would result in the loss of "individual" macroinvertebrates, but "is not expected to result in adverse impacts of these species at the population level within the Hudson River Estuary."[109]

The conclusion posited by the DEIS that estuaries have high rates of recovery from disturbance because they are adapted to disturbance is circular and without and scientific justification. Similarly the conclusion that there will be no adverse impacts to macroinvertebrate species on an estuary-wide basis ignores the relevant scope of impacts for the DEIS within the designated project area.

In a similar fashion the DEIS states that impacts to fish could occur from the temporary loss of habitat resulting from dredging the access channel. "These impacts would occur, in part, as a result of a localized reduction in benthic fauna."[110] Although the DEIS later describes the loss as "sizable" this section refers to the "dredging footprint" as a "very small percentage of the Hudson River Estuary."[111]Again, the relevant scope of impact for the DEIS and for the assessment of impacts to Essential Fish Habitat is the designated project area (and the area of designated Essential Fish Habitat), not the entire Hudson River Estuary.

For the reasons stated above, the DEIS's assessment of project impacts to EFH is inadequate and fails to properly characterize the impacts to EFH and the thirteen fish species within the project area regulated by the MAFMC.

XIII. The Aquatic Sampling Program ("ASP") and Biological Assessment ("BA") for Endangered Shortnose and Atlantic Sturgeon are Inadequate and Rely on Flawed Scientific Methodology that Fails to Accurately Assess Impacts to these Endangered Species and Aquatic Habitat.

The following comments summarize the review of the DEIS conducted by Carpenter Environmental Associates, Inc. ("CEA") for Riverkeeper (incorporated by reference and attached as Exhibit 3 hereto). Due to the significant inadequacies of the BA, Aquatic Sampling Program and underlying methodology, the lead agencies must address and correct all of the insufficiencies and data gaps described by CEA and issue a Supplement to the DEIS that includes the revised studies and makes them available for public comment, prior to issuing the final EIS and moving forward with this project.

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[108] *Id.* at 76.

[109] *Id.*

[110] *Id.* at 36.

[111] *Id.*

- CEA identified a number of instances in the Aquatic Sampling Program (ASP) where more information regarding the Atlantic and Shortnose Sturgeon populations must be provided. The Biological Assessment bases its assumptions on the conclusion that there is "no discernible trend regarding the presence or absence of shortnose sturgeon can be inferred from the data."[112] A more detailed analysis and discussion detailing occurrences of the Shortnose Sturgeon populations within and adjacent to the site is required to fully assess project impacts.

- CEA identified a number of instances in the Aquatic Sampling Program where survey sampling methodologies for Atlantic Sturgeon populations were insufficient. For example, the inadequate methodology regarding the use of gill nets likely contributed to the fact that no Atlantic sturgeon were collected during the one year ASP study, yet 562 Atlantic sturgeon were collected during the 21/2 year study performed by USFWS and NYSDEC.[113]

- CEA identified a number of instances in the BA where mitigation for disturbances to Atlantic and Shortnose Sturgeon populations was not addressed or insufficient.

- Disturbances to Atlantic and Shortnose Sturgeon populations within the project area due to the proposed installation of permanent platforms were not adequately assessed. For example, the project would require permanent platforms in the river that would destroy over 2 acres of overwintering and foraging habitat for Atlantic and Shortnose sturgeon. CEA found that the BA failed to thoroughly examine mitigation measures to address this loss of essential habitat.[114]

- Disturbances to Atlantic and Shortnose Sturgeon populations within the project area due to the proposed dredging were not adequately assessed. CEA notes that NMFS has identified dredging operations as causing sturgeon mortality in at least several other similar estuaries. CEA states that significant additional study of the dredging impacts are needed, given the historic scale of the proposed dredging operation.[115]

- Disturbances to Atlantic and Shortnose Sturgeon populations within the project area due to the effects of the sound from pile driving were not adequately assessed. CEA notes that the studies cited in the BA to support its conclusions regarding the impacts of pile driving on sturgeon populations "do not accurately represent the proposed project."[116]

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[112] Exhibit 3, CEA In-River Impacts Technical Report at 1.

[113] *Id.* at 2-3.

[114] *Id.* at 5.

[115] *Id.*

[116] *Id.* at 6.

XIV. The Army Corps Authorization under Nationwide Permit 15 for Compliance with Section 404 of the Clean Water Act Should Not Be Granted and Cannot Be Granted until Section 7 ESA Consultation is Completed.

The DEIS at 3-3 lists all applicable federal and state regulatory requirements, permits, and approvals required for the project, including Section 404 of the Clean Water Act. On January 27, 2012, the United States Army Corps of Engineers (Army Corps) issued a public notice (NAN-2012-0090-WSC)[117] announcing public hearings on the DEIS. This notice also contained a notification that the Army Corps had made the preliminary determination that potential discharges of dredged and fill material into Waters of the United States associated with construction of the replacement bridge (i.e. channel armoring, fill needed to extend an access bulkhead, and return flow from dredged material dewatering operations) would be eligible for authorization under a Corps of Engineers Nationwide General Permit, contingent upon authorization of the replacement bridge by the United States Coast Guard pursuant to Section 9 of the Rivers and Harbors Act of 1899.[118]

Corps of Engineers Nationwide General Permit (NWP) 15 covers U.S. Coast Guard Approved Bridges[119] and authorizes "[d]ischarges of dredged or fill material incidental to the construction of a bridge across navigable waters of the United States, including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills."[120]

The NWPs are authorized under section 404(e) of the Clean Water Act and "authorize minor activities that result in minimal adverse effects on the aquatic environment that would likely generate little, if any, public comment if they were evaluated through the standard permit process with a full public notice."[121]

The Army Corps preliminary determination to authorize the Tappan Zee Bridge Project under NWP 15 is flawed. As discussed previously, the effects to the aquatic environment of the project generally, and the dredging of the access channel specifically, cannot be in any way described as "minimal." Additionally, this project is not one that would generate little, if any,

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[117] Army Corps of Engineers Public Notice NAN-2012-0090-WSC (Jan. 27, 2012), *available at* http://www.nan.usace.army.mil/business/buslinks/regulat/pnotices/201200090.pdf

[118] *Id.* at 3.

[119] 2012 Nationwide Permits, Conditions, District Engineer's Decision, Further Information, and Definitions (with corrections), *available at* http://www.usace.army.mil/Portals/2/docs/civilworks/nwp/2012/2012nwps_corrections.pdf [hereinafter NWP 2012].

[120] NWP 2012 at 10.

[121] Reissuance of Nationwide Permits, 77 Fed. Reg. 10,185 (Feb. 21, 2012), *available at* http://www.gpo.gov/fdsys/pkg/FR-2012-02-21/pdf/2012-3687.pdf.

public comment. For this reason the proposed authorization of this project under a NWP is inappropriate.

If it is determined that authorization of the project under NWP 15 is appropriate, such authorization cannot occur until after an Endangered Species Act Section 7 consultation is completed. Nationwide General Permit Condition 18 (which applies to all NWPs) states that "No activity is authorized under any NWP which 'may affect' a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.[122] "Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized."[123]

Until such time as the Section 7 consultation has been completed, authorization under NWP 15 for the discharge of dredged and fill materials into Waters of the United States cannot be granted.

XV. The DEIS Violates and Ignores the Land Use Comprehensive Plans of Affected Communities, Which Call For Immediate Mass Transit Options and Preservation of Environmentally Sensitive Areas.

The DEIS acknowledges and describes the various comprehensive plans of the affected villages for use in planning land use, building codes, transportation plans, eminent domain, zoning ordinances, overlay districts, and redevelopment and revitalization. Nonetheless, the DEIS completely fails to consider these comprehensive plans that are essential to meeting future local and regional goals. Most notably, the majority of these plans call for the need for mass transit on the bridge. For instance, the Rockland County Comprehensive Plan (adopted March 1, 2011) explicitly expresses a preference for the construction of a bridge that is "BRT ready" and includes High Occupancy Vehicle (HOV) lanes. In addition, it foresees a bridge capable of commuter rail in future, and requests an examination of the feasibility of allowing buses to bypass congestion by using shoulders. The Orangetown Plan also considers construction of an additional rail line and encourages increased mass transit use. The Westchester County 2025 Plan (adopted May 6, 2008 and amended Jan. 5, 2010) supports "transportation alternatives that improve mobility choices of workers, consumers, and residents and that improve air quality." Finally, the 2010-2035 Regional Transportation Plan (RTP) conceives of any bridge replacement as including Bus Rapid Transit (BRT) and commuter rail components. Just because the RTP notes that these projects "are somewhat fluid and may change over time as planning work

[122] NWP 2012 at 30-31.

[123] *Id.*

proceeds, specific alternatives are chosen, and conditions change" does not mean that lead agencies are authorized to fully abandon or not even consider the RTP's intentions and goals.

Besides mass transit, these comprehensive plans also require the consideration of other important components, which the DEIS fails to assess or consider. For instance, the Tarrytown Comprehensive Plan (adopted in March 2007, based on the previous Tappan Zee/I-287 Corridor Project) explained that development projects must ensure that new development respects environmentally sensitive areas – particularly water resources – and preserves the scenic quality of the community." The Westchester County 2025 Plan calls for the preservation and protection of the "quality of scenic routes."

XVI. The Replacement Bridge Alternative Will Violate State Implementation Plan (SIP) Requirements for Nonattainment Areas.

The existing Tappan Zee Bridge is located in an EPA-designated "nonattainment" area under the Clean Air Act (CAA) for particulate matter ($PM_{2.5}$) (Westchester, Rockland, and Orange counties) and Ozone (Rockland and Westchester counties), and in a maintenance area for carbon monoxide (CO) (Westchester county).[124] By law, federal agencies must conform with the applicable State Implementation Plan (SIP) before they can assist, fund, permit, and approve projects in nonattainment or maintenance areas. Under the applicable New York SIP, transportation projects (such as the proposed Replacement Alternative) "must not cause or contribute to any new localized CO, PM_{10}, and/or $PM_{2.5}$ violations, increase the frequency or severity of any existing CO, PM_{10}, and/or $PM_{2.5}$ violations, or delay timely attainment of any National Ambient Air Quality Standards (NAAQS) or any required interim emission reductions or other milestones in CO, PM_{10}, and $PM_{2.5}$ nonattainment and maintenance areas."[125]

The DEIS claims that, since the preferred alternative will increase the lanes available to automobile traffic on the bridge, it will decrease congestion and therefore not increase emissions and conform to the SIP. This analysis is cursory and short-sighted. Because the construction of the Replacement Bridge Alternative *will* increase overall capacity, *see supra* Section V, it is reasonable to assume that the project may cause or contribute to new localized violations of the New York State SI) for nonattainment areas. As a result, the microscale modeling study's projections, indicating that the Replacement Bridge Alternative would not result in an adverse microscale air quality impact to CO and PM, are based on a faulty assumption that needs to be revisited. A new study of air quality impacts, factoring for an accurate increase in vehicle capacity on the new bridge, needs to be conducted before the FEIS can reasonably and legally

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[124] *See* New York Dep't of Envt'l Conservation, NEW YORK CITY METROPOLITAN AREA 24-HOUR $PM_{2.5}$ NONATTAINMENT AREA BOUNDARY DETERMINATION, *available at* http://www.dec.ny.gov/chemical/40748.html; *see also* EPA, The Green Book Nonattainment Areas for Criteria Pollutants (Aug. 30, 2011), *available at* http://www.epa.gov/oar/oaqps/greenbk/; DEIS at 11-4.

[125] 42 U.S.C. § 7506 (2006); 40 CFR § 93.116 (2010).

conclude that no exceedances of the NAAQS or applicable incremental thresholds will be projected. This analysis should be included in the form of a Supplemental DEIS.

XVII. Lead Agencies Should Consider The Promotion and Expansion of E-Z Pass As a Legitimate Means for Reducing Congestion.

As explained in the DEIS, the use of E-Z Pass to travel across the existing Tappan Zee Bridge is a useful and highly productive means for facilitating the flow of traffic. On weekday morning peak periods, when nearly 90 percent of drivers have E-Z Pass, the eastbound toll plaza generally handles the flow of traffic with minimum delay. On weekends, however, E-Z Pass usage is less than 60 percent, which creates backed-up queues of cash-paying drivers that block access to the E-Z Pass lanes and occasionally queue back onto the bridge, creating further traffic delays. It appears, therefore, that the presence and usage of E-Z pass is a determinative factor in the traffic patterns along the bridge corridor. While the Replacement Bridge Alternative provides a needed improvement by including a third highway speed E-Z Pass lane (one more than the currently-existing two highway speed E-Z Pass lanes), more can be done. If it is ultimately found that a replacement bridge is the proper alternative, then an expansion of the number of total E-Z Pass toll booths, an increased marketing campaign encouraging E-Z Pass use and purchase, and a greater increase of high-speed E-Z Pass lanes beyond the three planned lanes would benefit traffic congestion and help alleviate many of the traffic concerns mentioned in the DEIS.

XVIII. If All The Information Provides That a New Bridge Must Be Built, Then Given The Choice Between The Two, The Long Span Alternative Is The Better Choice For The River.

Riverkeeper has argued throughout these Comments that a Replacement Bridge Alternative cannot legally proceed before the lead agencies properly consider all legitimate alternatives and conduct adequate studies on the myriad environmental impacts associated with this Project, which the DEIS fails to do. However, if – after the proper reexamination of the flaws and issues of the DEIS have been adequately addressed – it is found that a replacement bridge must be built, the long span alternative is a preferable option over the short span option, and a better choice for the Hudson River, assuming that the construction impacts for both construction projects would be similar. Specifically, the short span option will require nearly twice the number of piers (116) as the long span option (64). Fewer piers needed to be constructed and installed in the river bed will provide for a reduced impact on the river topography, ecology, and adverse effects on aquatic organisms. In addition, wider distances between piers (380 feet in the long span option as compared to 180 feet in the short span option) will provide for easier navigation access for recreational and commercial boaters as they travel underneath the bridge.

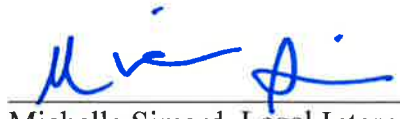
XIX. Conclusion

Central to the environmental review process is the full discussion and disclosure of available alternatives and their corresponding impacts, costs and benefits. Public participation in this process must be meaningful and robust, and the lead agencies must strictly carry out their obligations under NEPA and SEQRA. The flawed reasoning and inadequate conclusions of the Draft Environmental Impact Statement demonstrates how misguided efforts to "fast track" this project have led to unacceptable breaches in federal and state statutory and regulatory requirements. Riverkeeper fully intends to hold the project sponsors accountable for strict compliance with their environmental review obligations under federal and state law, and respectfully requests that the lead agencies go back to the drawing board and fully address the deficiencies identified herein in a Supplemental Draft Environmental Impact Statement.

Respectfully submitted,

Daniel E. Estrin, Supervising Attorney

Justin Davidson, Legal Intern



Michelle Simard, Legal Intern

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EXHIBIT 1

Technical Traffic Report by Brian T. Ketcham, P.E.

March 28, 2012

BRIAN KETCHAM ENGINEERING, PC

175 Pacific Street, Brooklyn, NY 11201, 718-330-0550, btk@konheimketcham.com

Prepared by Brian T. Ketcham, P.E., March 28, 2012

I have been asked by Riverkeeper, Inc. (the Hudson Riverkeeper) to comment on the transportation component of the Draft Environmental Impact Statement (DEIS) for the proposed replacement of the Tappan Zee Bridge (TZB) along I-287 connecting Tarrytown in Westchester County with West Nyack in Rockland County. The following comments refer to the DEIS and to related documents listed at various web sites. My comments are limited because the DEIS and related documents fail to provide any detail whatsoever regarding how conclusions are reached regarding the Project's transportation impacts. The DEIS says, in effect, "Trust us: The Bridge replacement will have no long-term negative traffic impacts."

My name is Brian T. Ketcham. I am a licensed Professional Engineer, licensed in the State of New York. I am currently retired. Before retiring I worked for more than 4 decades on various transportation engineering projects. I still operate Brian Ketcham Engineering, PC, assisting low and moderate income communities in analyzing proposed projects and holding developers and government officials accountable for compliance with environmental laws and regulations. My most recent project is the Willets Point Development Plan, in which I performed detailed technical analyses and which is currently pending in court. I have participated in dozens of other similar projects, some as large as Willets Point. I also was Vice President of Konheim & Ketcham, a full service environmental engineering firm with projects for the New York State Thruway Authority, the New York State Department of Transportation and the New York City Department of Transportation, among many other agencies and private clients, for which we prepared full environmental impact statements along with detailed traffic plans and models. K&K was closed at the end of 2006. I was also Executive Director of Community Consulting Services over twenty years during which we undertook hundreds of projects supporting low income communities on a pro-bono basis, providing more than 65,000 hours of free engineering services on projects like the Atlantic Yards project in Brooklyn and Hunts Point in The Bronx. Before this I was Executive Director of Citizens for Clean Air, an organization responsible in the 1960's for New York City's clean air programs and for bringing the first law suit against the Westside Highway Project in which the federal courts denied the City, State and federal governments permits to proceed with this project in 1975. This was the first and last time such a suit was undertaken against so large a highway project and was actually won in the public's interest. And before this I was director of the Bureau of Motor Vehicle Pollution Control for the New York City Department of Air Resources. For this organization I set up a new emissions test facility which, in 1971, had more cars equipped with catalytic emissions controls than the entire world's automotive industry. Along the way I built a three-way catalyst equipped car demonstrating we could meet Clean Air Act emissions standards and improve fuel economy, showing the Congress of the United States that if two young engineers using their own funds to accomplish what the auto industry said could not be done, certainly auto makers with billions of dollars in resources could at least match what we could do. The result was that Congress did not cave in to demands by auto makers to extend or relax emissions control deadlines. Finally, I was asked by the New York State Department of Environmental Conservation and the United States Environmental Protection Agency in 1972 to prepare New York's Clean Air Plan required by the 1970 CAA. I completed this work in less than 9 months meeting the stringent federal requirements. New York's Clean Air Plan is the most comprehensive transportation plan that

has ever been completed for New York City. For this work I was honored in 1993 by Mayor John Lindsay as the best manager in New York City government under the age of 35. Six months later I was fired by Mayor Abe Beame for trying to actually enforce the 1973 Clean Air Plan. A copy of my curriculum vitae is attached at Appendix A to this report.

My comments cover a number of issues: 1) demographics factors and their impact on travel; 2) traffic modeling; 3) the reported growth in traffic; 4) adding capacity to the TZB; 5) what might occur once the blockage reported at Exit 11 west of the TZB has been repaired at some future date; 6) traffic accident impacts not reported; 7) the externality costs of the resulting increase in traffic; 8) the resulting need for public transit; and 9) patterns of dishonesty.

1. Demographic factors and their impact on travel. The DEIS reports (Page 4-4) that Rockland County will grow by 50,000 residents between 2010 and 2047 (a 16% increase) and by 47,000 jobs (a 32% increase) during that same period; And that Westchester County will grow by 134,000 residents (a 14% increase) and by 160,000 jobs (a 30% increase) between 2010 and 2047. This information is important because auto travel increases approximately in proportion to jobs during peak travel periods and approximately in proportion to population during off-peak periods. Moreover, there is a huge disparity in the location of jobs (for example, 160,000 new jobs in Westchester County) and the location of potential employees (of the 134,000 new residents in Westchester County less than half would be available to fill the 160,000 new jobs). In other words, there would be a lot of additional travel into and out of Westchester County to fill these new jobs, many along I-287 and across the TZB. It is not clear how this was accounted for in the DEIS, nor whether or not the DEIS accounts for all this growth. Presumably this was done in the two models utilized but no details or data are provided for public review and analysis.

Compare these figures with those presented in Table 4-4 (Page 4-13) of the DEIS Chapter 4, Transportation. While the baseline used in Table 4-4 is 2005 not 2010 presented in Appendix B: Transportation, B-1, Traffic Volumes, which presents traffic volumes that are lower than reported in 2005 (the DEIS explains that this is, in part, a result of the 2008 economic collapse and the consequent loss of jobs), Table 4-4 does provide some insights. In particular, the growth in traffic during peak hour peak direction of travel. Despite the growth of population and jobs reported above, the DEIS reports that traffic across the TZB will increase by just 4% from 2005 to 2047 in the eastbound direction in the AM peak hour (compared to a 30% increase in jobs in Westchester) and by 15% in the westbound direction in the PM peak hour. In the off-peak direction, the DEIS reports considerably greater increases: 43% in the westbound direction (AM peak hour) and 51% in the eastbound direction (PM peak hour). Considering how many new jobs are projected for Westchester County (and further to the east in Connecticut), the peak direction peak hour projected traffic growth appears to be significantly underreported. And what about the peak hour peak direction shoulder hours? Does all this additional growth spill over into these hours and, if so, what effect does this spillover have on traffic on the TZB and the toll plaza? The DEIS is silent (See discussion of the Governor's I-287 Task Force report below). Note also that 65% of eastbound TZB person trips originate in Rockland and Orange counties and 63% of total person crossings are destined for Westchester County and Connecticut. (Reference "Origin-Destination Survey Results Summary," March 2004, DEIS appendix.) No discussion is included in the DEIS. The DEIS should account for traffic conditions for each hour of the day. The models used for this project have the capability of evaluating such impacts and, apparently, the data are available. Perhaps this has been done and is simply not reported. If so, why?

2. Modeling. The traffic analysis reports use of two models to examine and simulate traffic operations along the TZB: NYMTC's Best Practices Model (BPM) and the Paramics microsimulation model. However, except for a brief one-page summary of results (Table 4-4, and the March 2004 report, "Origin-Destination Survey Results Summary"), little detail is provided for review in a format that non-modelers (and even modelers) can understand. Indeed, except for the report "Origin-Destination Survey Results Summary," no other modeling results appear to be presented in the DEIS and what is presented is for the wrong direction (See DEIS, Table 4-4). This is a problem first because we are forced to take on faith the assertions based on unknown assumptions and input data. Failure to disclose details and compare those with earlier results asserted but nowhere available in the record except for Appendix B: Transportation, B-5, AECOM Future Capacity Memorandum, brings to mind my experience with the preparer of the EIS, Allee King Rosen and Flemming (AKRF) with the Willets Point Development Plan (WP). See Comment 9 for more details. Comparing the DEIS with earlier work for the TZB, it looks like the same thing is going on here as with Willets Point.

The DEIS at Page 4-5 reports on the estimated capacity for the proposed 10-lane toll plaza serving eastbound travel. Based on figures provided, toll plaza capacity is limited to about 5,400 passenger cars an hour based on the configuration described (this is for passenger cars alone; it would be less once trucks are factored into the equation). The DEIS describes severe backups eastbound during weekends because reportedly less than 60% of weekend motorists use E-ZPass (DEIS, Page 4-5). However, if the toll plaza is limited to processing just 5,400 vehicles per hour it is likely that backup will occur for much of the day in 2047 even with the low-balled estimates reported in the DEIS for travel in 2047. But the DEIS is again silent on the matter. Where are the toll plaza modeling results for this project? There are plenty of approved models that could be used if the project's consultants have not already completed such modeling. The DEIS must be augmented with modeling results including various scenarios to establish whether or not sufficient capacity is available in 2047 to accommodate all future traffic or if the toll plaza must be expanded.

3. The reported growth in traffic. There is some confusion about how the replacement Bridge would affect traffic. The DEIS claims it would not generate new trips and I agree with that statement; the Bridge itself is not a "traffic generator" since it does not, by itself, cause additional trips to be created.[1] However, as explained in the DEIS, the new Bridge is asserted have the capacity to accommodate more traffic were it not for reported blockages along I-287 near Exit 11 in Rockland County where steep grades and the reduction in travel lanes west of this interchange impede traffic flow (DEIS, Page 4-13).

Appendix B: Transportation, B-5, AECOM Future Capacity Memorandum, provides some help. Figure 1 reports a 29% increase in volume in the AM Westbound direction from 2010 to 2047. Figure 2 reports a 44% increase in the PM Eastbound direction. Both figures report reasonably good travel speeds along the Bridge with this increase in traffic. This analysis was apparently done to demonstrate whether or not three lanes would be adequate to accommodate traffic growth in the non-peak direction. What is not discussed are conditions for the peak hour peak

[1] For example, a project like the Willets Point Development Plan mentioned herein, a new multi-use development that would add millions of square feet of new activity to Queens, would produce 8,000 to 10,000 vehicle trips an hour and 80,000 vehicle trips over 24-hours is, itself, a "traffic generator."

direction of traffic flow: the eastbound direction AM peak period and westbound in the PM peak period.

Baseline traffic data are provided in Appendix B: Transportation, B-1 Traffic Volumes. They show 2010 baseline volumes in the range of 5,400 to 5,700 westbound for the PM peak period (3 to 6 PM) and in the range of 5,400 to 5,900 in the AM peak period (6 to 9 AM). A similar increase in the PM peak hour (44%) would result in approximately 8,000 vehicles per hour westbound in 2047 and in the AM peak hour (a 29% increase) in approximately 7,300 vehicles per hour eastbound in 2047. If this growth in traffic were applicable, these volumes would effectively exceed the capacity of 4 travel lanes and would definitely exceed the capacity of the toll plaza in the eastbound direction.

It is useful to compare these results with those provided to the Governor's I-287 Task Force in April 2000, "Long Term Needs Assessment and Alternative Analysis, I-287/Tappan Zee Bridge Corridor," prepared by Vollmer Associates, regarding "Key Aspects of Corridor Transportation Conditions" (Exec Sum – 2):

- "**Congestion is Growing.** Eastbound available capacity in the current AM peak is limited, causing congestion and long travel times. Westbound PM peak conditions are generally less severe but reverse commuting is growing rapidly. Growth in traffic has been greater during the shoulder hours (before and after the peak hour) than during the peak hours, resulting in a "spreading" of the peak period and shrinking of available capacity in the shoulder hours of travel." *(Ignored in the DEIS)*

- "**Future Traffic Forecasts Show Worsening Conditions.** Under either a low growth (20 percent more growth overall) or a high growth (30 percent more growth overall) forecast, future traffic levels will result in I-287 carrying volume in excess of capacity in the peak periods *(i.e., with 4 lanes of travel as proposed in the DEIS)*, resulting in lower speeds than at present and substantially greater travel times. New bottlenecks causing downstream congestion will exacerbate travel conditions. Even in the reverse commuting direction (westbound in the AM; eastbound in the PM), volumes are projected to equal or exceed capacity along the entire corridor. These forecast traffic conditions suggest that dedicated existing lanes for priority treatment of high occupancy vehicles will not solve future congestion. Lanes from the non-peak direction cannot be utilized for peak direction travel because reverse commuting is already too high and growing too rapidly. Similarly, there will be no available capacity in the peak direction that could be dedicated to buses or carpools without exacerbating congestion. Peak period congestion will spread over more hours in 2020 and the corridor will experience four rush hours rather than the current two *(i.e., in both directions in both the AM and PM peak periods)*. This renders long-term solutions that rely on shifting commuters to the shoulder periods (the hours directly before and after the rush hours) ineffectual." *(My emphasis and clarifications)*

While this was written before the financial crashes in 2002, and again in 2008, it should not be dismissed as irrelevant. As Figure 4-1 shows (following Page 4-4 of the DEIS Chapter 4, Transportation), while travel across the Tappan Zee Bridge leveled off over the decade of the 2000's, the conditions described above were for the period just prior to this leveling off when traffic volumes were apparently no different from today, and simply reinforce the expected severity of conditions in the future. Indeed, the Governor's I-287 Task Force report reports assumptions that are more severe than described in the DEIS. For example, lane capacities were

assumed to be 1,800, not 2,000, vehicles per hour as reported in the DEIS; with Moderately High Growth assumptions of 30% to 40% in traffic levels from 1999 to 2020 for both peak and off peak conditions, or 1.5% to 2% per year compared to the DEIS which assumes annual growth rates of just 0.3% per year from 2017 to 2047. As described above, this assumption is flawed because it does not match the projected growth patterns in population and jobs for counties in immediate proximity to the TZB that would be the source of most Hudson River crossings. The DEIS has to justify these enormous changes in the DEIS from earlier studies that, if wrong, will eventually reveal the fatal flaws in this current analysis. If the earlier work is ultimately proven to be correct, it also powerfully reinforces the need to include public transit in the current TZB design.

4. Effect of adding lanes including break down lanes on TZB capacity. The claim is made throughout the Scoping Report Response to Comments and the DEIS that the addition of a lane of traffic in the non-peak direction, and widening lanes and adding shoulders to the Bridge when none currently exist, will in no way increase Bridge capacity. This is simply not true. As described above, there is a need for additional capacity to accommodate the growth in existing peak period traffic and to accommodate the growth in reverse commute traffic. According to the DEIS the addition of a lane will add capacity for up to 2,000 passenger cars an hour (as also noted above, the Governor's I-287 Task Force report reports capacity limited to 1,800 passenger cars an hour). But it is not just the addition of a single lane to the TZB that adds capacity. Widening all lanes to the standard 12-foot width increases capacity as well, especially when heavy trucks are accounted for; reducing the roadway grade below 3% at the Bridge will likewise effectively increase capacity, especially for heavy trucks; the addition of breakdown lanes on the right side and shoulders on the left side permit increased travel speeds effectively increasing capacity thereby improving traffic flow and increasing traffic speeds compared to travel without these improvements. This is particularly true for accidents or vehicular breakdown when vehicles can be pulled out of the moving lane. And even with 14-foot wide right side breakdown lanes traffic delays will be significant because of "gawker effect" that frequently causes traffic to slow to half or less of designed speeds (and as reported in the DEIS—Page 4-5—accident rates along the approaches to and along the Bridge are very high). Adding shoulders and breakdown lanes clearly increases capacity compared to the existing Bridge configuration with no shoulders whatsoever. All of these issues are addressed in the Institute of Transportation Engineers Highway Capacity Manual section on freeways[2] and I am sure the consultant's simulation model is programmed to demonstrate these effects. The DEIS must be augmented to demonstrate these effects on traffic flow (analyses of before and after TZB replacement incorporating ITE HCM adjustment factors). It is simply wrong to assert that the proposed expansion of the TZB will not affect the traffic capacity of this project.

5. Effect of removing the I-287 blockage reported near Exit 11 in Rockland County. The DEIS cites blockages west of the TZB as the reason that proposed Bridge capacity will not be exceeded. Few details are provided. However, the DEIS does suggest that these blockages will divert traffic onto local roads connecting with I-287 parallel bypass roads that would impact local communities. How these diversions will reduce travel over the TZB is not clear since, as the DEIS emphasizes, there are no other River crossings either north or south of the TZB for 20 to 25 miles. Clearly if local (and regional) traffic needs to cross the Hudson River (especially heavy interstate trucks) they will find a way to the Bridge or they will shift to shoulder hours during which measured traffic volumes across the Bridge (Reference) are nearly as great as for

[2] Reference HCM2000, Chapter 23, pages 23-3 to 23-12.

peak hours, perhaps spreading the peak period from 3 to 4 hours to 5 to 7 hours. None of this is reported in the DEIS but, as described above, it was considered in the Governor's I-287 Task Force report (see discussion above). The State has ignored these diversions because it has abandoned road improvements recommended in earlier I-287 corridor studies. That action does not mean that these problems do not exist and that they will not get more severe in the future as population and jobs increase in the region demanding greater use of the TZB to cross the Hudson River. The DEIS must be amended to examine these problems in detail, providing affected communities with measures that can be adopted to mitigate these impacts.

6. Traffic accidents impacts not reported.[3] Increased traffic accidents will be significant in number. The DEIS follows the boilerplate methodology required by NYSDOT. However, it fails to account for the increase in the number of traffic accidents due to the significant growth in population and jobs in the region serviced by the TZB, generating nearly 44,000 new daily car and truck trips by 2047 and clogging I-287 and the surrounding local access roads. This error is revealed by how the DEIS reports traffic accidents—in accidents per million vehicle miles of travel. Clearly, as the phrase "accidents per million vehicle miles of travel" suggests, any increase in travel will result in additional traffic accidents. This impact is entirely ignored in the DEIS. It is done intentionally to mask the real impact of population and job growth and to sweep under the rug the real cost to a community for this increase in traffic accidents. By ignoring those effects, the DEIS also ignores yet another justification for including public transit in the proposed Bridge design.

By itself the growth in traffic along the I-287 corridor, generating 16 million more vehicle trips annually will increase annual vehicular travel by 155 million miles of travel and, because of this, produce an additional 470 traffic accidents each year. This impact is entirely ignored in the TZB DEIS. Table 1 (Tables 1 and 2 are in Appendix B) summarizes the traffic accidents estimated specifically for the growth of traffic along the I-287 corridor along with the related externality costs (more than $23 million in damages annually for traffic accidents alone). On this basis, the growth in traffic along the I-287 corridor crossing the TZB can be expected to generate 470 additional traffic accidents each year in 2047 including approximately 2 additional road deaths and nearly 160 personal injuries each year due to population and job growth and the resulting increase in vehicular travel. Table 1 provides the details on how these figures were derived. Table 1 also includes the societal costs of these added traffic accidents not covered by insurance in 2047: more than $23 million annually in costs to motorists and accident victims. This growth in the number of traffic accidents is acknowledged in the DEIS (Page 4-13): "…traffic volumes would grow and are likely to result in an increase in the number of accidents… on the bridge." This increase in accidents is simply not quantified, nor are motorist's vehicle breakdowns (e.g.,

[3] Average annual trips added to the TZB were estimated from data provided in the DEIS and referenced materials. Because the DEIS contains little information on traffic impacts it was necessary to extract from what is available. We started by digitizing traffic data provided in Appendix B: Transportation, B-1 Traffic Volumes, using that data to develop temporal, seasonal and weekday variations in travel. Using the limited data provided in Table 4-4 of the DEIS Transportation chapter, we were able to approximate future eastbound and westbound temporal characteristics for average weekday travel. These numbers were summed and adjusted for weekday and seasonal characteristics to approximate annual average travel. Annual average traffic impacts from the expected growth in travel were adjusted accordingly. The result was that the TZB can be expected to accommodate another 17 million annual trips by 2047. This annual addition to traffic moving along the TZB was used to estimate the growth in traffic accidents reported in this analysis. The tables used in this process are included as Appendix C to this Report.

mechanical failures, empty gas tanks) that total 3 to 4 times as many delays as caused by traffic accidents themselves. At 4 times the number of additional traffic accidents reported new to the TZB corridor by 2047, the Bridge would suffer 6 to 7 additional disruptions each day with obvious consequences for delay.

7. The externality costs of the resulting increase in traffic. Adding 16 million more cars and trucks to the TZB/I-287 corridor each year will generate approximate 155 million more miles of vehicular travel within about three to four miles of the TZB (from the Palisades Interstate Parkway to the interchange with the New York State Thruway). Air pollution and traffic noise will certainly be impacted, especially by the increase in diesel trucks crossing the Hudson River via the TZB that emit cancer causing particulates and other unhealthy pollutants.

Growth in traffic along the I-287 corridor will increase overall daily project traffic by about 40% on weekdays by 2047. For this reason alone the dollar cost of the environmental impacts of the replacement TZB must be evaluated in the DEIS.

In addition, the addition of 16 million more car and truck trips annually, approximately 155 million added vehicle miles of travel, to the already congested I-287 corridor, will clearly result in more congestion with increased travel times for all current and future motorists along with lost productivity to nearby businesses (as quantified below) (see also the Governor's I-287 Task Force report). This increase in travel will result in a significant increase in traffic accidents and personal injuries. The external costs borne by residents and workers along the I-287 corridor are not trivial. Accident costs, increased health care costs, pain and suffering resulting from the impacts of more traffic, are all very real totaling approximately $23 million each year for the project as reported, borne both by motorists and accident victims as well as by businesses and property owners along the I-287 corridor.

The addition of 16 million more vehicle trips generating 155 million added miles of travel comes with a financial cost to travelers along I-287 crossing the Hudson River. Table 2 summarizes the types of externalities this increase in traffic would generate. Congestion, an increase in traffic accidents and environmental damages are just the most obvious externalities.[4]

Table 2 summarizes these costs in terms of their dollar value to the community. These are costs that would be borne by existing motorists, residents and businesses alike. These costs total about $166 million dollars a year and represent a real loss to motorists and to the community in terms of lost productivity, increased health care costs, and losses associated with traffic accidents not covered by auto insurance. Congestion and lost productivity from the growth in traffic moving

[4] There are many more costs that have not been fully quantified in dollar terms that are borne by all communities from imposing new vehicular travel: storm water runoff of road salts and toxic organics that are a major source of water pollution, the damage and clean up costs of oil spills from the extraction of oil from off-shore drilling (as we so recently observed), greenhouse effects of vehicular emissions, the value of land devoted to highways and removed from our tax roles, the value of unpaid parking of cars and trucks which amount to untaxed subsidies to motorists, the cost nationwide of disposing of ten million car and truck chassis and a quarter billion tires each year, the social costs to those deprived of auto access, the foreign policy and defense costs of protecting our supplies of imported oil (the current Iraq war and other serious problems in the Middle East), and a similar array of hidden costs due to the manufacture of vehicles and the storage and refinement of petroleum products. All are part of the externalities associated with car and truck use.

across the TZB comes to approximately $38 million a year in losses; increased health care costs from air pollution, $20 million a year; traffic accident costs not covered by insurance, $23 million a year; plus all the other externalities listed in Table 2 and summarized in the footnote below, more than $85 million a year. All costs reported herein are in 2012 dollars.

Basis of Cost Estimates.[5] Costs are reported for 2010 as a baseline for the potential effects of expanding the TZB. The travel cost estimates are based on well-documented national calculations of travel costs by respected authorities [6, 7, 8] extrapolated to the New York metropolitan area, which were corrected for the region's higher density, employment, auto ownership and vehicle miles of travel. For comparison of the external costs reported herein, externality costs for car and truck operation for the 31–county New York Metropolitan Area totaled more than $108 *billion* in 2010.

8. The resulting need for public transit. The replacement Bridge would be designed to last more than 100 years. During the next 100 years travel behavior will change significantly, especially as the cost of travel skyrockets. Over the next 100 years it is reasonable to expect that gasoline will top $5, $6 even $7 per gallon in real inflation-adjusted dollars. The world has exceeded peak oil and from now on the extraction of oil will become increasingly difficult as we further deplete the world's dwindling supply of fossil fuels. Travel will become much more costly not just to own and operate cars and trucks, but to cross the TZB as toll rates are hiked to pay for this project. As Charles Komanoff has reported in StreetsBlog[9] in February 2011, this project could demand that tolls be doubled or tripled or more. The DEIS provides no means by which the Bridge would be paid for. Federal funds are currently limited especially since Congress will not increase gasoline taxes to cover very real national infrastructure needs. Travel behavior could change as more people seek lower cost public transport to get to the abundance of jobs in Westchester County and points beyond to the east yet remained domiciled in Rockland County of points to the west where housing is cheaper. The DEIS reports that the State has abandoned for now the public transit component of the TZB project and pushed it further into the future. The DEIS claims it would double the cost of the TZB to add transit at this stage of the project. It is really hard to accept that the addition of a transit lane to each bridge would cost so much. Indeed, to incorporate such a change now, widening each bridge by 12 to 15 feet (requiring some reinforcement of the foundation supports) could be done with relative ease without increasing the cost of the Bridge by more than 10% to 15%. The DEIS must be expanded to include a detailed analysis of the demand for transit along with an assessment of the effects of increasing costs for vehicular travel, along with the I-287 corridor and the resulting need to include transit in the Bridge design and implementation.

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[5] "Congestion Fee that Cuts Costly Car Use is a Bargain for All," Community Consulting Services, Inc., June 2007.

[6] "Transportation in America: A Statistical Analysis of Transportation in the United States," 20th Edition, May 2007. www.enotrans.com.

[7] "Transportation Costs and Benefit Analysis Techniques, Estimates and Implications," regularly updated on www.vtpi.org.

[8] "Final Report on the Federal Highway Cost Allocation Study," May 1982.

[9] Charles Komanoff, "Cost of Tappan Zee Bridge Mega-Bridge Could Cause Tolls to Triple.

I understand that just 2% of person trips crossing the TZB today are via public transit. However, given the certainty not even hinted at in the DEIS or related materials—that cost of travel will increase substantially forcing people to abandon long commuter trips by auto and seek alternatives for their trips to work (including relocating closer to work if affordable). The provision of dedicated transit across the TZB will prove to be a visionary strategy to assist the 99%.

9. Use of the EIS as a means of securing project approvals—patterns of dishonesty. Over the last three years I have been assisting Willets Point United to assess the 11 million square foot mixed use development for Queens near Flushing and across from the Nets CitiField Stadium—the Willets Point Development Plan (WP). The problem with the WP analyses is that they were vastly inconsistent and flawed. AKRF prepared the Draft Generic Environmental Impact Statement, the Final Generic Environmental Impact Statement, the Draft Access Modification Statement (AMR), the Phase I EIS, and the Draft EIS for the Van Wyck Ramps. Throughout their traffic analyses they used the same analytic models as reported for the TZB analyses. The problem is that each report assumed different travel characteristics for targeted audiences. Specifically, AKRF first assumed for the FGEIS 50% of WP generated trips would be diverted to the Van Wyck Expressway (VW) via the new ramps thereby minimizing local traffic impacts (the audience here was the NYC Council); AKRF then assumed just 16% of WP traffic would utilize the VW in the AMR; AKRF followed this by assuming 33% of WP traffic would utilize the VW in the EIS for the ramps. The problem with both the AMR EIS and the VW Ramp EIS is that the diversion of traffic from the VW to local access roads was ignored, thereby permitting AKRF to under report local project impacts. All the reports referenced here were prepared by AKRF and all were filled with errors and omissions. Much of this failure to report consistently and honestly was buried in the computer models used to evaluate project impacts. It took 1,000 hours of my engineering time to sort out these errors, upon which the project was stopped dead for two years beginning February 2010. Unable to respond to these disclosures, NYC EDC then attempted an end run with their Phase I segmentation proposal, itself filled with very significant errors—a report attempting to demonstrate that just 1.3 million square feet of the 11 million square foot project could be built without the need for the new Van Wyck ramps. I demonstrated that their analysis was flawed and that even 1.3 million square feet of new development at the WP site could not be done without huge traffic problems. This brief history of the Willets Point United work is provided because I see the same behavior with the latest attempt to "fast-track" a replacement for the Tappan Zee Bridge with little supporting data along with numerous errors and omissions that need correction.

10. Conclusions. Chapter 4 of the DEIS, Transportation, is limited and not convincing. It essentially asks the tax paying public and motorists to "trust" the agencies sponsoring this project. To build the Bridge without public transit in the face of growing constraints on fossil fuels and the anticipated increase in the cost of vehicular travel simply ignores vital facts to the severe detriment of the public interest. Moreover, the DEIS fails to fully document the transportation impacts of the proposed Bridge replacement, fails to present any details on modeling results assumed as backup for assertions, fails to fully consider the potential relatively near-term growth in traffic based on demographic data and especially once the bottleneck near Exit 11 on I-287 in Rockland County is cleared up, fails to account for the growth in traffic accidents and related societal costs of this increase in accident volume, fails to make a convincing case that transit should not be incorporated into the current proposed Bridge design and completely ignores the results of earlier engineering analyses that predict far more severe traffic conditions over the next two decades than are now reported in the subject DEIS.

The sponsoring agencies must be more forthcoming about traffic impacts including providing details of their modeling efforts and reporting a peak direction modeling of the entire peak periods, not just peak hours which, while worst case, do not deal with spill over traffic onto shoulder periods due to capacity constraints when traffic volumes are sure to exceed roadway and/or toll plaza capacity.

Brian T. Ketcham, P.E.

APPENDIX A

Brian T. Ketcham, P.E.
President, Brian Ketcham Engineering, P.C.

Professional Background

Brian Ketcham is an innovative transportation engineer with expertise in all transportation-related fields: traffic, transit, air quality and noise impact analyses; truck routing, parking plans, pedestrian flow, and associated socio-economic analyses. With more than 40 years of professional experience, he has performed dozens of complex traffic and mobile source air quality studies, managed environmental assessments of large-scale transportation projects (highways, shopping centers, residential developments, hospitals) and prepared several extensive truck route plans. Most have been prepared for New York City and State agencies. As a New York City official in the early 70s, he authored the nation's first transportation control plan to meet federal air quality standards, pioneering strategies that have come to be known as transportation systems management programs. Brian Ketcham is also a nationally recognized researcher on full cost accounting of transportation systems.

Relevant Experience

Directed large scale traffic analyses:

- Traffic simulation and modeling of traffic plans for the reconstruction of the Triborough Bridge (MTA), the Kosciuszko Bridge (NYSDOT), and the Queens Boulevard Bridge (NYCDOT).
- Regional Intelligent Transportation Systems (ITS) strategy study; modeled entire New York metropolitan area to identify sites for application of intelligent transportation systems strategies (NYS Thruway Authority).
- Impact and mitigation for the Manhattan West 1,100 residential dwelling unit development on upper West Side including 140 block traffic network (Private Developer).
- Impact and mitigation of the College Point Corporate Park, Queens, NY including 30 industrial and commercial trip generators (NYCEDC).
- Modeling and mitigation, and development of three alternative diversion route for more than 100 intersections in a 4 square mile area of Long Island City, Queens, NY (NYCDOT).
- Countywide impacts of 16 potential sites in Middlesex County, NJ for resource recovery facility, transfer station analysis, truck route study, traffic analysis of selected site, redesign of complex traffic circle (Middlesex County).

Performed air quality, noise impact analyses of traffic generated by large-scale developments:

- Route 347 expansion in Suffolk County, NY (NYSDOT)
- Grand Central Parkway safety improvements (2 studies), Queens (NYSDOT)
- Van Wyck Expressway safety improvements project, Queens (NYSDOT)
- Bronx River Parkway safety improvements project, Bronx (NYSDOT)
- FDR Drive at 116th Street safety improvement project, Manhattan (NYSDOT)
- La Guardia Airport expansion, Queens, NY (PANYNJ).
- Expansion of Long Island Expressway at the Sagtikos Parkway, Suffolk County, NY (NYSDOT).
- Route 25 widening, CR 83-Cr 21, Suffolk County, NY (NYSDOT).
- I-495, Exits 63-67, service improvements, Suffolk County, NY (NYSDOT).
- Route 112 widening, Route 25-I-495, Suffolk County, NY (NYSDOT).
- Route 25A widening, Suffolk County, NY (NYSDOT).
- Route 211 widening, Orange County, NY (NYSDOT).
- Route 9/I-84 reconstruction, Dutchess County, NY (NYSDOT).
- Route 240/Harlem Road widening, Buffalo, NY (NYSDOT).
- Merck World Headquarters, Reddington, NJ.
- Middlesex County, NJ resource recovery facility.
- Passaic County, NJ resource recovery facility.

Developed procedures for evaluating transit and pedestrian impacts of major land use changes:

- Developed methods to analyze impact of large-scale residential development on line haul subway capacity, bus service levels, pedestrian levels of service on subway entrances and platforms.
- Initiated study of large transportation node at portal to Manhattan for large-scale commercial project in Long Island City.
- Developed strategies for transit and pedestrian improvements on Lexington Ave. and on 34th Street.
- Developed pedestrian analytical techniques for NYC Department of City Planning; calibrated the pedestrian chapter of the Highway Capacity Manual (NYDCP).
- Developed white paper for Secretary of USDOT on transportation strategies for 1980s related to alternative land use scenarios.

Developed enforceable refuse truck routes:

- Passaic County, NJ resource recovery facility.
- Middlesex County, NJ resource recovery facility.
- Somerset County, NJ resource recovery facility.
- City of Newark, NJ for Essex County resource recovery facility.

Developed transportation management studies:

- Studied existing and future patterns of export of waste from New York City (NYCDOS).
- Directed study of avoided trucking and emissions due to Brooklyn containerport and barging (PANYNJ).
- Author of 1973 New York State Implementation Plan-Transportation Controls (NYSDEC).
- Advisor to USDOT/USEPA on Public Participation Guidelines on Transportation Planning Process.
- Managed study for NYCDOT, Reducing Taxi VMT in Manhattan CBD.
- Prepared report on congestion in Manhattan for Borough President.

Participated in regional and national transportation planning efforts:

- Principal U.S. investigator, The Four World Cities Transport Study, comparing New York, Paris, London and Tokyo.
- Using extensive database compiled for World Cities Study to develop master transit plan for Brooklyn, NY, extensively utilizing geographic information systems format (Community Consulting Services).
- Member of advisory committees on Long Range Transportation and Congestion Management Systems Plans, Congestion Management and Air Quality projects.
- Member, NYS Department of Environmental Conservation, Air Management Advisory Committee.
- Founding member and former Member of Board of Directors, Tri-State Transportation Campaign.
- Founding member and former Member of Board of Directors, Transportation Alternatives.

Developed innovative ways of characterizing the full cost of transportation:

- Wrote "Win-Win Transportation: A No-Losers Approach to Financing Transport in NYC and the Region" with C. Komanoff, presented at the AAAS Annual Meeting, Boston, February 1993.
- Presented "Making Transportation Choices Based on Real Costs" at the Transportation 2000 Conference on "Making Transportation a National Priority," Snowmass, CO, October 1991.
- Prepared "The Societal Costs of Congestion in New York City" for USEPA, December 1979.
- Developed an innovative model, which is being refined, for estimating the hidden costs of motor transport by vehicle and roadway type (Tri-State Transportation Committee).
- Organized a report to Congress on the hidden costs of motor transport nationwide for use in the debate over the 1991 Surface Transportation Assistance Act.
- Organized first-ever all day conference on the full-cost of roadway travel at the Annual Meeting of the Society of Automotive Engineers, Detroit, MI, 1973.

Education

Case Institute of Technology, B.S.M.E., 1962
Massachusetts Institute of Technology, all course work for Masters Degree in mechanical engineering, 1966

Professional Registration
Licensed Professional Engineer, 1969, New York State #045144

Societies
Institute of Transportation Engineers

Selected Professional Publications

“The Four World Cities Transport Study,” The London Reseach Centre, November 1998.

"Win-Win Transportation: A No-Losers Approach to Financing Transport in NYC and the Region," with C. Komanoff, presented at the AAAS93 Annual Meeting, Boston, February 12, 1993.

"Making Transportation Choices Based on Real Costs," presented at the Transportation 2000 Conference on "Making Transportation a National Priority," Snowmass, Colorado, October 6, 1991.

"A Validation of the Time-Space Corner and Crosswalk Analysis Method," co-authored by J. Fruin and P. Hecht, Paper No. 870389, Transportation Research Board, January 1988.

"Beyond Autocracy: The Public's Role in Regulating the Auto," co-authored with S. Pinkwas, Government, Technology and the Future of the Automobile, edited by D.H. Ginsburg and W.J. Abernathy, 1980.

"Diesel and Man", co-authored with S. Pinkwas, New Engineer Magazine, April 1978. (This article won the 1978 Business Journalism Award.)

"Environmental Impact of Goods Movement Activity in NYC," co-authored with M. Arrow and J. Coyle, Transportation Research Record No. 496, Urban Goods Movement, Transportation Research Board, National Research Council, Washington, D.C., 1974.

"The Implications of Present Trends for Air Quality," Proceedings of the International Conference on Transportation Research, Bruges, Belgium, Transportation Research Forum, Chicago, IL, 1974.

"Automotive Pollution Control: An Alternative Approach," International Conference on Transportation Research, Bruges, Belgium, June 18, 1973.

"Urban Transportation," co-authored with J.P. Romauldi, C. Stark and W. Sprietzer, Public Affairs Report No. 2, Society of Automotive Engineers, Inc., New York City, January 1973.

"Problems Associated with Air Quality Control Region Implementation Plans," co-authored with J.C. Fensterstock and M.P. Walsh, Conference Proceedings: The Relationship of Land Use and Transportation Planning to Air Quality Management, Center for Urban Policy Research and Conferences, Department, Rutgers University, May 1972.

"Urban Goods Movement and Environmental Quality," Proceedings: Metropolitan Goods Movement Symposium, United Engineering Center, New York City, March 27, 1972

"The Restructuring of Cities Through Transportation Planning," co-authored with J.C. Fensterstock, Proceedings Urban Technology Conference, American Institute for Aeronautics and Astronautics, Paper No. 71-517, May 1971.

APPENDIX B

TABLE 1

ESTIMATION OF THE NUMBER OF TRAFFIC ACCIDENTS ANNUALLY GENERATED BY 16 MILLION NEW VEHICLE TRIPS CROSSING THE TAPPAN ZEE BRIDGE IN 2047

EASTBOUND

ACCIDENT TYPE	RATE/100 MIL VMT (1)	NUMBER OF ACCIDENTS	EXTERNAL COSTS (2)
Fatal Accidents	**1.2**	**1**	**$3,929,118**
Incapacitating Injury Accidents	**23**	**16**	**$5,170,921**
Serious Injury Accidents	**46**	**32**	**$2,062,780**
Minor Injury Accidents	**85**	**59**	**$2,024,772**
Property-Damage-Only Accidents	**305**	**212**	**$771,682**
TOTAL NUMBER OF ACCIDENTS EACH YEAR		**320**	**$13,959,273**

WESTBOUND

ACCIDENT TYPE	RATE/100 MIL VMT (1)	NUMBER OF ACCIDENTS	EXTERNAL COSTS (2)
Fatal Accidents	**1.2**	**1**	**$4,828,010**
Incapacitating Injury Accidents	**9**	**8**	**$2,486,312**
Serious Injury Accidents	**17**	**15**	**$936,736**
Minor Injury Accidents	**32**	**27**	**$936,656**
Property-Damage-Only Accidents	**116**	**99**	**$360,637**
TOTAL NUMBER OF ACCIDENTS EACH YEAR		**150**	**$9,548,350**

WESTBOUND

ACCIDENT TYPE	RATE/100 MIL VMT (1)	NUMBER OF ACCIDENTS	EXTERNAL COSTS (2)
Fatal Accidents		**2**	**$8,757,128**
Incapacitating Injury Accidents		**24**	**$7,657,232**
Serious Injury Accidents		**46**	**$2,999,515**
Minor Injury Accidents		**86**	**$2,961,428**
Property-Damage-Only Accidents		**311**	**$1,132,319**
TOTAL NUMBER OF ACCIDENTS EACH YEAR		**469**	**$23,507,623**

(1) Rates based on accident data provided by NYMTC in their 2006 Transportation Safety Statistical Report adjusted for national figures presented in the NHTSA's Traffic Safety Facts 2006.

(2) Based on costs reported in "SafetyAnalyst: Software Tools for Safety Management of Specific Highway Sites, While Paper for Model 3-Economic Appraisal and Priority Ranking," prepared for FHWA by Midwest Research Institute, 2002, adjusted to 2012 dollars.

Brian Ketcham Engineering, PC, March 2012

TABLE 2

ANNUAL EXTERNALITY COSTS OF TRAFFIC GROWTH CROSSING THE TAPPAN ZEE BRIDE IN 2047

SUMMARY OF RESULTS

	Externality Costs (1)
Added Travel Time Costs (Congestion)	**$38,160,213**
Air Pollution (Health Costs)	**$20,164,204**
Noise Impacts (Health Costs)	**$3,469,110**
Accident Costs, Internal	**$15,122,738**
Accident Costs, External	**$8,384,885**
Pavement Wear & Tear	**$4,553,207**
Vehicular Wear & Tear Costs	**$4,336,388**
Other Externality Costs (2)	**$72,200,858**
TOTALS	**$166,391,604**

(1) Externality costs presented in 2012 dollars.
(2) Includes environmental degradation such as the control of water pollution, oil spills, the lost value of highway land removed from tax rolls, and, most apparent today, the foreign policy and military costs of ensuring an abundant supply of imported oil. Greenhouse gas emissions and their destabilizing effect on climate are another important environmental externality from motor vehicle use. Traffic growth crossing the Tappan Zee Bridge in 2047 will generate generate about 45,000 tons of CO2 emissions annually (assuming an average fuel economy of 35 MPG).

Brian Ketcham Engineering, PC, March 16, 2012

APPENDIX C

SUMMARY OF SEASONAL AND WEEKDAY TOTAL VOLUMES CROSSING THE TZB, 2010
WESTBOUND

WINTER	SUN	MON	TUES	WED	THUR	FRI	SAT	ANNUAL AVERAGE TOTAL
PC	42,672	53,044	53,919	53,394	55,590	58,334	50,411	
TRUCKS	531	2,186	3,495	2,499	2,371	2,250	934	
TOTALS	43,203	55,230	57,414	55,893	57,961	60,584	51,345	54,519
PERCENT SUMMER	73%	88%	91%	87%	85%	84%	78%	84%
SPRING								
	SUN	MON	TUES	WED	THUR	FRI	SAT	
PC	53,031	55,461	57,050	58,685	61,673	66,408	57,627	
TRUCKS	610	2,370	2,960	2,976	3,009	2,844	1,157	
TOTALS	53,641	57,831	60,010	61,661	64,682	69,252	58,784	60,837
PERCENT SUMMER	90%	92%	95%	95%	95%	96%	90%	93%
SUMMER								
	SUN	MON	TUES	WED	THUR	FRI	SAT	
PC	58,818	60,160	60,231	61,547	65,225	69,008	64,255	
TRUCKS	726	2,570	3,038	3,062	3,111	2,877	1,334	
TOTALS	59,544	62,730	63,269	64,609	68,336	71,885	65,589	65,137
PERCENT SUMMER								
FALL								
	SUN	MON	TUES	WED	THUR	FRI	SAT	
PC	54,174	57,326	57,758	58,923	60,607	66,179	59,111	
TRUCKS	674	2,587	2,986	2,988	2,739	2,673	1,204	
TOTALS	54,848	59,913	60,744	61,911	63,346	68,852	60,315	61,418
PERCENT SUMMER	92%	96%	96%	96%	93%	96%	92%	94%
ANNUAL WB TOTAL	19,275,285	21,507,990	22,031,126	22,271,753	23,207,156	24,689,786	21,538,011	22,074,444

Source: TZB DEIS, Appendix B: Transportation, B-1 Traffic Volumes

SUMMARY OF SEASONAL AND WEEKDAY TOTAL VOLUMES CROSSING THE TZB, 2010
EASTBOUND

WINTER	SUN	MON	TUES	WED	THUR	FRI	SAT	ANNUAL AVERAGE TOTAL
PC	35,575	43,673	43,704	41,344	42,798	41,903	36,906	
TRUCKS	646	1,497	1,532	1,471	1,515	1,235	532	
TOTALS	36,221	45,170	45,236	42,815	44,313	43,138	37,438	42,047
PERCENT SUMMER	56%	68%	72%	67%	67%	63%	61%	65%
SPRING								
	SUN	MON	TUES	WED	THUR	FRI	SAT	
PC	41,080	36,379	37,987	39,429	43,515	42,500	39,206	
TRUCKS	583	1,068	1,215	1,257	1,278	1,048	459	
TOTALS	41,663	37,447	39,202	40,686	44,793	43,548	39,665	41,001
PERCENT SUMMER	64%	56%	62%	64%	67%	64%	64%	63%
SUMMER								
	SUN	MON	TUES	WED	THUR	FRI	SAT	
PC	63,787	64,451	60,653	61,453	63,875	65,881	60,640	
TRUCKS	1,154	2,409	2,385	2,495	2,508	2,152	960	
TOTALS	64,941	66,860	63,038	63,948	66,383	68,033	61,600	64,972
PERCENT SUMMER								
FALL								
	SUN	MON	TUES	WED	THUR	FRI	SAT	
PC	46,854	44,942	44,049	48,219	49,742	51,679	44,996	
TRUCKS	837	1,754	1,674	2,059	1,783	1,598	705	
TOTALS	47,691	46,696	45,723	50,278	51,525	53,277	45,701	48,699
PERCENT SUMMER	73%	70%	73%	79%	78%	78%	74%	75%
ANNUAL EB TOTAL	17,384,585	17,900,786	17,629,409	18,042,589	18,890,028	18,979,635	16,826,865	17,950,557

Source: TZB DEIS, Appendix B: Transportation, B-1 Traffic Volumes

SUMMARY OF SEASONAL AND WEEKDAY TOTAL VOLUMES CROSSING THE TZB, 2010
TOTAL, BOTH DIRECTIONS

WINTER	SUN	MON	TUES	WED	THUR	FRI	SAT	ANNUAL AVERAGE TOTAL
PC	78,247	96,717	97,623	94,738	98,388	100,237	87,317	
TRUCKS	1,177	3,683	5,027	3,970	3,886	3,485	1,466	
TOTALS	79,424	100,400	102,650	98,708	102,274	103,722	88,783	96,566
PERCENT SUMMER	64%	77%	81%	77%	76%	74%	70%	74%
SPRING								
	SUN	MON	TUES	WED	THUR	FRI	SAT	
PC	94,111	91,840	95,037	98,114	105,188	108,908	96,833	
TRUCKS	1,193	3,438	4,175	4,233	4,287	3,892	1,616	
TOTALS	95,304	95,278	99,212	102,347	109,475	112,800	98,449	101,838
PERCENT SUMMER	77%	74%	79%	80%	81%	81%	77%	78%
SUMMER								
	SUN	MON	TUES	WED	THUR	FRI	SAT	
PC	122,605	124,611	120,884	123,000	129,100	134,889	124,895	
TRUCKS	1,880	4,979	5,423	5,557	5,619	5,029	2,294	
TOTALS	124,485	129,590	126,307	128,557	134,719	139,918	127,189	130,109
PERCENT SUMMER								
FALL								
	SUN	MON	TUES	WED	THUR	FRI	SAT	
PC	101,028	102,268	101,807	107,142	110,349	117,858	104,107	
TRUCKS	1,511	4,341	4,660	5,047	4,522	4,271	1,909	
TOTALS	102,539	106,609	106,467	112,189	114,871	122,129	106,016	110,117
PERCENT SUMMER	82%	82%	84%	87%	85%	87%	83%	85%
ANNUAL EB TOTAL	36,659,870	39,408,776	39,660,535	40,314,341	42,097,184	43,669,421	38,364,876	40,025,001

Source: TZB DEIS, Appendix B: Transportation, B-1 Traffic Volumes

SUMMARY OF TRAFFIC VOLUME DATA FOR SUMMER, 2010, USED TO ESTIMATE ANNUAL GROWTH IN TRAFFIC VOLUME USED IN ESTIMATING INCREASE IN TRAFFIC ACCIDENTS

SUMMER PASSENGER CARS WESTBOUND

	MON	TUES	WED	THURS	FRI
12 - 1 AM	729	609	690	728	850
1 - 2	365	349	372	386	484
2 - 3	237	240	266	275	339
3 - 4	192	210	224	234	288
4 - 5	273	292	304	312	373
5 - 6	644	636	640	675	742
6 - 7	1,810	1,829	1,811	1,855	1,855
7 - 8	3,118	3,240	3,243	3,252	3,150
8 - 9	3,372	3,453	3,508	3,532	3,501
9 - 10	2,882	2,828	2,881	2,960	3,186
10 - 11	3,118	2,850	2,860	3,119	3,492
11 - 12	3,340	3,006	3,097	3,351	3,890
12 - 1 PM	3,393	3,144	3,182	3,539	4,364
1 - 2	3,430	3,269	3,321	3,693	4,567
2 - 3	3,857	3,819	3,922	4,294	4,995
3 - 4	4,831	4,924	4,967	5,113	4,918
4 - 5	5,240	5,442	5,374	5,238	4,686
5 - 6	5,208	5,279	5,266	5,135	4,673
6 - 7	4,569	4,692	4,946	5,131	4,672
7 - 8	3,219	3,381	3,545	4,022	4,207
8 - 9	2,254	2,313	2,499	2,997	3,399
9 - 10	1,776	1,872	2,013	2,300	2,542
10 - 11	1,320	1,442	1,487	1,811	2,158
11 - 12	984	1,111	1,130	1,275	1,674
TOTALS	60,161	60,230	61,548	65,227	69,005

SUMMER PASSENGER CARS EASTBOUND

	MON	TUES	WED	THURS	FRI
12 - 1 AM	813	459	435	465	555
1 - 2	440	326	319	319	420
2 - 3	312	268	270	292	342
3 - 4	333	304	304	319	354
4 - 5	699	643	632	634	654
5 - 6	2,156	2,078	2,019	2,020	1,890
6 - 7	5,307	5,500	5,289	5,249	4,796
7 - 8	5,711	5,869	5,589	5,665	5,239
8 - 9	5,375	5,473	5,272	5,389	4,798
9 - 10	4,256	4,194	4,267	4,263	3,862
10 - 11	3,452	3,166	3,314	3,486	3,485
11 - 12	3,140	2,775	3,031	3,312	3,429
12 - 1 PM	3,110	2,669	2,860	3,084	3,550
1 - 2	3,100	2,693	2,911	3,074	3,542
2 - 3	3,280	2,942	3,107	3,310	3,670
3 - 4	3,341	3,121	3,201	3,319	3,680
4 - 5	3,659	3,446	3,499	3,628	3,729
5 - 6	3,915	3,722	3,721	3,659	3,722
6 - 7	3,483	3,244	3,316	3,389	3,494
7 - 8	2,562	2,284	2,363	2,665	2,999
8 - 9	2,076	1,839	1,899	2,091	2,452
9 - 10	1,783	1,646	1,715	1,890	2,187
10 - 11	1,347	1,250	1,324	1,458	1,789
11 - 12	798	741	797	895	1,244
TOTALS	64,448	60,652	61,454	63,875	65,882

SUMMER HEAVY TRUCKS WESTBOUND

	MON	TUES	WED	THURS	FRI
12 - 1 AM	27	68	75	76	79
1 - 2	27	62	65	64	73
2 - 3	28	57	64	61	68
3 - 4	36	68	71	73	77
4 - 5	49	84	86	85	90
5 - 6	64	97	104	102	107
6 - 7	83	114	118	117	117
7 - 8	99	122	130	130	132
8 - 9	117	137	140	144	147
9 - 10	146	167	173	174	176
10 - 11	170	189	196	201	202
11 - 12	187	211	217	225	211
12 - 1 PM	196	216	226	235	219
1 - 2	194	225	219	230	206
2 - 3	182	210	212	222	177
3 - 4	183	194	187	186	112
4 - 5	145	154	146	125	81
5 - 6	114	110	101	89	81
6 - 7	112	115	108	105	97
7 - 8	104	108	107	110	100
8 - 9	85	87	91	100	91
9 - 10	73	80	75	83	75
10 - 11	73	78	73	87	84
11 - 12	78	84	78	86	76
TOTALS	2,572	3,037	3,062	3,110	2,878

SUMMER HEAVY TRUCKS EASTBOUND

	MON	TUES	WED	THURS	FRI
12 - 1 AM	83	64	66	65	74
1 - 2	73	66	67	63	78
2 - 3	76	68	71	77	81
3 - 4	92	76	78	78	86
4 - 5	110	96	97	100	104
5 - 6	151	157	169	174	170
6 - 7	142	161	166	163	169
7 - 8	101	115	115	122	125
8 - 9	114	115	115	120	123
9 - 10	133	136	143	138	140
10 - 11	131	128	146	150	129
11 - 12	119	126	147	146	118
12 - 1 PM	127	125	146	140	120
1 - 2	120	115	132	121	98
2 - 3	110	105	113	107	79
3 - 4	93	91	96	91	68
4 - 5	92	90	88	89	57
5 - 6	83	86	81	78	53
6 - 7	87	86	86	83	54
7 - 8	89	90	92	93	55
8 - 9	81	82	82	90	56
9 - 10	71	72	67	78	42
10 - 11	66	67	66	72	38
11 - 12	64	67	66	69	36
TOTALS	2,408	2,384	2,495	2,507	2,153

SUMMER PASSENGER CARS AND HEAVY TRUCKS WESTBOUND

	MON	TUES	WED	THURS	FRI	AVERAGE	% TOTAL		INCR. 2047	
12 - 1 AM	756	677	765	804	929	786	1.2%	1,081	295	
1 - 2	392	411	437	450	557	449	0.7%	618	169	
2 - 3	265	297	330	336	407	327	0.5%	450	123	
3 - 4	228	278	295	307	365	295	0.4%	405	111	
4 - 5	322	376	390	397	463	390	0.6%	536	146	
5 - 6	708	733	744	777	849	762	1.2%	1,048	286	
6 - 7	1,893	1,943	1,929	1,972	1,972	1,942	2.9%	2,671	729	
7 - 8	3,217	3,362	3,373	3,382	3,282	3,323	5.0%	4,570	1,247	
8 - 9	3,489	3,590	3,648	3,676	3,648	3,610	5.5%	4,965	1,355	
9 - 10	3,028	2,995	3,054	3,134	3,362	3,115	4.7%	4,284	1,169	
10 - 11	3,288	3,039	3,056	3,320	3,694	3,279	5.0%	4,510	1,231	
11 - 12	3,527	3,217	3,314	3,576	4,101	3,547	5.4%	4,878	1,331	
12 - 1 PM	3,589	3,360	3,408	3,774	4,583	3,743	5.7%	5,148	1,405	
1 - 2	3,624	3,494	3,540	3,923	4,773	3,871	5.9%	5,324	1,453	
2 - 3	4,039	4,029	4,134	4,516	5,172	4,378	6.6%	6,021	1,643	
3 - 4	5,014	5,118	5,154	5,299	5,030	5,123	7.7%	7,046	1,923	
4 - 5	5,385	5,596	5,520	5,363	4,767	5,326	8.0%	7,325	1,999	
5 - 6	5,322	5,389	5,367	5,224	4,754	5,211	7.9%	7,167	1,956	
6 - 7	4,681	4,807	5,054	5,236	4,769	4,909	7.4%	6,752	1,843	
7 - 8	3,323	3,489	3,652	4,132	4,307	3,781	5.7%	5,200	1,419	
8 - 9	2,339	2,400	2,590	3,097	3,490	2,783	4.2%	3,828	1,045	
9 - 10	1,849	1,952	2,088	2,383	2,617	2,178	3.3%	2,995	817	
10 - 11	1,393	1,520	1,560	1,898	2,242	1,723	2.6%	2,369	647	
11 - 12	1,062	1,195	1,208	1,361	1,750	1,315	2.0%	1,809	494	
TOTALS	62,733	63,267	64,610	68,337	71,883	66,166		91,000	24,834	38%

SUMMER PASSENGER CARS AND HEAVY TRUCKS EASTBOUND

	MON	TUES	WED	THURS	FRI	AVERAGI	% TOTAL		INCR. 2047	
12 - 1 AM	896	523	501	530	629	616	0.9%	876	260	
1 - 2	513	392	386	382	498	434	0.7%	618	184	
2 - 3	388	336	341	369	423	371	0.6%	528	157	
3 - 4	425	380	382	397	440	405	0.6%	576	171	
4 - 5	809	739	729	734	758	754	1.1%	1,072	319	
5 - 6	2,307	2,235	2,188	2,194	2,060	2,197	3.3%	3,125	929	
6 - 7	5,449	5,661	5,455	5,412	4,965	5,388	8.2%	7,666	2,277	
7 - 8	5,812	5,984	5,704	5,787	5,364	5,730	8.7%	8,152	2,422	
8 - 9	5,489	5,588	5,387	5,509	4,921	5,379	8.2%	7,652	2,273	
9 - 10	4,389	4,330	4,410	4,401	4,002	4,306	6.6%	6,127	1,820	
10 - 11	3,583	3,294	3,460	3,636	3,614	3,517	5.4%	5,004	1,487	
11 - 12	3,259	2,901	3,178	3,458	3,547	3,269	5.0%	4,650	1,382	
12 - 1 PM	3,237	2,794	3,006	3,224	3,670	3,186	4.9%	4,533	1,347	
1 - 2	3,220	2,808	3,043	3,195	3,640	3,181	4.8%	4,526	1,345	
2 - 3	3,390	3,047	3,220	3,417	3,749	3,365	5.1%	4,787	1,422	
3 - 4	3,434	3,212	3,297	3,410	3,748	3,420	5.2%	4,866	1,446	
4 - 5	3,751	3,536	3,587	3,717	3,786	3,675	5.6%	5,229	1,553	
5 - 6	3,998	3,808	3,802	3,737	3,775	3,824	5.8%	5,440	1,616	
6 - 7	3,570	3,330	3,402	3,472	3,548	3,464	5.3%	4,929	1,464	
7 - 8	2,651	2,374	2,455	2,758	3,054	2,658	4.0%	3,782	1,124	
8 - 9	2,157	1,921	1,981	2,181	2,508	2,150	3.3%	3,058	909	
9 - 10	1,854	1,718	1,782	1,968	2,229	1,910	2.9%	2,718	807	
10 - 11	1,413	1,317	1,390	1,530	1,827	1,495	2.3%	2,127	632	
11 - 12	862	808	863	964	1,280	955	1.5%	1,359	404	
TOTALS	66,856	63,036	63,949	66,382	68,035	65,652		93,400	27,748	42%

Source: TZB DEIS, Chapter 4, Transportation and Appendix B: Transportation, B-1 Traffic Volumes

		ADJ. FACTOR	SEASONAL AND WEEKDAY ANNUAL ADJUSTED VOLUMES
ANNUAL TOTAL 2010 = (66,166 + 65,652) * 365 =	48,113,424	0.831888	40,025,001
ANNUAL TOTAL 2047 = (91,000 + 93,400) * 365 =	67,306,000	0.831888	55,991,083
ANNUAL GROWTH ESTIMATE - (24,834 + 27,748)* 365 =	19,192,576	0.831888	15,966,082
	PERCENT INCREASE 2010 TO 2047		40%

EXHIBIT 2

Charles Komanoff,
A Bridge Too Big?: New Yorkers' Toll from a 15-Lane Tappan Zee Bridge

March 26, 2012

A Bridge Too Big?

New Yorkers' Toll from a 15-Lane Tappan Zee Bridge

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March 26, 2012

This document is on line at: <http://komanoff.net/cars_II/Bridge_Too_Big.pdf>.
The spreadsheet in which the underlying calculations are performed is available at <http://komanoff.net/cars_II/TZB_Rebuild.xls>.

This report was prepared by a lifelong New Yorker and veteran policy analyst on issues of transportation, energy and environment. It is motivated by a concern that, as currently envisioned, the replacement Tappan Zee Bridge will be too expensive for its costs to be borne exclusively by bridge users; and that much of the costs will spill over to other state agencies, authorities and/or taxpayers, with adverse consequences to the efficiency and fairness of transportation and governmental administration throughout New York State.

A related concern is that the bridge's excessively high cost could create a perverse incentive for state officials to subsidize or otherwise facilitate driving, and to under-invest in public transit, in the I-87 / I-287 corridor and the lower Hudson Valley, in order to maximize throughput on the bridge and thus restrain the rate of toll hikes on the Tappan Zee. The resulting boost in traffic would last for generations, adversely affecting the quality of life and commerce in the downstate region.

A. Summary

How will the Tappan Zee replacement bridge — a 15-lane structure twice as wide as the current bridge, and with a $5.2 billion price tag — be paid for?

To recover the entire cost through charges on bridge users will require tolls at least twice and perhaps four times as great as the current $4.75 charge for passenger cars (with E-ZPass). Because tolls of these magnitudes — between $10.90 and $20.50 per trip[1] — are unlikely to be politically acceptable, there is a strong likelihood that some of the costs of the new bridge will end up being off-loaded: onto other Thruway users, state taxpayers, or users of MTA or Port Authority bridges, tunnels and mass transit.

Table 1: Tolls Required to Pay for Replacement Tappan Zee Bridge

Scenario	Assumptions	15-Lane TZB Toll	10-Lane TZB Toll
Current		**$4.75**	**$4.75**
Best	High traffic growth ▪ Fed Financing ▪ No Overruns	**$10.90**	**$8.90**
Worst	Low traffic growth ▪ No Fed Financing ▪ 25% Overruns	**$20.50**	**$15.30**
Average	Average of 16 Cases	**$14.90**	**$11.45**

Tolls are $3 (25%) less for 10-lane than 15-lane replacement bridge in best cases, $5.20 (25%) less in worst cases, and $3.45 (23%) less on average. "10-lane" is shorthand for 10- or 11-lane bridge (11th lane being a shared bike-pedestrian path).

Downsizing the project could mitigate the toll increases, as Table 1 shows. Jettisoning 4 of the 6 planned breakdown lanes would shrink the replacement bridge's width by around a quarter, from 183 feet to 135-140 feet. This could trim costs substantially and enable the Thruway Authority to recover the replacement bridge's construction cost with lesser toll rises than those posited in the "15-Lane" column of Table 1. Even with just 8 travel lanes and 2 breakdown lanes, the downsized bridge would still be 3 lanes wider than the current 90-foot Tappan Zee.[2] (The current 7-lane span employs a movable barrier to provide four lanes of travel in the peak direction.) This would ensure that the new structure is safer, easier to drive, and positioned to accommodate travel demand on I-87 for decades.

[1] As on other Hudson River crossings, tolls on the Tappan Zee Bridge are charged eastbound only.

[2] Wikipedia says the current width is 90 feet: <http://en.wikipedia.org/wiki/Tappan_Zee_Bridge>. The 183-foot configuration of the replacement bridge is diagrammed here: http://bit.ly/y5uB8j.

B. Tolls

The grim conclusions above about the difficulty of paying for the full-size replacement bridge through bridge tolls alone derive from a straightforward comparison of the debt service on its cost to the volume of vehicle trips that would pay off the debt via tolls. The ratio of the two — literally, annual debt service divided by annual trips[3] — yields a first-order approximation of the toll increases that drivers will face to cover the entire cost of the new Tappan Zee Bridge.

These conclusions are arrived at by testing 16 different scenarios of bridge cost and usage, covering a range of assumptions for four key parameters:

- How much, if any, of the bridge replacement project will be eligible for cheap federal financing (modeled as either zero or up to $2 billion).
- Whether construction suffers overruns (modeled as cost increases of zero or 25%).
- Whether bridge traffic volumes are moderately or slightly sensitive to toll levels.
- The underlying rate of traffic growth on the bridge (modeled as 2% a year or zero).

Since each parameter can assume either of two values, the number of possible combinations of assumptions ("scenarios") is 2 x 2 x 2 x 2, or 16. Note that all 16 scenarios pivot off of the current $5.2 billion cost figure; that is, no "bridge diet" is assumed.

For each scenario, I calculated the ratio of annual debt service to annual traffic levels ten years from today (after deducting O&M savings as noted in Footnote #3). The mean of the 16 ratios, $7.70, is the "expected value" of the *immediate increase* in the toll the Thruway Authority would need to impose to recover the entire bridge cost.

The $7.70 figure conceals a wide range: from a low increase of $5.25 in the best case (low-cost financing, no overruns, little sensitivity of travel to tolls, and high traffic growth); to an increase as great as $10.50 in the worst case. But these figures do not reflect the attrition in bridge ridership that higher tolls could trigger, which would require further increases because there would be fewer trips over which to amortize the cost of the bridge. When this "price effect" is taken into account, ***the true range of prospective toll increases to pay for a 15-lane Tappan Zee Bridge becomes $6.15 - $15.75 with an average of $10.15***.

[3] The debt service for the replacement bridge would be partially offset by the Thruway Authority's cessation of expenditures to operate, maintain and repair the existing Tappan Zee span, once it is decommissioned (assuming it is not converted into a bikeway/walkway). After reviewing Internet-available Authority documents, some of which are cited in my spreadsheet cited on the title page, I have chosen to assume that these avoided costs would amount to $75 million a year.

C. Off-Loading Costs: Implications

The idea that the toll to cross the Hudson on the New York State Thruway's Tappan Zee Bridge must more than double and perhaps quadruple to pay for a replacement structure may seem preposterous. It's natural to think that "something will be done." That "something" would probably take one (or more) of the following forms:

1. Off-loading some of the costs onto other Thruway segments and users.
2. Off-loading some of the costs onto the NY State DOT budget or other parts of the state's general fund.
3. Off-loading some of the costs onto the Metropolitan Transportation Authority or the Port Authority.

Each means of off-loading costs would be problematic.

C1: Off-loading costs elsewhere on the Thruway system

From an administrative standpoint, the easiest way to off-load Tappan Zee costs is to raise tolls on the NY State Thruway system. While the amount of the rise would depend on the extent of the off-loading, the economic and political fallout would almost certainly be severe, particularly for the economically challenged region west of Albany.

Tolls for the non-TZB Thruway system have evidently not been raised in several decades. But this will likely make it harder to absorb Tappan Zee costs, since the suppression of toll hikes has built up a backlog of deferred maintenance that will necessitate increases going forward simply to keep the system's *other* 567 miles in a state of good repair.[4] Any attempt to pay for the bridge by levying additional toll increases on the Thruway's non-TZB portions, hundreds of miles away, would likely ignite a firestorm of protests.

My calculations suggest that annual debt service for the full-size (15-lane) replacement bridge will cost between $230 and $329 million, although the Thruway Authority would realize savings by terminating unusual charges involved in operating and maintaining the current bridge (e.g., operating the movable barrier that changes the flow of the seventh lane twice daily; re-decking, inspecting and otherwise safeguarding the 55-year-old structure). By way of comparison, debt service for the entire NY State Thruway System in a recent year (2010) was only $167 million,[5] and only around $500 million in tolls is collected

[4] Sources report that systemwide Thruway toll increases of around 40% are being discussed in Albany, exclusive of the Tappan Zee project.

[5] Thruway Authority, statement of General Revenue Bonds and Notes, available at <http://www.thruway.ny.gov/about/financial/grb.html>. Total debt outstanding as of 1/1/12 was $2,158,220,000.

on the entire Thruway other than the Tappan Zee Bridge.[6] In other words, debt service payments for reconstructing the Tappan Zee Bridge as a double-wide span will be large in relation to the Thruway system as a whole.

C2: Off-loading costs to NYS DOT or NYS General Fund

The New York State Department of Transportation spends around $4 billion a year maintaining, upgrading and expanding state roads, bridges and highways.[7] Its budget is at least ten times greater than the estimated debt service for the Tappan Zee replacement project, making it a tempting pocket in which to fold some of the project's cost.

However, a glance at the DOT program statement accompanying the Governor's proposed budget for FY 2013 indicates that the DOT's $4 billion in expenditures are fully spoken for:

> The 2012-13 Executive Budget [includes] $1.16 billion of new funding … under the New York Works program that will accelerate capital investment to maintain, repair and replace critical highway and bridge infrastructure, and to prolong the useful life of these assets. Funded components include over $212 million for bridge repairs on 115 critical bridges throughout the State, $250 million for a pavement preservation program which will treat more than 2,000 lane miles of State roads, and over $700 million to accelerate signature transportation projects throughout the State… The [budget also] builds upon core transportation funding to provide a total DOT capital program of nearly $4.5 billion, including highways, bridges, rail, aviation, non-MTA transit, and DOT facilities.[8]

State DOT expenditures always have multiple claimants, including safety-related work, legislators' pet projects, and the usual basket of state-of-good-repair tasks. Shoehorning even a fraction of the debt service for the Tappan Zee into DOT's oversubscribed finances would set up a collision with these high-priority projects. The same applies to trying to tap the State's general fund to bail out the Tappan Zee project. Education, human resources,

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[6] Thruway Authority revenues are posted at <http://www.thruway.ny.gov/about/financial/mf2011/vtm/dec2011vtm.pdf>. Year-2011 revenues for the entire system were $634 million (calculated by prorating E-ZPass revenues of $457.7 million by E-ZPass's revenue share of 72.2%). TZB revenues for 2001 were calculated similarly by prorating $94.6 million by 74.8%, yielding $127 million. The difference between the two underlined revenue figures is $507 million.

[7] See "Transportation" section of the 2012 Executive Budget for 2012-2013, available at <http://publications.budget.ny.gov/eBudget1213/fy1213littlebook/Transportation.pdf>. The table, "IV. Summary of Spending (All Funds)" posted at p. 4 of 6 of that link (and apparently p. 76 of the Executive Budget document) gives State Department of Transportation spending at $3.942 billion for 2011-12 and $4.176 billion for 2012-13. These figures are exclusive of spending by MTA ($4.025 billion and $4.276 billion for the same years), NYS DMV $276 million and $277 million) and the Thruway Authority ($2 million in each year). The latter figure is apparently an appropriation from the General Fund and is aside from the Thruway Authority's own budget of approximately $1 billion.

[8] 2012 Executive Budget, "Transportation" section, p. 74 (link in preceding footnote, p. 2 of 6).

social services, health care, aid to localities, etc., have powerful constituencies; all are likely to be squeezed financially for the foreseeable future, and all would push back hard against any "raid" to shore up financing for the Tappan Zee.

C3: Off-loading costs to the MTA or Port Authority

The Metropolitan Transportation Authority is both a recipient of revenues from taxes enacted by the State Legislature, and, these days, a piggybank that the Legislature and the Governor sometimes tap to fund non-MTA programs and/or to reduce some of those same taxes. The Authority's enormous size — its 2012 operating budget is approximately $13 billion, and as of this writing it has $32 billion in outstanding debt — make it an obvious place for Albany officials to look to service debt that the Thruway Authority will assume to build the replacement Tappan Zee Bridge. The same is true of the Port Authority, though its bi-state nature presumably would make it harder to use it as a source of funds.[9]

While many scenarios can be imagined for having the MTA absorb some of the bridge costs, the most likely would involve dedicating *new* (future) MTA revenue streams to service Tappan Zee Bridge debt. Consider congestion pricing, which is again receiving new attention in the form of two complementary plans, either of which is projected to generate over a billion dollars a year in net revenue for subway, bus, rail and road improvements in New York City and the surrounding region.[10] It is all too easy to imagine a portion of the revenue being siphoned off to support debt service on the Tappan Zee replacement project. This could occur as political horse-trading to gain support from legislators in the Hudson Valley who have an interest in tamping down toll hikes on the bridge, as well as from upstate legislators who wish to preempt the system-wide Thruway toll increases discussed above.

The point here, and indeed the takeway from this discussion, is that the prospect of insupportable toll hikes due to a new 15-lane Tappan Zee Bridge should concern a wider circle than legislators and residents from Westchester, Rockland and other counties directly served by the bridge. The likelihood that costs would spill over from the area immediately surrounding the bridge is all too real. New Yorkers from Brooklyn to Buffalo and from Albany to Montauk have a compelling pocketbook and transportation interest in forestalling a bridge too big.

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[9] Servicing replacement bridge debt with Port Authority funds would add the irony that to ensure that toll revenues did not have to be shared with the Port Authority, the Thruway Authority moved the original Tappan Zee Bridge site northward, to virtually the Hudson River's widest point, ensuring a costly bridge.

[10] See, for example, a March 7 post on Streetsblog, "Details of Sam Schwartz's 'Fair Plan' and Other Orcutt+Komanoff Highlights," available at <http://bit.ly/w39xUd>.

D. A Bridge "Diet"?

The replacement bridge would be two spans, separated by a gap of at least 16 feet. Each span would have four travel lanes, two shoulders and one "emergency access" lane. The westbound span would also have a shared bicycle-pedestrian path separated from the adjacent shoulder by a 2-foot buffer. The westbound (north) structure is 8 lanes totaling 96 feet. The eastbound (south) structure is 7 lanes with a width of 87 feet. The two structures' combined 15 lanes and 183 feet are double the current bridge's 7 lanes and 90 feet.

Table 2: Tappan Zee Replacement Bridge, Thruway Configurations

Lane	Westbound (feet)	Eastbound (feet)
Outer Rail	2	2
Bike/Ped ("Shared") Path	12	0
Shared Path Buffer	2	0
Shoulder #1	10	15
Travel Lane #1	12	12
Travel Lane #2	12	12
Travel Lane #3	12	12
Travel Lane #4	12	12
Shoulder #2	8	8
Emergency Access	12	12
Inner Rail	2	2
Subtotal	96	87
Grand Total		183

Doubling the bridge's width appears to have been a *premise* of the replacement bridge's design rather than the *outcome* of an open and unbiased planning process, as this excerpt from the Thruway Authority's "Project Alternatives" report suggests:[11]

> Twin bridge structures would provide superior service redundancy as compared with a single structure. In the event that an incident or extreme event would require the closure of one structure, the second structure could remain open to traffic. At the same time, this redundancy would [give] NYSTA … greater flexibility in planning for the bridge's inspection, long-term maintenance, and future contract work, and therefore would ensure the structural and operational integrity of this vital link over a longer timeframe. This configuration would also provide for safer work zones for inspection, maintenance, and repair crews.

[11] Available at http://www.tzbsite.com/tzbsite_2/pdf-library_2/02_Project_Alternatives.pdf. Pages 2-4 to 2-5.

The advantages of a double-wide span — redundancy and easier maintenance — are certainly attractive. But these should manifest in clear and robust metrics: reduced delays after serious incidents such as fires, crashes or other disasters; maintenance efficiencies; improved work crew safety; and longer bridge life. Yet the Authority has not attempted to quantify the value of these advantages. For example, no frequencies have been attached to the incidents that would be mitigated by having two spans rather tan one, nor has the Authority offered estimates of the societal savings from each.

A bit of *reduction ad absurdum* may be instructive: Why not mandate that every new home be built with a twinned free-standing structure? Families would occupy the first and hold the second in reserve in case of temporary inhabitability of the primary residence. As a plus, annual inspection and spring cleaning would be more efficient. This mandate would fail any rational cost-benefit test, of course. While upsizing the Tappan Zee replacement bridge might well pass such a test, none has been performed.

Table 3 suggests a number of ways to downsize the replacement bridge while keeping five lanes — four travel lanes and one breakdown lane — in each direction.

Table 3: Alternative Bridge Configurations (lane numbers are for each direction)

Option	Travel Lanes	Shoulders	Emergency Lanes	Bike-Ped?	Width, ft	% Reduxn	$ Savings
Baseline	4	2	1	YES	183	NA	**NA**
ALT #1	4	1	0	NO	124	32%	**27%**
ALT #2	4	0	1	NO	128	30%	**25%**
ALT #3	4	1	0	YES	138	25%	**20%**
ALT #4	4	0	1	YES	142	22%	**18%**

Numbers of lanes are per span, except that Bike-Ped lane is on westbound span only. Percentage reductions in width and cost are vs. baseline. Configurations with one shoulder assume 10-foot widths.

Each of the alternative configurations has 10 or 11 lanes (counting the single bicycle-pedestrian path as one lane). The percentage reductions in width range from 22% to 32%. The associated cost reductions range from 18% to 27%, as discussed in the next section.

E. Cost Savings from A Bridge Diet

A narrower replacement bridge should cost less than the full-size one envisioned and assumed by the Thruway Authority. But how much less?

In lieu of published estimates of the costs of different bridge configurations, I constructed a formula to estimate the extent to which the cost of the replacement bridge would fall as a function of shrinking the bridge's width. It rests on these two assumptions:

- 10% of the project's cost is assumed to be fixed; these costs, for overhead and some engineering, are assumed to be incurred regardless of the bridge's width.
- The remaining 90% of costs obey a 0.9 "scaling factor" such that a 10% shrinkage in width is assumed to reduce those costs by 9%.[12]

The results of this formula are reflected in Table 3: downsizing bridge width by, say, 30%, produces an expected cost saving of 25%. Some of the savings would be realized via reductions in the amounts of steel, concrete and labor. Consolidating the intended two spans into one would also provide savings by reducing the number of caissons, struts, etc. In calculating tolls for a 10-lane bridge, I have assumed that the cost of the full-size bridge is reduced by 22.5% — the mean of the four saving percentages in Table 3.

F. Bridge Volumes

Tappan Zee Bridge traffic volumes on a typical weekday peaked in 2004, at an average of 140,310 vehicles (all figures sum annual eastbound and westbound traffic and divide by 365). The 2011 daily rate of 132,070 vehicles was the lowest since 1998 and was 5.9% less (5.6%, adjusted for leap year) than the 2004 peak.

Table 4, below, uses four-year averages to encapsulate the past two decades; for example, the figure for 2011 is the average of 2008-2011. Even knowing that the 2008 financial crisis and subsequent recession took a toll on bridge use, the extent of the decline is striking, with 4% fewer crossings in 2008-2011 than in 2004-2007. Moreover, even during the peak four-year period of 2004-2007, volume was a mere 2% greater than in 2000-2003, indicating that *growth in bridge volumes had slowed before the housing bubble burst in 2008 and took down the economy with it.*

A detailed treatment of future bridge volumes is beyond the scope of this paper. Current trends militate in favor of slow traffic growth. These include a move away from single-tenant office parks such as those in the "platinum mile" served by I-287 east of White

[12] A scaling exponent is an engineer's rule of thumb for calculating unit cost savings with increasing scale. The closer its value to zero, the greater the savings (an exponent of 1.0 indicates a linear relationship between scale and cost, i.e., zero scale economies). With a 0.9 scaling exponent, the variable cost component of a project must be downsized by a little more than 27% to reduce its cost by 25%. The formula is: **Cost of Bridge with Width W% of Full-Size Design Width = 0.1 x Cost of Full-Size Bridge Cost + 0.9 x (W% * Full-Size Bridge Cost) ^ 0.9**.

Plains[13]; a possible long-term decline in the attractiveness of suburban lifestyles vis-à-vis urban living; more flexible work arrangements such as telecommuting[14]; and a cultural shift away from automobility.[15] None of these trends were forecast 20 years ago, illustrating the difficulty of anticipating societal trends that shape travel.

Table 4: Tappan Zee Bridge Travel Volumes

4-Year Period Ending in Year Shown	Average Daily Volume	Annualized Change from Prior Period
2011	**133,158**	– 1.1%
2007	**138,923**	+ 0.5%
2003	**136,093**	+ 1.7%
1999	**127,049**	+ 2.3%
1995	**116,075**	+ 2.1%
1991	**106,789**	

Source: Volumes for each 4-year period were calculated by author from various Thruway Authority sources. Surprisingly, no single source for this data is available. Year-2011 datum was compiled by author from Thruway Authority document cited in FN 6. Percent figures in text pertain to differences between 4-year periods, whereas percent figures in table are annualized.

To address this uncertainty, I've bounded annual growth by a high rate of 2% and a low rate of zero. This bracket fits nicely around the 1.1% average annual compound growth rate from 1991 to 2011, according slightly greater weight to the 2001-2011 decade in which growth was zero. Note that future traffic volumes will also be affected by travelers'

[13] See New York Times, "In Westchester County, the Platinum Mile Is Reinvented, Again," Jan. 3, 2012, available at <http://nyti.ms/xHAUIG>. The article reported that one million square feet of commercial office space along the nearly four miles of I-287 in White Plains, Harrison and Rye is now vacant, a rate of 19%, up from 13% in 2002. The article said that the recession "is not the whole story" behind the high vacancy rate, citing competition from "White Plains's newly vibrant downtown" with "upscale shops" and other attractions including the 35-minute Metro-North commute from New York's Grand Central Terminal.

[14] A 2011 report by Jacobs Engineering Group for the Thruway Authority cited a doubling in the number of employees telecommuting at least once a month, from 17 million in 2001 to 34 million in 2008, as a probable contributor to the nationwide decline in automobile use in recent years. The Jacobs report also cited survey data "suggest[ing] that increases in internet usage … may have caused a decrease in discretionary travel" as people spend more time online. See Draft Memorandum, 31 August 2011, attached to Thruway Authority 2012 Budget, pp. 38-39 of 82, available at >http://www.thruway.ny.gov/about/financial/budget-books/2012/2012-budget.pdf>.

[15] See New York Times, "To Draw Reluctant Young Buyers, G.M. Turns to MTV, March 22, 2012, available at <http://nyti.ms/GFy1e0>. According to FHWA data reported there, in 2008 just 46.3% of "potential drivers" 19 and under had drivers' licenses, vs. 64.4% in 1998. A similar falloff mentioned in The Times in "The Go-Nowhere Generation," March 10, 2012, available at <http://nyti.ms/zNBovD>, was attributed in part to the rise in use of social media —an activity that harmonizes poorly with autos.

reactions to the higher tolls that will be required to pay for the replacement bridge, as I now discuss.

G. Toll Shock[16]

"Rate shock" was the term applied to the electricity industry's financial crisis in the 1970s, when utility company finances buckled under the weight of escalating nuclear power costs. Not only were the costs of the reactors spiraling out of control, but the electricity rate hikes required to pay for them caused power use unexpectedly to flatten, as customers reacted to the high rates by conserving. Attempts by some utilities to make up for the revenue shortfalls with "supplemental" rate hikes failed, leading to dividend cuts that cost investors billions.

From this experience, realization grew that energy use is somewhat price-sensitive. Yet it is less widely understood that society's level of *driving* is also subject to changes in *its* cost.

What makes this pertinent to the bridge replacement project is the prospect of a rise in the bridge's toll big enough to drive up the total price of trips that use the bridge. To test for that, I've posited these characteristics for a "typical" round-trip using the TZB:

- Total trip distance (round-trip): 35 miles
- Average fuel economy (mostly highway): 25 mpg
- Gasoline price: $4.00 per gallon
- Current toll: $4.75
- Other trip costs (maintenance, parking where applicable, etc.): $2.80

These assumptions yield a total (round-trip) cost of $13.15. Now consider a ten-dollar hike in the Tappan Zee Bridge toll, raising the cost of the trip to $23.15, or 75% more than with the current toll. How much this increase in trip cost would affect the number of trips (assuming that every traveler faced the same 75% increase) depends on those trips' price-sensitivity, a quantity represented mathematically by their "price-elasticity." A low elasticity assumption of 0.25 implies that the number of trips would fall by 13%; whereas a higher elasticity, say 0.50, would imply a 24% drop in trips.[17] The higher the elasticity —

[16] This section draws on an article I posted on Streetsblog on Jan. 26, "Cost of Tappan Zee Mega-Bridge Could Cause Tolls to Triple" (available at <http://bit.ly/y5uB8j>). That article employed somewhat more draconian assumptions (e.g., higher price-elasticities) and thus had more dire conclusions than the analysis here.

[17] Mathematically, the elasticity — which is actually a negative number — is applied as an exponent (power) to the factor increase in the price of the trip. In this example, the price factor is 1.75, since the toll hike makes the trip 75% more costly. For the low elasticity of negative 0.25, the factor of 1.75 is raised to the negative 0.25 power; the result, shown on any hand calculator, is 0.87, indicating that 87% of trips remain and the other 13% disappear. For the high elasticity, negative 0.5, the result is 1.75 raised to the negative 0.5 power; this yields 0.76, meaning that 76% of trips remain and 24% disappear.

and, of course, the steeper the increase in trips' costs — the more severe the drop-off in the amount of travel.

The $10 toll increase in the cost of trips using the Tappan Zee Bridge in the example above is an illustrative assumption. The actual toll will depend on the cost of the replacement project, whether or not the project obtains cheaper federal financing, and the extent to which costs are off-loaded (as discussed in Section C). A further factor is whether, and by how much, bridge traffic itself increases over time, since more traffic allows the (fixed) cost of the bridge to be distributed over a larger base of trips.

Table 5, below, runs through different combinations of these variables to show how bridge volumes could be affected by the toll needed to recover the replacement project's cost. It assumes the $5.2 billion cost reported in the press, which means no "bridge diet" as discussed in Sections D and E, but no overruns either.

Table 5: Effect of Tappan Zee Replacement Bridge Cost on Travel Volumes

Fed Financing?	Price-Elasticity	Underlying Growth	Trip Cost, % Hike	Volume Loss, %
NO	Low (0.25)	0% / yr	59%	**11%**
YES	Low (0.25)	0% / yr	49%	**9%**
NO	High (0.50)	0% / yr	59%	**21%**
YES	High (0.50)	0% / yr	49%	**18%**
NO	Low (0.25)	2% / yr	49%	**9%**
YES	Low (0.25)	2% / yr	40%	**8%**
NO	High (0.50)	2% / yr	49%	**18%**
YES	High (0.50)	2% / yr	40%	**16%**

Calculations are for 2021. They assume $5.2 billion project cost, 100% of debt service covered by toll, less $75 million a year for maintenance savings. Underlying growth rate in middle column is applied to 2011 average daily volume of 66,000 toll-paying trips. "Trip Cost, % Hike" is increase in total cost of typical trip using the Tappan Zee; increase in *toll component alone* is far greater.

What's most striking about Table 5 is the next-to-last column, showing the increase in the driver's cost for a 35-mile round trip on the replacement Tappan Zee Bridge as a function of different assumptions on bridge financing and volumes. (Thirty-five miles is roughly the distance to travel from Spring Valley in Rockland County to White Plains and back.) The out-of-pocket cost for such a trip, now $13.15, would rise by 40-60 percent — and that is before incorporating the "toll shock" effect on traffic volumes from the direct toll hikes

shown. (The toll itself would rise far more steeply, but the relevant figure for predicting future traffic levels is the growth in the trip's *entire cost*, not just its *toll portion*.)

The attrition in volume from such a rise in the trip price could be as high as 21%, in the case with low underlying growth in volume, high trip sensitivity to toll hikes and zero federal financing; or as little as 8%, if each of those assumptions is flipped. But even this low figure is significant, since any attrition in bridge volumes due to "toll shock" would necessitate a further hike in the Tappan Zee toll — barring off-loading of costs. The smallest loss in volume shown in Table 5, 8%, would require a 9% toll rise on top of the increase already shown to make up for the fewer trips over which the fixed costs are spread.

"Losing" 10-20% of trips that would otherwise be made on the Tappan Zee Bridge, due to a steep toll hike, is no small erosion. Where would these "lost" trips go, i.e., how would attrition in bridge volumes actually manifest? The answer is a combination of things: more car-pooling (higher car occupancies); greater use of transit; relocation of trips, particularly to destinations that obviate the need to cross the Hudson; and less travel, period. Some reductions would be fairly immediate; others would evolve over a longer time-horizon.[18]

Higher Tappan Zee Bridge tolls will also cut into TZB trips via "toll-shopping," as some trips divert north to I-84 which crosses the Hudson at Newburgh and Beacon or south to the George Washington Bridge. Needless to say, which trips actually divert will be situation-dependent. It's hard to imagine any toll hike that would cause trips from Nyack to Tarrytown to divert to a bridge other than the Tappan Zee. And even a trip from Albany to Manhattan that now uses the TZB is unlikely to be diverted to the George if the driver expects to lose an hour in heavier traffic. On the other hand, some number of Tappan Zee Bridge trips are marginal enough vis-à-vis other crossings that a modest toll increase should suffice to induce the driver to switch. And since we are talking here about more than modest toll increases, the number of switches could be substantial.

H. A Bridge to Handle Future Traffic Volumes

Lanes on the current Tappan Zee Bridge are 11.2 feet wide. The 12-foot travel lanes for the replacement bridge would be 7.5% wider, and are assumed to have the capacity to move 2,000 autos (passenger vehicles) per hour. With four lanes, each direction of travel would then have a capacity of 8,000 PCE (passenger-car equivalents). This is well in excess of the

[18] Consider a hypothetical Westchester County high school soccer "travel team" that plays a few games a year in Rockland. In the short term, a stiff toll hike should make it more likely that some parents will pool their vehicles for inter-county trips. In the long run, travel leagues on either side of the Hudson might reconfigure to reduce or even eliminate trips across the river. Whether these or analogous changes in commuting, shopping, visiting, recreation, etc. are desirable is beside the point, which is that higher tolls will *cause* them.

average weekday 2011 peak-hour volume of 6,975 PCE, which takes place during the hour between 7 and 8 am.[19]

Table 6: Projected Peak-Hour Traffic Volumes (passenger-car equivalents, eastbound)

	2021	2031
15-Lane TZB, Mean Volume in 16 Scenarios	6,418	7,824
15-Lane TZB, Maximum Volume in 16 Scenarios	7,676	9,357
Bridge Diet TZB, Mean Volume in 16 Scenarios	6,700	8,168
Bridge Diet TZB, Maximum Volume in 16 Scenarios	7,832	9,547

Note that 4 lanes in each direction have combined nominal capacity of 8,000 passenger-car equivalents. "Actual" 2011 peak hourly volume was 6,975 (see FN 18).

Even under the highest-growth scenario of bridge volumes for both the full-size bridge and the slimmed-down design — 2%/year underlying traffic growth from 2011 and federal financing mitigating debt service costs for the replacement bridge — the 8,000 per-hour PCE limit won't be exceeded for at least ten years, i.e., through 2021. That is not the case a decade later, however, as Table 6 shows: peak-hour travel in 2031 is over 9,000 passenger-car equivalents in the maximum-traffic scenarios for both bridge designs, and the mean scenarios involving both the 10-lane and 15-lane bridge are around 8,000 PCE's per hour.

Does this mean that 4 lanes (in each direction) are insufficient to handle peak volumes much beyond 2021? No. This is because the one-hour peak is indeed that: just one hour's worth. During the 8-9 am period following the 7-8 am peak, 14% fewer vehicles pass through the TZB's eastern portal; and the shortfall from the peak in the preceding 6-7 am hour is more than twice as stark, with 29% fewer vehicles than during 7-8 am. *These figures suggest that by applying peak or "differential" pricing, with off-peak discounts offsetting on-peak premium tolls, the Thruway Authority could keep travel demand within the 8,000-per-hour target dictated by a 4-lane (in one direction) bridge design for years to come.*

Consider this exploratory calculation on a datum in the prior paragraph, that 6-7 am eastbound TZB traffic is 29% lighter than during the 7-8 am peak. Posit a flat $15 toll on the replacement bridge — the approximate average toll for the 16 scenarios outlined in Table 1 (all assuming no bridge diet). Now, instead, consider a $20 toll for the peak hour (7-8 am)

[19] At this writing (late March 2012), weekday per-hour TZB traffic volumes were not available from the Thruway Authority's Web site, requiring me to convert available weekday per-hour car and commercial-vehicle volumes from the TZB's peak travel year, 2004 (for which I equated each commercial vehicle to two autos) and prorate them to with 2011 and 2004 annual volumes, adjusting the latter for Leap Year. The result is the eastbound PCE of 6,975 for 2011 noted in the text. Note that the westbound peak volume is less.

and $12 for the pre-peak hour (6-7 am). Based on the time-switching elasticity that the Port Authority observed after it instituted a peak vs. off-peak toll differential on its Hudson River crossings in early 2001, the ratio between consecutive-hour TZB volumes, now 0.71, would be expected to rise to 0.97.[20] That is, instituting a 40% off-peak discount from the premium peak toll should cause enough travel times to change, so that what is now a 29% difference in respective volumes would shrink to just 3%.

Thus, if the 7-8 am peak volume under flat-rate pricing was going to be, say, 9,100 vehicles, then the type of differential pricing sketched above would induce approximately 1,200 trips to "migrate" from the 7-8 am peak hour to 6-7 am. This would reduce the 7-8 am peak to approximately 7,900 vehicles per hour, while lifting the prior 6-7 am volume of around 6,500 vehicles to 7,700. Both figures fall within the 8,000 vehicle capacity.

Would peak (differential) pricing come at a cost? Certainly. Drivers who move their travel time earlier will be inconvenienced, while those who will continue to drive during 7-8 am and pay the premium rate will be disadvantaged monetarily. On the other side of the ledger, however, are toll savings that will be reaped not just by those who will choose to travel off-peak (including "switchers" from the peak), but, more importantly, by *everyone* who will ever drive on the new Tappan Zee Bridge, by virtue of the lower toll enabled by the reduction in the cost of the downsized bridge. As noted in Section C, this benefit may well extend to New Yorkers who use the bridge rarely or never, if downsizing the bridge forestalls higher Thruway tolls, state taxes or transit fares to make up for the shortfall between the bridge's debt service and the tolls that TZB users can be made to bear.

The replacement Tappan Zee Bridge is intended to last at least half-a-century. It appears plausible that travel demand beyond 2031 could be accommodated through a combination of more comprehensive differential pricing, provision of improved public transportation including Bus Rapid Transit, real-time ride-sharing enhanced by digital communications, pay-for parking reforms such as "cashing out free parking" that incentivize drivers to use non-drive-alone means to commute to office parks, and other technologies that will emerge over the next 20 years. This kind of future warrants serious consideration now, before New York State plunges ahead with a project that could saddle future generations with high financial and traffic costs.

[20] For a look at the mathematics underlying this paragraph, which are based on the Port Authority study, download my "Balanced Transportation Analyzer" spreadsheet via this link <http://www.nnyn.org/kheelplan/BTA_1.1.xls> and navigate to the **Travel-Time Switching** worksheet tab. The spreadsheet is under 4 MB and runs on Excel 2007 or later.

I. Areas for Further Inquiry

The following questions to the New York State Thruway Authority arose in the course of composing this analysis.

- How does the Authority intend to pay for the replacement bridge? Will TBZ users pay the entire cost? If not, who will?
- How does the Authority compute debt service on the financing for the bridge?
- What are the likelihoods of cost overruns? Are issues such as seismic safety, dredging of Hudson River sediment, non-interference with traffic on the existing span, and community impacts fully reflected in the Authority's cost estimate?
- What is the cost to decommission the existing bridge, and is that cost included in the cost estimate for the replacement bridge?
- What is the best estimate of current TZB costs that will be avoided once the old bridge is taken out of service?
- What are weekday, weekend and annual TZB traffic volumes for each of the past 30 years? What are each year's hour-by-hour weekday and weekend volumes over the same period?
- What price-elasticity does the Thruway Authority believe applies to trips that cross the TZB? Has the Authority factored that into its planning for bridge design and financing?
- What does the Authority believe is the applicable price-elasticity for "switching" trip times, as a function of differential (peak vs. non-peak) toll prices?
- What are "distance deciles" for trips that use the Tappan Zee Bridge, i.e., what are the average distances, in miles, of trips that are the shortest 10%, the next shortest 10%, etc., up to the longest 10%?
- How many times in recent years was at least one direction of the Tappan Zee Bridge taken out of service due to an unforeseen event such as a crash, storm, etc.? For how many hours was traffic halted? What were the associated economic losses?
- What, if anything, would be saved in construction cost and time by building the replacement bridge as a single (bi-directional) span rather than as two separate spans?
- What would be saved in construction cost and time by building the replacement bridge to be 25% less wide than the current design (183 feet wide)?

About Charles Komanoff

Komanoff is an activist, economist and policy analyst. He directs the Carbon Tax Center and develops traffic-pricing modeling tools for the Nurture Nature Foundation. A prolific writer, Charles's output includes books, scholarly articles, journalism and landmark reports such as *Power Plant Cost Escalation*, *Killed By Automobile*, and the *Bicycle Blueprint*. A math-and-economics graduate of Harvard, Charles lives with his wife and two teenage sons in lower Manhattan. For links and more, go to www.komanoff.net.

EXHIBIT 3

In-River Impacts Technical Report
Carpenter Environmental Associates, Inc.

March 30, 2012

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March 30, 2012

Mr. Philip Musegaas, Esq.
Hudson River Program Director
Riverkeeper, Inc.
Ossining, NY 10562

Re: Review of Draft Environmental Impact Statement
Tappan Zee Hudson River Crossing Project

CEA No. 21213

Dear Mr. Musegaas:

Carpenter Environmental Associates, Inc. (CEA) has reviewed the Draft Environmental Impact Statement (DEIS) for the Tappan Zee Hudson River Crossing Project prepared by the U.S. Department of Transportation dated January 2012. CEA offers the following comments with respect to impacts to Atlantic (*Acipenser oxyrichus*) and Shortnose Sturgeon (*Acipenser brevirostrum*) populations identified within the project area and more specifically discussed in the Aquatic Sampling Program (Appendix F-1) and Biological Assessment (Appendix F-4).

1. CEA identified a number of instances in the Aquatic Sampling Program (ASP) where more information regarding the Atlantic and Shortnose Sturgeon populations must be provided. The Aquatic Sampling Program states the following:

- *"No discernible trend regarding the presence or absence of shortnose sturgeons can be inferred from the data."*[1]

  The Biological Assessment (BA) continues to base calculations and assumptions on the data described in the above statement. From the data, the BA calculated an encounter rate which was then used to calculate the number of fish to be affected by the project. Considering the above statement, the number of affected fish calculated in the BA is not based on a conclusively defined data set.

[1] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-39.

A more detailed analysis and discussion detailing occurrences of the Shortnose Sturgeon populations within and adjacent to the site is required to fully assess project impacts.

2. CEA identified a number of instances in the Aquatic Sampling Program where survey sampling methodologies for Atlantic Sturgeon populations were insufficient:

- *"Due to concerns of injuring the shortnose sturgeon, the gill net soak times were limited by water temperatures. For temperatures below 59°F (15°C), the maximum soak time was 4 hours; for temperatures between 59 and 68°F (15 and 20°C), the soak times were limited to 2 hours. For temperatures between 68 and 80.6°F (20 and 27°C), the soak times were limited to 1 hour. No netting was permitted when the water temperatures exceeded 80.6°F (27°C)."*[2]

  The ASP soak times ranged from one to four hours depending on the temperature of the water.[3] The 2007 Sweka study of juvenile Atlantic sturgeon completed by the U.S. Fish and Wildlife Service (USFWS) and New York State Department of Environmental Conservation (NYSDEC) stated that nets were soaked for a *minimum* of 2 hours per net.[4] Furthermore, the Sweka study did not require any necessary protections for shortnose sturgeon due to temperature conditions and therefore does not limit the soak time. In fact, the greatest catches in the Sweka (2007) study were observed when recorded water temperatures were greater than 20°C.[5] The statement above from the ASP indicates that when temperatures were between 20°C and 27°C the net was deployed for a *maximum* of 1 hour. A study documented in the National Marine Fisheries Service (NMFS) 2007 Status Review of Atlantic Sturgeon documents reduced soak times for nets when water temperatures exceed 30°C.[6] The ASP study shows a deficiency in understanding the capture of Atlantic sturgeon. The methodology that utilized reduced soak times for the performed sampling is likely a contributing factor as to why no Atlantic sturgeons were collected during the 1 year ASP study and 562 wild juvenile Atlantic sturgeons were collected during the 2½ year Sweka study performed in conjunction with the USFWS and NYSDEC.

- The ASP gill net survey took place between April 2007 and May 2008 on a bi-monthly schedule.[7,8] The sampling performed during the Sweka study occurred

[2] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-33
[3] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-33
[4] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg 1060
[5] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1065. Pg 1065
[6] Atlantic Sturgeon Status Review Team for the National Oceanic and Atmospheric Administration. Status Review of Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus). February 23, 2007. Updated July 27, 2007. Pg 69
[7] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 14

during five time periods: fall 2003, spring 2004, fall 2004, spring 2005 and fall 2005.[9] This covers a 30 month (2½ year) period. By using a longer, seasonally overlapping time frame for sampling, the USFWS and NYSDEC were able to correct circumstantial deficiencies (such as debris in nets) within their sampling.[10] Furthermore, the extended sampling period allowed for a statistical analysis/comparison between sampling periods and locations to occur.[11] These advantages of using a longer, seasonally overlapping time frame were not available to the ASP which was only conducted over the course of one year. Additional studies modeled after the Sweka study needs to be conducted to ensure adequate sampling procedures for capturing and assessing Atlantic Sturgeon populations.

- Atlantic Sturgeon adults and sub adults, that are not spawning, live in coastal and estuarine conditions, generally in shallow water (10-50 m or 33 to 164 ft.) near shores dominated by gravel and sand.[12] The water depth on the eastern side of the existing bridge reaches a low of 50ft.[13] Figure 5 of the BA shows the area corresponding with the 50ft deep water to be comprised of sandy silt clay. Of the area studied by the ASP, the eastern portion of the bridge within the 50ft deep channel would be the most likely location to find Atlantic sturgeon. The ASP does not give the exact depths of the gill nets for each sample location/event, but does state that sampling location F10 was used for deep water sampling at water depths of 25-34 feet.[14] ASP nets were not deployed in water depths greater than 35 feet; therefore they were not deployed within the most likely location for finding Atlantic sturgeon. The gill nets deployed during the ASP were 8 feet high by 125 feet long. The net consisted of 5 gill net panels (each 25 feet long) with mesh sizes ranging between 1 and 5 inches.[15] The gill nets deployed during the Sweka study, in attempt to catch juvenile Atlantic sturgeon, were 8 feet high by 200 feet long. The net consisted of 3 gill net panels, one of each mesh size. The mesh sizes ranged from 3 to 5 inches, which have been shown to effectively capture juvenile-

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[8] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-33

[9] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg 1060

[10] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg 1060

[11] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg 1061

[12] NOAA Fisheries – Office of Protected Resources. Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus). Updated March 14, 2012. Accessed March 27, 2012. http://www.nmfs.noaa.gov/pr/species/fish/atlantic sturgeon.html

[13] NOAA – Office of Coast Survey. September 2004 nautical chart. http://www.charts .noaa.gov/OnLineViewer/12346.shtml

[14] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-10

[15] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-4

sized Atlantic sturgeon.[16] When compared to one another, the Sweka study used an area of 1600 sq. ft. of net effective at collecting juvenile Atlantic sturgeon. The ASP provided an area of 600 sq. ft. of net effective at capturing juvenile Atlantic sturgeon. When considering the available effective net size, it would be expected that the Sweka study would capture more Atlantic sturgeon.

3. CEA identified a number of instances in the BA where mitigation for disturbances to Atlantic and Shortnose Sturgeon populations was not addressed or insufficient:

- *"The dredging depth required assumes that two feet of sand and gravel armor is placed on the bottom. In total, the channel would be dredged to a depth corresponding to 4.9 m (16 feet) below MLLW)."*[17]

  "However, dredging of the access channel will result in a temporary modification of benthic habitat. Over time deposition processes would allow much of the benthic habitat to return to its pre-construction state. The rate of this transformation would begin at approximately 1 foot per year, likely decreasing as the bed nears it natural pre-dredged elevation."[18]

  The BA states that the river channel substrate will recover on its own and therefore no mitigation plans for the dredged channels have been developed. The channel may recover naturally in time; however, it will take several years after the completion of the project (4½ to 5½ years) for full recovery to pre-disturbance levels. The sturgeon will be losing part of their foraging habitat for a minimum of four to five years. The BA report does not discuss the implications of large scale disturbance to the benthic environment within the Atlantic Sturgeons overwintering habitat (located under and adjacent to the existing bridge). Many factors combine to provide adequate benthic habitat for foraging sturgeon species. The study does not sufficiently identify comparable areas that would support overwintering sturgeon populations that would be displaced due to the long-term disturbances expected in the proposed project area.

  In summary, with the exception of oyster beds that may be permanently lost, where access channels are dredged, there would be a temporary loss of habitat that could affect sturgeon that use the dredged area for foraging. These effects would occur as a result of a localized reduction in benthic fauna. However, the dredging footprint represents a very small percentage of the Hudson River Estuary and its soft bottom habitat. Thus, the temporary reduction of benthic fauna within the dredged area would not substantially reduce foraging opportunities for the river's sturgeon populations, because sturgeon are highly mobile and anadromous, moving up and down the estuary.[19]

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[16] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg 1060

[17] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 29

[18] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 75

[19] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 62

The Hudson River Estuary extends from the Battery in southern Manhattan to the Troy Dam, north of Albany, for a distance of 153 miles. Along the length of the 153 miles of the estuary are different sturgeon habitats that provide for spawning, foraging, migrating and overwintering habitats.[20] The Haverstraw-Tappan Zee region of the river is an area identified by NMFS, USFWS and NYSDEC as overwintering habitat.[21] Comparing the habitat provided within the area of the river proposed for dredging to the entirety of the Hudson River Estuary is not an acceptable means for providing conclusive assessments as not all the river has a soft bottom habitat that is used by sturgeons for foraging.

4. Disturbances to Atlantic and Shortnose Sturgeon populations within the project area due to the proposed installation of permanent platforms were not adequately assessed.

- Figures in the BA depict both temporary and permanent platforms. However, within the text only temporary platforms are clearly discussed. The permanent platform is being shown to be located at the Rockland Landing.[22,23] The BA briefly touches on the additional shading impact of the approx. 99,153 sq-ft permanent platform. The BA also states that the additional shading would not result in direct effects to the sturgeon.[24] There is a lack of defined population and habitat usage data in the vicinity of the proposed project area and more specifically the proposed location of the permanent platforms. The proposed permanent platforms would effectively eliminate over 2 acres of potential overwintering and foraging habitat for Atlantic and Shortnose Sturgeon populations. This portion of the project area requires additional studies and a thorough examination of potential mitigation for loss of essential sturgeon habitat.

5. Disturbances to Atlantic and Shortnose Sturgeon populations within the project area due to the proposed dredging were not adequately assessed.

- Dredging the access channel for the project would be the largest dredging operation (1.68-1.74 million CY) in the Hudson Valley. The extent and magnitude of the dredging impacts on sturgeon population must be better assessed and understood. The NMFS identifies dredging operations as a source of sturgeon mortality in a number of similar estuaries. Significant studies are warranted here.

6. Disturbances to Atlantic and Shortnose Sturgeon populations within the project area due to the effects of the sound from pile driving were not adequately assessed.

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[20] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012.
[21] Sweka, J.A. 2007. Juvenile Atlantic Sturgeon Habitat Use in Newburgh and Haverstraw Bays of the Hudson River: Implications for Population Monitoring. *North American Journal of Fisheries Management* 27: 1058–1067. Pg. 1064.
[22] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Figure 9.
[23] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 28
[24] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 63

- *"There are limited data from other projects to demonstrate the circumstances under which immediate mortality occurs as a result of pile driving: mortality appears to occur when fish are close [(within a meter to 9 m (a few ft to 30 ft)] to driving of relatively large diameter piles. Studies conducted by California Department of Transportation (Caltrans, 2001) showed some mortality for several different species of wild fish exposed to driving of steel pipe piles 2.4 m (8 ft) in diameter, where as Ruggerone et al. (2008) found no mortality to caged yearling coho salmon (Oncorhynchus kisutch) placed as close as 0.6 m (2 ft) from a 0.45 m (1.5 ft) diameter pile and exposed to over 1,600 strikes. Thus, in the overall range of effects on fish in ecosystems such as the Tappan Zee, only a very small fraction of a fish population likely will be close enough to a pile to be subject to immediate mortality."*[25]

  The two cited studies do not accurately represent the proposed project. The short span option utilizes 1,326 piles with diameters ranging between 4 and 10 feet. The long span option utilizes 836 piles with diameters ranging between 4 and 10 feet. The BA cites no studies concerning fish mortality related to the driving of piles larger than 8 ft in diameter. The BA does not state the distance the fish were from the pile driving activities or what species were mortally affected in the Caltrans 2001 study. Assuming that different species of fish react the same to pile driving, or any other environmental disruption, is an unacceptable practice. Again, in referencing the Ruggerone study, the coho salmon are not sturgeon and are therefore going to be impacted differently. The conclusion that a small fraction of a fish will be within a close enough vicinity to experience immediate mortality is not supported by the referenced material.

  Sampling locations of the gill net survey (ASP) were chosen in order to determine the habitat conditions around the existing bridge. This included six sampling sites directly adjacent to and/or underneath the bridge and three reference sites within 500 and 600 feet north of the bridge.[26,27] The BA states:

  "The limits of the study area considered in this BA have been determined by the potential project effects for dredging and re-deposition of suspended sediment, acoustic impacts from pile driving, and loss of habitat. The potential geographic boundaries extend across the entire width of the Tappan Zee Reach, and based on modeled sound isopleths extend a maximum of 2,210 m (7,250 feet) or less in both up and downriver directions."[28]

  The sampling locations in the ASP do not adequately represent the limits of the study area reported in the BA. The limits of the study area reported in the BA are 20 times larger than the area studied by the ASP. The gill net fish survey does not cover the entire area affected by this project and therefore cannot be considered as a reputable source for information on the study area.

[25] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 44
[26] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-9
[27] DEIS – Appendix F: Ecology F-1 Aquatic Sampling Program, AECOM, April 2011; Pg F-1-3
[28] DEIS – Appendix F: Ecology F-4 Biological Assessment, AKRF, Inc., January 2012; Pg 55

Sincerely,

Carpenter Environmental
Associates, Inc.

Ralph E. Huddleston, Jr
Senior Vice President