Attachment B: Written Comments on the Final Environmental Impact Statement

B-1 LIST OF COMMENTERS

Azerrad, Joel: Written comments dated August 1, 2012

Ballard, Wayne: Written comments dated August 15, 2012

Buroughs, Edward, Commissioner, Westchester County Department of Planning: Written comments dated September 4, 2012

Callan, Chuck: Written comments dated September 4, 2012

Carlock, Hayley, Scenic Hudson, Inc.: Written comments dated September 4, 2012

Centolanzi, Patrick: Written comments dated August 5, 2012

Crossan, A. Brook, Mack Associates, LLC, representing Salisbury Point Cooperative: Written comments dated September 4, 2012

Fixell, Drew, Mayor, Village of Tarrytown: Written comments dated September 4, 2012

Harper, Dennis: Written comments dated August 16, 2012

Konduru, Somnath: Written comments dated August 8, 2012; and written comments dated August 23, 2012

Krajeski, William: Written comments dated August 16, 2012

Kwasnicki, John: Written comments dated August 16, 2012

Mans, Deborah, NY/NJ Baykeeper: Written comments dated September 4, 2012

Mausner, Claudia: Written comments dated August 15, 2012

Musegaas, Phillip and Josh Verleun, Riverkeeper, Inc.: Written comments dated September 4, 2012

Parish, Nathaniel, representing The Quay Condominium and Salisbury Point Cooperative: Written comments dated August 30, 2012

Pratt, Charles: Written comments dated August 5, 2012

Sachs, Joel, representing The Quay Condominium: Written comments dated September 4, 2012

Saunders, Alexander: Written comments dated August 30, 2012; and written comments dated September 3, 2012

Singer, Sr., Donald Lee, representing residents of Salisbury Point Cooperative: Written comments dated September 4, 2012

Sullivan, Joan: Written comments dated August 23, 2012

Vanderhoef, C. Scott, Rockland County Executive: Written comments dated September 4, 2012

Vanterpool, Veronica and Vincent E. Pellechia, Tri-State Transportation Campaign: Written comments dated August 29, 2012

Vess, Bill and Michelle: Written comments dated August 13, 2012; written comments dated August 20, 2012; written comments dated August 29, 2012; written comments dated August 31, 2012; additional written comments dated August 31, 2012; and written comments dated September 1, 2012

Weiss, Lois: Written comments dated August, 31, 2012

Winoker, Arthur: Written comments dated August 6, 2012; and written comments dated August 8, 2012

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: Final Environmental Impact Statement
Date:	Wednesday, August 01, 2012 5:29:43 PM

From: Joel Azerrad[SMTP:JAZERRAD@OPTONLINE.NET]
Sent: Wednesday, August 01, 2012 5:29:26 PM
To: dot.sm.mo.tzbsite
Subject: Final Environmental Impact Statement
Auto forwarded by a Rule I want you to ensure that the new Tappan Zee Bridge will have -- *upon opening* -- a functioning light rail or railroad connection to Metro North at Tarrytown.

This is very important because it will lighten auto traffic on the bridge, move many more people in the same amount of time and be a spur to the development of rail on the west side of the Hudson.

Joel Azerrad
915-762-1875

From: dot.sm.mo.tzbsite <tzbsite@dot.ny.gov>
Date: August 15, 2012 8:31:30 PM EDT
To: "Vasco, Sandra (DOT)" <Sandra.Vasco@dot.ny.gov>, "gpaschalis@hshassoc.com" <gpaschalis@hshassoc.com>, "Robbins, Russell (DOT)" <Russell.Robbins@dot.ny.gov>
Subject: FW: basis of award

From: wayne ballard[SMTP:WJSKJB@OPTONLINE.NET]
Sent: Wednesday, August 15, 2012 8:31:15 PM
To: dot.sm.mo.tzbsite
Subject: basis of award
Auto forwarded by a Rule
Mr. Michael P. Anderson,
First of all the web site for the new bridge is very well done, informative and interesting. My compliments to the enter team who put together both the tzb web site and the documents for a job well done. As an engineer/construction manager that worked on much smaller design/built projects, I find it all to be well done.
I am curious as to what bases and format will be used to determine the final design/built team. I know it will not be merely based on the lowest dollar value. I'm sure the presentation, adherence to the requirements, strength of the team and look of the structure all play a role in the decision process. Where on the web site is the selection process of the design/built team defined.
Again I thanks you and your team for all of the effort put into this project. Also the time you took to read my email and respond to my question.
My email is betaalpha80@gmail.com

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: Westchester County Comments on Final EIS Tappan Zee Hudson River Crossing Project
Date:	Tuesday, September 04, 2012 2:47:56 PM
Attachments:	Westchester County Comments 09-04-2012 on TZ Hudson River Crossing Final EIS.pdf

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From: Buroughs, Ed[SMTP:EEB6@WESTCHESTERGOV.COM]
Sent: Tuesday, September 04, 2012 2:47:00 PM
To: dot.sm.mo.tzbsite
Cc: Anderson, Michael (DOT); Plunkett, Kevin J.; Pisco, Jay
Subject: Westchester County Comments on Final EIS Tappan Zee Hudson River Crossing Project
Auto forwarded by a Rule

Dear Mr. Anderson:

Please see attached letter conveying the comments of Westchester County on the Final EIS for the Tappan Zee Hudson River Crossing Project. If you have any questions, please let me know.

Thank you.

Ed Buroughs

Edward Buroughs, AICP
Commissioner of Planning, Westchester County

Westchestergov.com

Robert P. Astorino
County Executive

Department of Planning

Edward Buroughs, AICP
Commissioner

September 4, 2012

Michael P. Anderson, P.E., Project Director
NYS Department of Transportation
4 Burnett Boulevard
Poughkeepsie, NY 12603

Subject: **Tappan Zee Hudson River Crossing Project**
Comments on Final Environmental Impact Statement, July 2012

Dear Mr. Anderson:

On August 16, 2012, subsequent to the release of the "Tappan Zee Hudson River Crossing Project Final Environmental Impact Statement" (EIS) dated July 2012, Westchester County Executive Robert P. Astorino, Rockland County Executive Scott Vanderhoef and Putnam County Executive MaryEllen Odell announced that they had developed a framework in conjunction with Governor Andrew Cuomo that addresses the need for mass transit on the bridge when it is built and in the future. Under the terms of the framework:

- Dedicated bus lanes will be incorporated on the bridge from the start.
- The bridge will be constructed with mass transit capacity compatible with a Bus Rapid Transit (BRT) system and Commuter Rail Transit.
- A Regional Transit Task Force will be created to study costs and options for regional transit, including commuter rail and a BRT system on the bridge and key portions of the Westchester-Rockland corridor.
- The Task Force will issue recommendations in one year, with a plan for short-term steps that can be considered for immediate commencement, as well as long-term plans for transit solutions.
- Incentives will be created for contractors that could be used to reinvest in regional mass transit or to moderate impact on toll-payers.

In addition, the governor and county executives agreed to establish a working group of Thruway, state, federal and local officials to examine ways to keep toll increases to the minimum necessary, including maximizing federal support, expanding discount programs for regional residents and financing mechanisms that lower the cost of credit and borrowing.

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148 Martine Avenue
White Plains, New York 10601 Telephone: (914) 995-4400 Fax: (914) 995-9093 Website: westchestergov.com

Obviously as this framework was defined after release of the final EIS, its very significant components setting forth how mass transit needs are to be considered immediately are not reflected in the final EIS. It is critical that this framework be acknowledged.

County Executive Astorino said at the time of the announcement, "I have been a strong supporter on the need for a new bridge but I've been equally strong on the need for some form of mass transit as a way to reduce congestion and pollution. Under the framework, mass transit will not be an afterthought in the building of the bridge. With plans to have mass transit as part of the new Tappan Zee Bridge we're not waiting five years to start thinking about it, we're moving forward now."

With regard to the content of the final EIS, our review has found that the responses in the final EIS to three of the comments that we made in our letter on the draft EIS, dated March 30, 2012, do not address our questions, concerns and suggestions. We request that these topics be more fully addressed.

a. **Ensure ability for "ready-to-operate Bus Rapid Transit" (BRT) across the full project limits**. The final EIS does not describe the specific improvements that must be incorporated in the bridge approaches to ensure that BRT service can be provided when the new bridge opens.

The Record of Decision should include a statement that the exit/entrance to the Emergency Access Lane (Bus Rapid Transit lane) on each new bridge span will be designed to extend through the new toll plaza area and under the Route 9/South Broadway Bridge so that it can be used for transit immediately upon completion of the new bridge.

b. **Consider future use of temporary construction access road as Bus Rapid Transit access road to Tarrytown station**. The final EIS does not provide a response to this specific suggestion.

In the draft EIS, Figure 18-4 "Westchester Landing Construction Access" shows how a new access road is to be built between the current Thruway offices on Route 9 (a site which will become the "Westchester Inland Staging Area") and the "Westchester Bridge Staging Area" located on platforms in the Hudson River north of the bridge. This access road will extend south from the office area, pass under the bridge approach, cross the Metro-North Hudson Line/Amtrak rail lines south of the existing bridge and then turn north and parallel the river shoreline for over 1,000 feet. This figure also shows that an "emergency access road" will be constructed to extend this road north from the "Westchester Bridge Staging Area" to Green Street near the Tarrytown Metro-North Railroad station. This work will require a significant investment and careful coordination with Metro-North so as to allow the road's use by heavy construction equipment and the delivery of supplies.

This investment should not be short term or temporary. The Record of Decision should discuss the potential future conversion of this access road and its emergency extension into a Bus Rapid Transit only ramp that would link the BRT lanes on the new bridge spans to the Tarrytown Metro-North Railroad station.

c. **Include construction of RiverWalk as part of the project**. The final EIS does not address this specific proposal.

We had recommended that the design and construction of the proposed Hudson RiverWalk section to be located below the Tappan Zee Bridge be part of the Tappan Zee Hudson River Crossing Project. The route location is within the project limits and the potential path is already planned to be developed as an access road (discussed above). Further, its completion along with new connections to the bridge would provide for a seamless bicycle/pedestrian network which would maximize the potential of the new bridge pathway/bikeway. The Record of Decision should include a commitment to include this trail connection as part of the project scope.

Thank you for the opportunity to comment on this important document and process.

Sincerely,

Edward Burroughs, AICP
Commissioner

cc: Hon. Robert P. Astorino, County Executive
Kevin J. Plunkett, Deputy County Executive
Jay Pisco, P.E., Commissioner of Public Works and Transportation

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: Comment on Tappan Zee FEIS
Date:	Tuesday, September 04, 2012 8:58:38 PM
Attachments:	Comparison of Noise Estimates 09-04-12.pptx

From: Callan, Chuck (845-398-0550)[SMTP:CHUCK.CALLAN@BROADRIDGE.COM]
Sent: Tuesday, September 04, 2012 8:58:06 PM
To: dot.sm.mo.tzbsite
Subject: Comment on Tappan Zee FEIS
Auto forwarded by a Rule
Dear Mr. Anderson:

I appreciate the opportunity to comment on the Final Environment Impact Statement.

To date, the NYSDOT has not addressed the ongoing noise pollution caused by the Tappan Zee Bridge or its proposed Short- and Long-Span alternatives. The FEIS raises the 2010 noise baseline over that reported in the DEIS. The FEIS also raises its estimates of the ongoing noise levels of the Short- and Long-Span alternatives from estimates provided in the DEIS. Refer to the attached chart, "Comparison of Noise Estimates."

The NYSDOT does not appear to have a handle on the projected ongoing noise impacts of the 'build' alternatives. No measurements were made of the extent to which noise travels over water and out into the surrounding communities further afield of the bridge landing zones. The NYSDOT's past performance in this regard is cause for concern. The recent re-decking solution has significantly increased the level of ongoing noise and that came as a surprise to NYSDOT and others. Best practices were not explored.

The NYSDOT may accomplish a goal of restoring ongoing noise to pre-2005 levels by, for example: considering a smaller, less expensive bridge; a single bridge with mass transit; a tunnel; or, more informed selection of surface materials.

Thank you,

Charles V. Callan
205 River Road
Grandview, NY 10960

Noise Levels Are High and Increasing. The FEIS Increases the Noise Levels for the 2010 Baseline and for the estimates of the noise of both the Short-Span and Long-Span Alternatives.

Noise Receptors	Existing Conditions 2005	Existing Conditions 2010 DEIS	Existing Conditions 2010 FEIS	Short Span DEIS	Short Span FEIS	Long Span DEIS	Long Span FEIS
R1	69	70	70	71	71	71	71
R2	62	66	66	67	67	67	67
R3	n.a.	72	72	73	72	74	72
R4	n.a.	78	78	74	78	75	78
R5	n.a.	72	76	73	76	70	76
R6	n.a.	68	76	70	72	66	72

Increased Noise from Re-Decking

The FEIS Raises the Baseline Noise Figures Reported in the DEIS

FEIS Short-Span Increases the Estimated Noise in the DEIS

FEIS Long-Span Increases the Estimated Noise Reported in the DEIS

Changes designated in red. Refer to NYSDOT draft and final environmental impact statements.

Notes to Table

1. **Noise Receptors**: DEIS Figure 12-2 labels Site 1 as Elizabeth Place and Site 2 as Smith Avenue. There is a labeling inconsistency with DEIS Table 12-3 which reverses these site and address designations. The figures given above are an average of the first and second peak measurements as indicated in Table 4.
2. **Existing Conditions 2005**: Refer to DEIS and FEIS Tables 12-3, 12-4, and 12-5. Note: these tables change the designations used in DEIS Figure 12-2 so that Site 1 is re-labeled as Cornelison Avenue, Site 2 as Smith Avenue, and Site 3 as Elizabeth Place. The DEIS and FEIS provide limited assessment of noise conditions prior to the installation of the re-decking.
3. **Existing Conditions 2010 DEIS**: Refer to column of same name in DEIS Tables 12-7, 12-9, and 12-11.
4. **Existing Conditions 2010 FEIS**: Refer to FEIS Tables 12-7, 12-9, and 12-11. The FEIS raises the reported levels of noise for R5 and R6, even though these refer to the same sites and timeframe as those reported in the DEIS Existing Conditions 2010. This has the effect of narrowing the incremental noise increase of the Short- and Long-Span alternatives.
5. **Short Span DEIS**: refer to DEIS Table 12-9.
6. **Short Span FEIS**: refer to FEIS Table 12-9. In comparison to the DEIS, the FEIS's estimated noise level increases in three sites and decreases in one site.
7. **Long Span DEIS**: refer to DEIS Table 12-11.
8. **Long Span FEIS**: refer to FEIS Table 12-11. In comparison to the DEIS, the FEIS's estimated noise level increases in three sites and decreases in one site.

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: Scenic Hudson Comment Letter on FEIS
Date:	Tuesday, September 04, 2012 4:43:33 PM
Attachments:	Scenic Hudson Comments on FEIS.pdf

From: Hayley Carlock[SMTP:HCARLOCK@SCENICHUDSON.ORG]
Sent: Tuesday, September 04, 2012 4:43:14 PM
To: dot.sm.mo.tzbsite
Subject: Scenic Hudson Comment Letter on FEIS
Auto forwarded by a Rule

Dear Mr. Anderson:

Please find attached comments regarding the Tappan Zee Hudson River Crossing Project FEIS on behalf of Scenic Hudson, Inc.

Please contact the undersigned with any questions or concerns. Thank you.

Hayley Carlock, Esq.
Environmental Advocacy Attorney
Scenic Hudson, Inc.
Tel: 845 473 4440 Ext 210
Fax: 845 473 2648
hcarlock@scenichudson.org

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land ■ parks ■ advocacy

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September 4, 2012

BY E-MAIL
Michael P. Anderson
New York State Department of Transportation
4 Burnett Boulevard
Poughkeepsie, NY 12603
tzbsite@dot.state.ny.us

Dear Mr. Anderson:

Please accept these comments regarding the Final Environmental Impact Statement ("FEIS") for the Tappan Zee Hudson River Crossing Project (the "Project") on behalf of Scenic Hudson, Inc.

Scenic Hudson is a not-for-profit organization working to protect and restore the Hudson River as an irreplaceable national treasure and a vital resource for residents and visitors. An advocate for the valley since 1963, today we are the largest environmental group focused on the Hudson River Valley. Scenic Hudson combines land conservation, citizen-based advocacy and sophisticated planning tools to create environmentally healthy communities, champion smart economic growth, open up riverfronts to the public and preserve the valley's inspiring beauty and natural resources.

Dredging and Habitat Impacts

To construct the Project as proposed, it is anticipated that approximately 1.9 million cubic yards of sediment over approximately 175 acres of River bottom will be dredged to enable water access during construction and demolition.[1]This represents an extremely large impact to this area of the River – the most significant dredging project in the Hudson River since the navigation channel was dredged. The dredged area will be "armored" with approximately 400,000 cubic yards of sand and stone to prevent vessel prop wash from dispersing bottom sediment into the water column. This "armoring" will temporarily alter the benthic habitat in that 175 acres and not allow it to be immediately recolonized.

The National Marine Fisheries Service ("NMFS") has stated that "impacts associated with bridge construction and removal may adversely affect living aquatic resources and their habitats."[2]Dredging will occur over a four-year period[3], so while the impact would be temporary, the scale of the dredging will significantly impact the benthic community and the aquatic species that rely on benthos for their food source. In addition, recovery from the dredging will take time, further prolonging the impact on the ecosystem. Sediment re-deposition in the dredged areas is very unlikely to take place as quickly as

[1]FEIS at 18-10.
[2] NMFS June 22, 2012 letter.
[3] FEIS at 18-6.

contemplated in the FEIS. The FEIS states that deposition within the dredged channel will occur at the rate of about one foot per year.[4] Data from other projects in nearby areas of the Hudson River indicate that the deposition rate would be far less – on the order of one or two inches per year. Given this information, recolonization will likely take many years and the scar to the floor of the River caused by the dredging will represent a long-term impact to the habitat.

There are sixteen Essential Fish Habitat ("EFH") species designated for the Hudson River that could potentially be impacted by the proposed project. Six of these species are known to occur in the immediate Tappan Zee region. Benthic species will be especially vulnerable due to the impacts of the proposed dredging and armoring, which are quite extensive. Further, while the benthic community may recover quickly after construction is completed, there is no data to suggest that the aquatic species that prey on the benthic organisms will return equally quickly.

The method of disposal of the dredge spoils remains an open question, as the ultimate decision of how to transport and dispose of dredge spoils is left up to the contractor.[5] The preferred plan is to place this fill in the Historic Area Remediation Site (HARS). However, disposal at the HARS requires an Army Corps of Engineers permit and the sediments must meet certain criteria related to toxic materials. It is far from clear that the sediments from the Tappan Zee area would meet the necessary toxic criteria. If the permit application for use of HARS is denied, the contractor would have to determine another place to dispose of the dredged material, and this possibility is not evaluated any further in the FEIS. Given that it could be potentially difficult to find a location to dispose of the dredge spoils, and that this could carry with it significant environmental impacts of its own, the potential for other disposal methods must be evaluated.

In addition to the long-term impacts resulting from construction of the bridge, there will be a permanent loss of up to 13 acres of oyster habitat[6], as well as shading associated with the new bridge structure. In addition, some wetlands will also suffer permanent damage and there will be a permanent loss of vegetation along the shoreline.

Finally, it is possible to construct the span without any dredging at all, by using construction trestles.[7] While using the trestles would result in a net cost of $263 million over the dredging alternative, the reduction in impacts to benthic habitat would be enormous. This non-dredging option should remain on the table, and a more robust comparison of the environmental impacts of dredging 1.9 million cubic yards of sediment versus the increased number of piles needed for the trestle option should be conducted.

Endangered Species

The draft state Incidental Take Permit for the shortnose and Atlantic sturgeon, issued by DEC pursuant to 6 NYCRR Part 182.2(j), estimates that approximately 125 Atlantic sturgeon and 298 shortnose sturgeon will be affected by elevated noise levels caused by pile driving during

[4] FEIS at 18-94 and Appendix E.
[5] FEIS at 18-8.
[6] FEIS at 16-39.
[7] FEIS at 18-8.

construction. Further, according to the draft Permit, as many as 52 Atlantic sturgeon and 89 shortnose sturgeon may suffer fatal injuries.[8]

The federal Incidental Take Statement for the shortnose and Atlantic sturgeon, issued by NFMS pursuant to Section 7 of the Endangered Species Act, in stark contrast, permits the mortality of only 2 individuals of each type of sturgeon, and asserts that this level of impact will not result in jeopardy to the species.[9]

This discrepancy between the draft state and federal Incidental Take Permits is startling in its magnitude and must be resolved. While the fatality of 4 sturgeonmay not result in jeopardy to the species, the fatality of 141 sturgeon – and particularly of 52 Atlantic sturgeon, given the Hudson River population's perilous state – would represent a very detrimental loss, from which the Hudson River population may not be able to recover.

The deeper water habitat created by the trench may actually attract sturgeon to the project area during construction, therefore increasing the chance of injury and mortality. Further, while the FEIS does propose construction windows for dredging operations, pile driving and other construction activities will be ongoing during the upstream migration period of the sturgeon. More restrictive construction windows are necessary to minimize the impact on these endangered species.

Mitigation

The proposed mitigation measures represent a good start to addressing some of the impacts of the project. However, given the enormous area to be dredged, and the slow recovery period, a much more robust mitigation plan than proposed in the FEIS is warranted.

Additional compensatory habitat reconstruction is especially vital to ensure the health of sensitive species in the Hudson River. Given that 175 acres of shallow water habitat will be disturbed by the dredging, a multiple of this acreage of similar shallow water habitat elsewhere must be restored to adequately compensate for the loss of habitat. Permanent shoreline hardening will result from the project and therefore equivalent shoreline softening in other areas should be undertaken. To compensate for expected injury and mortality to endangered species, direct contributions to the recovery of these species (investments in fishery resources, hatcheries, etc.) should be included in any mitigation plan.

Mass Transit

After nearly ten years of study and broad consensus in the Hudson Valley that the solution to replace the Tappan Zee Bridge should include some form of mass transit, the FEIS does not reflect this public input and instead states that a project with a mass transit component is not financially feasible at this time. The

[8] New York State Department of Environmental Conservation, Tappan Zee Bridge Draft Part 182 Incidental Take Permit at 2. *Available at* http://www.newnybridge.com/documents/dec-permit/draft-permit.pdf.
[9] See NOAA NFMS Biological Opinion at 146.

FEIS ignores the facts, findings and public consensus that developed over a decade of study and public meetings that public transportation is an important part of a bridge replacement project. An historic opportunity to change the transportation picture in the Hudson Valley for the better presents itself in the Tappan Zee Bridge replacement project. A 21st century solution meeting the transportation needs of the future by including mass transit would leave a positive legacy on transportation and land use patterns throughout the region.

The selected alternative of simply rebuilding the old span with one extra lane is a 1950's era solution to the modern regional problems of the Tappan Zee corridor. Mass transit is the key for handling growth in the region well into the 21st century, and if included on the new Tappan Zee Bridge on Day 1 will help position New York State as a leader in national transportation policy. Unfortunately, experience tells us that no matter how many lanes are built on the bridge, they will eventually be filled – soon, the new eight lane design will be where the current seven lanes are today. Indeed, only two years ago, the New York State Department of Transportation Scoping Summary stated that, "Mass transit offers the only realistic means of addressing the requirements of improving mobility in the corridor."[10] It is safe to say that there are no changed circumstances that warrant abandoning that finding.

While the FEIS states that it will "not preclude" the addition of mass transit in the future[11], there is very little information as to how the later addition of mass transit might be accomplished, other than that the superstructure of the bridge will be able to bear the load of a mass transit system.

Scenic Hudson is sensitive to the current fiscal constraints; however, failure to add mass transit does not address well established principles of transportation and land use planning. Simply expanding the current bridge requires all trans-Hudson commuters to travel by automobile. This encourages the spread of suburban sprawl across the Hudson Valley's beautiful landscape, rather than concentrating population in development centers convenient to mass transit. Any daily commuter knows our roads are extremely congested during rush hour. Population in the Hudson Valley is projected to continue to increase by 20 to 25% between 2010 and 2050 and without offering trans-Hudson commuters an option besides private automobile commuting, road congestion will inevitably dramatically increase as well. The current proposal trades short-term cost savings for long-term economic, environmental and quality-of-life benefits. It is imperative that the state ensure mass transit will be available to the people living in the corridor today, and not put it off to a speculative future date.

The questions that arise from lack of detailed plans for the future addition of mass transit demonstrate that the time to put forth a comprehensive bridge design including bus rapid transit ("BRT") should be now, not some indeterminate time in the future. If mass transit is not integrated into the design of the new Tappan Zee crossing today, chances are it never will be. The FEIS estimates that a BRT service between Suffern and Port Chester would cost approximately $5 billion – effectively doubling the cost of the project. Compared to the construction of other BRT systems around the US, with similar constraints, this estimate seems quite high. The FEIS does not contain a detailed cost analysis for different mass transit

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[10] NYS Department 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)
[11] FEIS at 4-1.

configurations that could be implemented to support its claim that including mass transit would be too costly.

The FEIS anticipates that there "could" be the ability for express bus services to use the extra width on the bridge during peak hours, to avoid the mobility constraints to which private vehicles are subject.[12] At an absolute minimum, the ability for existing express bus service to move more efficiently through the corridor is a must. As it stands today, there is very little incentive for residents to use the bus service, since it will be stuck in the same traffic that all other vehicles are subject to and cannot be relied upon. Concrete plans for how to begin construction of a BRT system at least between the Palisades Mall and White Plains should be developed immediately. While it will bring the cost of the project up to some extent, it will be less expensive to do it now than do it at a later date and will maximize the value of the public investment in this project. A Tarrytown connector, to bring bus service efficiently from the bridge to the Tarrytown train station, should be implemented immediately, as this relatively small investment would greatly increase efficiency for a large number of commuters from Rockland County.

Finally, it is imperative that the Governor's recently announced Mass Transit Task Force must not only issue "recommendations" after a year of study, but have a solid plan ready to put into action to add mass transit in some form to the Tappan Zee corridor.

Community Impacts

The communities surrounding the bridge on either side of the River will be greatly impacted not only during construction, but for the life of the bridge, as the new approaches and span designs will change neighborhood character, views and quality of life for many residents.

Impacts to the surrounding communities during construction will include traffic congestion and detours, disrupted access to residences, businesses and other facilities, presence of equipment, materials and staging areas near the waterfront, noise and vibrations from construction equipment and vehicles, dust and other airborne pollutants, and removal of or damage to trees, shrubs, grass, etc. Construction would also impact Elizabeth Place Park and an adjacent green space area in the Village of South Nyack. Temporary disruptions to recreational boating in the area of the construction will also occur.

The level of noise from the pile-driving demonstration pilot project that took place in the spring of 2012 was quite disturbing to many residents of the river villages of Tarrytown, Nyack and South Nyack. The test piles were only driven for a few days' duration; when the actual bridge construction takes place, the noise and vibration will last a far longer period of time and be a much greater disturbance to residence of local communities. In fact, the FEIS itself state that construction activities could create noise levels sufficient to cause community disturbance and interfere with daily activities, despite limiting pile driving to no more than 12 hours a day.[13]

Even with the best noise mitigation measures, it is clear that significant disturbance will occur to the surrounding communities during construction. This level of community disturbance clearly warrants

[12] FEIS at 2-12
[13] FEIS at 18-11.

significant mitigation measures to ensure residents are compensated for the temporary and permanent loss of enjoyment of their homes and communities. Mitigation projects to compensate for these impacts to communities should include increasing public access to riverfront, undertaking waterfront planning, shoreline restoration, environmental remediation projects, and improving local transit options.

Visual Impacts

The new Tappan Zee Bridge will serve as gateway to the majestic Hudson Valley from the New York metro area, and as such, having an aesthetically pleasing design is an important feature. The Hudson River is a highly valued scenic resource for residents and visitors alike, and the profound impact the new bridge will have on the viewshed should be taken into account in choosing the bridge design. An aesthetically pleasing bridge could actually improve the views of the River from important nearby receptors; a purely utilitarian bridge designed without aesthetic considerations, on the other hand, could be a great detriment to the aesthetic qualities of the Tappan Zee.

While we appreciate that the Governor will be convening a blue-ribbon panel to evaluate and consider visual aspects of the bridge design and issue recommendations, it is concerning that the Design-Build process requires the contractor to have approximately 30% of the bridge designed in their bid. Once this foundational third of the design is complete, it is unclear what impact the additional input from the blue ribbon panel could have. The chosen design may not be visually sensitive whatsoever, and the recommendations of the panel could end up having the impact of putting lipstick on the proverbial pig.

The design of the new bridge should represent a visual improvement over the current bridge It is integral that stakeholder and community members have meaningful input to the design of the bridge, not merely over paint color or other minor aspects.

Conclusion

In general, the fact that many details that could potentially impact valuable resources are being left to future planning and are therefore not analyzed in the FEIS make it difficult to fully evaluate all potential impacts. Given the significant environmental and community impacts that have not yet been fully investigated or mitigated, Scenic Hudson urges the State to slow down its fast-track process and conduct a Supplemental EIS in order to fully analyze and minimize the significant impacts described above.

Respectfully submitted,

/s/Hayley Carlock/
Hayley Carlock, Esq.
Scenic Hudson, Inc.

From: Patrick M. Centolanzi, PE[SMTP:CENTOLANZI@AOL.COM]
Sent: Sunday, August 05, 2012 6:15:43 PM
To: dot.sm.mo.tzbsite
Subject: Tappan Zee Hudson River Crossing Project Final Environmental Impact Statement Comment
Auto forwarded by a Rule

Michael Anderson:

I hope you are well.

I am concerned that there is no government agency involved in the project that is capable of monitoring the design and construction of the project to ensure that future transit options are preserved in accordance with various sections of the FEIS. For example, at least one of the following agencies should be involved:

- Federal Transit Administration
- New York Metropolitan Transportation Council
- Metropolitan Transportation Authority
- Public Transportation Bureau, New York State Department of Transportation
- Westchester County Department of Transportation

While it is very clear that the FEIS requires future transit options to be preserved, it does not identify an agency specializing in transit to make sure these requirements are enforced.

Thank you.

Best regards,

Patrick M. Centolanzi, PE
5417 Trevino Drive
Haymarket, VA 20169
C: (917) 881-4217

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: Comments on the FEIS
Date:	Tuesday, September 04, 2012 2:36:34 PM
Attachments:	Salisbury MACK Comments TZB FEIS 4 Sept 2012.pdf

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From: A. Brook Crossan[SMTP:BROOKC@MACKASSOCIATESLLC.COM]
Sent: Tuesday, September 04, 2012 2:36:48 PM
To: dot.sm.mo.tzbsite
Cc: 'catherine mccue'; 'Parish & Weiner'; mblau@tarrytowngov.com
Subject: Comments on the FEIS
Auto forwarded by a Rule
Please find attached our comments on the FEIS on behalf of Salisbury Point Cooperative.

Thanks you.

A. Brook Crossan, Ph.D., P.E.
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MACK ASSOCIATES, LLC

ENGINEERS • SCIENTISTS • PLANNERS

a Service Disabled Veteran Owned Small Business

MEMORANDUM

TO: Tappan Zee Hudson River Crossing Project

Attention: Larry Schwartz
Attention: Michael Anderson
Attention: Brian Conybeare

FROM: A. Brook Crossan, Ph.D., P.E.

DATE: 4 September 2012

CC: Salisbury Point Cooperative
Donald Singer, Esq.
Nat Parish, P.E.
Mike Blau, Tarrytown Village Administrator

RE: Tappan Zee Bridge FEIS
Noise Comments on behalf of
Salisbury Point Cooperative
Rockland County

At the request of Salisbury Point Cooperative (Salisbury) MACK Associates, LLC (MACK) has reviewed the noise elements of the FEIS for the Tappan Zee Bridge River Crossing Project. We had also reviewed the DEIS and submitted comments to USEPA Region 2 by letter of 26 March 2012 and Michael Anderson of NYSDOT by letter of 30 March 2012. As you are aware we have also been retained by the Village of Tarrytown in Westchester County to perform the same functions.

Some very important additions have occurred between the DEIS and FEIS that will provide enhanced noise mitigation during construction of the new facility. These include:

- Commitments for source and path controls to mitigate noise from individual pieces of equipment to defined noise limits at 50 feet that can be monitored for compliance (Table 18-24 on page 18-59 of the FEIS); and
- Construct noise barriers (variously mentioned as " at least 8-11' high" and "a minimum of 11' high") around all staging areas and along some of the construction access roads.

However, we are disappointed in the overall responsiveness of the FEIS and Response to Comments to the issues raised by our comment letters, and clarified and expanded upon in subsequent meetings. There were many comments either ignored, or not adequately addressed. On behalf of the Village of Tarrytown and Salisbury we submitted 38 pages of text with more than 100 discrete comments. These were grouped (or ignored) into 15 comments that were approximately 5 ½ pages long. Rather than reiterate past comments, we have focused on making our points by providing new comments on the FEIS, the Response to Comments, and relevant Design Build Project documents. Also, for the DEIS review we generated two letters (one for the Village of Tarrytown, and one for the Salisbury Point Cooperative), with common attachments. This approach appears to have contributed to some of the aforementioned consolidation issues. Therefore, there will be no attachments and all comments will be within the body of the letter or memorandum. Also for the sake of clarity, and future reference and discussions, we have numbered each of our individual comments. While it is unclear as to your intent as to how and when to respond to these comments, we believe that they should be addressed in a Supplemental Environmental Impact Statement (SEIS) as discussed below.

First we present general comments (G-1 through G-91) that relate to the project and analysis in the whole. These comments are essentially identical in this memorandum to you and in a letter to Tarrytown. There are some slight editorial changes in this version, which is later, to try to improve the language to make our points clearer and to also correct a numbering problem (hence there are 91 not 89 numbered general comments). Comments G-1 through G-73 relate to inconsistencies or uncertainties relating to the mitigation commitments that the Authority (which collectively is used to mean the NY State Thruway Authority and NYS Department of Transportation) has made. It is important that all mitigation commitments be clear to all parties (the Contractor, the Authority, local municipalities and agencies, and the public), and easily enforceable.

The remaining general comments (G-74 to G-91) relate to unresolved deficiencies in the baseline data, analysis, or mitigation. In some instances the comments stand on their own, and in other instances they introduce issues that are followed up in greater detail in the Salisbury specific comments (S-1 through S-23). Comments S-14 through S-23 relate to the 26 July 2012 AKRF Memo provided to Salisbury. It should be noted that there are also parallel concerns in Tarrytown as noted in these comments. The memo was received after our review letter had already been submitted to Tarrytown. Thus, follow 112 comments on the noise aspects of the project. These comments focus on construction noise (monitoring, modeling, and mitigation) and the permanent sound barriers as they affect road noise at Salisbury. In total there are 126 discrete comments that address noise concerns at Salibury and Tarrytown. We urge the Authority to use this version of the General Comments (G-1 to G-91) when responding.

General Noise Comments

The following general comments (G-1 through G-39) relate to text in the following document:

DB Contract Documents Part3
Project Requirements
Revision (Addendum No.10)
July 18, 2012

Exhibit B Item 2. CONSTRUCTION NOISE AND VIBRATION CONTROL from pages B-3-3 and B-3-4 has been reproduced in its entirety in *black italics* and numbered comments added in ***red italics*** throughout. We have **bolded** some of the text for emphasis.

A. ***Where practicable and feasible*** *electric powered equipment rather than diesel powered equipment shall be used.*

Comment G-1: Who determines what's practicable and feasible?

Comment G-2: What are the inspection, reporting, and enforcement mechanisms involved with respect to scheduling and frequency?

Comment G-3: Will inspection and compliance reports be posted to the website in a timely fashion? If not, why not?

B. Use of impact devices such as jackhammer, pavement breakers and pneumatic tools ***shall be limited where practicable and feasible****.*

Comment G-4: Who determines what's practicable and feasible?

Comment G-5: What are the inspection, reporting, and enforcement mechanisms involved with respect to scheduling and frequency of equipment use?

Comment G-6: Will inspection and compliance reports be posted to the website in a timely fashion? If not, why not?

C. Shrouds shall be utilized to limit noise exposure to the levels stated in Table 3-B-2-1.

Comment G-7: Which of the equipment listed will need shrouds to meet the noise levels?

Comment G-8: What are the inspection, reporting, and enforcement mechanisms involved with respect to scheduling and frequency of equipment use?

Comment G-9: Will inspection and compliance reports be posted to the website in a timely

fashion? If not, why not?

D. *Installation of* ***appropriate*** *noise attenuation around construction staging areas, including minimization of backup alarms and other noises.*

Comment G-10: Who determines what's appropriate?

Comment G-11: The statement uses the word "around" which seem to imply path controls in the form of a wall, but the examples seem to imply source controls. Please clarify.

Comment G-12: ***What are the inspection, reporting, and enforcement mechanisms involved with respect to scheduling and frequency of equipment use?***

Comment G-13: Will inspection and compliance reports be posted to the website in a timely fashion? If not, why not?

E. Proper maintenance and service of all equipment used on Site, including Subcontractors' equipment, including installation of mufflers to limit noise.

Comment G-14: Will there be an inspection program for all new equipment brought to the Site?

Comment G-15: If not, how will this provision be enforced?

F. Use of sound attenuating curtains or shrouds on the pile driving hammers to reduce noise exposure to the levels stated in Table 3-B-2-1.

Comment G-16: How is this different from Item C?

Comment G-17: Please clarify that the shroud will enclose all four directions simultaneously. As discussed elsewhere pile driver noise will travel long distances so both shores must be protected simultaneously.

Comment G-17: How will compliance monitoring be conducted? Ground (or water) level monitoring at 50 feet will not be sufficient. Monitoring must also occur at representative vertical elevations.

G. Use of movable noise attenuation measures around pumps, trucks, and other noisy equipment when operating in ***close proximity*** *to residential areas.*

Comment G-18: What does close proximity mean?

Comment G-19: Is this more restrictive than Item C? If so, are there additional performance standards and enforcement mechanisms?

H. The development and implementation of community outreach activities related to construction noise impacts as outlined in the Environmental Documentation (EIS Chapter 18) and discussed further in Part 3, Project Requirement 8 – Public Involvement

I. In addition to the vibration monitoring requirements detailed in Project Requirement 10 – Geotechnics, six noise and vibration monitoring stations that shall continuously record noise and vibration shall be provided by the Design-Builder. These devices shall transmit data to a secure website to be maintained by the Design-Builder and access to the website shall be provided to the Authority or the Authority's designee. Three stations shall be located near the Westchester shoreline and three stations shall be near the Rockland shoreline. The locations of the stations shall be subject to the approval of the Authority, and shall be relocated as directed by the Authority. Faulty stations shall be repaired by the Design-Builder within 48 hours of observing a fault.

Comment G-20: Will there be public input on the site selection? If not, why not? If so, how and when?

Comment G-21: We presume that the noise monitoring will be conducted to document the general success of construction noise mitigation program to limit noise increases (and impacts) to those increases disclosed in the FEIS. Thus, it will be important to monitor and document pre-construction baseline noise levels for comparison to monitored construction noise levels.

Comment G-22: Will the monitoring data be posted on the public website? If not, why not? If so, how quickly can the data be posted?

J. To the maximum extent possible, temporary noise walls shall be provided by the Design-Builder to shield residences from construction staging areas, platforms and construction works. A minimum 11 feet high, temporary noise wall shall be installed between the construction staging areas and platforms and the shorelines, and between the construction staging areas and platforms and the south side of the exit ramp (adjacent to Ferris Lane).

Comment G-23: What does "to the maximum extent possible" mean? The location and height of the barriers should be presented to the public and feedback obtained as part of the Public Information Program.

Comment G-24: What studies or modeling has been done to determine what an appropriate

height is? Other major highway construction projects (e.g. the Central Artery in Boston) have used higher barriers with cantilevered tops to provide protection for receptors at higher elevations during construction. The following text was in a paper describing the Central Artery construction noise mitigation:

If practical, noise barriers should be tall enough to provide noise reduction for the upper-most stories of nearby sensitive receptors, though this may not always be achievable with abutting multi-story buildings. Indeed the limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In these cases, the barrier/curtain system must either be very tall or have some form of roofed enclosure to protect upper-story receptors.

Comment G-25: By saying a minimum 11' high implies that the barrier could or should be higher. Who will evaluate the appropriate height based upon the elevation of adjacent sensitive receptors?

K. All construction equipment, including any at-source noise abatement systems, shall not exceed the maximum noise levels shown in Table 3-B-2-1. See Part 2 DB§107-13 for nighttime noise restrictions. In addition, on Saturday mornings until midday and on Sundays all day, no equipment shall be used that emits noise above 70dBA measured at an offset distance of 50 feet if the work is on land and at the nearest point of the shoreline if the work is in the water.

Comment G-26: With respect to work on land does this mean that no equipment with a Lmax of 71 dBA(Table 3-B-2-1) of greater can be used during these time periods, including concrete mixer and pump trucks?

Comment G-27: With respect to work in or over the water how is this determined? Will the noise monitoring data in Item I be used in any way? If so how?

Monitoring, internal reporting, and management of noise levels by the Design-Builder shall be configured to ensure that:

any exceedance of the maximum permitted noise levels shall be identified by the Design-Builder within 30 minutes of the occurrence; and (ii) the activity causing the exceedance is mitigated within 1 hour of the first occurrence such that the exceedance is not repeated. Any exceedance of the maximum noise limits shall be reported to the Authority's Project Manager within 48 hours, with details of the mitigation adopted. Other than exceedance events, reporting of noise measurements shall be weekly.

Comment G-28: What noise monitoring other than the six stations in Item I will be required?

Comment G-29: Will the Authority undertake any independent verification noise monitoring? If not, why not? If so, what are they?

Comment G-30: Who will establish, and who will review and approve the equipment specific noise monitoring protocols?

Comment G-31: Will the public or local municipalities be afforded the opportunity to comment on the noise monitoring protocols? If not, why not? If s what will the process be?

Comment G-32: Will the professionals hired by interested parties be provided access for verification noise monitoring should conflicts arise? If not, why not?

Comment G-33: Will noise measurements and exceedance data be promptly posted on the public website? If not, why not?

Table 3-B-2-1 Maximum permitted noise levels from construction equipment

Equipment Description	***Maximum noise levels Lmax (dBA)(1)***
Compressor (air)	*58*
Concrete mixer truck	*71*
Concrete pump truck	*71*
Crane	*70*
Drill rig truck	*69*
Dump truck	*69*
Excavator	*71*
Flat-bed truck	*66*
Front end loader	*74*
Generator	*60*
Impact pile driver	*90*
Man lift	*63*
Paver	*67*
Pumps	*73*
Roller	*70*

Comment G-34: The FEIS says 77 dBA for pumps. Which value is correct?

Vibratory pile driver	*90*
Other	*70*

Comment G-35: We presume that "Other" includes all other pieces of equipment including, but not limited to: chain saw; concrete saw; grader; grapple; jackhammer; hoe ram; and pneumatic tools. Is that correct?

(1) A-weighted maximum sound level, measured at a distance of 50 feet from the construction equipment, with the use of relevant at-source noise abatement system controls.

Comment G-36: Which of these limits can be met by selection of quiet equipment, and which will require shrouds or other enclosures that will require periodic inspection?

Comment G-37: What are the specific measures to reduce impact pile driving noise from 105 dBA to 90 dBA? Please provide a schematic that identifies the major noise generating portions of the pile driving, the location of the shrouds, and the location (horizontal and vertical) of the compliance noise monitoring.

Comment G-38: Have these measures been successfully used elsewhere? If so where? If not what confidence do you have that they will work?

Comment G-39: In the EIS for The San Francisco- Oakland Bay Bridge East Span Replacement (which is currently under construction) CALTRANS made the following statement (http://www.dot.ca.gov/dist4/sfobb/Environmental%20Consequences.html#4145): ***Caltrans has already investigated such measures as selecting a quieter pile driver, placing a shroud around the hammer, using portable shielding, sound blankets, and plywood sheets. These measures were found not to work for a variety of reasons, including not being effective, challenges in implementation due to wind conditions and elevation, and cost.***

This raises some concerns. Will the Authority allow the Design Build contractor to not meet the noise limits for technological or cost reasons? If so, what will the process be, and will there be an opportunity for public review and comment before implementation of a change.

The following general comments relate to **Exhibit B Item 7. PILE DRIVING MANAGEMENT** on page B-3-9.

D. Limiting the periods of pile driving to no more than 12-hours per day, and ***predominantly*** *within daytime hours (****for example*** *7am to 7pm). In rare circumstances, and after notifying the Authority Project Manager, it is possible that piling may extend further than 12 hours depending on the practicality of driving.*

Comment G-40: We can understand the use of the phrase" predominantly within daytime hours" as it relates to winter and short days (9 hours from sunrise to sunset). However, if applied in the summer time when the days are longer (15 hours from sunrise to sunset) the start time could be before 7am and the end time could be after 7pm. Why can the Authority not just commit to 7am to 7pm?

Comment G-41: What is the process that the Authority will use to allow pile driving for more than 12 hours a day? Will there be the opportunity for public input into that process? If not, why not? How will the Authority provide notice to communities (both municipal governments and residents) that they have allowed pile driving for more than 12 hours on a particular day(s)?

CommentG-42: What are the schedule, cost and impact factors that the Authority will use in making a determination on such a request? Will complaints or issues relating to 7am to 7pm operations be a factor?

The following general comments relate to PIP Section 8: Public Involvement during Design-Build Phase from page A-8-11.

i. ***Interim Information Updates for Local Officials –*** *the Authority, in consultation with the Design-Builder, shall provide interested municipal and county elected officials and key agencies with a two-weekly update of (1)* ***planned construction activities*** *for the subsequent two-week period, highlighting any potential for noise, dust, safety or other impacts of possible concern to local residents or travelers; (2) any* ***unusual traffic diversions*** *or delays due to planned construction activities; and (3)* ***nighttime or weekend construction activities*** *(e.g. off-hour deliveries).*

Comment G-43: Why can there not be regular reporting of the onging and compliance noise monitoring?

A summary of any ***unusual or important*** *public comments or concerns submitted in writing, posted on the website or received on the Project's phone hotline would also be provided, along with any planned or completed responses to those comments.*

Comment G-44: Who makes the decisions as to which are "unusual or important"? This concern is less an issue if all comments and responses would be posted on the public website in a timely fashion.

Comment G-45: Would not a more transparent way of reporting to track comments by geographically (e.g. Salisbury Point, or the Irving neighborhood) and by technical area (e.g. air quality, or traffic) to provide context? Can this be done? If not, why not?

The Authority shall provide this information to involved municipalities and agencies that indicate an interest in receiving these "municipal e-alerts" on a two-weekly basis and at other times as deemed appropriate. Immediate contact shall also be made with local and county officials in potential affected areas connected with emergency-type events, such as accidents, spills of other events of possible public concern.

j. **Public *Information Response Process –****Based on the recommendation included in the selected Design-Builder's proposal and finalized in consultation with the Authority, this process will clearly indicate how it will consider and utilize all forms of stakeholder input, including potential actions in consultation with the Agencies to refine the Project's design or construction activities.*

Comment G-46: Will the Authority solicit feedback from the public on the Public Involvement Plan before it is adopted? If not, why not?

The following general comments (G-47 to G-53) relate to
DB Contract Documents Part2
DB Sections 100
General Provisions
Revision (Addendum No.10)
July 18, 2012

Section **DB 107-13 NOISE ABATEMENT** on pages 151 – 152 states:

In urban or populated rural areas where quiet conditions normally prevail, no equipment that emits noise above 70 DBA measured at an offset distance of 50 feet, if the work is on land, and at the nearest point of the shoreline, if the work is in the water, shall be operated during nighttime hours unless such Work is otherwise specified in the Contract Documents. The Authority's Project Manager may authorize nighttime Work under special circumstances or emergency conditions.

Comment G-47: This language is similar to, but not identical to, language in Part 3. Why not make the language identical?

Comment G-48: Does "noise above 70 dBA" mean an Lmax of 70 dBA?

Comment G-48: Nighttime should be defined.

Comment G-49: This clause does not address different work hours on the weekend. It should be modified to so address.

Comment G-48: The first part of the statement indicates that work can occur at night if it less than 70 dBA, yet the final sentence states that nighttime work may be authorized. Does that mean that any nighttime work needs to be authorized? Or does it mean that nighttime work over 70 dBA needs to be authorized?

Every earlier version of the document also contained the following statement:

> *County or municipal ordinances shall apply if they are more stringent than the requirements of the Contract Documents.*

Comment G-49: Why was this deletion made?

Comment G-50: We presume that this sentence has been used in other contract documents in the State. Where else has it stayed in the contract?

Comment G-51: The deletion of this sentence appears to directly contravene NYSDOT procedures https://www.dot.ny.gov/divisions/engineering/environmental-analysis/manuals-and-guidance/epm
4.4.18 Noise Analysis Policy and Procedures
In some cases there may be local laws or ordinances that govern construction noise levels or hours. New York City has a local law that is quite restrictive in many areas. The Department is not generally subject to local noise control ordinances; nevertheless, the existence of those laws should be investigated during project development and every reasonable effort made to comply with their provisions during construction following the procedures provided above.

Please comply with NYSDOT procedures. We recommend that the Authority coordinate with each affected municipality with respect to the conditions in their noise ordinances.

Comment G-52: The FEIS Response to Comment 18-98 states:

> ***The NYSTA is a state authority and is not required to comply with local codes and regulations. However, it is NYSTA's practice to comply with local codes and regulations where and when compliance would not result in substantial delays,***

require incurring additional costs, or interfere with achieving project goals.

This is NOT what the procedures say. There was no discussion of what the various noise codes say in the affected municipalities and how and why the project is deviating from them. The phrase "every reasonable effort" in the procedures certainly seems clear. The Authority and their consultants should have "investigated" the local noise codes during NEPA/SEQRA and assessed their ability to comply. Compliance with those parts of the noise codes that could be complied with should have been summarized. Specific reasons for non-compliance of other portions should have been documented. Any additional cost, as the response implies, should not a reason for non-compliance. Because of the sensitivity of construction noise as an issue public dialogue on what constitutes "every reasonable effort" should have been part of the NEPA/SEQRA process. This must be addressed in a SEIS.

Comment G-53: Since the FEIS has not properly addressed the "every reasonable effort" issue and the noise mitigation measures are only vaguely defined there are many more details to be finalized. How will this be accomplished moving forward? It will be important for all municipalities and affected residents to have their voices heard.

In addition to discussions regarding construction noise in the Design Build Documents there are also discussions in the FEIS on pages 18-58 and 18-59. General comments C-54 to C-71 relate to those pages, the relevant text of which is reproduced below.

Two significant noise abatement measures that NTSTA/NYSDOT will implement would be: (1) the use of noise barriers to reduce truck noise along the south and north sides of the ramp leading to River Road in Rockland County and on the south side of the access road leading to the staging area in Westchester County;

Comment G-54: This commitment includes more construction road noise barriers. See text relating to Comments G-23 to G-25. The Record of Decision/Findings Statement should include all barriers.

Comment G-55: The barriers along construction roads should be installed before the access roads are constructed, and dismantled only after the access roads are demolished.

Comment G-56: The barriers at staging areas should be installed as early in the construction sequence as possible.

and (2) the use of quiet equipment and path control measures. Specifically contractors will be required to construct noise barriers at least 8-11 feet high in the areas described above, and around all inland

and pier staging areas.

Comment G-57: The Design Build documents say a minimum of 11 feet. See Comment G-25. We presume that barriers will be a minimum of 11 feet tall. Is that correct?

With regard to the use of quiet equipment and path control measures, ***Table 18-24*** *shows Lmax noise levels at 50 feet for selected typical construction equipment and the Lmax noise levels at 50 feet for the same equipment that contractors would be required to achieve (using quiet equipment and/or path controls [shrouds, barriers, etc.]).*

In addition to the noise barriers and equipment with reduced noise levels specified above NYSTA and NYSDOT are committed to implementing the following generalized source control, site control, and community awareness measures to minimize and reduce potential noise concerns relating to construction activities:

Comment G-58: These general items are either not mentioned in the Design Build documents or are worded differently. This needs to be clarified.

- *Source Control Measures:*
  - *Use of properly designed and well-maintained mufflers in all internal combustion engines, engine enclosures, and intake silencers;*

Comment G-59: Who will inspect? Who will enforce?

  - *Require contractors to perform regular periodic equipment maintenance; and*

Comment G-60: Will contractors be required to have maintenance logs for Authority inspection? If not, how will requirement be met?

  - *Use of new equipment with reduced noise levels where feasible and practicable.*

Comment G-61: Is this requirement any more restrictive (i.e. protective of the residents) that Table 18-24?

- *Site Control Measures:*
  - *Place stationary equipment as far away as feasible and practicable from sensitive receptor locations;*

Comment G-62: Who determines what is feasible and practicable?

Comment G-63: Will the Authority inspect equipment locations and require changes if necessary?

- Strategically select waste disposal sites to minimize potential noise concerns;

Comment G-64: Will the Authority approve waste disposal sites?

Comment G-65: Will the Authority inspect waste disposal sites and require changes if necessary?

- Where feasible, coordinate work operations to coincide with time periods when people would be least likely to be affected by construction-related noise;

Comment G-66: Who determines what is feasible?

Comment G-67: What time periods would people be least likely to be affected by construction noise?

- Where feasible eliminate nighttime operations (in particular no pile driving will be scheduled for nighttime, Saturday morning and all day Sunday);

Comment G-68: The commitment is vague and inconstant with the Design Build documents. Please clarify.

- Eliminate "tail gate banging";

Comment G-69: How will this be done?

Comment G-70: Who will inspect?

- Reduce backing-up procedures for equipment with backup alarms, and replace backup alarms with strobes where acceptable per Occupational Safety and Health Administration (OSHA) and other regulations; and

Comment G-71: How will back-up procedures be reduced?

Comment G-72: There are also variable loudness back-up beepers that meet OSHA requirements. Alternate (i.e. quieter than standard) backup beepers should be required on all equipment. If not, why not?

- *Where feasible, prior to construction operations commencing, construct noise barriers described in Chapter 12 to mitigate post construction conditions.*

- *Community Awareness Measures:*
  - *Notify the public of construction activities that may be perceived of as noisy and intrusive prior to starting construction; and*
  - *Establish means for the public to contact the engineer-in-charge (i.e., provide telephone number, email, etc.) and methods to handle complaints.*
  - *Implement a noise and vibration monitoring program.*

Comment G-73: Many other items should be posted on the public website including, but limited to: (1) on-going noise monitoring data; (2) noise mitigation compliance reports; and (3) complaints and responses. The responses should be clear as to how individual complaints are addressed.

There are other items of general concern that are discussed in the FEIS or in the Response to Comments. These topics are: (1) whether a SEIS should have been prepared; (2) the acquisition and use of noise data during and from the PIDP; (3) the lack of adequate baseline noise monitoring including L10 and Lmax data and analyses; (4) construction noise modeling using Cadna/A; (5) enhanced noise transmission over water bodies; and (6) the appropriateness of receptor controls. Specific comments are below.

Comment G-74: Numerous commenters on the DEIS raised the issue that a SEIS needed to be prepared and not a FEIS. Part of Response R 3-18 states:

> *Partly in response to comments made with respect to the claimed need for an SDEIS, FHWA prepared a Re-evaluation to assess whether, after the completion of the DEIS, there were any changes to the proposed action or new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts that would result in significant environmental impacts not evaluated in the DEIS. The Re-evaluation, which appears in Appendix A to this FEIS, reflects the agency's determination that an SDEIS was not required.*

This Re-evaluation (Appendix A-7) is a 607 page document with no table of contents to permit an easy review. In scanning every page we concluded that NONE of the SEIS points raised in the comments on the DEIS by anyone had been addressed. Thus, the claim that there is a link between the comments on the DEIS and the Re-evaluation is unsupported by the available information. The issue of the need for a SEIS should have been discussed globally in the Re-evaluation rather than piecemeal in Responses to Comments. The piecemeal response allowed comments to be restated with important issues missing, and to be addressed separately and narrowly, rather than in a large comprehensive way.

Comment G-75: We and others had raised issues about incorporating the results of the PIDP in the SEIS (or in this case the FEIS). Fisheries work relating to noise and other issues was summarized in a 181 page technical appendix (Appendix F). The only report on ambient noise monitoring was to say that the impact pile driver was 106 dBA at 50 feet. There was no discussion of any important details, for example, methodology, location and height of monitoring, monitoring at multiple distances, how many occasions the monitoring was conducted, or whether attenuation rates over the water varied. This information is crucial to the conclusions in the FEIS should be provided. The impact pile driver is the noisiest piece of equipment by far and is the controlling factor as far as peak noise levels.

Comment G-76: We had raised the issue that L10 and Lmax should also have been addressed (Comment 18-96). The response, R 18-96, misses the point. The Leq descriptor, which was used in the DEIS and FEIS, may indeed be the single most utilized descriptor, but it is not the only important or relevant descriptor. It is the easiest to calculate because of RCNM. However, Lmax, which is indicative of how loud the loudest, most intrusive and disruptive noises are, is also easy to calculate. Presentation and discussion of Lmax levels would have assisted the reader in understanding exactly how intrusive the construction activities would be in their daily lives. It will likely be the peak noises (Lmax) that generate the most complaints from the adjacent residences. Because of that the Lmax levels that correspond to the modeled Leq values should be calculated and disclosed. In this way monitored Lma values can also be used to document the success of the noise mitigation program.

Comment G-77: L10 is also an important descriptor in that at 45 dBA L10 is a commonly used interior standard, which is used in New York City. The L10 issue will be further discussed in Comment T-1.

Comment G-78: An important aspect of an EIS is to "bound" the potential impacts. Bounding means to describe and disclose the worst case impacts. With noise that is related to maximum loudness and duration. The FEIS discusses worst case impacts (for a period of up to 6 months), but does not duration further. For example the NYC CEQR Technical Manual defines construction impacts of less than two years as short term and greater than two years as long term. The FEIS did not address the noise increases that would exist throughout the long term construction. For example, Table 18-25 reports a maximum increase in Leq of 10 dBA at 5 Edgewater Lane. This is described as a unmitigated noise impact that could occur for up to 6 months. The FEIS is silent on what happens beyond 6 months. We can only assume, therefore,

that at all locations noise increases will be 3 dBA or less except for one six month period. Any increases more than 3 dBA outside the 6 month window are not analyzed or disclosed in the FEIS, and therefore not covered by the bounding. Any unmitigated noise impacts longer than 6 months would require additional mitigation and analysis in a Supplemental EIS.

Comment G-79: The issue of inadequate baseline noise monitoring raises additional issues. It is reported on page 18-61 of the FEIS that:

> *construction-related activities would be expected to produce noise levels at these five receptor sites (Sites 2, 3, 5, 6, and 7), and* ***at locations near these receptor sites****, which would be intrusive and noisy, and result in unmitigated noise impacts.*

Site # 2, which is somewhere on Thruway property between The Quay and the Thruway, has a maximum noise increase of 10 dBA. Site # 1, which is somewhere in the Tappan Landing development, has a maximum increase of 3 dBA, which is barely perceptible and not an unmitigated impact. The Quay lies between these two receptors. Can those residents expect increases of 3 dBA, which would not be an impact, or can they expect increases of 10 dBA which would be an impact?

Comment G-80: If The Quay or Salisbury, for example, wanted to independently verify during construction that the mitigation measures were working as represented in the FEIS there are no accepted (by the Authority) baseline values in the Quay or Salisbury to which to compare. In fact, no independent observer could do monitoring at any of the sites because we do not know the location at which the measurements were taken and the modeling performed.

Comment G-81: In fact, if the Authority were to attempt to do noise monitoring during construction in response to complaints there is not sufficient baseline noise monitoring. The noise and vibration monitoring at the 6 sites (3 in Westchester County and 3 in Rockland County) discussed in the Design Build Contract (see Comments G-20 to G-22) could partially solve this problem if noise monitoring were to start prior to construction. Will that be required to occur?

Comment G-82: Even if it does occur at those 6 sites how will the Authority respond to complaints from residents not adjacent to those 6 monitoring locations?

Comment G-83: It would seem appropriate for the Authority, in consultation with the affected municipalities, to establish a more comprehensive set of baseline monitoring data to which future compliance is compared. More detailed examples of the lack of sufficient site specific baseline noise monitoring is presented in both the Tarrytown

and Salisbury comments. We recommend that the Authority and interested parties agree to monitoring protocols that could be followed by any interested party to confirm that mitigation measures are being implemented and mitigate noise levels as represented in the FEIS.

Comment G-84: If compliance noise monitoring at 50' is within the limits specified, but the ambient monitoring shows unmitigated impacts that are greater in intensity or duration than disclosed in the FEIS, what will the Authority's response be? Enhanced mitigation? A Supplemental EIS? How quickly will the response be implemented?

Comment G-85: We previously commented that Cadna/A would have been a more appropriate construction noise model than RCNM (Comment C 18-92). The response was:

> *The RCNM 1.1 model used for the construction noise analysis is the model recommended and approved by FHWA and NYSDOT for this type of analysis. The Cadna A model is not a model that has been approved by FHWA and NYSDOT for this use.*

The response is not totally correct. Yes RCNM 1.1 is used and approved by FHWA and NYSDOT, but it not exclusive. As per FHWA's Construction Noise Handbook http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook06.cfm

> *More recently there have been very sophisticated noise prediction model programs commercially available such as SoundPLAN (by SoundPLAN LLC of Shelton, WA**), Cadna/A** (by DataKustik of Munich, Germany), and the Environmental Noise Model (ENM by RTA Technology of Australia). These programs are able to display the predicted noise levels in formats that **provide much more information**, when compared to spreadsheet models, by **graphically displaying results as equivalent noise contour lines**. In doing so, noise levels at any receptor location of interest can quickly be estimated by interpolating the results between adjacent noise contour lines. Moreover, the construction equipment types and working locations can be changed fairly easily in these models, and new noise results can be computed much more quickly than could be done with discrete receptor point models. These sophisticated models also allow for some evaluation of noise reduction effects from various mitigation measures and/or man-made or natural barriers.*

There is a clear acknowledgement by FHWA that Cadna/A is a more sophisticated model for use in more complex environments. In fact, we question whether Figures 18-13 and 18-14 in the FEIS were developed with Cadna/A. Since RCNM 1.1 could not have been used to generate the contours to develop those figures, the model, methodology, assumptions and input parameters should be disclosed and discussed in

a SEIS.

Comment G-86: There were several comments on the DEIS on the enhanced transmission of sound over water and at multiple meetings with the Authority. The response that the models account for that is not correct.

A recent (2010) noise study by DOE reported that modeled noise levels at a distance of 4.83 km (3.0 mi) modeled over water are 16 dBA higher than modeled at that distance over land. The report citation is:

> ***USDOE Report PNNL- 20015***
> ***Offshore Wind Turbines***
> ***Estimated Noise from Offshore Wind Turbine,***
> ***Monhegan Island, Maine***
> ***Environmental Effects of Offshore Wind Energy Development***
> ***November 2010***

The explanation in the report is quoted as follows:

> *The noise level calculated using the Swedish overwater model is much larger than that calculated with the two land-based models. This is due to the manner in which the model treats the geometric divergence of the acoustic signal. While both land models assume spherical wave spreading throughout the entire region, the Swedish overwater model assumes spherical wave spreading for the first 200 m and then transitions to cylindrical spreading. For spherical wave spreading the sound pressure levels decrease 6 dB with every doubling in distance, while with cylindrical spreading there is a 3 dB reduction with every doubling in distance.*

The approximate width of the Hudson River at the crossing is 3 mi. This means that pile driving on the Westchester side of the river will be about 16 dBA louder on the Rockland side than the FEIS acknowledges. This also means that pile driving in the center of the River would be about 11 dBA higher on both shores than the FEIS represents in its modeling. Thus, the potential for unmitigated noise impacts extending for greater than 6 months is great and must be addressed. This supports the reasonableness and need for receptor controls to mitigate construction and operation noise.

Comment G-87: We raised the issue of receptor controls (Comment C 18-101). The Response (R 18-101) stated:

> *It is not FHWA and NYSDOT policy to fund receptor abatement measures (i.e., building envelope improvements, such as soundproofing or the installation of*

better quality windows to reduce noise impacts for residents), and NYSTA has no plans to install a bubble over the pool for noise abatement.

To say that it is not FHWA policy to fund receptor abatement measures is confusing at best and wrong at worst. It is FHWA's Construction Noise Handbook (2006) that specifically discusses receptor noise abatement measures. Also, other FHWA projects (e.g. the Boston Central Artery) have included receptor noise abatement measures such as replacement windows.

A direct quote from the following paper supports and explains this point.

Construction noise control program and mitigation strategy at the Central Artery/Tunnel Project (Received 1999 December 15; revised 2000 July 21; accepted 2000 August 04) Erich Thalheimer

Acoustical window treatments to improve the noise reduction qualities of residential window openings represents a proven successful means to implement receptor noise control. In general, window openings are the weak link in a structure's external facade allowing noise infiltration into the building. When properly specified and installed, window treatments can provide for a significantly quieter interior noise environment, particularly in multi-story buildings with upperfloors that may not benefit from typical noise barriers.

Because (1) construction noise impacts have been understated in duration and (2) difficulties with respect to compliance monitoring and enforcement, there must be consideration of receptor controls as an appropriate means of noise mitigation.

Comment G-88: It is insufficient and inadequate to say that it is not NYSDOT to fund receptor abatement measures. Policies are developed on the basis of past practice and must be re-evaluated as new information becomes available. It was likely Massachusetts DPW's old policy not to fund receptor abatement, as construction was started on the Central Artery without such a program. The policy was obviously amended to permit it, and it was successfully incorporated into the project. NYSDOT should re-evaluate their policy.

Comment G-89: A very important question, to which we did not see answered in the Design Build documents, or explained in the FEIS is: what are the consequences to the contractor of non-compliance with the noise mitigation plan?

Comment G-90: The FHWA Construction Noise Handbook speaks to this point in Section 7.8:

On those projects where construction noise impacts require a significant level of physical and operational mitigation, the ability to successfully monitor

construction noise is closely tied to the commitment to meet the requirements detailed in the contract specifications and special provisions.
To be able to successfully enforce any project's construction noise requirements, it is essential that the project's specifications and special provisions embody the following:

- *Empowerment of staff;*
- *Clearly defined consequences; and*
- *Dispute resolution mechanism.*

We believe that these points should be explicitly addressed in the contract documents.

Comment G-91: Another recommendation in the FHWA Construction Noise Handbook, Section 7.3.4 is:

Another technique worthy of consideration involves the inclusion of incentives and/or disincentives in the contract specifications to encourage contractors to participate in the mitigation program and to make the contractors more accountable for impacts.

Can incentives and disincentives be included in the contract? If not, why not?

<u>Salisbury Point Cooperative Noise Comments</u>

Comment S-1: There are no noise monitoring sites in Salisbury. There are two adjacent sites, Site 5, a residential property to the north, and Site 6, on NYS Thruway Authority immediately adjacent to the Thruway. Site 5 is projected to have a maximum construction noise increase of 5-10 dBA, which is a significant adverse impact that could occur for up to six months. Site 6 is projected to have a maximum construction noise increase of 5-9 dBA, which is a significant adverse impact that could occur for up to six months. However, neither of these sites are at all representative of the either the existing conditions at Salisbury, or the potential exposure to construction noise impacts. This deficiency was pointed out in our comments on the DEIS, but was rectified in the FEIS.

Comment S-2: One important aspect that the FEIS has not acknowledged in the construction noise analysis is the fact that the different floors, different buildings and different facades at Salisbury will be exposed to different construction noise impacts. With respect to different floors, it is a well documented fact that the various path controls are less effective when the receptors are a higher elevation. For example, Chapter 12 of the FEIS on page 12-20 discusses the reductions at Salisbury due to the new Wall 3. The reductions will be 7 dBA or more at the ground floor, 6 dBA at the 4th floor and

only 1-4 dBA at the 7th floor. We expect that similar effects would be observed with construction noise. This needs to be further analyzed in a Supplemental EIS.

Comment S-3: The FEIS does not discuss the different buildings and facades at Salisbury and the different noise environments present. Two of the four buildings have two facades that face the Thruway. They are approximately 300' from the Thruway now, and 200' in the future. The other two buildings are approximately 500' from the Thruway now, and 400' in the future, and are partially shielded by the two intervening buildings. The facades that face the river (and the Rockland staging area, and pile driving will be subject to the greatest construction noise, while the facades facing the Thruway have the highest existing noise levels. The understanding of noise levels at various units throughout all 4 buildings and 7 floors is crucial to any construction and operation noise impact and mitigation assessment. This must be included in the SEIS.

Comment S-4: In our comments on the DEIS we requested performance standards based on noise increases at the receptors. We had proposed using the Central Artery as a model which limited increases to 5 dBA over background. The Authority declined and proposed performance standards at 50' from the noise source. The FEIS also presented modeled construction noise increases to bound the potential impacts. It should be noted that none of the residences in Tarrytown are currently projected not to have ANY adverse construction noise impacts, with increases being 3 dBA or less, which is reasonable with respect to the Central Artery limits.

Comment S-5: Yet the residential Rockland sites are projected to have significant adverse noise impacts: Site 5 up to 10 dBA; Site 7up to 7 dBA; and Site 8 up to 4 dBA. It is unfair and unacceptable that mitigation measures have been designed to eliminate adverse impacts in Westchester County, while allowing potential adverse impacts in Rockland County that far exceed any reasonable performance standard. Thus, all Rockland County residential properties, including Salisbury, should be evaluated for receptor controls.

Comment S-6: The temporary access road exit from the Rockland Bridge Staging Area in the River is to be constructed immediately to the south of Salisbury. How this road can be constructed, used, and demolished all while not increasing noise levels Salisbury needs to be clarified. To the extent that these clarification needs to be postponed until the Design Build contractor is selected, a Supplemental Noise Analysis needs to be conducted and released for public review. If new noise impacts are identified this should be circulated as a focused SEIS that considers additional mitigation measures.

Comment S-7: Response to comment R 12-30 stated that at Salisbury "the terraces are windowed areas and not typical receptor locations". It should be noted that six of the terraces are not enclosed in any way. In addition, the vast majority of the "windowed" terraces are unheated, un-airconditioned, and separated from the living area by a sliding glass door, so they really function as an outside porch.

Comment S-8: None the less the FEIS did add Wall 3, which mitigates noise at ground level receptors at Salisbury. There is a discussion on page 12-20 that discusses the noise reductions at various floors at Salisbury. However, the discussion is not complete in that it does not compare existing and proposed noise levels and is not specific to each build and each building face. Nor does it discuss the additional benefits and costs of constructing a taller wall. These details need to be addressed in a SEIS.

Comment S-9: Response to Comment R 12-26 states: "If design studies indicate that reflected noise is a concern, in accordance with NYSTA and NYSDOT practice, barriers with absorptive properties will be recommended." What is meant by design studies? Who does them? When in the process?

Comment S-10: Why could such a study not have been done as part of the FEIS?

Comment S-11: Will public review and comment on the design studies be permitted? If not, why not? If so, how will public comment be incorporated?

Comment S-12: What is NYSTA and NYSDOT practice? Is in a formal memo that can be shared, or is it an informal practice?

Comment S-13: In our comments on the DEIS we reported interior noise levels of 51 to 55 dBA. These values far exceed USEPA's recommended limit of 45 dBA. That 45 dBA level has been adopted by the City of New York as being protective of the health and welfare of the residents. Given that interior noise levels far exceed a reasonable limit that is protective of health and welfare, and they will be subject to additional construction noise, and traffic noise increases from a roadway moving closer that cannot be fully mitigated, that receptor controls in the form of replacement windows be added.

Comment S-14: We received (on 30 August 2012) a 4 page noise memo dated 26 July2012. It is based on monitoring conducted at Salisbury on 27 April (Fri), 2 May (Wed), 3 May (Thurs), and 5 May (Sat), and at The Quay on 14 May (Mon) and 12 July (Thur). Why was this not an Appendix to the FEIS?

Comment S-15: The monitoring data included in the report raises many issues with respect to

claims and representations made in the DEIS and FEIS. Figure 12-3 in the FEIS shows a dBA variation in noise levels from 7 am to 6 pm. The data at Salisbury shows a range of 5 dBA on 27 April, 4 dBA on 2 May, and 2 dBA on 3 May. The data at The Quay shows a range of 8 dBA on 12 July. The reasons and significance of this high variability are not discussed in the 26 July memo. We believe that one of the reasons for these wide differences is the fact that the noise transmission over water is dramatically influenced by meteorological conditions. The reasons for these large ranges need to be explained based up a technical analysis. This should be part of the SEIS.

Comment S-16: The wide variation of the 7am Leq at Salisbury (varies from 63 to 66 dBA) raises issues as to the accuracy of the modeling of the noise at sites that are along the River. We do not believe that the TNM model can be validated using the Salisbury monitoring data. An attempt should be made to validate it in the SEIS.

Comment S-17: If TNM cannot be verified using the Salisbury data we believe that all the noise modeling (both TNM and construction noise) at Salisbury, as well as the Tarrytown riverfront neighborhoods (Irving, The Quay, and Tappan Landing) cannot be considered valid. The issue of enhanced noise transmission over water and the effect of meteorological conditions would need to be explored further.

Comment S-18: The fact that the calculated Lmax at 50' was 107 dBA at Salisbury and 100 dBA at The Quay is totally unexplained. Just to be clear on this point – the 107 dBA is the result of a source that is 5 times louder than the one that generated 100 dBA. This is a massive difference that needs to be explained.

Comment S-19: This raises several unanswered questions:

a. Were there operational or equipment differences that caused or contributed to this variation?
b. Were there meteorological differences that caused or contributed to it?
c. Did AKRF have observers on or near the pile driving to verify the operational activities?

Comment S-20: The fact that with only two data points and such a wide variation (107 vs 100 dBA) that is totally unexplained raises the very real concern that 107 dBA Lmax at 50' may not be the worst case as was represented in the memo and FEIS. If there were two more data points maybe the woest case is really 114 is totally unexplained raises the very real concern that 107 dBA Lmax at 50' may not be the worst case as was represented in the memo and FEIS. If there were two more data points maybe the worst case is really 114 dBA. This point needs to be addressed.

Comment S-21: There was no attempt in the memo to develop and implement a monitoring protocol for actually measuring noise levels at 50'. A monitoring protocol at 50' for the pile driving should be developed and described in the SEIS.

Comment S-22: Because of the wide variability in the monitoring data at Salisbury, compliance with the 50 dBA limits must be determined by monitoring at 50', not by monitoring at remote receptors and then calculating what the values at 50' likely were. The Authority needs to develop and publically release their compliance noise monitoring protocols and data.

Comment S-23: The fact that an important opportunity was lost to concurrently monitor pile driving at 50' and at longer distances (to be able to calculate actual attenuation rates) was missed raises serious questions as to whether the Authority takes the issue of noise attenuation over water, and mitigation compliance seriously. We have previously brought these issues up in comments on the DEIS and at subsequent meetings with AKRF and the Authority. The wide range of monitored data and modeling calculations presented in the 26 July memo demonstrate conclusively the Authority needs to address these concerns on a technical basis in a SEIS. Ignoring the concerns that we raise when your own unexplained data supports these concerns is no longer a viable option.

Should you have any questions please do not hesitate to contact me at 732-616-4557 or via email at brookc@mackassociatesllc.com.

TARRYTOWN-ON-HUDSON

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FAX NO. 914-909-1208

September 4, 2012

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

VIA EMAIL AND REGULAR MAIL

Re: Village of Tarrytown Comments on Final Environmental Impact Statement, Tappan Zee Hudson River Crossing Project

Dear Mr. Anderson:

The following should be considered the official submission of the Village of Tarrytown Board of Trustees in regards to the Final Environmental Impact Statement prepared for the Tappan Zee Hudson River Crossing Project.

1. In the March 30, 2012 official submission from the Village of Tarrytown concerning the DEIS, the Village made reference to a Village of Tarrytown comment relating to the Scoping Document dated November 3, 2011 requesting that a hard look be provided in the Environmental Review Process to alternatives and/or specific actions that would mitigate the substantial negative impacts the project outlined in the scoping packet ("the preferred alternative") will have on the eighty-nine unit Quay Condominiums. The Village noted that the bridge replacement alternative will render the condominium's common elements nearly valueless and that the review must consider measures that will either directly mitigate these effects or enable the private property owners to recover the lost value. The FEIS includes a statement that the Replacement Bridge Alternative is not anticipated to significantly impact the quality of life or property value of The Quay, but there is no documentation to back up this assertion. Based thereon, the Village can only presume that the "hard look" requested by the Village in our response to the Scoping Documents and to the DEIS did not occur.

   Specifically, there is no analysis of the economic impact of the proximity of the new bridge on

The Quay and the diminution of the value of the units at The Quay based upon the bridge replacement project. There is also nothing in any environmental review document regarding the fact that the proximity of the bridge directly adjacent to and above the pool and tennis courts renders these amenities virtually valueless other than an acknowledgement in the DEIS that an easement must be obtained for a 0.05 acre piece of vacant land adjacent to these amenities over which the bridge will pass. The description of that easement in the DEIS makes clear that the value ascribed to it is not nearly equivalent to, and simply does not take into account, the adverse environmental impacts the sheer presence of the massive bridge structure will have on the value of these amenities and the FEIS does nothing to rectify this deficiency. The DEIS failed completely to mitigate these negative impacts and the FEIS repeats this failure. The FEIS document also does not assess the economic impact of the proximity of the bridge to the Tappan Landing neighborhood and the Irving neighborhood.

2. In the March 30, 2012 official submission from the Village of Tarrytown concerning the DEIS, the Village reiterated a request that was originally included in the Village of Tarrytown comments on the Scoping Document dated November 3, 2011 that a hard look be given to the alternative concept of constructing one new bridge to the north of the existing bridge (to serve westbound/northbound traffic) and rehabilitating the existing bridge (to serve eastbound/southbound traffic). Similar to the DEIS, there is nothing in the FEIS addressing this particular concept, other than the statement in Executive Summary that the EIS considers two alternatives (No Build and Replacement Bridge) and that other alternatives, including Rehabilitation, Tunnel and Single Structure were determined "not to be reasonable because they would not meet the project's goals and objectives". However, the concept noted herein was never evaluated in any environmental document.

3. Although there has been considerable reporting in the print media regarding financing of the preferred alternative, nothing definitive is included in the FEIS in regards to how the project will be funded. The FEIS document states that the completeness of the DEIS is not dependent upon a financial plan being provided for the Tappan Zee Hudson River Crossing Project. It is difficult for the Village to accept such a comment since the funding component of the project has such a major impact upon the project and the region. It is the position of the Village that the failure of any environmental review document to address the financing issue is a severe shortcoming of the entire environmental review process.

   In addition, the Village's comments regarding the DEIS noted that the document had failed to address the impact of an increase on tolls on both work related and discretionary travel. The concern regarding work travel also related to the impact on lower income drivers paying the increased toll in order to get to work. Although the FEIS document addresses the toll issues for work related travel, the conclusion that there is minimal impact due to the fact that there are not a significant number of low income drivers utilizing the bridge provides an extremely narrow perspective and fails to evaluate the impact on that sector of the population that actually does use the bridge for travel to work. The FEIS document fails to take a hard look at discretionary

travel and the impact on tourism and retail activities in Westchester and Rockland Counties.

4. In the March 30, 2012 official submission from the Village of Tarrytown concerning the DEIS, the Village made reference to comments from the Village dating back to October 2006 that that a hard look be given the concept of a Tappan Zee Bridge Bus-Train transfer station being constructed as part of the toll plaza. This issue was not addressed in the DEIS or the FEIS and it remains the position of the Village of Tarrytown that such a transfer station would provide, among other benefits, significantly reduced travel times, especially for commuters traveling to New York City for work purposes. Similarly, such a transfer station would also greatly enhance the flexibility of all other inter-county bus routes by allowing every bus crossing the bridge to provide transfer service to the Metro-North trains. The transfer station would also mitigate the negative environmental impacts associated with the continuation of the existing Tappan Zee Express bus service traversing the Village's streets when driving to and from the current Metro North Railroad (MNRR) station, as well as any negative impacts likely to result from future expansions in bus service, including a Bus Rapid Transit system. The transfer station would also provide significant benefits to the multitude of residents who live near the toll plaza, including and especially providing pedestrian access to MNRR. Such access not only would mitigate a portion of the adverse environmental impacts the new bridge will impose directly on those residents, but also would provide the broader environmental benefit of eliminating the need for those residents to utilize automobiles to travel to the current train station. The FEIS is silent in relation to this concept and it is the position of the Village that because of the concept's numerous benefits, in particular its potential to mitigate adverse environmental impacts, a Tappan Zee Bus-Train transfer station should have been evaluated as part of the environmental review process.

5. In the March 30, 2012 official submission from the Village of Tarrytown concerning the DEIS, the Village noted that there was a discussion in the document regarding the Westchester Bridge Staging Area, the Westchester Inland Staging Area and a roadway between the two areas. The DEIS document asserts that the staging areas and the connector road pose no significant adverse environmental impacts and the Village questioned that conclusion. The FEIS document notes that the temporary roadway and the staging areas meet the National Ambient Air Quality Standards (NAAQS) and the Village must once again note that it is the belief of the Village that it is highly unlikely that the creation of staging areas that presently do not exist will have no significant adverse impacts on the residential neighborhoods in which they are in close proximity, especially in relation to the noise, vibration and air pollution that will be generated by trucks and equipment utilizing the areas and the road. The Village locations that will be adversely impacted are the Irving neighborhood just south of the bridge, the Quay condominiums, and the Tappan Landing neighborhood just north of the Quay.

   It does not appear that the following issues that were noted by the Village in the March 30, 2012 letter were considered in the FEIS. First, the fact that the existing noise barrier located adjacent to Van Wart Avenue (south of the toll plaza and NYS Thruway work area) is currently

inadequate to address the noise issues in the adjacent neighborhood. Second, the cumulative negative impacts that are likely to occur from the simultaneous development and construction of the 96-acre General Motors site in Sleepy Hollow. In the latter case, the Village of Sleepy Hollow has approved this project and its construction during the Tappan Zee Bridge Replacement Project period is a virtual certainty. In the March 30, 2012 official submission from the Village of Tarrytown concerning the DEIS, the Village noted that the preferred alternative provides for a bike and pedestrian trail on the new crossing; however, the DEIS does not address parking issues associated with access to the new trail. The response to the Village's comment is that this issue will be addressed during the design-build process. It is the position of the Village of Tarrytown that the issue requires an evaluation as part of the environmental review process, since the trail has secondary adverse impacts, namely added traffic and an increased demand for parking that is likely to result from the public's attempts to utilize that amenity. This issue has not been analyzed in the FEIS and it remains the position of the Village of Tarrytown that the environmental review process must address this access issue and provide suitable mitigation for the adverse environmental impacts associated with it.

7. In the March 30, 2012 official submission from the Village of Tarrytown concerning the DEIS, the Village referenced Tarrytown Mayor Drew Fixell's comments at the March 1, 2012 public hearing, in which Mayor Fixell reiterated the statements contained in the November 3, 2011 letter concerning the need for mass transit on the new bridge, especially that the inclusion of mass transit will mitigate many of the adverse environmental impacts that the bridge creates for the Village of Tarrytown, the County and the region. The FEIS reiterates statements in the DEIS asserting that mass transit is beyond the scope of the project and that the new bridge will be constructed in a manner to accommodate mass transit in the future. However, it remains the position of the Village that mass transit, specifically Bus Rapid Transit (BRT) or other enhanced bus service, must be explicitly committed to and should be considered now rather than later. Absent that, there can be no assurance that the region will ever see mass transit on the Tappan Zee Bridge and, therefore, that there will be substantially less mitigation of the significant adverse environmental impacts associated with the new bridge.

8. The Village continues to employ the services of Mack Associates, LLC in regards to noise issues relating to the project, both during the construction project and after the bridge has been completed. The Village's consultant has reviewed the FEIS and Mack Associates comments, which shall be considered official comments of the Village of Tarrytown, are included with this letter.

The Village appreciates the opportunity to provide these comments in regards to the Tappan Zee Hudson River Crossing Project Final Environmental Impact Statement, however, the Village is disappointed that many of the comments included in the March 30, 2012 from the Village of Tarrytown were not addressed in the FEIS document.

Very truly yours,
VILLAGE OF TARRYTOWN

Drew Fixell
Mayor

C: Board of Trustees
Michael Blau, Village Administrator
Paul Feiner, Supervisor and Members of the Greenburgh Town Council

MACK
ASSOCIATES, LLC
ENGINEERS • SCIENTISTS • PLANNERS
a Service Disabled Veteran Owned Small Business

29 August 2012

Mayor Drew Fixell and the Board of Trustees
Village of Tarrytown
One Depot Plaza
Tarrytown, NY 10591

Re: Tappan Zee Bridge FEIS
Noise Comments on behalf of
Village of Tarrytown
Westchester County

Dear Mayor Fixell and the Board of Trustees:

At your request MACK Associates, LLC (MACK) has reviewed the noise elements of the FEIS for the Tappan Zee Bridge River Crossing Project. We had also reviewed the DEIS and submitted comments to USEPA Region 2 by letter of 26 March 2012 and Michael Anderson of NYSDOT by letter of 30 March 2012. As you are aware we have also been retained by the Salisbury Point Cooperative (Salisbury) in South Nyack, Rockland County to perform the same functions.

Some very important additions have occurred that will provide enhanced noise mitigation during construction of the new facility. These include:

- Commitments for source and path controls to mitigate noise from individual pieces of equipment to defined noise limits at 50 feet that can be monitored for compliance (Table 18-24 on page 18-59); and
- Construct noise barriers (variously mentioned as " at least 8-11' high" and "a minimum of 11' high") around all staging areas and along some of the construction access roads.

However, we are disappointed in the overall responsiveness of the FEIS and Response to Comments to the issues raised by our comment letters, and clarified and expanded upon in subsequent meetings. There were many comments either ignored, or not adequately addressed. On behalf of the Village of Tarrytown and Salisbury we submitted 38 pages of text with more than 100 discrete comments. These were grouped (or ignored) into 15 comments that were approximately 5 ½ pages long. However, rather than reiterate past comments, we have focused on making our points by new comments on the FEIS, the Response to Comments, and relevant Design Build Project documents. Also, for the DEIS

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review we generated two letters (one for the Village of Tarrytown, and one for the Salisbury Point Cooperative), with common attachments. This approach appears to have contributed to the aforementioned consolidation issues. Therefore, there will be no attachments and all comments will be within the body of the letter. Also, for the sake of clarity and future reference we have numbered each of our individual comments.

First we present general comments (G-1 through G-89) that relate to the project and analysis in the whole. These comments are identical in this letter to you and in a letter to Salisbury. Comments G-1 through G-71 relate to inconsistencies or uncertainties relating to the mitigation commitments that the Authority (which collectively is used to mean the NY State Thruway Authority and NYS Department of Transportation) has made. It is important that all mitigation commitments be clear to all parties (the Contractor, the Authority, local municipalities and agencies, and the public), and easily enforceable.

The remaining general comments (G-72 to G-89) relate to unresolved deficiencies in the baseline data, analysis, or mitigation. In some instances the comments stand on their own, and in other instances they introduce issues that are followed up in greater detail in the Tarrytown specific comments (T-1 through T-9). Thus, follow 98 comments on the noise aspects of the project. These comments focus on construction noise (monitoring, modeling, and mitigation). With respect to the permanent noise barriers, the visual analysis enhanced imagery that was promised at the public meetings has been deferred until the final design by the Design Build contractor. Since this seems like a reasonable approach we have not formally commented on it.

General Noise Comments

The following general comments (G-1 through G-39) relate to text in the following document:

DB Contract Documents Part3
Project Requirements
Revision (Addendum No.10)
July 18, 2012

Exhibit B Item 2. CONSTRUCTION NOISE AND VIBRATION CONTROL from pages B-3-3 and B-3-4 has been reproduced in its entirety in *black italics* and numbered comments added in ***red italics*** throughout. We have **bolded** some of the text for emphasis.

A. ***Where practicable and feasible*** *electric powered equipment rather than diesel powered equipment shall be used.*

Comment G-1: Who determines what's practicable and feasible? Will the Authority review and verify?

Comment G-2: What are the inspection, reporting, and enforcement mechanisms involved with

respect to scheduling and frequency of equipment use?

Comment G-3: Will inspection and compliance reports be posted to the website in a timely fashion? If not, why not?

B. *Use of impact devices such as jackhammer, pavement breakers and pneumatic tools* ***shall be limited where practicable and feasible.***

Comment G-4: Who determines what's practicable and feasible? Will the Authority review and verify?

Comment G-5: What are the inspection, reporting, and enforcement mechanisms involved with respect to scheduling and frequency of equipment use?

Comment G-6: Will inspection and compliance reports be posted to the website in a timely fashion? If not, why not?

C. *Shrouds shall be utilized to limit noise exposure to the levels stated in Table 3-B-2-1.*

Comment G-7: Which of the equipment listed will need shrouds to meet the noise levels?

Comment G-8: What are the inspection, reporting, and enforcement mechanisms involved with respect to scheduling and frequency of equipment use?

Comment G-9: Will inspection and compliance reports be posted to the website in a timely fashion? If not, why not?

D. *Installation of* ***appropriate*** *noise attenuation around construction staging areas, including minimization of backup alarms and other noises.*

Comment G-10: Who determines what's appropriate?

Comment G-11: The statement uses the word "around" which seem to imply path controls in the form of a wall, but the examples seem to imply source controls. Please clarify.

Comment G-12: ***What are the inspection, reporting, and enforcement mechanisms involved with respect to scheduling and frequency of equipment use?***

Comment G-13: Will inspection and compliance reports be posted to the website in a timely

fashion? If not, why not?

E. Proper maintenance and service of all equipment used on Site, including Subcontractors' equipment, including installation of mufflers to limit noise.

Comment G-14: Will there be an inspection program for all new equipment brought to the Site?

Comment G-15: If not, how will this provision be enforced?

F. Use of sound attenuating curtains or shrouds on the pile driving hammers to reduce noise exposure to the levels stated in Table 3-B-2-1.

Comment G-16: How is this different from Item C?

Comment G-17: Please clarify that the shroud will enclose all four directions simultaneously. As discussed elsewhere pile driver noise will travel long distances so both shores must be protected simultaneously.

Comment G-17: How will compliance monitoring be conducted? Ground (or water) level monitoring at 50 feet will not be sufficient. Monitoring must also occur at representative vertical elevations.

G. Use of movable noise attenuation measures around pumps, trucks, and other noisy equipment when operating in ***close proximity*** *to residential areas.*

Comment G-18: What does close proximity mean?

Comment G-19: Is this more restrictive than Item C? If so, are there additional performance standards and enforcement mechanisms?

H. The development and implementation of community outreach activities related to construction noise impacts as outlined in the Environmental Documentation (EIS Chapter 18) and discussed further in Part 3, Project Requirement 8 – Public Involvement

I. In addition to the vibration monitoring requirements detailed in Project Requirement 10 – Geotechnics, six noise and vibration monitoring stations that shall continuously record noise and vibration shall be provided by the Design-Builder. These devices shall transmit data to a secure website to be maintained by the Design-Builder and access to the website shall be provided to the Authority or the Authority's designee. Three stations shall be located near the Westchester shoreline and three stations shall be near the Rockland shoreline. The locations of the stations shall be subject to the

approval of the Authority, and shall be relocated as directed by the Authority. Faulty stations shall be repaired by the Design-Builder within 48 hours of observing a fault.

Comment G-20: Will there be public input on the site selection? If not, why not? If so, how and when?

Comment G-21: We presume that the noise monitoring will be conducted to document the general success of construction noise mitigation program to limit noise increases (and impacts) to those increases disclosed in the FEIS. Thus, it will be important to monitor and document pre-construction baseline noise levels for comparison to monitored construction noise levels.

Comment G-22: Will the monitoring data be posted on the public website? If not, why not? If so, how quickly can the data be posted?

J. To the maximum extent possible, temporary noise walls shall be provided by the Design-Builder to shield residences from construction staging areas, platforms and construction works. A minimum 11 feet high, temporary noise wall shall be installed between the construction staging areas and platforms and the shorelines, and between the construction staging areas and platforms and the south side of the exit ramp (adjacent to Ferris Lane).

Comment G-23: What does "to the maximum extent possible" mean? The location and height of the barriers should be presented to the public and feedback obtained as part of the Public Information Program.

Comment G-24: What studies or modeling has been done to determine what an appropriate height is? Other major highway construction projects (e.g. the Central Artery in Boston) have used higher barriers with cantilevered tops to provide protection for receptors at higher elevations during construction. The following text was in a paper describing the Central Artery construction noise mitigation:

> *If practical, noise barriers should be tall enough to provide noise reduction for the upper-most stories of nearby sensitive receptors, though this may not always be achievable with abutting multi-story buildings. Indeed the limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In these cases, the barrier/curtain system must either be very tall or have some form of roofed enclosure to protect upper-story receptors.*

Comment G-25: By saying a minimum 11' high implies that the barrier could or should be higher. Who will evaluate the appropriate height based upon the elevation of adjacent sensitive receptors?

K. All construction equipment, including any at-source noise abatement systems, shall not exceed the maximum noise levels shown in Table 3-B-2-1. See Part 2 DB§107-13 for nighttime noise restrictions. In addition, on Saturday mornings until midday and on Sundays all day, no equipment shall be used that emits noise above 70dBA measured at an offset distance of 50 feet if the work is on land and at the nearest point of the shoreline if the work is in the water.

Comment G-26: With respect to work on land does this mean that no equipment with a Lmax of 71 dBA (Table 3-B-2-1) of greater can be used during these time periods, including concrete mixer and pump trucks?

Comment G-27: With respect to work in or over the water how is this determined? Will the noise monitoring data in Item I be used in any way? If so how?

Monitoring, internal reporting, and management of noise levels by the Design-Builder shall be configured to ensure that:

any exceedance of the maximum permitted noise levels shall be identified by the Design-Builder within 30 minutes of the occurrence; and (ii) the activity causing the exceedance is mitigated within 1 hour of the first occurrence such that the exceedance is not repeated. Any exceedance of the maximum noise limits shall be reported to the Authority's Project Manager within 48 hours, with details of the mitigation adopted. Other than exceedance events, reporting of noise measurements shall be weekly.

Comment G-28: What noise monitoring other than the six stations in Item I will be required?

Comment G-29: Will the Authority undertake any independent verification noise monitoring?

Comment G-30: Who will establish, and who will review and approve the equipment specific noise monitoring protocols?

Comment G-31: Will the public or local municipalities be afforded the opportunity to comment on the noise monitoring protocols? If not, why not? If yes, what will the process be?

Comment G-32: Will the professionals hired by interested parties be provided access for verification noise monitoring should conflicts arise? If not, why not?

Comment G-33: Will noise measurements and exceedance data be promptly posted on the public

website? If not, why not?

Table 3-B-2-1 Maximum permitted noise levels from construction equipment

Equipment Description	***Maximum noise levels Lmax (dBA)(1)***
Compressor (air)	*58*
Concrete mixer truck	*71*
Concrete pump truck	*71*
Crane	*70*
Drill rig truck	*69*
Dump truck	*69*
Excavator	*71*
Flat-bed truck	*66*
Front end loader	*74*
Generator	*60*
Impact pile driver	*90*
Man lift	*63*
Paver	*67*
Pumps	*73*

Comment G-34: The FEIS says 77 dBA for pumps. Which value is correct?

Roller	*70*
Vibratory pile driver	*90*
Other	*70*

Comment G-35: We presume that "Other" includes all other pieces of equipment including, but not limited to: chain saw; concrete saw; grader; grapple; jackhammer; hoe ram; and pneumatic tools. Is that correct?

(1) A-weighted maximum sound level, measured at a distance of 50 feet from the construction equipment, with the use of relevant at-source noise abatement system controls.

Comment G-36: Which of these limits can be met by selection of quiet equipment, and which will require shrouds or other enclosures that will require periodic inspection?

Comment G-37: What are the specific measures to reduce impact pile driving noise from 105 dBA to 90 dBA? Please provide a schematic that identifies the major noise generating portions of the pile driving, the location of the shrouds, and the location (horizontal

and vertical) of the compliance noise monitoring.

Comment G-38: Have these measures been successfully used elsewhere? If so where? If not what confidence do you have that they will work?

Comment G-39: In the EIS for The San Francisco- Oakland Bay Bridge East Span Replacement (which is currently under construction) CALTRANS made the following statement
(http://www.dot.ca.gov/dist4/sfobb/Environmental%20Consequences.html#4145):
Caltrans has already investigated such measures as selecting a quieter pile driver, placing a shroud around the hammer, using portable shielding, sound blankets, and plywood sheets. These measures were found not to work for a variety of reasons, including not being effective, challenges in implementation due to wind conditions and elevation, and cost.
This raises some concerns. Will the Authority allow the Design Build contractor to not meet the noise limits for technological or cost reasons? If so, that would increase noise impacts above those disclosed in the FEIS (since the pile driver is the noisiest piece of equipment used any increases in peak pile driving noise will increase the maximum construction noise levels) and would necessitate a Supplemental EIS.

The following general comments relate to **Exhibit B Item 7. PILE DRIVING MANAGEMENT** on page B-3-9.

D. Limiting the periods of pile driving to no more than 12-hours per day, and ***predominantly*** *within daytime hours (****for example*** *7am to 7pm). In rare circumstances, and after notifying the Authority Project Manager, it is possible that piling may extend further than 12 hours depending on the practicality of driving.*

Comment G-40: We can understand the use of the phrase" predominantly within daytime hours" as it relates to winter and short days (9 hours from sunrise to sunset). However, if applied in the summer time when the days are longer (15 hours from sunrise to sunset) the start time could be before 7am or the end time could be after 7pm. Why can't the Authority just commit to 7am to 7pm?

Comment G-41: What is the process that the Authority will use to allow pile driving for more than 12 hours a day? Will there be the opportunity for public input into that process prior to implementation? If not, why not? How will the Authority provide notice to communities that they have allowed pile driving for more than 12 hours on a particular day(s)?

CommentG-42: What are the schedule, cost and impact factors that the Authority will use in making a determination on such a request? Will complaints or issues relating to 7am to 7pm operations be a factor?

The following general comments relate to PIP Section 8: Public Involvement during Design-Build Phase from page A-8-11.

i. ***Interim Information Updates for Local Officials*** *– the Authority, in consultation with the Design-Builder, shall provide interested municipal and county elected officials and key agencies with a two-weekly update of (1)* ***planned construction activities*** *for the subsequent two-week period, highlighting any potential for noise, dust, safety or other impacts of possible concern to local residents or travelers; (2) any* ***unusual traffic diversions*** *or delays due to planned construction activities; and (3)* ***nighttime or weekend construction activities*** *(e.g. off-hour deliveries).*

Comment G-43: Why can't there be regular reporting of the onging and compliance noise monitoring?

A summary of any ***unusual or important*** *public comments or concerns submitted in writing, posted on the website or received on the Project's phone hotline would also be provided, along with any planned or completed responses to those comments.*

Comment G-44: Who makes the decisions as to which are "unusual or important"? This concern is less an issue if all comments and responses would be posted on the public website in a timely fashion.

Comment G-45: Wouldn't a more transparent way of reporting be to track comments by geographically (e.g. Salisbury Point, or the Irving neighborhood) and by technical area (e.g. air quality, or traffic) to provide context? Can this be done? If not, why not?

The Authority shall provide this information to involved municipalities and agencies that indicate an interest in receiving these "municipal e-alerts" on a two-weekly basis and at other times as deemed appropriate. Immediate contact shall also be made with local and county officials in potential affected areas connected with emergency-type events, such as accidents, spills of other events of possible public concern.

j. **Public** ***Information Response Process*** *–Based on the recommendation included in the selected Design-Builder's proposal and finalized in consultation with the Authority, this process will clearly indicate how it will consider and utilize all forms of stakeholder input, including potential actions in consultation with the Agencies to refine the Project's design or construction activities.*

Comment G-46: Will the Authority solicit feedback from the public on the Public Involvement Plan before it is adopted? If not, why not?

The following general comments (G-47 to G-53) relate to

DB Contract Documents Part2
DB Sections 100
General Provisions
Revision (Addendum No.10)
July 18, 2012

Section **DB 107-13 NOISE ABATEMENT** on pages 151 – 152 states:

In urban or populated rural areas where quiet conditions normally prevail, no equipment that emits noise above 70 DBA measured at an offset distance of 50 feet, if the work is on land, and at the nearest point of the shoreline, if the work is in the water, shall be operated during nighttime hours unless such Work is otherwise specified in the Contract Documents. The Authority's Project Manager may authorize nighttime Work under special circumstances or emergency conditions.

Comment G-47: This language is similar to, but not identical to, language in Part 3. Why not make the language identical?

Comment G-48: Does "noise above 70 dBA" mean an Lmax of 70 dBA?

Comment G-48: Nighttime should be defined.

Comment G-49: This clause does not address different work hours on the weekend. It should be modified to so address.

Comment G-48: The first part of the statement indicates that work can occur at night if it less than 70 dBA, yet the final sentence states that nighttime work may be authorized. Does that mean that any nighttime work needs to be authorized? Or does it mean that nighttime work over 70 dBA needs to be authorized?

Every earlier version of the document also contained the following statement:

County or municipal ordinances shall apply if they are more stringent than the requirements of the Contract Documents.

Comment G-49: Why was this deletion made?

Comment G-50: We presume that this sentence has been used in other contract documents in the State. Where else has it stayed in the contract?

Comment G-51: The deletion of this sentence appears to directly contravene NYSDOT procedures https://www.dot.ny.gov/divisions/engineering/environmental-analysis/manuals-and-guidance/epm

4.4.18 Noise Analysis Policy and Procedures

In some cases there may be local laws or ordinances that govern construction noise levels or hours. New York City has a local law that is quite restrictive in many areas. The Department is not generally subject to local noise control ordinances; nevertheless, ***the existence of those laws should be investigated during project development and every reasonable effort made to comply with their provisions during construction*** *following the procedures provided above.*

Please comply with NYSDOT procedures. We recommend that the Authority coordinate with each affected municipality with respect to the conditions in their noise ordinances.

Comment G-52: The FEIS Response to Comment 18-98 states:

The NYSTA is a state authority and is not required to comply with local codes and regulations. However, it is NYSTA's practice to comply with local codes and regulations where and when compliance would not result in substantial delays, require incurring additional costs, or interfere with achieving project goals.

This is NOT what the procedures say. There was no discussion of what the various noise codes say in the affected municipalities and how and why the project is deviating from them. The phrase "every reasonable effort" in the procedures certainly seems clear. The Authority and their consultants should have "investigated" the local noise codes during NEPA/SEQRA and assessed their ability to comply. Compliance with those parts of the noise codes that could be complied with should have been summarized. Specific reasons for non-compliance of other portions should have been documented. Any additional cost, as the response implies, should not a reason for non-compliance. Because of the sensitivity of construction noise as an issue public dialogue on what constitutes "every reasonable effort" should have been part of the NEPA/SEQRA process.

Comment G-53: Since the FEIS has not properly addressed the "every reasonable effort" issue and the noise mitigation measures are only vaguely defined there are many more

details to be finalized. How will this be accomplished moving forward? It will be important for all municipalities and affected residents to have their voices heard.

In addition to discussions regarding construction noise in the Design Build Documents there are also discussions in the FEIS on pages 18-58 and 18-59. General comments C-54 to C-71 relate to those pages, the relevant text of which is reproduced below.

Two significant noise abatement measures that NTSTA/NYSDOT will implement would be: (1) the use of noise barriers to reduce truck noise along the south and north sides of the ramp leading to River Road in Rockland County and on the south side of the access road leading to the staging area in Westchester County;

Comment G-54: This commitment includes more construction road noise barriers. See text relating to Comments G-23 to G-25. The Record of Decision/Findings Statement should include all barriers.

Comment G-55: The barriers along construction roads should be installed before the access roads are constructed, and dismantled only after the access roads are demolished.

Comment G-56: The barriers at staging areas should be installed as early in the construction sequence as possible.

and (2) the use of quiet equipment and path control measures. Specifically contractors will be required to construct noise barriers at least 8-11 feet high in the areas described above, and around all inland and pier staging areas.

Comment G-57: The Design Build documents say a minimum of 11 feet. See Comment G-25. We presume that barriers will be a minimum of 11 feet tall. Is that correct?

With regard to the use of quiet equipment and path control measures, ***Table 18-24*** *shows Lmax noise levels at 50 feet for selected typical construction equipment and the Lmax noise levels at 50 feet for the same equipment that contractors would be required to achieve (using quiet equipment and/or path controls [shrouds, barriers, etc.]).*

In addition to the noise barriers and equipment with reduced noise levels specified above NYSTA and NYSDOT are committed to implementing the following generalized source control, site control, and community awareness measures to minimize and reduce potential noise concerns relating to construction activities:

Comment G-58: These general items are either not mentioned in the Design Build documents or

are worded differently. This needs to be clarified.

- *Source Control Measures:*
  - *Use of properly designed and well-maintained mufflers in all internal combustion engines, engine enclosures, and intake silencers;*

Comment G-59: Who will inspect? Who will enforce?

  - *Require contractors to perform regular periodic equipment maintenance; and*

Comment G-60: Will contractors be required to have maintenance logs for Authority inspection? If not, how will requirement be met?

  - *Use of new equipment with reduced noise levels where feasible and practicable.*

Comment G-61: Is this requirement any more restrictive (i.e. protective of the residents) that Table 18-24?

- *Site Control Measures:*
  - *Place stationary equipment as far away as feasible and practicable from sensitive receptor locations;*

Comment G-62: Who determines what is feasible and practicable?

Comment G-63: Will the Authority inspect equipment locations and require changes if necessary?

  - ***Strategically select*** *waste disposal sites to minimize potential noise concerns;*

Comment G-64: Will the Authority approve waste disposal sites?

Comment G-63: Will the Authority inspect waste disposal sites and require changes if necessary?

  - ***Where feasible****, coordinate work operations to coincide with time periods when people would be least likely to be affected by construction-related noise;*

Comment G-64: Who determines what is feasible?

Comment G-65: What time periods would people be least likely to be affected by construction

noise?

- Where feasible eliminate nighttime operations (in particular no pile driving will be scheduled for nighttime, Saturday morning and all day Sunday);

Comment G-66: The commitment is vague and inconstant with the Design Build documents. Please clarify.

- Eliminate "tail gate banging";

Comment G-67: How will this be done?

Comment G-68: Who will inspect?

- Reduce backing-up procedures for equipment with backup alarms, and replace backup alarms with strobes where acceptable per Occupational Safety and Health Administration (OSHA) and other regulations; and

Comment G-69: How will back-up procedures be reduced?

Comment G-70: There are also variable loudness back-up beepers that meet OSHA requirements. Alternate (i.e. quieter than standard) backup beepers should be required on all equipment. If not, why not?

- Where feasible, prior to construction operations commencing, construct noise barriers described in Chapter 12 to mitigate post construction conditions.

- *Community Awareness Measures:*
  - *Notify the public of construction activities that may be perceived of as noisy and intrusive prior to starting construction; and*
  - *Establish means for the public to contact the engineer-in-charge (i.e., provide telephone number, email, etc.) and methods to handle complaints.*
  - *Implement a noise and vibration monitoring program.*

Comment G-71: Many other items should be posted on the public website including, but not limited to: (1) on-going noise monitoring data; (2) noise mitigation compliance reports; and (3) complaints and responses. The responses should be clear as to how individual complaints are addressed.

There are other items of general concern that are discussed in the FEIS or in the Response to Comments. These topics are: (1) whether a SEIS should have been prepared; (2) the acquisition and

use of noise data during and from the PIDP; (3) the lack of adequate baseline noise monitoring including L10 and Lmax data and analyses; (4) construction noise modeling using Cadna/A; (5) enhanced noise transmission over water bodies; and (6) the appropriateness of receptor controls. Specific comments are below.

Comment G-72: Numerous commenters on the DEIS raised the issue that a SEIS needed to be prepared and not a FEIS. Part of Response R 3-18 states:

> *Partly in response to comments made with respect to the claimed need for an SDEIS, FHWA prepared a Re-evaluation to assess whether, after the completion of the DEIS, there were any changes to the proposed action or new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts that would result in significant environmental impacts not evaluated in the DEIS. The Re-evaluation, which appears in Appendix A to this FEIS, reflects the agency's determination that an SDEIS was not required.*

This Re-evaluation (Appendix A-7) is a 607 page document with no table of contents to permit an easy review. In scanning every page we concluded that NONE of the SEIS points raised in the comments on the DEIS by anyone had been addressed. Thus, the claim that there is a link between the comments on the DEIS and the Re-evaluation is unsupported by the available information. The issue of the need for a SEIS should have been discussed globally in the Re-evaluation rather than piecemeal in Responses to Comments. The piecemeal response allowed comments to be restated with important issues missing, and to be addressed separately and narrowly, rather than in a large comprehensive way.

Comment G-73: We, and others, had raised issues about incorporating the results of the PIDP in the SEIS (or in this case the FEIS). Fisheries work relating to noise and other issues was summarized in a 181 page technical appendix (Appendix F). The only report on ambient noise monitoring was to say that the impact pile driver was 106 dBA at 50 feet (which is significantly higher than used in the DEIS analysis). There was no discussion of any important details, for example, methodology, location and height of monitoring, monitoring at multiple distances, how many occasions the monitoring was conducted, or whether attenuation rates over the water varied. This information is crucial to the conclusions in the FEIS should be provided. The impact pile driver is the noisiest piece of equipment by far and is the controlling factor as far as peak noise levels.

Comment G-74: We had raised the issue that L10 and Lmax should also have been addressed (Comment 18-96). The response, R 18-96, misses the point. The Leq descriptor, which was used in the DEIS and FEIS, may indeed be the single most utilized

descriptor, but it is not the only important or relevant descriptor. It is the easiest to calculate because of RCNM. However, Lmax, which is indicative of how loud the loudest, most intrusive and disruptive noises are, is also easy to calculate. Presentation and discussion of Lmax levels would have assisted the reader in understanding exactly how intrusive the construction activities would be in their daily lives. It will likely be the peak noises (Lmax) that generate the most complaints from the adjacent residences. Because of that the Lmax levels that correspond to the modeled Leq values should be calculated and disclosed. In this way monitored Lma values can also be used to document the success of the noise mitigation program.

Comment G-75: L10 is also an important descriptor in that at 45 dBA L10 is a commonly used interior standard, which is used in New York City. The L10 issue will be further discussed in Comment T-1.

Comment G-76: An important aspect of an EIS is to "bound" the potential impacts. Bounding means to describe and disclose the worst case impacts. With noise that is related to maximum loudness and duration. The FEIS discusses worst case impacts (for a period of up to 6 months), but does not duration further. For example the NYC CEQR Technical Manual defines construction impacts of less than two years as short term and greater than two years as long term. The FEIS did not address the noise increases that would exist throughout the long term construction. For example, Table 18-25 reports a maximum increase in Leq of 10 dBA at 5 Edgewater Lane. This is described as a unmitigated noise impact that could occur for up to 6 months. The FEIS is silent on what happens beyond 6 months. We can only assume, therefore, that at all locations noise increases will be 3 dBA or less except for one six month period. Any increases more than 3 dBA outside the 6 month window are not analyzed or disclosed in the FEIS, and therefore not covered by the bounding. Any unmitigated noise impacts longer than 6 months would require additional mitigation and analysis in a Supplemental EIS.

Comment G-77: The issue of inadequate baseline noise monitoring raises additional issues. It is reported on page 18-61 of the FEIS that:

> *construction-related activities would be expected to produce noise levels at these five receptor sites (Sites 2, 3, 5, 6, and 7), and* ***at locations near these receptor sites****, which would be intrusive and noisy, and result in unmitigated noise impacts.*

Site # 2, which is somewhere on Thruway property between The Quay and the Thruway, has a maximum noise increase of 10 dBA. Site # 1, which is somewhere in the Tappan Landing development, has a maximum increase of 3 dBA, which is barely perceptible and not an unmitigated impact. The Quay lies between these two

receptors. Can those residents expect increases of 3 dBA, which would not be an impact, or can they expect increases of 10 dBA which would be an impact?

Comment G-78: If The Quay or Salisbury, for example, wanted to independently verify during construction that the mitigation measures were working as represented in the FEIS there are no accepted (by the Authority) baseline values in the Quay or Salisbury to which to compare. In fact, no independent observer could do monitoring at any of the sites because we do not know the location at which the measurements were taken and the modeling performed.

Comment G-79: In fact, if the Authority were to attempt to do noise monitoring during construction in response to complaints there is not sufficient baseline noise monitoring. The noise and vibration monitoring at the 6 sites (3 in Westchester County and 3 in Rockland County) discussed in the Design Build Contract (see Comments G-20 to G-22) could partially solve this problem if noise monitoring were to start prior to construction. Will that be required to occur?

Comment G-80: Even if it does occur at those 6 sites how will the Authority respond to complaints from residents not adjacent to those 6 monitoring locations?

Comment G-81: It would seem appropriate for the Authority, in consultation with the affected municipalities, to establish a more comprehensive set of baseline monitoring data to which future compliance is compared. More detailed examples of the lack of sufficient site specific baseline noise monitoring is presented in both the Tarrytown and Salisbury comments. We recommend that the Authority and interested parties agree to monitoring protocols that could be followed by any interested party to confirm that mitigation measures are being implemented and mitigate noise levels as represented in the FEIS.

Comment G-82: If compliance noise monitoring at 50' is within the limits specified, but the ambient monitoring shows unmitigated impacts that are greater in intensity or duration than disclosed in the FEIS, what will the Authority's response be? Enhanced mitigation? A Supplemental EIS? How quickly will the response be implemented?

Comment G-83: We previously commented that Cadna/A would have been a more appropriate construction noise model than RCNM (Comment C 18-92). The response was:

The RCNM 1.1 model used for the construction noise analysis is the model recommended and approved by FHWA and NYSDOT for this type of analysis. The

Cadna A model is not a model that has been approved by FHWA and NYSDOT for this use.

The response is not totally correct. Yes RCNM 1.1 is used and approved by FHWA and NYSDOT, but it not exclusive. As per FHWA's Construction Noise Handbook http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook06.cfm

> *More recently there have been very sophisticated noise prediction model programs commercially available such as SoundPLAN (by SoundPLAN LLC of Shelton, WA)**, Cadna/A** (by DataKustik of Munich, Germany), and the Environmental Noise Model (ENM by RTA Technology of Australia). These programs are able to display the predicted noise levels in formats that **provide much more information**, when compared to spreadsheet models, by **graphically displaying results as equivalent noise contour lines**. In doing so, noise levels at any receptor location of interest can quickly be estimated by interpolating the results between adjacent noise contour lines. Moreover, the construction equipment types and working locations can be changed fairly easily in these models, and new noise results can be computed much more quickly than could be done with discrete receptor point models. These sophisticated models also allow for some evaluation of noise reduction effects from various mitigation measures and/or man-made or natural barriers.*

There is a clear acknowledgement by FHWA that Cadna/A is a more sophisticated model for use in more complex environments. In fact, we question whether Figures 18-13 and 18-14 in the FEIS were developed with Cadna/A. Since RCNM 1.1 could not have been used to generate the contours to develop those figures, the model, methodology, assumptions and input parameters should be disclosed and discussed.

Comment G-84: There were several comments on the DEIS on the enhanced transmission of sound over water and at multiple meetings with the Authority. The response that the models account for that is not correct.

A recent (2010) noise study by DOE reported that modeled noise levels at a distance of 4.83 km (3.0 mi) modeled over water are 16 dBA higher than modeled at that distance over land. The report citation is:

> ***USDOE Report PNNL- 20015***
> ***Offshore Wind Turbines***
> ***Estimated Noise from Offshore Wind Turbine,***
> ***Monhegan Island, Maine***
> ***Environmental Effects of Offshore Wind Energy Development***
> ***November 2010***

The explanation in the report is quoted as follows:

> *The noise level calculated using the Swedish overwater model is much larger than that calculated with the two land-based models. This is due to the manner in which the model treats the geometric divergence of the acoustic signal. While both land models assume spherical wave spreading throughout the entire region, the Swedish overwater model assumes spherical wave spreading for the first 200 m and then transitions to cylindrical spreading. For spherical wave spreading the sound pressure levels decrease 6 dB with every doubling in distance, while with cylindrical spreading there is a 3 dB reduction with every doubling in distance.*

The approximate width of the Hudson River at the crossing is 3 mi. This means that pile driving on the Westchester side of the river will be about 16 dBA louder on the Rockland side than the FEIS acknowledges. This also means that pile driving in the center of the River would be about 11 dBA higher on both shores than the FEIS represents in its modeling. Thus, the potential for unmitigated noise impacts extending for greater than 6 months is great and must be addressed. This supports the reasonableness and need for receptor controls to mitigate construction and operation noise.

Comment G-85: We raised the issue of receptor controls (Comment C 18-101). The Response (R 18-101) stated:

> *It is not FHWA and NYSDOT policy to fund receptor abatement measures (i.e., building envelope improvements, such as soundproofing or the installation of better quality windows to reduce noise impacts for residents), and NYSTA has no plans to install a bubble over the pool for noise abatement.*

To say that it is not FHWA policy to fund receptor abatement measures is confusing at best and wrong at worst. It is FHWA's Construction Noise Handbook (2006) that specifically discusses receptor noise abatement measures. Also, other FHWA projects (e.g. the Boston Central Artery) have included receptor noise abatement measures such as replacement windows.

A direct quote from the following paper supports and explains this point.

> **Construction noise control program and mitigation strategy at the Central Artery/Tunnel Project** (Received 1999 December 15; revised 2000 July 21; accepted 2000 August 04) Erich Thalheimer
>
> *Acoustical window treatments to improve the noise reduction qualities of residential window openings represents a proven successful means to implement receptor noise control. In general, window openings are the weak link in a*

structure's external facade allowing noise infiltration into the building. When properly specified and installed, window treatments can provide for a significantly quieter interior noise environment, particularly in multi-story buildings with upperfloors that may not benefit from typical noise barriers.

Because (1) construction noise impacts have been understated in duration and (2) difficulties with respect to compliance monitoring and enforcement, there must be consideration of receptor controls as an appropriate means of noise mitigation.

Comment G-86: It is insufficient and inadequate to say that it is not NYSDOT to fund receptor abatement measures. Policies are developed on the basis of past practice and must be re-evaluated as new information becomes available. It was likely Massachusetts DPW's old policy not to fund receptor abatement, as construction was started on the Central Artery without such a program. The policy was obviously amended to permit it, and it was successfully incorporated into the project. NYSDOT should re-evaluate their policy.

Comment G-87: A very important question, to which we did not see answered in the Design Build documents, or explained in the FEIS is: what are the consequences to the contractor of non-compliance with the noise mitigation plan?

Comment G-88: The FHWA Construction Noise Handbook speaks to this point in Section 7.8:

On those projects where construction noise impacts require a significant level of physical and operational mitigation, the ability to successfully monitor construction noise is closely tied to the commitment to meet the requirements detailed in the contract specifications and special provisions.
To be able to successfully enforce any project's construction noise requirements, it is essential that the project's specifications and special provisions embody the following:

- *Empowerment of staff;*
- *Clearly defined consequences; and*
- *Dispute resolution mechanism.*

We believe that these points should be explicitly addressed in the contract documents.

Comment G-89: Another recommendation in the FHWA Construction Noise Handbook, Section 7.3.4 is:

Another technique worthy of consideration involves the inclusion of incentives and/or disincentives in the contract specifications to encourage contractors to

participate in the mitigation program and to make the contractors more accountable for impacts.

Can incentives and disincentives be included in the contract? If not, why not?

<u>Village of Tarrytown Noise Comments</u>

Comment T-1: The potential construction noise impacts to the communities (the Irving neighborhood, The Quay, and the Tappan Landing neighborhood) along the Hudson River (and the Amtrak/MetroNorth rail line) are understated because of the inclusion of the rail noise in the background noise values. We do not know by how much because the number of diesel and electric trains were not counted during the noise monitoring. The peak noise from the diesel trains is a far louder than the traffic noise; however, it only occurs for short periods of time (less than 4 minutes of any hour). It is loud enough to measureably raise the Leq, but is not off long enough duration to raise the L10 (because the diesel train noise is far less than 10% of the total time). The diesel trains could easily raise the monitored Leq by 4 to 6 dBA or more. Thus, a projected 3 dBA increase over 1 hour could in reality be a 9 dBA increase for 56 minutes of that hour. There should be disclosure of the monitored L10 and Lmax values in the supplemental noise studies. Should new impacts be uncovered as a result of this disclosure a focused Supplemental EIS (SEIS) should be prepared. Additional mitigation should be analyzed and proposed.

Comment T-2: There is one monitoring site in the Irving neighborhood (#4). Site 4 is projected to have a maximum construction noise increase of 1 dBA, which is not an impact. Reliance on this modeling would indicate that the Irving neighborhood will not be subject to ANY construction noise impacts for ANY period of time. It would seem logical that one of the three Westchester noise and vibration monitoring sites should be located in the Irving neighborhood. If future monitoring showed any increases over 3 dBA then a supplemental noise analysis and additional mitigation would be required as part of a focused SEIS.

Comment T-3: The sole temporary access road to the Westchester Bridge Staging Area in the River is to be constructed immediately to the north of the Irving neighborhood. How this road can be constructed, used, and demolished all while not increasing noise levels in the Irving neighborhood needs to be clarified. To the extent that this clarification needs to be postponed until the Design Build contractor is selected, a Supplemental Noise Analysis needs to be conducted and released for public review at that time. If new noise impacts are identified this should be circulated as a focused Supplemental EIS that considers additional mitigation measures.

Comment T-4: This construction road, once it crosses the railroad tracks and gets to the river bank, will turn to the north paralleling the river to get to the staging area access point. As indicated in the DEIS, and clarified in subsequent meetings with the Authority, this portion of the access road may require pile driving. If this is the case, the Supplemental noise analysis discussed above should include this activity.

Comment T-5: There is one monitoring site in the Tappan Landing neighborhood (#1). Site 1 is projected to have a maximum construction noise increase of 3 dBA, which is not an impact. Reliance on this modeling would indicate that the Tappan Landing neighborhood will not be subject to ANY noise impacts for ANY period of time. It would seem logical that one of the three Westchester noise and vibration monitoring sites should be located in the Tappan Landing neighborhood. If future monitoring showed any increases over 3 dBA then a supplemental noise analysis and additional mitigation would be required as part of a focused SEIS.

Comment T-6: The temporary access rood, the Westchester Bridge Staging Area, and direct access to it are immediately adjacent to or directly off-shore from it. Once the Design Build contractor is selected a Supplemental Noise Analysis needs to be conducted and released for public review. If new noise impacts are identified, this should be circulated as a focused Supplemental EIS that considers additional mitigation measures.

Comment T-7: There are no current monitoring sites in The Quay. It would seem logical that one of the three Westchester noise and vibration monitoring sites should be located in the Tappan Landing neighborhood. However, it is currently unclear what construction noise impacts the FEIS is disclosing for The Quay. The residential location just to the north (Site 1) indicates that there would be NO noise impacts during construction. The non-residential site just to the south (Site 2) indicates that maximum construction noises increases of 10 dBA for up to 6 months are possible. Since the FEIS elected not to clarify this point, it is reasonable to take the most conservative assumption that Site 1 is representative of all the units in The Quay. This means that there are no projected construction noise impacts at The Quay disclosed in the FEIS. If it determined that there would be impacts (i.e. increases of more than 3 dBA) then a SEIS should be prepared with additional mitigation analyses.

Comment T-8: The temporary access rood, the Westchester Bridge Staging Area, and direct access to it are immediately adjacent to or directly off-shore from The Quay. Once the Design Build contractor is selected a Supplemental Noise Analysis needs to be conducted and released for public review. If new noise impacts are identified, this

should be circulated as a focused Supplemental EIS that considers additional mitigation measures.

Comment T-9: The FEIS currently represents that with mitigation as proposed there will not be ANY noise impacts (i.e. no noise level increases of more than 3 dBA Leq at ANY of the residences in Tarrytown. Should future studies by the Design Build contractor, or future monitoring demonstrate that there are or would be impacts then a focused SEIS must be prepared with additional mitigation measures evaluated. These additional mitigation measures should consider receptor controls.

Comment T-10: The Authority should clarify that the noise walls on the Westchester Bridge Staging Area will also be on the north side so that the marina and Losee Park will be protected.

Should you have any questions please do not hesitate to contact me at 732-616-4557 or via email at brookc@mackassociatesllc.com.

Sincerely,
MACK Associates, LLC

A. Brook Crossan

Brook Crossan, Ph.D., P.E.
President

Copy:
Michael Blau, Village of Tarrytown

From: dot.sm.mo.tzbsite <tzbsite@dot.ny.gov>
Date: August 16, 2012 7:21:41 PM EDT
To: "Vasco, Sandra (DOT)" <Sandra.Vasco@dot.ny.gov>, "gpaschalis@hshassoc.com" <gpaschalis@hshassoc.com>, "Robbins, Russell (DOT)" <Russell.Robbins@dot.ny.gov>
Subject: FW: TZ B comment -Have you consider this?

From: Dennis Harper[SMTP:DISTAR97@BESTWEB.NET]
Sent: Thursday, August 16, 2012 7:21:33 PM
To: dot.sm.mo.tzbsite
Subject: TZ B comment -Have you consider this?
Auto forwarded by a Rule
Dear DOT...

I believe the new bridge is being fairly debated. However there is something I don't hear people talking about.

After crossing the bridge westbound during the evening rush, I notice traffic often slows and backs up due to the long up gradient (the hill) and at top the left lane is lost. While most cars have no problem with the hill, heavy trucks cannot regain lost speed so easily, which in turn slow down all traffic.

Has this been studied?

The ideal solution is to add a lane on the right and maintain all lanes at least until the mall. I hope it's not too late to consider this.

I know there is a standard methodology for "slow truck lanes" in the interstate system. I don't know if this hill
qualifies. My feeling this is not a typical application of that standard due to the raw volume of traffic combined
with the inability of trucks to quickly make up for what would otherwise be minor speed loss.

Thank You,
Dennis Harper - Yonkers NY

From: Sam I am[SMTP:SAMIAM914@YAHOO.COM]
Sent: Thursday, August 23, 2012 9:28:13 AM
To: dot.sm.mo.tzbsite
Subject: Plz have train over the new TZ bridge
Auto forwarded by a Rule

Dear Mr.Anderson,

Please see that at least a train crossing over the river from Tarrytown into Rockland over the new Tappan Zee bridge, i.e. it need not go any further than where the bridge starts in Rockland, this will cut the costs of having to put tracks for miles into Rockland, this can be done later. For now just get the train just over the river to the entry point in Rockland.

Thanks
somnath konduru
Tappan, NY. 10983

From: dot.sm.mo.tzbsite
To: Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject: FW: Final Environmental Impact Statement
Date: Wednesday, August 08, 2012 2:38:04 PM

From: somnath konduru[SMTP:SOMNATH_KONDURU@YAHOO.COM]
Sent: Wednesday, August 08, 2012 2:36:40 PM
To: dot.sm.mo.tzbsite
Subject: Re: Final Environmental Impact Statement
Auto forwarded by a Rule

Dear Mr.Anderson,

New Tappan Zee bridge should not be built without a train. At least build the tracks just to connect from Tarrytown train station to cross over the river via the new bridge and stop on the Rockland side immediately at the bridge, this way we are only talking around 5 miles of track. When money is available the tracks can be extended further into Rockland, we just need the train to cross over the river for now, existing buses or other transportation methods can bring the people near the bridge and they can take the train from there.

Mass transit bus system is NO GOOD for the bridge, Lincoln tunnel with a special bus lane is a good example, I took the bus to NYC, we waited 30+ minutes in the bus lane to just to get to the tunnel, it was like a parking lot, nothing moving. Tappan Zee bridge is worse, I took the TZ bridge for over 10 years, what a nightmare. Let's learn from Chinese, they built dozens of high speed trains recently, why can't we do the same?

Building a new bridge without a working train is a very BAD idea.

Reagrds
Somnath Konduru
845-359-0362

From: Tappan Zee Hudson River Crossing Project <Tappan_Zee_Hudson_River_Crossing@mail.vresp.com>
To: somnath_konduru@yahoo.com
Sent: Wednesday, August 1, 2012 4:35 PM
Subject: Final Environmental Impact Statement

FINAL ENVIRONMENTAL IMPACT STATEMENT NOTICE OF AVAILABILITY

The Federal Highway Administration (FHWA) along with the New York State Department of Transportation (NYSDOT) and the New York State Thruway Authority (NYSTA) have prepared a Final Environmental Impact Statement (FEIS) to examine the potential environmental effects of proposed alternatives for the Tappan Zee Hudson River Crossing Project, and where adverse impacts are identified, it discusses measures to mitigate them. Copies of the FEIS are available online at http://cts.vresp.com/c/?HowardSteinHudsonAss/cc7f22049a/f69d11c0a0/7fdca6f162 (formerly

http://cts.vresp.com/c/?HowardSteinHudsonAss/cc7f22049a/f69d11c0a0/847bbaa621) and for review and copying during business hours at the repositories listed here.
This document is available for public review until September 4, 2012 after which time a Record of Decision will be issued. Questions or comments regarding this FEIS should be sent to:
Michael Anderson
New York State Department of Transportation
4 Burnett Boulevard
Poughkeepsie, New York 12603
or email mailto:tzbsite@dot.state.ny.us?subject=Final Environmental Impact Statement
The Record of Decision will address any new or substantive comments made during the public review period.

Howard/Stein-Hudson Associates
11 Hanover Sq. 3rd Floor
New York, 10005
US

From: dot.sm.mo.tzbsite <tzbsite@dot.ny.gov>
Date: August 16, 2012 9:35:58 AM EDT
To: "Vasco, Sandra (DOT)" <Sandra.Vasco@dot.ny.gov>, "gpaschalis@hshassoc.com" <gpaschalis@hshassoc.com>, "Robbins, Russell (DOT)" <Russell.Robbins@dot.ny.gov>
Subject: FW: Staging area

From: billyk41@optonline.net[SMTP:BILLYK41@OPTONLINE.NET]
Sent: Thursday, August 16, 2012 9:35:42 AM
To: dot.sm.mo.tzbsite
Subject: Staging area
Auto forwarded by a Rule

Dear Mr. Anderson,

When the construction phase for the TZB begins, where will the staging areas be located on the Tarrytown side of the river to support the project? Specifically, how will the workers and the equipment be delivered to the worksite on a daily basis? I look for your reply, as there are a number of concerned people in Tarrytown and Sleepy Hollow who could be impacted for the next 5 years on how your team will implement these plans. Thank you.

William Krajeski
177 White Plains Rd.
Tarrytown , N.Y. 10591.

From: dot.sm.mo.tzbsite <tzbsite@dot.ny.gov>
Date: August 16, 2012 6:17:48 PM EDT
To: "Vasco, Sandra (DOT)" <Sandra.Vasco@dot.ny.gov>, "gpaschalis@hshassoc.com" <gpaschalis@hshassoc.com>, "Robbins, Russell (DOT)" <Russell.Robbins@dot.ny.gov>
Subject: FW: TZ Bridge/I-287 comment

From: John Kwasnicki[SMTP:KWAZ23@VERIZON.NET]
Sent: Thursday, August 16, 2012 6:17:35 PM
To: dot.sm.mo.tzbsite
Subject: TZ Bridge/I-287 comment
Auto forwarded by a Rule

NYS Thruway & DOT new proposed TZBridge - Hudson River Lack of Planning
August 16, 2012

I would like to know as a APA (American Planning Association) member (since 2004) from Rockland County, NY -Village of Sloatsburg..that is part of the APA NY Metro Chapters- Lower Hudson Valley West (LHVW) that includes Rockland, Orange,Sullivan and Ulster Counties..I, have never been contacted by the LHVWest for meetings with all APA/AICP (American Institute of Certified Planners) member on the new Tappen Zee
Bridge construction proposals to render APA/AICP position papers and TZB-DEIS comments. Why has this been going on?

As you know many Rockland & Orange County AICP Planners are hired by Town and Villages and have Planning Firms that are only appointed advisers to local Planning/Zoning Boards since the AICP Planners ARE NOT NYS LICENSED or are TESTED by NYS Civil Service. Since these AICP Planning Firm have presented many Land-Use development plans in Rockland/Orange Counties since the first TZBridge built..Why not for all
of its Housing Sprawl should help pay for the new TZBridge as to per Housing units of $2000 each ?
Example: The Orange County-Town of Tuxedo has approved a PUD development two (2) times in 2004/10 called Tuxedo
Reserve of 1,195 mixed housing units on their south tract ..that the population from this development will traffic effect impact the TZBridge with additional traffic.

NYS is now looking for means to reduce cost of such new TZBridge let all major developers be local new Zoning Code charged for the TZBridge cost. The Proposed Thruway exist 15B in the Town of Tuxedo should also be built as part of the new TZB-DEIS as to lower the traffic flow on the NYS Rt. 17 corridor.

In my opinion, since there has been NO APA/AICP meetings or comments made by the LHVWest members on the new TZBridge..The NYS Thruway-DOT proposed planning (their planning comes from what Planning Firm source ?) on the TZBridge should be eliminated until the NYS Governor, State Legislature State Comptroller Office fully look into this matter. By NYS Licensing AICP Planner would also bring in License fee Revenues to the NYS yearly BUDGET.

Sincerely yours
John Kwasnicki APA member #147802

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: Comments on Tappan Zee Bridge FEIS
Date:	Tuesday, September 04, 2012 4:58:56 PM
Attachments:	image001.png image002.png

From: Debbie Mans[SMTP:DEBBIE@NYNJBAYKEEPER.ORG]
Sent: Tuesday, September 04, 2012 4:58:16 PM
To: dot.sm.mo.tzbsite
Cc: debbie@nynjbaykeeper.org; meredith@nynjbaykeeper.org; kerstin@nynjbaykeeper.org
Subject: Comments on Tappan Zee Bridge FEIS
Auto forwarded by a Rule

Please accept these comments on behalf of NY/NJ Baykeeper on the Final Environmental Impact Statement for the Tappan Zee Hudson River Crossing Project (the "Project"). Since 1989, NY/NJ Baykeeper has been working to protect, preserve and restore the Hudson-Raritan Estuary (the "Estuary").

Oysters are vital to the ecological integrity of the Estuary, which is why Baykeeper has been working to restore oyster beds since 1999. Our volunteer-driven oyster gardening program, remote setting aquaculture of oyster spat-on shell, and several current reef restoration projects has resulted in the restoration of hundreds-of-thousands of oysters to the Estuary ecosystem – allowing this keystone species to begin playing its natural role in cleansing our waterways.

The proposed Project calls for an unacceptable permanent impact to oyster habitat. Throughout the Estuary oysters are functionally extinct, making remaining habitat and live animals critical to the ultimate revival of this ecologically and culturally significant species.

Oysters are considered to be a Keystone Species. A keystone species has a disproportionate affect on its environment relative to its abundance; this means this type of species can affect many other organisms in an ecosystem and help to determine the types and numbers of various others species in a community. Oysters have two major functions in the ecosystem that make them so important:

> Oysters are filter-feeders: They remove nutrients, algae, plankton, and/or pollutants from the water column, which contributes to cleaner, clearer water. An adult oyster can filter up to 50 gallons of water per day. So, a large population of oysters can have a significant positive impact on water quality. Cleaning up the water in our estuary is an obvious positive change for humans, but it can also help to support the growth of other marine ecosystems that rely on light from the sun, like seagrass beds and other plant life.
>
> Oysters are the only bivalves that build a reef: Natural oyster reefs are built by larval oysters attaching to adult live or dead oysters and creating a vertical structure into the water column. This function is important for several reasons: A reef structure provides habitat for many other marine organisms. This increases the species richness and biodiversity of the region.

Furthermore, an increase in biodiversity in an area helps to support a diverse food web resulting in an economic and tourism benefit.

While the FEIS calls for compensatory mitigation measures to offset dredging-related impacts to the benthic community, including the restoration of 13 acres of hard bottom/shell oyster habitat in the immediate vicinity of the existing bridge and reintroduction of oysters to the habitat (FEIS at 16-40), the document is extremely short on details as to how and where this will occur.

Baykeeper supports the requirements set forth by both the New York State Department of Environmental Conservation and National Marine Fisheries Service in their July 2012 correspondence for the mitigation and restoration plan for restoring oyster reef habitat and would add the following comments:

- All efforts must be made to further reduce impacts to oyster habitat and live oysters. An impact of this magnitude could have serious repercussions for the much larger ecosystem of fledging oyster research and restoration efforts.

- Baykeeper has partnered with 20 scientists, not-for-profit groups and government agencies on the Oyster Restoration Research Project (ORRP) on the first stage of an ambitious research effort to determine if oysters can once again flourish in the waters of NY Harbor. Since 2010, ORRP has constructed five research oyster reefs, including one in the Hudson River at Hastings-on-Hudson, just south of the proposed impacted area. We urge NYS to work with our partnership to understand how to best reintroduce oyster habitat in the impacted area.

- Baykeeper supports the collection and maintenance of live oysters from the impacted area for the establishment of a brood stock for future restoration efforts. Our experience has shown that oysters adapt to local conditions and any larvae or spat for future restoration work should be derived from local oysters. Our experience has also shown this is difficult to do and NYS should enlist the appropriate expertise to ensure that conditions are optimal not only to store the live animals for the duration of the project, but also to develop spawning conditions.

- There should be additional restoration required for the temporary loss of the oyster habitat during the duration of the Project.

Thank you for your attention to our comments. Please confirm receipt. Debbie Mans

Deborah A. Mans, Baykeeper & Executive Director
NY/NJ Baykeeper
52 W. Front Street
Keyport, NJ 07735
732.888.9870 ext. 2
732.888.9873 fax
Website: www.nynjbaykeeper.org

Follow us at:

Protecting, preserving, and restoring the Hudson-Raritan Estuary since 1989.

From: dot.sm.mo.tzbsite <tzbsite@dot.ny.gov>
Date: August 15, 2012 5:57:07 PM EDT
To: "Vasco, Sandra (DOT)" <Sandra.Vasco@dot.ny.gov>, "gpaschalis@hshassoc.com" <gpaschalis@hshassoc.com>, "Robbins, Russell (DOT)" <Russell.Robbins@dot.ny.gov>
Subject: FW: Comment on Final Environmental Impact Statement

From: Claudia Mausner, PhD[SMTP:C.MAUSNER.PHD@GMAIL.COM]
Sent: Wednesday, August 15, 2012 5:57:00 PM
To: dot.sm.mo.tzbsite
Subject: Comment on Final Environmental Impact Statement
Auto forwarded by a Rule
I cannot support any bridge plan that does not include, at the very least, detailed design plan for supporting public transit, whether train or bus. With higher tolls and absence of public transit, a new bridge would in effect create a block between Rockland and Westchester, rather than allowing for easier flow of traffic for work, entertainment and shopping trips. I believe the Governor can do better. This is a time for creative thinking, to take advantage of federal funding while simultaneoulsy including a REQUIREMENT, with a SPECIFIED TIMEFRAME, for adding public transit if it cannot be afforded upfront.

Claudia Mausner, Ph.D.

Claudia Mausner, Ph.D.
Environmental Psychology Consultant
Adjunct Associate Professor of Environmental Studies, Pace University
www.linkedin.com/in/cmausner

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: Riverkeeper Comments on FEIS for the Tappan Zee Hudson River Crossing Project
Date:	Tuesday, September 04, 2012 6:07:48 PM
Attachments:	Riverkeeper Comments TZ Hudson River Crossing Project FEIS Sept4_12.pdf Riverkeeper Exhibits 1_4 FEIS Comments Sept4_12.pdf

---

From: Phillip Musegaas[SMTP:PHILLIP@RIVERKEEPER.ORG]
Sent: Tuesday, September 04, 2012 6:08:37 PM
To: dot.sm.mo.tzbsite
Cc: Anderson, Michael (DOT)
Subject: Riverkeeper Comments on FEIS for the Tappan Zee Hudson River Crossing Project
Auto forwarded by a Rule

Mr. Anderson,

Please find attached Riverkeeper, Inc.'s Comments and related Exhibits on the FEIS for the Tappan Zee project. A hard copy will follow by regular mail.

Please let me know if you have any difficulty accessing or viewing the attached files.

Thank you,

Phillip Musegaas, Esq.
Hudson River Program Director
Riverkeeper, Inc.
20 Secor Road
Ossining, NY 10562
914-478-4501 x224
phillip@riverkeeper.org

RIVERKEEPER.
NY's clean water advocate

Riverkeeper---Defending the Hudson. Protecting Our Communities.

RIVERKEEPER.
NY's clean water advocate

September 4, 2012

Michael Anderson
New York State Department of Transportation
4 Burnett Boulevard
Poughkeepsie, New York 12603
VIA ELECTRONIC MAIL

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

Dear Mr. Anderson:

Please accept the following comments on behalf of Riverkeeper, Inc. (Riverkeeper) on the Final Environmental Impact Statement (FEIS) for the Tappan Zee Hudson River Crossing Project, released August 1, 2012.

Riverkeeper incorporates within this comment on the FEIS its comments submitted March 30, 2012 on the Draft Environmental Impact Statement (DEIS) and hereby reserves all legal rights relating to, and arising from issues we previously raised in those comments, but do not include here.

The FEIS is insufficient because it does not fully address the numerous, significant concerns raised by Riverkeeper in its comments to the DEIS, including the lack of an adequate alternatives analysis, and inadequate assessment of impacts to endangered species and aquatic ecology and habitat that would result from this project. The FEIS also does not remedy the DEIS' failure to fully consider avoidance of such impacts, and mitigation measures to address unavoidable impacts. In addition, the timing of the issuance of the FEIS demonstrates the state's intention to move forward without adequate public participation. For example, the fact that the FEIS has been issued before the construction bids have been released to the public, or a bidder has been selected, ignores the possibility that the detailed bridge construction proposal could result in different environmental impacts that have not been assessed in a process the state now deems complete. Once the FEIS is finalized and a Record of Decision (ROD) and findings pursuant to New York's State Environmental Quality Review Act (SEQRA) are made, the public will no longer have an opportunity to provide formal input to the state regarding this project. Considering the fact that this is the largest public works project in the Hudson Valley in decades that will have short and long term impacts on the Hudson River and the region as a whole, it is crucial that the public is afforded a democratic, transparent process that provides every opportunity for meaningful participation prior to the project's approval.

Riverkeeper notes that our concerns regarding the adequacy of the DEIS, and now the FEIS, are consistent with significant concerns raised by the U.S. Fish and Wildlife Service (USFWS) in its comments on the DEIS. In a March 1, 2012 letter to the National Park Service that incorporates its comments on the DEIS included here as Exhibit 1, USFWS expresses concern that the DEIS does not meet the requirements of NEPA and calls on the state to prepare a supplemental EIS. "We are also concerned that the...lack of detail may not fully meet the requirements of the National Environmental Policy Act (NEPA)....In order to fully comply with NEPA and to fully inform the public of all relevant environmental impacts, we recommend that the FHWA commit to the preparation and publication of a supplemental EIS once all pertinent details become known and prior to final decision-making.[1]" Riverkeeper supports the comments of the USFWS regarding the adequacy of the project's NEPA review and the need for a supplemental EIS, particularly since the concerns raised by USFWS and Riverkeeper regarding public participation and the sufficiency of the environmental assessment in the DEIS have not been addressed adequately in the FEIS.

For the reasons set forth in its DEIS comments and reiterated herein, as well as the following additional comments on the FEIS, Riverkeeper hereby requests that the state withdraw the FEIS and prepare a Supplemental draft EIS that includes a revised alternatives analysis, revised assessment of in-river impacts on endangered Atlantic and shortnose sturgeon and a complete analysis of the impacts of demolishing the existing bridge.

Insufficient Alternatives Analysis

Despite the public's interest in examining the Tunnel, Rehabilitation, and Single Structure alternatives, both the DEIS and the FEIS only presented two alternatives to this Project: the No Build Alternative and the Replacement Bridge Alternative.[2] In the comments on the DEIS, Riverkeeper raised the need to consider and analyze these viable alternatives to the Project; however, the FEIS continued to dismiss these alternatives.[3] The DEIS, and FEIS also fail to include an assessment of a new single or double span bridge with mass transit as a reasonable alternative. Dismissing viable project alternatives before conducting a full study of their impacts, costs, and benefits compared to the project proposal does not constitute a meaningful alternatives analysis, as required by both the National Environmental Policy Act (NEPA) and New York's State Environmental Quality Review Act (SEQRA). The fact that the Project sponsors have put forth an ad hoc rationale for why they chose to dismiss these three Project alternatives does not excuse them of their legal obligation to conduct a complete analysis that takes the requisite "hard look" at the impacts and possible mitigation measures of all these alternatives equally.

Furthermore, there remains no plan for the incorporation of a mass transit system on the bridge and no analysis of the impacts of building a new crossing with mass transit. The state rejects the inclusion of mass transit on a new bridge[s] and excludes it from further analysis primarily for cost reasons, despite the fact that the DEIS and FEIS do not contain detailed cost estimates for different types of mass transit that could be implemented on a new crossing.

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[1] Letter to National Park Service from United States Fish and Wildlife Service, sending Final Comments on Draft Environmental Impact Statement (DEIS) for the Tappan Zee Hudson River Crossing Project 87/287, Rockland and Westchester Counties, NY (March 1, 2012) at 2. (See exhibit 1).

[2] *See* TAPPAN ZEE HUDSON RIVER CROSSING PROJECT FINAL ENVIRONMENTAL IMPACT STATEMENT AND SECTION 4(F) EVALUATION (August 2012), Section 2-2 [hereinafter FEIS].

[3] FEIS, Section 2-3.

Project Constitutes Illegal Segmentation

Several commenters on the DEIS—Riverkeeper included—raised the issue that the environmental review process for this Project is being segmented.[4] The FEIS does acknowledge these comments; however, the lead agencies have still not studied all of the cumulative impacts of related future projects that should be considered in conjunction with the current project (e.g., the construction of mass transit, potential future improvements to adjacent highway segments, and demolition of the existing bridge).

Demolition of the existing Tappan Zee Bridge constitutes one of the actions that will be undertaken as a direct result of constructing the new bridge. Therefore, the Environmental Impact Statement for this Project must fully consider the impacts of this action. The FEIS's expansion of the DEIS's discussion of demolishing the existing bridge contains very little new information on the actual effects of demolition, though.[5] Most of the additional information found in the FEIS refers to the processes that will be used during demolition, as opposed to the anticipated impacts on the Hudson River and surrounding communities.[6] In addition, the FEIS fails to adequately assess ways to avoid, minimize or mitigate such impacts.

Failure to Study Various Environmental Impacts

Riverkeeper is very concerned about the fact that this Project has been designated to receive a fast track review at the federal level. This rush to complete each step of the mandatory review process as quickly as possible has not allowed for a proper analysis of all the immediate, long-term, and cumulative impacts of this Project. This rushed review process has effectively resulted in the mere *appearance* of an environmental review process, as opposed to a properly conducted and adequately supported study.

For example, the FEIS includes a discussion about the alternatives to dredging, as Riverkeeper requested in its comments on the DEIS; however, the explanation provided for why the alternatives to dredging have been dismissed is very brief and still does not fully weigh the costs and benefits of these dredging alternatives.[7] As Riverkeeper stressed in its comments on the DEIS, the harmful effects of performing dredging in this area of the Hudson River are extensive. Dredging will cause disturbances to the endangered shortnose and Atlantic sturgeon, the loss of benthic macroinvertebrates and their habitat, and the resuspension of PCBs, metals, and other hazardous materials located in the river sediments. The FEIS fails to fully consider these impacts, or to fully examine measures to avoid them or mitigate them if necessary. For example, the use of a full length trestle platform, as an alternative to dredging, has been dismissed because the lead agencies have found it would be too expensive to install the pile foundations of a trestle, due to the soil conditions in this area of the River.[8] However, these monetary costs have not been weighed against the environmental costs of performing extensive dredging. A proper review process should fully take into consideration the costs and benefits of different project alternatives. Simply dismissing an alternative to dredging because of the projected costs, without

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[4]FEIS, Section 24-2-3.
[5] FEIS, Section 18-3-8.
[6] *Id.*
[7] *Id.*
[8] *Id.*

simultaneously considering the countervailing environmental impacts or benefits, does not constitute a proper environmental review.

Riverkeeper reiterates the significant concerns stated in its comments on the DEIS that the environmental impact review conducted for the Project fails to adequately consider and characterize the impacts to the Hudson River ecosystem, including to endangered shortnose and Atlantic sturgeon. In our comments on the DEIS, Riverkeeper called for the preparation of a supplemental draft EIS once the National Marine Fisheries Service (NMFS) had completed its Biological Opinion (BO) assessing the impacts to these endangered species, so that the public would have the opportunity to provide informed comments on these impacts prior to the issuance of the FEIS. Riverkeeper also raised significant questions regarding the validity of the underlying scientific studies conducted as part of the Aquatic Sampling Program (ASP) and Biological Assessment (BA) that were submitted to the National Marine Fisheries Service ("NMFS") as part of its Section 7 Endangered Species Act consultation.

Since the comment period on the DEIS closed, Riverkeeper's concerns have increased significantly with NMFS' release of its BO for the project (which is incorporated in the FEIS) and the New York State Department of Environmental Conservation (DEC) issuance of a draft Incidental Take permit pursuant to New York State Environmental Conservation Law Article 11, and its implementing regulations at 6 NYCRR Part 182 (DEC Draft Permit).

As discussed below, there are inconsistencies in the authorized sturgeon take between the BO and DEC draft permit that raise significant questions about the underlying scientific validity of the BO and DEC Draft Permit.

The BO found that the Project would adversely effect, but is not likely to jeopardize the continued existence of shortnose and Atlantic sturgeon.[9] In analyzing the impacts of pile driving for the Project, NMFS anticipates the number of shortnose sturgeon and Atlantic sturgeon to be affected by the increased noise level to be 43-70 of each species (depending on the Long Span or Short Span Options, respectively), and estimates that one of each may suffer mortality.[10] The BO also estimates one fatality for each species per year as the result of dredging. In the BO, NMFS issued a Take Statement authorizing the take of shortnose and Atlantic sturgeon in these numbers.[11]

Less than 1 week prior to the release of the FEIS, the DEC issued the Draft Permit. The Draft Permit states in part that "It is estimated that approximately 125 Atlantic sturgeon and 298 shortnose sturgeon will be affected by elevated noise levels caused by pile driving during construction. Of these, as many as 52 Atlantic sturgeon and 89 shortnose sturgeon may suffer fatal injuries. The remaining incidental take will be in the form of non-lethal injury, disturbance or harassment."[12] The DEC Draft Permit does not appear to assess any impacts to shortnose or Atlantic sturgeon resulting from dredging related to the project.

In Riverkeeper's comments on the DEIS we stated that the ASP and BA for endangered shortnose and Atlantic sturgeon were inadequate and relied on flawed scientific methodology that failed to accurately assess impacts to these species. Our concerns continued to hold for the revised BA dated April 2012. The subsequent release of the BO and DEC Draft Permit only added to Riverkeeper's concerns, because they show vastly different take numbers, due to

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[9] FEIS Appendix F-6, NMFS Biological Opinion, at 2.

[10] FEIS Appendix F-6, NMFS Biological Opinion, at 145.

[11] FEIS Appendix F-6, NMFS Biological Opinion, at 80.

[12] New York State Department of Environmental Conservation, Tappan Zee Bridge Draft Part 182 Incidental Take Permit at 2. *Available at* http://www.newnybridge.com/documents/dec-permit/draft-permit.pdf

radically different methodologies and assumptions used by NMFS and DEC in their analyses. Both the NMFS and DEC analyses appear to rely on the same flawed baseline studies conducted by the state that underlie the original BA and revised BA. The FEIS' reliance on the NMFS BO conclusions, therefore, renders the FEIS' overall determination of impacts to sturgeon invalid and legally deficient.

As described in further detail in Riverkeeper's consultant's analyses, included herein as Exhibits 3 and 4, the NMFS BO assessment of impacts to shortnose and Atlantic sturgeon is deficient and potentially underestimates the number of both species of sturgeon that will be affected by this project. The deficiency of the BO results from, among other things, NMFS' use of flawed data regarding the numbers of sturgeon which may be present in the area during bridge construction, the lack of reliable information on noise impacts and sturgeon behavioral responses to underwater noise, lack of assessment of potential take from vessel strikes, and inadequate assessment of dredging impacts, both direct (direct take from dredging operations) and indirect (significant loss of foraging habitat). The different assessment and study methods employed by NMFS and DEC fail to agree on the proper methodology to use in determining baseline sturgeon data, and do not utilize available historical data on Atlantic and shortnose sturgeon from the United States Fish and Wildlife Service (USFWS) and DEC. As noted by Riverkeeper's consultant,

> The FEIS must account for the huge discrepancy between the JASCO PIDP report issued in July 2012 (126 sturgeon), based on one month of study, and the observed AECOM gillnet study results (12 shortnose sturgeon/no Atlantic sturgeon), based on one year of study. It must also be noted that none of the reports issued to date have been revised to reflect the JASCO sturgeon data including the Biological Assessment, the Incidental Take Permit, and the Biological Opinion all of which rely on AECOM's gillnet data to determine the amount of sturgeon expected to be affected from the pile driving operations. (Exhibit 4 at 2).

Long term research regarding the effects of the localized impacts of pile driving must be completed to fully assess and understand the impacts the Project will have on the federally endangered Atlantic and shortnose sturgeon. Exhibit 3 at 9.

In a similar fashion, Riverkeeper's comments on the DEIS raised concerns regarding the analysis of the environmental impacts of dredging the access channel for the Project and the potential impact to shortnose and Atlantic sturgeon. Although the FEIS contains limited mitigation measures that are apparently a condition set by the DEC, the dredging impact associated with the project is still grossly understated and is hardly minimized or mitigated.

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. Despite conclusions in the BO that only one sturgeon of each species per year would suffer lethal take, as Riverkeeper pointed out in its DEIS comments, the Fact Sheet prepared by NMFS to accompany the listing of Atlantic Sturgeon as Endangered, and the DEIS itself acknowledged that dredging is one of the primary threats to the New York Bight population. Given the unprecedented scale of dredging and the lack of adequate study, the BO and FEIS' conclusions regarding the impacts of dredging are unsupported.

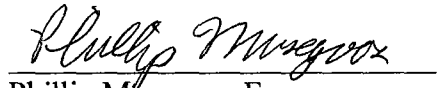
In addition, the significant loss of benthic habitat that would result from the dredging of a 500 foot wide channel across the Hudson River, and the impacts caused by the armoring of the dredged channel, have not been adequately assessed in the DEIS or FEIS, nor is there an explanation for why the natural river bottom will not be restored post-construction. The FEIS also does not address comments made by the USFWS on a draft of section 18 of the DEIS, which stated that "deposition of river sediments on top of an unnatural substrate is unlikely to mimic a natural river bottom...the DEIS needs to clearly explain what the impacts of armoring will be and what loss of natural resources will result...[so that] any short term impacts to natural resources are mitigated."[13]

Minimization of dredging impacts, mitigation of any short term or long term impacts, and restoration of the habitat lost must all be fully addressed in a supplemental EIS.

Conclusion

The lead agencies for this Project have effectively excluded the public from the review process and they remain in noncompliance with their state and federal legal obligations to conduct a proper environmental review of this Project. The fast track agenda for this Project is not allowing for the full and open public discussion of the viable alternatives to this Project, nor is it allowing for a proper analysis of the full extent of the Project's impacts on the environment. For all the reasons stated above, as well as those included in Riverkeeper's comment submitted on the DEIS, Riverkeeper maintains that this Project violates the requirements of both NEPA and SEQRA.

Respectfully submitted,



Phillip Musegaas, Esq.
Hudson River Program Director

Josh Verleun, Esq.
Chief Investigator and Staff Attorney

[13] *See United States Fish and Wildlife Service Comments on draft DEIS Chapter 18- Construction Impacts (December 2011)*, pg 18-7 (Exhibit 2).

EXHIBIT 1

United States Fish and Wildlife Service, Letter to National Park Service Enclosing FWS Final Comments on Draft Environmental Impact Statement (DEIS) for the Tappan Zee Hudson River Crossing Project 87/287, Rockland and Westchester Counties, NY (March 1, 2012)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
3817 Luker Road
Cortland, NY 13045

March 1, 2012

Ms. Mary K. Morrison
Resource Planning Specialist
Division of Resource Planning and Compliance
National Park Service, Northeast Region
200 Chestnut Street
Philadelphia, PA 19106

Dear Ms. Morrison:

This letter includes the U.S. Fish and Wildlife Service's (Service) comments on the Draft Environmental Impact Statement (DEIS) for the Tappan Zee Hudson River Crossing Project Interstate 87/287, Rockland and Westchester Counties, New York, PIN 8TZ1.00 (Environmental review reference number 12/0052).

The primary concern and mandate of the Service is the protection of public fish and wildlife resources and their habitats. The Service has legal responsibility for the welfare of migratory birds, anadromous fish, and endangered animals and plants occurring in the United States. The Service is also responsible for administering the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 et seq.). These comments notwithstanding, we may also comment on future projects, pursuant to our authorities under the Migratory Bird Treaty Act (MBTA; 16 U.S.C. 703-712); the ESA; the Clean Water Act (CWA; 33 U.S.C. 1344; the Fish and Wildlife Coordination Act (FWCA; 48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), or other legislation, as applicable.

Prior to this review, the Service provided comments on the Federal Highway Administration's (FHWA) preliminary DEIS, which we provided via electronic mail on December 14, 2012, and which are hereby incorporated by reference. In these comments, we requested additional information on a number of issues and commented on issues of potential concern. Many of these issues have been addressed in the current DEIS and we commend the FHWA and the joint lead agencies, New York State Department of Transportation (NYSDOT) and the New York State Thruway Authority (NYSTA), collectively referred to hereafter as "lead agencies," for their efforts. Nevertheless, we have several outstanding concerns that we recommend be addressed in the DEIS.

The following comments are intended to assist the lead agencies in identifying and rectifying potential impacts that may result from the replacement of the Tappan Zee Bridge.

The Planning Process

The planning process that is being used for this project makes it difficult for the lead agencies to fully identify all potential effects to public trust resources that may arise from the proposed project. Many details that could themselves impact these resources (e.g., staging areas; minimization or mitigation measures, etc.) are being left to future planning efforts and are excluded from this analysis. For example, the DEIS provides a generalized description of potential measures to mitigate project impacts to fish and wildlife resources (e.g., storm-water impacts on river water quality, bird strikes, loss of oyster habitat, wetland loss, etc.) but defers to some future "investigations" to determine what, if any, such measures will be implemented as a part of the project. Similar generalities are made throughout the DEIS. These circumstances create difficulties for the Service and other regulatory agencies, as well as the affected public, to fully assess potential impacts or recommend possible methods to alleviate those impacts. One solution might be to assume a "worst case scenario" in which the maximum effects would be analyzed and include an explanation that the final project description is likely to be less impactive.

Adequacy of NEPA Analysis

We are also concerned that the above-mentioned lack of detail may not fully meet the requirements of the National Environmental Policy Act (NEPA). Specifically, the implementing regulations at 40 CFR Part 1500.1(b) state, in part: "NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA." In order to fully comply with NEPA and to fully inform the public of all relevant environmental impacts, we recommend that the FHWA commit to the preparation and publication of a supplemental EIS once all pertinent details become known and prior to final decision-making.

Lack of Scientific Justification

Throughout the DEIS, there are a number of instances in which conclusions are drawn but the analyses upon which these conclusions are based has not been included. Additionally, there are numerous statements made which are not substantiated with appropriate citations. For example, the defined study area is not justified by any rationale or cited literature; nor is it clear that this boundary would be sufficient to identify all direct and indirect environmental effects. Similarly, in Section 16-4-1-2, the DEIS concludes that "...many species represented in the atlas are unlikely to occur in the project area," but does not provide any analysis to support this statement. These types of general statements are made throughout the DEIS. We recommend that the DEIS be revised to include the analyses upon which all conclusions are drawn and include all literature used in these analyses. The cited literature should also be presented as a bibliography in a "Literature Cited" section at the end of the DEIS.

Indiana Bat

The DEIS states that individual Indiana bats (*Myotis sodalis*; a Federally-listed endangered species) that are associated with a known hibernaculum located within 40 miles of the project site may move into the area to breed and that coordination with the Service will occur prior to the removal of trees with a diameter at breast height (dbh) greater than four inches. However, in order to comply with the ESA, the FHWA or their designated representative must make a determination as to whether the proposed project may affect the Indiana bat once the full potential for impacts is known. To do this, the FHWA or their designated representative must determine whether the proposed project would result in (1) no effect (no further action required); (2) may affect, but not likely to adversely affect (requires concurrence from the Service); or (3) likely to adversely affect (requires formal consultation pursuant to section 7(a)(2) of the ESA). If formal consultation is required, we recommend that consultation be initiated as soon as feasible so that any conservation measures developed during this consultation can be incorporated into the project design.

Note that the lead Federal agency "shall make no irreversible or irretrievable commitment of resources that would prevent formulating or implementing any reasonable and prudent alternatives for the action" (50 CFR 402.14) until the requirements of section 7(a)(2) are satisfied (e.g., the formal determination of "no effect" by FHWA; the Service's concurrence on a "not likely to adversely affect" determination; or FHWA's receipt of a biological opinion from the Service, in the event of a formal consultation). Please contact the Service's New York Field Office for assistance in making this determination.

Migratory Birds

With respect to migratory birds, the Hudson River Valley provides an important migration corridor. As mentioned in the DEIS, the western side of the river provides ideal conditions for raptor migration. However, the document falls short of recognizing the river as migration stopover habitat for numerous shorebirds, water birds and waterfowl. Several Important Bird Areas, as designated by Audubon, are found in the Hudson River Valley north of the project site. The DIES indicates that there will be low levels of disturbance to birds from bridge construction. It indicates that birds habituate to bridge traffic and would not be impacted by human activity and noise levels associated with replacement bridge construction. We note that vehicle traffic and construction activity affect birds in different ways and are generally not comparable. Impacts to nesting peregrine falcons seems likely given the close proximity of the proposed bridges to the existing one. Displacement of the breeding pair is plausible although may not be permanent. This should be mentioned in the text.

There is a significant height difference between the two designs. The arch design more closely resembles the height of the existing bridge and would require less supporting cables. Therefore, we recommend this as the less impactive option of the two. What this section fails to mention is the amount of bridge cross section within the airspace. The profiles of both proposed alternatives are substantially more than the existing causeway design. The additional structure within the airspace poses a somewhat greater collision risk to birds, especially during inclement weather, even if the bridge heights are similar.

The DEIS indicates that that the bridge lighting will be the most important factor in determining avian collision risk. Bridge location, height, design, adjacent habitat and weather all play important roles in collision risk and the text should be reworded to reflect this. We recommend a citation for the first sentence on Page 16-29. We note that there have been very few scientific studies conducted to document avian collision risk at bridges.

There will be bridge deck lighting required, in addition to the FAA warning lighting mentioned. Deck lighting should be minimized to the extent possible, be shielded down onto the road surface and not consist of high-pressure sodium lights, if possible. The important design aspect is to not let bright white light stray from the structure, especially skyward. We recommend that the project sponsors commit to minimizing potential lighting impacts on wildlife. In addition, the FHWA and NYSDOT could commit to seasonal adjustments to lighting during migration, especially during periods of inclement weather and poor visibility.

The DIES indicates that there will be low levels of disturbance to birds from bridge construction. It indicates that birds habituate to bridge traffic and would not be impacted by human activity and noise levels associated with replacement bridge construction. We note that vehicle traffic and construction activity affect birds in different ways and are generally not comparable. Impacts to nesting peregrine falcons seems likely given the close proximity of the proposed bridges to the existing one. Displacement of the breeding pair is plausible although may not be permanent. This should be mentioned in the text.

There is a significant height difference between the two designs. The arch design more closely resembles the height of the existing bridge and would require less supporting cables. Therefore, we believe that the arch should be the more bird-friendly design. What this paragraph fails to mention is the amount of bridge cross section within the airspace. The profiles of both proposed alternatives are substantially more than the existing causeway design. The additional structure within the airspace poses a somewhat greater collision risk to birds, especially during inclement weather, even if the bridge heights are similar.

The DEIS indicates that that the bridge lighting will be the most important factor in determining avian collision risk. Bridge location, height, design, adjacent habitat and weather all play important roles in collision risk and the text should be reworded to reflect this. We recommend a citation for the first sentence on Page 16-29. We note that there have been very few scientific studies conducted to document avian collision risk at bridges.

Deck lighting should be minimized to the extent possible, be shielded down onto the road surface and not consist of high-pressure sodium lights, if possible. The important design aspect is to not let bright white light stray from the structure, especially skyward. We recommend that the project sponsors commit to minimizing potential lighting impacts on wildlife. In addition, the FHWA and NYSDOT could commit to seasonal adjustments to lighting during migration, especially during periods of inclement weather and poor visibility.

We appreciate the opportunity to provide these comments. If you require additional information or assistance, please contact Steve Sinkevich at 631-286-0485.

Sincerely,

Patricia Coll

for David A. Stilwell
Field Supervisor

EXHIBIT 2

United States Fish and Wildlife Service Comments on draft DEIS Chapter 18-Construction Impacts (December 2011)

18-1 INTRODUCTION

This chapter describes the construction means and methods of the Long Span and Short Span Options for the Replacement Bridge Alternative and assesses the potential environmental impacts associated with these activities. The two options would be constructed using the same general construction sequencing and methods over an approximately 4½ to 5½ year period. Provided in Section 18-2 of this chapter is a description of the overall construction sequencing and schedule for both the Long and Short Span Options. Section 18-3 includes a more detailed description of the construction methods and equipment that would be used to complete each of the key project elements. As discussed below, much of the work for the project would be performed from barges in the river as well as temporary platforms along both shorelines of the Hudson River. The potential adverse environmental effects as well as any proposed measures to avoid, minimize, or mitigate adverse effects are also discussed.

The construction means and method presented in this chapter are based on the current level of engineering design, discussions with contractors, and past experience on similar projects. While the techniques ultimately utilized for the project may vary to some degree, the process described below presents the most likely scenario for construction of the project. While some flexibility is available within the overall means and methods, the environmental impacts and types of mitigation measures would likely be the same.

With the above in mind, this chapter does not include an analysis of those elements of construction that would be at the contractor's discretion and are unknown at this time. Those elements would include construction staging, in lieu of, or in addition to the two privately owned sites discussed below; disposal and borrow sites; sites used for the pre-fabrication of bridge components outside the immediate vicinity of the project and the production of concrete at existing permitted batch plants. In accordance with FHWA policy independent decisions by the contractor, unless effectively dictated by the project sponsor, are beyond the scope of the federal action. Furthermore, NYSDOT Standard Specifications for all construction contracts require the contractor to comply with all applicable environmental regulations and obtain all necessary approvals and permits for the course of construction.

Comment [TC1]: These are elements which we need to understand in order to adequately analyze potential impacts to trust resources.

In an effort to avoid and/or minimize potential adverse effects during construction of the project, a number of Environmental Performance Commitments (EPCs) have been identified which will be included as part of the project's construction contracts. The EPCs are identified and discussed where applicable below.

18-2 CONSTRUCTION SEQUENCE AND SCHEDULE

As shown in **Figure 18-1**, construction of the Short Span Option would take approximately 5½ years. The schedule shows both preliminary activities used to support the construction of the project (i.e., dredging and temporary platforms) as well as individual elements of bridge construction (i.e., main span and approaches). Throughout the construction period roadway work would be required at various times. During that time, the approach roadways would be shifted and remain in the new location for an extended period before being shifted again. The dredging would occur in three 3-month phases over a 4-year period, and construction of the main span would consist of approximately 3½ years of construction. Completion of the short span approaches would involve approximately 3½ to 4 years of construction. Demolition of the existing Tappan Zee Bridge would be expected to span approximately 1 year.

Construction of the Long Span Option would last approximately 4½ years. The construction sequence and schedule would be similar to that of the Short-Span Option with the exception of the construction of the approaches, which would be expected to take approximately 2½ to 3 years.

18-2-1 LANDINGS

Landings would employ typical highway construction techniques and would be completed on both the Westchester and Rockland sides of the Hudson River upland from the bridge abutment to the tie in with the existing roadway. Construction of the landings would occur throughout the duration of the construction. The construction activity for the landings, however, would be gradual, as the roadways on both sides would be altered and then maintained for lengthy spans of time before being altered again. The alterations to the landings would consist of changes in roadway grade, elevation, direction, and general configuration.

Comment [TC2]: Where are these techniques described?

18-2-2 APPROACHES

Beginning at the abutments, the approaches carry traffic from the land to the main span of the bridge. Construction of the approaches would last for approximately three and a half to four years for the short-span alternative, and two and a half to three years for the long-span alternative. The piles, pile caps, piers, and deck that compose this segment of the bridge would be built sequentially so that as a new pile is being constructed, a completed pile would be undergoing further transformation with, for example, the addition of a pile cap.

18-2-3 MAIN SPANS

The main span would stretch between the Westchester and Rockland approaches. It is the segment of the bridge that would be defined largely by its superstructure design as an arch or cable stayed bridge. Within its substructure, the piers would be more substantial than those of the approaches. All main span work would be done sequentially and in a similar manner as that of the approaches. The piles, pile caps, pylons, and deck construction would last approximately three and a half years.

18-3 CONSTRUCTION OF KEY ELEMENTS

Construction of either option of the Replacement Bridge Alternative would require a wide range of activities on both sides of the river as well as from within the waterway itself. In addition, due to the lack of available land along the waterfront in the vicinity of the bridge, staging areas at some distance from the construction site would be required. Furthermore, it is likely that some bridge components would be pre-fabricated well outside the study area and transported to the site via barge.

To support construction of the main span and bridge approaches, materials, equipment, and crews would be transported from upland staging areas in Westchester and Rockland counties to temporary platforms that would be constructed on the shoreline of the river, as shown in **Figure 18-2**. Dredged channels would provide access to the two work areas in the shallow portion of the river crossing: the Rockland and Westchester approaches. Substructure construction would establish the foundation of the bridge through the processes of pile driving, construction of pile caps, and construction of columns. Superstructure construction would then take place either with a gantry that would move from pier to pier lifting segments from barges below (as in the case of the short-span design option) or a short pier-head truss segment would be lifted atop the next open pier column and secured (as in the case of the long-span option).

18-3-1 WATERFRONT CONSTRUCTION STAGING

The shoreline areas near the proposed bridge site are limited by adjacent development. In order to provide space for the docking of vessels, the transfer of materials and personnel, and the preparation of construction elements, temporary platforms would be extended out from the shoreline over the Hudson River (see **Figures 18-3** and **18-4**). The Rockland platforms would protect the shoreline and also enable the continued maintenance of the original Tappan Zee Bridge as well as providing continued support for the New York State Thruway Authority (NYSTA) Dockside Maintenance facility operation. The number of acres that the footprint of the platforms would occupy would depend upon the available upland area and the bridge option selected. Upon the delineation of the work area, steel piles would be driven to support the platforms. These platforms would provide access to the replacement bridge site via temporary trestles. Their main purposes would be to facilitate delivery of heavy duty bridge elements from an offsite fabrication facility, receive deliveries from the concrete batch plant, receive deliveries (i.e., construction equipment and light duty bridge elements) from the staging areas, and allow for barge-mounted cranes to erect heavy duty bridge elements. Upon completion of construction, the temporary platforms and the piles that support them would be removed.

As the construction of the temporary platforms and access trestles would begin at the shoreline, an access road and work area near the shore would also be constructed. A channel would be dredged specifically to provide barge access to the temporary platforms from in-river work sites.

18-3-2 IN-LAND CONSTRUCTION STAGING

For a project of this size, additional construction staging beyond the waterfront staging areas would be required to accommodate a number of functions. A contractor may utilize one large site or possibly use multiple sites to satisfy their specific construction

needs. While the contractor may or may not choose to use the sites discussed below, based on their proximity to the project site, available size, surrounding land uses and access to the Thruway, these sites are likely candidates and provide a reasonable scenario to assess the potential impacts that may occur from the operation of a construction staging area in Westchester or Rockland Counties. While it is likely that the contractor may use a number of sites throughout the area to stage construction, the analysis in this document for the two in-land sites conservatively assumes that all activities would occur at one of the two sites. As noted above, at any staging areas ultimately utilized for construction of the project, the contractor would be required to obtain all of the necessary permits and approvals for each and any site.

Comment [TC3]: How might this affect timing of the project?

18-3-2-1 FUNCTIONS

Concrete Batch Plant

One or more concrete batch plants could be utilized to provide the concrete needed to construct the bridge foundation, piers, and deck. Typically, a batch plant would occupy approximately 3 acres of land. The location for the plant would be strategically assigned such that the material will be deliverable to the construction site within 90 minutes of load-out at the plant in order to allow concrete to be poured before curing in the truck. For the purpose of this analysis, it was assumed that 40 percent of the concrete needed for construction would be supplied by a batch plant at one of the two sites discussed below. The remaining 60 percent would be supplied by existing concrete batching facilities in Rockland and/or Westchester Counties.

Comment [TC4]: Is there a likelihood that they will be located in different locations?

Laydown/Storage Area

The assembly sites would offer space to complete many tasks throughout the course of construction. Unassembled construction equipment would be delivered to and assembled within these sites. Light duty bridge components would also be delivered to and stored within the assembly sites until they are ready to be utilized at the construction site.

Office/Administrative and Support Space

Office space would be required for construction administration and engineering staff. Interconnected trailers adjacent to the assembly sites would be ideal structures to support this need. It would also be possible, however, for the contractor to rent office space in nearby communities if the trailers are unattainable for any reason. Designated parking for all employees would be a consideration. It will be preferable to have on site space allocated for this purpose but, if necessary, employees would be shuttled from remote parking areas to the construction sites.

18-3-2-2 POTENTIAL CONSTRUCTION STAGING AREAS

Four inland staging sites are discussed below—two privately-owned properties and two parcels within the NYSTA's right-of-way. While the sites within the Thruway right-of-way would definitely be used for construction staging, additional sites would be required. The two privately-owned properties in Rockland County discussed below are likely candidate sites which could supply the needed area for construction staging outside the project's right-of-way. As such, an analysis of these two sites is included in the construction impact assessment. However, as noted above, the contractor is not

obliged to use the privately owned sites and they are included in this document for a discussion of the possible environmental effects if they were used as part of the project's construction. With this analyze, the impacts can be understood wherever the staging area may be.

Comment [TC5]: This is not necessarily true. There may be site-specific issues which cannot be analyzed without knowing where these sites are located.

West Nyack Staging Area (WNSA) Site

Comment [TC6]: Is this a completely developed site or are there any natural resources on or near this site?

The potential West Nyack Staging Area Site occupies approximately 33 acres of land near Interchange 12 south of the Palisades Mall at the intersection of Routes 59 and 303. Only 3.7 miles from the Rockland Bridge Staging Area, WNSA has the additional benefit of currently operating its own concrete batch plant. In addition, the relatively large expanse allows for potential accommodation of office trailers and parking lots. Light duty items may be stored and assembled here. To access the construction site, vehicles would travel on Route 303, entering the Thruway at Interchange 12 before exiting onto a temporary ramp located west of the bridge. From the temporary ramp, vehicles would pass onto River Road and travel under the existing Tappan Zee Bridge onto the temporary platforms of the Rockland Landing Dock Facility, as shown in Figure 18-3. Concrete trucks would drive onto barges by way of the docks. All other vehicles would deliver their stock to waterborne vessels. Delivery of batched concrete to the Tarrytown abutment is expected to take about 90 minutes.

Tilcon Quarry Staging Area (TQSA) Site

Comment [TC7]: See comment above.

The potential Tilcon Quarry Staging Area, which is directly north of the Thruway and opposite the Palisades Mall, is an exceptionally large quarry site operated by Tilcon. Measuring approximately 120 acres, this site would have the capacity to contain many of the facets required for construction operations. In addition, this site is adjacent to the CSX West Shore Line and could potentially provide materials to be used during construction. Although the site is currently in operation, it may be possible to lease a portion of the space. The site is accessible via Interchange 12 of the Thruway and access to the construction site would be similar to that described above for the WNSA.

Westchester Inland Staging Area (WISA) Site

Comment [TC8]: See comment above.

Presently used by the NYSTA's Tappan Zee Bridge Maintenance Facility, Bridge Patrol, Equipment Maintenance, and the local station of New York State Police (NYSP) Troop T, the triangle of land located north of I-87 and opposite the toll plaza is a possible location for staging on the Westchester side of the Hudson River, as shown in Figure 18-4. The Westchester Inland Staging Area currently contains a westbound on-ramp from southbound Route 9 which would be removed during construction staging. Highway access to WISA is available directly to the westbound I-287 shoulder, eastbound from I-287 by a short restricted-use ramp leading south of the Toll Plaza to the administrative area, and from South Broadway via Interchange 9. In order to access the Westchester Bridge Staging Area, vehicles would travel along the north-south access road under the Tappan Zee Bridge. From there, they would pass onto a temporary haul road that will be constructed in order to bring trucks over the Metro-North Railroad (MNR) Hudson Line to the Westchester Bridge Staging Area (WBSA).

Interchange 10

Comment [TC9]: See comment above.

The vacant land included within the footprint of the existing interchange may be utilized for construction support for the RBSA. This site measures approximately 7.4 acres. This

site would most likely be used as a laydown/storage area for unassembled construction equipment, light duty bridge elements such as sheet piles, reinforcing bars and cables and other material delivery and storage.

18-3-3 DREDGED ACCESS CHANNEL

Since the proposed bridge alignment spans extensive shallows, it would be necessary to dredge an access channel for tugboats and barges to utilize during construction of the approach spans. These vessels would be instrumental in the installation of cofferdams, pile driving, the construction of pile caps and bridge piers, and the erection of bridge decks and other superstructure components. As noted earlier, temporary, trestle-type access platforms would be constructed near the shoreline to provide access for construction vehicles that would operate on the trestles. This would avoid the need to dredge the near-shoreline area.

Two alternate construction methods were evaluated in an effort to avoid the need to dredge an access channel. One method involved the use of overhead gantries for the construction of foundations and the other consisted of the implementation of a full-length temporary trestle for access. Both of these alternatives were found to be impractical: the former because it is not practicable for the heavy-duty pile-driving requirements of the replacement bridge and the latter because the deep soft soils in the shallow waters of the construction zone would require foundations that would be expensive and time-consuming to construct.

As shown in **Figure 18-5**, dredging would be conducted in three stages over a 4-year period for a duration of 3 months each year. The purpose of the first two dredging stages (Years 1 and 2) would be to provide access for bridge construction, while the final dredging stage (Year 4) would provide access for demolition of portions of the existing bridge allowing completion of the remaining portions of the new structure. Each of these three-month spans would occur during the limited fall window when dredging is typically allowed in the New York Harbor/Hudson River Estuary area; this is the period when dredging activities would have the minimum effect on aquatic resources.

Based on an analysis of the types, number, size and operation of vessels that would operate in the access channel during construction, it was determined that a clear draft of 12 feet would be required within the access channel. To avoid the potential for grounding of vessels, an additional two feet would be added to provide a working channel depth of 14 feet at the lowest observed water level, which occurs during the Spring Neap Tide. The lowest observed water level is referred to as Mean Low Low Water (MLLW).

In addition, to minimize any adverse effects from the re-suspension of the fine sediment material due to movement of vessels, particularly tugboats, within the dredged channel, a layer of sand and gravel (referred to as "armor") would be placed at the bottom of the channel following dredging. As discussed below in Section 18-4-12 (Water Resources) the sediments in the vicinity of the area to be dredged are highly susceptible to resuspension into the water column. Without "armoring," prop scour from working tugboats in the channel would result in the generation of suspended sediment at rates several orders of magnitude greater than what would occur from the dredging operation itself. Therefore, it was concluded that this level of sediment resuspension and ultimate

Comment [TC10]: The substrate of the Hudson River contains a number of environmental contaminants and dredging activities would be likely to disturb these contaminants and place them into suspension within the water quality. You need to analyze (1) what contaminants are known to exist in these areas; (2) how much or to what degree these contaminants will be disturbed and to what degree water quality would be affected; and (3) what impacts will these affects have on natural resources and human health.

Comment [TC11]: The draft EIS should contain a complete analysis of all alternatives considered.

Comment [s12]: •The document should specify the three months when dr***Endangered Species Act (16 USC §§ 1531-1544; 50 CFR Part 402).*** Section 7 of this Act requires FHWA to consult with the U.S. Fish and Wildlife Service (USFWS) for any project activities that may jeopardize threatened or endangered species or destroy or adversely modify their critical habitats. Coordination with the National Marine Fisheries Service (NMFS) will also be required for this project due to its location in a marine environment.
edging would occur.

Comment [TC13]: Will the entire bridge be removed?

Comment [s14]: Location of armoring should be depicted on a figure and referenced here.

transport into the river would pose an unnecessary and potentially substantive adverse effect to the environment.

The installation of the stone or gravel would take place as soon as the dredging for that section of the channel was successfully completed, forming a protective layer to keep sediment from further disturbance. Without this protective layer, additional dredging would be required to create a deeper work zone. The stone or gravel materials would be delivered by barges or scows, and would be placed within the channel by barge-mounted cranes. The materials would not be removed after the project completion, since they would become fully buried by the gradual deposition of river sediments over time. The dredging depth required assumes that two feet of stone or gravel armor is placed on the bottom. In total, the channel would be dredged to a depth corresponding to 16 feet below MLLW[1].

Comment [TC15]: Is this intended as a temporary impact during construction? What remedial actions will be taken after construction is completed? What are the environmental impacts of the armoring? Where will it take place—what currently exists there (e.g., plant or animal resources)—chapter 16 references SAV, etc? What would be lost or degraded and what would that do to aquatic plants and animals?

Comment [TC16]: This still does not address what impact this armoring will have. Also, the deposition of river sediments on top of an unnatural substrate is unlikely to mimic a natural river bottom. The DEIS needs to clearly explain what the impacts of armoring will be and what loss of natural resources will result. Additionally, we generally recommend that the natural bottom be restored post-construction and any short term impacts to natural resources be mitigated. The appropriate measures would depend upon what the impacts are. Please clarify.

Table 18-1 shows the amount of material to be dredged during each stage for the two bridge design options. For either design option, the channel width would measure approximately 475 to 530 feet, and it would extend approximately 7,000 feet from the Rockland County side into deeper waters and 2,000 feet from the Tarrytown access trestle into deeper waters. Because the long span alternative would occupy a wider footprint, a slightly larger area must be dredged for that alternative. It is estimated that approximately 1.68 and 1.74 million cubic yards of sediment would be dredged for the short and long span options, respectively.

Table 18-1
Dredging Quantities for the Replacement Bridge Alternatives

Construction Stage	Short Span		Long Span	
	Quantity (million CY)	Percent of Total	Quantity (million CY)	Percent of Total
Stage 1	1.08	64%	1.12	64%
Stage 2	0.42	25%	0.43	25%
Stage 3	0.18	11%	0.19	11%
Total	1.68	100%	1.74	100%

Notes:
CY = cubic yards
Dredging for bridge demolition (Stage 3) includes that portion of the bridge which must be removed to complete the Replacement Bridge Alternative tie-in.

Environmental Performance Commitments (EPCs) to be used during dredging operations include:

Adherence to a 3-month fall window when dredging would be allowed;

Comment [s17]: Again, the document should specify the months when dredging would occur.

Use of an environmental bucket with no barge overflow; and

Armoring of the channel to prevent re-suspension of sediment during the movement of construction vessels, installation and removal of cofferdams, and pile driving.

[1] Since the elevation of MLLW is -1.9 feet below datum in the project's design drawings the actual elevation of the dredging as referenced in the design and permit documents is -17.9 feet or approximately -18 feet.

18-3-4 TRANSPORT AND DISPOSAL OF DREDGED MATERIAL

During each three-month period when dredging is occurring, dredged materials would be collected from the bottom of the river by barge-mounted cranes placed into hopper scows, which are boats with a capacity of approximately 2,500 cubic yards. To ensure that the scows do not exceed the maximum allowable draft of the river work zone, they would be limited to 80 percent of their maximum load, or 2,000 cubic yards per load.

Each dredging stage would occur during a 90-day period. During that period, it is estimated that dredging would occur up to 75 of the 90 days, with two dredge operations occurring at a time. During the busiest dredging stage, Stage 1, up to 15,000 cubic yards of materials would be dredged each day. **Table 18-2** presents the estimated daily volumes of materials removed for each dredging stage for the two replacement bridge alternatives.

Table 18-2
Daily Materials Removal by Construction Stage

Construction Stage	Short Span Daily Volume (cubic yards)	Long Span Daily Volume (cubic yards)
Stage 1	14,600	15,000
Stage 2	5,700	5,800
Stage 3	2,400	2,600

After placement in the hopper scows, the next step in the dredge materials handling would depend on the dredge placement option selected.

As discussed above in the introduction of this chapter, certain activities related to project construction are left to the discretion of the contractor. One of these specific activities would be the ultimate transport and disposal of dredge spoils from construction of the access channel. Transport by ocean scow and placement in the Historic Area Remediation Site (HARS) in the New York Bight would offer a number of benefits to the project including cost, schedule, logistics and the avoidance of impacts to the surrounding residential communities on the Rockland and/or Westchester shorelines.

In this option, the dredged materials would be transported to HARS, 3.5 miles east of Sandy Hook, NJ. The HARS is overseen by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (USEPA). This site was historically used for ocean disposal of dredged material and a variety of waste products, including some contaminated materials. Today, the site is being remediated through a program to cap those historic sediments with cleaner sediments dredged from New York Harbor that meet certain criteria established by the Ocean Dumping Act.

A permit is required for dredged material to be placed at the HARS from the USACE for that placement. To receive the permit, the materials must be suitable for remediation, in that they meet certain criteria related to contaminants based on sediment toxicity and bioaccumulation tests. In addition, in accordance with 40 CFR §227.16, the USEPA must evaluate alternative disposal options before permitting placement of dredged material at the HARS, and must find that there are no practicable alternative locations

Comment [TC18]: We note that sediment concentrations of copper, lead, mercury, PCBs and PAHs (in particular) were reported in excess of thresholds that categorize them as Class C sediments according to the 2004 "NYSDEC In-water and Riparian Management of Sediment and Dredged Materials" (Tables 15-3, 15-4, 15-5) . Class C sediments should be dredged using a closed bucket or other method that minimizes resuspension . There should be no barge overflow, which you state above. Most importantly, in-water disposal is generally not acceptable for Class C sediment, making the HARs site potentially unsuitable. FHWA should provide further support for use of this disposal site and consider upland contained options for disposal of these sediments.

Comment [TC19]: What about impacts to natural resources within the river and in the vicinity of the disposal site?

Comment [TC20]: Describe these criteria.

and methods of disposal or recycling available. In support of this required finding, an alternatives analysis can be found in Appendix ___documenting that there are no practicable alternatives locations for the placement of the dredged material at the HARS site.

In recognition of the many benefits offered by the HARS site, the project is proceeding with sampling and analysis of the dredged material in support of a permit under Section 103 of the Marine, Protection, Research, and Sanctuaries Act of 1972 from the USACE. If approved the dredged materials from the Tappan Zee Hudson River Crossing Project placed at the HARS would be transferred from the hopper scows to larger capacity (up to 4,500 cubic yards) ocean scows. These vessels have large drafts, typically up to 18 feet, that would be too large to be accommodated in the dredged construction channel. Therefore, materials would be transferred from the hopper scows to the ocean scows in deeper water. The ocean scows would then travel to the HARS, where materials would be placed at the site in accordance with the permit conditions for that placement.

If the permit application for the use of HARS is denied, the contractor would be required to dispose of the dredged material at an approved facility in accordance with all applicable laws and regulations. However, due to the estimated number of truck trips that would be required (nearly 800 round trips daily) and the potential for adverse traffic, air quality and noise impacts on the local community the contractor would not be allowed to transport the dredged material by truck from the waterfront staging areas in Rockland or Westchester Counties. The contract documents would specify that alternate means of transport of the dredged material such as barge or barge to rail would be required for disposal.

18-3-5 SUBSTRUCTURE CONSTRUCTION

Substructure construction would vary as a function of water depth and sediment conditions at each location. Work on the foundations can be categorized into three segments referred to as Zone A, Zone B, and Zone C (see **Figures 18-6** and **18-7**). Pile installation would typically be performed one row of piles at a time. The actual pile driving is done one pile at a time. As shown in **Table 18-3**, a total of 1,326 piles for Piers 1 to 57 would be required for the Short Span Option. **Table 18-4** includes similar information for the Long Span Option at Piers 1 thru 32. The Long Span Option would require 836 piles. In terms of the largest piles, the number of the 10-foot piles would be the same (50) for either option. The greatest difference between the two options would be the number of smaller 4-foot piles with the Sport Span Option requiring approximately 346 more piles than the Long Span Option. The Long Span Option would also require 104 less 6-foot piles and 40 less 8-foot piles for a total difference of 490 piles. Under either option, the driving of the largest piles (8- and 10-foot) would only occur for a few months in the first year of construction.

Comment [TC21]: We cannot comment until we have reviewed this appendix.

Comment [TC22]: What are these benefits? What about any disadvantages?

Comment [TC23]: Provide a list of potential such facilities.

Comment [TC24]: Are there specifications regarding containment of contaminanted materials during transport? What is the possibility of a spill? Are there contingency plans?

Comment [s25]: The document should define/explain what piers and piles are and how they function.

Table 18-3
Pile Driving, Short Span Option

Pier No.	Substructure Zone	Pile Size (diameter ft)	No. of Piles Within each Pier	Total No. of Piles
1-3	A1	6	4	24
4-8	B1	6	6	60
9 - 14	B1	4	20	240
15-32	B1	4	20	720
33-35	B1	8	4	24
36-43	C	8	4	64
44-45	C	10	25	50
46-50	C	6	6	60
51-57	B2	6	6	84
Total				**1,326**

Table 18-4
Pile Driving, Long Span Option

Pier No.	Substructure Zone	Pile Size (diameter ft)	No. of Piles Within each Pier	Total No. of Piles
1-2	A1	6	4	16
3	A1	6	6	12
4	B1	6	6	12
5-17	B1	4	25	614
18-21	B1	8	4	32
22-23	C	8	4	16
24-25	C	10	25	50
26-28	C	6	6	36
29-30	B2	6	6	24
31-32	A2	6	6	24
Total				**836**

EPCs to be employed during construction of the substructure include:

The use of cofferdams and silt curtains, where feasible, to minimize discharge of sediment into the river.

The use of vibratory pile driver to the extent feasible particularly for the initial pile segment.

Using bubble curtain, cofferdams, isolation casings, Gunderboom or other technologies to achieve a reduction of at least 10 dB of noise attenuation.

Using the results of the Hudson River site specific PIDP[1] to inform the project on the effectiveness of BMP technologies for reducing sound levels, and implementing BMPs to achieve maximum sound reduction.

Comment [TC26]: What are the likely impacts of noise and vibration to terrestrial and aquatic wildlife?

Limiting the periods of pile driving to no more than 8 to 12-hour day.

Pile tapping (i.e., a series of minimal energy strikes) for an initial period to frighten fish.

Comment [TC27]: For what purpose? What would this do to fish behavior and what would be the consequences?

Development of a comprehensive monitoring plan. Elements would include:

- Monitoring locations to characterize the hydroacoustic field surrounding pile driving operations with locations and distances from pile driving established on the basis of sound levels established by NMFS as potential for impact;
- Monitoring of fish mortality and predation levels by gulls and other piscivorous birds; and
- Development of criteria for re-initiating consultation with NMFS should specific numbers of shortnose or Atlantic sturgeon come to the surface wounded or dead.

18-3-5-1 FOUNDATION ZONE A

The two areas of shallowest water depth extend from the shorelines on the Rockland and Westchester sides of the Hudson. These areas, where the water measures less than 7 feet in depth, are labeled as Zone A. The area adjacent to the Rockland shoreline is labeled Zone A1, while the area adjacent to the Westchester shoreline is Zone A2. Zone A substructure elements would be constructed within cofferdams from adjacent temporary trestle platforms. These cofferdams would be constructed prior to pile driving the bridge foundation piles. The cofferdam would remain flooded during pile installation.

Cofferdams

A cofferdam is a watertight chamber designed to facilitate construction in an area that would otherwise be underwater. In this case, the cofferdams would be composed of interlocking sheet piles extending into the riverbed a distance of up to 20 feet. Upon completion of the cofferdam, foundation piles would be driven into the riverbed prior to dewatering. The remaining work of pile cap and pier construction would follow the dewatering process.

Pile installation

Prior to pile driving, a template to guide piles would be placed within the cofferdam to ensure that they are in position and to hold them when pile driving is not taking place. Once all piles are driven, the template and its supports would be transitioned to the next cofferdam. A quick, low-noise, moderate-energy vibratory hammer would be used to install much of the length of the pile, after which a high efficiency hydraulic impact hammer suspended from cranes operating on the two temporary shoreline access

[1] Hydroacoustic modeling performed for the Pile Demonstration Implementation Project (PIDP) (JASCO 2011b) indicated that the distances to peak SPL thresholds at 206 dB for 10 ft diameter piles went from 573 ft without BMPs, to 166 ft with a 10 dB BMP, to 89 ft with a 20 dB BMP. The PIDP project which will be conducted in early 2012 will test various BMP practices and provide additional information on the level of sound reduction that may be achieved by their implementation for the Bridge Replacement Project.

trestles would be used to apply force to the tops of the piles so as to deliver the piles more deeply into the riverbed. It should be noted that the use of vibratory hammer for the entire driving operation is not possible due to the excessive depths to solid founding layers. Feasibility of deep vibratory techniques will be tested in the PIDP. From these tests, it is anticipated that the initial set for these deep piles cannot be overcome after pile sections are spliced. The introduction of vibratory methods throughout would require the addition of substantially more pilings to achieve the desired capacity and settlement characteristics. The extent of vibratory piling will be reconsidered after the results from the PIDP are available.

A 300-ton crawler crane would suspend the 150-foot pile sections and support the pile driving hammer during operation. Upon completion of pile installation, the soil within each pile would be excavated and transported to an off-site disposal facility. Finally, a tremie concrete plug, which braces the bottom of the sheet pile cofferdam and provides a seal at the base of the cofferdam to allow for dewatering of the cofferdam, would be poured inside the pile and a steel reinforcing cage would be inserted into the pile. Since the water within the cofferdam would be of the same quality as the water outside the cofferdam, no treatment during the dewatering process is proposed.

Pile caps

As previously mentioned, a tremie concrete plug would be poured into the hollowed pile. The pile itself would be dewatered down to the plug. Prior to the installation of the pile cap, pier reinforcement, post tensioning ducts, and pile reinforcement would be secured. A pile cap, which is a reinforced concrete slab constructed atop a cluster of foundations piles, would then be constructed to form a single structural element that would allow for even distribution of the weight that the piles bear, avoiding over stressing any individual component. These slabs would also provide a larger area for the construction of the columns that they will support.

18-3-5-2 FOUNDATION ZONE B

The water depths in Zone B range from 5 to 18 feet, and the zone is characterized by a relatively deep soft-soil profile. Zones B1 (close to the Rockland shoreline) and B2 (close to the Westchester shoreline) are located adjacent to Zones A1 and A2 and are closer to the centerline of the river. The functions performed in Zone B substructure construction would take place in cofferdams, as in Zone A, but the tasks would be completed from barges and support vessels.

Pile installation

Piles, which would be transported in two pieces to Zone B by barge, would measure between 250 and 300 feet due to the relatively deep soft-soil profile within the zone. Pile driving would begin immediately upon completion of the cofferdam construction. As in Zone A, a 300 ton crawler crane would lift the pile sections. A pile-driving rig would supply a hammer suspended from the barge mounted crane. The template would be positioned to guide the lower pile section into proper position before the pile would be allowed to delve into the soft stratum under its own weight. The depth achieved in this manner would be considerable, and should the application of further pressure be called for, a vibratory hammer would be used to drive the remainder of the pile into place. Upon the placement of the lower segment of the pile, preparations to begin welding the

two segments together will commence. In order for the two segments to be joined, the upper segment would be hovered over the lower until the automated welding process was complete. Upon the completion and inspection of the welding, the remaining length of the conjoined pile would be driven to required depth or specified penetration resistance with a hydraulic hammer. As in Zone A, the soil within the pile would be excavated and transported to an off-site disposal facility in order to create space for the tremie plug and steel reinforcing cage.

Pile caps

The construction process of pile caps in Zone B would be similar to that of Zone A. One difference would be that a granular fill material would be distributed inside of the cofferdam to enable the tremie seal to be poured to its planned elevation. This granular material would remain after the removal of the cofferdam.

18-3-5-3 FOUNDATION ZONE C

Foundation Zone C lies between Zones B1 and B2, connecting the two sides of the river. This zone is defined by the greatest water depths, which range from 18 to 45 feet. Construction in this zone would encompass the construction of the main span as well as that of both approaches.

The first substructure construction activity in Zone C would be the installation of the foundation piles. In this zone, due to the greater depths than Zones A or B, cofferdam construction would follow the pile installation, thus requiring that the cofferdam be constructed around the installed pile to create a dry environment in which to construct the tremie seal. The cofferdam in Zone C would be constructed using a different method than that utilized in Zones A and B. This alternative method, the “hanging cofferdam method”, would begin with the installation of a temporary support structure above the foundation piles on which the cofferdam would be assembled. The cofferdam components would then be pieced together from pulleys secured to the top beams of the support structure. After the placement of the cofferdam, the tremie slab would be poured onto a steel deck acting as the cofferdam floor. Divers would seal the gaps between the piles and the cofferdam deck before the dewatering process. The tremie slab would then be poured, and the unreinforced slab would bond the piles to the cofferdam pending the construction of the reinforced pile cap.

18-3-6 CONSTRUCTION OF BRIDGE SUPERSTRUCTURE

Completion of the bridge superstructure would include piers, columns, pylons (for a cable-stayed option), bridge deck, roadway finishes, lighting, and the shared use path. Much of the material would be pre-fabricated at various locations and delivered to the project site via barge. At the construction site, these elements would be lifted into place by gantries and cranes operating on barges, the temporary work platforms, or completed portions of the structure.

18-3-7 EXISTING BRIDGE DEMOLITION

The existing Tappan Zee Bridge contains five segments: causeway, east trestle, east deck truss, west deck truss, and main spans. The demolition of the existing bridge will be performed in two stages. The first stage will include partial demolition to allow for

construction of the new bridge, and the second stage will occur after the completion of the new bridge. No blasting of the existing structure would occur.

18-3-7-1 CAUSEWAY AND EAST TRESTLE SPANS

The causeway is a simple span construction composed of 166 spans measuring 50 feet, with the exception of one 100-foot span. The east trestle is comprised of 6 spans. Within its simple span construction, the causeway contains a stringer and deck superstructure and a substructure of concrete columns and footings on timber piles. Initially, the deck and stringers would be lifted out and placed onto awaiting barges. Then, the protective dolphins would be cut so as to offer unrestricted access for pier removal. Columns and footings would either be cut with diamond wire or broken by pneumatic hammers. Finally, the timber piles forming the causeway foundation would be cut to just below the mud line. All materials would be transported to an appropriate permitted off-site disposal facility, and a turbidity curtain would be utilized to ensure that demolition debris would not be dispersed. Side-scan sonar surveys would be performed in order to verify that all generated debris would be removed from the river.

18-3-7-2 DECK TRUSS SPANS

The deck truss spans, including 13 east deck, 7 west deck, and all approach truss spans, each contain a deck slab, steel trusses, and concrete piers supported on buoyant foundations or caissons. The deck slabs would be removed and transported off-site by an awaiting barge. A channel would then be dredged in Stage 3 to provide access to the trusses near the Westchester shoreline, and steelwork would either be removed by barge-mounted crane or a crane mounted on an adjacent in-tact span. Caisson-supported piers would be demolished using the same process as in the causeway and east trestle spans, and would then be removed to the mud line using diamond cutting wire devices or pneumatic hammers. Steel H piles would remain below the mud line. Turbidity curtains and netting would also be used in this stage.

18-3-7-3 MAIN SPAN

The main span stretches 2,412 feet and is structurally formed by a through truss above a deck supported by four latticework piers on buoyant foundations, ice deflectors around the two central piers, and pre-stressed concrete beams on 30-inch diameter steel piles. Initially, the main span deck slab would be lifted and removed off-site by barge. Then, the entire suspended span would be lowered onto a barge via a strand jack or winch system. Conventional barge-mounted cranes would then deconstruct the anchor span steelwork piece by piece and the ice-breaker and fender structures protecting the main span piers would be demolished by divers and barge-mounted cranes. The pier steelwork would also be removed piece by piece, and the buoyant caissons would be cut and flooded. Following main span demolition, a barge-mounted crane operated clam shell bucket would clear the river bottom of debris. Side-scan sonar surveys would verify that all debris and concrete were removed from the river.

18-3-8 CONSTRUCTION ANALYSIS FRAMEWORK

For construction projects that extend over multiple years, a critical period is identified to isolate the greatest potential for adverse effects. The assessment of impacts in the critical or peak construction period results in and the determination of mitigation measures that would also alleviate adverse effects in other phases of the construction

period, since activities would be less intense than in the critical period. For each stage of construction, a peak condition has been developed that replicates the daily activities that may be encountered for each stage. These activities include the type and location of construction activities, a roster of (onsite) construction equipment, the hours of operation for each equipment type, and the numbers of trucks providing material or demolition transport. It was also necessary to develop estimates of construction worker vehicle trips, even though these are not expected to occur in the peak analysis hours, because they may be substantial over a 24-hour period. Once these details were established for the individual construction stages, an analysis scenario was developed to assess the potential environmental impacts.

To develop the analysis framework, different critical analysis periods were selected for different resource impact assessment (i.e., Air Quality, Noise and Vibration, Ecology, etc.). For example, the peak period for the construction noise analysis would occur when both the landing and bridge construction equipment would be operating simultaneously in close proximity to sensitive receptors near the shoreline. However, for potential water quality impacts, the peak dredging period was analyzed, while the bioacoustics analysis focuses on the peak pile driving activities.

Table 18-5 includes a list of the major pieces of construction equipment that is anticipated to be used for construction of the bridge. **Table 18-6** includes the equipment that would be used to support construction of the roadway segments on the upland portion of the project. This equipment roster was utilized in the air quality as well as the noise and vibration analyses discussed later in this chapter of the DEIS.

18-3-9 OTHER ENVIRONMENTAL PERFORMANCE COMMITMENTS

In addition to those EPCs already discussed above, there are a number of measures that the project would employ during construction to avoid or minimize adverse environmental impacts as follows:

18-3-9-1 TRANSPORTATION

Traffic and transportation issues as they relate to the construction effort would be managed by a comprehensive and detailed Work Zone Traffic Control (WZTC) management plan. The contract specifications would require road closures and detours to be strictly coordinated so that traffic can take safe, practical and short detour routes. This coordination would serve to avoid or minimize, to the extent feasible, traffic diversions through residential neighborhoods. Further, the construction would be staged to maintain through traffic, perhaps with only one direction being detoured at a time. Temporary closures and detours would be done in sequence as the project progresses geographically through a particular construction zone. During such closures and detours, the construction contractor would be required to post detours for traffic and implement other measures to ensure that traffic flow can be accommodated in an efficient manner as may be both practical and safe. Intelligent Transportation System (ITS) measures, such as variable message signs (VMS), would be deployed at strategic locations during construction to provide accurate, timely information to motorists to enable them to make rational decisions on routing choices.

While much of the material needed for construction of the project is anticipated to arrive by barge directly to the work platforms within the river, the project sponsors would also

coordinate with local agencies regarding the hauling of any construction materials to identify acceptable routes and times of operation, and roadways to be used. The

Table 18-5
Major Construction Equipment Required for Bridge Construction

Equipment	Short Span Option	Long Span Option	Required
Sheetpile Vibratory Hammer	X	X	2
Barge Mounted 500 Ton Crane	X	X	1
Barge Mounted 200 Ton Crane	X	X	2
Barge Mounted 100 ton Crane	X	X	4
Pile Vibratory Hammer	X	X	1
Pile Driving Hammer - 500 kJ	X	X	1
Pile Driving Hammer – 800 kJ	X		1
Compressors	X	X	20
Generators	X	X	20
Water Pumps	X	X	20
Welding Huts	X	X	8
Rock Socket Drilling Rig	X	X	4
Tugboats	X	X	8-10
Dredgers	X	X	2
Hopper Scows	X	X	10
Dump Scows	X	X	3
Flat Deck Barges	X	X	20
Concrete Delivery Barges	X	X	20
Concrete Pumping Barges	X	X	6
Pile Delivery Barges	X	X	3-5*
Segment Delivery Barges	X		5-10*
Truss Delivery Barges		X	3-5*
Deck Segment Erection Gantry	X		2 Units
Truss Lifting winches		X	2 Sets
Jacking T-cranes (pylons)	X	X	6-8
Temporary Cable Stayed Pylon	X	X	6

Note:
* Supplier provided, depends upon travel distance, capacity and installation rates.

Table 18-6
Major Construction Equipment Required for Roadway

Construction

Equipment	Rockland	Westchester
Crew Buses	2	1
Trucks (tractor-trailer)	3	3
Cranes (50 to 100 tons)	3	1
Dump Trucks (9-12 yd)	10	10
Dump Trucks (articulated)	3	2
Pay-loaders	2	1
Bulldozers/graders	2	2
Backhoe	2	2
Excavator	3	1
Rock/Concrete Crusher	1	1
Screeder (vibratory)	1	0
Rolling compactor	1	0
Concrete Trucks	6	6
Truck Wash Station	1	1
Milling Machine	1	1
Saw Cutting Machine	2	1
Concrete Paving Screed	1	1
Asphalt Paver	1	1
Asphalt Roller	1	1
Jack Hammers	8	8
Compressors	3	3
Pavement Breakers	2	2
H-Pile Driver	1	1
Personnel Boom Lift	2	1
Highway Advisory Signs	4	4
Construction Lights	6	6
Construction Generators	3	3
MPT Trucks	4	4

contractor, in coordination with NYSDOT and NYSTA, would coordinate with potentially affected public services in planning traffic control measures. Construction activities that might substantially disrupt traffic would not be performed during peak travel periods to the maximum extent practicable. Access to all businesses and residences would be maintained.

Warning signs would be used as appropriate to provide notice of road hazards and other pertinent information to the traveling public. Signage and barricades would be used as part of the typical roadway construction traffic controls. Temporary traffic signal adjustments and/or temporary manual traffic control could be required when construction occurs at signalized intersections on adjacent arterials or roadways. The effectiveness of the traffic control measures would be monitored during construction and adjustments would be made, as necessary. The local news media would be notified in advance of road closures, detours, and other construction activities. Information would also be posted on the project website.

The ability for boats to travel along the Hudson River would be maintained throughout the construction period. Signage and channel markers would be utilized to advise recreational boaters of preferred routes and potential dangers within the construction zone. While some boaters, due to water craft size or power source, may experience difficulty navigating through the construction zone during this time period, this temporary disruption is not considered an adverse impact.

18-3-9-2 AIR QUALITY

Construction activity in general, and large-scale construction in particular, has the potential to adversely affect air quality as a result of diesel emissions. The main component of diesel exhaust that has been identified as having an adverse effect on human health is fine PM. To ensure that the construction of the project results in the lowest practicable diesel particulate matter (DPM) emissions, the construction contracts will require several EPC, including the following components:

Clean Fuel

Best Available Tailpipe Reduction Technologies.

Utilization of Newer Equipment

Tug Boat Emissions Reduction

Concrete Batch Plant Controls

In addition, land-based non-road diesel-powered vehicles and construction equipment rated Tier 3, discussed further in “Air Quality” below, or higher would be used where conforming equipment is available, and the use of such equipment is practicable.

18-3-9-3 NOISE AND VIBRATION

Noise abatement measures would be utilized where practicable and feasible, including:

Electric powered equipment, rather than diesel powered mechanical equipment would be utilized;

Use of impact devices such as jackhammer, pavement breakers and pneumatic tools should be limited and shrouds would be utilized to limit noise exposure;

Construction staging areas would have appropriate noise attenuation installed around the areas and would be configured to minimize backup alarm and other noises; and

Contractors and subcontractors would be required to properly maintain and service their equipment and install quality mufflers so they meet noise specifications;

Sound attenuating curtains or shrouds would be used on the pile drivers to reduce noise when operating in close proximity to residential uses (i.e. for pile driving activities near the Westchester and Rockland shorelines); and

Movable noise attenuation measures would be erected around pumps, trucks, and other noisy equipment when operating in close proximity to residential areas.

18-3-9-4 ENERGY AND CLIMATE CHANGE

Construction contracts will require the use of recycled materials, locally resourced materials, and renewable fuels, which would substantially reduce the potential greenhouse gas (GHG) emissions during construction.

18-3-9-5 ARCHAEOLOGICAL RESOURCES

Ongoing geo-archaeological survey work has been designed to collect sufficient data on potential prehistoric sites previously identified, in order to mitigate any adverse effects that may occur on these potential resources as a result of the replacement bridge alternative. If S/NR-eligible historic-period submerged resources such as shipwrecks are identified on the river bottom, an appropriate data recovery plan will be implemented in coordination with SHPO and consulting parties to mitigate unavoidable adverse effects of implementation of the project. These measures are set forth in the projects Section 106 MOA (see **Appendix C**).

18-4 SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACTS

This section addresses the potential adverse social, environmental and economic impacts due to construction of the Replacement Bridge Alternative. As discussed in Chapter 2, “Project Alternatives,” two feasible build options (Short Span and Long Span) have been identified. Generally, the short-term construction impacts of each build alternative are similar since the methods used to construct the river crossing would be the similar for both Short Span and Long Span Options. The difference in the bridge span options would not substantially alter any of the short-term effects. Much of the following discussion of potential construction impacts would apply to both the Short Span and Long Span Options being considered for the Replacement Bridge Alternative. The analysis below identifies impacts that would occur under both the Short Span and Long Span Options.

Since the No Build Alternative would involve the continued operation of the existing seven-lane bridge with ongoing maintenance to keep the bridge in a state of good repair, it is not analyzed further for construction-related impacts. The New York State Thruway Authority (NYSTA) would continue maintenance of the bridge and would invest capital funds to keep it in a state of good repair. NYSTA estimates that it would spend $1.3 billion to maintain and repair over the next decade. Major work activities would include seismic upgrades to portions of the bridge, navigational safety improvements, steel and concrete repairs, and other miscellaneous work to continue to keep the bridge safe for the traveling public. At times, these activities would be disruptive of traffic movement on the bridge.

Extraordinary maintenance efforts and capital projects would ensure that the bridge continues to be safe to the traveling public, but these projects would not correct all of the structural, operational, safety, security, or mobility needs of the bridge as described in Chapter 1, “Purpose and Need.” Therefore, given the age of the bridge and its vulnerabilities in extreme events, it is possible that under the No Build Alternative, the crossing could be closed altogether at some point in the future, resulting in the loss of a critical infrastructure element to an important transportation corridor.

18-4-1 TRANSPORTATION

The potential transportation impacts due to the construction of the project may be summarized in three areas; (1) the potential impact on traffic operations due to construction activities on the bridge and along the highway approaches; (2) the potential impact due to the increase in traffic generated by construction worker trips and truck trips from the proposed staging areas; and, (3) the impact of bridge construction on marine traffic. These potential impact areas were studied and the findings of which determined the Replacement Bridge Alternative would not constitute an adverse impact provided the environmental performance commitments are implemented. These commitments include the preparation of a comprehensive and detailed Work Zone Traffic Control Plan,

18-4-1-1 CONSTRUCTION ACTIVITY ALONG THE HIGHWAY AND BRIDGE APPROACHES

Although the construction site and staging areas would benefit from direct access to the New York State Thruway and New York State highways, temporary closures are anticipated that would inconvenience local residents and create delays for users of the Tappan Zee Bridge.

For the Tappan Zee Bridge users, these delays would be comparable to conditions currently experienced on the existing Tappan Zee Bridge due to recurring maintenance projects. Construction activities along the bridge and highway approaches would involve traditional construction lane closures, lane narrowing and shifting of lanes requiring traffic to slow down at the construction areas. Four lanes of traffic would be maintained on the Tappan Zee Bridge in the peak direction during all peak hours during construction.

Construction-related vehicles would also create temporary traffic impacts at the approaches to the Tappan Zee Bridge and at construction staging areas. Slow-moving construction vehicles on the roadway near the construction exits or staging area would create delays. A qualitative review indicates that the magnitude of these impacts would vary depending on the final location of the construction staging areas relative to the construction sites, the concrete batch plant, laydown/storage areas, and administrative facilities. Other factors to be determined include the sources of fill material, disposal sites for surplus material, land uses along the haul roads, amount and duration of hauling operations, and construction phasing strategies.

In Rockland County, temporary closures are anticipated on River Road and South Broadway (Route 9W). Since River Road provides direct access to the waterfront staging area, temporary closures would occur on River Road throughout the construction period to support roadway improvements, movement of heavy machinery and delivery of construction materials. River Road is likely to be signalized to allow for improved construction access.

The construction effort would also require improvements to the existing service roads (on ramp and off ramp) providing access to and from River Road in South Nyack. These ramps would provide access for construction vehicles to the waterfront construction staging area. These highway elements would create a merge, diverge and weave conditions in both directions on I-287/I-87. To address the potential impact that

the additional construction-related traffic would have on highway users, a weaving analysis was conducted utilizing Highway Capacity Manual methodologies. The weaving analysis focused on Level of Service (LOS) conditions in both directions on the highway between Interchange 10 and the construction access ramps, a length of approximately 1,500 feet. In the eastbound direction, the results of the analysis indicated an acceptable LOS D during the weekday AM peak hour and LOS B during the PM peak hour. In the westbound direction, the weaving analysis indicated a LOS B during the weekday AM peak hour and LOS D during the PM peak hour. The details supporting the technical analysis are presented in a technical memorandum provided in **Appendix E**.

Interchange 10 (Route 9W) would not be closed for any extended duration; however, the construction sequence may require closure for short durations to allow for the movement of heavy machinery. The closures would be limited to less than six hours and confined to off-peak commuter periods.

In Westchester County, the on-ramp from South Broadway (Route 9) to the Tappan Zee Bridge would be closed for approximately 24 months. The closure is anticipated to take effect approximately 12 months into the construction effort. Vehicles currently utilizing the on-ramp would be rerouted to the primary access ramp (Interchange 9) at White Plains Road (NY119) via the jug handle at the intersection of South Broadway (US 9) and White Plains Road (NY119). An LOS capacity analysis was conducted to analyze the impacts of this detour. The analysis focused on operations at the intersection of South Broadway (Route 9) at White Plains Road (NY119) and the intersection of White Plains Road (NY 119) at the westbound I-287/I-87 ramp (Interchange 9). The findings indicated that the existing LOSs would be maintained under the future detour condition with minor adjustments (a five second green time allocation) to the traffic signal at South Broadway (Route 9) and White Plains Road (NY119). Currently, both intersections operate at LOS A during the weekday AM peak hour and LOS E during the weekday PM peak hour. The details supporting the technical analysis are presented in a technical memorandum provided in the Appendix.

As previously stated, the actual construction means and methods would be determined by the contractor; the final details of the traffic management plan would be included in a Work Zone Traffic Control (WZTC) management plan to be prepared by the contractor in advance of any construction activity.

18-4-1-2 CONSTRUCTION TRAFFIC GENERATED FROM THE PROPOSED ROCKLAND INLAND STAGING AREA

As previously discussed, two sites near Interchange 12 in Rockland County could serve as potential inland staging areas for construction activities that would generate construction worker trips and truck trips. For purposes of evaluating potential impacts associated with construction activities and the delivery of material, the primary staging area was assumed to be located west of the Tappan Zee Bridge in the vicinity of Interchange 12 either at the West Nyack Staging Area (WNSA) or the Tilcon Quarry Staging Area (TQSA).

Current projections of construction activities between the in-land and waterfront staging areas include the movement of concrete trucks, heavy equipment, and construction workers and staff using shuttle buses. **Table 18-7** provides a summary of the daily construction trips projected for the busiest construction period. The projections correspond to the 8-month period starting approximately 10 months into the construction effort.

Table 18-7
One-Way Peak Daily Construction Trips
In-land to Waterfront Staging Area (near Interchange #12)

Item	Int. #12 to RBSA	Int. #12 to WBSA	Total
Concrete Trucks	47	10	57
Heavy Equipment/Haul Away/Deliveries	74	36	110
Shuttle Buses/Construction Workers*	19	12	31
Total	140	58	198

Note:
* Assumes a peak condition of approximately 930 construction workers; 570 accessing the job site from Rockland County and 360 from Westchester County. Assumes 30 workers per shuttle bus.

As shown in Table 18-7, concrete trucks would make approximately 47 daily trips between the Interchange 12 (TQSA or WNSA) and the Rockland Bridge Staging Area (RBSA), and ten daily trips between Interchange 12 and the Westchester Bridge Staging Area (WBSA).

Heavy equipment activities would generate daily trips of 74 between Interchanges 12 and RBSA, and 36 between Interchange 12 and the WBSA.

Shuttle buses for construction workers would have a capacity of 30 passengers and would create 19 and 12 daily trips between the two bridge staging areas, respectively. This represents approximately 570 construction workers shuttled between Interchange 12 and the RBSA, and 360 workers shuttled between Interchange 12 and the WBSA.

Construction workers would arrive at the designated staging area by 6:30 AM. The origins of the construction worker trips is difficult to identify but assuming the project would utilize the local construction worker population, a majority of the trips would come from Rockland, Orange, Westchester, and Putnam counties. The weekday AM peak hour on the Tappan Zee Bridge typically occurs between 7:00 AM and 9:00 AM. During the 6:00 AM hour, typical volumes on the Tappan Zee Bridge are approximately 1,800 vehicles in the westbound direction and 4,800 vehicles in the eastbound direction. The two-way volume of 6,600 vehicles is approximately 83 percent of the traffic volumes experienced during the peak hour.

At the end of a typical day, construction workers would board shuttle buses at approximately 3:00 PM to take them from the job site to the staging area where their vehicles are parked. At approximately 3:30 PM construction workers would depart the staging area. Those with destinations in Westchester and Putnam counties would travel east crossing the Tappan Zee Bridge while a majority of the remainder, with destinations in Rockland and Orange counties, will likely travel westbound on I-287/I-87. While construction worker trips are expected to overlap with the start of the

weekday PM peak period (3:00PM to 6:00PM); those workers with destinations in Westchester and Putnam counties will be traveling in the off-peak direction (eastbound).

No adverse effect on traffic flow is anticipated due to the increase in construction worker trips for either the AM or PM peak conditions.

The construction schedule identifies single eight hour shifts for work crews without weekend work; however, on occasion shifts may extend past eight hours and up to 12 hours, depending on the crew type and detail of the work to be completed. It should be anticipated, that some activities may required the contractor to work late shifts or possibly weekends on critical activities. Some of these activities would include cable erection of the main spans, heavy lifts or potentially delivery of material by barge.

With new ramps to/from River Road proposed in the eastbound and westbound directions on I-287/I-87, weaving maneuvers involving heavy vehicles to/from Interchange 12 would occur, but operations would remain acceptable, as previously discussed.

18-4-1-3 MARINE TRAFFIC

In addition to roadway traffic, construction of the new bridge and demolition of the existing bridge could affect marine traffic in the Hudson River. Impacts to navigation could occur during construction of the project from the following activities:

- Delivery of material by vessel would increase usage of the navigation channel;
- Scow movements related to dredging would increase usage of the navigational channel;
- Construction of the main spans' substructure and superstructure would result in some restrictions to navigation; and
- Demolition of the existing bridge's main span substructure and superstructure would result in some restrictions to navigation.

The dredging required as part of the replacement bridge's construction would occur outside of the navigational shipping channel, with no projected impacts on navigation.

Disruption to river shipping during overall construction would be minimized, but cannot be eliminated, as some of the main span construction activities would restrict the channel for a short period. For the Cable-stayed Option, it is anticipated that deck segments may be delivered via barge and hoisted up to the deck. Up to 40 segments may be delivered in the main channel with an additional 20 segments in each of the adjacent spans. Delivery and installation of the segments would be coordinated with the U.S. Coast Guard to minimize the effect on shipping. It is anticipated that two hours would be required for the delivery of each section, with time included for the segment to reach the required clearance and be stabilized. For the Arch Option, bridge segments may also be delivered by barge, with a similar number of segments required. However, instead of construction in segments, there is the potential that the contractor may construct the Arch in one large full span lift—a method that would require closing of the main shipping channel for one or two days.

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To minimize any adverse effects on marine navigation, the NYSDOT and NYSTA would coordinate with the U.S. Coast Guard in conjunction with the Bridge Permit process to develop acceptable navigation windows and limit any channel closures to the minimum time necessary to provide a safe construction process.

18-4-2 COMMUNITY CHARACTER

Major construction projects have the potential to inconvenience or disturb persons who reside in or use the areas adjacent to construction and staging areas. Temporary effects to adjacent neighborhoods could include:

Traffic congestion and detours;

Disrupted access to residences and businesses;

Loss of roadside parking;

Disruption of utility services;

Presence of construction workers, equipment, materials and staging areas including potential concrete batch;

Noise and vibrations from construction equipment and vehicles;

Airborne dust and possible mud on roadway surfaces; and

Removal of or damage to vegetation (e.g., trees, shrubs, grass, etc.).

Without proper planning and implementation of controls, these construction-related impacts could adversely affect the comfort and daily life of residents and inconvenience or disrupt the flow of customers, employees, and materials/supplies to and from businesses. For residents living along the roadway alignment, some materials stored for the project may be visually displeasing. This is a temporary condition and should pose no substantial problem in the long term. Nevertheless, the construction contract documents would stipulate that the contractor must maintain a clean and orderly worksite and would include metrics for determining compliance, provisions for enforcement, and penalties for non-compliance.

Provisions for construction phasing and traffic control plans, as mentioned under transportation would be used to avoid the potential for adverse effects of traffic on community character. In addition, an emergency access plan for the construction phase of the project will be developed as part of the project's safety program. As described above under air quality and noise EPCs, other measures that would be incorporated into the contract documents which would avoid or minimize, in the case of noise, the adverse effects of construction on community character.

18-4-2-1 ROCKLAND BRIDGE STAGING AREA

The land use context near the proposed temporary platform on the Rockland County side is exclusively residential, with the seven-story Salisbury Point apartments and three-story Bradford Mews apartments immediately north of the bridge landing. Other areas to the north and south of the bridge landing are medium density single-family residences. The existing bridge would screen most of the temporary platform and its activity from residences to the south. However, the residents near the river to the north would have direct views of the platform. Visibility of the temporary construction platform

would not constitute an adverse impact, and would not alter the existing community character.

18-4-2-2 WEST NYACK STAGING AREA (WNSA)

As discussed above, the WNSA site occupies approximately 33 acres of land near Interchange 12 south of the Palisades Mall at the intersection of Routes 59 and 303. With respect to land use compatibility, this potential staging area is currently an industrial site with an existing concrete batch plant. The potential staging area is zoned Manufacturing (M) and Regional Shopping (RS) by the Town of Clarkstown. Land uses surrounding the site include industrial, transportation and utilities, commercial, a closed sanitary landfill that is currently used as a waste transfer station, and vacant land. There are no residential uses adjacent to the site.

The proposed construction facilities would not be out of character with existing uses at and around the site. Operations at the site during the construction phase may be more intensive than those operating presently, but all truck traffic would be using the major arterials of Route 59 and Route 303 and would have immediate access to the Thruway at Interchange 12 on NYS Route 303. Consequently, there would be little spillover of operational effects to nearby residential neighborhoods on Greenbush Road, and none to the West Nyack neighborhood. Consequently, no adverse impacts to community character are anticipated.

18-4-2-3 TILCON QUARRY STAGING AREA (TQSA)

As discussed above, the TQSA is an approximately 120-acre site located directly north of the Thruway and opposite the Palisades Mall. This potential staging is currently an active industrial site. The potential staging area is zoned Manufacturing (M) by the Town of Clarkstown. Land uses surrounding the site include industrial, transportation and utilities, commercial, and vacant land. There are residential uses located to the northeast of the potential staging area, which are in the southern portion of the Valley Cottage neighborhood.

The proposed construction facilities would not be out of character with existing industrial uses and character at and around the site. Consequently, no adverse impacts to community character are anticipated.

18-4-2-4 WESTCHESTER BRIDGE STAGING AREA (WBSA)

On the Tarrytown waterfront, the temporary platform would be approximately 600 feet from the shore, opposite the Tarry Landing neighborhood and approximately 400 feet south of the entrance to the Tarrytown Boat Club Marina. While the existing bridge would screen most of the platform and its activity from residences to the south, the residents near the river to the north would have direct views of the platform. Visibility of the temporary platform would not alter the existing community character.

18-4-2-5 WESTCHESTER INLAND STAGING AREA (WISA)

Another staging area is the triangle of land located north of Interstate 87/287 and opposite the toll plaza. As discussed above, this staging area currently comprises NYSTA's Tappan Zee Bridge Maintenance Facility, Bridge Patrol, Equipment Maintenance, and the local station of NYSP Troop T.

Although this area is completely within the existing Interstate 87/287 right-of-way, it is currently zoned R-7.5 (One-Family Residence on 7,500 square foot lots) by the Village of Tarrytown. Existing land uses in close proximity to the potential staging area site include commercial and multi-family residential.

The proposed truck route from the WISA and the Westchester Bridge Staging Area would traverse in close proximity to the Van Wart and Paulding Avenue neighborhoods south of Interstate 87/287. Although there is an existing noise barrier screening much of the Van Wart and Paulding Avenues neighborhood from Interstate 87/287 and the toll plaza, the temporary access road would pass adjacent to the homes on Hudson Place (north of Van Wart Avenue) before crossing over the MNR tracks to the temporary river platform. The temporary access road would also connect with Green Street and the Tarrytown street network in the north, and would be within the viewshed of the Quays and Tarry Landing residential neighborhoods. The WISA or temporary access road would not change community character of the adjacent residential neighborhoods and business districts in the Village of Tarrytown.

18-4-3 LAND ACQUISITION, DISPLACEMENT, AND RELOCATION

The Replacement Bridge Alternative would result in several temporary easements on parcels in Rockland County during construction (permanent land acquisitions are discussed fully in Chapter 6, “Land Acquisition, Displacement, and Relocation”). In the Village of South Nyack, a 0.03-acre temporary easement on a portion of Elizabeth Place Park and a 0.04-acre temporary easement on a nearby un-named park would be required for the purposes of reconstructing and realigning the South Broadway bridge over Interstate 87/287. These temporary easements would be returned to the Village of South Nyack after construction for continued use. Access to and use of Elizabeth Place Park would remain unaffected during construction. The un-named park would be inaccessible during construction.

North of the existing highway, a temporary easement on a portion of a multi-family residential parcel in Rockland County would be required for purposes of realigning Interstate 87/287 with the replacement bridge. The temporary easement on this parcel would be substantially similar under both the Short and Long Span Options (slightly less than 0.05 acres for the Short Span Option and slightly greater than 0.05 acres for the Long Span Option). This temporary easement would displace existing parking spaces. In addition, a 0.01-acre temporary easement of an adjacent single-family residential property would be required during construction. This temporary easement would not be expected to affect the use of the parcel.

18-4-4 PARKLANDS AND RECREATIONAL RESOURCES

The construction of the Replacement Bridge Alternative would temporarily impact two parkland resources in Rockland County: Elizabeth Place Park and its ancillary un-named park. Both are located in the Village of South Nyack near the proposed bridge landing. In addition, potential impacts to Hudson River recreational uses are also discussed below.

18-4-4-1 ELIZABETH PLACE PARK AND ANCILLARY UN-NAMED PARK

As discussed in Chapter 7, “Parklands and Recreational Resources,” Elizabeth Place Park is a public park in the Village of South Nyack that is situated on an approximately

0.81-acre triangular parcel on the southwest side of Interstate 87/287. Southeast of Elizabeth Place Park is an ancillary, un-named 0.05 acre triangular park.

Implementation of the Replacement Bridge Alternative would require a 0.03-acre temporary easement from Elizabeth Place Park, which represents 3.7 percent of the total park area. The temporary easement would occur only during the construction period of the project. This easement would not affect access to Elizabeth Place Park and all active features of the park would continue to be accessible during the construction period.

The construction of the Replacement Bridge Alternative would also require a temporary easement of 0.04 acres and acquisition of 0.01 acres of the 0.05 acre un-named ancillary park located southeast of Elizabeth Place Park. This park would be inaccessible during construction, but the 0.04-acre temporary easement would be returned to the Village of South Nyack after construction for continued parkland use. This temporary easement and partial acquisition would be required for purposes of reconstructing and realigning the South Broadway bridge over Interstate 87/287 and to avoid the closure of South Broadway during construction which would otherwise have potential adverse traffic and economic impacts in the area.

18-4-4-2 HUDSON RIVER GREENWAY WATER TRAIL

As further discussed in Chapter 7, “Parklands and Recreational Resources,” the Hudson River Greenway Water Trail, which accommodates canoeists and kayakers, traverses through the study area and beneath the existing Tappan Zee Bridge. Although the Replacement Bridge Alternative would not directly affect the existing Hudson River Greenway Water Trail landing sites, temporary disruptions to small water craft navigation beneath the bridge during the construction period can be expected. No long-term impacts to the Hudson River Greenway Water Trail are anticipated once the Replacement Bridge Alternative is operational.

18-4-4-3 HUDSON RIVER RECREATIONAL BOATING

The Hudson River is also used by sail boaters, power boaters, and other personal water craft users for recreational purposes. Temporary disruptions to recreational boating through the study area can be expected during the construction period for the Replacement Bridge Alternative, and sail boaters may be precluded from using sails while traversing through the construction zone. However, no long-term impacts to recreational boating on the Hudson River are anticipated once the Replacement Bridge Alternative is operational.

18-4-5 SOCIOECONOMIC CONDITIONS

The economic benefits associated with construction activities are directly related to the cost of constructing the Tappan Zee Hudson River Crossing. Those benefits were estimated using the IMPLAN (IMpact analysis for PLANning) input-output modeling system. IMPLAN was originally developed by the U.S. Department of Agriculture Forest Service in 1979 and was subsequently privatized by the Minnesota IMPLAN Group (MIG). This analysis is based on the 2009 models for Rockland and Westchester Counties, and uses economic data from sources such as the U.S. Bureau of Economic Analysis, the U.S. Bureau of Labor Statistics, and the U.S. Census Bureau to predict effects on the local economy from direct changes in spending. The model contains data

for Rockland and Westchester Counties on 440 economic sectors, showing how each sector affects every other sector as a result of a change in the quantity of a product or service. A similar IMPLAN model for New York State was used to trace the effects on the state economy. Using these models and the specific characteristics of the projected development, the total effect has been projected for Rockland and Westchester Counties and New York State.

18-4-5-1 IMPLAN OVERVIEW

Using IMPLAN terminology, economic impacts are broken into three components: direct, indirect, and induced effects:

Direct effects represent the initial benefits to the economy of new investment (e.g., a construction project, changes in employment, or changes in employee compensation).

Indirect effects represent the benefits generated by industries purchasing from other industries as a result of the direct investment (e.g., indirect employment resulting from construction expenditures would include jobs in industries that provide goods and services to the contractors). A direct investment triggers changes in other industries as businesses alter their production to meet the needs of the industry in which the direct impact has occurred. These businesses in turn purchase goods and services from other businesses, causing a ripple effect through the economy. The ripple effect continues until leakages from the region (caused, for example, by imported goods) stop the cycle. The sum of these iterative inter-industry purchases is called the indirect effect.

Induced effects represent the impacts caused by increased income in a region. Direct and indirect effects generate more worker income by increasing employment and/or salaries in certain industries. Households spend some of this additional income on local goods and services, such as food and drink, recreation, and medical services. Benefits generated by these household expenditures are quantified as induced effects.

18-4-5-2 CONSTRUCTION PERIOD EFFECTS

Value of Construction

Based on preliminary estimates, the cost of constructing the Tappan Zee Hudson River Crossing (at the 90 percent confidence level) is estimated at $4.64 billion dollars in 2011 dollars. The construction cost includes sitework, hard costs (actual construction), and soft costs (such as engineering and permitting).

For purposes of the economic and fiscal benefits analysis, the $4.64 billion construction cost estimate was reduced by $1.285 billion (or 27.7 percent) to deduct escalation costs and equipment and steel that would be manufactured outside of New York State. These costs were deducted since the purchase of out-of-state equipment and material would not have a direct effect on the regional or statewide economy. Therefore, the construction cost assumed for this economic benefits analysis is $3.36 billion. The following analysis presents the economic and fiscal benefits that would result during the construction period.

Employment and Economic Effects

Employment

The $3.36 billion represents the direct expenditures during the construction period. As a result of the direct expenditures, the direct employment demand from construction is estimated at 14,094 person-years of employment (see **Table 18-8**). A person-year is the equivalent of one person working full-time for a year. Over the estimated five-year construction build-out, the project would directly generate an average of 2,819 full-time equivalent jobs.

Table 18-8
Economic Benefits from Construction

	Rockland and Westchester Counties	New York State
Employment (Person-Years)		
Direct (jobs in construction)	14,094	14,094
Indirect (jobs in support industries)	3,394	4,185
Induced (jobs from household spending)	4,611	6,589
Total	22,099	24,868
Employee Compensation (Millions of 2011 dollars)		
Direct (earnings in construction)	$1,141.74	$1,141.74
Indirect (earnings in support industries)	$314.66	$377.13
Induced (earnings from household spending)	$323.70	$464.53
Total	$1,780.10	$1,983.40
Total Economic Output (Millions of 2011 dollars)[1]		
Direct (output from construction)	$3,355.00	$3,355.00
Indirect (output from support industries)	$997.63	$1,225.26
Induced (output from household spending)	$1,097.10	$1,550.96
Total	$5,449.73	$6,131.22

Note: [1] Economic output is defined as the total cost of production, including intermediate goods and services (raw materials, transportation, utilities, contracted services) and value added (employee compensation, proprietary income, and indirect business taxes).

Source: The characteristics and construction cost of the proposed development; the IMPLAN economic modeling system.

As discussed above, when new direct jobs are introduced to an area, those jobs lead to the creation of additional indirect and induced jobs. Indirect employment resulting from construction expenditures would include jobs in industries that provide goods and services to the contractors, and induced employment would include jobs generated by new economic demand from households spending salaries earned through the direct and indirect jobs. Based on the IMPLAN model's economic multipliers for Rockland and Westchester Counties, the project would generate an additional 3,394 person-years of indirect employment and 4,611 person-years of induced employment within Rockland and Westchester Counties, bringing the total number of jobs from construction to 22,099 person-years of employment (see Table 18-6). In the larger New York State economy, the model estimates that the Tappan Zee Hudson River Crossing Project would generate 10,774 person-years of indirect and induced employment, bringing the

total direct and generated jobs from construction of the project to 24,868 person-years of employment over the estimated five-year construction period.

Employee Compensation

The direct employee compensation during the construction period is estimated at $1.14 billion (see Table 18-6). Total direct, indirect, and induced employee compensation resulting in Rockland and Westchester Counties from construction of the Tappan Zee Hudson River Crossing Project is estimated at $1.78 billion. In the broader state economy, total direct, indirect, and induced employee compensation from construction of the project is estimated at $1.98 billion.

Total Effect on the Local Community

As indicated above, the total construction cost for the project (excluding escalation costs and materials/specialized equipment from outside of New York State) is expected to be $3.36 billion. Based on the IMPLAN models for Rockland and Westchester Counties and New York State, the total economic activity that would result from construction of the project is estimated at $6.13 billion in New York State, of which $5.45 billion would occur in Rockland and Westchester Counties (see Table 18-8).

Taxes

Even though the project would be exempt from sales tax on construction materials, the construction activity would have associated with it tax revenues for New York State, the Metropolitan Transportation Authority (MTA), Rockland and Westchester Counties, and other local jurisdictions. Of these tax revenues, the largest portion would come from personal income tax, sales tax from workers' expenditures, corporate and business taxes, and numerous other taxes on direct and secondary economic activity. These public sector revenues are estimated to have an order-of-magnitude value of approximately $166.95 million.

18-4-6 VISUAL AND AESTHETIC RESOURCES

During construction, there would be an increase in the level of activity within the study area, especially in the location of the Hudson River crossing for the bridge replacement. As the project proceeds, cranes, vessels, and other large pieces of equipment, as shown in Table 18-5, would be utilized and visible to a variety of viewer groups. As described previously in Chapter 9, "Visual and Aesthetic Resources," Interstate 87/287 is screened from view from the majority of the surrounding neighborhoods in the study area by dense vegetation and sound walls along the rights-of-way on both sides of the river. However, in some locations, the vegetative screenings and sound walls would need to be removed for creation of the shared-use path and other project construction activities. In addition, those who have views of the Hudson River crossing would have views altered during construction. The Hudson River crossing would become a large construction site that would be visible to sensitive viewers such as residents, park users, and rail travelers along the river. Commercial and/or recreational boaters would also be sensitive to the possible effects upon the quality of the view within the study area during construction. Other groups, including local motorists and employees and visitors of commercial activity have been estimated to have lower sensitivity to the visual alterations arising during the construction phase. Because the largest group of viewers in the study area is motorists passing through the region on Interstate 87/287 at

generally greater speeds than 55 mph, viewer sensitivity during construction would be considered low for these viewers.

The character and quality of views of the Hudson River during construction of the project would be impaired for sensitive viewers who have views of this visual resource. Therefore, the Replacement Bridge Alternative would result in temporary unavoidable adverse impacts to visual and aesthetic resources during construction.

18-4-7 HISTORIC AND CULTURAL RESOURCES

18-4-7-1 ARCHAEOLOGICAL RESOURCES

A Phase I Archaeological survey of the terrestrial portions of the Area of Potential Effect (APE) for potential direct effects concluded that no archaeological resources are present in that area. However, two classes of potential archaeological resources have been identified within the river portion of the APE that could potentially be affected by the proposed project: a submerged landform that may have been occupied during the Archaic Period or the Paleo-Indian Period; and possible submerged historic resources including potential shipwrecks lying on the river bottom. Further analysis will be undertaken to determine whether submerged S/NR eligible resources are present in the river portion of the APE for direct effects. If submerged resources are identified and determined to be S/NR eligible, the project would have an adverse effect on those resources as a result of dredging and construction of the replacement bridge. The FEIS will provide the results of this further analysis. Consultation with SHPO and any appropriate tribal nations and consulting parties would be undertaken to identify measures to avoid, minimize or mitigate any potential S/NR-eligible resources that may be adversely affected by the proposed project.

18-4-7-2 ARCHITECTURAL RESOURCES

Direct impacts upon a property could include demolition, alteration, or damage from construction. Indirect affects could include the isolation of a property from its surrounding environment, or the introduction of visual, audible, or atmospheric (e.g., pollutants) elements that are out of character with a property or that alter its historic setting and context (e.g., contextual effects).

As described in “Chapter 10, “Historic and Cultural Resources,” two resources that have been determined eligible for the State/National Register of Historic Places (S/NR) are located within the APE for potential direct effects. The Tappan Zee Bridge would be removed under the bridge replacement alternative. The South Nyack Historic District is also partially located within the APE for potential direct effects. Two properties that contribute to the Historic District, 21 Cornelison Avenue and 78 Smith Avenue, would be removed in order to construct the bridge replacement alternative. Therefore, the Tappan Zee Bridge and the South Nyack Historic District would be adversely affected by the construction for this project.

In order to mitigate the adverse effect on the Tappan Zee Bridge that would result under the bridge replacement alternatives, mitigation measures have been identified in a Memorandum of Agreement (MOA), included in Appendix C. These measures include Historic American Engineering Record (HAER) documentation of the existing Tappan

Zee Bridge and the production of an educational brochure for use by local libraries, historical societies, and educational institutions.

A potential adverse effect has also been identified on the S/NR-eligible South Nyack Historic District in Rockland County. This effect would result from the removal of two contributing resources within that district, 21 Cornelison Avenue and 78 Smith Avenue. Measures to mitigate this direct adverse effect on the South Nyack Historic have been identified in the MOA included in **Appendix C**, and include planting vegetation along sound walls along the western edge of the district and preparing Historic American Building Survey (HABS) recordation to document the two contributing resources that would be removed. Furthermore, it is proposed that signage interpreting the history and architecture of the South Nyack Historic District be created for installation within the South Nyack Historic District or along the shared-use path that would be constructed along the western edge of the Historic District as part of the project.

18-4-8 AIR QUALITY

This section examines the potential air quality impacts from the construction of the project. Emissions from on-site construction equipment and on-road construction-related vehicles, and the effect of construction vehicles on background traffic congestion, have the potential to affect air quality. The analysis of potential impacts of the construction of the project on air quality includes a quantitative analysis of both on-site and on-road sources of air emissions, and the overall combined impact of both sources, where applicable. The analysis addresses both local (microscale) concentrations and regional (mesoscale) emissions.

In general, most construction engines are diesel-powered, and produce relatively high levels of nitrogen oxides (NO_x) and particulate matter (PM). Some construction activities also emit fugitive dust. Although diesel engines emit much lower levels of carbon monoxide (CO) than gasoline engines, the stationary nature of construction emissions and the large quantity of engines could lead to elevated CO concentrations, and impacts on traffic could increase mobile source-related emissions of CO as well. Therefore, the pollutants analyzed for the construction period are nitrogen dioxide (NO_2), particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and CO. For each pollutant, concentrations were modeled for each averaging period regulated in the National Ambient Air Quality Standards (NAAQS): short-term analyses address 24-hour averages for PM, and 8-hour and 1-hour concentration averages for CO, and long-term analyses address annual averages for $PM_{2.5}$ and NO_2. For more details on air pollutants and NAAQS see Chapter 11, “Air Quality.”

As defined in 40 Code of Federal Regulations (CFR) Part 80 Subpart I, diesel fuel supplied by large refiners and exporters must limited to a sulfur content of 15 parts per million (ppm) for nonroad engines beginning June 1, 2010, and for marine engines beginning June 1, 2012; purchase by wholesale purchaser consumers in the locomotive and marine sectors by October 1, 2012. Ultra-low-sulfur diesel (ULSD) would be used exclusively for all diesel engines throughout the construction sites, including marine engines; therefore, sulfur oxides emitted from construction activities would be negligible.

Construction activity in general, and large-scale construction in particular, has the potential to adversely affect air quality as a result of diesel emissions. The main component of diesel exhaust that has been identified as having an adverse effect on human health is fine PM. To ensure that the construction of the project results in the lowest practicable diesel particulate matter (DPM) emissions, the construction contracts will require several EPCs, including the following components:

- *Clean Fuel.* All diesel fuel used for the project will contain 15 parts per million (ppm) or less sulfur by weight. This includes on-road, non-road, and tug boats operating on-site.
- *Best Available Tailpipe Reduction Technologies.* Nonroad diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract) including but not limited to concrete mixing and pumping trucks, would utilize the best available tailpipe (BAT) technology for reducing DPM emissions. Diesel particulate filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest PM reduction capability. Construction contracts would specify that all diesel nonroad engines rated at 50 hp or greater would utilize DPFs, either installed on the engine by the original equipment manufacturer (OEM) or retrofit with a DPF verified by the United States Environmental Protection Agency (USEPA) or the California Air Resources Board, and may include active DPFs,[1] if necessary; or other technology proven to reduce DPM by at least 90 percent.
- *Utilization of Newer Equipment.* EPA's Tier 1 through 4 standards for nonroad engines regulate the emission of criteria pollutants from new engines, including PM, CO, oxides of nitrogen (NO_x), and hydrocarbons (HC). All nonroad construction equipment in the project would meet at least the Tier 3 emissions standard.
- *Tug Boat Emissions Reduction.* The total combined PM emission rate from all tug boats used for the project will be limited to 3,700 grams per hour at peak power, including auxiliary engine emissions. This limit may be achieved by installing retrofits, using new engines, repowering or engine replacement, or various combinations of these measures, along with limitations on the engine size and number of tug boats on site.[2]
- *Concrete Batch Plant Controls.* The concrete batch plant would vent the cement weigh hopper, gathering hopper, and mixing loading operations to a baghouse or filter sock. Storage silo chutes would be vented to a baghouse. Baghouses should have a control efficiency of at least 99.9 percent. Roadways at the concrete batch plant, and all unloading and loading material handling operations would have a dust control plan providing at least a 50 percent reduction in PM_{10} and $PM_{2.5}$ emissions from fugitive dust through wet suppression.

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[1] There are two types of DPFs currently in use: passive and active. Most DPFs currently in use are the "passive" type, which means that the heat from the exhaust is used to regenerate (burn off) the PM to eliminate the buildup of PM in the filter. Some engines do not maintain temperatures high enough for passive regeneration. In such cases, "active" DPFs can be used (i.e., DPFs that are heated either by an electrical connection from the engine, by plugging in during periods of inactivity, or by removal of the filter for external regeneration).

[2] For example, the analysis in this section assumed eight 1,500 hp tug boats with EPA Tier 2 rating each with an 80 kw auxiliary engine, with all engines retrofit with a diesel oxidation catalyst.

18-4-8-1 METHODOLOGY

Chapter 11, "Air Quality," contains a review of the pollutants for analysis; applicable regulations, standards, and benchmarks; and general methodology for mobile source air quality analyses. Additional details relevant only to the construction air quality analysis methodology are presented in the following section.

Local (Microscale) On-Site Construction Activity Assessment

As described in Section B above, there are two construction options: Short Span Option and Long Span Option. The Short Span Option would require approximately twenty-seven more spans than the Long Span Option and would have more construction equipment working simultaneously. In addition, the Short Span Option would take approximately one year longer to construct than the Long Span Option. The Short Span Option was selected for analysis because it would represent the worst-case scenario for air quality.

The construction periods with activities closest to sensitive receptors (i.e., residences, institutional buildings, and open spaces) and with the most intense activities and highest emissions were selected as the worst-case periods for analysis. Construction-related $PM_{2.5}$ emissions were estimated for the different subtasks of construction, including the reconstruction of the approach roadway areas in Rockland and Westchester counties, dredging, trestle construction, abutment construction, cofferdam construction, pile installation, pile cap construction, column construction, deck installation, and demolition of the existing TZB.

Detailed analyses were performed for the following construction periods, as shown in **Figures 18-8** through **18-11**:

Rockland Landing—Reconstruction of the South Broadway Bridge: The Rockland landing is defined as the portion of the corridor that extends from the abutment of the bridge to just west of the South Broadway Bridge. During this period of construction, the South Broadway Bridge would be replaced and heavy diesel equipment such as cranes, excavators and loaders would be used. The peak construction activities during this period would occur near sensitive residential receptors and would last for several months.

Rockland Landing—Approach Roadway Construction: The side slopes south of existing Interstate 87/287 from South Broadway to the river would be removed, the retaining walls would be constructed and temporary pavement would be placed. Heavy diesel equipment such as cranes, excavators and loaders would be used. The peak construction activities during this period would occur near sensitive residential receptors and would last for several months.

Rockland Inland Staging Area: A staging area would be required for a concrete batch plant and miscellaneous construction vehicle storage. The precise location of this area is unknown at this time, and therefore this analysis was performed for a generic plant meeting the needs of the project. The concrete batch plant would be a source of particulate matter emissions. Fugitive sources associated with a concrete batch plant include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. Estimates

of air emissions from these activities were derived based on EPA procedures delineated in AP-42 Section 11.12.

Bridge Construction—Rockland Approach and Main Span: There would be 3 principal in-river work areas, including the main span, Rockland approach, and Westchester approach. Tug boats and barges would be used during in-river construction activities. The substructure construction at each area would include dredging, cofferdam construction, assembly work, pile driving, construction of the pile cap, construction of the columns and deck erection. Pile driving was identified as the substructure construction activity with the highest air quality emissions due to the high amount of heavy equipment employed during this task, including pile drivers and large generators. The period when pile driving would occur at spans that are closest to the Rockland shoreline and therefore closest to sensitive receptors was selected for analysis. Pile driving at spans near the shoreline would last for approximately two months for the north structures and another two months for the south structures at a later period. Similar pile driving work would occur at spans further away from the shoreline at an earlier time. Construction activities at the Main Span that would overlap with the Rockland Approach during this peak period were also included in the analysis, as well as roadway and earthworks at the Rockland Landing.

Westchester Landing: This period of construction would include the relocation of the NYSTA Tappan Zee Bridge Maintenance Facility and New York State Police (NYSP) facilities directly north of the Interstate 87/287 near the Toll Plaza. In addition, a temporary bridge would be constructed to connect the temporary access road west of the railroad tracks and the existing bridge area east of the railroad tracks. Heavy diesel equipment such as cranes, excavators and loaders would be used. The peak construction activities during this period would occur near sensitive residential receptors and would last for several months.

Bridge Construction—Westchester Approach and Main Span: Tug boats and barges would be used during in-river construction activities for the Westchester Approach. Pile driving was identified as the substructure construction activity with the highest air quality emissions due to the high amount of heavy equipment employed during this task, including pile drivers and large generators. The period when pile driving would occur at spans that are closest to the Westchester shoreline and therefore closest to sensitive receptors was selected for analysis. Pile driving at spans near the shoreline would last for approximately two months for the north structures and another two months for the south structures at a later period. Similar pile driving work would occur at spans further away from the shoreline at an earlier time. Construction activities at the main span that would overlap with the Westchester approach during this peak period were also included in the analysis, as well as roadway and earthworks at the Westchester landing.

Engine Exhaust Emissions

The projected usage factors, sizes, types, and number of construction equipment were estimated based on the construction activity schedule. Emission factors for NO_x, CO, PM_{10}, and $PM_{2.5}$ from on-site construction engines were developed using the EPA's NONROAD2008 Emission Model (NONROAD). Since emission factors for truck-

mounted concrete pumps are not available from either the EPA MOBILE6.2 emission model (MOBILE6) or NONROAD, emission factors specifically developed for this type of application were used.[1] With respect to trucks, emission rates for NO_X, CO, PM_{10}, and $PM_{2.5}$ for truck engines were developed using MOBILE6. A maximum of 5-minute idle time was employed for the heavy trucks. For analysis purposes, it was assumed that each concrete truck would operate for 45 minutes per delivery. Tugboat emissions were estimated according to the latest emission factors and methodologies delineated by US. Environmental Protection Agency (EPA)[2].

Fugitive Emission Sources

Particulate matter emissions would be generated by material handling activities (i.e., loading/drop operations for fill materials and excavate), truck transports, and concrete batching at the Inland Staging Area. Estimates of air emissions from these activities were developed based on EPA procedures delineated in AP-42 Table 13.2.3-1.

Dispersion Modeling

Projected NO_2, CO, PM_{10} and $PM_{2.5}$ concentration increments resulting from the construction of the project were predicted using the EPA/AMS AERMOD dispersion model.[3] AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources. AERMOD is a steady-state plume model that incorporates current concepts with respect to flow and dispersion in complex terrain.

For the short-term model scenarios, all stationary sources that idle in a single location while unloading, were simulated as point sources. Other engines, which would move around the site on any given day, were simulated as area sources. In the annual analyses, all sources would move around the site throughout the year and were therefore simulated as area sources.

Meteorological Data

The meteorological data set consisted of five consecutive years of meteorological data: surface data collected at LaGuardia Airport (2006–2010) and concurrent upper air data collected at Brookhaven, New York.

Receptor Locations

Thousands of receptors (locations in the model where concentrations are predicted) were placed along the sidewalks closest to the construction sites that would be publicly accessible, at residential and other sensitive uses at both ground-level and elevated locations (e.g., residential windows), and at open spaces. In addition, a ground-level

[1] Concrete pumps are usually truck mounted and use the truck engine to power pumps at high load. This application of truck engines is not addressed by the MOBILE6 model, and since it is not a non-road engine, it is not included in the NONROAD model. Emission factors were obtained from a study which developed factors specifically for this type of activity. *FEIS for the Proposed Manhattanville in West Harlem Rezoning and Academic Mixed-Use Development*, CPC–NYCDCP, November 16, 2007.

[2] EPA, Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, April 2009.

[3] EPA, AERMOD: Description Of Model Formulation, 454/R-03-004, September 2004; and EPA, User's Guide for the AMS/EPA Regulatory Model AERMOD, 454/B-03-001, September 2004 and Addendum December 2006.

receptor grid of approximately two thousand receptors was also included in the dispersion modeling to assist in the analysis of potential impacts.

Local (Microscale) Mobile Source Assessment

The general methodology for mobile source modeling presented in Chapter 11, “Air Quality” was followed.

Traffic flow on Interstate 87/287 would be maintained throughout the construction period while roadway work is performed. During those times, traffic would be diverted to temporary roadway segments and remain in the temporary location for an extended period before being shifted again. A shift in the roadway would reduce the distance between the heavily traveled Interstate 87/287 and residences located near the temporary segment, potentially increasing pollutant concentrations at those locations. Microscale analyses were performed for both the Rockland and the Westchester sides to assess the effect of these temporary roadway shifts on air quality.

Combined Impact

Since emissions from on-site construction equipment and mobile sources may contribute to concentration increments concurrently, the combined effect was assessed. Total concentrations were estimated by combining the results from the on-site construction analysis with the construction-related mobile source increments at the same location. The combined total is a conservatively high estimate of potential impacts, since it is likely that the highest results from different sources would occur under different meteorological conditions (e.g., different wind direction and speed), and would not necessarily occur when the highest background concentrations are present.

Region-Wide (Mesoscale) Effects of Construction Activity

The pollutants of concern on a regional basis are CO, PM_{10}, $PM_{2.5,}$ NO_x, and volatile organic compounds (VOC). (Although CO reacts rapidly in the atmosphere and is therefore not transported throughout the region, it is accounted for on a mesoscale in order to ensure that area-wide emissions do not exceed the emissions budgets in the applicable maintenance plan.) Construction activity related non-road equipment emissions and marine engine emissions were calculated on an annual basis based on the emissions modeling procedures described above for the microscale analysis.

18-4-8-2 ENVIRONMENTAL EFFECTS

Local (Microscale) On-Site Construction Activity Assessment

Rockland Landing—Reconstruction of the South Broadway Bridge

Maximum predicted concentration increments from construction activities associated with the South Broadway Bridge replacement and overall concentrations (including background) are presented in **Table 18-9**.

The maximum predicted total concentrations of $PM_{2.5}$, PM_{10}, CO, and annual-average NO_2 would not exceed the NAAQS.

Table 18-9
Maximum Predicted Pollutant Concentrations from Construction Site Sources—Rockland Landing, Reconstruction of the South Broadway Bridge (µg/m^3)

Pollutant	Averaging Period	No Build Alternative	Project	Increment	NAAQS
$PM_{2.5}$	24-hour	28.0	28.4	0.4	35
	Annual Local	9.6	9.7	0.1	15
PM_{10}	24-hour	64	65	1	150
NO_2	Annual	45	51	6	100
CO	1-hour	3.4 ppm	7.2 ppm	3.8 ppm	35 ppm
	8-hour	2.5 ppm	2.8 ppm	0.3 ppm	9 ppm

Rockland Landing-Approach Roadway Construction

Maximum predicted concentration increments from construction activities associated with the Rockland landing approach roadway and overall concentrations (including background) are presented in **Table 18-10**. As shown, the maximum predicted total concentrations of $PM_{2.5}$, PM_{10}, CO, and annual-average NO_2 would not exceed the NAAQS.

Table 18-10
Maximum Predicted Pollutant Concentrations from Construction Site Sources—Rockland Landing, Approach Roadway Construction (µg/m^3)

Pollutant	Averaging Period	No Build Alternative	Project	Increment	NAAQS
$PM_{2.5}$	24-hour	28.0	29.2	1.2	35
	Annual Local	9.6	9.7	0.1	15
PM_{10}	24-hour	64	66	2	150
NO_2	Annual	45	52	7	100
CO	1-hour	3.4 ppm	6.2 ppm	2.8 ppm	35 ppm
	8-hour	2.5 ppm	2.8 ppm	0.3 ppm	9 ppm

Rockland Inland Staging Area

Maximum predicted concentration increments from construction activities associated with the construction staging activities including the concrete batch plant at the Rockland inland staging area and overall concentrations (including background) are presented in **Table 18-11**.

Since the location of the project concrete batch plant has not been determined, a grid receptor network was used for modeling to capture the potential area of effect from operations at the concrete batch plant.

The maximum total concentrations of $PM_{2.5}$, PM_{10}, CO, and annual-average NO_2 were predicted at fenceline receptors adjacent to the project concrete batch plant, and would not exceed the NAAQS.

Table 18-11
Maximum Predicted Pollutant Concentrations from Construction Site Sources—Rockland Inland Staging Area (µg/m^3)

Pollutant	Averaging Period	No Build Alternative	Project	Increment	NAAQS
$PM_{2.5}$	24-hour	28.0	32.6	4.6	35
	Annual Local	9.6	9.9	0.3	15
PM_{10}	24-hour	64	94	30	150
NO_2	Annual	45	48	3	100
CO	1-hour	3.4 ppm	3.5	0.1	35 ppm
	8-hour	2.5 ppm	2.53	0.03	9 ppm

Bridge Construction-Rockland Approach and Main Span

Maximum predicted concentration increments from construction activities associated with the construction activities at the Rockland approach and the bridge main span and overall concentrations (including background) are presented in **Table 18-12**. As shown, the maximum predicted total concentrations of $PM_{2.5}$, PM_{10}, CO, and annual-average NO_2 would not exceed the NAAQS.

Table 18-12
Maximum Predicted Pollutant Concentrations from Construction Site Sources—Bridge Construction, Rockland Approach and Main Span (µg/m^3)

Pollutant	Averaging Period	No Build Alternative	Project	Increment	NAAQS
$PM_{2.5}$	24-hour	28.0	34.1	6.1	35
	Annual Local	9.6	10.0	0.4	15
PM_{10}	24-hour	64	71	7	150
NO_2	Annual	45	52	7	100
CO	1-hour	3.4 ppm	6.0 ppm	2.6 ppm	35 ppm
	8-hour	2.5 ppm	3.0 ppm	0.5 ppm	9 ppm

Westchester Landing

Maximum predicted concentration increments from construction activities associated with the construction activities at the Westchester landing and overall concentrations (including background) are presented in **Table 18-13**. As shown, the maximum predicted total concentrations of $PM_{2.5}$, PM_{10}, CO, and annual-average NO_2 are not expected to exceed the NAAQS.

Bridge Construction-Westchester Approach and Main Span

Maximum predicted concentration increments from construction activities associated with the construction activities at the Rockland approach and the bridge main span and overall concentrations (including background) are presented in **Table 18-14**. As shown, the maximum predicted total concentrations of $PM_{2.5}$, PM_{10}, CO, and annual-average NO_2 are not expected to exceed the NAAQS.

Table 18-13
Maximum Predicted Pollutant Concentrations from Construction Site Sources—Westchester Landing (µg/m^3)

Pollutant	Averaging Period	No Build Alternative	Project	Increment	NAAQS
$PM_{2.5}$	24-hour	28.0	28.5	0.5	35
	Annual Local	9.6	9.63	0.03	15
PM_{10}	24-hour	64	65	1	150
NO_2	Annual	45	48	3	100
CO	1-hour	3.4 ppm	4.0 ppm	0.6 ppm	35 ppm
	8-hour	2.5 ppm	2.6 ppm	0.1 ppm	9 ppm

Table 18-14
Maximum Predicted Pollutant Concentrations from Construction Site Sources—Bridge Construction, Westcheter Approach and Main Span (µg/m^3)

Pollutant	Averaging Period	No Build Alternative	Project	Increment	NAAQS
$PM_{2.5}$	24-hour	28.0	34.3	6.3	35
	Annual Local	9.6	10.4	0.8	15
PM_{10}	24-hour	64	73	9	150
NO_2	Annual	45	63	18	100
CO	1-hour	3.4 ppm	13.5 ppm	10.1 ppm	35 ppm
	8-hour	2.5 ppm	6.3 ppm	3.8 ppm	9 ppm

Other Periods of Construction

The modeled results are based on construction scenarios for specific worst-case periods. Lower concentration increments from construction would generally be expected during periods with lower construction emissions. Since worst-case short-term results may often be indicative of very local impacts, similar maximum local impacts may occur at any stage at various locations but would not persist in any single location, since emission sources would not be located continuously at any single location throughout construction, but would not exceed the concentrations projected for the worst-case scenarios.

Local (Microscale) Mobile Source Assessment

Maximum predicted concentration increments from mobile sources from roadway shifts at both the Rockland and Westchester sides, and overall concentrations (including background) are presented in **Tables 18-15** and **18-16**. The maximum predicted total concentrations of $PM_{2.5}$, PM_{10}, and CO are not expected to exceed the NAAQS.

Summary of Total Combined Concentrations

Total combined concentration increments were estimated by combining the results from the on-site construction analysis with the construction-related mobile source increments from the mobile source receptor closest to the location of the on-site increment. The overall combined concentrations of PM_{10}, CO, and annual-average $PM_{2.5}$, including background concentrations, are not expected to exceed the NAAQS.

Table 18-15
Maximum Predicted Pollutant Concentrations from Mobile Sources—Rockland County (µg/m^3)

Pollutant	Averaging Period	No Build Alternative	Project	Increment	NAAQS
$PM_{2.5}$	24-hour	28.0	31.2	3.2	35
	Annual Local	9.6	10.2	0.6	15
PM_{10}	24-hour	64	76	12	150
CO	1-hour	3.4 ppm	7.4 ppm	4.0 ppm	35 ppm
	8-hour	2.5 ppm	5.3 ppm	2.8 ppm	9 ppm

Table 18-16
Maximum Predicted Pollutant Concentrations from Mobile Sources—Westchester County (µg/m^3)

Pollutant	Averaging Period	No Build Alternative	Project	Increment	NAAQS
$PM_{2.5}$	24-hour	28.0	31.9	3.9	35
	Annual Local	9.6	10.6	1.3	15
PM_{10}	24-hour	64	72	8	150
CO	1-hour	3.4 ppm	12.0 ppm	8.6 ppm	35 ppm
	8-hour	2.5 ppm	6.5 ppm	4.0 ppm	9 ppm

At the Rockland side, the maximum total combined $PM_{2.5}$ 24-hour concentration is estimated to be 34.9 µg/m^3 which is less than the applicable air quality standard of 35 µg/m^3. This maximum concentration includes a background value of 28.0 µg/m^3, a stationary source contribution of 5.5 µg/m^3, and a mobile source contribution of 1.2 µg/m^3, and was predicted at a receptor location along the Rockland shoreline adjacent to Interstate 87/287.

At the Westchester side, the maximum total combined $PM_{2.5}$ 24-hour concentration is estimated to be 35.6 µg/m^3. This maximum concentration includes a background value of 28.0 µg/m^3, a stationary source contribution of 5.7 µg/m^3, and a mobile source contribution of 1.9 µg/m^3, and was predicted at several residential receptor locations along the Westchester shoreline north of the Interstate 87/287. The meteorological conditions required to produce predicted concentrations above 35 µg/m^3 at each of these locations occurred only once in five years of meteorological data. These maximum increments are unlikely to occur because it is likely that the highest results from different sources would occur under different meteorological conditions (e.g., different wind direction and speed) and are unlikely to coincide with the highest background level. Therefore, 24-hour exceedances would be unlikely to occur, and if they do, would be limited to a single occurrence at any given location. Since the duration of intense construction activity near the shorelines is limited, this would not occur in successive years, and would therefore not result in an exceedance of the NAAQS for 24-hour average $PM_{2.5}$ which is based on a 3-year average of peak concentrations. Based on the limited duration and extent of these peak concentrations, the low frequency of occurrence, and the limited potential for exposure, this would not be considered an adverse impact.

Regionwide (Mesoscale) Effects of Construction Activity

Construction activity emissions on an annual basis and for the entire construction period are presented in **Table 18-17**. The estimated non-road emissions from the project correspond to 1.2 percent, 0.04 percent, and 0.01 percent of the total 2012 NO_x, VOC, and CO metropolitan area-wide emissions from non-road sources presented in the New York ozone State Implementation Plant (SIP)[1], respectively. The estimated total $PM_{2.5}$ emissions correspond to 0.3 percent of the total 2012 metropolitan area-wide $PM_{2.5}$ emissions from non-road sources presented in the $PM_{2.5}$ SIP.[2] At this time, no PM_{10} SIP is available and the project area is not classified as nonattainment for PM_{10}. However, the PM_{10} emissions would represent a fraction of regional emissions similar to $PM_{2.5}$.

Table 18-17
Total Regional Emissions from Construction Activities (ton/yr)

Pollutant	PM2.5	PM10	NO_x	VOC	CO
Year 1*	4.6	5.0	179.9	8.1	47.1
Year 2	11.4	12.4	458.5	21.2	105.9
Year 3	11.2	12.2	435.3	19.1	78.9
Year 4	11.0	12.0	394.7	16.0	48.7
Year 5	10.9	11.9	385.6	15.2	42.0
Year 6	10.9	11.9	387.0	15.4	48.3
Year 7*	1.4	1.6	49.3	1.9	4.5
Max Year	11.4	12.4	458.5	21.2	105.9
Project Total (ton)					
Project	61.4	66.9	2,290.2	96.9	375.4

Note: * The first and last years were assumed to include only a few months of the year.

The contribution from the project to regional non-road emissions of VOC and CO emissions is small. **[ASSESSMENT OF PM AND NO_X EMISSIONS AWAITS CONSULTATION WITH THE APPROPRIATE AGENCIES]**.

18-4-8-3 1-HOUR NO_2 NATIONAL AMBIENT AIR QUALITY STANDARD

EPA recently established a new 1-hour average NO_2 standard of 100 parts per billion (ppb), effective April 12, 2010, in addition to the current annual standard. The statistical form is the 3-year average of the 98th percentile of daily maximum 1-hour average concentrations in a year. EPA is considering the need for changes to the secondary NO_2 standard under a separate review.

By promulgating the 1-hour NO_2 standard, EPA has initiated a process under the CAA that will ultimately result in the adoption of strategies designed to attain and maintain ambient NO_2 concentrations at levels below the standard. This process will first involve

[1] New York State Implementation Plan for Ozone 8-Hour NAAQS Attainment Demonstration for New York Area, NYSDEC, February 2008.

[2] New York State Implementation Plan for $PM_{2.5}$ (Annual NAAQS) Attainment Demonstration for the New York Metropolitan Area, NYSDEC, October 2009.

installation of additional ambient NO_2 monitoring stations near roadways. With respect to those areas that are identified as in non-attainment, states will be required to develop SIPs designed to meet the standard by specified time frames. EPA and the states also can be expected to issue new regulations and guidance that will address methodologies and criteria for performing assessments of 1-hour NO_2 concentrations from project-level emission sources and for evaluating their impacts. This information is not currently available. Therefore, although EPA has promulgated the 1-hour standard, it has yet to be fully implemented.

Uncertainty exists as to 1-hour NO_2 background concentrations at ground level, especially near roadways, since these concentrations have not been measured within the current monitoring network. In the New York downstate region and adjacent counties in New Jersey and Connecticut, background concentrations at existing rooftop monitors range from 41 ppb to 67 ppb (there are no stations in the immediate area of the project). In addition, there are no clear methods to predict the rate of transformation of NO to NO_2 at ground-level given the level of existing data and models. EPA, in promulgating the standard, has expressed specific concern regarding mobile source impacts, and estimated that ambient concentrations of NO_2 adjacent to roadways could be 30 to 100 percent higher than the concentrations measured at community scale (rooftop) monitoring stations.[1] Similar concerns exist regarding areas adjacent to large construction sites.

Therefore, predicted construction impacts cannot be based on comparison with the new 1-hour NO_2 NAAQS since total 98th percentile values, including local area roadway contributions, cannot be estimated. In addition, methods for accurately predicting 1-hour NO_2 concentrations from construction activities have not been developed. However, given the magnitude of the NOx emissions associated with the project's construction, exceedances of the 1-hour NO_2 standard resulting from construction activities cannot be ruled out; however, as discussed above, land-based non-road diesel-powered vehicles and construction equipment rated Tier 3 or higher would be used where conforming equipment is available, and the use of such equipment is practicable.

18-4-9 NOISE AND VIBRATION

Although they are temporary, construction activities can create noise levels sufficient to cause community annoyance and interfere with daily activities. Similarly, construction activities can cause vibration levels that may result in structural or architectural damage, and/or community annoyance or interference with vibration-sensitive activities. This section assesses the potential noise and vibration effects resulting from construction of the Tappan Zee Bridge Hudson River Crossing Project.

Construction noise differs from traffic noise in a number of ways, including the following:

Construction noise only lasts for the duration for the duration of the construction contract(s);

Construction activities generally take place for a short or limited period of time at any specific location;

[1] EPA, Final Regulatory Impact Analysi s (RIA) for the NO_2 National Ambient Air Quality Standards (NAAQS), January 2010.

Construction noise may be intermittent and variable depending upon the type of construction activities taking place at a specific location and time period; and

Construction noise is sporadic in nature, whereas traffic noise occurs continuously over the life of a facility.

Construction activities that may cause noise impacts include earthwork, land clearing, paving, and structure construction. Noise levels due to construction at specific locations are a function of the number and types of construction equipment that would be utilized for a specific project, and are highly variable throughout the various phases of construction. Although construction noise is unavoidable in its entirety, there are a number of noise abatement measures that can be implemented to minimize and reduce construction noise effects. NYSDOT and NYSTA are committed to requiring the use of a wide variety of noise abatement measures, which have been found to be effective, feasible and practicable to minimize noise with construction activities. These measures include the EPCs previously discussed in this chapter, as well as:

Source Control Measures:

1. Use of properly designed and well-maintained mufflers in all internal combustion engines, engine enclosures, and intake silencers;
2. Perform regular equipment maintenance; and
3. Use of new equipment subject to new product noise emission standards;

Site Control Measures:

1. Place stationary equipment as far away as feasible and practicable from sensitive receptor locations;
2. Strategically select waste disposal sites to minimize potential noise concerns;
3. Coordinate work operations to coincide with time periods when people would be least likely to be affected by construction-related noise;
4. Limit work hours (i.e., limited nighttime operations);
5. Eliminate “tail gate banging”;
6. Reduce backing-up procedures for equipment with backup alarms, and replace backup alarms with strobes where acceptable per OSHA and other regulations; and
7. Construct proposed noise barriers prior to other construction operations.

Community Awareness Measures:

1. Notify the public of construction activities that may be perceived of as noisy and intrusive prior to starting construction;
2. Establish means for the public to contact the engineer-in-charge (i.e., provide telephone number, email, etc.) and methods to handle complaints.

At locations where construction-related noise and/or vibration levels would have the potential for result in adverse impacts, the feasibility and practicability of implementing abatement measures to reduce or eliminate predicted adverse impacts has been examined.

18-4-9-1 NOISE

Comment [TC28]: This section appears to define what the noise amounts are likely to be but does not contain an analysis of the likely impacts of noise to fish and wildlilfe resources. Please revise accordingly.

Methodology

The methods used in determining construction noise impacts are in accordance with FHWA regulations and NYSDOT policy. NYSTA follows both federal regulation and state policy to determine construction noise impacts.

The FHWA Road Construction Noise Model (RCNM 1.1) predicts noise from stationary highway construction operations based on a compilation of empirical data and the application of acoustical propagation formulas. The model takes into account the noise generated by equipment used for various construction operations, attenuation with distance, attenuation due to shielding, etc. The RCNM 1.1 determines the total noise level by combining the noise resulting from all significant pieces of equipment operating during the same time period.

Since the RCNM 1.1 does not account for excess ground attenuation or atmospheric absorption, the model is particularly appropriate for those shoreline receptors when the Hudson River water surface is between the equipment and a receptor.

Noise emission levels and acoustical use factors for generic types of heavy equipment are contained in a database contained in the model. The data contained in the model is largely based upon data gathered as part of the noise studies for the Central Artery/Tunnel project in Boston, Massachusetts in the 1990s (see **Table 18-18**). However, the model allows users to supplement the data contained in the model.

While the RCNM 1.1 does account for construction-related trucks when they are stationary on-site, it does not account for them when they are travelling to and from the construction site. To account for noise from these sources the FHWA Traffic Noise Model (TNM 2.5) was used. TNM 2.5 calculates the noise contribution of each roadway segment to a given noise receptor and sums the contributions to estimate the noise level at a given receptor location. The noise from each vehicle type is determined as a function of the reference energy-mean emission level, corrected for vehicle volume, speed, roadway grade, roadway segment length, and source receptor distance.

Table 18-18
Highway Construction Equipment Noise Reference Levels and Usage Factors from RCNM 1.1

Equipment Description	Impact Device[1]	Acoustical Use Factor (Percent)[2]	Spec 721.560 Lmax @ 50 feet (dBA, slow)[3]
All Other Equipment > 5 HP	No	50	85
Auger Drill Rig	No	20	85
Backhoe	No	40	80
Bar Bender	No	20	80
Blasting	Yes	N/A	94
Boring Jack Power Unit	No	50	80
Chain Saw	No	20	85

Table 18-18 (Continued)
Highway Construction Equipment Noise Reference Levels

and Usage Factors from RCNM 1.1

Equipment Description	Impact Device[1]	Acoustical Use Factor (Percent)[2]	Spec 721.560 Lmax @ 50 feet (dBA, slow)[3]
Clam Shovel (dropping)	Yes	20	93
Compactor (ground)	No	20	80
Compressor (air)	No	40	80
Concrete Batch Plant	No	15	83
Concrete Mixer Truck	No	40	85
Concrete Pump Truck	No	20	82
Concrete Saw	No	20	90
Crane	No	16	85
Dozer	No	40	85
Drill Rig Truck	No	20	84
Drum Mixer	No	50	80
Dump Truck	No	40	84
Excavator	No	40	85
Flat Bed Truck	No	40	84
Front End Loader	No	40	80
Generator	No	50	82
Generator (<25KVA, VMS signs)	No	50	70
Gradall	No	40	85
Grader	No	40	85
Grapple (on backhoe)	No	40	85
Horizontal Boring Hydr. Jack	No	25	80
Hydra Break Ram	Yes	10	90
Impact Pile Driver	Yes	20	95
Jackhammer	Yes	20	85
Man Lift	No	20	85
Mounted Impact Hammer (hoe ram)	Yes	20	90
Pavement Scarafier	No	20	85
Paver	No	50	85
Pickup Truck	No	40	55
Pneumatic Tools	No	50	85
Pumps	No	50	77
Refrigerator Unit	No	100	82

Note:
1 Denotes percussive construction equipment that strikes another surface or material.
2 An estimation of the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.
3 A-Weighted Maximum sound level, measured at a distance of 50 feet from the construction equipment.

Impact Criteria

There are no federal or state regulations which define what constitutes a noise impact. In general, three factors should be considered when determining whether a

construction-related activities would results in a noise impact at a receptor location—the magnitude of noise produced by construction-related noise activities, the magnitude of the increase in noise levels (the difference in noise levels with construction-related activities minus existing noise levels), and the duration of the increased noise levels. NYSDOT in their guidance document, *Environmental Manual (TEM),* Chapter 4.4.18, *"Noise Analysis Policy and Procedures"* states that construction noise impact will not normally occur for projects outside of New York City when construction-related noise levels are under 80 dBA $L_{eq(1)}$. In terms of magnitude of change, typically, an increase in noise level of 2-3 decibels is considered by most people as a barely perceptible change in noise level, an increase in noise level of 5 decibels is considered by most people as a readily noticeable change in noise level, an increase in noise level of 10 decibels is considered by most people as a doubling in noise level, and an increase in noise level of 20 decibels is considered by most people as a dramatic change in noise level. Noise level increases which substantially exceed the existing noise levels may not be considered impacts if they would occur for only a limited duration.

Lacking specific federal or state guidance, for purposes of this project, a determination of whether an impact would be expected to occur will be determined based upon a consideration of the three factors discussed above.

Noise Receptor Locations

Eleven (11) locations were selected as noise receptor locations for the construction noise analysis. **Table 18-19** lists each of the selected noise receptor locations and they are also shown in **Figure 18-12**. These selected locations are locations at which the maximum construction-related noise impacts would be expected to occur.

Table 18-19
Selected Noise Receptor Locations

Site #	Location	Town
1	15 North Tappan Zee Landing	Tarrytown
2	Thruway Property	Tarrytown
3	Thruway Property	Tarrytown
4	92 Paulding Avenue	Tarrytown
5	5 Edgewater Lane	Upper Grand View
6	Thruway Property	Upper Grand View
7	24 River Road	South Nyack
8	66 River Road	South Nyack
9	Smith Avenue near Broadway	Upper Grand View
10	Elizabeth Place and Broadway	South Nyack
11	Greenbush Road North and Stony Hill Lane	Central Nyack
Note: Sites 9 and 10 are listed as Sites 1 and 2, respectively, in Chapter 12 "Noise and Vibration."		

Sites 1-8 were chosen to represent the surrounding areas for the time periods when noise due to construction activities from both the bridge and the landing areas would be occurring simultaneously. This would be expected to be the noisiest time period at these receptor sites. Sites 9 and 10 were chosen to represent the area immediately adjacent to the South Broadway overpass which will be demolished and rebuilt at the

beginning of construction activities. Site 11 was chosen to represent the area adjacent to the potential concrete batching plant located south of the Palisades Center Mall. This location represents the location where maximum noise levels would be expected since it is the location that is closest to sensitive receptors.

Existing Noise Levels

Existing noise levels were determined by field measurements at each of the 11 construction noise receptor locations. Twenty-four hour measurements were made at Sites 1 through 8. Twenty minute short-term measurements were made at Sites 9, 10, and 11 during the AM peak hour only. These measurements are summarized below in **Table 18-20**. A range of the hourly $L_{eq(1)}$ was given for Sites 1 through 8 based on the measured values between 7:00AM and 4:00 PM (i.e., the typical hours of construction).

Analysis Results

Table 18-20 shows the construction noise analysis results. For each of the eleven receptor locations the following $L_{eq(1)}$ noise levels are shown: existing noise levels; noise level due to construction-related activities alone without noise abatement; noise levels with proposed noise abatement (EPCs); total ambient noise levels with construction-related activities with proposed noise abatement (i.e., the sum of existing noise levels and noise levels due to construction-related activities with proposed noise abatement); and the increase in noise levels due to construction-related activities.

Table 18-20
Existing Noise Levels at Construction Noise Receptors

Site #	Measurement	$L_{eq(1)}$ (in dBA)
1	24 hour	60-68
2	24 hour	67-70
3	24 hour	56-61
4	24 hour	63-71
5	24 hour	49-56
6	24 hour	64-68
7	24 hour	65-67
8	24 hour	56-63
9	20 minute AM peak period	69
10	20 minute AM peak period	61
11	20 minute AM peak period	58
Note: The $L_{eq(1)}$ noise levels shown for Sites 1-8 are values measured between 7:00AM and 4:00PM.		

Noise abatement measures described in the EPCs include shrouds to reduce pile driver noise, quiet compressors and generators, and use of portable or other noise barriers and/or enclosures. Other noise abatement measures that would be utilized where practicable and feasible are as follows:

Electric power equipment, rather than diesel powered mechanical equipment would be utilized;

Use of impact devices such as jackhammer, pavement breakers and pneumatic tools should be limited and shrouds would be utilized to limit noise exposure;

Construction staging areas should have appropriate noise attenuation installed around the areas and would be configured to minimize backup alarm and other noises; and

Contractors and subcontractors would be required to properly maintain and service their equipment and install quality mufflers so they meet noise specifications.

As shown in **Table 18-21**, the proposed noise abatement measures would be expected to reduce noise due to construction at receptor sites by up to approximately 6 dBA.

Table 18-21
Construction Noise Analysis Results

Site #	Location	Existing Noise Levels $L_{eq(1)}$	Construction Only Noise Levels without 4Abatement $L_{eq(1)}$	Construction Noise Levels with Abatement $L_{eq(1)}$	Total Noise Levels with Abatement $L_{eq(1)}$	Increases in Noise Levels with Construction and Noise Abatement $L_{eq(1)}$
1	15 North Tappan Zee Landing	60-68	68	68	69-71	9-11
2	Thruway Property	67-70	87	81	81	11-14
3	Thruway Property	56-61	75	70	70-71	10-15
4	92 Paulding Avenue	63-71	66	66	68-72	1-9
5	5 Edgewater Lane	49-56	69	64	64-65	8-16
6	Thruway Property	64-68	81	75	75-76	7-12
7	24 River Road	65-67	81	75	75-76	8-11
8	66 River Road	56-63	67	63	64-66	3-10
9	Smith Avenue near Broadway	69*	71	69	70-72	3-9
10	Elizabeth Place and Broadway	61*	80	76	76	15-21
11	Greenbush Road North and Stony Hill Lane	58*	60	60	61-62	3-5

Note: * This represents the peak measured value. Off-peak values are assumed to be approximately up to 6 dBA lower than the peak measured value.

At Sites 1 through 8, even with the proposed noise abatement measures, construction-related activities alone from the bridge and landing areas would result in $L_{eq(1)}$ noise levels that would range from 63-81 dBA. In addition, these activities would increase $L_{eq(1)}$ noise levels by between 1 and 15 dBA, depending upon the site and hour. Therefore, at all but Site 3, construction-related activities would result at least a doubling of noise levels during one or more hours of the day. These large increases in

noise level would occur principally because of pile driving. While noise abatement measures are proposed for pile driving, even with the proposed measures pile driving would be expected to produce noisy and intrusive noise increases at Sites 1-8 and adjacent receptor locations. There are no additional noise more effective noise abatement measures that are feasible and practicable that could be utilized to eliminate and/or further reduce the noise levels due to pile driving. However, these pile driving is only expected to occur for a limited time period (i.e., less than 5 months) in this area and, the effects they cause are not considered to be noise impacts.

At Sites 9 and 10, even with the proposed noise abatement measures, construction-related activities alone from the South Broadway overpass would result in $L_{eq(1)}$ noise levels of 69 and 76 dBA, respectively. In addition, these activities would increase $L_{eq(1)}$ noise levels by 3 to 9 dBA at Site 9 and by 15 to 21 dBA at Site 10. (The higher increase in noise levels at Site 10 is due to the distance between the receptor and the construction activities and the lower existing noise levels at Site 10.) Therefore, construction-related activities would result almost a doubling of noise levels during some hours of the day at Site 9 and significantly more than a doubling of noise levels during all hours of the day at Site 10 when construction activities are underway. There are no additional noise more effective noise abatement measures that are feasible and practicable that could be utilized to eliminate and/or further reduce the noise levels at these locations. However, while construction-related activities would result in noisy and intrusive noise levels at these two receptor sites and locations adjacent to these sites, because construction activities are expected to occur for a limited time period (i.e., less than a two months) in this area, the effects they cause are not considered to be noise impacts.

At Site 11, construction-related activities alone from the concrete batching plant south of the Palisades Center Mall would result in $L_{eq(1)}$ noise levels of 60 dBA, respectively. In addition, construction-related activities would increase $L_{eq(1)}$ noise levels at Site 11 by 3 to 4 dBA, a perceptible increase. These modest increases in noise levels would not be considered to be noise impacts.

The cumulative noise results presented above were primarily a function of the construction equipment. Construction vehicles idling on the project site and traveling to and from the construction site made negligible additions to the noise levels. Tug boats in operation for staging and transporting equipment and crew are similarly expected to contribute negligible amounts due to their distance from any noise sensitive receptors.

18-4-9-2 VIBRATION

Comment [TC29]: Similar to noise—this document estimates the amount of vibration but fails to analyze the resulting impacts to fish and wildlife resources. Please revise accordingly.

Construction activities have the potential to result in vibration levels that may in turn result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities. In general, vibration levels at a location are a function of the source strength (which in turn is dependent upon the construction equipment and methods utilized), the distance between the equipment and the location, the characteristics of the transmitting medium, and the building construction type at the location. Construction equipment operation causes ground vibrations which spread through the ground and decrease in strength with distance. Vehicular traffic, even construction-related vehicular and equipment traffic, typically does not result in perceptible vibration levels unless there are discontinuities in the roadway surface. With

the exception of the case of fragile and possibly historically significant structures or buildings, construction activities typically do not reach vibration levels that can cause architectural or structural damage, but can achieve levels that may be perceptible and annoying in buildings very close to a construction site. An assessment has been prepared to quantitatively assess potential vibration impacts of construction activities on structures and residences near the project area.

Construction Vibration Criteria

For purposes of assessing potential structural or architectural damage, the determination of a significant impact was based on the vibration impact criterion of a peak particle velocity (PPV) of 0.50 inches per second. For non-fragile buildings, vibration levels below 0.50 inches per second would not be expected to result in any structural or architectural damage. For fragile buildings, vibration levels should be below 0.20 inches per second.

For purposes of evaluating potential annoyance or interference with vibration-sensitive activities, vibration levels greater than 65 vibration decibels (VdB) would have the potential to result in adverse impacts if they were to occur for a prolonged period of time.

Methodology

For purposes of assessing potential structural or architectural damage, Peak Particle Velocity (PPV) was used while the vibration level in VdB L_v(D) was used assess potential annoyance or interference with vibration sensitive activities.

Table 18-22 shows vibration source levels for typical construction equipment.

Table 18-22
Vibration Source Levels for Construction Equipment

Equipment		PPVref (in/sec)	Approximate Lv (ref) (VdB)
Pile Driver (sonic)	upper range	0.734	105
	Typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Ram Hoe		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Transit Noise and Vibration Impact Assessment, FTA-VA-90-1003-06, May 2006.

Analysis Results

Generally, the types of construction equipment involved in construction activities that have the highest potential for resulting in architectural damage due to vibration are pile driving, ram hoes, truck loading/unloading, and jackhammers. In terms of potential vibration levels that would result in architectural damage, construction would have the

most potential for producing levels which would exceed the 0.50 inches per second PPV limit at receptor locations within a distance of approximately 50 feet from the operation of the pile driving rig; approximately 8 feet from the operation of ram hoe or truck loading/unloading; and approximately 5 feet from the operation of jackhammer. Since all receptors are located substantially beyond these distances, there would not be the potential for architectural damage due to construction activities.

In terms of potential vibration levels that would be perceptible and annoying, pile driving, vibratory roller activities, and truck loading activities would have the most potential for producing levels which exceed the 65 VdB limit. It is likely that at receptor locations within a distance of approximately 900 feet pile driving would produce perceptible and annoying vibration levels, within a distance of 230 feet vibratory roller activities would produce perceptible and annoying vibration levels, and within a distance of 125 feet truck loading activities would produce perceptible and annoying vibration levels. However, these operations would only occur for limited periods of time at a particular location and therefore would not result in any significant adverse impacts. In no case are significant adverse impacts from vibrations expected to occur.

18-4-10 ENERGY AND CLIMATE CHANGE

The potential effect of project construction on energy consumption and greenhouse gas (GHG) emissions is assessed in this section.

While the contribution of any single project to climate change is infinitesimal, the combined GHG emissions from all human activity severely impact global climate—an impact that is expected to increase in the future. The nature of the impact dictates that all sectors address GHG emissions by identifying GHG sources and practicable means to reduce them. Therefore, this chapter does not identify specific contributions of the proposed project to climate impacts, but rather addresses the changes in GHG emission associated with the project construction.

18-4-10-1 POLICY, REGULATIONS, STANDARDS, AND BENCHMARKS

In a step toward the development of national climate change regulation, the U.S. has committed to reducing emissions to 17 percent lower than 2005 levels by 2020 and to 83 percent lower than 2005 levels by 2050 (pending legislation) via the Copenhagen Accord.[1] Without legislation focused on this goal, the U.S. Environmental Protection Agency (USEPA) is required to regulate GHGs under the Clean Air Act, and has already begun preparing and implementing regulations. USEPA has established various voluntary programs to reduce emissions and increase energy efficiency and has recently embarked on regulatory initiatives related to GHG emissions.

There are also regional, state, and local efforts to reduce GHG emissions. In 2009, Governor Paterson issued Executive Order No. 24, establishing a goal of reducing GHG emissions in New York by 80 percent, compared to 1990 levels, by 2050, and creating a Climate Action Council tasked with preparing a climate action plan outlining

[1] Todd Stern, U.S. Special Envoy for Climate Change, letter to Mr. Yvo de Boer, UNFCCC, January 28, 2010.

the policies required to attain the GHG reduction goal—that effort is currently under way, and an interim draft plan has been published.[1]

The 2009 New York State Energy Plan[2] outlines the state's energy goals and provides strategies and recommendations for meeting those goals.

The 2009 New York State Smart Growth Public Infrastructure Policy Act requires that State infrastructure agencies (including NYSDOT, NYSTA, and others) ensure that, to the extent practicable, public infrastructure projects they approve, undertake, support, or finance be consistent with a series of smart-growth criteria.

A number of benchmarks for energy efficiency and green building design have also been developed. For example, NYSDOT'S Green Leadership in Transportation Environmental Sustainability (GreenLITES) Project Design Certification Program[3] is a self-certification rating system for enhancing the environmental performance of transportation projects. The certification addresses issues such as recycled content of materials, local materials, reducing electricity and petroleum consumption, improving cycling and pedestrian facilities, and many other sustainability items.

Currently, there are no standards or regulations applicable to GHG emission levels or impacts from actions subject to environmental review under NEPA or SEQRA. Accordingly, the potential effects of the project have been evaluated in the context of their consistency with the objectives stated in federal and state policies. Potential GHG emissions from the project are assessed and disclosed, and the feasibility and practicability of various measures available for reducing GHG emissions are discussed.

18-4-10-2 METHODOLOGY FOR GREENHOUSE GAS EMISSIONS ANALYSIS

Approach and Scope

Since the impact of GHGs emitted in the troposphere is generally the same regardless of where they are emitted, the analysis of GHGs addresses emissions resulting from project construction regardless of their location and timing. However, since project operations are expected to affect only a small reduction in GHG emissions from vehicles, the construction emissions represent the net total GHG emissions associated with the project.

The analysis includes both direct emissions from sources such as construction equipment and vehicles, and indirect emissions associated with electricity consumption. In addition, there are emissions preceding and following the proposed project, referred to as upstream and downstream emissions, such as emissions associated with the transport and production of fuels and construction materials, and emissions associated with disposal of materials after their use. The GHG analysis addresses both direct and indirect emissions, and, where practicable and substantial, upstream and downstream emissions.

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[1] http://www.nyclimatechange.us/

[2] New York State, *2009 New York State Energy Plan*, December 2009.

[3] https://www.dot.ny.gov/programs/greenlites

NYSDOT's Draft Energy Analysis Guidelines for Project-Level Analysis, November 25, 2003 (NYSDOT guidance) and associated MOVES Roadway and Rail Energy and Greenhouse Gas Analysis Extension (MOVES-RREGGAE) enable analysis of transportation project, using EPA's MOVES model for on-road emissions and other analysis procedures for construction emissions. The construction analysis procedures used in MOVES-RREGGAE rely on available information, mostly associated with standard roadway and rail projects, including in some cases estimates associated with the correlation between project costs and energy expenditure. Given the scale and complexity of the project, and the availability of more detailed construction information, a more detailed approach was applied here, relying on project data and existing information from USEPA, the US Department of Energy's Energy Information Administration (EIA), and other sources when necessary, as detailed below.

Greenhouse Gases Analyzed

Six GHGs are included in the analysis where relevant: Carbon dioxide (CO_2), nitrous oxide (N_2O), methane, Hydrofluorocarbons, Perfluorocarbons, and Sulfur Hexafluoride. To present a complete inventory of all GHGs, component emissions are added together and presented as CO_2 equivalent (CO_2e)—a unit representing the quantity of each GHG weighted by its effectiveness using CO_2 as a reference.

Non-Road Construction Engines

Fuel use for nonroad engines used on-site, including all construction engines, generators, and tug boats for all construction years and sites was estimated, similar to the detailed estimates of engine use described above for air quality and noise analyses. The total diesel fuel use was estimated to be 11.5 million gallons for the Short Span Option and 10.7 million gallons for the Long Span Option. This quantity of fuel was multiplied by an emission factor of 10.14 kg CO_2e per gallon of diesel to calculate total GHG emissions from these sources.

On-Road Vehicles

The total number of construction worker trips was estimated using the detailed construction schedule. The total number of trips, 885,832 for the Short Span Option and 246,238 for the Long Span Option, was then divided by an average vehicle occupancy of 1.2 and multiplied by an average round-trip distance of 30.3 miles[1] to obtain a total personal vehicle miles traveled of 11.17 million for the Short Span Option and 3.10 million miles for the Long Span Option. An average combined emission factor of 406 grams CO_2e per mile was applied; this was derived from the EPA MOVES emission model, assuming a roadway classification mix of 23.0 percent, 27.6 percent, and 49.4 percent on local, arterial, and freeway/expressway, respectively.[2]

Concrete and general deliveries (fuel, potable water, and other miscellaneous materials) were assumed to travel 50 miles round-trip (ready-mix concrete needs to be

[1] A one-way average commuting distance in the Poughkeepsie area of 15.13 miles was obtained from—Oak Ridge National Laboratory, 2001 National Household Travel Survey, New York Add-On— Putnam, Rockland, Westchester, May 2004.

[2] Average 2007 vehicle miles traveled mix by roadway classification for Rockland and Westchester counties. Data provided by NYSDOT.

delivered within a short time, and other materials are available locally). Other truck trips, including raw material delivery, such as materials for concrete batching, and removal of dredge and demolition materials would travel to/from unknown sites. It is estimated that these trips could range from 25 to 150 miles in each direction. Since these trips represent a large fraction of the total trips, emissions associated with these trips were calculated for round trip distances of 50 and 300 miles, and the range of results is presented. The trips, distances, and resulting total VMT are presented in **Table 18-23**.

Table 18-23
Total Construction Truck Trips and Distances

Type	Number	Distance (round-trip miles)	Vehicle Miles Traveled
Short Span Option			
Muck trucks	3,400	50 to 300	172,004 to 1,032,023
Raw material trucks	22,812	50 to 300	1,140,611 to 6,843,665
Concrete trucks	74,123	50	3,756,157
General deliveries	30,979	50	1,548,929
		Total:	**6,617,700 to 13,180,773**
Long Span Option			
Muck trucks	17,890	50 to 300	894,500 to 5,367,000
Raw material trucks	10,557	50 to 300	527,840 to 3,167,100
Concrete trucks	36,165	50	1,808,267
General deliveries	25,764	50	1,288,214
		Total	**4,518,821 to 11,630,521**

An average combined emission factor of 1,201 grams CO_2e per mile was applied; this was derived from the EPA MOVES emission model, assuming a roadway classification breakdown of 10 percent local roads, 10 percent arterial roads, and 80 percent freeway or interstate.

EPA estimates that the well-to-pump GHG emissions of gasoline and diesel are approximately 22 percent of the tailpipe emissions. Upstream emissions (emissions associated with production, processing, and transportation) of all fuels can be substantial and are important to consider when comparing the emissions associated with the consumption of different fuels.[1] Since this analysis does not include different fuels and since the upstream fuel component for materials is unknown and therefore not included, well-to-pump emissions were not included for the on-road component either. However, well-to-pump emissions are included in the consideration of the use of alternative fuels for construction (see “Measures to Reduce Greenhouse Gas Emissions”).

1 Environmental Protection Agency, MOVES2004 Energy and Emission Inputs, Draft Report, EPA420-P-05-003, March 2005.

Electricity Use

Although some grid-supplied electric power would be used for the Project, this would be limited to office use and other uses in the various staging areas. These uses are unknown at this time, but are expected to be minor on the scale of the other emissions quantified here, and were therefore not included.

Construction Materials

Upstream emissions related to the production of construction materials were estimated based on the expected quantity of iron or steel and cement. Although other materials will be used, cement and metals have the largest embodied energy and direct GHG emissions associated with their production, and large quantities would be used for the project.

The construction is estimated to require 739 and 351 thousand cubic yards of cement for the Short and Long Span Options, respectively. Concrete is estimated to have a density of 1.8 metric tons per cubic yard, and 10 percent cement content by weight, resulting in approximately 134 and 64 thousand metric tons of cement used for the Short and Long Span Options, respectively. An emission factor of 0.928 metric tons of CO_2e per metric ton of cement produced was applied to estimate emissions associated with energy consumption and process emissions for cement production.[1]

The construction is estimated to require approximately 295 and 301 thousand tons of steel for the Short and Long Span Options, respectively. An emission factor of 0.6 metric tons of CO_2e per metric ton of steel product produced was applied to estimate emissions associated with production energy consumption,[2] and a factor of 0.65 metric tons of CO_2e per metric ton of steel product produced was applied for process emissions associated with iron and steel production.[3]

18-4-10-3 ANALYSIS RESULTS

Greenhouse Gas Emissions—Long Span Option

The projected maximum GHG emissions by component for the duration of construction of the Long Span Option, along with the quantities and emissions factors for each component, are presented in **Table 18-24**.

Table 18-24
Greenhouse Gas Emissions—Long Span Option

Component	Quantity	Units	Emission Factor (metric tons CO_2e/unit)	Total Emissions (metric tons CO_2e)

[1] The Portland Cement Association, Life Cycle Inventory of Portland Cement Manufacture, 2006

[2] Arpad Horvath et al., Pavement Life-cycle Assessment Tool for Environmental and Economic Effects, Consortium on Green Design and Manufacturing, UC Berkeley, 2007.

[3] Based on 42.3 teragrams of CO_2e emitted and 65,460 thousand tons produced; EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2009, April 15, 2011.

Materials Embedded*				
Cement	63,600	metric tons	0.928	59,100
Steel	272,700	metric tons	1.25	339,700
Non-road Engines** (diesel)	10,673,000	gallons	0.0101	108,300
On-Road Vehicles				
Trucks***	11,630,000	VMT	0.00120	14,000
Worker vehicles	3,100,000	VMT	0.00041	1,300
			Total:	**522,000**

Notes:

Numbers are presented at analysis precision level. Sums may not add up due to rounding.

* Emissions do not include extensive additional shipping such as international shipping of steel, if steel is imported. For example, shipping the steel from South America could add 250 thousand metric tons of CO_2e, and from China could be double that amount.

** Non-road engines include on-site tug boat operations. Tug boat deliveries are listed separately.

*** Truck emissions presented are based on the high-end assumption of 300-mile round trip distance. The lower-end scenario of 50-mile round trip would result in 5,400 metric tons of CO_2e from truck trips, reducing the total by 8,500 metric tons CO_2e.

Greenhouse Gas Emissions—Short Span Option

The projected maximum GHG emissions by component for the duration of construction of the Short Span Option, along with the quantities and emissions factors for each component, are presented in **Table 18-25**.

Summary

Total GHG emissions associated with construction of the project are projected to be approximately 0.5 million metric tons, with emissions from the Short Span Option approximately 12 percent higher than the Long Span Option. It is unknown at this time if steel for the bridge will be produced in the US or imported; if the steel for the project needs to be shipped for long distances emissions could be considerably higher. For example, shipping all steel 12,500 miles (approximate distance from Shanghai to an east coast port) would result in an additional 850 thousand metric tons CO_2e (both options require approximately 300 thousand tons of steel in total).

Table 18-25
Greenhouse Gas Emissions—Short Span Option

Component	**Quantity**	**Units**	**Emission Factor** (metric tons CO_2e/unit)	**Total Emissions** (metric tons CO_2e)
Materials Embedded*				

Cement	133,900	metric tons	0.928	124,300
Steel	267,400	metric tons	1.25	333,100
Non-road Engines** (diesel)	11,526,000	gallons	0.0101	116,900
On-Road Vehicles				
Trucks***	13,180,000	VMT	0.00120	15,800
Worker vehicles	11,170,000	VMT	0.00041	4,500
			Total:	**595,000**

Notes:

Numbers are presented at analysis precision level. Sums may not add up due to rounding.

* Emissions do not include extensive additional shipping such as international shipping of steel, if steel is imported. For example, shipping the steel from South America could add 66 thousand metric tons of CO_2e, and from China could be double that amount.

** Non-road engines include on-site tug boat operations. Tug boat deliveries are listed separately.

*** Truck emissions presented are based on the high-end assumption of 300-mile round trip distance. The lower-end scenario of 50-mile round trip would result in 7,950 metric tons of CO_2e from truck trips, reducing the total by 7,900 metric tons CO_2e.

18-4-10-4 MEASURES TO REDUCE GREENHOUSE GAS EMISSIONS

Potential measures to reduce GHG emissions could address any of the GHG emission categories analyzed above for construction. In addition, there are some measures that could be incorporated in the project design and operations which could further reduce GHG emissions for years to come—see Chapter 13, “Energy and Climate Change for a discussion of project design and operational measures and features.

To address emissions associated with construction, several measures will be required via construction contracts to reduce direct emissions and upstream emissions associated with construction materials and their transportation:

Supplementary Cementitious Materials (SCM): Construction contracts would require the use of fly ash, slag, silica fume, calcined clay, and/or interground limestone to the extent practicable, contingent upon meeting the project’s concrete specifications. Depending on the practicable level of implementation, these measures may reduce emissions by as much as 15,000 or 30,000 metric tons CO_2e for the Long Span Option and the Short Span Option, respectively.

Reducing Concrete Waste: Construction contracts would require contractors to make efforts to reduce concrete waste. Concrete is wasted when concrete cannot be poured on site for reasons such as timing, quality control, or quantity estimates (e.g., leftover concrete from the last pour of the day). In such cases, concrete can be poured as blocks or sidewalk slabs for later use.

Optimize Cement Content: Contractors will be required to optimize cement content according to project specifications.

In addition, the following measures will be implemented where practicable:

Biodiesel: Biodiesel could be used for non-road engines during construction. The feasibility of using biodiesel for some or all construction engines and/or tug boats will be investigated, and included in construction contracts if found to be practicable.

This would reduce project emissions in the range of 12,000 to 117,000 metric tons CO_2e depending on the biodiesel blend used.

Recycled Steel: Requiring the use of recycled steel in construction contracts where practicable could ensure lower GHG emissions from steel production. If all project steel is from recycled sources, emissions could be reduced by approximately 220,000 metric tons CO_2e (40 to 45 percent of total emissions).

Local Materials Sourcing: The use of local materials can substantially reduce emissions from transportation. For example, the difference between the 50-mile round trip scenario and the 300-mile trip scenario for project truck trips is approximately 14,000 metric tons CO_2e for the Long Span Option, and 10,000 for the Short Span Option. More importantly, as discussed above, if steel is shipped from distant international origins, additional emissions associated with the shipping could amount to 385,000 to 850,000 metric tons CO_2e. In addition to the request for the use of local materials where practicable in the construction bid documents, the "buy American" provisions would require the use of American materials unless savings amounting to 25 percent of the entire cost of the project could be made by purchasing materials from other countries; therefore, it is unlikely that materials would be sourced from international origins.

18-4-11 TOPOGRAPHY, GEOLOGY, AND SOILS

As described in Chapter 14, "Topography, Geology, and Soils," the limit of disturbance area for the replacement bridge is characterized by rolling and gently sloped topography, primarily comprising 0-15 percent slopes. The only area of steep slopes (25-35 percent) is along the Hudson River shoreline in Westchester County. The TQSA and WNSA are located in areas of primarily minimal slopes (0-15 percent).

The majority of ground disturbance related to construction of the Replacement Bridge Alternative would occur in areas of 0-15 percent slopes. The roadway would be elevated over the areas of 25-35 percent slopes in Westchester County; therefore, substantial regrading would not be required.

The primary concerns related to soils are erosion and suitability for construction. Ground disturbance can expose soils to wind, rain, and other erosive forces, thereby potentially creating dust or sedimentation of waterbodies. Erosion hazards for the soils in the limit of disturbance area range from moderate to very severe. To minimize potential impacts associated with soil erosion, all construction activities would be conducted in accordance with any applicable NYSDEC-approved SWPPP and ESC plan developed pursuant to NYSDEC's SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001). In the post-construction (i.e., operation) condition, any previously exposed areas during construction would either be developed with highway improvements or maintenance facilities or would be re-vegetated, thereby limiting long-term erosion concerns.

18-4-12 WATER RESOURCES

Construction of the Replacement Bridge Alternative has the potential to affect the water quality of the Hudson River within the study area due to in-water construction activities that include dredging of bottom sediments, installation of cofferdams, driving of piles, vessel movement, and demolition of the existing bridge. Additionally, upland

construction activities within the upland staging areas, the bridge landings within Rockland and Westchester Counties, upland activities associated with establishing access to the waterfront staging areas have the potential to affect floodplains, and surface and groundwater resources within the vicinity of these sites. Activities within the floodplain, discharges to surface water and groundwater, and dredging and disposal of dredge material must comply with the federal and state legislation and regulatory programs described previously in Chapter 15, "Water Resources".

Comment [TC30]: Yes. However, you still need to disclose to the public what impacts these activities will have.

Potential impacts on groundwater, floodplains, and water quality of the Hudson River were assessed by considering the following:

Comment [TC31]: Existing contaminants in the river and the impacts from re-suspension?

The existing groundwater and floodplain resources and Hudson River water quality within the study areas, as discussed in Chapter 15, "Water Resources;"

Results of modeling conducted to assess the potential for sediment disturbance resulting from in-water construction activities (i.e., dredging, cofferdam installation, pile driving, and vessel movement) to result in adverse environmental impacts to Hudson River water and sediment quality, as described in greater detail below;

The potential for cofferdam dewatering to affect water quality; and

The potential for demolition of the existing bridge to impact water quality.

The potential for land-based construction activities to result in soil erosion and the discharge of stormwater runoff.

18-4-12-1 SEDIMENT RESUSPENSION ANALYSIS METHODOLOGY

Comment [TC32]: What impacts on aquatic species and their habitats would result from sediment resuspension? Include discussion of contaminants (e.g., bioaccumulation, etc)

For the Hudson River, the principal water quality resources issues for the construction of the Replacement Bridge Alternative is the resuspension of river sediments during construction and removal of the existing bridge foundations, and the transport[1] and eventual deposition[2] of this resuspended sediment elsewhere in the Hudson River. While the sand fraction of river sediment settles out relatively quickly after being resuspended, the finer sediment fractions will remain suspended and will be transported away from the construction area and will be deposited elsewhere in the estuary or leave the estuary altogether. Hydrodynamic modeling was used to project the plume of resuspended sediment that would result from sediment disturbing construction activities and the fate and transport of this plume within the Hudson River estuary. As discussed in detail in **Appendix E**, two public domain models were employed in the modeling; the Environmental Fluid Dynamics Code (EFDC) model and Research Management Associates (RMA) model. The EFDC is a state-of-the-art hydrodynamic model that can be used to simulate aquatic systems in one, two, and three dimensions. It is one of the most widely used and technically defensible hydrodynamic models in the world (www.Epa.gov/Athens/wwqtsc/html/efdc.html). The EFDC model and technical support is available from the USEPA and is the most widely used hydrodynamic model. The RMA model is a dynamic two-dimensional depth-averaged finite element hydrodynamic

[1] Resuspended sediment will be transported by river flow. During transport the sediment is subject to a variety of processes, including dispersion, which tends to dilute concentrations over time.

[2] At some point after being resuspended, sediment will settle in depositional areas within the estuary system. This material will become part of the natural sediment transport cycle in the Hudson River estuary and will undergo additional cycles of resuspension and deposition.

model that was developed for the USACE and is used extensively for bridge scour evaluations in estuaries. It is one component of the US Army Corps of Engineers TABS-MD System (US Geological Service (USGS) Surface Water and Water Quality Models Information Clearinghouse (http://smig.usgs.gov/cgi-bin/SMIC/model_home_pages /model_home?selection=rma2).

Inputs to the hydrodynamic models included the following:

Results of SedFlume[1] analysis of sediments within the vicinity of the area to be dredged conducted by Dr. Donald Hayes, that indicated sediments within the study area are highly susceptible to resuspension. Dr. Hayes is the director of the Institute for Coastal Ecology and Engineering at the Universtiy of Louisiana at Lafayette Department of Civil Engineering and a recognized expert in the areas of dredging, sediment management, beneficial uses and contaminated sediment (Louisiana Sea Grant program http://www.laseagrant.org/comm/experts/hayes.htm).

Existing information to characterize the Hudson River Estuary within the study area, examples of which include bathymetry from the National Oceanic and Atmospheric Administration (NOAA) navigational charts, tidal data from US Geological Survey (USGS) and NOAA tide stations, USGS freshwater discharge, salinity and suspended sediment concentration data, and USGS suspended sediment concentration data.

Results of numeric models developed by Dr. Hayes to estimate suspended sediment loadings that would result from dredging; pile driving, coffer dam installation, dewatering, and removal; and vessel movement as described below. Inputs to these models are presented below.

- Suspended sediment generated by dredging—dredging area (up to approximately 173 acres (about 0.2 square miles) and volume (up to 1.8 million cubic yards), rate of dredging (about 7,500 cubic yards per dredge per 24 hour period with two dredges operating concurrently), use of environmental/closed bucket with no barge overflow and a conservative sediment loss rate of about 1 percent. This conservative loss rate, combined with the projected dredging rate and the sediment characteristics results in an average sediment resuspension rate for each dredge of 39 kilograms per minute (kg/min), and a maximum rate of 94 kg/min (see **Appendix E**, Attachment 4).
- Suspended sediment generated by cofferdam construction and dewatering—In the absence of existing information on sediment resuspension rates associated with cofferdam construction, resuspension of sediment during installation of sheet pile for cofferdams was developed on the basis of results of suspended sediment monitoring conducted for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project during dredging and in-water construction activities

[1] High Shear Stress flume (SEDflume http://www.erdc.usace.army.mil) is designed for estimating gross erosion rates of fine-grained and mixed fine/coarse-grained sediments and the variation of the erosion rate with depth below the sediment-water interface. The erosion data are used to predict stability for contaminated sediments, capping material, native sediment, or dredged material and are often incorporated into numerical sediment transport models. The flume is designed to erode sediment cores layer by layer. Each core layer is eroded by regulating flow over the core surface. The flume is operator-controlled, so the operator selects the range of shear stresses (starting at a low value and proceeding through higher values) for measuring erosion rate.

(http://biomitigation.org/bio_overview/subjects_overview.asp#water). Results of monitoring for that project indicated that installation of sheet pile for cofferdam construction resulted in average resuspension of bottom material that was about 30 percent of the average resuspension during dredging (see **Appendix E**, Attachment 4).

- Suspended sediment generated by pile driving and dewatering—Existing information on sediment resuspension from pile driving and dewatering was similarly absent and was estimated to be approximately 40 percent of that observed during dredging on the basis of the suspended sediment monitoring for the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project (see **Appendix E**, Attachment 4).
- Suspended sediment generated by vessel movement and prop scour—As discussed previously a layer of gravel and sand would be placed at the bottom of the dredged channel to minimize sediment re-suspension. However, this layer would not prevent the resuspension of sediment that would be naturally deposited each day. Using an estimated depositional rate of sediment within the dredged channel of 104 kilograms per meter per day developed on the basis of van Rijn (1986) and total suspended sediment concentrations measured during studies conducted for the Replacement Bridge Alternative, the hourly scour rate of sediment as the vessels move along the channel was estimated as 8.7 kg per meter per hour (kg/m/hr) (see **Appendix E**, Attachment 4).

As indicated in the construction timeline presented in Figure 18-1, there are periods when sediment disturbing activities evaluated in the hydrodynamic modeling would occur concurrently, with the majority of the potential for sediment resuspension occurring during the first two dredging periods. The hydrodynamic modeling results evaluated in this EIS comprise conservative scenarios that would be expected to result in the greatest sediment resuspension:

Stage 1 dredging with pile driving for the main span (Zone C) and trestles;

Pile driving and cofferdam installation and dewatering for Zones C and B, movement of construction vessels, and trestle construction after Stage 1 dredging is complete; and

Stage 2 dredging combined with pile driving and cofferdam installation and dewatering for Zones C and B, and movement of construction vessels.

Appendix E to this chapter presents the results of the hydrodynamic modeling for all of the scenarios evaluated for the project. The worst case scenarios evaluated in this EIS were developed on the basis of these analyses.

Comment [TC33]: We need to see this document in order to provide comments.

18-4-12-2 SEDIMENT RESUSPENSION AND TRANSPORT

The Long Span Option would have fewer total number of piers (35) than the Short Span Option (62) (see Figures 18-6 and 18-7), resulting in a shorter construction duration (4½ years) than the short span option (5½ years). While the number of main span piers is the same between the two options, the long span option has far fewer piers in the approaches.

Sediment disturbing construction activities include dredging, cofferdam construction, and pile driving within Substructure Zones A and B, pile driving within Substructure

Zone C (see Figures 18-6 and 18-7 for the location of these zones) and the movement of construction vessels within the construction access channel for the Long and Short Span options. Within Construction Zones A and B (see Figures 18-6 and 18-7) pile driving would occur within the cofferdams and would not have the potential to re-suspend sediment within the river. Within Zone C, piles would be driven first and then the pile caps installed within hanging cofferdams. Therefore, only the Zone C piles would have the potential to result in additional sediment re-suspension. Hydrodynamic modeling was used to project the plume of resuspended sediment that would result from these concurrent sediment disturbing construction activities and the fate and transport of this plume within the river estuary.

The results of the modeling of the scenarios expected to result in the greatest resuspension of sediment indicated in **Figures 18-13** through **18-16** are similar for the Long Span and Short Span Options and indicate that total suspended sediment concentrations in the range of 50 to 100 mg/L above ambient conditions would only occur in the immediate vicinity of the dredges. This level of increase would be expected to occur within the allowable mixing zone[1] for dredging. Other sediment disturbing construction activities would result in a much smaller contribution of suspended sediment (i.e., driving of piles for the cofferdams, pile driving, vessel movement and cofferdam dewatering). On flood and ebb tides, concentrations of 10 mg/L above ambient conditions may extend in a relatively thin band approximately 1,000 to 2,000 feet from the dredges, while concentrations of 5 mg/L may extend a greater distance. Total suspended sediment concentrations recorded during sampling conducted for the project ranged from 13 to 111 mg/L. Additionally, the approximately 8-year record of suspended sediment concentration (SSC) recorded by the USGS at Poughkeepsie (see Chapter 15, "Water Resources," Figure 15-8) indicates there is considerable variation in the suspended sediment concentration within the Hudson River, as would be expected with an estuarine environment. During periods of higher freshwater flow the differences between low and high SSCs range between approximately 20 to 40 mg/L, during periods of low freshwater inflow the differences between low and high SSCs range from about 5 to 20 mg/L. Therefore, the projected increases in suspended sediment due to dredging concurrent with other sediment-disturbing construction activities would be well within the natural variation in suspended sediment concentration and would not result in adverse impacts to water quality and would be expected to meet the turbidity standard[2] for Class SB waters at the edge of the mixing zone. Concentrations of total suspended sediment from cofferdam construction (which include the discharge of river water recovered during dewatering) and pile driving would be approximately 5 to 10 mg/L in the immediate vicinity of the activity (within a few hundred feet) which would be much less than that projected to result from dredging and would not result in adverse water quality impacts. Concentrations of total suspended sediment resulting from construction vessel movement are projected to be less than 5 mg/L. Increases of total suspended

Comment [TC34]: Impacts to aquatic species and their habitats?

[1] A mixing zone is an area in a water body within which the NYSDEC will accept temporary exceedances of water quality standards resulting from short-term disruptions to the water body caused by dredging or the management of dredged material. A mixing zone can be assigned at the site of dredging (NYSDEC 2004).

[2] The turbidity standard for Class SB waters is "No increase that will cause a substantial visible contrast to natural conditions."

sediment concentration above ambient would be greatest during slack tide, without tidal action to disperse it (see Figures 18-13 and 18-15).

Placement of the sand/gravel armoring material within the dredged area, similar to the placement of granular capping material over contaminated sediment, has the potential to result in sediment resuspension when the capping material is deposited upon the sediment, but would not be expected to affect the magnitude of sediment resuspension projected through the hydrodynamic modeling. Results of monitoring conducted during placement of granular capping material on soft sediment indicated that resuspended sediment plumes were due to fines washed of the sand cap material and not due to resuspension of bottom sediment as the capping material was put in place (USACE 2005). Measures would be implemented during placement of the sand layer of the armoring to minimize resuspension of the newly exposed sediment. These measures are the same type of measures that have been demonstrated to successfully cap contaminated sediment with minimal mixing of the cap with contaminated sediment (Palermo et al. 2011), and for the capping of subaqueous dredged material (Palermo et al. 1998). They include both mechanical (dry sand capping material with bottom-dump barge, side-casting, bucket/clamshell, tremie (gravity-fed downpipe)) and hydraulical (wet/slurry of sand placed from a pipe or tremie, or from a spreader barge) placement of the capping material (USACE 2005 and 2006a, USEPA 1995, Palermo et al. 2011). Mechanical methods rely on the gravity settling of the granular capping materials in the water column (Palermo et al. 2011) which can result in less water column dispersion than discharge of hydraulically-handled cap material because it settles faster in the water column (USACE 1991). Hydraulic methods can allow for a more precise placement of the material at the surface or depth but may require use of a dissipation devise to reduce sediment resuspension (Palermo et al. 2011, USACE 1991).

Placing sand capping material in layers has been found to allow gentle spreading, resulting in a more stable sand cap (Ling and Leshchinsky undated), and avoiding displacement of or mixing with the underlying sediment (USEPA 2005). This results in a decrease in the turbidity plume with each successive cap layer. The reduction in sediment resuspension observed by placing granular capping material in lifts or layers may afford the ability to place subsequent layers using an alternative methodology that may allow faster placement (USEPA 2008). Therefore, once the sand layer of the proposed armoring is in place, the placement of the gravel would have limited potential to result in sediment resuspension. With the implementation of these methods of placement of granular capping material that have been proven to reduce sediment resuspension during placement, additional sediment resuspension that would occur during the placement of the armoring material would be minimized and would not be expected to result in adverse water quality impacts.

In summary, the results of the hydrodynamic modeling of changes in suspended sediment resulting from construction activities—dredging, pile driving, cofferdam construction, and vessel movement—indicate that with the exception of the portion of the mixing zone within the immediate vicinity of the dredge, increases in suspended sediment would be minimal for the Long and Short Span Options and within the natural range of variation of suspended sediment concentration within this portion of the river. Sediment resuspension resulting from dredging and other sediment disturbing activities would be expected to meet the Class SB turbidity standard at the edge of the mixing

zone. Resuspended sediment would dissipate shortly after the completion of the dredging activities, and would not result in adverse impacts to water quality. During the periods of in-water construction when no dredging is occurring, the limited sediment resuspension during pile driving, cofferdam installation and removal, and vessel movement would be localized, would be expected to dissipate shortly after the completion of in-water construction activity and would not result in adverse water quality impacts. Similarly, with the implementation of measures demonstrated to minimize sediment resuspension during placement of capping or armoring material, the placement of the armoring material within the dredged area would not result in adverse water quality impacts. For all of the reasons presented above the increase in suspended sediment projected to result from dredging and other in-water sediment-disturbing construction activities, even under the worst case scenarios, and the placement of armoring within the dredged channel, would not result in adverse impacts to water quality of the Hudson River.

Comment [TC35]: Adverse impacts to aquatic species?

18-4-12-3 SEDIMENT QUALITY

Comment [TC36]: This section needs to have a discussion of existing contaminants in the river.

Chapter 15, "Water Resources," presents a detailed discussion of sediment quality on the basis of results of laboratory analysis of sediment samples collected within the study area in 2006 and 2008 (see Figures 15-13 through 15-18). The results of these analyses are summarized in Table 15-3, and the samples classified as Class B (moderate contamination) or Class C (high contamination) in accordance with NYSDEC's In-Water and Riparian Management of Sediment and Dredged Material (NYSDEC 2004). While there are some locations for which certain contaminants fall under the Class B or Class C category, these concentrations typically apply to only the upper few feet and the concentrations of these contaminants decline to those meeting Class A (no appreciable contamination) category within a few feet of the mudline. Resuspension of sediments during dredging can also affect water quality through the release of contaminants dissolved in the sediment pore water (i.e., the water occupying the spaces between sediment particles). Considering the limited plume of increased suspended sediment above ambient concentrations projected to occur during the three-month dredging periods, and the limited area of sediments with low to moderate levels of contamination within the area to be dredged, the release of any contaminants would not result in adverse impacts to water quality.

The other in-water construction activities with the potential to result in sediment resuspension (pile driving, installation of the cofferdam and vessel movement) for the Long and Short Span Options are projected to result in a minimal increase in SSC above ambient concentrations. These projected increases would actually be much lower, because within Zones A and B, the sand/gravel armoring layer installed throughout these two zones to minimize scouring would also minimize any resuspension of sediment resulting from the installation of the cofferdams. River water recovered during dewatering of the cofferdams would be treated (e.g., tanks to settle out any suspended sediments and water filtration system as necessary) and discharged back to the Hudson River in accordance with conditions issued by the NYSDEC under the Section 401 water quality certification for the project and would not result in adverse impacts to water quality of the Hudson River.

18-4-12-4 EXISTING BRIDGE DEMOLITION

Bridge demolition would occur in two stages. The first stage includes partial demolition to allow for construction of the replacement bridge in the vicinity of the Westchester shoreline. The second stage includes the remaining demolition after completion of the replacement bridge. Use of turbidity curtains during removal of the columns and footings and cutting of the timber piles would minimize the potential for sediment resuspended during the bridge removal activities to adversely affect water quality. Following removal of the existing bridge, sediment that has been deposited within mounds in the vicinity of the existing bridge piers may erode over time until reaching a new equilibrium elevation. Because the Tappan Zee portion of the Hudson River is considered to be neither a depositional or erosional environment (i.e., in equilibrium) (Nitsche et al. 2007) as indicated by the results of the 20th century sediment mapping presented in Chapter 15, "Water Resources" (see **Appendix E),** the erosion of these sediments in the vicinity of the existing bridge would be limited under normal river conditions and would most likely occur during high flow events. While some of these sediment deposits have elevated concentrations of certain contaminants (Class B or Class C categories), these elevated concentrations do not extend more than a few feet below the mudline. Therefore, the gradual erosion of some areas of contaminated sediment following the removal of the bridge would not be expected to result in adverse impacts to water quality or result in water quality conditions that fail to meet the Class SB standards.

18-4-12-5 INLAND STAGING AREAS

Groundwater Resources

West Nyack Staging Area

This approximately 33-acre site contains a concrete batch plant, and areas of paved and unpaved surfaces. The use of the WNSA for the construction staging activities described in Section 18-3-2, "Inland Construction Staging," of this chapter would not be expected to adversely affect the designation of the aquifer at the site as a Principal Aquifer with maximum obtainable well yields of 10 to 100 gallons per minute (gpm)(see **Figure 18-17**). As described in Chapter 15, "Water Resources," principal Aquifers are known to be highly productive, but are not used as a public water supply (NYSDEC 1990). Any storage and use of petroleum and other chemical products (e.g., diesel fuel, lubricating oil and miscellaneous cleaning and maintenance chemicals) would be in accordance with applicable regulatory requirements, including those relating to federal Spill Prevention, Control, and Countermeasures (SPCC) requirements and state petroleum bulk storage, chemical bulk storage (CBS), and spill requirements. With implementation of these measures, potential impacts to groundwater resources would be minimized. Furthermore, once specific locations of soil disturbance are identified, environmental site investigation(s) would be conducted to identify potential areas of subsurface contamination to minimize the potential for adversely affecting groundwater quality. Therefore, the project would not result in any adverse impacts to groundwater resources at the WNSA.

Tilcon Quarry Staging Area

Use of the quarry site or adjacent commercial properties for construction staging activities described in Section 18-3-2, “Inland Construction Staging,” of this chapter would not result in significant adverse impacts to the Principal Aquifer near the site. Implementation of the SPCC requirements as necessary would minimize the potential for the storage of petroleum or chemical products on the site to adversely affect groundwater resources. With implementation of these measures, potential impacts to groundwater resources would be minimized. As discussed for the WNSA environmental site investigation(s) would be conducted to identify potential areas of subsurface contamination prior to any soil disturbing activities to minimize the potential for adversely affecting groundwater quality. Therefore, the project would not result in any adverse impacts to groundwater resources at the TQSA.

Westchester Staging Area

The WISA is currently used by the NYSTA’s TZB maintenance facility, Bridge patrol, Equipment Maintenance, and the NYSP Troop T unit. It contains impervious surfaces, such as buildings and paved road/parking areas, and landscaped areas. There are no Principal or Primary Aquifers designated by the NYSDEC or Sole Source Aquifers (SSAs) designated by the EPA within the vicinity of the WISA (see Figure 18-17). Implementation of the SPCC requirements as necessary would minimize the potential for the storage of petroleum or chemical products on the site to adversely affect groundwater resources. With implementation of these measures, potential impacts to groundwater resources would be minimized. Use of this site for construction staging activities described in Section 18-3-2, “Inland Construction Staging,” of this chapter would not result in adverse impacts to groundwater resources.

Watersheds and Waterbodies

Rockland Inland Staging Areas

On the Rockland Inland Staging Area sites, any soil disturbance that would occur as a result of use of the WNSA and TQSA in preparation for their use for construction staging would employ erosion and sediment control measures (e.g., silt fences and straw bale dikes) in accordance with the New York Standards and Specifications for Erosion and Sediment Controls (last revised August, 2005). Stormwater management measures would be implemented in accordance with the Stormwater Pollution Prevention Plan (SWPPP) developed for the site in accordance with the New York State Stormwater Management Design Manual (NYSSMDM) (last revised August, 2010). These measures would minimize potential impacts to water quality of the Hackensack Tributary 9AA and Hackensack River associated with stormwater runoff from the WNSA and TQSA, respectively. Therefore, the project would not result in adverse environmental impacts to the water quality of Hackensack Tributary 9AA or the Hackensack River.

Westchester Inland Staging Area

Use of the WISA for construction staging activities would not result in significant adverse environmental impacts to surface water resources. Any soil disturbance that would occur on this primarily paved site in preparation for its use for construction staging would employ erosion and sediment control measures (e.g., silt fences and

straw bale dikes) in accordance with the New York Standards and Specifications for Erosion and Sediment Controls. Stormwater management measures would be implemented in accordance with the SWPPP developed for the site in accordance with the NYSSMDM. These measures would minimize potential impacts to surface waters associated with stormwater runoff from the WISA, and the use of this site as a staging area would not result in adverse impacts to surface waters.

Floodplains

West Nyack Staging Area

While a portion of the site is within the 100- and 500-year floodplain, no activities would be conducted in this portion of the site that would impede floodwaters or result in increased flooding of adjacent areas (see **Figure 18-18**).

Tilcon Quarry Staging Area

The TWSA is located outside the 100- and 500-year floodplain (see Figure 18-18) and would not result in adverse impacts to floodplain resources.

Westchester Inland Staging Area

The WISA is located outside the 100- and 500-year floodplain (see Figure 18-18) and would not result in adverse impacts to floodplain resources.

Bridge Staging Areas

The temporary platforms constructed for the Rockland and Westchester Bridge Staging areas would be within the 100-year flood plain. As discussed in Chapter 15, "Water Resources," the Hudson River within the study area is tidally influenced and as such is affected by coastal flooding, which is influenced by astronomic tide and meteorological forces and would not be affected by the platforms proposed within the Bridge Staging Areas for the Replacement Bridge Alternative. Therefore, the platforms within the bridge staging areas would not result in adverse impacts to wetland resources and would be in compliance with Executive Order 11988.

18-4-12-6 STORMWATER MANAGEMENT

During upland construction activities such as those associated with the previously described upland staging areas, the bridge landings for the Replacement Bridge Alternative, and development of construction access to the waterfront staging areas, erosion and sediment control measures (e.g., silt fences and straw bale dikes) would be implemented in accordance with the New York Standards and Specifications for Erosion and Sediment Controls. Stormwater management measures would be implemented through development of a SWPPP, in accordance with the New York State Stormwater Management Design Manual (NYSSMDM) (last revised August, 2010) and the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001). Implementation of these measures would minimize the potential for stormwater runoff from upland construction areas to adversely affect water quality of the Hudson River, Sheldon Brook, or the freshwater wetland adjacent to the access road to the Westchester Bridge Staging Area. Therefore, upland soil disturbance and discharge of stormwater runoff from construction access and inland

staging areas would not result in adverse impacts to water quality of the Hudson River or Sheldon Brook.

18-4-13 ECOLOGY

Construction of the Replacement Bridge Alternative has the potential to affect wetlands, terrestrial resources including vegetation, wildlife, and threatened or endangered terrestrial species, due to disturbance for construction of the new bridge landings, staging areas and development of construction access to the waterfront staging areas. In-water construction activities such as dredging, armoring of the dredged channel, installation of cofferdams and bulkhead, driving of piles, and demolition of the existing bridge have the potential to affect aquatic biota, including threatened or endangered species, and significant habitat areas of the Hudson River (e.g., Significant Coastal Fish and Wildlife Habitat, USFWS Significant Habitats, and Essential Fish Habitat (EFH)) within the study area. Activities within wetlands or special habitats, or those that have the potential to affect federal or state-listed threatened or endangered species, EFH, or affect the presence of invasive species must comply with the federal and state legislation and regulatory programs described previously in Chapter 16, "Ecology."

Potential impacts to terrestrial biota, wetlands and aquatic biota within the study area were assessed by considering the following:

Temporary impacts to wetlands due to dredging and temporary structures;

Permanent impacts to NYSDEC littoral zone wetlands and a possible freshwater wetland due to placement of fill or structure;

Temporary and permanent loss of terrestrial vegetation and it use as wildlife habitat due to land clearing, grading and other construction activities;

Airborne noise disturbances to wildlife, including threatened and endangered species;

The potential for temporary increases in suspended sediment resulting from dredging, in-water construction activities, and demolition of the existing bridge, to affect benthic invertebrates, fish (including threatened and endangered species), and Submerged Aquatic Vegetation (SAV)

The loss or temporary modification of bottom habitat due to dredging, armoring of the dredged channel, and pile-driving;

Permanent loss of bottom habitat due to construction of in-water components of the project; and

Hydroacoustic effects to fish (including threatened or endangered species) and benthic invertebrates.

18-4-13-1 WETLANDS

Tidal Wetlands

Tidal wetlands would be affected within the Bridge Study Area by construction of the temporary access roadway to the temporary platform for the Westchester Bridge Staging Area, construction of the permanent work platform within the Rockland Bridge Staging Area; and dredging activities for the project as described below and summarized in **Tables 18-26** and **18-27**.

Table 18-26
Overwater Coverage from Platforms

	Habitat	Acres
Temporary Overwater Coverage		
West Platform-Storage Platform Area	Open Water	2.30
West Platform-Docking Platform Area	Open Water	1.84
East Platform-Storage Platform Area	Open Water	2.30
East Platform-Docking Platform Area	Open Water	1.84
East Platform-Access Road	Littoral Zone	0.50
TOTAL		**8.78**
Permanent Overwater Coverage		
Permanent Platform	Littoral Zone	0.09
Permanent Platform	Open Water	1.89
TOTAL		**1.98**

Table 18-2
Potential Loss of River Bottom, Wetlands, and Adjacent Area Habitats due to Project Activities

	Possible Freshwater Wetland Areas	NYSDEC Littoral Zone Tidal Wetlands	NYSDEC Tidal WetlandAdjacent Area	Open Water Benthic Habitat	Total
Temporary					
West Platform-Storage Platform Area	-	-	-	0.12	**0.12**
West Platform-Docking Platform Area	-	-	-	0.09	**0.09**
East Platform-Storage Platform Area	-	-	-	0.12	**0.12**
East Platform-Docking Platform Area	-	-	-	0.09	**0.09**
East Platform-Access Road	-	0.03	0.4	-	**0.43**
Dredging	-	5.3	-	160-170	**165-175**
West Nyack Staging Area	2.0	-	-	-	**2.0**
Tilcon Quarry Staging Area	-	-	-	-	**0**
TOTAL TEMPORARY	**2.0**	**5.3**	**0.4**	**160.4-170.4**	**167.9-177**
Permanent					
Permanent Work Platform-Pile-supported	0.11	0.005	-	0.09	**0.21**
Permanent Work Platform-Bulkheaded	-	-	-	0.23	**0.23**
New Bridge	-	-	-	6.5-8.0	**6.5-8.0**
Removal of Existing Structure	-	-	-	(7.1)	**(7.1)**
TOTAL PERMANENT	**0.11**	**0.005**	**-**	**(0.28)-1.22**	**(0.16)-1.34**

Comment [s37]: Table should specify area of benthic habitat lost/impacted by armoring.

Comment [s38]: Acres?

Comment [s39]: The document should either state that the losses are the same for each alternative or specify the losses for each alternative.

Temporary Access Roadway

Two temporary work platforms would be constructed north of the existing bridge, one platform within each Bridge Staging Area, to provide space for the docking of vessels, the transfer of materials and personnel, and the preparation of construction elements for the Replacement Bridge Alternative. Neither temporary platform would be located within mapped NYSDEC littoral zone tidal wetlands. However the construction of the temporary access road leading to the Westchester Bridge Staging Area would result in temporary impacts to approximately 0.03 acres of mapped NYSDEC littoral zone tidal

wetland within the footprint of the piles driven to support the pile-supported access roadway platform. Approximately 0.5 acres of mapped NYSDEC littoral zone tidal wetlands would be covered by the access roadway platform. In addition, approximately 0.4 acres within the associated tidal wetland adjacent area[1] would be affected. After construction, the temporary roadway would be removed and the area would return to littoral zone habitat. The area disturbed within the adjacent area would be revegetated with species indigenous to this region of New York to the greatest extent practicable in accordance with a landscaping plan that would be in compliance with E.O. 13112, "Invasive Species." Therefore, the construction of the temporary access roadway for the Westchester Bridge Staging Area would not result in adverse impacts to mapped NYSDEC tidal wetlands or adjacent area.

Comment [TC40]: Will the area be rehabbed or are you expecting to return naturally? What measures will be taken to reduce impacts such as invasive exotic species?

Comment [TC41]: What about temporary impacts or indirect effects? What time of year will these activities take place? What species of plants and animals will be affected and how? What wetland ecological functions will be impacted? Will the landscaping plan be reviewed by DEC or other agency?

Rockland Bridge Staging Area

Approximately 0.09 acres of mapped NYSDEC littoral zone tidal wetlands would be covered by the approximately 2-acre permanent overwater platform within the Rockland Bridge Staging Area. Within this littoral zone tidal wetland area, only approximately 0.005 acres would be permanently lost within the footprint of the piles driven to support the platform. This area of NYSDEC littoral zone tidal wetland is flat, unvegetated, with a silty bottom. The covering of this small area of NYSDEC littoral zone tidal wetland and minimal loss within the pile footprints would not result in adverse impacts to NYSDEC littoral zone tidal wetlands within the Hudson River.

Dredging

As discussed above in Section 18-3-3, "Dredged Access Channel," dredging of the Hudson River is required to allow access for construction barges. While the majority of dredging would occur in water depths of greater than 6 feet at mean lower low water (MLLW), approximately 5.3 acres of mapped NYSDEC littoral zone tidal wetland south of the existing bridge on the east bank of the River would be dredged to construct the eastern portion of the Replacement Bridge Alternative. The area that would be dredged is flat, unvegetated, with a silty bottom. Upon completion of construction activities, natural deposition of sediment within the dredged channel over time would be expected to restore some or all of this area to a depth that would be classified as NYSDEC littoral zone tidal wetland (i.e., no deeper than 6 feet at mean low water (MLW)). The temporary loss of this small area of mapped NYSDEC littoral zone tidal wetlands would not result in adverse impacts to NYSDEC littoral zone tidal wetland resources within the Lower Hudson River.

Comment [TC42]: Still no discussion of contaminants.

[1] Adjacent area is the land immediately adjacent to a tidal wetland within whichever of the following limits is closest to the most landward tidal wetland boundary, as such most landward tidal wetlands boundary is shown on an inventory map:

(i) 300 feet landward of said most landward boundary of a tidal wetland; or

(ii) to the seaward edge of the closest lawfully and presently, functional and substantial fabricated structure; or

(iii) to the elevation contour of 10 feet above mean sea level, except when such contour crosses the seaward face of a bluff or cliff, or crosses a hill on which the slope equals or exceeds the natural angle of repose of the soil, then to the topographic crest of such bluff, cliff, or hill.

Freshwater Wetlands

Bridge Study Area

Upland construction of the access road to the temporary platform within the Westchester Bridge Staging Area adjacent to the small stream and forested wetland corridor (approximately 0.18 acres) on the east bank of the river would have the potential to affect this resource through the discharge of sediment in stormwater runoff. However, as discussed above in Section 18-4-12-5, "Stormwater Management," implementation of erosion and sediment control measures (e.g., silt fences and straw bale dikes) and stormwater management measures implanted through the development of a SWPPP would minimize the potential for stormwater runoff from construction of the access road to affect this small wetland area. Therefore the project would not adversely affect this freshwater wetland.

Comment [TC43]: Minimize or eliminate?

The small (approximately 0.11 acres) depression exhibiting freshwater wetland characteristics within the Rockland Bridge Staging Area would be permanently lost due to the placement of fill for the construction of the permanent work platform. The loss of this potential freshwater wetland area would not adversely affect freshwater wetland resources within the region. Once engineering design has sufficiently progressed and the permitting phase of the project has begun, this possible freshwater wetland would be evaluated and the boundary delineated in accordance with the USACE *Wetlands Delineation Manual*.[1]

Comment [TC44]: Why not?

Westchester Inland Study Area

No mapped NYSDEC freshwater wetlands are present on the WISA. In addition, no National Wetland Inventory (NWI)-mapped wetlands are present on the WISA (see **Figure 18-19**).

West Nyack Inland Staging Area

No mapped NYSDEC freshwater wetlands are present on the WNSA. As shown in **Figure 18-20**, National Wetland Inventory (NWI)-mapped wetlands consist of a palustrine forested wetland with broad-leaved deciduous vegetation that is seasonally flooded or saturated (PFO1E). However, most of the PFO1E wetland appears as unvegetated land that is part of the current industrial activities and concrete batch plant operations. If the WNSA is selected and completely developed, about 2 acres of palustrine forest would be lost. As part of the design build contract, a wetland delineation would be performed to confirm the presence, area, and condition of potential wetlands on the WNSA per the USACE *Wetlands Delineation Manual*. The project would first seek to avoid and minimize impacts to wetlands on the WNSA. If there is no feasible or practical alternative to filling wetlands, a wetland mitigation plan will be developed in coordination with the USACE. Therefore, the use of the WNSA would not result in adverse impacts to freshwater wetlands.

[1] USACE 1987 Wetland Delineation Manual and 2009 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region.

Tilcon Quarry Staging Area

As stated above, the majority of the TQSA is an active excavation site devoid of vegetation. No mapped NYSDEC freshwater wetlands are present on this site. As shown in **Figure 18-21**, NWI-mapped wetlands within the site comprise: excavated palustrine wetland with an unconsolidated bottom that is permanently flooded (PUBHx), excavated palustrine wetland with an unconsolidated bottom that is semi-permanently flooded (PUBFx), excavated palustrine wetland with an unconsolidated shore that is seasonally flooded (PUSCx), and palustrine forested wetland with broad-leaved deciduous vegetation that is saturated (PFO1B). The area in the vicinity of the PFO1B was observed to be cleared during the site visit. In addition, the mapped palustrine excavated areas are not visible on aerial mapping of the TQSA and have likely been altered quarry activities. Additionally, under guidance issued by the USACE[1] surface waters created as a result of construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel are not considered Waters of the United States until the construction or excavation operation is abandoned. Therefore, use of the TQSA would not result in adverse impacts to freshwater wetland resources.

Executive Order 11990, "Protection of Wetands"

As described in Chapter 16, "Ecology," under E.O. 11990, federal agencies must avoid undertaking or providing assistance for new construction in wetlands unless there is no practical alternative to such construction and the proposed action includes all practicable measures to minimize harm to the wetland. NYSDEC-regulated littoral zone wetlands and open water benthic habitats are considered deepwater habitats and as such, are not included as E.O. 11990 wetland resources.

Comment [TC45]: CWA section 404 permit needed?

Wetland habitats with the potential to be affected per E.O. 11990 include the small (0.11-acre) possible freshwater wetland depression at the Rockland Bridge Staging Area, the 0.18-acre stream and forested wetland corridor at the Westchester landing, and approximately 2 acres of forested wetlands at the WNSA. As described above, all practicable measures (i.e., avoidance, minimizing intrusion, implementation of erosion and sediment control measures) will be taken to minimize harm to wetland areas.

As discussed above, implementation of erosion and sediment control measures (e.g., silt fences and straw bale dikes) and stormwater management measures implanted through the development of a SWPPP would minimize the potential for stormwater runoff from construction of the access road to affect the small wetland area at the Westchester landing. In addition, the project would first seek to avoid and minimize impacts to wetlands on the WNSA. If there is no feasible or practical alternative to filling wetlands, a wetland mitigation plan will be developed in coordination with the USACE.

The small (approximately 0.11 acres) depression exhibiting freshwater wetland characteristics within the Rockland Bridge Staging Area would be permanently lost due to the placement of fill for the construction of the permanent work platform. There is no feasible or practicable alternative to construction within this potential wetland area. In order to provide access to the Rockland Bridge Staging Area, the configuration of the

[1] The U.S. Army Corps of Engineers issued guidance clarifying the definitions of waters of the United States under their Section 404 regulatory program (33 CFR Parts 320 through 330) as a Final Rule published in the Federal Register (Vol 51, No 219) on November 13, 1986

platform is sized to accommodate the width required for construction equipment and emergency vehicles. Once engineering design has sufficiently progressed and the permitting phase of the project has begun, this possible freshwater wetland would be evaluated and the boundary delineated in accordance with the USACE *Wetlands Delineation Manual* and mitigation measures developed, as necessary, in coordination with the USACE should this area be considered under USACE jurisdiction.

Therefore, the project is consistent with the intent of E.O. 11990.

18-4-13-2 TERRESTRIAL RESOURCES

Construction of the project would require the temporary loss of terrestrial vegetation in addition to permanent changes discussed in Chapter 16, "Ecology." The temporary loss of vegetative communities (i.e., successional forest) would occur as a result of construction at the bridge landings, staging areas, and access roads would have the potential to affect wildlife using these areas. Noise and increased human activity associated with the in-water construction activities would have the potential to result in the loss of foraging habitat due to avoidance of the area in the vicinity of these activities, as described below.

Terrestrial Vegetation

Bridge Study Area

Less than 9 acres of habitat that would be characterized as disturbed roadside (mowed lawn, paved areas, etc.) and successional forest terrestrial habitats following Edinger et al. (2002) would be disturbed due to staging areas, access roads, etc. These ecological communities are common throughout the region and are of low ecological value due to low species diversity, high level of anthropogenic activities, and dominance of non native, invasive vegetation. Therefore, the loss of these habitats during construction of the project would not result in adverse impacts to these ecological communities throughout the region. Disturbed areas not occupied by permanent structures (about 7 acres) would be revegetated with native species indigenous to this region of New York to the greatest extent practicable in accordance with a landscape plan that would be in compliance with E.O.13112, "Invasive Species."

Interchange 10 Staging Area

The ecological communities of the Interchange 10 Staging Area would be characterized as unpaved and paved areas and mowed lawn communities following Edinger et al. (2002). The site is an existing staging area for the NYSTA located north-adjacent of Interstate 87/287 and is nearly devoid of vegetation. The habitat value of this site is low due to limited vegetation and high levels of anthropogenic activities. During construction of the project, this facility would continue to operate as a staging area. Therefore, the project would not result in adverse impacts to terrestrial plant resources.

West Nyack Inland Staging Area

The disturbed/developed portions of this potential staging area contain industrial uses (e.g., an existing concrete batch plant). The ecological communities within these portions of the WNSA site would be characterized as unpaved and paved areas and urban vacant lot habitat following Edinger et al. (2002) and have limited vegetation coverage with invasive and pioneer species. Plants observed around buildings and at

the edges of the site are common urban-adapted species. The habitat value of these communities is low due to low species diversity, high level of anthropogenic activities, and dominance of non native, invasive vegetation and the loss of these communities as a result of the construction of the project would not result in adverse impacts to terrestrial plant resources. The potential impacts to late flowering boneset (*Eupatorium serotinum*) individuals, a state-listed endangered species, observed on the WNSA is discussed below under *Threatened, Endangered, and Special Concern Species*.

As described above under *Freshwater Wetlands*, there is a potential for palustrine forested wetlands mapped by the NWI to be present on the WNSA (see Figure 18-20). For the reasons discussed under Freshwater Wetlands, the use of this site would not result in adverse impacts to this plant community within the region.

Tilcon Quarry Staging Area

The ecological community of this site would be characterized as a rock quarry terrestrial community following Edinger et al. (2002) and is an active excavation site. The site is nearly devoid of vegetation with limited vegetation coverage along the perimeters of the site. This site has low habitat value due to lack of vegetation, low species diversity, high level of anthropogenic activities, and dominance of non native, invasive vegetation. Therefore, the loss of the limited habitat within the TQSA would not result in adverse impacts to this habitat type within the region.

Westchester Inland Staging Area

The terrestrial communities present within the WISA would be characterized paved road/path, mowed lawn, and mowed lawn with and a successional southern hardwoods community following Edinger et al. (2002). The habitat value of these communities is low due to low species diversity, high level of anthropogenic activities, and dominance of non native, invasive vegetation and the loss of these communities as a result of the construction of the project would not result in adverse impacts to these habitat types within the region.

Terrestrial Wildlife

Bridge Study Area

As described in detail in Chapter 16, “Ecology,” the terrestrial wildlife communities in the bridge study area are largely composed of disturbance-tolerant, species that are associated with fragmented habitats and forest edges and can co-exist with anthropogenic activities in highly disturbed areas. The loss of the vegetation communities described above under *Terrestrial Vegetation* for construction of the project within the bridge landings and access roads to the Bridge Landing Areas, which comprise primarily poor quality wildlife habitat, would not result in adverse impacts to wildlife resources of the region.

Wildlife using habitats within the Bridge Study Area that would not be affected by construction of the project would have the potential to be affected by noise and increased human activity resulting from the construction of the project. Human activity levels influence wildlife community composition, as disturbance tolerance varies greatly among different species (Bowles 1995, Bayne et al. 2008, Francis et al. 2009). Because the study area around the bridge has been developed and under its present land use

for many years, local wildlife communities have been shaped in part by its high existing levels of noise and other human disturbances. These communities are primarily composed of urban-adapted, disturbance-tolerant species. Highly sensitive species are unlikely to occur in the study area due to its high levels of human activity and lack of undisturbed habitat. However, construction of the project and demolition of the existing bridge would elevate noise and human activity levels above background levels in the area, and thus there is the potential to temporarily displace or otherwise adversely affect wildlife that is habituated to lower levels of disturbance.

The species most likely to be affected are those that would occur in closest proximity to the areas of construction, such as peregrine falcons that nest on the bridge, and waterbirds that forage in the Hudson River, primarily during winter. However, there has been significant maintenance work on the bridge on recent years and many of these species are habituated to elevated noise and anthropogenic activity. As discussed below, peregrine falcons have become increasingly common in urban areas and are tolerant of human disturbance (Cade et al. 1996, White et al. 2002).

Comment [TC46]: This is a speculative statement. We recommend time of year restrictions to avoid disruption of breeding falcons, etc.

Reactions of wildlife to loud, unfamiliar noises and other human disruptions usually include a rise in heart rate and acute stress level, and/or departure from the source of the disturbance (Bowles 1995). Waterbirds that forage in the Hudson River would in most cases be expected to temporarily avoid the areas of construction activity and instead utilize other sections of the river slightly up- or down-stream. The loss of this small section of the river to birds for habitat would not result in adverse impacts to regional bird populations. Additionally, nearby expanses of open–river would remain accessible and free of disturbances throughout the project's construction.

On land, the terrestrial species expected to occur within the vicinity of the bridge landings and WISA would take place are limited to urban-adapted birds and mammals, due to the high existing levels of noise and limited habitat availability in the area. Noise and human activity associated with construction in these areas would not adversely affect regional wildlife populations.

Rockland Inland Staging Areas

The WNSA and TQSA are within a heavily developed landscape with minimal undisturbed habitat available to wildlife. Similar to the bridge study area, the wildlife expected to occur around the Rockland potential staging areas is largely limited to urban-adapted, disturbance-tolerant species that inhabit degraded habitats. The pond and forested wetland areas to the east and west of the WNSA and forested wetland area within the central portion of the WNSA may support relatively diverse assemblages of wildlife species, particularly reptiles and amphibians. However, the WNSA site is located in a highly commercial area, along a busy road adjacent to a waste transfer station. In addition, the WNSA site already has a concrete batching plant and other industrial activities. Similarly, the TQSA is an active quarry. Birds and wildlife that use this site would be acclimated to the use of noisy heavy equipment. Overall, given the current commercial and industrial usages of the proposed staging areas and birds and wildlife using these sites are already adapted to high levels of anthropogenic activity, the use of the WNSA and TQSA for the construction staging activities described in Section 18-3-2, "Inland Construction Staging," of this chapter would not result in adverse impacts to regional wildlife populations. During project construction, the

habitats within and around the potential staging sites would continue to support urban-adapted wildlife.

18-4-13-3 AQUATIC RESOURCES

Construction of the project has the potential to affect benthic macroinvertebrates and fish due to loss of habitat from dredging, pier installation (e.g., pile driving, installation of cofferdams and fendering), the temporary change in bottom habitat resulting from dredging and subsequent placement of armoring, temporary increases in suspended sediment due to dredging and other sediment disturbing construction activities, and hydroacoustic effects on fish and benthic macroinvertebrates, as discussed in detail below.

Benthic Macroinvertebrates

Tables 18-26 and 18-27 indicate permanent and temporary impacts to benthic macroinvertebrates due to dredging and armoring. Temporary increases in suspended sediment and changes to the hydroacoustic environment have the potential to affect benthic macroinvertebrate resources.

Dredging

The primary impact to benthic macroinvertebrates from dredging is the loss of the habitat and animals associated with the dredged material (Hirsch et al. 1978). Dredging can also cause the conversion of shallow subtidal habitat to deeper subtidal habitat and can result in temporary increases of suspended sediment due to resuspension of bottom sediment. This section addresses the potential impacts to benthic macroinvertebrates from the loss of habitat and individuals. Potential impacts associated with increased suspended sediment are evaluated under *In-water Construction Activities*. The frequency of dredging or disturbance of an area affects the invertebrate community and its ability to recover following each dredging event. Benthic communities found in environments with a great deal of variability such as estuaries have higher rates of recovery from disturbance. Recovery rates of benthic macroinvertebrate communities following dredging range from only a few weeks or months to a few years, depending upon the type of project, the type of bottom material, the physical characteristics of the environment and the timing of disturbance (Hirsch et al. 1978, LaSalle et al. 1991). In a two year study in the lower Hudson River, Bain et al. (2006) reported that within a few months following dredging, the fish and benthic communities at a dredged location were no different from seven nearby sites that had not been dredged. The results of monitoring did not indicate a lasting effect at the dredged site.

Dredging activities for the project have the potential to remove benthic macroinvertebrates, including oyster beds, and the food resources they provide to other aquatic resources. Approximately 165 to 175 acres of bottom habitat—including about 5.3 acres of NYSDEC regulated littoral zone tidal wetland described above under *Tidal Wetlands* and 160-170 acres of open water benthic habitat—would be dredged during three 3-month phases over a four year period (see Figure 18-5). Dredging would be initiated in the late summer or fall to avoid periods of anadromous fish spawning migrations and peak biological activity. In addition, the trench would be armored following dredging and the benthic habitat within the dredge zone which was primarily

Comment [TC47]: Why must the armoring be left in place after construction?

soft sediment would be changed to a substrate of sand and gravel. Since armoring would occur up to 20 feet of the side slope, total acreage of hard bottom would be approximately 155 to 165 acres.

While the dredging would result in the loss of individual macroinvertebrates, it is not expected to result in adverse impacts of these species at the population level within the Hudson River Estuary System. The majority of the bottom habitat and associated benthic macroinvertebrates within the area impacted is the soft sediment community which dominates the Upper New York Harbor and Hudson River. Calculations suggest that deposition within the dredged channel will occur at a rate of about one foot per year (see Appendix D). Recolonization by benthic organisms adapted to softer sediments could be expected to begin within a few months after completion of construction in any given area. Prior to the deposition of sufficient sediment to support a soft substrate benthic invertebrate community, some recolonization of the gravel armor material would be expected occur. Organisms within the nearby gravel substrate located within the main channel (NYSDEC benthic mapper http://www.dec.ny.gov/lands/33596.html, and Nitsche et al. 2007) would serve as a source of organisms to colonize the gravel capping material until the soft sediment is of a sufficient depth to be colonized by soft substrate organisms. Although the area affected by dredging is substantial, the effects to the soft sediment habitat, which is the dominant sediment type in the lower estuary, should be viewed as temporary and not indicative of a long-term adverse impact.

Comment [TC48]: Cite data upon which this assertion is based.

Comment [s49]: The document should cite and discuss any previous studies on the impacts of armoring benthic habitats for other bridge construction projects.

Oyster beds

Oyster beds were mapped approximately two miles north and south of the existing bridge from depths of 8 to 30 feet. Seven potential oyster beds were identified south of the bridge and six potential beds to the north (see Appendix E-3 for a description of each of the beds). All identified oyster beds except one were confirmed to contain at least some live organisms with beds exhibiting differences in terms of oyster density, amount of shell hash, gravel, or sandstone fragments, etc. Dredging would remove about 13 acres of oyster beds, some or all of which may be permanently lost due to dredging and armoring of the bottom. A permanent loss of these oyster beds would result in an unavoidable adverse impact. Potential for implementation of oyster enhancement or restoration projects will be explored and other mitigation strategies will be developed through consultation with the NYSDEC.

Comment [TC50]: This is unclear—if oyster beds were mapped, does this mean that there are oysters here, or that there is unoccupied suitable habitat? Please clarify.

Comment [TC51]: NEPA requires that all impacts be identified and fully analyzed, including all responses to those impacts. You need to be specific in what you will do to offset the adverse impact.

Comment [s52]: Should include NMFS, USFWS, USACOE in this effort.

In-Water Construction Activities

In-water construction activities have the potential to result in temporary and permanent habitat loss, habitat modification, and temporary increases in suspended sediment due to resuspension of bottom sediment as described below.

Pier Construction

During construction, a total of approximately 8 acres and 7 acres of open water benthic habitat would be lost within the footprint pilecaps and fendering for the Short Span and Long Span Options, respectively.

Comment [s53]: The document should specify is these losses are temporary or permanent. Also, the document states in Chapter 16 of this document (16-27) that "Under the Short Span Option there would be a net increase of approximately one acre of new benthic (bottom) habitat. With the Long Span Option, there would be a net loss of approximately 0.5 acre of bottom habitat". This document also states the following in Chapter 16 (16-28): "Furthermore, the Short Span and Long Span Options would provide 7, and 8.7 acres of additional benthic habitat, respectively, above the current condition after demolition of the existing bridge is completed." The document needs to clarify this apparent discrepancy.

Temporary Platforms within Bridge Staging Areas

Impacts to benthic habitat would also occur due to the construction of two temporary work platforms north of the existing bridge. Temporary platforms would be constructed

on the east and west sides of the river. Since the work platforms for the two bridge replacement options would be the same, approximately 8 acres of open water benthic habitat would be temporarily affected due to overwater coverage, and about 0.4 acres of open water benthic habitat would be temporarily lost within the footprint of the piles supporting the temporary platforms. After construction, these temporary platforms would be removed and the supporting piles cut at the mudline.

Comment [TC54]: What impact would this temporary loss have on benthic organisms?

Permanent Platform Within the Rockland Bridge Staging Area

As discussed above a permanent work platform would also be constructed within the Rockland Bridge Staging Area. In order to support the platform, the existing bulkhead would be extended waterward and about 0.2 acres of open water benthic habitat would be filled. An additional 0.09 acres of open water benthic habitat would be lost within the footprint of the piles supporting the overwater portion of the work platform. The permanent work platform would result in about 2 acres of overwater coverage. The permanent loss of about 0.3 acres of open water benthic habitat and permanent coverage of approximately 2 acres of open water benthic habitat would not result in adverse impacts to benthic macroinvertebrate resources.

Comment [TC55]: As determined how? A permanent loss of habitat would be expected to adversely impact the organisms/populations that live there. Please clarify.

Temporary Increases in Suspended Sediment from Construction Activities

Construction activities that are expected to contribute to sediment resuspension include dredging, vessel movements, cofferdam construction, pile driving and demolition of the existing bridge. The principal Hudson River resources that can potentially be impacted by resuspended sediments are water quality (addressed in Section 18-4-12 Water Resources) and aquatic biota, including benthic macroinvertebrates.

A wide array of benthic macroinvertebrates occurs near the bridge; they vary from motile to sessile benthic organisms and include mollusks (e.g., oysters and clams), annelids (i.e., worms), and arthropod crustaceans such as mysid shrimp, amphipods, isopods, crabs, and other species. Although estuarine benthos have developed behavioral and physiological mechanisms for dealing with variable concentrations of suspended sediment and are well adapted to changes in sedimentation and resuspension processes, certain organisms could be impacted by high levels of water column TSS interfering with their methods of feeding (e.g., filter feeders) and/or causing possible habitat impairment. With respect to shellfish, negative impacts to oyster egg development have been observed at TSS concentrations of 188 mg/L and impacts to clam egg development at 1,000 mg/L (Clarke and Wilber 2000). NOAA, NMFS has identified 390 mg/L (Letter from Patricia Kurkul, NMFS Regional Administrator to Stacey Jensen, USACE dated March 16, 2011) as a concentration below which adverse impacts to benthos are not anticipated. In studies of the tolerance of crustaceans to suspended sediments that lasted up to two weeks, nearly all mortality was caused by extremely high suspended sediment concentrations (greater than 10,000 mg/L) (Clarke and Wilber 2000), levels which would not occur from the in-water work associated with the proposed project.

Comment [TC56]: It is true that benthic organisms can generally cope with natural changes in sedimentation, etc. However, construction activities are likely to create an unnatural suspension load for an extended period of time, resulting in adverse impacts to all benthic organisms in the area and downstream.

Comment [TC57]: Sub-lethal effects?

Background concentrations of TSS in the bridge vicinity generally vary between 15 mg/L and 50 mg/L throughout the year. The increase in TSS levels predicted to occur as a result sediment-disturbing activities would range from 50-100 mg/L in the immediate vicinity of the dredging to 5 mg/L to 10 mg/L over a relatively limited river

area near the replacement bridge construction site (Section 18-4-12-2). Such increases in water column solids loads would be within the normal variation occurring in the Hudson River and well below levels that would be expected to affect normal life functions of benthic invertebrates. Thus, impacts to benthic invertebrates due to increased water column suspended sediments from construction activities are expected to be minimal and would not result in adverse impacts to benthic communities.

Comment [TC58]: You seem to define adverse impacts as only consisting of mortality. However, you do not address sub-lethal effects such as loss of recruitment, impacts to feeding, breeding or sheltering, complete or partial loss of local communities, and the results of these and any other impacts to the benthic community. Please revise to include this analysis.

Bridge Demolition

As discussed above under Section 18-4-12, "Water Resources," and in *Temporary Increases in Suspended Sediment from Construction Activities*, demolition of the bridge could cause turbidity and the potential resuspension of contaminated sediments. Turbidity curtains would be used during removal of the columns and footings and cutting of the timber piles would minimize the potential for sediment that may be resuspended during bridge removal activities to affect benthic macroinvertebrates and other aquatic biota. Since the benthic sampling program for the project indicated similar benthic community structure in bottom sediments at both existing and proposed bridge location, and because the demolition is not expected to substantially alter sediment characteristics, the benthic community recolonizing the restored bottom habitat following bridge demolition would be expected to be similar to that lost as a result of dredging. Demolition of the existing bridge would also remove the benthic invertebrates and algae that are attached to the bridge, which provide forage and structural habitat for fish. However, the new bridge would offset much of these losses by providing similar structural habitat for these species. Impacts to benthic invertebrates due to increased water column suspended sediments from bridge deomolition activities are expected to be minimal and would not result in adverse impacts to benthic communities.

Comment [TC59]: Citation.

Comment [TC60]: See above comment re sub-lethal effects.

Hydroacoustic Effects

Limited information is available on how benthic invertebrates may use sound (e.g., Popper et al. 2003) and there is little information indicating whether sounds from construction would have any impact on invertebrate behavior. The one available study on effects of seismic exploration on shrimp suggests no behavioral effects at sound levels, with a source level of about 196 dB re 1 µPa rms at 1 meter (Andriguetto-Filho et al. 2005).

There is also no substantive evidence on whether the high sound levels from pile driving or any anthropogenic sound would have physiological effects on benthic invertebrates. The only potentially relevant data are from a study on the effects of seismic exploration on snow crabs on the east coast of Canada (Boudreau et al. 2009). The preponderance of evidence from this study showed no short- or long-term effects of seismic exposure in adult or juvenile animals, or on eggs.

The lack of any air bubbles (such as those of the fish swim bladder) that would be set in motion by high intensity sounds would suggest that there would be little impact on benthic invertebrates. However, like fish, if the benthic invertebrates are very close to the source, the shock wave from the source might have an impact on survival.

Comment [TC61]: What impact and what effect would that have on the benthic community?

Impacts to benthic invertebrates due to increased water column suspended sediments from hydroacoustic effects associated with pile driving activities are expected to be minimal and would not result in adverse impacts to benthic communities.

Comment [TC62]: You do not define what these "minimal effects" are.

Summary

In summary, for the reasons presented above, the cumulative permanent loss of benthic habitat due to pier construction, and the construction of the permanent platform for the Rockland Bridge Staging Area of 7 and 8 acres for the Short Span and Long Span Options respectively, the temporary loss of approximately 0.4 acres of benthic habitat within the footprint of the piles for the temporary platforms within the Bridge Staging Areas, and dredging of between 165 and 175 acres of bottom habitat followed by placement of approximately 155 to 165 acres of armoring material would not result in adverse impacts to populations of benthic macroinvertebrates within the lower Hudson River estuary.

Submerged Aquatic Vegetation (SAV)

The nearest SAV beds to the replacement bridge construction site are small and located north of the project area (see Figure 16-3). Therefore, dredging and temporary platform construction for the project would not directly impact SAV, but would have the potential to result in indirect impacts due to potential temporary increases in suspended sediment levels and sedimentation rates within these beds. However, dredging operations would occur after the SAV growing season, minimizing potential adverse impacts to this resource. Additionally, as discussed above under "Water Resources," cumulative increases in suspended sediment due to dredging and other in-water construction activities are projected to be within the range of normal variation in SSC within this portion of the Hudson River. Therefore, construction of the project would not result in adverse environmental impacts to SAV within the Hudson River.

Fish

Dredging

Where access channels are dredged, there would be a temporary loss of habitat that could impact fish that use the dredged area. These impacts would occur, in part, as a result of a localized reduction in benthic fauna. However, the dredging footprint represents a very small percentage of the Hudson River Estuary. Thus, the temporary reduction of benthic fauna within the dredged area would not substantially reduce foraging opportunities for the river's fish populations. Once construction is completed, the dredged channels would be restored over time to their original elevations by action of natural sedimentation, and the river's benthic community would recolonize those areas as well.

Temporary and Permanent Platforms Within the Bridge Staging Areas

Approximately 8 acres of temporary platforms would be erected within the Bridge Staging Areas in the Hudson River to facilitate bridge construction. These platforms would be supported by an array of small piles driven into the river substrate. The piles would occupy approximately 0.4 acres of benthic habitat representing a minor reduction of foraging opportunities for fish near the construction site. An approximately 2-acre permanent platform would result in the permanent loss of approximately 0.3 acres of benthic habitat due to bulkhead construction and pile driving. The supporting piles for the platforms would provide a substrate for encrusting organismswhich would provide some additional foraging opportunities for fish. Moreover, fish are widely known to seek structures for shelter and the temporary and permanent platforms could represent a

Comment [s63]: See comment No. 10 above about inconsistencies in the net gain/loss of benthic habitat.

Comment [s64]: The Service does not agree with this conclusion. The filling of 155 to 165 acres of bottom habitat is a significant action that will have adverse impacts to the benthic organisms present in these areas through burial of these species and alteration of the habitat.

Comment [TC65]: As mentioned above, you do not analyze sub-lethal effects, nor do you analyze the ecological community effects due to temporary impacts. Please revise to include this analysis.

Comment [TC66]: What species are dependent upon this SAV and what ecological impacts would result?

Comment [TC67]: Loss of species' habitat "over time" may also have impacts—please revise to include this analysis.

Comment [TC68]: This is too general and vague. You need to discuss what "foraging opportunities" will be lost, what species will be affected and how, in order to substantiate your statement that there are no adverse effects.

favorable diversity in habitat that currently is a large flat, silty bottom. Therefore, the minimal loss of foraging habitat, and the temporary and permanent coverage of aquatic habitat by overwater structures would not result in adverse impacts to fish within the Lower Hudson River estuary.

Temporary Increases in Suspended Sediment from Construction Activities

As described above under *Benthic Macroinvertebrates*, construction activities expected to contribute to sediment resupsension include dredging, vessel movements, cofferdam construction, pile driving and demolition of the existing bridge.

Resuspension of sediments can have a range of impacts to fish depending on the species and life stages being considered. Lethal levels of TSS vary widely among species; one study found that the tolerance of adult fish for suspended solids ranged from 580 mg/L to 24,500 mg/L (Shrek et al. 1975 as cited in NMFS 2003). Common impacts to fish are the abrasion of gill membranes resulting in an inability to collect oxygen, impairment of feeding, reduction in dissolved oxygen, and fatal impacts to early life stages. Increased TSS can inhibit migratory movements as well. A study conducted by NOAA concluded that TSS concentrations as low as 350 mg/L could block upstream migrations of various species (NOAA 2001). Fish, however, are mobile and generally avoid unsuitable conditions in the field, such as large increases in suspended sediment and noise (Clarke and Wilber 2000). Fish also have the ability to expel materials that may clog their gills when they return to cleaner, less sediment-laden waters.

Burton (1993) indicated that concentrations of suspended solids can reach thousands of milligrams per liter before an acute toxic reaction is reached. Lethal effects were demonstrated between concentrations of 580 to 700,000 mg/L depending on species, (580 mg/L for sensitive species and 1,000 as more typical). Striped bass did not avoid concentrations of 954 to 1,920 mg/L to reach spawning sites (Summerfelt and Mosier 1976; Burton 1993) which are well above the levels likely to be encountered during dredging operations.

Larval stage fish also have a wide suspended sediment tolerance range. Kiorboe et al. 1981 (as cited in Clarke and Wilber 2000), indicate that hatching of striped bass and white perch can be delayed if daily sediment concentrations reach 100 mg/L. Wilbur and Clarke 2001 (as cited in NMFS 2003), indicate that hatching is delayed for striped bass and white perch at concentrations of 800 mg/L and 100 mg/L, respectively. In a 2003 Biological Opinion, the NMFS indicated that TSS concentrations below 100 mg/L are not likely to affect eggs and larvae—at least over short durations (NMFS 2003).

The TSS projected to occur as a result of the project's construction would be below the physiological impact thresholds of adult and larval fish and also below concentrations that would be expected to impact migration. Furthermore, anadromous fish such as striped bass, American shad, blueback herring, and alewife spawn well upriver and their most vulnerable early life stages such as eggs and yolk-sac larvae would not be expected to occur in the Tappan Zee vicinity. Impacts due to increased water column suspended sediments are expected to be minimal and would not result in adverse impacts to fish within the Lower Hudson River estuary.

Comment [TC69]: Which species? Which species are present in the proposed construction site? Explain how this study is relevant. What other studies have you included? Other life stages?

Comment [TC70]: Impairment of ability to locate predators, breeding activities, effects to growth rates, mortality to all life stages—not just early, other?

Comment [TC71]: This is also an effect and needs to be included in your analysis. What is the result of area avoidance to the local ecological community (e.g., changes in predator/prey ratios? Reduction in recruitment? Other?)

Comment [TC72]: This is not always the case. You need to substantiate these vague statements and analyze the impacts likely to arise from the actions.

Comment [TC73]: As above, you do not analyze sub-lethal effects and their results on the ecology of the area.

Comment [TC74]: Which species were included in this analysis? You state that larval fish have a wide tolerance but then extrapolate NMFS's statement in an unnamed BO as applicable to all species. This needs to be clarified. Also, we do not know what papers you are citing so we cannot comment on the completeness of your lit search. See: THE INFLUENCES OF INORGANIC
SEDIMENT ON THE AQUATIC
LIFE OF STREAMS
ALMO J. CORDONE and DON W. KELLEY
Inland Fisheries Branch, California Department of Fish;
Direct and indirect effects of sediment pulse duration on stream invertebrate assemblages and rainbow trout (Oncorhynchus mykiss) growth and survival
E Al Shaw, John S Richardson; and others.

Comment [TC75]: All species?

Comment [TC76]: Citation?

Comment [TC77]: Are there other species present that would be affected?

Comment [TC78]: As above, you do not analyze sub-lethal impacts and their consequences.

Hydroacoustic Effects

Effects on fish associated with noise from pile driving include damage to body tissue that can potentially result in death, sub-lethal effects that could result in temporary decreases in fitness, or to temporary or long-term changes in behavior. Alternatively, there is the likelihood of no effect of sound exposure on fish. The type of effects depends on many factors including sound intensity, sound duration, fish species, and numerous other variables, The type and intensity of pile driving sounds that may result in effects vary with factors such as the type and size of the pile, firmness of the substrate, depth of water, and the type and size of the pile driver. Larger piles and firmer substrate require greater energy to drive the pile resulting in higher sound pressure levels (SPL). Hollow steel piles appear to produce higher SPLs than similarly sized wood or concrete piles (Hanson et al. 2003). Some fish have been observed exhibiting an initial startle response to the first few strikes of an impact hammer, after which they may remain in an area with potentially harmful sound levels (Dolat 1997, NMFS 2001 in Hanson et al. 2003), or they may leave the area. Fish with swim bladders and smaller fish have been shown to be most vulnerable (Hanson et al. 2003). The degree of damage to fish and their hearing organs from pile driving is related to the received level and duration of the sound exposure.

Comment [TC79]: Unsubstantiated statement.

Popper (2010) (Appendix E-5) indicated that the limited data from other projects suggests that immediate fish mortality may occur in limited circumstances during driving of very large piles (e.g., 8 ft diameter) and that generally only fish that are very close (up to 33 ft) to the pile driving would potentially be impacted. California Department of Transportation (Caltrans 2001) showed some mortality for several different species of wild fish exposed to driving of 8 ft diameter steel pipes, whereas Ruggerone et al. (2008) found no mortality to caged yearling coho salmon (*Oncorhynchus kisutch*) placed as close as 5.9 ft from a 1.7 ft diameter pile and exposed to over 1,600 strikes. During construction of the Woodrow Wilson Bridge, driving of piles larger than 66" in diameter near the navigation channel resulted in kills of certain species including catfish, gizzard shad, alewife, and white perch. Implementation of bubble curtain technology at the Woodrow Wilson Bridge attenuated pressure waves to below the threshold for fish mortality (FHWA 2003). The Woodrow Wilson report also indicated that "pile tapping" which involves a series of less intensive strikes at the beginning of pile driving to startle fish, was at times an effective method for reducing fish mortality.

Sound is measured in many ways with the most common approach being the "root mean square" (rms) which is the average sound signal over a specific time period (Popper 2010). "Peak" sound, which is the highest level of sound within a signal, may also be measured. Because neither peak nor rms measures provide a true characterization of the extent of energy that can potentially impact an organism, scientists developed the concept of Sound Exposure Level (SEL). SEL is the integration over time of the square of the acoustic pressure in the signal and is an indication of the total acoustic energy the organism is exposed to (see Popper and Hastings 2009). SEL is generally expressed as the total energy in a signal over one second. There are two ways of looking at SEL that are relevant to pile driving. The single strike SEL (SEL_{ss}) is the amount of energy in one strike of the pile while the cumulative SEL (SEL_{cum}) represents the summed energy in all strikes received over a unit of time. SEL_{cum} is particularly useful since it indicates the full energy to which an organism is exposed to

during any kind of signal. Halvorsen et al. (2011), based on extensive experimental studies, concluded that at least three metrics should be considered when evaluating or predicting the onset of injury, namely, SEL_{cum}, SEL_{ss}, and the total number of strikes. A more detailed discussion of the characteristics of sound, how it is measured and propagated in water, and the potential for noise from project activities to impact fish species is presented in the Popper 2010 (Appendix E-5) and the Biological Assessment (BA) Report (Appendix E-4).

Current Interim Physiological Criteria

The current interim criteria for onset of physiological effects on fish were developed on the U.S. west coast. These interim criteria arose from discussions between the members of the Fisheries Hydroacoustic Working Group (FHWG), a group consisting of West Coast state agencies, NMFS, USFWS, and FHWA. In June 2008, these discussions resulted in the FHWG establishing interim injury onset criteria for projects in California, Oregon, and Washington (reviewed in Woodbury and Stadler, 2008; Stadler and Woodbury, 2009). These West Coast interim criteria (FHWG, 2008) are:

Peak SPL: 206 dB re 1 µPa

SEL_{cum}: 187 dB re 1µPa^2-s for fishes above 2 grams (0.07 ounces)

SEL_{cum}: 183 dB re 1µPa^2-s for fishes below 2 grams (0.07 ounces)

The 2008 agency agreement specifically designated the criteria as interim, and the agencies committed to “review the science periodically and revise the threshold and cumulative levels as needed to reflect current information” (FHWG, 2008).

Recent studies provide additional important data that indicate that the onset of physiological effects occur at levels considerably greater than 187 SEL_{cum} re 1µPa^2-s (Popper et al. 2006; Carlson et al. 2007; Popper 2010).These views have been strongly supported in a recent peer-reviewed study from the Transportation Research Board (TRB) of the National Research Council of the National Academies of Science that describes the first carefully controlled experimental study of the effects of pile driving sounds on fish (Halvorsen et al. 2011). This investigation was funded by National Cooperative Highway Research Program (NCHRP) of the TRB, Caltrans, and the Bureau of Ocean Energy Management (BOEM), as well as by the Canadian Department of Fisheries and Oceans (DFO) and was developed and overseen by individuals from highway programs throughout the United States. The study was the first to document effects of pile driving sounds (recorded by actual pile driving operations) under simulated free-field acoustic conditions where fish could be exposed to signals that were precisely controlled in terms of number of strikes, strike intensity, and other parameters. The acoustic field simulated one that would take place beyond about 10 m from a source. Subsequent to treatment, animals were subjected to extensive necropsy (autopsy) to determine the types of physiological effects and the sound exposure levels at which these effects would show up.

The study was conducted on Chinook salmon (*Oncorhynchus tshawytscha*), an endangered species on the U.S. West Coast. The study considered the onset of a wide variety of potential physiological effects that ranged from small amounts of hemorrhage at the base of fins to severe hemorrhage or rupture of the swim bladder and surrounding body tissues (kidney, liver, spleen, etc.). It was determined that effects,

such as small hemorrhages at the base of fins are not life threatening nor would they have any short or long-term effect on fish, while damage such as swim bladder rupture would result in mortality. Based on a statistical analysis of results, with extensive controls, it was determined that onset of physiological effects that have the potential of reduced fitness, and thus a potential impact on survival, started to appear when sounds were above 210 dB re 1 $\mu Pa^2 \cdot s$ SEL_{cum}, a level that is about 23 dB above the current West Coast interim onset criteria. The peak level for effects is about the same as the current West Coast level.[1]

Subsequent work, using the identical methodology, has demonstrated that there is complete recovery from effects on Chinook salmon exposed to sounds as high as 216 dB 1 $\mu Pa^2 \cdot s$ SEL_{cum} (higher levels could not be used), and similar results have been found for striped bass (Casper et al., in prep.). In addition, other studies have shown that similar results to those reported for Chinook salmon were also found in several other species, including lake sturgeon (*Acipenser fulvescens*). There was small variation in the onset SEL_{cum} level for physiological effects, but all were well above 200 dB 1 $\mu Pa^2 \cdot s$ (Halvorsen et al., in prep; Casper et al., in prep), or levels well above the West Coast interim criteria.

Pile driving also has the potential to affect fish behavior. However, the generated sound must be behaviorally relevant to the fish, it must be detected, and be sufficiently above a threshold level so that the fish responds to it. While NMFS has considered 150 dB as a possible criterion, the scientific basis for a behavioral threshold has not been determined, and there is a substantial question as to even the origin of the 150 dB level (Hastings, 2008). Furthermore, fish would not be expected to remain in an area at which noise (from pile driving or any other source) would cause discomfort.

Comment [TC80]: Changes in behavior is a sub-lethal effect and should be included in your analysis.

Hydroacoustic Modeling

In order to analyze the potential impacts of the project's pile driving on Hudson River aquatic resources, the likely hydroacoustic scale of pile driving was modeled (JASCO 2011a, Appendix E-6). The extent of the sound pattern generated by pile driving for the replacement bridge was determined by application of three different sound propagation modeling approaches (i.e., MONM, VSTACK, and FWRAM). The models account for the frequency composition of the source signal and the physics of acoustic propagation in the Hudson River and underlying geological substrates. This type of modeling differs from generalized and empirical acoustic models, such as "practical spreading loss" models (Caltrans, 2009), that do not take into full account the source characteristics or the many site-specific factors that could influence the rate of noise transmission such as water depth and substrate transmission characteristics.

Various pile driving scenarios were used to generate the cumulative sound exposure level (SEL_{cum}) for each day over the construction period. Maximum and typical pile driving scenarios were analyzed. In addition, the application of Best Management Practices (BMPs) that provided a 10 dB reduction in sound was incorporated into the

[1] The authors also point out that there is a criterion single strike level that is determined by the number of strikes to which fish will be exposed. Thus, a fish exposed to 960 strikes, could be exposed to $SEL_{ss}$of about 181 dB 1 $\mu Pa^2 \cdot s$ whereas if the fish will be exposed to 1920 strikes the maximum single strike level to which the fish should be exposed is about 177 dB 1 $\mu Pa^2 \cdot s$.

acoustic modeling effort. These practices represent various methods to reduce the extent to which a waterbody would be ensonified by pile driving operations. Various BMPs have been employed on pile driving operations around the country, including air bubble curtains of various forms, isolation casings, Gunderbooms, and dewatered cofferdams. The Tappan Zee Bridge Project is committed to the use of BMPs to attenuate the potential impacts of sound associated with pile driving.

Figure 18-22 presents the peak SPL, with BMPs, for 4-, 6-, 8-, and 10-ft piles being driven at representative locations along the alignment of the replacement bridge. The figure illustrates the transmission loss that would occur as distance from the pile driving site increases. Transmission loss is not uniform across the different size piles since the piles would be driven at locations where water depth and other environmental factors vary. For the 4-ft piles, sound above the interim 206 dB threshold encompasses a distance of about 30 ft; for the 10-ft piles the 206 dB peak SPL the distance increases to approximately 300 ft.

Figure 18-23 presents the SEL_{cum} metric for installing two 10-ft piles at the replacement bridge main span in one day, which is considered a representative worst case for driving of 10 ft piles, and would be the same for both the Short and Long Span Options. The concentric "circles" (or isopleths) of different colors represent distances from the pile driving activity at which various SEL_{cum} levels would be attained during that particular pile driving day. For example, the 187 dB isopleths extends over a mile in each direction north and south of the point of pile driving and 49% of the cross sectional width of the river. This can be contrasted with the 187 dB 1 $\mu Pa^2 \cdot s$ isopleth profile for installing four 4-ft piles at the replacement bridge main span in one day, which does not extend substantial distances in any direction (see **Figure 18-24**).

Figure 18-25 indicates the cross sectional area of the river that would be ensonified by the 187 dB re 1μPa^2-s isopleths over the duration of the construction period for the Short Span Option, and assumes a BMP reduction of 10 dB. During the period of driving the 10 foot piles, 49% of the river cross sectional width would be occupied within the 187dB re 1μPa^2-s isopleth. This ensonified area would be between 43 and 61% during the four-month period when 4, 6, and 8 ft piles are all being driven, sometimes simultaneously. The figure indicates that driving of the 10 and 8 ft piles would take place in the first few months of the first year of construction, limiting the period of time of greatest potential impact, During the remaining years of the construction period, the affected cross section of the river is considerably less, on the order of 14 to 38%. Given that the river is approximately 3 miles wide, there would always be a considerable portion of the river that remains below the threshold noise criteria, thereby insuring adequate corridors for migration and movement of fish through the region. **Figure 18-26** indicates the cross sectional area of the river that would be ensonified by the 187 dB re 1μPa^2-s isopleths over the duration of the construction period for the Long Span Option,

Impacts to Fish

As a means to quantitatively assess potential impacts of pile driving to Hudson River fish resources, the isopleths that were generated by the JASCO hydroacoustic model (JASCO 2011a; See Appendix E-6) were used to delineate the spatial extent of the SEL_{cum} of 187 dB re 1μPa^2-s noise isopleths generated during pile driving. Noise isopleths were superimposed on bathymetric data of the project area to estimate water

volumes contained by the 187 dB re 1µPa^2-s isopleths during driving of 4, 6, 8 and 10-foot diameter piles. To account for depth-related differences in habitat use by various fish species, the three-dimensional volume was partitioned into habitats that corresponded to those recognized by the Hudson River Utilities Monitoring Program. These habitats included:

Shoal (0-20-ft depth),

Bottom (0-10-ft from the bottom where water is >20-ft deep), and

Channel (water column above the bottom where water is >20-ft deep).

Fish community data collected as part of the Hudson River Utilities Fall Shoals monitoring program over a recent 10-year period (1998-2007) were used to estimate the number of fish by habitat within the 187 dB re 1µPa^2-s isopleths. To do this, mean fish densities in the Tappan Zee region (RM 24-33) were first calculated by habitat and sampling event for each of the sampling events that typically occurred every other week from July through November. Using the actual observed densities, interpolated densities for "off" weeks were calculated during the survey year (July through November) when samples were not collected, as well as for weeks between survey years (December through June). Details of the interpolation and the other analysis methods are presented in Appendix E-7. The resulting dataset included an estimate of the mean density of fishes by habitat in the Tappan Zee region for each of the 52 weeks during the calendar year.

Mean weekly fish abundances were calculated within the boundaries of the187 dB re 1µPa^2-s noise isopleths during each week of the proposed construction schedule to estimate the total number of fish expected to be potentially impacted by pile-driving activities on a weekly basis over the course of bridge construction. Impacted volumes were determined following the preliminary proposed construction schedule, which outlines the month, week and year during which specific piles are to be driven and allows fish-density estimates to be linked to the habitat and volume impacted by pile driving over the course of construction. This approach accounted for the various combinations of pile sizes that will be driven simultaneously (which includes worst case modeled scenarios), and their location along the span and their depth within the River. Fish numbers were expressed in terms of the Hudson River standing crop. Upper and lower bounds were calculated by assuming that individual fish could either be affected only once (i.e., fish are highly mobile and all fish leave the ensonfied area after each week, and are replaced by new fish) or multiple times (i.e., fish are less mobile and limited in their range to habitats within the project area). The details of the methodology used for setting ranges for estimating fish encounters within the ensonified area are also presented in Appendix E-7.

For the Short Span Option, the number of fish that would be contained within the boundaries of a SEL_{cum} level of 187 dB re 1µPa^2-s and be potentially affected would range from 0.4% (lower bound) to 2.0% (upper bound) of the estimated annual riverwide standing stock of approximately 346.3 million fish. (Appendix E-7, Table 1). For the Long Span Option the number of fish that would be potentially affected by 187 dB 1 µPa^2·s ispoleth would range from approximately 0.4% to 2.3% of the riverwide standing stock. It is not considered likely, however, that the affected number of fish would approach either extreme of the range.

Appendix E-7, Table 1 presents results for the seven most abundant species. Three of these species (bay anchovy, striped bass and weakfish) made up about 94% of the standing stock abundance. Species composition of the fish community is largely dominated by bay anchovy (*Anchoa mitchilli*), which represented 283.8 million, or 82% of the riverwide standing stock of 346.3 million fish. In the Tappan Zee region bay anchovy was the dominant fish in all habitats but particularly in the channel habitat where it made up 99% of all individuals collected. In the shoal habitat bay anchovy comprised over 85% of all individuals collected and comprised 48% of fish in the bottom habitat.. For the Short Span Option, the number of bay anchovy encounters within the boundaries of a SEL_{cum} level of 187 dB re 1µPa^2-s and be potentially affected would range from 0.5% (lower bound) to 1.8% (upper bound) of their standing stock. For the Long Span Option the number of fish encounters within the 187 dB re 1µPa^2-s ispoleth would range from approximately 0.5% to 2.1% of the bay anchovy standing stock. Potential bay anchovy losses that might occur due to pile driving are a very small portion of the large coastal population that is the source of the bay anchovy that enter the Hudson, and the potential losses of individuals of this forage species would not be expected to result in significant adverse impacts on the Hudson River or coastal population of this species.

Striped bass, the second most abundant species with 21.2 million fish, comprised about 6% of the riverwide standing stock of 346.3 million fish. For the Short Span Option, the number of striped bass encounters within the boundaries of a SEL_{cum} level of 187 dB re 1µPa^2-s would range from 0.08% (lower bound) to 0.7% (upper bound) of their standing stock. For the Long Span Option the number of fish encounters within by 187 dB re 1µPa^2-s ispoleth would range from approximately 0.06% to 0.7% of the striped bass standing stock.

Weakfish, the third most abundant species with 9.2 million fish, comprised just under 3% of the riverwide standing stock of 346.3 million fish. For the Short Span Option, the number of weakfish encounters within the boundaries of a SEL_{cum} level of 187 dB re 1µPa^2-s would range from 0.07% (lower bound) to 0.7% (upper bound) of their standing stock. For the Long Span Option the number of weakfish encounters within the 187 dB re 1µPa^2-s ispoleth would range from approximately 0.09% to 0.7% of the weakfish standing stock.

The number of fish at risk would be expected to be lower than the encounter estimates presented above and in Appendix 7, Table 1 for a number of reasons:

Since the calculations do not take into consideration the normal behaviors of the fish it is reasonable to assume that fish, on hearing the pile driving sound, would either not approach the source or move around it. Since the pile driving sounds are very loud, it is very likely that many of the fish will hear the sound, and respond behaviorally, well before they reached a point at which the sound levels exceeded even the interim SEL_{cum} criterion of 187 dB 1 µPa^2·s.

The modeling assumes that during the construction schedule when multiple pile sizes are being driven, they are all being driven simultaneously, representing a worst case scenario with the largest isopleth footprint. In reality, the isopleths are likely to be considerably smaller given that during a large part of any day the piles may be each driven separately rather than simultaneously.

Based on the recent scientific studies discussed above, the 187 dB re 1µPa2-s SEL_{cum} threshold may be overly conservative, and if the conclusions of these studies are relied upon, a higher threshold (e.g. SEL_{cum} of 203 dB or greater) would be used to evaluate injury to fish. Under this higher threshold value, the area of the isopleths would be considerably reduced, as would the number of potentially affected fish.

The analysis was conducted using a 10 dB decibel reduction associated with implementation of BMPs, which may underestimate the level of noise attenuation that can be achieved by bubble curtains or other technologies. The California Department of Transportation's technical guidance document (CALTRANS 2009) indicates that bubble curtains will attenuate noise by about 20 dB for piles greater than 4 ft in diameter. With an attenuation system providing 20 dB of noise reduction the spatial extent of the isopleth could be expected to be substantially reduced. For example, hydroacoustic modeling performed for the Pile Demonstration Implementation Project (PIDP) (JASCO 2011b) indicated that the distances to peak SPL thresholds at 206 dB for 10 ft diameter piles went from 573 ft without BMPs, to 166 ft with a 10 dB BMP, to 89 ft with a 20 dB BMP. The PIDP project which will be conducted in early 2012 will test various BMP practices and provide additional information on the level of sound reduction that may be achieved by their implementation for the Bridge Replacement Project.

Summary

For all of the reasons stated above, construction of either the Short or Long Span Options would not be expected to result in adverse impacts to populations of fish species in the Hudson River.

Comment [TC81]: As above, you have not fully analyzed the sub-lethal impacts.

18-4-13-4 THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES

Terrestrial Species

Threatened or endangered terrestrial species were evaluated for a distance of ½ mile north and south of the Interstate 87/287 (New York State Thruway) right-of-way generally between Interchange 10 (Route 9W) in Rockland County and Interchange 9 (Route 9) in Westchester County, including the Hudson River, and within a ½ mile radius of the WNSA and TQSA sites.

Bridge Study Area

As discussed in Chapter 16, "Ecology," due to lack of appropriate habitat in the study area, the project would have no effect on federally-listed threatened or endangered terrestrial wildlife species, including the bog turtle (*Clemmys* [*Glyptemys*] *muhlenbergii*), New England cottontail (*Sylvilagus transitionalis*), or Indiana bat (*Myotis sodalis*). All of the terrestrial threatened, endangered, and special concern wildlife species that are considered to occur within the study area are birds. State-listed species considered to have the potential to occur in the bridge study area include bald eagle (also protected under the federal Bald and Golden Eagle Protection Act), peregrine falcon *(Falco peregrinus*), sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*A. cooperii*), red-shouldered hawk (*Buteo lineatus*), osprey (*Pandion haliaetus*), common loon (*Gavia immer*), and pied-billed grebe (*Podilymbus podiceps*). These species are also protected under the federal Migratory Bird Treaty Act. Of these state-listed species, the occurrence of sharp-shinned hawk, Cooper's hawk, red-shouldered hawk, and osprey

would likely be limited to passage overhead during migration and possibly brief stopovers. In these cases, project construction would not have any impact on individuals or populations of these species. Sharp-shinned hawk, Cooper's hawk, and red-shouldered hawk have the potential to overwinter in the area, but suitable wintering habitat for these species is limited to the study area's periphery, such as the forest fragment on the Lyndhurst Museum property, where they would not experience any disturbance as a result of project construction.

Bald eagles would have the potential to occur within the study area during the winter during which time individuals would usually be found sitting on ice flows within areas of open water. Because bald eagles are easily disturbed by human activities (Stalmaster and Newman 1978, Stalmaster and Kaiser 1997) bald eagles would be expected to avoid the portion of the river within the Bridge Study Area and instead forage elsewhere on the river where disturbance levels are lower. On the basis of the 0.5-mile maximum buffer for minimizing disturbances to bald eagles due to extremely loud noises recommended in the federal guidelines (USFWS 2007), approximately 1 mile of foraging habitat on the river would have the potential to be avoided during construction of the project. This minimal loss of foraging habitat within the lower Hudson River would not result in adverse impacts to bald eagles at either the individual or regional population levels.

Comment [TC82]: Once again, this is also an impact. You need to include sub-lethal effects in your analysis.

Comment [TC83]: Unsubstantiated statement.

Common loons and pied-billed grebe would have the potential to occur within the study area during the fall and winter and winter and spring, respectively (DeOrsey and Butler 2006). Individuals of both species would be expected to avoid the bridge study area during construction of the project and use other portions of the river with less human disturbance for foraging habitat. This minimal loss of foraging habitat for these two species would not result in adverse impacts to regional populations of these two species.

Peregrine falcons have consistently nested in artificial nest boxes on the Tappan Zee Bridge since the 1980's (Mildner 1988, USFWS 1997) and they remain in the area year-round. Peregrine falcons have become increasingly common in urban areas, demonstrating a tolerance of human disturbance and an ability to exploit resources in human-modified environments (Cade et al. 1996, White et al. 2002). It has been suggested that peregrine falcons will tolerate almost any level of human activity taking place below their nest, provided that the nest is inaccessible (Ratcliffe 1972).

Comment [TC84]: Suggested or demonstrated? Please provide the context for this statement.

The pair of falcons currently occupying the Tappan Zee Bridge is expected to habituate (i.e., after a period of exposure or after repeated exposures to a stimulus an animal stops responding) to and tolerate the increased levels of noise and human activity that would occur during project construction, and continue to utilize the current nest site based on their past tolerance of maintenance work. The boxes were placed on the existing bridge over 20 years ago by NYSTA and have been adopted by the falcons. Nest site abandonment in urban peregrine falcons is extremely rare when successful nesting has occurred in prior years (Cade et al. 1996).

Comment [TC85]: Speculative statement. Examples of falcons habituating to unusual, extended disturbance?

Comment [TC86]: Provide a comparison of noise and other disturbances from routine maintenance and the proposed construction.

Comment [TC87]: The same pair or successive pairs?

Comment [TC88]: Under normal conditions—but what about the sudden, loud, unaccustomed disturbance. What about breeding season? It is unlikely that a single pair would be able to habituate (if indeed they would) quickly enough to successfully breed during construction disturbance.

During project construction, efforts should be taken to distance activities as far from the peregrine falcon nest on the existing bridge as possible. During previous maintenance construction activities on the bridge, NYSTA developed contractor protocols, in conjunction with NYSDEC and NYCDEP, for avoiding disturbance to peregrine falcons

nesting on the Tappan Zee Bridge. Similar protocols would be developed for this project. They may include prohibiting construction activities, where practicable, at heights greater than 26 feet above the roadway or within 100 feet of the piers over which the nest boxes are located, and marking the tops of heavy equipment (e.g., cranes) and any tall exhaust pipes of such equipment with flagging to deter peregrine falcons from landing on them. It is possible, upon completion of the replacement bridge, and prior to demolition of the existing bridge, nest boxes would be moved to the replacement bridge to provide an alternative nest site for the resident pair of peregrine falcons to utilize in future breeding seasons. Depending on the timing of completion and demolition of the bridges, the pair may lose an opportunity to reproduce for one breeding season. The nesting season of peregrine falcons in New York City is generally from February through August. The timing of nest box relocation and the siting of the boxes on the replacement bridge would be performed in consultation with NYSDEC and NYCDEP wildlife biologists to help ensure a successful transition. As such, it is expected that the falcons would relocate to boxes on the new bridge. Therefore, there the project would not result in adverse impacts to peregrine falcons.

Comment [TC89]: Describe these measures and document the falcons responses during breeding season.

Comment [TC90]: What if they don't?

Comment [TC91]: This is a weak statement. You present no data that demonstrates that the falcons would accept a new nest box—you also assume that the falcons will immediately nest in a new box, but again, no data are presented to substantiate this claim. The loss of reproductive output for one (or more?) seasons is an adverse impact and needs to be fully analyzed in this document.

Inland Staging Areas

The limited habitat available within the Inland Staging Areas would not be expected to provide habitat for threatened or endangered wildlife. Therefore, use of these sites for construction staging activities would not have any adverse impact on threatened, endangered, or special concern wildlife species.

The state-listed endangered late flowering boneset was observed within portions of the successional southern hardwoods community within the WNSA. Currently, this species is on the New York Natural Heritage Program's (NYNHP) "2010 Rare Plant Status List - Native Pioneer Plant Watch List." This list contains species that are under review for potential delisting by the state because they are considered pioneer species, or weedy in nature, and predicted to increase in numbers over time. These species are usually recent additions to the state and are actively colonizing disturbed sites. With respect to late flowering boneset, there is a debate among botanists over the native versus non-native status of this species within New York State (Lamont and Young 2001). Despite this debate, it has been determined that late flowering boneset is considered to be a native weedy species in states south and west of New York State, and the species is expected to continue to spread northward (Lamont and Young 2001).

Should late flowering boneset be delisted by the state prior to project construction, then it would be assumed that populations of this plant are secure and that the construction of the project would not result in an adverse impact on populations of this species within the region. However, if late flowering boneset remains listed by the state when construction is scheduled to commence, then coordination with NYNHP to develop a conservation strategy (e.g., the implementation of protection measures during construction or relocation of plants) to protect individuals of this species would occur. With this conservation strategy in place, the construction of the project would not result in adverse impacts on late flowering boneset populations within the region.

Aquatic Species

Only one federally listed ESA species is located in this region of the Hudson River—the endangered shortnose sturgeon. The Atlantic sturgeon is proposed for listing as

endangered. Both species forage in this portion of the river as they migrate to and from their upriver spawning grounds far to the north of the Tappan Zee Bridge. This portion of the river is not used as spawning grounds or overwintering habitat for either species. There is no designated critical habitat for either shortnose or Atlantic sturgeon in the Hudson River.

As described in Chapter 16, "Ecology," a Biological Assessment (BA) has been prepared as part of a formal consultation process under Section 7 of the Endangered Species Act (ESA) (see Biological Assessment, Appendix E-4). Under Section 7 of the Endangered Species Act (ESA), the FHWA is required to consult with the USFWS and National Oceanic and Atmospheric Administration (NOAA) Fisheries to determine whether any federally listed species or species proposed for listing as endangered or threatened species, or their designated critical habitats, occur in the vicinity of a proposed project that is subject to United States Environmental Protection Agency (USEPA) jurisdiction. In the event that a federally listed or proposed endangered or threatened species or its designated critical habitat occurs in the vicinity of a "major construction activity," a Biological Assessment (BA) must be prepared to determine whether the proposed federal action would affect that species. The regulations promulgated pursuant to the ESA require every federal agency to ". . .[e]nsure that any action it authorizes, funds, or carries out, in the United States or upon the high seas, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat" (50 CFR Section 402.01).

While the loss of habitat associated with construction of the project may impact individual shortnose and Atlantic sturgeon, it would not be expected to jeopardize either their populations or adversely modify their critical habitat. The project site is neither a shortnose nor Atlantic sturgeon spawning area, or designated as critical habitat. Both of these species spawn well north of the bridge, with the principal spawning area for the shortnose as far north as Albany. Early life stages such as eggs and larvae of either species would not occur in the vicinity of the project. The dredged access channels would represent an area of reduced foraging opportunities for both sturgeon species. As discussed above, over time deposition processes would allow benthic habitat to return to its pre-construction state. The temporary loss of the access channel area would represent a minor fraction of similar available habitat throughout and the Tappan Zee portion of river. The BA (Appendix E-4) concluded that while construction activities such as dredging and pile driving could affect individual fish, these activities would have minimal effects to shortnose and Atlantic sturgeon populations. Therefore, the construction of the project would not result in adverse impacts to populations of either species.

Comment [TC92]: This is not a determination that FWHA/DOT can make. You must make an effects determination (e.g., no effect; may affect but not likely to adversely affect (requires NMFS concurrence); or likely to adversely affect (requires formal section 7 consultation). The jeopardy analysis and determination lies with the regulatory agency with jurisdiction (in this case, NMFS) as a part of the section 7 consultation.

Analyses were conducted to estimate the number of shortnose sturgeon that may be affected by pile driving activities. These analyses are more fully described in the attached appendix document (Appendix E-7).

Using fish abundance estimates from a 1-year comprehensive gill-net sampling study (Appendix E-3), the encounter rate of shortnose sturgeon in the project area was estimated as the number of shortnose sturgeon collected per gill net per hour. From June 2007–May 2008, 476 gill nets were deployed just upstream of the existing Tappan Zee Bridge for a total sampling time of 679 hours. During this time, 12 shortnose sturgeon were collected: 7 in September and October, 4 in May and June, and 1 in

August. Based on the observed number of sturgeon collected over 679 gill-net hours, the encounter rate for shortnose sturgeon in the project area was calculated as 0.02 sturgeon encountered per hour of sampling.

To estimate the potential number of shortnose sturgeon affected by pile driving activities, it was necessary to scale gill-net encounter rates from a single gill-net sample to the area encompassed by the isopleth bounding the SEL_{cum} of 187 dB re 1µPa^2-s (JASCO 2011a, Appendix E-6). The SEL_{cum} of 187 dB re 1µPa^2-s, which is a NMFS interim threshold measure for onset of physical injury to fish was used to determine the number of shortnose sturgeon that would have been collected if multiple gill nets were deployed side-by-side across the width of the 187 dB re 1µPa^2-s isopleth. The length of the gill net is 125-ft. For the Short Span Option the width of the 187 dB isopleth for the pile sizes ranges from 1,020 ft to 9,324 ft, depending on the size of the pile, or combination of pile sizes being driven (Appendix E-7, Table 2) . However, for about 80% of the weeks that construction will be ongoing, the width of the isopleths will be 3,500 ft or less. For the Long Span Option the width of the 187 dB isopleth for the pile sizes ranges from 1,178 ft to 7,965 ft, depending on the size of the pile, or combination of pile sizes being driven (Appendix E-7, Table3). For 80% of the weeks that construction will be ongoing for the Long Span Option, the width of the isopleths will be 3,910 ft or less.

Movement by shortnose sturgeon has been shown to be strongly oriented into or with river currents. This is supported by data collected during the 2007-2008 gill net study, in which shortnose sturgeon were collected with greater frequency in gill nets deployed across the river current vs. with the current. Based on these results, it was assumed that sturgeon moved in an upstream or downstream direction through the project area and at a constant rate and would thus be intercepted by gill nets spanning the width of the noise isopleth. It was also assumed that catch rates are proportional to shortnose sturgeon abundance, which is a central assumption of most fish-sampling gears, and that sturgeon were uniformly distributed throughout the Tappan Zee region. Under these assumptions, each gill net would encounter shortnose sturgeon at the same rate allowing the estimates of sturgeon number to be scaled to the width of the isopleth.

Appendix E-7, Tables 2 and 3 provide a summary of the number of shortnose sturgeon potentially affected by the pile driving at various locations with 10 dB BMPs for each week of the construction period. Based on the analytical approach, the Short Span Option has the potential to impact 505 shortnose sturgeon and the Long Span Option has the potential to impact 407 fish, in total, for the project. Assuming 60,000 as a valid, current standing stock estimate for shortnose sturgeon in the Hudson River and assuming that this number remains static for the duration of the project, the Short Span Option has the potential to affect 0.84% of the population and the Long Span has the potential to affect 0.68% of the population. These estimates can be viewed as a conservative maximum because they represent the encounter rate within the isopleths over several years, and one should assume that some fraction of that total number would be encountered more than once. This approach also overestimates the numbers affected because is neglects any behavioral effects, such as moving away from the sounds at the onset of ensonification.

Because Atlantic sturgeon were not collected in the gill net sampling program no estimate of the number of fish within the ensonifed zone was calculated. However,

because the Hudson River population size is considerably less than that for the shortnose, the number would be expected to be less than 505 and 407 fish for the Short Span and Long Span, respectively.

The attached BA (Appendix E-4) concluded that while pile driving can potentially injure sturgeon in the immediate vicinity of the activity, it will not jeopardize the continued existence of shortnose or Atlantic sturgeon in the Hudson River. Both shortnose and Atlantic sturgeon are subject to the same risks associated with pile driving as are other fish species inhabiting or migrating through the Tappan Zee region. However, their relatively small swim bladder would suggest that the physiological impacts of pile driving on sturgeon may not be as great as for other species with larger swim bladders. Furthermore, NMFS has commented (FHWA 2003) that fish like shad and alewife are more susceptible to pressure waves due to their laterally compressed body shape, in comparison to the shortnose sturgeon's fusiform shape. There is no critical habitat for shortnose or Atlantic sturgeon in the Hudson River.

While pile driving impacts resulting from constructing either Short or Long Span options may impact some individuals of these two species either behaviorally or physiologically, the activity would not adversely impact their overall populations.

Impacts to Marine Mammals from Pile Driving

The impact of sound on marine mammals are addressed in the attached Biological Assessment (Appendix E-4). The BA concludes that given the scarcity of marine mammals in the project area, it is not possible to reliably estimate the number of animals that may be affected by pile driving sounds (or noises associated with other construction activities). Based on the few anecdotal observations cited in the BA, the presence these species in the vicinity of the project is rare and is likely attributable to either previously stressed/injured animals or healthy, but transient, individuals. In the case of the former, the pile driving sounds could exacerbate existing stressors and result in either sub-lethal or lethal effects, while in the case of the latter, healthy animals would be expected to retreat from the source of any sounds that produce discomfort. Nevertheless, because this portion of the Hudson River doesn't provide areas for spawning, nursery, or overwintering, or migratory pathways for these species, any anthropogenic sound in the river is not expected to result in adverse effects to the movement, reproduction, feeding, or sustained population of these species.

Comment [TC93]: We do not have this document and therefore, cannot comment.

Comment [TC94]: Which mammal species? Estimated pop. density per mile, etc?

Comment [TC95]: And go where? From where? Where are they going to? As above, area avoidance is an effect and must be fully evaluated.

Comment [TC96]: But will it prevent them from coming/going to places that do have these characteristics?

18-4-13-5 SIGNIFICANT HABITATS

Significant Coastal Fish and Wildlife Habitats

Neither the area to be dredged for access channels nor the area over which temporary platforms would be constructed, would directly impact Significant Coastal Fish and Wildlife Habitat. The closest Significant Coastal Fish and Wildlife Habitat is the Piermont Marsh, which is located two miles south of the bridge, far outside the projected plumes of increased suspended sediment for the worst-case in-water construction scenarios discussed above. Therefore, construction of the project would not result in adverse impacts to the resources of Piermont Marsh.

USFWS Significant Habitats

For reasons discussed above under "Fish," and below in Sections 18-4-13-3, "Suspended Sediment," and 18-4-13-4, "Hydroacoustic Effects," construction of the project would not result in adverse impacts to aquatic habitat or biota and would not affect the inclusion of this portion of the Hudson River within the USFWS Lower Hudson River Estuary Significant Habitat of the New York Bight.

Comment [TC97]: See comments in these sections.

Essential Fish Habitat

An EFH evaluation has been prepared as part of a formal consultation process under the Magnuson-Stevens Fishery Conservation and Management Act (see Appendix E-2). As discussed in Chapter 16, "Ecology," and summarized in the attached EFH evaluation, the vicinity of the Tappan Zee Bridge is not spawning habitat for most EFH species, and construction of a replacement structure is not expected to adversely affect EFH. Dredging for an access channel would result in an area of reduced foraging opportunities for some EFH species; however, the access channel represents a minor fraction of similar available habitat throughout the estuary. Temporary construction platforms, would be removed once the bridge becomes operational, but a portion of the platform constructed within the Rockland Bridge Landing would remain following completion of construction of the Replacement Bridge Alternative. Finally the in-river footprint of the construction platforms (i.e., approximately 8.78 acres for both options) would indicate that any loss of habitat from their temporary emplacement would not aversely effect EFH.

The effects of pile driving on EFH and EFH fish species are discussed in detail in Appendix E-2. Most of the EFH species do not utilize the Tappan Zee region as their spawning grounds and/or critical habitat. In the winter, few, if any, of the EFH species are likely to be in the project area due to low river salinities. However, in the warmer months of the year several EFH species do frequent the project area. While the proposed construction activities may affect individuals of the EFH species, and their prey, these species are common throughout the waters of the estuary, and it is anticipated that only a small percentage of the regional fish stock would be potentially exposed to high acoustic levels. Thus, pile driving impacts resulting from constructing either Short or Long Span options may impact individuals of the EFH species, but they would not adversely impact their overall populations. Therefore, the hydroacoustic effects resulting from pile driving would not result in adverse impacts to EFH.

18-4-13-6 PROJECT MEASURES TO MINIMIZE HYDROACOUSTIC EFFECTS

A number of measures are being implemented by the bridge replacement project to reduce the potential for pile driving associated injury to sturgeon and other aquatic species. These include:

Driving the largest (10 and 8 ft) diameter piles within the first few months of the project thereby limiting the period of greatest potential impact.

Using cofferdams and silt curtains, where feasible, to minimize discharge of sediment into the river.

Using a vibratory pile driver to the extent feasible particularly for the initial pile segment.

Using bubble curtain, cofferdams, isolation casings, Gunderboom, or other technologies to achieve a reduction of at least 10 dB of noise attenuation.

Using the results of the Hudson River site specific PIDP to inform the project on the effectiveness of BMP technologies for reducing sound levels, and implementing BMPs to achieve maximum sound reduction.

Limiting the periods of pile driving to no more than 8 to 12-hours/day.

Pile tapping (i.e. a series of minimal energy strikes) for an initial period to frighten fish.

Development of a comprehensive monitoring plan. Elements would include:

- Monitoring at locations to characterize the hydroacoustic field surrounding pile driving operations, which also includes a nearfield component to evaluate the performance of underwater noise attenuation systems that are integral to the project.
- A water quality element that monitors water quality parameters such as temperature, salinity, and suspended sediment concentrations in the vicinity of the pile driving.
- Monitoring of fish mortality and inspection of fish for types of injury.
- Monitoring of predation levels by gulls and other piscivorous birds.
- Development of criteria for re-initiating consultation with NMFS should specific numbers of shortnose or Atlantic sturgeon come to the surface wounded or dead.
- Preparation of a Standard Operating Procedures Manual outlining the monitoring and reporting methods to be implemented during the program.

18-4-14 HAZARDOUS AND CONTAMINATED MATERIALS

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[1] (e.g., asbestos and lead-based paint) both in the existing bridge structure and in other structures that would be demolished/renovated as well as any potential hazardous materials in the subsurface, i.e., soil and groundwater, in the upland areas that would be disturbed.

To evaluate the potential presence of hazardous materials, a Phase I Environmental Site Assessment (ESA) was performed. This non-ground-intrusive study included site reconnaissance, research on current/historical use, and review of federal and state regulatory listings for both the project site itself and for its neighboring properties within certain specified distances. Where a Phase I ESA finds evidence of known or potential concerns, a subsurface (also known as a Phase II) investigation is generally recommended. Unlike a Phase I ESA, a Phase II investigation typically includes laboratory analysis of soil and groundwater samples in the areas of potential disturbance. Both Phase I and Phase II studies also frequently include evaluation of

[1] For the purposes of this chapter the terms “hazardous material” and “contaminated material” are used interchangeably and to mean any substance that poses a threat to human health or the environment. “Hazardous waste” is a specific regulatory term meaning a subset of solid wastes in the federal (40 CFR Part 261) or State (6 NYCRR Part 371) regulations that are either specifically listed or possess the characteristic of ignitability, reactivity, corrosivity or toxicity.

non-subsurface issues typically associated with structures, e.g., asbestos-containing materials (ACM) or lead-based paint. Hazardous materials associated with existing structures must be addressed in accordance with established regulatory requirements, especially when being renovated or demolished.

Phase I ESAs found evidence of "recognized environmental conditions" (RECs) as well as non-REC issues, such as ACM and lead-based paint, and recommended that subsurface investigations be done to understand the nature of potential contaminants.

Phase II investigations would be used to refine the measures to be implemented during construction to properly manage hazardous materials in the existing bridge structure, in other structures that would be disturbed, and in the subsurface, i.e., soil and groundwater. In this way, adverse impacts to workers, the surrounding communities and the environment would be avoided. To avoid the potential for adverse impacts, the project would be conducted in accordance with the following:

Once the exact areas where soil disturbance are identified (and prior to the soil disturbance activities), subsurface (Phase II) investigations of the areas to be disturbed would be conducted. The investigations would involve the collection of subsurface soil and groundwater samples for laboratory analysis. Should additional project areas (e.g., construction staging) be identified that were not within the limits of the existing Phase I ESA, additional Phase I ESAs and, if warranted by Phase I ESA findings, subsurface investigations, would be conducted prior to soil disturbance in those areas.

Based on the findings of the subsurface investigations, site-specific Remedial Action Plans (RAPs) and Construction Health and Safety Plan (CHASP) would be prepared and implemented during construction. These plans would provide the appropriate clean fill importation criteria and criteria for allowable reuse of excavated site soils (whether in the uppermost layer of unpaved areas or elsewhere), handling, stockpiling, testing, transportation, and disposal of excavated materials, including any unexpectedly encountered contaminated soil and petroleum storage tanks, in accordance with applicable regulatory requirements. The RAP would include requirements that all excavated soil and/or fill be handled and disposed of in accordance with regulatory requirements and standard NYSDOT procedures. Where dewatering is required, it would be conducted under a NYSDEC State Pollutant Discharge Elimination System (SPDES) permit and in accordance with standard NYSDOT procedures. The CHASP would ensure that subsurface disturbance is performed in a manner protective of workers, the community, and the environment.

Any petroleum storage tanks within the project limits that would not be used following the proposed action would be properly closed and removed, along with any contaminated soil, prior to disturbance in accordance with NYSDEC requirements and NYSDOT procedures. Any remaining tanks, as well as any new tanks, would be maintained in accordance with regulatory requirements and standard NYSDOT procedures as discussed in Chapter 17, Hazardous and Contaminated Materials.

Any chemicals requiring disposal would be properly disposed of in accordance with regulatory requirements and standard NYSDOT procedures. Any chemicals used for maintenance following the proposed action, as well as any accident-related

chemicals requiring clean-up, would be handled and disposed of in accordance with regulatory requirements and standard NYSDOT procedures as discussed in Chapter 17, Hazardous and Contaminated Materials.

18-5 MITIGATION

Comment [TC98]: This is not an adequate analysis. Mitigation actions can also have effects and are a part of the Action. You need to provide a robust analysis of the anticipated impacts; the anticipated ecological consequences; and then the mitigation measures should be developed to offset those consequences.

18-5-1 ECOLOGY

Potential measures to mitigate effects on ecological resources are identified below.

Oyster Reefs: Opportunities for oyster bed restoration would be evaluated under consideration with NYSDEC as possible mitigation for loss of oyster reefs.

Wetland Enhancement: Wetland enhancement and/or creation can be implemented to offset impacts to wetlands at the WNSA should this staging site be selected during the design build process and there are unavoidable impacts to the forested wetland habitat. Mitigation would be coordinated with USACE during the design build process for the loss of wetlands at this site.

EXHIBIT 3

Review of NMFS Biological Opinion and NYSDEC Draft Permit Tappan Zee Bridge Replacement Project

Carpenter Environmental Associates, Inc.

August 30, 2012

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August 30, 2012

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

Re: Review of NMFS Biological Opinion
and NYSDEC Draft Permit
Tappan Zee Bridge Replacement Project

CEA No. 21233

Dear Mr. Musegaas:

Carpenter Environmental Associates, Inc. (CEA) has reviewed the Biological Opinion (BO) for the Tappan Zee Bridge Replacement Project prepared by the NOAA's National Marine Fisheries Service (NMFS) dated June 22, 2012 and the New York State Department of Environmental Conservations' (NYSDEC) Draft Permit and associated documents. CEA offers the following comments with respect to project related impacts to Atlantic (*Acipenser oxyrichus*) and shortnose sturgeon (*Acipenser brevirostrum*) populations.

Dredging

1.) The NMFS utilizes the Bath Iron Works' (BIW) permit as a source of information to predict inaccurate conclusions, regarding the effects of dredging, for the TZB project. The BO issued for the BIW permit, for dredging the Kennebec River in Maine, details the BIW project. Dredging at the BIW facility would entail the removal of 303,500 CY of material over six years (50,583 CY, on average, per year).[1] NMFS estimates that one shortnose sturgeon is likely to be captured during each year that dredging maintenance at the BIW facility will occur, or every 50,583 CY of material removed.[2] Over the three year period that dredging will occur at the Tappan Zee Bridge (TZB) project site, a total

[1] NOAA's National Marine Fisheries Service – Northeast Region. Endangered Species Act Section 7 Consultation: Biological Opinion. Issuance of 10 Year Permit to Bath Iron Works for Maintenance Dredging at their facility along the Kennebec River at Bath, Maine. November 4, 2009. p 5.

[2] NOAA's National Marine Fisheries Service – Northeast Region. Endangered Species Act Section 7 Consultation: Biological Opinion. Issuance of 10 Year Permit to Bath Iron Works for Maintenance Dredging at their facility along the Kennebec River at Bath, Maine. November 4, 2009. p 56.

of 1.68 – 1.74 million CY of material is to be removed.[3] By utilizing NMFS' estimate developed for dredging at the BIW facility, of one mortally injured shortnose sturgeon per 50,583 CY of material removed, the TZB dredging can be expected to mortally injure 33 shortnose sturgeon. NMFS does not account for this major size difference within projects. Dredging is a principal threat to the shortnose sturgeon's survival.[4] Sturgeons are known to be sensitive to anthropogenic impacts.[5] Habitat modification, such as that caused by dredging and other construction activities, is one of the main factors responsible for the decreasing abundance of most sturgeon species and populations.[6] Any and all potential impacts from the TZB project must be fully assessed to ensure the safety of the Atlantic and shortnose sturgeon.

2.) During the one year gillnet survey, conducted by AECOM, a total of 12 shortnose sturgeon were captured; 7 of which were caught in the vicinity of the bridge during September and October.[7] Dredging would occur between August 1st and November 1st, when more than 50% of the shortnose sturgeon were caught.[8] The dredging window must be more closely examined for temporal impacts through additional gillnet surveys and utilization of historic U.S. Fish and Wildlife Service (USFWS) and NYSDEC tagging and tracking and sampling surveys.

Pile Driving

3.) The BO readily acknowledges that there is no data for shortnose or Atlantic sturgeon regarding hearing sensitivity or the structure of their auditory systems.[9] NMFS use data available for lake sturgeon. Lake sturgeon in New York average a length of 3-5 feet, while Atlantic sturgeon are typically much larger, 6-10 feet, and shortnose sturgeon are typically smaller, less than 3.5 feet.[10] Generally, smaller fish are more vulnerable to

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[3] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 12.

[4] National Marine Fisheries Service. Final Recovery Plan for the Shortnose Sturgeon – *Acipenser brevirostrum*. December 1998. p 6.

[5] Hatin, D. Effect of Dredged Sediment Deposition on Use by Atlantic Sturgeon and Lake Sturgeon at an Open-Water Disposal Site in the St. Lawrence Estuarine Transition Zone. American Fisheries Society Symposium 56:235-255. p 249.

[6] Hatin, D. Effect of Dredged Sediment Deposition on Use by Atlantic Sturgeon and Lake Sturgeon at an Open-Water Disposal Site in the St. Lawrence Estuarine Transition Zone. American Fisheries Society Symposium 56:235-255. p 249.

[7] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 98.

[8] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 11.

[9] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 84.

[10] NYSDEC. Similarities and Differences Among New York's Sturgeon. http://www.dec.ny.gov/animals/7265.html. 2012.

injuries endured from sound than larger fish.[11] Furthermore, lake sturgeon are primarily found in freshwater habitats while the shortnose and Atlantic sturgeon within the project area will be in brackish waters.[12,13] Because seawater has a higher density than freshwater, sound travels faster and with greater frequency in seawater than freshwater.[14] For these reasons, NMFS needs to assess the Atlantic and shortnose sturgeon individually, since the noise from pile driving will affect each fish differently.

4.) The BO acknowledges the data used regarding lake sturgeon (the surrogate used for both the Atlantic and shortnose sturgeon) (Lovell et al. 2005; Meyer et al. 2010) examines the responses of the ear rather than whether or not the fish respond to the sounds detected by the ear. It is therefore hard to determine the lake sturgeon's hearing threshold because of this lack of data. [15] The BO goes on to state that the lake sturgeon has a hearing range from below 100 Hz to 800 Hz.[16] Initial studies (unpublished) by Meyer and Popper suggest that some species within the *Acipenser* genus of sturgeon may be able to detect sounds from below 100 Hz to over 1,000 Hz.[17] Based on the Meyer and Popper data, impacts to Atlantic and shortnose sturgeon due to an increased hearing range need to be examined

5.) The NMFS states in the BO "there are no data that correlate effects of noise on fishes and swim bladder size."[18] Despite this, NMFS continues to draw conclusions from the size of the swim bladder such as "the physiological effects of pile driving on sturgeon may actually be less than on other species due to the small size of their swim bladder."[19] Without data that correlates the effect noise has on fish and swim bladder size, NMFS should not be drawing such conclusions.

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[11] California Department of Transportation (Caltrans). Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. February 2009.
[12] NYSDEC. Lake Sturgeon Fact Sheet. http://www.dec.ny.gov/animals/26035.html. 2012.
[13] Haley, N. et al. Juvenile Sturgeon Habitat Use in The Hudson River. 1996. p VIII-14.
[14] NOAA's National Marine and Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Pile Installation Demonstration Project F/NER/2011/05769. March 7, 2012. p 50.
[15] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 84.
[16] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 84.
[17] Popper, A. Environmental BioAcoustics, LLC. A Review of Hearing by Sturgeon and Lamprey. August 12, 2005. p 13.
[18] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 84.
[19] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 84.

6.) Fish with swim bladders, like Sturgeon, are suspected to be more likely to experience neurotrauma when exposed to high sound pressures. [20] "Acoustic stunning", loss of consciousness, is expected to be a result of such neurotrauma.[21] When a sturgeon experiences "acoustic stunning", its ability to leave the ensonified area and protect itself from further harm will be greatly reduced, contrary to the BO's assumption that the fish will immediately leave the area. The BO needs to account for possible deaths caused by acoustic stunning.

7.) The BO assumes that Atlantic and shortnose sturgeon will leave the ensonified area when pile driving begins and concludes that injury and mortality from pile driving will be rare.[22,23] This assumption is partially based on the planned utilization of a "soft start".[24,25] However, either exposure to low levels of sound for a relatively long time, or exposure to higher levels of sound for shorter periods of time, may result in auditory tissue damage or temporary hearing loss.[26] Temporary loss of hearing can prevent the sturgeon from sensing their physical environment (i.e. decreased success in locating prey).[27] The 2009 Caltrans study states that "no studies have examined the long-term effect of exposure to pile driving sounds that may lead to delayed death or, perhaps, to other alteration in behavior that could affect the survival of individuals or of populations of fishes."[28] The study suggests that future research needs to address not only the immediate impacts of pile driving, but the long-term effects it has on fish physiology and behavior.[29] The BO must discuss how hearing loss may inhibit the federally endangered Atlantic and shortnose sturgeon's long term survival.

8.) The BO uses conclusions from a 2003 Plachta and Popper study on the American shad (20-24 inches long) to draw a generalized conclusion on fish's behavioral response to

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[20] California Department of Transportation (Caltrans). Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. February 2009. p 3-4.

[21] California Department of Transportation (Caltrans). Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. February 2009. p 3-4.

[22] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 114.

[23] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 110.

[24] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 114.

[25] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 110.

[26] California Department of Transportation (Caltrans). Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. February 2009. p 3-3.

[27] California Department of Transportation (Caltrans). Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. February 2009. p 3-3.

[28] California Department of Transportation (Caltrans). Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. February 2009. p 3-4.

[29] California Department of Transportation (Caltrans). Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. February 2009. p 3-5.

different sound intensities. The American shad has a much larger hearing range than that of the Atlantic and shortnose sturgeon.[30] Inferring the sturgeon's behavioral responses to sound from that of the American shad is contradictory of the BO's prior statement that "behavioral responses can vary substantially, even within a single species…Thus, it may be difficult to assign a single criterion above which behavioral responses to noise would occur."[31] The BO cannot use the behavioral responses observed by American shad to predict responses in the shortnose and Atlantic sturgeon.

Vessel Strikes

9.) The BO claims that geographic features, such as narrow migration corridors and shallow/narrow river channels, are not present in the Hudson River.[32] While that is normally true, during the installation of the piles the corridor available for fish to move through without being subject to behavioral or physiological effects will be limited.[33] Locations that have relatively narrow waterways seem to be more prone to ship strikes.[34] Although the increase in traffic associated with the bridge replacement project is small, any expected increase in boating traffic increases the potential for Atlantic sturgeon to be struck by boats.[35] The BO must account for deaths to sturgeons due to vessel strikes during pile driving activities.

NYSDEC Draft Permit

10.) Major inconsistencies exist between agency methodologies utilized to determine the number of sturgeon expected to be affected from the increased noise due to pile driving.

Shortnose sturgeon

The NYSDEC draft permit anticipates the number of shortnose sturgeon to be affected by the elevated noise levels to be 298, 89 of which may suffer mortality.[36] These numbers are consistent with the Incidental Take Permit (ITP) report submitted to NYSDEC and

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[30] NOAA's National Marine and Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Pile Installation Demonstration Project F/NER/2011/05769. March 7, 2012. p 51.

[31] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 87.

[32] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 119.

[33] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 8.

[34] Atlantic Sturgeon Status Review Team - NMFS. Status Review of Atlantic Sturgeon (*Acipenser oxyrinchus*). February 23, 2007. Updated July 27, 2007. p 91.

[35] Atlantic Sturgeon Status Review Team - NMFS. Status Review of Atlantic Sturgeon (*Acipenser oxyrinchus*). February 23, 2007. Updated July 27, 2007. p 91.

[36] NYSDEC Facility DEC ID 3-9903-00043/00012. Permit Under the Environmental Conservation Law (ECL). Part 182 Incidental Take. p 2.

the revised Biological Assessment (BA), both prepared by AKRF, Inc. in April 2012.[37,38] AKRF's methodology in calculating the affected number of shortnose sturgeon is based on the encounter rate of sturgeon within the project area, obtained from AECOM's one year gillnet survey, and the SEL_{cum} noise levels at which injuries can occur.[39,40] The gillnet survey provided a scaled encounter rate of .033 shortnose sturgeon per hour of sampling along with data showing that sturgeon typically move with or against the current.[41,42] Since the sturgeon tend to move with or against the current, AKRF further scaled the gillnet encounter rate from one gillnet to the number of gillnets necessary to encompass the width of the isopleth of concern.[43,44] The ITP and BA, prepared by AKRF, state that based on recent studies and *discussions with the NMFS*, the SEL_{cum} levels at which injuries can occur are 197 dB re $1\mu Pa^2 \cdot s$ for potential recoverable physical injury and 207 dB re $1\mu Pa^2 \cdot s$ for potential mortal injury.[45,46] AKRF estimates the number of shortnose sturgeon affected as a result of pile driving by assessing the amount of fish each driven pile will affect.[47,48] AKRF anticipates 298 shortnose sturgeon to be affected, 89 of which may suffer mortality, based on <u>SEL_{cum} sound levels</u>.[49,50]

The NMFS, in the June 22, 2012 BO, anticipates the number of shortnose sturgeon to be affected by the increased noise level to be 43-70 (depending on the Long Span or Short Span Options, respectively), one of which may suffer mortality.[51] NMFS uses the same methodology as AKRF in the ITP with one major difference; the noise criteria for the onset of physiological effects.[52] NMFS uses a <u>peak sound level</u> of 206 dB re 1µPa, rather than a <u>SEL_{cum} sound level</u>, as their criteria for potential physiological effects to occur

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[37] AKRF, Inc. Tappan Zee Hudson River Crossing Project – Incidental Take Permit. April 2012. p 37.
[38] AKRF, Inc. Biological Assessment for the Tappan Zee Hudson River Crossing Project. Revised April 2012. p 56.
[39] AKRF, Inc. Tappan Zee Hudson River Crossing Project – Incidental Take Permit. April 2012. p 35-37.
[40] AKRF, Inc. Biological Assessment for the Tappan Zee Hudson River Crossing Project. Revised April 2012. p 54-55.
[41] AKRF, Inc. Tappan Zee Hudson River Crossing Project – Incidental Take Permit. April 2012. p 35-36.
[42] AKRF, Inc. Biological Assessment for the Tappan Zee Hudson River Crossing Project. Revised April 2012. p 54-55.
[43] AKRF, Inc. Tappan Zee Hudson River Crossing Project – Incidental Take Permit. April 2012. p 36.
[44] AKRF, Inc. Biological Assessment for the Tappan Zee Hudson River Crossing Project. Revised April 2012. p 54-55.
[45] AKRF, Inc. Tappan Zee Hudson River Crossing Project – Incidental Take Permit. April 2012. p 36-37.
[46] AKRF, Inc. Biological Assessment for the Tappan Zee Hudson River Crossing Project. Revised April 2012. p 55.
[47] AKRF, Inc. Tappan Zee Hudson River Crossing Project – Incidental Take Permit. April 2012. p 45-48.
[48] AKRF, Inc. Biological Assessment for the Tappan Zee Hudson River Crossing Project. Revised April 2012. p 64-67.
[49] AKRF, Inc. Tappan Zee Hudson River Crossing Project – Incidental Take Permit. April 2012. p 48.
[50] AKRF, Inc. Biological Assessment for the Tappan Zee Hudson River Crossing Project. Revised April 2012. p 56.
[51] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 104-110.
[52] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 104.

within sturgeon.[53] The difference in criteria is based on NMFS' assumption that the shortnose sturgeon will not remain in the ensonified area for more than a few minutes.[54] The different criteria results in a decreased number of sturgeon because the new isopleth (peak 206 dB re 1μPa) has a smaller width; thus, needing less gillnets to span it. NMFS also states that because they expect the shortnose sturgeon to leave the ensonified area during pile driving activities, they do not expect any deaths. However, NMFS stated they must account for the unexpected, resulting in their estimated death of one sturgeon.[55]

It is unclear as to why after discussions between NMFS and AKRF, the ITP and BO use radically different criteria in assessing the amount of affected shortnose sturgeon. The noise level at which physiological effects occur within shortnose sturgeon is obviously unknown and needs to be investigated further.

Atlantic sturgeon

The NYSDEC draft permit anticipates the number of Atlantic sturgeon to be affected by the elevated noise levels to be 125, 52 of which may suffer mortality. [56] These numbers do not directly correspond to those found within the AKRF produced ITP and revised BA reports; however, the Draft NYSDEC Permit uses Atlantic sturgeon numbers taken from the data found within AKRF's April 2012 documents.[57] The method employed by AKRF to determine the amount of Atlantic sturgeon affected consists of four steps: 1) Determine the efficiency of the gear used in the Fall Shoals Program (FSP) for catching juvenile Atlantic sturgeon 2) Develop a population estimate for juvenile Atlantic sturgeon 3) Estimate abundance of juvenile Atlantic sturgeon in the ensonified area 4) Estimate abundance of adult Atlantic sturgeon in the ensonified area.[58,59] AKRF produced numbers for both the Short and Long Span bridge Options and for both juvenile and adult sturgeon.[60,61] It is from these numbers that the NYSDEC obtained the amount of Atlantic sturgeon they expected to be affected by the pile driving operations.

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[53] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 104.
[54] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 104.
[55] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 110.
[56] NYSDEC Facility DEC ID 3-9903-00043/00012. Permit Under the Environmental Conservation Law (ECL). Part 182 Incidental Take. p 2.
[57] Personal communication. Riverkeeper and the NYSDEC. 8/22/12.
[58] AKRF, Inc. Tappan Zee Hudson River Crossing Project – Incidental Take Permit. April 2012. p 38.
[59] AKRF, Inc. Biological Assessment for the Tappan Zee Hudson River Crossing Project. Revised April 2012. p 56.
[60] AKRF, Inc. Tappan Zee Hudson River Crossing Project – Incidental Take Permit. April 2012. p 48.
[61] AKRF, Inc. Biological Assessment for the Tappan Zee Hudson River Crossing Project. Revised April 2012. p 67.

There is a major issue with the NYSDEC obtaining the amount of Atlantic sturgeon they expect to be affected by the pile driving operations from AKRF's analysis. In the BO, NMFS details the method that AKRF used, points out multiple errors and clearly states that the estimates provided in the BA (and thus the ITP) cannot be relied on.[62] The BO acknowledges that the basis for the entire method, the assumption that gear selectivity for juvenile Atlantic sturgeon can be obtained from shortnose sturgeon data, cannot be validated.[63] The BO further states that the numbers produced by AKRF for affected adult sturgeon are likely an underestimate.[64] NYSDEC's use of AKRF's data for the draft Incidental Take statement is unjustified. The NYSDEC must reevaluate the number of Atlantic sturgeon expected to be affected with a methodology that relies not only on AKRF's limited gillnet survey, but also on the extensive sampling and tracking studies the USFWS and NYSDEC has performed and gathered for federally endangered Atlantic sturgeon populations over the last 9 years.[65,66]

The NMFS, in the June 22, 2012 BO, anticipates the number of Atlantic sturgeon to be affected by the increased noise level to be 43-70 (depending on the Long or Short Span Options, respectively), one of which may suffer mortality.[67] These numbers were obtained directly from the shortnose sturgeon calculations and are an estimate of the *maximum* amount of Atlantic sturgeon NMFS expects to be affected.[68] This is based on the assumption that there are less Atlantic sturgeon within the project area than there are shortnose sturgeon.[69] Furthermore, the NMFS assumes that the one possible death would be that of a juvenile Atlantic sturgeon rather that an adult because the potential for mortal injury from noise exposure decreases as fish size increases.[70]

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[62] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 110-113.

[63] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 113.

[64] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 113.

[65] NYSDEC. Adult Atlantic Sturgeon. http://www.dec.ny.gov/animals/37121.html. Accessed 8/24/12.

[66] NYSDEC. Juvenile Atlantic Sturgeon Monitoring. http://www.dec.ny.gov/animals/9970.html. Accessed 8/24/12.

[67] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 113.

[68] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 113.

[69] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 113.

[70] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 113.

The methods employed by both AKRF and NMFS and subsequently relied on by NYSDEC to estimate impacts to both Atlantic and shortnose sturgeon suffer from a lack of consensus regarding methodology and efficient use of available historical data. A reevaluation using methodologies bolstered by historical USFWS and NYSDEC sturgeon population data coupled with definitive, long-term research regarding localized acoustical impacts from pile driving must be completed to fully assess and understand the impacts that the project will have on the federally endangered Atlantic and shortnose sturgeon.

Sincerely,

Carpenter Environmental
Associates, Inc.

Ralph E. Huddleston, Jr
Senior Vice President

RALPH E. HUDDLESTON, JR. – SENIOR VICE-PRESIDENT

CARPENTER ENVIRONMENTAL ASSOCIATES, INC.
CEA ENGINEERS, P.C.
www.ceaenviro.com

EDUCATION

- Eastern Kentucky University: Master of Science, Fisheries Biology, 1982
- University of Louisville: Bachelor of Arts, Biology, 1976

CONTINUING PROFESSIONAL EDUCATION

- Rutgers University: Coastal Vegetation Identification
- Methodology of Delineating Wetlands
- Advanced Wetland Delineation
- Wetland Systems of the Northeast

AFFILIATIONS

- American Fisheries Society
- Society of Wetland Scientists

EXPERTISE

- Wetlands and Ecological Investigations
- Delineation
- Enhancement and creation studies
- Permitting, stream sampling and analysis
- Natural Resource Inventories
- Litigation Support

SKILLS AND EXPERIENCE

Ralph E. Huddleston, Jr., is a Senior Vice-President with over 30 years of experience in the wetlands and environmental permitting industry. His areas of expertise include environmental impact assessment; wetland delineation, enhancement and creation; flora and fauna studies; natural resource inventories; and environmental permitting. Mr. Huddleston is responsible for providing technical input and directing the firm's environmental assessment efforts, ecological investigations, and wetland assessment activities. He regularly provides expert witness testimony in the environmental and biological sciences in local, state and federal courts.

REPRESENTATIVE PROJECTS

COOLING WATER INTAKE STRUCTURES

Proposed Athens Generating Project Evaluation, Riverkeeper Inc./Scenic Hudson, Athens, New York.

A new electric generating station was proposed for construction along the Hudson River. CEA was retained to evaluate the siting application for the facility, as well as the draft State Pollutant Discharge Elimination System (SPDES) permit. Mr. Huddleston assessed the environmental impacts of the proposed facility on the Hudson River, particularly its fisheries. Mr. Huddleston also evaluated the proposed cooling water intake structures for the facility in relation to the Clean Water Act requirement that CWIS reflect the best technology available (BTA) for minimizing environmental impacts. Mr. Huddleston provided testimony at an administrative hearing on the expected adverse impacts of the facility on the Hudson River fisheries, as well as the proposed CWIS.

Fish Entrainment Prevention Barrier Evaluation, Riverkeeper, Inc., Stony Point, New York.

Riverkeeper, Inc. initiated litigation against Orange and Rockland Utilities (O&R) alleging that the cooling water intake structure (CWIS) at the Lovett Generating Station (Lovett) did not reflect best technology available for minimizing adverse environmental impacts as required by the Clean Water Act. A Federal court mandated that Lovett mitigate the CWIS to attain acceptable environmental impact levels. Mr. Huddleston served as a technical advisor to Riverkeeper, Inc. throughout the installation, removal, and performance of the mitigative measures at Lovett. Mr. Huddleston identified several issues of concern, including the high

potential for impingement and entrainment of fish larvae and eggs. The issues of concern must be addressed prior to support of the mitigative measures at the Lovett facility.

In the Matter of Mirant Bowline, LLC for a State Pollutant Discharge Elimination System Permit pursuant to Environmental Conservation Law Article 17 and Title 6 of the Official Compilations of Codes, Rules & Regulations of the State of New York (6NTCRR) Parts 750 et seq., Riverkeeper, Inc. Haverstraw, New York.
The Bowline Generating Station (Bowline 3) proposed the construction of a new unit along the Hudson River with a hybrid cooling and filter fabric Gunderboom around the water intake structure. The Clean Water Act CWA requires that cooling water intakes reflect the Best Available Technology (BAT) for minimizing adverse environmental impacts. Mr. Huddleston assisted in the evaluation of the proposed cooling technology and determined that the Gunderboom was an experimental technology and not a BAT. Mr. Huddleston also directed in-river experiments that were conducted to determine whether the Gunderboom would be subject to clogging by organisms. The Gunderboom was subject to extensive biofouling, which reduced its effectiveness. Mr. Huddleston provided testimony at an administrative hearing, and ultimately the Administrative Law Judge determined that the Gunderboom could not be considered a BAT.

Salem Generating Station Cooling Water Intake Structure Evaluation, Delaware Riverkeeper Network, Salem, New Jersey.
The Delaware Riverkeeper Network retained CEA to review the impact of the Salem Generating Station (Salem) on the biota of the Delaware Estuary. CEA reviewed Salem's permit application, New Jersey Pollutant Discharge Elimination System (NJPDES) permit, and also conducted a Best Technology Available (BTA) analysis. CEA determined that each of the technologies designated as BTA by the NJDEP could only serve to reduce fish mortality associated with impingement, while over 99% of fish losses at Salem were associated with entrainment. CEA concluded that the intake flow of the facility must be reduced in order to minimize fish entrainment. As a result, CEA recommended a closed-cycle cooling system at the Salem facility. Mr. Huddleston prepared comments to the NJDEP detailing the deficiencies in the draft NJPDES permit and Salem's BTA analysis. Mr. Huddleston also assisted in the preparation of a grant application to the United States Environmental Protection Agency (EPA) for continued

evaluation of the Salem facility. The grant was accepted and CEA continued to evaluate the effectiveness of the wetland mitigation programs instituted by Salem in the Delaware Estuary.

Salem Generating Station Wetland Restoration Program Evaluation, Delaware Riverkeeper Network, Salem, New Jersey, Delaware Estuary.
CEA prepared a grant application and received a grant from the United States Environmental Protection Agency (EPA) to evaluate the effectiveness of the wetland restoration and enhancement program in and around the Delaware Estuary. Mr. Huddleston evaluated data provided by PG&E regarding the response of vegetation to PG&E's wetland restoration/enhancement efforts that included restoring the tidal influence to salt hay farms and treatment of Phragmites dominated wetlands to reduce Phragmites densities. Mr. Huddleston also evaluated the possible increase in fish migration and spawning as a result of the installation of fish ladders in tributaries to the Delaware Estuary. CEA determined that there was little benefit from Phragmites removal, but vegetation and fish responded positively to mitigation at the former salt hay farm sites. Additionally, some of the fish ladders installed met with success while others did not. There was no evidence in an Estuary-wide increase in fish populations as a result of the restoration and enhancement program. Mr. Huddleston assisted in the preparation of a report documenting CEA's evaluation for distribution to the EPA and the public.

Trout Unlimited Catskill Mountain Chapter and Theodore Gordon Flyfishers, et. al. v. The City of New York et. al., Trout Unlimited Catskill Mountain Chapter and Theodore Gordon Flyfishers, Catskill Region, New York.
Trout Unlimited Catskill Mountain Chapter and Theodore Gordon Flyfishers brought a Clean Water Act (CWA) citizen suit against The City of New York for discharge without a permit into the Shandaken Tunnel. The Shandaken Tunnel discharges to Esopus Creek, a well known trout fishery in a separate watershed. The discharge from the City of New York resulted in highly turbid water being discharged into Esopus Creek resulting in a dimished trout fishery. Mr. Huddleston provided litigation support to Trout Unlimited during trial after initial negotiations with New York City were unsuccessful. He presented an opinion based upon historical documentation that flows from the Shandaken Tunnel were critical to the sport fishery of Esopus Creek as claimed by the City. The United States District Court ruled that the City was

liable for violations of the CWA for operating the Tunnel without a permit. The Court also assessed penalties and ordered the City to obtain a permit in a timely fashion. The New York State Department of Environmental Conservation (NYSDEC) was ordered to issue a NPDES permit within 18 months. The draft permit was issued and Mr. Huddleston assisted in the preparation of comments to the NYSDEC regarding the lack of enforceable permit conditions for turbidity.

WETLANDS

Chester Industrial Park, Wetland Habitat Restoration. Chester, New York.
As part of a negotiated settlement of a Notice of Violation (NOV) with the New York State Department of Environmental Conservation (NYSDEC), Mr. Huddleston investigated the historical delineation of the wetlands and designed a wetland restoration plan to address 10 acres of concern. After the NYSDEC approval of the plan, Mr. Huddleston oversaw the successful implementation of the restoration effort that included site grading, stormwater management, construction and planting of the wetlands, three years of status reporting, and maintenance recommendations. Our efforts resulted in a successful settlement of all outstanding issues and the creation of 10 acres of functional and mapped NYSDEC freshwater wetlands.

Wetlands Delineation/Mitigation, Richmond Valley Estates. Staten Island, New York.
The NYSDEC issued a NOV for the non-permitted clearing of vegetation and earth within regulated freshwater wetland and wetland adjacent area. Mr. Huddleston delineated on-site wetland boundaries to determine the extent of clearing and excavation activities within regulated wetland and adjacent areas. Mr. Huddleston worked directly with the NYSDEC to develop a plan that would mitigate the impacts to the freshwater wetland and wetland adjacent area. Mr. Huddleston oversaw the implementation of the approved mitigation plan, and after approximately one year's time, the plan was deemed successful, and the violation was closed.

Toys "R" Us Distribution Center. Henry County, Georgia.
Mr. Huddleston delineated on-site wetlands for a one-million-square-foot distribution center proposed in 157 acres in Henry County, GA. Mr. Huddleston oversaw the design of an 8.75-acre

mitigation area/stormwater detention basin for the establishment of new wetlands. The design minimized the disturbance to the on-site wetlands while assuring that usable site area was maximized. In addition to providing new wetlands to offset disturbed wetlands, the mitigation design also provided required stormwater control. CEA prepared and submitted applications for a Nationwide Permit #26 and a Georgia Stream Encroachment Permit for submittal to the Georgia Environmental Protection Division (GAEPD). GAEPD expedited the review and approval of the applications.

Waterfront Commons Mitigation Design. Staten Island, New York.
Mr. Huddleston was responsible for overseeing the development of a 4.8-acre wetland mitigation design in conjunction with an Army Corps of Engineers (ACOE) Individual Permit and NYSDEC Tidal Wetlands Permit. The mitigation involved the creation and enhancement of tidal and freshwater wetlands within a 30-acre parcel containing coastal upland, historically disturbed, freshwater wetlands and tidal wetland communities along the Arthur Kill.

Wetland Permitting/Mitigation, C & S Grocers. Chester, New York.
Mr. Huddleston directed efforts for obtaining an ACOE Nationwide Permit and NYSDEC Freshwater Wetlands Permit in conjunction with a warehouse expansion project. The permit application process included conducting wetland delineations and preparing a wetland mitigation plan. The mitigation plan was designed for the enhancement of adjacent freshwater wetlands associated with historically disturbed, fallow agricultural land. The mitigation plan and the permit application were approved, and the permits were issued for the expansion.

Wetland Permitting, The Shoppes at Union Square. Newburgh, New York.
Mr. Huddleston supervised the preparation of NYSDEC Protection of Waters Permit and ACOE Nationwide Permit applications in conjunction with a stream crossing for a commercial development. The permit application process included conducting a freshwater wetland delineation, a Phase I Bog Turtle site assessment and agency negotiations. Mr. Huddleston worked with the project architects to minimize any potential impacts to the stream and associated wetlands. The project is currently under review.

Wetland Delineation/Mitigation, Proposed Motorsports Entertainment Facility and Retail Center. Staten Island, New York.
Mr. Huddleston supervised coordination efforts with the multi-disciplinary project team to delineate tidal and freshwater wetlands, assess site flora and fauna, and design mitigation plans for a 675-acre parcel in Staten Island, New York. Mr. Huddleston contributed to the composition of environmental impact statements prepared for the proposed facility. He also provided project planning assistance to counsel and played an integral role in agency negotiations to obtain required NYSDEC and ACOE Permits.

Seton Hall Prep, Old Growth Forest Survey. Essex County, New Jersey.
Mr. Huddleston oversaw the development and implementation of field protocols to conduct a survey to determine the presence of old growth forest within a 45-acre parcel. Survey methodologies included the use of grid sampling to assess vegetative strata and clinometer measurements to determine the presence/absence of specimen trees.

Moore Mining Stream and Wetland Impact Evaluation. Sparrowbush, New York.
Mr. Huddleston coordinated a stream corridor and wetland assessment to determine the impact of sediment deposition which was a result of a failed detention basin. The assessment included the identification of impacted vegetation and aquatic wildlife and preparation of a cost estimate for re-establishment of native fish species. The project is currently pending.

ECOLOGICAL ASSESSMENTS

Scenic Development Natural Resource Inventory. Ramapo, New York.
Mr. Huddleston oversaw the design and implementation of a natural resource inventory for the characterization of ecological communities within a 200-acre parcel. Site surveys were conducted over four seasons to assess the native flora and fauna, as well as the presence of threatened and endangered species. Mr. Huddleston directed the composition of the wetland and wildlife sections incorporated into a Draft Environmental Impact Statement (DEIS).

Natural Resource Inventory, Waterfront Commons. Staten Island, New York.
Mr. Huddleston supervised the design and execution of a four-season natural resource inventory to document the ecological communities, associated flora and fauna, and threatened and endangered species within a 30-acre parcel containing coastal upland, historically disturbed, freshwater wetlands and tidal wetland communities along the Arthur Kill. The data from these surveys was used to develop the wetland and wildlife sections which will be incorporated into a DEIS. The project is currently pending.

Tetz Asphalt Plant Draft Environmental Impact Statement (DEIS) Review, International Union of Operation Engineers. Middletown, New York.
The Tetz Concrete and Gravel facility proposed the expansion of the current operation to include an asphalt plant. Mr. Huddleston reviewed and evaluated the DEIS under the New York State Environmental Quality Review Act (SEQRA). CEA determined that the DEIS was incomplete and could not be used as a basis for decisions regarding the environmental impacts for the proposed asphalt plant. Mr. Huddleston prepared comments for submission to the Middletown Planning Board and the US Army Corps of Engineers ACOE, and he also provided oral and written testimony to the local planning board. The ACOE issued a wetlands violation notice to the applicant, and the planning board denied the expansion.

LITGATION SUPPORT

General Electric (GE) Westchester County Hanger Environmental Assessment Form (EAF) Review, Hudson Riverkeeper Inc. Westchester County, New York.
GE proposed the construction of a 75,000-square foot airplane hanger at the Westchester County Airport. Riverkeeper raised concerns about the close proximity of the proposed construction to the Kensico Reservoir and associated wetlands. Mr. Huddleston reviewed GE's EAF and supporting materials for completeness and adherence to applicable regulations and standards under the SEQRA. After review of the EAF, it was determined that the project could have the potential to significantly impact the Kensico Reservoir. The EAF also failed to provide mitigation for wetland disturbances and contained no Stormwater Pollution Prevention Plan (SWPPP). Mr. Huddleston provided litigation

support during the lawsuit brought against the Westchester County Legislature for inadequate environmental assessment. The State Supreme Court ruled that the Westchester County Legislature failed to conduct a complete environmental assessment of the effects of the proposed hanger, and they mandated that additional studies be conducted. GE ultimately abandoned the project.

American Canoe Association; Professional Paddlesports Association; Conservation Council of North Carolina; United States of America v. Murphy Farms, Inc., d/b/a Murphy Family Farms and D.M. Farms of Rose Hill, L.L.C., US District Court for the Eastern District of North Carolina Southern Division, 7-98-CV-4-V(1); 7-98-CV-19-F(1); & 5-98-CV-209-F(1).
Mr. Huddleston provided litigation support to the American Canoe Association and US Department of Justice (USDOJ) in a Clean Water Act (CWA) Citizen Suit against five related hog Confined Feeding Operations (CAFO's) in Rose Hill, North Carolina, that allegedly discharged swine wastes to waters of the US without a National Pollutant Discharge Elimination System (NPDES) Permit. Mr. Huddleston assisted in the evaluation of Murphy's waste management practices and demonstrated that Murphy failed to prevent or mitigate discharges of hog waste to waters of the US. The substance of the suit was settled after the 4th Circuit ruled that a NPDES Permit was required.

New York City Bluebelt Proceedings, The City of New York Law Department, Staten Island, New York.
The city of NY initiated the acquisition of approximately 130 properties located on Staten Island to form a "Bluebelt" of protected wetlands. Mr. Huddleston supervised the analysis and preparation of reports detailing the development potential of each property in the City's Bluebelt eminent domain proceedings based on the interpretation and application of wetland, wetland adjacent area, and zoning regulations. These reports were used by the city's appraiser to determine a fair market value for each property. Mr. Huddleston also provided expert witness testimony during trials. The Bluebelt Proceedings are still underway.

PUBLICATIONS

1. Bell, B., R. Cardenas, R. Huddleston, and R. Martin, *Procedure for Evaluation of the Impact of Intermittently Discharged Industrial Wastes on Municipal Treatment Facilities*, In: Industrial Wastes, J. Alleman and J. Kavanaugh, Eds., Ann Arbor Science Publishers, Ann Arbor, MI, 1982.

2. Cardenas, R., and R. Huddleston, *Toxicity of Heavy Metals in Anaerobic Digestors*, Presented at the WPCF National Meeting, 1978, In: Proceedings.

EXHIBIT 4

Review of JASCO PIDP and NYSDEC FOIL GIS Data for Tappan Zee Bridge Replacement Project

Carpenter Environmental Associates, Inc.

September 4, 2012

CARPENTER ENVIRONMENTAL ASSOCIATES, Inc.
CEA ENGINEERS, P.C.

307 Museum Village Road
Monroe, New York 10950

***Sender's Phone*: 845-781-4844 EXT 307**
Sender's Email: re.huddleston@cea-enviro.com

***Phone*: 845-781-4844**
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September 4, 2012

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

Re: Review of JASCO PIDP
and NYSDEC FOIL GIS data
Tappan Zee Bridge Replacement Project

CEA No. 21233

Dear Mr. Musegaas:

Carpenter Environmental Associates, Inc. (CEA) has reviewed the New York State Department of Environmental Conservations' (NYSDEC) FOIL Response and associated documents and the JASCO Applied Sciences Underwater Acoustic Monitoring of the Tappan Zee Bridge Pile Installation Demonstration Project (PIDP) Comprehensive Report. CEA offers the following comments with respect to project related impacts to Atlantic (*Acipenser oxyrichus*) and shortnose sturgeon (*Acipenser brevirostrum*) populations.

1.) The PIDP prepared by JASCO Applied Sciences documents the identification of 195 tagged fish within the immediate vicinity of the demonstration project.[1] 126 of the 195 identified tagged fish were confirmed sturgeon species (65%).[2] JASCO fails to specifically identify whether they are Atlantic or shortnose sturgeon. Of the four hydroacoustic monitoring stations deployed, only three were recovered from the demonstration study. Of the three recovered stations, #6 and #7, located on either side of the deep navigation channel, had the highest number of tagged sturgeon present during the month long study (April 28 through May 18, 2012).[3] The 185 tagged fish identified at Station #6 were detected 15,838 times over the course of the one month study period.[4] The 187 tagged fish identified at station #7 were detected 20,418 times over the course of the one month study period.[5]

[1] JASCO Applied Sciences. Underwater Acoustic Monitoring of the Tappan Zee Bridge Pile Installation Demonstration Project Comprehensive Report. July 7, 2012.
[2] *Ibid.*
[3] *Ibid.*
[4] *Ibid.*
[5] *Ibid.*

During the one year gillnet survey, conducted by AECOM, a total of only 12 shortnose sturgeon were captured in the vicinity of the bridge.[6] The FEIS must account for the huge discrepancy between the JASCO PIDP report issued in July 2012 (126 sturgeon), based on one month of study, and the observed AECOM gillnet study results (12 shortnose sturgeon/no Atlantic sturgeon), based on one year of study. It must also be noted that none of the reports issued to date have been revised to reflect the JASCO sturgeon data including the Biological Assessment, the Incidental Take Permit, and the Biological Opinion all of which rely on AECOM's gillnet data to determine the amount of sturgeon expected to be affected from the pile driving operations.

2.) Boththe JASCO PIDP report and the FEIS-Response to Comments (RTC) discuss the size reduction in isopleth intensity contours that were observed between modeled and actual PIDP results. The decrease in isopleth intensity was attributed to both noise attenuation systems (primarily bubble curtains) and the presence of barges almost completely surrounding the pile driving location.[7] Both documents readily acknowledge that the presence of the barges with drafts ranging from 6-10 feet likely had a large impact on pile driving noise attenuation and subsequently isopleth intensity contour reduction as the depth of the water at the PIDP test sites ranged from 9 to 16 feet.[8] However, the FEIS RTC does not elaborate on whether the actual pile driving for the bridge will utilize the same methodologies, so as to recreate the noise attenuation provided by the barges.[9] The FEIS must verify that the same procedures that resulted in reduced isopleth intensities during the PIDP will be utilized during actual bridge construction (i.e. ringing the pile driving locations with barges) so as to limit the predicted impacts to sturgeon and other fish species from elevated noise levels.

Sincerely,

Carpenter Environmental
Associates, Inc.

Ralph E. Huddleston, Jr
Senior Vice President

[6] NOAA's National Marine Fisheries Service – Northeast Regional Office. Endangered Species Act Section 7 Consultation: Biological Opinion. Tappan Zee Bridge Replacement F/NER/2012/01780. June 22, 2012. p 98.

[7] JASCO Applied Sciences. Underwater Acoustic Monitoring of the Tappan Zee Bridge Pile Installation Demonstration Project Comprehensive Report. July 7, 2012.

[8] *Ibid*.

[9] FHWA. Final Environmental Impact Statement and Section 4(f) Evaluation: Volume I. Chapter 24: Response to Comments on DEIS. July 2012.

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: comments on EIS Review Process and FEIS
Date:	Friday, August 31, 2012 4:56:42 PM
Attachments:	TZ Hudson River Crossing1.doc

From: Parish & Weiner[SMTP:PWM101@VERIZON.NET]
Sent: Friday, August 31, 2012 4:55:52 PM
To: Schwartz, Larry (CHAMBER); dot.sm.mo.tzbsite
Subject: comments on EIS Review Process and FEIS
Auto forwarded by a Rule

Please also forward copies of the attached comments to: Michael P. Anderson and Brian Conybeare.

Thank you.

Nathaniel J. Parish

Parish & Weiner, Inc.
297 Knollwood Road, Suite 315
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(914) 997-7201 (fax)
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Nathaniel J. Parish, P.E., A.I.C.P.
Michael Weiner, A.I.C.P. (1938-1995)
Bernard Buller, A.I.C.P.

Senior Consultants
George M. Raymond. A.I.A., A.I.C.P.
Richard Hyman, A.I.C.P.
John Sarna, P.E., I.T.E.

August 30, 2012

MEMORANDUM

TO: Tappan Zee Hudson River Crossing Project

Attention: Larry Schwartz
Attention: Michael Anderson
Attention: Brian Conybeare

CC: The Quay Condominium
Salisbury Point Cooperative
Joel Sachs, Esq.
Donald Singer, Esq.

FROM: Nat Parish

RE: Comments on Environmental Review Process and final Environmental Impact Statement ("FEIS")

I am writing as consultant to The Quay Condominium in Tarrytown, NY and The Salisbury Point Cooperative in South Nyack, NY. Both properties are directly affected by the proposed new bridge and will experience impacts during the five year (plus) construction period and long-term impacts thereafter. The significant adverse impacts will include, but are not necessarily limited to: noise, air quality, vibration, visual, security, neighborhood character and property value.

The comments which follow supplement verbal comments which I made at the Draft Environmental Impact Statement ("DEIS") Public Hearing, and comment letters submitted during the DEIS public comment period.

1. The recent actions taken by the New York Metropolitan Transportation Council (NYMTC) was a clear violation of the past 617 State Environmental Quality Review Regulations.

Section 617.11 (c) states:

> *(c) No involved agency may make a final decision to undertake, fund, approve or disapprove an action that has been the subject of a final EIS, until the time period provided in subdivision 617.11(a) of this section has passed and the agency has made a written findings statement. Findings and a decision may be made simultaneously.*

This is confirmed in Section S-5-1 of the FEIS.

The NYMTC, either defined as a State Agency or a local agency, is in any event an involved agency, which could not make a decision until SEQRA findings have been issued. This is confirmed by specific language in Section S-5-1 of the FEIS.

The July 30, 2012 memorandum issued by the Project, per Michael Anderson, established a public review period that would continue until September 4, 2012"…after which time a record of Decision (i.e., SEQRA findings) will be issued.

Thus, the NYMTC could not properly issue its approval of this project on Monday, August 20th…clearly well before the September 4th date on which the findings statement is scheduled to be issued.

This is not merely a minor procedural error. The very purpose of the SEQRA/NEPA coordinated review process has been violated. The process is structured so that a lead agency conducts the various detailed studies, issues a findings statement which documents those studies and its conclusions, and it is then made available to involved agencies who, after review, can accept those findings, or can issue their own findings. Clearly the NYMTC could not follow this required procedure because it had no findings to consider. It could not, by SEQRA regulation, issue its own findings before those of the lead agency were issued.

Clearly, my clients have been prejudiced by this action as the NYMTC could not properly consider whether the impacts on The Quay and Salisbury Point have been mitigated to the maximum extent feasible as required by SEQRA regulations.

The action by NYMTC must be rescinded and must await the issuance of a Findings Statement by the lead agency. As further discussed, the lead agency cannot properly issue a Findings Statement until a Supplementary Environmental Impact Statement ("SEIS") is issued.

2. The FEIS is a 10,000 page document. Section 617.9(b) of the SEQRA regulations establish a <u>number of document requirements</u> that have been violated:

> *"EISs must be analytical and not encyclopedic"*.
> *"EISs must be clearly and concisely written in plain language that can be read and understood by the public"*.
> *"Highly technical material should be summarized and, if it must be included in its entirety, should be referenced in the statement and included in Plan appendix."*.

Obviously, a 10,000 page document, which cannot be reasonably downloaded to hard copy, and which is not properly cross-referenced in order to facilitate public review, hardly meets these criteria.

To make matters worse, the authors have not followed the conventional procedure of including the prior lengthy DEIS <u>by reference</u>…and, in the FEIS, providing a simple understandable section titled "revisions and supplements to the DEIS" (as required by Section 617.9(b)(8). Rather, they have within the several thousand pages repeated the DEIS, <u>and within those pages, here and there buried some new information or purported answers to substantive comments</u>.

They have also failed to follow the procedures conventionally used in almost all EISs in which the verbal or written comments included in the FEIS appendix are given identification symbols for each substantive issue topic, and then the responses to each of those comments are cross-referenced to those symbols. The systems used are for the purposes of enabling those who have made comments to be able to clearly determine where the particular responses can be found in the document. The purpose is intended to facilitate public review and the ability to comment on the FEIS…and later, if necessary, for a Court to determine whether the responses adequately met the required "hard look" test.

The obscurely buried revisions, additions to the DEIS, and the impossible to identify specific responses to specific substantive comments, have made an intelligent and comprehensive review virtually impossible (particularly in a 30-day period when many are on scheduled vacations).

The requirement for a responsible public review and involved agency review has not been met. It is not even reasonable to expect that the high level officials responsible for signing off on a Record of Decision could easily, conveniently and reasonably review a 10,000 page document drafted by a list of several hundred technical staffers…and fairly determine whether or not there has been an adequate response to the substantive comments from affected interested parties and their professional advisers.

As part of an SEIS, which should also be issued for the other reasons discussed in this comment letter, a revised and understandable FEIS needs to be included.

3. A Findings Statement/Record of Decision should not be issued until the following has occurred:

   a. The results of the Test Pile program is fully presented and analyzed, mitigation is proposed, and the information is presented in a Supplementary EIS ("SEIS").

b. The specific plan which will actually be proposed to be implemented is prepared by the selected Design Build team, and the mitigation proposals it will include are presented in an SEIS for public review and comment.

c. Specific mitigation agreements are entered into with The Quay and Salisbury Point providing receptor site mitigation including but not limited to: building noise insulation; amenity area noise mitigation and receptor barriers; a rodent prevention program; loss of value compensation; parking area security installation and security management (for Salisbury Point).

If the above steps are not taken the EIS review will have been improperly segmented and could not possibly pass the "hard look" test required for a SEQRA/NEPA negative declaration.

4. I, and Dr. Brook Crossan (Noise Consultant to the Village of Tarrytown and Salisbury Point), provided extensive comments with respect to the DEIS. These detailed deficiencies particularly in the noise, air quality and visual impact DEIS analyses. The comments asked for specific mitigation agreements to be entered into for the purposes of mitigating obvious impacts on The Quay and Salisbury Point. There is no specific identified response to these comments in the FEIS.

5. Subsequent to the DEIS public hearing/comment period, TZB staff and consultants have held a number of meetings with The Quay and Salisbury Point Board members and residents. (I have attended some of those meetings.) The TZB staff/consultants tried to explain and amplify their DEIS studies. They listened attentively to the mitigation requests made by The Quay and Salisbury Point, and promised to give them full consideration. Various statements have been made by State officials that vaguely advise that mitigation in addition to what was included in the DEIS is still under consideration…and also that the selected Design-Build team will be asked to provide additional mitigation. Yet, despite all of these discussions,

there have been no specific proposals for mitigating impacts on The Quay and Salisbury Point. This is in clear violation of the SEQRA regulations and, in fact, regulations which were also acknowledged in Section S-5-1 of the FEIS:

> *SEQRA requires New York governmental agencies to identify potential environmental effects that would result from their discretionary actions, and to the extent that significant adverse impacts are identified, avoid, minimize or mitigate those impacts to the maximum extent practicable, consistent with social, economic, environmental and other considerations.*

There is not even a shred of reasonable argument to establish that the DEIS and the EIS have mitigated impacts to The Quay and Salisbury Point to "the maximum extent practicable". There are no social or environmental reasons for avoiding the obligation to mitigate. There can be no economic/cost reasons as the cost for mitigation would, at most, be less than 1% of the estimated $5 billion budget for this project.

Arguments have been vaguely presented about State/Federal "policies" that limit the level and type of mitigation that can be provided. There is absolutely no known State or Federal statute that would preclude the State of New York from meeting its statutory SEQRA obligation to mitigate impacts "to the maximum extent practicable".

The mitigation must be presented in an EIS and confirmed in the SEQRA Findings Statement. A failure to do so is a failure to follow the clear requirement of the SEQRA statute.

6. I understand that Brook Crossan, PhD, P.E., who is noise consultant for the Village of Tarrytown and the Salisbury Point Cooperative, will be submitting a detailed comment letter critiquing the FEIS analyses and their failure to address many of the issues which he and I both raised with respect to the DEIS studies.

These deficiencies are serious and cannot be ignored. But, in basic terms, no matter what the theoretical studies, even if corrected, will show…there can be no denial that constructing a new bridge which will slice across a section of The Quay property, and be almost astride of the Salisbury Point property line will have significant adverse noise, air quality, vibration, security (in case of Salisbury), quality of life and visual impacts. While the specific extent of these impacts can be variously measured, and variously interpreted, there can be no argument that they will exist during the five year construction period, and forever after. There can be no reliance on TZB technical staff establishing arbitrary limits on what level of impacts merit mitigation, or rationing mitigation on degrees of exceedance from base line conditions. The SEQRA requirement for mitigating impacts "to the maximum extent feasible" must be followed.

7. Among the specific other deficiencies of the DEIS and repeated in the FEIS:

   a. Mitigation language which limits lower noise level construction equipment to a "where practical and feasible" standard does not constitute true mitigation.

   b. Mitigation language which envisions "appropriate noise attention around construction staging areas"…and anticipates "minimization" of alarms and other noise generators does not constitute true mitigation.

   c. There is no specific and clear presentation of how compliance monitoring will be conducted.

   d. Requiring noise attenuation measures only for equipment operating "…in close proximity to residential areas" is a vague non-specific mitigation measure.

   e. There are a number of mitigation measures and compliance programs identified as being the subject of the proposals to be later advanced by the Design/Build team. This can only

be acceptable if there is an absolute commitment to issue a Supplementary EIS which will present these proposals in detail.

f. There are insufficient proposals for mitigating pile driving noise. Particularly, the limitation of driving "predominantly within daytime hours" is unacceptable. There needs to be a specific limitation for pile driving and other noise producing construction impacts that is consistent with the limitations imposed by the South Nyack and Tarrytown statutes. The FEIS is internally contradictory in its language on these points.

g. There are numerous deficiencies in the assumptions and techniques used in the DEIS/FEIS noise monitoring studies. (Dr. Crossan will provide information on this in detail.)

There is a totally inadequate analysis of the obvious visual impacts that the new bridge will have on both The Quay and Salisbury Point. There is no possible mitigation for those impacts. Thus, it becomes a simple issue of fairness that adequate mitigation is provided for the other impacts that will be generated and which can feasibly mitigated.

On request, I shall be happy to answer any questions and to further discuss my comments.

NJP:pd

From: Vincent Pellecchia[SMTP:VINCENT@TSTC.ORG]
Sent: Wednesday, August 29, 2012 11:42:45 AM
To: dot.sm.mo.tzbsite
Cc: Vvanterpool@tstc.org; rlynch@tstc.org
Subject: TSTC Comments to TZ Bridge FEIS
Auto forwarded by a Rule

Mr. Anderson,

Please find the Tri-State Transportation Campaign's comments on the Tappan Zee Bridge Hudson River Crossing Project Final Environmental Impact Statement attached hereto. Thank you.

Sincerely,

Vincent

Vincent E. Pellecchia
General Counsel
Tri-State Transportation Campaign
350 West 31st Street, Suite 802
New York, NY 10001
(P) 212.268.7474
(F) 212.268.7333

TRI-STATE TRANSPORTATION CAMPAIGN

Mobilizing the Region

August 29, 2012

Michael Anderson
New York State Department of Transportation
4 Burnett Boulevard
Poughkeepsie, New York 12603

RE: Comments on the Tappan Zee Bridge Hudson River Crossing Project Final Environmental Impact Statement

Dear Mr. Anderson:

Thank you for the opportunity to submit comments on the Final Environmental Impact Statement (FEIS) for the Tappan Zee Bridge Hudson River Crossing Project. The Tri-State Transportation Campaign (Tri-State) is a nonprofit organization working for a more balanced, equitable and environmentally sustainable transportation network. We have been involved in the Tappan Zee Bridge/I-287 Corridor Project for over a decade, including representation on two Stakeholder Advisory Working Groups.

Throughout the evolution of the project, Tri-State has had three major concerns: that all transit modes are evaluated comprehensively and fairly, that the project proceed with real public input and that the project incorporate land use planning with the understanding that it will have wide-ranging development impacts on the Hudson Valley, an area already irrevocably transformed by the opening of the original Tappan Zee Bridge.

Unfortunately, the DEIS did not contain any public transit alternatives despite years of state studies and stakeholder input that concluded public transit is an absolute necessity in any Tappan Zee replacement project. We submitted comments on the Draft Environmental Impact Statement on March 30, 2012. The FEIS is essentially the same as DEIS, except for highlighted additions in the document. As such, we incorporate by reference our DEIS comments in full as we believe most of our concerns were not resolved by the FEIS. The following are comments to the changes made to the DEIS as highlighted in the FEIS.

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tstc@tstc.org
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FEIS Section Specific Comments:

Chapter 1: Purpose and Need

1-2 Project History

The FEIS adds the statement: "The proposed replacement of the Tappan Zee Bridge would not preclude other initiatives to enhance mobility along the Interstate 87/287 Corridor should these projects be advanced independently with appropriate environmental review at some point in the future." Although we continue to believe that transit should be included in the EIS alternatives analysis, if it is not, the state must ensure that the final bridge design does everything possible to not preclude transit. This means considering how each element of the bridge could impact or limit transit options in the future. The DEIS and FEIS have not conclusively proven this project will increase mobility through widening lanes and adding shoulders. Accordingly, transit remains the only way to actually increase mobility in the corridor and must not be precluded.

Chapter 2: Project Alternatives

Section 2-2 Alternatives Analyzed in this Environmental Impact Statement

1. Operations

The FEIS explains that "The Replacement Bridge Alternative's configuration could support the ability for express bus services to use the extra width on the bridge during peak hours. This use would have to be appropriately assessed and considered before being implemented." We believe that the state should allow buses to use the extra width in the emergency access lanes during and beyond the peak period. The state, through the FEIS, should commit to this modification which would allow buses to bypass congestion and thereby provide further incentive for public transportation use.

2. Project Costs and Financing

We believe that a project of this size should not move forward without a detailed financial statement. The financial plan in the FEIS is not a financial plan at all but merely describes the state's aspirations for financing and funding the project. More detail is needed for two reasons. First, the Thruway Authority is currently proposing a toll increase in commercial traffic just to ensure that it can keep its debt service coverage ratio (DSCR) above 1.2x, the minimum allowed under its General Revenue Bond Resolution. The state's own documents[1] indicate this fact, and that the DSCR will fall below the Authority's Fiscal Management Guidelines minimum of 1.5x irrespective of the commercial traffic toll increase and approach 1.3x by 2016. This weakening financial position and the need to aggressively raise tolls were the impetus for recent downgrades of the Authority's credit outlook.[2]

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[1] New York State Thruway Authority General Revenue Bonds Offer Statement, June 27, 2012, *available at*, http://www.thruway.ny.gov/about/financial/bond/sales/genrevseries1.pdf; Jacobs Civil Consultants, Inc., New York State Thruway Financial Requirements and Proposed Toll Adjustments 2012-2016, May 2012, *available at*, http://www.thruway.ny.gov/news/pressrel/2804.pdf.

[2] Jon Campbell, S&P downgrades Thruway Authority's bond outlook, June 12, 2012, *available at*, http://blogs.democratandchronicle.com/voteup/2012/06/12/sp-downgrades-thruway-authority%E2%80%99s-bond-outlook; Joseph Spector, Moody's Also Drops Thruway's Outlook To Negative, Says Toll Increase Needed, June 18, 2012, *available at*, http://polhudson.lohudblogs.com/2012/06/18/moodys-also-drops-thruways-outlook-to-negative-says-toll-increase-needed.

Second, an analysis of the impact of tolls on traffic diversion is an important part of the FEIS and discussed in more detail in Section 4-5 and Chapter 24. However, in order to ensure that analysis is sound, a detailed financial plan supporting that analysis should be made available with the FEIS. We believe the financial plan should be detailed and comport with the FHWA Financial Plans Guidance.[3]

Chapter 3: Process, Agency Coordination and Public Participation

3-4 Public Outreach Program

From the very start, this process has been less than open. The scope of the project was changed and the Scoping Packet was prepared without public input – only after the scope was changed was the scope subject to comment. The DEIS relied on various documents, such as the Transit Options Alignment Report and May 2011 Cost Estimate, that were not made available to the public during the comment period and were only disclosed two months ago. The FEIS lacks a detailed financial plan that would allow residents to fully understand the state's traffic diversion analysis and possibly identify other consequences of the financial plan that the state may not have considered. Only at the end of July did the state begin making a push to meet with the public to address their concerns in more detail. Despite this effort, the lack of information and accessibility from the issuance of the new NOI in October 2011 through July 2012 critically impacted the public's ability to comment on the project as is desired and required under NEPA.

Chapter 4: Transportation

4-5 Environmental Effects

4-5-2 Replacement Bridge Alternative

We continue to believe that the conclusion that mobility will be enhanced by the replacement bridge is far from certain. For one, the FEIS assumes more incidents occur on the bridge than can be proven to occur. Table 4-2 shows that only approximately 50 accidents happen per year in the eastbound peak period and approximately 30 accidents happen during the westbound peak period, essentially once per week east bound and once every other week westbound. However, the EIS assumes many more "incidents" occur based on a ratio in the FHWA Incident Management Handbook. It is not clear that these other "incidents" occur with the frequency assigned to them in that handbook. If the frequency is much lower than assumed, the new bridge will not provide as much mobility improvement as anticipated. Second, the bridge is very congested irrespective of accident frequency. If capacity is not changing on the bridge or in the corridor as the FEIS suggests, then non-accident traffic will remain a problem, especially with the volume increases that are expected. In sum, the FEIS does no better than the DEIS in making the case that the replacement bridge will improve mobility in the corridor. Congestion will remain, and can only be relieved through addition of transit as the Tappan Zee Bridge/I-287 Corridor Project found. The state must plan for transit now so that when the new bridge opens, mobility will truly be enhanced and an alternative will exist for those that do not want to or cannot pay the increased tolls.

[3] FHWA, Financial Plans Guidance, January 2007, pg. 17-42, *available at*, http://www.fhwa.dot.gov/ipd/pdfs/project_delivery/financial_plans_guidance.pdf.

Traffic Diversions Due to Potential Toll Adjustments

The analysis of traffic diversion due to toll adjustments should be more clear. Although the FEIS explains that "the analyses assumed a worst-case scenario in which Tappan Zee Bridge tolls would be equal to the approved Port Authority of New York and New Jersey (PANYNJ) tolls at the George Washington Bridge in 2017" what this means is far from certain. First, the 2017 George Washington Bridge toll schedule is undetermined. Second, the assumptions used for the traffic diversions analysis should be made available. If the state does not make the full 2017 toll schedule and analysis it used available, the public cannot adequately comment on and FHWA cannot properly analyze the FEIS.

4-5-2-3 Transit

The FEIS explains that "The Replacement Bridge Alternative configuration could support the ability for express bus services to use the extra width on the bridge during peak hours. This use would have to be appropriately assessed and considered before being implemented." We believe that the state should allow buses to use the extra width in the emergency access lanes at a minimum during peak hours. The state, through the FEIS, should commit to this change – as it has done in public statements – that would allow buses to bypass congestion and thereby provide further incentive for public transportation use.

Chapter 8: Socioeconomic Conditions

The analysis of traffic diversion due to toll adjustments should be more clear. Without a concrete toll schedule for 2017 the state cannot full analyze the socioeconomic impacts of this project and the public cannot adequately comment on and FHWA cannot properly review and analyze the socioeconomic impacts of the toll hikes presented in the FEIS.

Chapter 11: Air Quality

We continue to believe that the state's position that capacity is not increasing despite the addition of a lane in the non-peak direction is incorrect. The bridge as currently operated regularly fills up with traffic in the four-lane peak direction despite the specific roadway characteristics the state relies on to show capacity is not being increased.

This increase in capacity requires a more detailed air quality analysis. The extra lane provides added capacity which can impact air quality, especially if non-peak volume increases significantly. The state should revisit its position that the lane does not increase capacity and analyze the impacts of this increased capacity on the air quality in the corridor.

Chapter 21: Indirect and Cumulative Effects

As noted above, we continue to believe that the FEIS wrongly assumes that increasing capacity by 25% on hugely influential regional transportation infrastructure will not have any effects of the area because the area already has well-established land use patterns. However, as noted above, this assumption is unconvincing. The bridge fills up with traffic during peak periods when four lanes are provided, yet, the state says the bridge will not fill up when four lanes are provided during non-peak periods. That fourth lane might induce development and traffic despite projected speeds on the roadway. The state has not seriously looked at this issue but it should. A more comprehensive

analysis of the indirect and cumulative effects of the addition of a fourth, non-peak lane should be performed.

Appendix A: Project Planning and Development

A-1 White paper on Transit and the Tappan Zee Hudson River Crossing Project

As discussed above, although we continue to believe that transit should be included in the EIS alternatives analysis, if it is not, the state must ensure that the final bridge design does everything possible to not preclude transit. This means considering how each element of the bridge could impact or limit transit options in the future. The DEIS and FEIS have not conclusively proven this project will increase mobility through widening lanes and adding shoulders. Transit remains the only way to actually increase mobility in the corridor.

Also as noted above, we believe that the state should allow buses to use the extra width in the emergency access lanes at a minimum during peak hours. The state, through the FEIS, should commit to this change – as it has done in public statements – that would allow buses to bypass congestion and thereby provide further incentive for public transportation use.

Appendix B: Transportation

B-5 AECOM Future Capacity Memorandum

This memorandum disregards the impact an increase in capacity can have on people's expectations. No analysis has been done as to whether and how expanding part of a roadway affects the portion of the roadway with less capacity. For example, the Garden State Parkway in New Jersey was wider in the north than in the south, with a significant amount of growth happening just at the end of the wider portion in the south. Eventually the volume became too great, and another lane was added. The FEIS should give more consideration to how the addition of capacity to part of a roadway impacts subsequent growth in other areas of the roadway. These impacts must be studied as part of the FEIS.

In sum, there are many unresolved issues in the FEIS. The state must address each of the preceding issues before the project can be finalized.

Sincerely,

Veronica Vanterpool, Executive Director
Tri-State Transportation Campaign

Vincent Pellecchia, General Counsel
Tri-State Transportation Campaign

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: tap-z-br
Date:	Sunday, August 05, 2012 9:38:35 PM

From: charles pratt[SMTP:CGJPRATT@MSN.COM]
Sent: Sunday, August 05, 2012 9:38:08 PM
To: dot.sm.mo.tzbsite
Subject: tap-z-br
Auto forwarded by a Rule
If you would allow Full-Fledged Casino's you wouldn't have to raise the tolls so much the casino's would also create more jobs bringing more tax money

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: Tappan Zee Bridge Project - FEIS Comments
Date:	Tuesday, September 04, 2012 3:05:57 PM
Attachments:	20120904145247140.pdf

From: Baumgartner, Stacie[SMTP:SBAUMGARTNER@KBLAW.COM]
Sent: Tuesday, September 04, 2012 3:05:30 PM
To: dot.sm.mo.tzbsite
Cc: Schwartz, Larry (CHAMBER); jsachs@KBLAW.com
Subject: Tappan Zee Bridge Project - FEIS Comments
Auto forwarded by a Rule
This email is being sent on behalf of Joel Sachs

Stacie Baumgartner
Administrative Assistant

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MEMORANDUM

TO: **Tappan Zee Hudson River Crossing Project**
Attention: **Brian Conybeare**
Michael Anderson
Larry Schwartz

FROM: **Joel H. Sachs**

RE: **Tappan Zee Bridge Project – FEIS Comments**

DATE: **September 4, 2012**

This law firm has been retained by The Quay, a condominium consisting of 89 residental units located on South Broadway, Village of Tarrytown. As I believe that the New York State Department of Transportation ("NYSDOT") and the New York State Thruway Authority ("NYSTA"), as well as the Governor's office, are aware, The Quay has significant legal and factual concerns in regard to the proposed new Tappan Zee Bridge, both procedurally and substantively.

Initially, we would like to indicate that our office has extensive experience in both the SEQRA and NEPA review process and has litigated various maters in both Federal and State courts involving non-compliance by federal and state agencies with requirements of NEPA and SEQRA. We also have extensive experience in the New York Court of Claims in regard to condemnation proceedings and issues of valuation.

For the sake of brevity, please be advised that we have reviewed the comments on the FEIS submitted to the Lead Agencies by The Quay's land use, planning and traffic consultant, namely Nathaniel Parish, of Parish & Weiner Inc. dated August 30, 2012 as well as an extensive comment letter by Mack Associates LLC addressed to the Village of Tarrytown, dated August 29, 2012. The Quay fully supports the statements set forth by both Messers. Parish and Crossan in their respective reports and will not repeat at length the procedural and substantive arguments stated therein.

The form and substance of the FEIS prepared by the lead agencies in alleged compliance with the requirements of both NEPA and SEQRA does not meet the "hard look" test required under both federal and state law. The voluminous document of approximately 10,000 pages was prepared to deliberately confuse, not to inform, the public. Ever other FEIS that this office has either prepared or reviewed contains specific responses to each and every specific comment raised during the public comment on the DEIS. The instant document does nothing of the sort, but rather reiterates the text of the DEIS and inserts some hard to find comments into the text of the DEIS, and calls the revised document an FEIS.

The heart of an FEIS under both NEPA and SEQRA is the requirement that all the enviromental impacts of a project should be mitigated "to the maximum extent practicable". Here, the significant adverse environmental impacts on The Quay include, but are not limited to air quality, vibration, noise, visual impact, neighborhood character and property values. There are no specific mitigation measures set forth therein, rather only vague generalities.

This office on behalf of The Quay has attended several meetings with representatives of both the NYSDOT and NYSTA wberein the concerns of residents of The Quay were fully articulated to the government representatives. However, none of these concerns are adequately addressed in the FEIS. The FEIS apparently denies that mitigation is warranted and incredulously attempts to make The Quay believe that even though the new bridge will be significantly closer to The Quay than the existing bridge, that impacts such as noise, vibration and air quality will be less than they are at present. This is totally absurd.

A major reason that no hard look has been taken is that both NYSDOT and NYSTA are moving at breakneck speed to get the project approved and built. By the Lead agencies determining to proceed with a Design/Build project, and without the important design documents having been prepared, many of the significant environmental impacts of the project cannot even be intelligently reviewed at this point. This is why The Quay has been requesting that a Supplemental Environmental Impact Statement be prepared once the project is further designed and also to take account of the serious deficiencies in the responses to comments set forth in the present FEIS. Both the SEQRA and NEPA regulations require the preparation of a Supplemental EIS in order to both cure the deficiencies in the present FEIS and when there are changes proposed to the project, when there is new discovered information or whether there is a change in circumstances related to the project. See 6NYCRR Part 617(7); 40 C.F.R.1502.9(c).

Further, the failure of the FEIS to comprehensively review all the potential environmental, land use and economic impacts of the proposed project run afoul of the segmentation prohibitions of both SEQRA and NEPA. Under both the federal and state regulations, the environmental review of a proposed action must be reviewed comprehensively, as opposed to being reviewed independently and piecemeal. By fast-tracking the NEPA and SEQRA process, with many of the environmental impacts not yet known and not yet disclosed, the NYSDOT and NYSTA have violated the non-segmentation requirements of the federal and state environmental impact review.

Among the NEPA cases which the undersigned has been involved with that involve the lead agency jumping the gun and approving a project in the absence of full studies concerning the environmental impacts of the project, *Protect Key West Inc. v. Cheney*, 795 F.Supp. 1552 (S.D.FLA. 1992) is instructive. In that case, the U.S. Navy in its rush to get approval for a housing project, prepared a series of preliminary studies on many of the significant environmental issues and argued to the Court that subsequent studies, reports and analyses cured any deficiencies in the NEPA process. The Chief

Judge of the Southern District of Florida rejected the approach which he characterized as "commit first, ask questions later". In issuing an injunction against the United States Navy, the Court indicated that full environmental information must be available to the public before decisions are made and before actions are taken. "In the NEPA context, post hoc compliance by definition does not accord with the congressional mandate." See *Sierra Club v. Lujan.* 716 F.Supp. 1289 (D Ariz 1989), see also *Cady v. Morton*, 527 F.2d 786 (9th Circuit 1975).

Here, as in the cases cited above, the NEPA/SEQRA process must be reopened in order to allow all significant environmental information to be concerning the potential impacts of the project to be presented to the public prior to the time the lead agency makes a decision to proceed with the project. In issuing an injunction, the Court in *Protect Key West* indicated that "irreparable harm results where environmental concerns have not been addressed by the NEPA process." See also *Sierra Club v. Marsh*, 872 F.2d 497 (1st Circuit 1989).

Further, the FEIS completely dismisses the claims of The Quay in regard to significant diminution of the property values of The Quay as well as those of the individual homeowners, both during and after construction. In this regard, the FEIS conclusions in regard to diminution of property values are wrong both legally and factually.

Finally, the recent decision made by the New York Metropolitan Transportation Council ("NYMTC") constitutes a clear violation of 40 CFR 1506.1 and 6 NYCRR 617.11(g) which prohibit any involved agency from making a final decision to undertake, fund or approve an action which has been the subject of an FEIS until such time as the FEIS has been accepted and the Lead Agency has issued a Findings Statement. Thus, the approval of the project by the NYMTC on August 20, 2012 is a clear violation of SEQRA and NEPA. Until the acceptance of an FEIS and the issuance of a Findings Statement, the NYMTC cannot properly consider whether the environmental impacts of the proposed bridge project have been mitigated to the maximum extent practicable as required by both SEQRA and NEPA.

Thank you for incorporating the within comments into the public record.

cc: Alice Goldberg, President, The Quay
Hon. Doris Friedman
Hon. Drew Fixell and the Members of the Board of Trustees
Hon. Thomas Abinanti
Hon. Andrea Stewart Cousins
Hon. Paul Feiner
Nathaniel Parish
Brook Crossan

6385/01/429882v1 9/4/12

DEAR TZB INFO,

THIS COMMENT ON THE NEW NY BRIDGE FEIS IS WRITTEN WITH EXTREME PROTEST.

THE DESIGN BUILD LEGISLATION MEANS JUST THAT. AT THIS TIME THE DESIGNS AND THEIR COSTS FROM THE 3 BIDDERS HAVE NOT BEEN RELEASED TO THE PUBLIC, SO IT IS IMPOSSIBLE TO COMMENT ON THE ACTUAL PROJECT.

I WOULD LIKE TO ENTER AT THIS TIME ALL PREVIOUS CORRESPONDENCE FROM MYSELF TO GOVERNOR PATAKI, MICHAEL ANDERSON, THE TZB REPLACEMENT PROJECT, GOVERNOR CUOMO, THOMAS MADISON, LARRY SCHWARTZ, AND OTHERS. IN THIS CORRESPONDENCE, FOR OVER 12 YEARS, I HAVE CLEARLY STATED THAT A REGIONAL SOLUTION IS NECESSARY, RAIL MUST BE INCLUDED, ACCESS TO LONG ISLAND MUST BE INCLUDED, AND THAT TUNNELS ARE RAPIDLY CONSTRUCTED AND VERY COST EFFICIENT IN NUMEROUS PROJECTS WORLDWIDE. STARTING IN 1994 IN TOKYO AND CULMINATING IN DOZENS OR MORE PROJECTS IN CHINA, SEATTLE, ST. PETERSBURG, LONDON, AND MANY OTHERS, TUNNEL BORING HAS PROVEN EXTREMELY RELIABLE, VERY COST EFFECTIVE, AND VERY RAPID. COSTS PER LANE MILE IN THE ORDER OF $30 MILLION AND ADVANCE RATES OF 100 FEET PER DAY HAVE BECOME AN INDUSTRY STANDARD.

THE FEIS HAS MANY INTERNAL CONTRADICTIONS, AND MANY CONTRADICTIONS EXIST WITH DRAFT PERMITS WHICH ARE AVAILABLE THROUGH THE WEBSITE. THESE INCLUDE:

- THE EFFECT, QUANTITY, AND DISPOSITION OF DREDGING;
- THE EFFECT AND MORTALITY RATE OF THE ENDANGERED AND COMMON FISHES OF THE RIVER;
- THE EFFECT OF AIR POLLUTION.

NOT INCLUDED IN THE FEIS OR THE PLANNING IS A TRUE REGIONAL SOLUTION AND THE POTENTIAL FUEL SAVINGS AVAILABLE THROUGH DIRECT ACCESS TO LONG ISLAND, FULL SCALE HEAVY FREIGHT RAIL SERVICE, TRUCK-ON-TRAIN SERVICE, MASS TRANSIT, AND HIGH SPEED RAIL. ALL OF THESE SERVICES ARE AFFORDABLE AND EFFECTIVE IN THE TUNNEL PROGRAMS PROPOSED AS EARLY AS APRIL, 2000 AT THE FIRST MEETING. WHILE WE HAVE FAILED TO DO ANY SUBSTANTIAL ACTION TO ACHIEVE THE BENEFITS OF THESE SERVICES, THEY HAVE BEEN INCORPORATED IN MANY PROJECTS WORLDWIDE.

THE PRESENT CONSULTANT ARUP ALSO HAS WORKED ON MANY OF THESE TUNNEL PROJECTS WORLDWIDE AND PREPARED A PAPER WHICH ALSO APPEARED IN THE PREVIOUS CORRESPONDENCE REFERRED TO ABOVE AND WAS PRINTED, BUT NOT PRESENTED, AT THE RETC CONFERENCE IN SEATTLE IN 2005.

THE FEIS SUFFERS FROM SEVERE SEGMENTATION IN THAT THE REPLACEMENT BRIDGES ARE ONLY A SMALL SEGMENT OF THE I-287 CORRIDOR IMPROVEMENT, AND ARE REFERRED TO AS SUCH BY GOVERNOR CUOMO. THE I-287 PROJECT IS ONLY A SEGMENT OF THE ORIGINALLY PLANNED AND NECESSARY NORTH RING WHICH INCLUDED A LONG ISLAND SOUND CROSSING. THE LONG ISLAND SEGMENT WAS BUILT AS NY 135 SEAFORD OYSTER BAY EXPRESSWAY. THE BRIDGE CROSSING THE SOUND WAS NOT BUILT DUE TO ENVIRONMENTAL PROBLEMS AND QUESTIONABLE TECHNOLOGY. THE ORIGINAL PLANNING DID NOT HAVE THE BENEFITS OF MODERN TUNNEL TECHNOLOGY, AND DID NOT INCLUDE RAIL.

THERE IS ALSO MASSIVE INCORRECTNESS IN THE ALTERNATIVES ANALYSIS REJECTION OF THE TUNNEL OPTION, INCLUDING OBSOLETE DATA AND INCORRECT COSTS AND TIME. AIR SCRUBBING, STABILITY

IN THE RIVER SILTS, VALUE OF THE ROCK PRODUCTION ON SITE, AND PRODUCTION ON SITE OF CONCRETE TUNNEL SEGMENTS -- ALL ARE EITHER NEGLECTED OR KNOWINGLY MISSTATED.

THIS PROJECT CANNOT GO FORWARD WITHOUT PUBLIC COMMENT IN DETAIL ON THE SPECIFIC PHYSICAL AND FINANCIAL PLANS. THE FEIS IS PREMATURE AND THE PRE-CONSTRUCTION INVASION OF THE HUDSON RIVER WAS ABSOLUTELY ILLEGAL. WITHOUT AN APPROVED RECORD OF DECISION, WHICH SHOULD PROPERLY SPECIFY A WORLD CLASS READILY AVAILABLE AND AFFORDABLE TUNNEL, RATHER THAN A TRULY EXPERIMENTAL PAIR OF BRIDGES OFFERING NO IMPROVED SERVICE, NO EXTENDABILITY, AND A VERY LONG,EXPENSIVE, AND DANGEROUS CONSTRUCTION TIMELINE, THIS PROJECT CANNOT AND SHOULD NOT GO FORWARD. THE ATTEMPTS TO RUSH THROUGH THE PLANNING PROCESS RISK ENTERING AN INDEFINITE AND PROBABLY FUTILE MANY YEAR LONG PROCESS OF LITIGATION. NO JOBS WILL BE PRODUCED AND THE TZB WILL CONTINUE TO REQUIRE EXPENSIVE MAINTENANCE.

THERE IS A GENUINE NEED TO REPLACE THE PRESENT TZB, BRINGING THE TRANSPORTATION SYSTEM, INCLUDING RAIL, INTO AN EFFECTIVE REGIONAL PLAN. CREATING AN EFFECTIVE RAIL CROSSING OF THE HUDSON RIVER AND ACCESS TO LONG ISLAND WILL SAVE THOUSANDS OF LIVES EACH YEAR PRESENTLY LOST TO TRAFFIC CAUSED AIR POLLUTION.

SINCERELY,
ALEXANDER SAUNDERS
853 OLD ALBANY POST ROAD
GARRISON, NY 10524
PHONE 845 265 3631

Office of the Secretary of Transportation
Executive Secretariat

Control number:	S10-120830-007	**Action office:**	FHWA
Document date:	8/30/2012	**Due date:**	9/7/2012
Author(s):	Alexander Saunders		
Subject:	Asking for the Support of the U.S. Department of Transportation on the Current And Affordable Plan for the Tappan Zee Bridge Replacement in New York.		
Action:	Direct Reply		

Comments:

Date	Action	Action by
8/30/2012	Folder Sent for Draft to Action Office: FHWA for 'Direct Reply'.	CATHERINE.WECKENMAN
8/30/2012	DIST: MARAD,B1,P1,C1,FRA,S3	CATHERINE.WECKENMAN
8/30/2012	Updated Folder Information.	CATHERINE.WECKENMAN
8/30/2012	Work Folder Assigned to FHWA.	MPETTIFORD
8/30/2012	Incoming File Uploaded.	MPETTIFORD
8/30/2012	Control Number Created.	MPETTIFORD

Date	Note	Note by

From:	Saunders Foundry
To:	LaHood, Ray (OST)
Subject:	Tappan Zee Replacement
Date:	Thursday, August 30, 2012 11:36:13 AM
Attachments:	LaHood Letter 6-3-12.pdf Newsday Article June 2011.pdf Journal News Article May 2000.pdf

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Dear Secretary LaHood,

On June 3, 2012 we attempted to email you and apparently it did not reach you. This letter referred to the Tappan Zee Bridge replacement and a fresh copy is attached. The two articles referenced in the letter are also attached.

At this time using further incorrect procedure NYMTC has voted to further support this project. The vote was incorrect in that it took place before the 72 hour notice required. The FEIS comment period has not expired and significant opposition to the environmentally problematical bridge proposal is being mounted.

At this time support from the US Department of Transportation for the currently available and easily affordable tunnel would help avoid extended litigation. This tunnel also would make a major contribution to the interstate highway and interstate rail systems and would include an ultimate extension to Long Island which was planned sixty years ago but never built. It is critical to improving traffic and rail transit in the Metropolitan New York Region.

Sincerely,
Alexander Saunders

JUNE 3,2012

DEAR SECRETARY LAHOOD,

WARREN FLATAU, SENIOR PUBLIC AFFAIRS SPECIALIST, REQUESTED THAT I WRITE TO YOU ON THE SUBJECT OF THE TAPPAN ZEE REPLACEMENT.

THE PROPOSAL NOW BEING RUSHED FORWARD BY THE NEW YORK STATE D.O.T. AND GOVERNOR CUOMO IN DEFIANCE OF REASONABLE E.I.S. PROCEDURE AND GOOD ENGINEERING IS THE WRONG PROJECT IN THE WRONG PLACE AT THE WRONG TIME FOR THE WRONG PRICE.

THE NEED IN THE TAPPAN ZEE CROSSING IS FOR FAR MORE THAN A HIGH CAPACITY BRIDGE FOR AUTOMOBILES AND TRUCKS. THE HUDSON RIVER CROSSING IS ONLY A SMALL PART OF THE INTERSTATE HIGHWAY SYSTEM I-287 WHICH WAS ORIGINALLY DESIGNED AS A NORTH RING ROAD AROUND THE NEW YORK METROPOLITAN AREA, INCLUDING A LONG ISLAND SOUND CROSSING RYE TO SYOSETT. MODERN TUNNEL TECHNOLOGY PERMITS THE RAPID COMPLETION OF THIS DESIGN AT A REASONABLE COST.

MODERN TECHNOLOGY WOULD OFFER HIGH SPEED RAIL AND TRUCK-ON-TRAIN AS WELL AS ROAD. TUNNELS ARE BEING BUILT ALL OVER THE WORLD AT RATES EXCEEDING 100 FEET PER DAY PER HEADING, AND AT COSTS IN THE ORDER OF $25 MILLION PER LANE OR RAIL MILE. AIR SCRUBBING IS AVAILABLE AND OF COURSE ALL-WEATHER CONSTRUCTION AND SERVICE ARE A GIVEN.

THE MANY STUDY TEAMS ON THE HUDSON RIVER CROSSING HAVE CONSISTENTLY REJECTED MODERN TUNNEL TECHNOLOGY, AND HAVE OFFERED ARGUMENTS AGAINST THE TUNNEL OPTION WHICH ARE UNTRUE AND OBSOLETE. THE HUDSON RIVER CROSSING DRAWING OFFERED TO NEW YORK IN OCTOBER 2003 WAS SUCCESSFULLY COMPLETED IN SHANGHAI IN 2008 FOR $0.8 BILLION IN 22 MONTHS. THE PROPOSED BRIDGE WILL TAKE BETWEEN 5 AND 10 YEARS FOR COMPLETION, OFFER NO RAIL COMPONENT, OR AIR SCRUBBING, AND IS PROJECTED TO COST AT LEAST $5.2 BILLION.

THE BRIDGES WILL NOT CONNECT TO ANY IMPROVED HIGHWAY OR RAIL SERVICE, AND MAY NOT BE EXTENDED TO LONG ISLAND. FEDERAL PARTICIPATION IN THIS PROJECT SHOULD BE BASED ON A TRUE UNDERSTANDING OF THE REGIONAL NEEDS WHICH INCLUDE RAIL CROSSINGS OF THE HUDSON RIVER AND LONG ISLAND SOUND, AIR QUALITY IMPROVEMENT, AND REASONABLE COST.

RAIL SERVICE ACROSS THE HUDSON PRESENTLY REQUIRES A 250-MILE DETOUR TO THE SELKIRK CROSSING. ELIMINATING THE COST OF THIS DIVERSION COULD MAKE A SUBSTANTIAL CONTRIBUTION TO THE HUDSON RIVER TUNNEL. RAIL SERVICE TO LONG ISLAND IS VIRTUALLY NON-EXISTANT. E.P.A. REPORTS SOME 2,000 DEATHS PER YEAR DUE TO TRAFFIC AIR POLLUTION ON I-95 THROUGH THIS REGION.

THE TAPPAN ZEE PROJECT, WHICH HAS BEEN STUDIED FOR ALMOST 2 DECADES, HAS MADE NO PROGRESS ON SOLVING ANY OF THESE PROBLEMS, OR IMPROVING REGIONAL AND INTERSTATE TRAFFIC FLOW. THE PRESENT OFFER OF TWIN BRIDGES ACROSS THE HUDSON RIVER ONLY, WHILE EXTREMELY EXPENSIVE, IS ESSENTIALLY USELESS, ENVIRONMENTALLY DAMAGING, AND WILL FURTHER DISRUPT THE AFFECTED VILLAGES OF NYACK, SOUTH NYACK, AND TARRYTOWN.

IN THAT THERE IS NO FINANCING FOR THE TWIN BRIDGES PROJECT, IT WILL PROBABLY NOT TAKE PLACE, BUT THE NEED FOR HIGH SPEED HEAVY RAIL, IMPROVED COMMUTER SERVICE, AND ELIMINATION OF AIR POLLUTION PERSISTS. FEDERAL INVESTMENT BASED ON THESE IMPROVEMENTS WOULD BE CORRECT AND APPRECIATED. THE FUEL SAVINGS AND WEAR AND TEAR, THE SHORTENED RAIL TRAVEL FOR SOME 400 CARS EACH DAY OF NEW YORK CITY GARBAGE, ALL WOULD MAKE SUBSTANTIAL CONTRIBUTIONS TO THE VERY REASONABLE COST OF MODERN TUNNEL CONSTRUCTION. THE FEAR OF STRUCTURAL FAILURE OF THE CURRENT TAPPAN ZEE BRIDGE WOULD INDICATE THAT THE TUNNEL PROJECT, WHICH CAN BE BUILT VERY RAPIDLY, SHOULD BE INSTITUTED PROMPTLY.

ATTACHED ARE TWO ARTICLES FROM THE EARLY DAYS OF THE TAPPAN ZEE PROJECT, WHICH DISCUSSED THE EXTREMELY OBVIOUS REGIONAL NEEDS. THEY CONTINUE TO BE RELEVANT.

SINCERELY,

ALEXANDER SAUNDERS
853 OLD ALBANY POST ROAD
GARRISON, NEW YORK 10524

FULLOUT SECTION

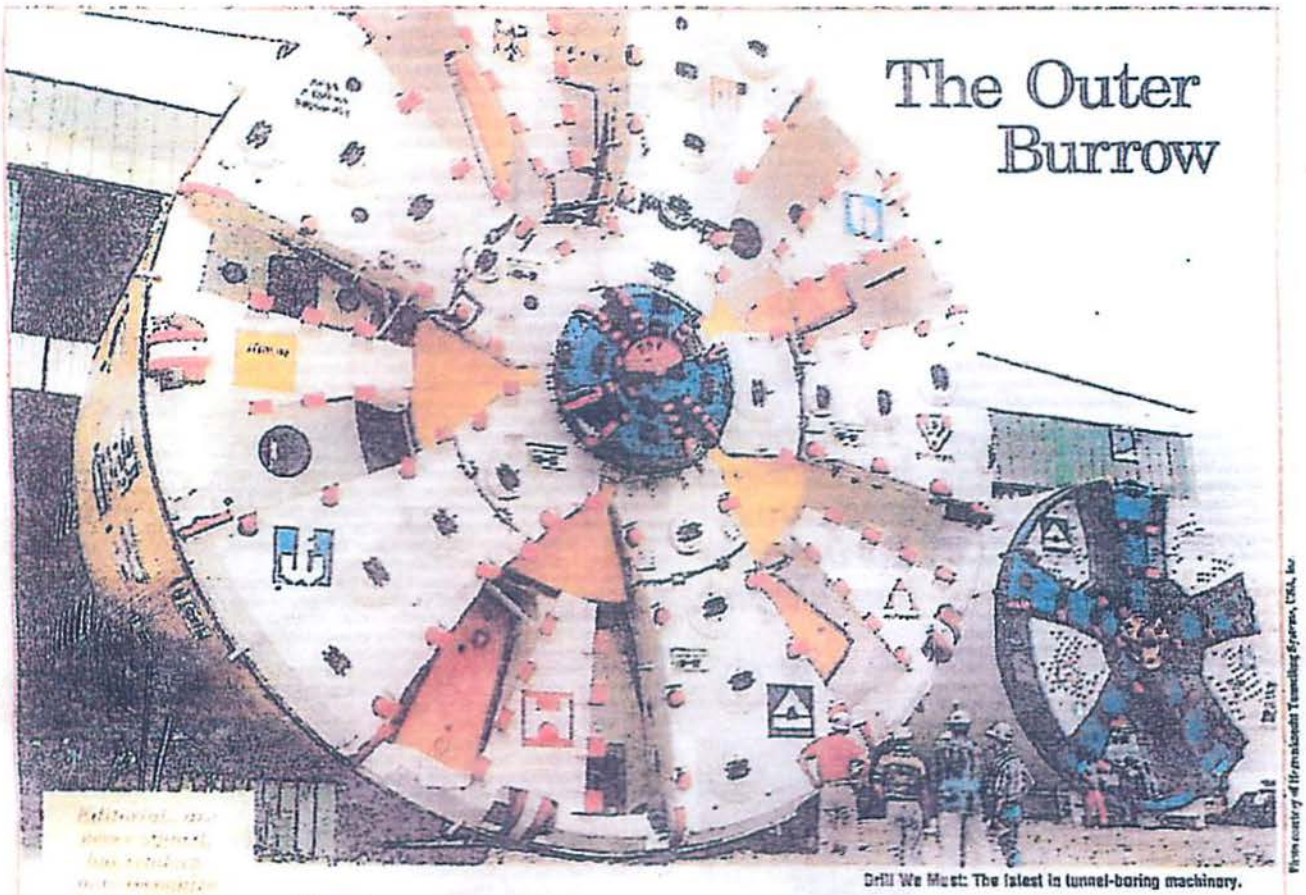
Section B

Newsday

CURRENTS & BOOKS

Sunday, June 3, 2001

The Outer Burrow



Drill We Must: The latest in tunnel-boring machinery.

Photo courtesy of Hydroshield Tunneling Systems, USA, Inc.

COVER EDITORIAL

THE FIRST LONG CAR trip marks the arrival of summer with far more authority than the solstice. For Long Islanders, it marks the beginning of a season of togetherness writ large in the stomach linings of all those who have ever spent hours edging toward a bridge. For it is the bridges of New York City that transform Long Island into a virtual peninsula, with entrance and egress at only one end.

This is why the Nassau-Suffolk region is often described as a transportation dead end that raises the cost of shipping goods. And it makes routes of travel absurd in their indirection: Goods shipped or people traveling northeast have to follow a dog-leg route west into the city

— Continued on Next Page

The above editorial was published June 3, 2001 as Roger Wiemer's valedictory. This followed a year of work based on Governor Pataki's final report on the Tappan Zee Bridge and I-287. This critical piece of planning has been shunned for the past 6 ½ years by the various study teams for I-287 and the Tappan Zee Bridge. In this time over 200 million has been spent on studies and maintenance of the bridge and hundreds of millions more on revising Exit 8 of the New York State Thruway and much more than that in traffic delays, health effects from air pollution and hindrance to the regional economy. The time to correct this situation is now.

Link LI to Mainland With a Tunnel Under the Sound

— Continued from Preceding Page

before they can turn north and east. This is especially wasteful in a time of rapidly escalating fuel costs.

The need for an escape route east of New York City is obvious. This is why over the years there have been so many attempts to rally support for a bridge across Long Island Sound. But bridges are costly, and so far as both Nassau and Suffolk Counties are concerned, they have been impossible to site. No one wants a huge bridge in the backyard.

In truth, the possibility of going up and over Long Island Sound is still dim, but the chances of going under it via a tunnel have blossomed in recent years.

Yes, it is time to start thinking about building a tunnel. Here are a few reasons why:

- One of the region's most outspoken advocates of tunneling is engineer Alexander Saunders, who follows tunneling costs worldwide. He reports it should be possible to build a tunnel under Long Island Sound for between $2 billion and $3 billion. By contrast, New York State's Department of Transportation once estimated a cross-sound bridge would cost $20 billion to $25 billion.
- Tunneling costs have come down because tunnel-boring technology has changed, and that may change everything for Long Island. Enormous tunnel-boring machines are able to dig without disturbing either the environment or the resident NIMBY population above. Two years ago, Albert Appleton, a senior fellow at the Regional Plan Association, took these changes in technology into account when he predicted, "There's going to be a renaissance in urban tunneling."
- At the moment, two of the most ambitious tunneling projects in history are underway on the East Coast: New York City's $6 billion Water Tunnel No. 3, which started in 1970, will be 60 miles long by the time it is finished in 2020. A tunnel-boring machine 20 feet across is being used. The $10.8-billion Central Artery Project in Boston, scheduled for completion in 2004, will replace an elevated highway with an eight-to-10-lane underground expressway.
- Many observers of seaborne commerce believe shipping is headed toward an airline-style hub system. They foresee one great container port eventually dominating the East Coast. At the moment, New York is still competitive with Halifax, Nova Scotia, and Norfolk, Va. Brooklyn specifically has a distinct advantage because it has the depth to accommodate deep-draft container ships. But it needs a connection to the railroads west of the Hudson. Mayor Rudolph Giuliani is lobbying for a cross-harbor tunnel. A second tunnel, across the sound, could only enrich the region's appallingly sparse rail freight infrastructure.

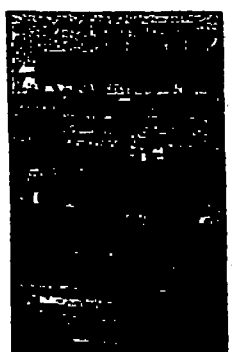
Why Not?

In most of the United States, 40 percent of freight is moved by rail; east of the Hudson less than 3 percent is moved by rail. That's one reason why Saunders, who lives upstate in Garrison, is so fired up about replacing the near-derelict Tappan Zee Bridge with a tunnel that could carry both highway traffic and rail freight. Last year he watched a massive tunneling machine near Antwerp, Belgium, and noted that soil conditions there were very close to conditions at the Tappan Zee crossing of the Hudson.

What he learned then about tunneling costs turned him into a crusader for a combined highway-rail tunnel at the Tappan Zee Bridge site. The alternative there is either extensive rehabilitation or replacement of the existing bridge. Saunders has taken his case to the executive director of the New York State Thruway Authority. He wants the authority to measure the costs of tunneling against those of bridge-building. His ideas have not been enthusiastically embraced, but they have not been rejected either.

"Why not build a tunnel?" is one of the questions contained in a Thruway Authority list of frequently asked questions. In its answer, the authority says: "Tunnel alternatives will be discussed and investigated as part of the environmental process."

> *Technology has changed and tunnel-boring costs have shrunk.*



In Europe, the English Channel tunnel, or "Chunnel," runs underground for about 30 miles, with two-thirds of the distance underwater. Japan's 34-mile Seikan undersea tunnel connects the islands of Honshu and Hokkaido. Extrapolating from the costs associated with tunneling-machine projects in Europe, Saunders believes a Tappan Zee Tunnel could be built with both automobile and rail-freight capability for between $700 million and $850 million. The Thruway Authority estimates the cost of rehabilitating or replacing the bridge at $1.1 billion. A rail component would add another $400 million to that.

Said Saunders, "My basic pitch is that bridge [the Tappan Zee] needs doing because that bridge is going to fall down without [massive] . . . maintenance." Both the Thruway Authority and the state Transportation Department should take fresh looks at tunneling costs.

Moses' Last Stand

In his advocacy of a Long Island Sound tunnel, Saunders advocates using roughly the same route proposed for the controversial, never-built Rye-Oyster Bay Bridge. That crossing was first suggested in a 1966 report commissioned, in part, by the Triborough Bridge and Tunnel Authority, headed by the then-powerful Robert Moses. It was also paid for by Gov. Nelson Rockefeller's Department of Public Works and called for a 8.1-mile sound crossing between Oyster Bay and Rye, in Westchester County. The bridge would have connected Long Island's Sunrise-Oyster Bay Expressway with the Cross Westchester Expressway. The plan was part of Moses' vision of a new beltway around the city. But extensive opposition developed. Rockefeller ended up folding the MTA into his new Metropolitan Transportation Authority, depriving Moses of his power base.

In the devastate area, Moses built the Whitestone, Throgs Neck, Triborough and Verrazano Narrows bridges, but his defeat in Oyster Bay ended an era of great public works projects. A bridge across the sound never again made its way so far into the planning stage.

Twenty years ago, there was a study of five potential cross-sound bridges: from Port Jefferson to Bridgeport, Conn., 14.6 miles; from Wading River to East Haven, Conn., 19.3 miles; from Riverhead to Guilford, Conn., 19.2 miles; from East Marion to Old Saybrook, Conn., 9.8 miles; and from Orient Point to Watch Hill, R.I., 24.5 miles. While nothing came of the study, it provides some idea of the distances involved.

Others Have Done It

Assuming a tunnel would be the same length as a bridge, one stretching from, say, Port Jefferson to Bridgeport would be about 15 miles long. That's half the length of the Chunnel between England and France, and 10 times the length of the Holland Tunnel to New Jersey. A brand new tunnel precisely 15 miles long carries cars between Lærdal and Aurland, Norway.

About 10 years ago, Albany promised ferry service between Wading River and New Haven. The palaver continues today, but no progress has been made. The proposed ferry lacks even a turnaround on this side of the sound.

Tunneling's new technology could destroy this dismal inertia, but not automatically. A governor and a cadre of servile legislators, accustomed to yes-saying, have to be roused.

If you're fed up with rising at 4 a.m. to begin a vacation trip, fed up with running this west-end gantlet, then it's time to demand a tunnel under the sound.

FROM PAGE ONE

Tunnel surfaces as residents' answer to Tappan Zee future

REG CLARY
e Journal News

One thing that Thruway officials ɜard clearly during the Interstate 87 hearings on replacing the Tapn Zee Bridge was a grass-roots ıggestion that they tunnel under ·e Hudson River rather than build ıother bridge.

It's an idea that is innovative as ell as Old World, transportation ɔperts say, and could find its way ıto the short list of long-term solu-ɔns for the Hudson Valley's busiest affic corridor.

"We're interested in the tunneling ɔncept," said John Platt, executive ırector of the state Thruway Auɔrity. "We certainly want to learn ore about that." Platt is one of the ve members on Gov. George Pata-'s task force charged with finding ıswers to traffic conditions along 287.

Tunnels have continued to solve ·ossing problems here and around ıe world, with projects such as the ɜntury-old New York City subway ·stem; the Trans-Tokyo Bay Highay, billed as the world's largest ınnel; and the high-profile tunnel ɔnnecting England with France ıder the English Channel, often re-·rred to as "The Chunnel."

The Central Artery project runs ırough the heart of Boston. It is ıown to many as "The Big Dig" — ı some cases because it started at ı estimated cost of $2.5 billion in 185 and has exceeded that figure ve-fold without being completed.

"Compared to a bridge, tunnels re very expensive," said Louis ilano of Parsons Brinckerhoff, an ıternational engineering firm, who ·orked on the Central Artery proɜct for five years. "You're paying ·ore, but you're getting more ɜngevity."

The rule of thumb in the industry that a tunnel project costs about vice what a bridge costs for the ıme crossing and lasts about three mes as long.

To replace the Tappan Zee Bridge ith another that also is capable of andling mass transit — in the form f light or commuter rail or a guidd busway — the early estimates are 1.5 billion.

No estimates were compiled for ıe tunnel alternative, but experts ıid that in order to handle eight lanes of traffic plus the mass transit, two tunnels probably would have to be dug, with Westchester-bound lanes in one and Rockland-bound lanes in the other.

"A tunnel alternative certainly should make the first cut," said Robert Dennison, director of the state Department of Transportation for the lower Hudson Valley. "My fear is that the technical problems would wash it out before you had to worry about cost."

Dennison's agency was part of Pataki's task force and is responsible for much of the state's transportation infrastructure that connects to the bridge.

Dennison said trucks and trains would need a gentle incline down and back up to get through the tunnel, a requirement that would mean putting the openings on both sides of the Hudson River, far beyond the shorelines. To get the grade necessary, about 1 percent for commuter rail or as much as 3 percent for light rail, the tunnel would have to run horizontally 100 feet for eve. y 1 to 3 feet it must rise.

Preliminary discussions by speakers at the I-287 hearings have focused on openings as far away as the Palisades Center mall and as far east as the I-287/87 split in Elmsford, but no engineering has been done to determine if those predictions are accurate.

King Daniels, a technical adviser for Robbins Co. in Solon, Ohio, worked on the English Channel Tunnel — about 10 times the length of what would be required to cross the Hudson River.

Daniels' company makes a $17 million boring machine that can chomp through the granite in Queens and on Long Island, the chalk in England and the silt that lies beneath the Tappan Zee Bridge. The machine, the industrial equivalent of a very large worm, pushes the broken material along conveyor belts out its back end.

Daniels said he hasn't seen geological data on the Tappan Zee area, so it would be hard to judge how well a tunnel would work here, but said in general tunneling solves the problem of disturbing the river bed because it goes well below that.

The silt that supports much of the bridge and would do the same for a tunnel is the type of material that can cause problems, Daniels said. The tunnel has to find a level where the ground material is solid enough and in some cases that can require significant depth.

The greater the depth required, the longer the tunnel must be, experts said, and that increases cost.

The idea of tunneling under the river could solve a multitude of problems, if it's feasible.

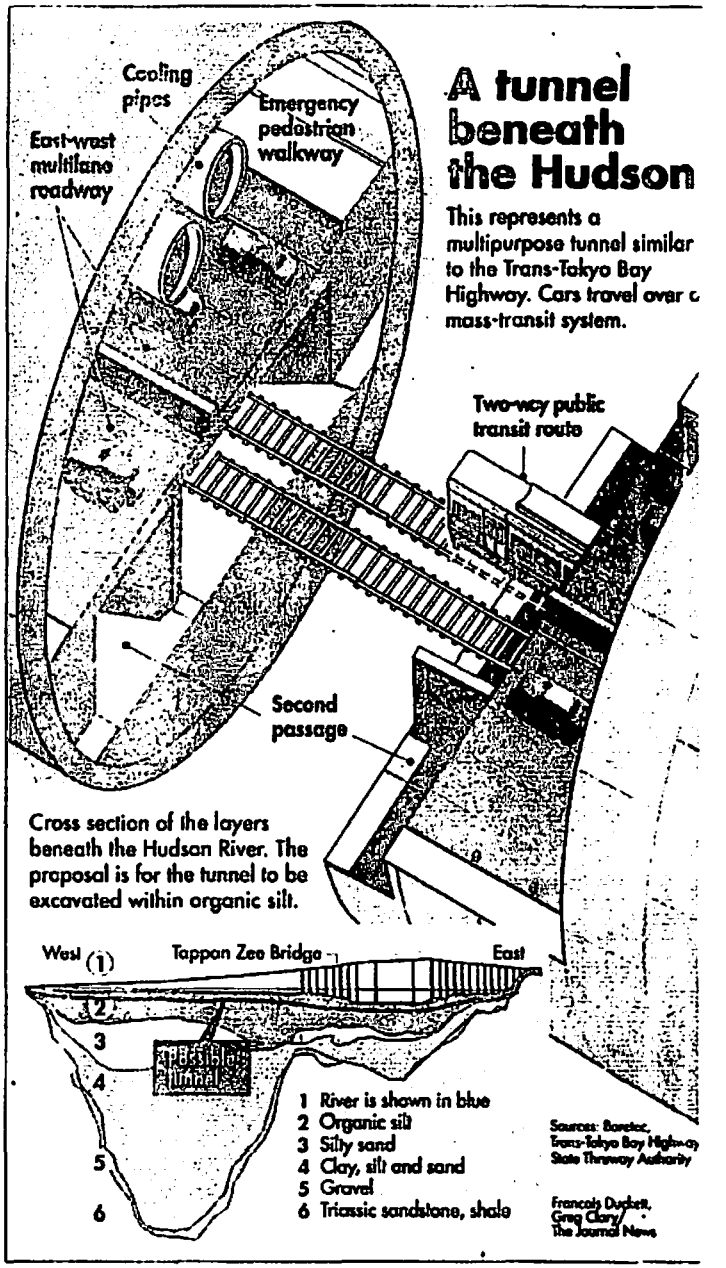
Land-taking would be minimal because most of the construction would be done so far below ground that property owners wouldn't be affected, Daniels said. Ground farther below the surface than 10 to 20 feet doesn't belong to the property owner anyway, he said, but rather to the federal government.

The riverbed would not be dis turbed, which could solve the prob lem of how to work on a new cross ing without stirring up dangerou pollutants that have settled into th silt, tunnel experts said.

A tunnel would be less prone t seismic activity than a bridge Daniels said, and requires les maintenance once it opened.

The toxic fumes from cars, truck and other machines going back an forth through the tunnels will nee to be cleaned out, however, an that's an environmental concern.

"You can't vent it into the river, Dennison said. "And you have to fig ure out a way to do it that doesn hurt the environment."



A tunnel beneath the Hudson

This represents a multipurpose tunnel similar to the Trans-Tokyo Bay Highway. Cars travel over a mass-transit system.

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: Tappan Zee Bridge Project Submission
Date:	Tuesday, September 04, 2012 5:19:46 PM
Attachments:	salisbury final 090412.doc

From: singersr@optonline.net[SMTP:SINGERSR@OPTONLINE.NET]
Sent: Tuesday, September 04, 2012 5:19:19 PM
To: jsachs@KBLAW.com
Cc: dot.sm.mo.tzbsite
Subject: Tappan Zee Bridge Project Submission
Auto forwarded by a Rule
See attached. Thank you.

Donald Lee Singer, Sr.
Attorney at Law
74 Cordwood Road
Cortlandt Manor, New York 10567
[914] 739-1164
FAX [914] 293-7714
Via email tbzsite@dot.state.ny

September 4, 2012

To: Tappan Zee Hudson River Crossing Project
Attention: Brian Conybeare
Michael Anderson
Larry Schwartz

FROM: Donald Lee Singer Sr.

Re: Tappan Zee Hudson River Crossing Project

I am the attorney for residents of the Salisbury Point Cooperative, Inc. in regard to the above project. My clients are very concerned with various aspects of the project that have been discussed previously with you and other representatives of New York State including the Department of Transportation and the New York State Thruway Authority.

I have reviewed comments on the FEIS as submitted by Nathaniel Parish of Parish and Weiner, Inc. dated August 30, 2012 as well as a letter from Mack Associates, LLC dated August 29, 2012 to Mayor Drew Fixell and the Board of Trustees of the Village of Tarrytown.
My clients are in full agreement with the comments submitted by Mr. Parish and Mr. Crossan.

I think most people will agree that the FEIS prepared by the lead agencies that are not in compliance with NEPA and SEQUA. The 10,000 page documents in my clients view is not only confusing, but on its face does not meet the "hard look" test required under applicable laws. My clients believe that the DEIS was supplemented into a documents that is now called an FEIS, without a full discussion of relevant submissions that they believe were either not fully addressed or omitted.

My clients believe that there is a dramatic deficiency in addressing concerns relating to mitigation of environmental impact to the maximum extent practicable that is required both under NEPA and SEQRA. There are significant environmental impacts to Salisbury Point, including, but not limited to noise, visual impact, air quality, vibration, property values and neighborhood character changes, that have not been fully and properly addressed.

I have attended several meetings with key members of the Board of Salisbury Point and State officials, including representatives of NYSTA and NYSDOT where concerns of residents were discussed, but not satisfactory replies received. Those concerns were alleged to be taken into consideration but are not addressed adequately addressed in the FEIS either. The FEIS conclusions that environmental impacts will be less than currently exist, flies in the face of professional evaluation of these concerns and the conclusion that there will in fact be major environmental impacts to our residents in these areas. It is understandable that the State is

moving at a rapid speed to move this project along. However, this may well be the reason no really hard look has been taken by NYSDOT and NYSTA. How can the lead agency determine to proceed with the design/building project, without the important design documents having been prepared? My clients believe that a proper review of the environmental impacts cannot be made at this stage.

Salisbury Point has and is requesting that a Supplemental Environmental Impact Statement be prepared once the project is further designed also taking into account deficiencies in the responses to comments set forth in the present FEIS. See 6NHYCRR Part 617(7; 40 C.F.R. 1502.9(c). I am sure you are well aware of the NEPA cases that found that FEIS statements were inadequate and did not meet the standards required in applicable law and regulations.

On behalf of my clients, I am requesting the comment period be extended because of the rather short time allotted for this process. My clients believe that the approval of the project by the NYMTC on August 20, 2012 is in violation of both SEQRA and NEPA and we believe such approval is in violation of 40 CFR 1506.1 and6 NYCRR617.11(g) for the reasons stated *supra.*

I appreciate you taking the time to read and review this memo that I respectfully request be incorporated into the public record.

cc: Cathy McCue, President, Salisbury Point

Hon. Doris Friedman, Hon. Thomas Abinanti, Hon. Andrea Stewart Cousins

Hon Paul Feiner, Nathaniel Parish, Brook Crossan

CORRESPONDENCE TRACKING SYSTEM

CONTROL SHEET

CONTROL NO.: 120829-006-2004/S10120829-005

WRITER'S NAME: SULLIVAN, JOAN

AFFILIATION(S):

OTHER WRITER(S):

ORIGINATOR: GENERAL PUBLIC

CATEGORY: PERMANENT WITH DUE DATE

DUE DATE: 09-06-2012

ADDRESSED TO: SECRETARY OF TRANSPORTATION (S-1) (X102)

SUBJECT: ASKING THE SECRETARY TO CONSIDER THE TRAFFIC CONGESTION IN THE NEW NY (OLD TAPPAN ZEE) BRIDGE PROJECT

COMMENTS: FOR RESPONSE BY HDANY

ASSIGNED TO:

TO ORGANIZATION	ACTION	DATE
NEW YORK DIVISION, ALBANY	ACTION ASSIGNED	08-29-2012

SIGNATURE LEVEL: NEW YORK DIVISION, ALBANY

DISTRIBUTION:

ORGANIZATION	DATE
CHIEF COUNSEL	08-29-12
ASSOCIATE ADMINISTRATOR FOR PLANNING, ENVIRONMENT, AND REALTY	08-29-12

ANALYST/PHONE: ROSEMARY ZACCAGNINO / (202) 366-5655<< TD>

United State Department of Transportation - **Federal Highway Administration**

Office of the Secretary of Transportation
Executive Secretariat

Control number:	S10-120829-005	**Action office:**	FHWA
Document date:	8/23/2012	**Due date:**	9/6/2012
Author(s):	Joan Sullivan		
Subject:	Asking the Secretary to Consider the Traffic Congestion in the New NY (Old Tappan Zee) Bridge Project.		
Action:	Direct Reply		

Comments:

Date	Action	Action by
8/29/2012	Folder Sent for Draft to Action Office: FHWA for 'Direct Reply'.	CATHERINE.WECKENMAN
8/29/2012	DIST: A1,B1,P1,C1,FTA,S3,I1	CATHERINE.WECKENMAN
8/29/2012	Updated Folder Information.	CATHERINE.WECKENMAN
8/29/2012	Work Folder Assigned to FHWA.	MPETTIFORD
8/29/2012	Incoming File Uploaded.	MPETTIFORD
8/29/2012	Control Number Created.	MPETTIFORD

Date	Note	Note by

August 23, 2012

Mr. Ray La Hood
Secretary of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590

Dear Mr. La Hood,

I am enclosing a copy of an open letter I wrote to several newspapers and politicians concerning the replacement of the Tappan Zee Bridge in New York. My neighbors and I are very concerned about the speed at which the project has been approved and advanced to date. We are worried about where the funding is coming from for this project. Will our tax bill rise enormously or will the toll be prohibitive? The toll is projected to be $14 almost a 200% increase over what we now pay. We are concerned that the project has been fast tracked to such a degree that we all have "whiplash" just following the fast approvals by government bodies. We are concerned that certain requirements were sidestepped like answering our concerns in the DEIS; not giving us the specifics on mitigation for the complex in which I live which is the closest to the Tappan Zee Bridge on the Rockland side and the epicenter for construction noise, vibration, etc.; and, how quickly the Metropolitan Transportation Council voted on the project while not allowing the customary 2 weeks for public input before their vote.

I ask that you read the following and consider the fact that traffic congestion will not be lessened in any way with the current plan. There is NO viable plan for mass transit included in this project. Please consider these facts before you give final approval for the funding and ultimately for the entire New NY Bridge project as our lives and homes will be irrevocably negatively impacted.

The "New NY (old Tappan Zee) Bridge Project :
A fable for the citizens of New York

I recently attended my 8th "informational" meeting concerning the "New NY Bridge". I am now more confused and concerned about this project than ever before.

I consider myself to be a bit of an "expert" on commuting across the Tappan Zee Bridge as I have done so twice a day, every working day since 1982. That is 30 years of construction; reconstruction; altered travel lanes; the introduction of EZ Pass; the advent of the mobile barrier; the year and a half of interminable traffic caused by "the plates"; the removal of the mountain at Exit 8 in Westchester; etc. I have seen and experienced it all while traversing the Bridge. There HAS been progress in 30 years. A commute that used to take me 1 – 1 ½ hours now takes me 20 minutes to reach my office in Valhalla in the morning and 30-40 minutes to return to Rockland in the evening. I have a long and important (to me) relationship with the bridge: I need it.

The August 2nd presentation was the "slickest" to date now that Brian Conybeare, formerly of Channel 12 News, joined the governor's "team". The powerpoint presentation was seamless but some of the information it contained was an affront to the intelligence of many of the attendees.

After Mr. Conybeare introduced the panel of experts, he opened the floor to Mr. Roche, an engineer working for the Thruway Authority. Mr. Roche presented an in-depth explanation of the wonders of a "Bus Rapid Transit" system. He spent nearly 20 minutes presenting the many different options of the system but then told us that we could not have a BRT because the required system of dedicated roadways could not be built in our area. The "Mass Transit Option" we would be entitled to would be a "dedicated bus lane on the new bridge" and a bridge designed for some "form of mass transit" to be added "sometime in the future".

Mr. Larry Schwartz, Secretary to the Governor, told the audience that by including BRT or some form of mass transit to the new bridge now will cause the toll to rise to $28. Repairing or retrofitting the existing bridge would cost approximately $2 billion and cause the toll to rise to $12 from the current $5. A new bridge will cost $5.2 billion and bring the toll to $14. Thus, the new bridge will cost the taxpayers $3.2 billion more. What he didn't fully explain was that this would cost the commuting bridge users an additional $108/month or approximately $1300 a year. After tax money. An obvious bargain.

After local politicians were given time to "laud" the governor and his team for a job well done it was time to open the meeting to questions from the audience. I was lucky enough to have my name called to ask a question. I believe that I have some credibility in questioning the panel of experts as I have extensive knowledge of the existing bridge and its " bottlenecks".

My questions to the panel were simple.

- If the new bridge is going to be constructed with 5 lanes in each direction and nothing is done to remediate the roadways on either side of the bridge, how will congestion be relieved?
- I asked if the 5 travel lanes continue to funnel into 4 lanes and then into 3 lanes at Exit 11 in Rockland, where is the benefit?
- I recounted what the chief noise engineer, Mr. Robert Conway told those who attended a "Noise" meeting in Nyack. At the time, I asked him about current noise levels at the complex where I live (the epicenter of new bridge construction). He estimated the level to be 66 decibels (the state never bothered to take decibel readings at the complex closest to the bridge on the Rockland side for the DEIS). He also stated that the decibel levels were expected to DECREASE. Many in attendance were amazed as the bridge was going to be at least 200 feet closer to our homes. We asked how this could be possible. He

said, and I quote, "there will be so much congestion on the bridge that traffic will be moving so slowly that noise levels will decrease." To quote Bart Simpson, "DUH"!

The panel of experts seemed stymied at first that someone would have the temerity to ask such questions. Their response was that there would only be 4 lanes of traffic and one "breakdown" lane but traffic would still merge into 3 lanes Rockland bound because there is a mountain next to Exit 11 in Rockland and they can't take it down to widen the road or to add lanes because of population density. They would also add 3 high speed EZ Pass lanes on the Westchester side. High speed to where – the usual traffic jam between the toll plaza and the 287 merge?

To continue the same line of thought:

- I asked about the "dedicated" bus lane on the bridge. I asked what the benefit is to having a "dedicated" lane if once the bus crosses the bridge it has to merge into the existing travel lanes on either side of the bridge. The experts' silence was deafening. Mr. Roche did explain that there would be a walking and bike lane complete with "belvederes" (outcroppings to enjoy the view). Hmmm. A perfect example of avoiding the issue. By the way, where are the walkers going to park their cars in South Nyack or Tarrytown to walk the 3.5 miles over the bridge?

What I didn't ask, and I really should have:

- If there are 4 travel lanes on the bridge and one is a "dedicated" bus lane does that mean that there will only be 3 general traffic lanes? If I do the math correctly, we are actually LOSING a lane of traffic for cars and trucks.

So let me recap:

- They are going to build a new bridge at a cost of $5.2 billion dollars with no funding in place as of yet.
- The toll will rise to $14.
- We currently have 4 travel lanes merging into 3 lanes causing massive traffic jams on a daily basis.
- Future plans for the "NEW NY BRIDGE" include 4 travel lanes including a "dedicated bus lane" leaving 3 general traffic lanes and a bus lane still merging into 3 lanes which will continue to cause massive traffic jams.
- The "New NY Bridge" will be built to include additional space for "Mass Transit". Why? If there is no funding for a mass transit option now, why should we expect any funding will be available any time in the future?

Some of the stated purposes of the "New NY Bridge" I have heard at many of the meetings are:

- To make it easier for people to travel back and forth across the bridge. To get to/from work in a timely fashion. To go shopping. To go to restaurants on the

other side from where they live. HOW WILL TRAFFIC CONGESTION BE EASED? Won't it be just as bad? We will be extremely disappointed to expect improvement from what we have now AND we will be saddled with a huge tax burden and soaring tolls.

- The new bridge will be earthquake proof. Can ANY bridge be earthquake proof?

- The old bridge is unsafe. If it is as unsafe as Larry Schwartz repeatedly says it is – why hasn't it been shut down? Should I be scared on my twice daily commute?

- A bridge has to be built because a tunnel wouldn't work. Why not? Where's the proof? Engineers are building tunnels of this scope all over the world. Why wasn't a tunnel option fully addressed in the DEIS?

- And, last but not least, "We want your input".

I ask again, WHY BOTHER? Why disrupt the lives of the people living in close proximity to the bridge. Our health and property values will be severely affected. Why sentence us to 5 years of hard labor to build a new bridge and who knows how many years to take down the old one? Why saddle the citizens of New York with huge taxes and tolls?

I am very disturbed by the superficial and unclear if not deliberately misrepresented presentations. It seems a poor way to treat citizens who seem quite powerless in the process although the presenters consistently profess their wish to hear "input". One wonders exactly who stands to gain here. Certainly not the citizens of New York, it seems. Boston had "The Big Dig"; New York will have "The Big Lie".

Thank you for your attention to this matter.

Sincerely,

Joan Sullivan
4 Salisbury Point
South Nyack, New York 10960
jshandson@aol.com

Sullivan
Salisbury Point #L3
South Nyack, NY
10960

WESTCHESTER NY 205

24 MAR 2012

UNITED STATES POSTAGE

$000.46

Mr. Raymond LaHood
Secretary of Transportation
1200 New Jersey Ave SE
Washington, DC 20590

20590

S10-1208290005

From:	Anderson, Michael (DOT)
To:	George Paschalis
Subject:	Fw: TZB FEIS Comments
Date:	Tuesday, September 04, 2012 1:51:41 PM
Attachments:	tzbfeis.pdf

----- Original Message -----
From: C. Scott Vanderhoef [mailto:VanderhS@co.rockland.ny.us]
Sent: Tuesday, September 04, 2012 11:56 AM
To: Anderson, Michael (DOT); dot.sm.mo.tzbsite
Cc: Ron Levine <LevineR@co.rockland.ny.us>; meyers@co.rockland.ny.us; Thomas Vanderbeek <VanderbT@co.rockland.ny.us>
Subject: TZB FEIS Comments

Please see attached comments and please acknowledge receipt. Thank you.

Scott

COUNTY OF ROCKLAND

OFFICE OF THE COUNTY EXECUTIVE

Allison-Parris County Office Building
New City, New York 10956
Tel.(845) 638-5122
Fax (845) 638-5426

C. SCOTT VANDERHOEF
County Executive

September 4, 2012

Mr. Michael P. Anderson
Project Director
Tappan Zee Hudson River Crossing Project
New York State Dept. of Transportation
4 Burnett Boulevard
Poughkeepsie, New York 12603

RE: <u>TAPPAN ZEE HUDSON RIVER CROSSING PROJECT</u>

Dear Mr. Anderson,

Thank you for the opportunity to respond to the Tappan Zee Hudson River Crossing Project Final Environmental Impact Statement (FEIS) document. Many of Rockland County's concerns have been addressed subsequent to the issuance of the FEIS with the six points in the inter-municipal agreement established by Governor Cuomo, Westchester County Executive Rob Astorino, Rockland County Executive C. Scott Vanderhoef and Putnam County Executive Mary Ellen Odell.

Those points are as follows:

1) Dedicated bus lanes will be incorporated on the bridge from the start.

Point #1 acknowledges using the emergency access lanes on the new bridge during peak hours, and recognizes the need to accommodate Rockland County's existing TZx bus service.

2) The bridge will be constructed with mass transit capacity compatible with a Bus Rapid Transit (BRT) system and Commuter Rail Transit.

3) A Regional Transit Task Force will be created to study costs and options for regional transit, including commuter rail and a BRT system on the bridge and key portions of the Westchester-Rockland corridor.

Rockland County looks forward to participating on the Task Force outlined in Point #3, along with MTA, NYS Thruway Authority, NYS DOT, Westchester County, other local agencies and residents.

4) The Task Force will issue recommendations in one year, with a plan for short-term steps that can be considered for immediate commencement, as well as long-term plans for transit solutions.

Point #4 addresses many of our comments, including, in the short-term, bus-on-shoulder and a slip ramp at Tarrytown.

5) Incentives will be created for contractors that could be used to reinvest in regional mass transit or to moderate impact on toll-payers.

6) Establish a working group of Thruway, State, Federal and local officials to examine ways to keep toll increases to the minimum necessary, including maximizing federal support, expanding discount programs for regional residents, and financing mechanisms that lower the cost of credit and borrowing.

Point #6 will address many of Rockland County's funding and toll concerns, and we again look forward to participating within this working group.

Rockland County requests that the six formally-agreed upon points be reflected in the Tappan Zee Hudson River Crossing Project Record of Decision.

In addition, we have the following closing comments:

- The Governor has discussed forming a Blue-Ribbon Panel with some of its tasks being to assist in reviewing the RFPs, obtaining and providing community input for construction and staging impacts, and to have meaningful input to the visual design selection. As one of two impacted host communities, we look forward to participating in this panel.

- The County is still requesting a requirement that the project support a full-time Rockland County project manager and a full-time Rockland County construction inspector, appointed by the County and paid for by the project, as well as having the project reimburse any staff time expended during construction.

- Under separate cover we have asked for the development and funding of a Construction Mitigation Transit Plan, and supplemental funding for the Tappan Zee Express operations during construction so that we may increase ridership and remove single occupancy vehicles from the bridge.

On behalf of Rockland County, I would appreciate inclusion of these and the attached comments in the Record of Decision. Thank you for your consideration.

Sincerely,

C. Scott Vanderhoef
COUNTY EXECUTIVE

Attachment
cc: Tom Vanderbeek, Commissioner

Rockland County Comments
Tappan Zee Hudson River Crossing Project FEIS

CHAPTER 4 : Transportation

1. Rockland County continues to request that the project require toll-exemption for all County-owned public transit buses (including the TAPPAN ZEExpress) at Tarrytown and Spring Valley.
2. Rockland County is pleased that the State has committed to establishing a working group of Thruway, State, Federal and local officials to examine ways to keep toll increases to the minimum necessary, including maximizing federal support, expanding discount programs for regional residents, and financing mechanisms that lower the cost of credit and borrowing. To that end, Rockland looks forward to participating in the working group.
3. Rockland County calls for the Thruway Authority to fund this project by utilizing system-wide (Thruway & Canal System) and/or other resources, just as the Tappan Zee tolls have been utilized throughout history to fund other system-wide needs.
4. Rockland County continues to call for a significantly discounted bridge toll rate for all Rockland County resident E-ZPass® tag holders, similar to other such programs in the region, such as on the Thruway Grand Island Bridges, in Staten Island on the MTA Verrazano-Narrows Bridge, and in Rockaway/Broad Channel for the MTA Marine Parkway and Cross Bay Bridges.
5. Rockland County continues to call for a set aside of 2% from all tolls collected on the Tappan Zee Bridge to be dedicated to transit service in the corridor.
6. The new bridge will have dedicated Bus Lanes for Rockland County's TAPPAN ZEExpress bus service from day one to improve transit reliability and remove the constraints of traveling in the general traffic lanes. This should be reflected in the FEIS. Having TAPPAN ZEExpress buses use the emergency lanes on the new bridge is making more efficient use of the highway capacity the new bridge will provide – a concept that FHWA itself promotes in its Freeway Management Program (publication number: FHWA-HOP-10-023).
7. The Thruway should also provide a bus-on-shoulder lane from the Palisades Center to the new bridge during peak travel times. This early action will improve mobility during and after construction until the full-corridor transit can be funded and built. The bus-on-shoulder lane will improve mobility to the bridge approach, where the congestion is the heaviest. This will be used during peak AM & PM and connect with the TZB lane that will be dedicated for transit during peak AM & PM travel times.
8. We understand the new bridge will not preclude future transit. Rockland County is pleased that a Regional Transit Task Force is being created to study costs and options for regional transit, including commuter rail and a BRT system on the bridge and key portions of the Westchester-Rockland corridor. This Task Force creation should be reflected in the FEIS. Rockland County looks forward to participating on the Task Force, along with MTA, NYS Thruway Authority,

NYS DOT, Westchester County, other local agencies and residents, and to having the study team get the environmental review process underway to provide BRT in the corridor.

9. The access ramp to the Westchester Bridge Staging Area should be constructed to allow temporary bus access for the TAPPAN ZEExpress bus service during construction, and to eventually become a permanent route for a bus-only slip ramp/connector from the Tarrytown Toll Plaza area to the Tarrytown railroad station.
10. Rockland County is again requesting that NYSDOT, Thruway Authority & MTA begin the study now for the permanent transit slip ramp/connector. This will prepare the agencies for future federal funding.

CHAPTER 5: Community Character

1. NYMTC's Regional Transportation Plan (2010-2035) includes the Village of South Nyack's feasibility study for a project to construct a deck over Interstate 287 as it bisects the Village of South Nyack. The deck, combined with land recovered from the reduction of the Exit 10 interchange, would be used to create a unique environmental, recreational and light commercial asset. This will promote economic revitalization for the river villages region through the conversion of unutilized space above a major urban freeway in an ecologically sensitive manner to promote local sustainable community and economic development. Accommodation of this plan should be reflected in the project planning.

CHAPTER 7: Parklands and Recreational Resources

1. We are pleased that the FEIS has committed to not precluding the South Nyack deck project at interchange 10 - a feasibility study for a project to construct a deck over Interstate 287 as it bisects the Village of South Nyack.

CHAPTER 9: Visual and Aesthetic Resources

1. Rockland County is pleased that the state will commission a Blue-Ribbon Design Panel to evaluate the general design criteria for the new bridge, including assisting in reviewing the RFPs, obtaining and providing community input for construction and staging impacts, and to have meaningful input to the visual design selection. Rockland County looks forward to participating on this panel as one of two impacted host communities.

CHAPTER 11: Air Quality

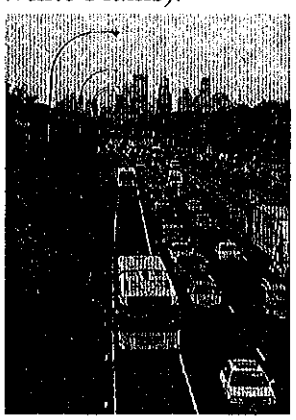
1. The State's commitment to create a dedicated bus lane on the bridge will help to reduce mobile source emissions. The provision of a dedicated bus lane should be reflected in the FEIS.

CHAPTER 18: Construction Impacts

1. Rockland County has requested that a Construction Mitigation Transit Plan be funded by the State and formulated in partnership with the County.
2. Rockland County has requested FHWA/NYSDOT funding to expand the TAPPAN ZEExpress (TZx) bus service during construction as part of a Construction Mitigation Transit Plan. This will reduce the number of Single Occupant Vehicles (SOV) traveling in the construction zone.
3. The access ramp to the Westchester Bridge Staging Area should be constructed to allow temporary bus access for the TAPPAN ZEExpress bus service during construction, and to

eventually become a permanent structure for a bus-only slip ramp/connector from the Tarrytown Toll to the Tarrytown Rail Station.

4. TAPPAN ZEExpress buses should be allowed use of the Thruway shoulders or temporary construction access roads during construction. The shoulders should later become a dedicated Bus Lane. The project should create a bus-only slip ramp/connector from Exit 10 westbound directly to S. Franklin Street for buses only to access Nyack and bypass the Interchange 10 circle in the PM peak.
5. Another component of the Construction Mitigation Transit Plan should include expansion of the Haverstraw/Ossining Ferry. Rockland County requests that NYSDOT work with Metro-North to expand the operating hours of the service to further reduce the number of SOVs crossing the Hudson during construction and providing more transit options during construction.
6. Exit 10 will be used as a temporary staging area. After completion of the new bridge, all temporary staging areas must be removed. The project should make efforts to coordinate with the Village of South Nyack in creating an appropriate re-use plan for the interchange.
7. The Westchester Inland Staging Area (WISA) currently contains a westbound on-ramp from southbound Route 9 that would be removed during construction staging. Highway access to WISA is available directly to the westbound I-287 shoulder, eastbound from I-287 by a short restricted-use ramp leading south of the Toll Plaza to the administrative area, and from South Broadway via Interchange 9. In order to access the Westchester Bridge Staging Area (WBSA), vehicles would travel along the north-south access road under the Tappan Zee Bridge. From there, they would pass onto a temporary haul road that will be constructed in order to bring trucks over the Metro-North Railroad (MNR) Hudson Line to the WBSA. Rockland wants to see the project plan for this ramp construction to be used in the future for BRT/bus access to Tarrytown Rail Station.
8. Bus on Shoulder from the bridge landing in Rockland to Exit 12 should be provided, including signage. NYSDOT/Thruway Authority must work together with Rockland County to enhance shoulders at minor cost for buses during construction and after construction until the full corridor BRT is built (Suffern to White Plains).



9. As one of the two impacted host communities, the County looks forward to participating on the Blue-Ribbon Design Selection Panel. The County is also still requesting the right to specifically be a part of the RFP selection committee, and that a design-build oversight team be created and include Rockland County representatives.
10. The County is still requesting a requirement that the project support a full-time Rockland County project manager and a full-time Rockland County construction inspector, appointed by the County and paid for by the project, as well as having the project reimburse any staff time expended during construction.

From: dot.sm.mo.tzbsite [mailto:tzbsite@dot.ny.gov]
Sent: Monday, August 13, 2012 11:39 AM
To: Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject: FW: permanent easements

From: michele vess[SMTP:TWINMAMA11486@HOTMAIL.COM]
Sent: Monday, August 13, 2012 11:38:27 AM
To: dot.sm.mo.tzbsite
Subject: permanent easements
Auto forwarded by a Rule
i have a question about the proposed permanent easements for the tappen zee bridge project in rockland and westchester counties..why are these easements to be removed from the property tax rolls.. if the fee owner still has access across these easements shouldn't the town assessor have the decision as to whether the easement is tax exempt or should get only a partial percentage off depending on how much the fee owner can use the property thank you bill vess

From: michele vess[SMTP:TWINMAMA11486@HOTMAIL.COM]

Sent: Monday, August 20, 2012 3:28:58 PM

To: dot.sm.mo.tzbsite

Subject: permanent easements property tax reductions

Auto forwarded by a Rule

to whom it may concern i have a question. What happens after a permanent easement is taken by the govt. Is the fee owner of property that has a eminent domain acquired permanent easement responsible for the property tax on the land that the easement encumbers...thank you Bill Vess

---
From: michele vess[SMTP:TWINMAMA11486@HOTMAIL.COM]
Sent: Wednesday, August 29, 2012 7:43:38 PM
To: dot.sm.mo.tzbsite
Subject: property tax on a permanent easement
Auto forwarded by a Rule
After nys by eminent domain takes a permanent easement for highway purposes. Is the fee owner responsible for any future property tax for the land the easement encumbers.. OR is the easement now considered part of the highway and now tax exempt ?

From: dot.sm.mo.tzbsite
To: Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject: FW: permanent easements and property tax
Date: Friday, August 31, 2012 11:43:09 AM

From: michele vess[SMTP:TWINMAMA11486@HOTMAIL.COM]
Sent: Friday, August 31, 2012 11:35:28 AM
To: dot.sm.mo.tzbsite
Subject: permanent easements and property tax
Auto forwarded by a Rule
After the govt. acquires a permanent easement for highway and parkway purposes. Does the fee owner of the property with the easement get refunded any property tax that has already been paid prior to the taking.

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: permanent easement and property tax
Date:	Friday, August 31, 2012 11:45:07 AM

From: michele vess[SMTP:TWINMAMA11486@HOTMAIL.COM]
Sent: Friday, August 31, 2012 11:44:16 AM
To: dot.sm.mo.tzbsite
Subject: permanent easement and property tax
Auto forwarded by a Rule
After nys takes title to a property in the form of a permanent highway easement and the property is removed from the tax roll.. How long does the Town Assessor have to wait before he can put the property with the easement back on the tax roll ?

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: permanent easement fee owners liability
Date:	Saturday, September 01, 2012 10:03:21 AM

From: michele vess[SMTP:TWINMAMA11486@HOTMAIL.COM]
Sent: Saturday, September 01, 2012 10:03:04 AM
To: dot.sm.mo.tzbsite
Subject: permanent easement fee owners liability
Auto forwarded by a Rule
After nys by eminent domain takes title to property in the form of a permanent easement which gives the fee owner only the right to egress and regress across the easement and the fee owner has no of control of hazardous conditions on the easement. Who is responsible if a neighbor gets injured on the state permanent easement ?

From:	dot.sm.mo.tzbsite
To:	Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject:	FW: TZ Bridge/I-287 comment REQUEST FOR MEETING
Date:	Friday, August 31, 2012 12:17:26 PM
Importance:	High

From: Lois Weiss[SMTP:LOIS@BETWEENTHEBRICKS.COM]
Sent: Friday, August 31, 2012 12:16:57 PM
To: dot.sm.mo.tzbsite
Subject: TZ Bridge/I-287 comment REQUEST FOR MEETING
Importance: High
Auto forwarded by a Rule

I live at Ichabod's Landing along River St. in Sleepy Hollow.
Our 42 unit condo association has not been involved in any of the discussions
about the upcoming replacement project,
yet our townhomes jut into the Hudson River and
face downstream right at the bridge.

Additionally, we have already been impacted by the preliminary work as
workers parked nearby at the Castle Oil site each morning,
and then a boat would start its very loud engines around 6 am each morning, including Saturday.
The boat would not simply dock but most often,
the pilot would keep the engines in reverse to
hold it against the dock for 10 or 15 minutes waiting for everyone to arrive.

This woke up many of us each and every morning.

Each day the boat would also ply back and forth bringing workers to and from the various
work areas in the river near the bridge. Another, smaller boat also took workers.
This was all fine, but the morning revving of the engines was not.

Several of us also work at home.
I was very impacted by the noise and vibrations of the pile driving.
Somehow the very last pile was the loudest and noisiest and had to
be close to 90 to 100 decibels outside when I opened my patio door

which faces the bridge.
Inside everything was vibrating and thumping.

It would be very helpful if we could set up a meeting
with our condo association to discuss
the bridge, noise, times of expected work, and staging and parking for the work.

While I personally believe you should use the empty GM plant for worker parking,
And perhaps even build a worker-only temp Metro North station on the site,
Others may not agree.
If you used GM, you could build a new large dock for both staging and boats
that could be used in the future by the village of Sleepy Hollow.

Naturally, you would have to cut a deal with GM. They should do it for the project.
The site is empty now and could handle both the worker parking and the large trucks
and large pieces of steel that would need to be hauled in.

The village of Sleepy Hollow may also need some payments as they would be
foregoing increases in tax revenue from the upcoming development that is
still stalled by a lawsuit against Sleepy Hollow by Tarrytown.

The large number of worker cars coming and going each day, and perhaps
buses from Tarrytown train station if you do not build a temp RR station;
would also provide evidence to Tarrytown that the roads could handle the commuter parking
from a future housing development.

The Village would also want the esplanade walk from Ichabod's Landing to Kingsland Park open to

walkers.

Please call me to discuss setting up a meeting for Ichabod's Landing and perhaps
With the Sleepy Hollow officials as well.

Lois Weiss (writing here as a resident)
914 332 0003

Lois Weiss
103 River Street
Sleepy Hollow, NY 10591
914 332 0003

From: dot.sm.mo.tzbsite
To: Vasco, Sandra (DOT); George Paschalis; Robbins, Russell (DOT)
Subject: FW: Your Tappan Zee Bridge Questions
Date: Wednesday, August 08, 2012 8:00:46 AM

From: Arthur[SMTP:WINO1515@GMAIL.COM]
Sent: Wednesday, August 08, 2012 8:00:44 AM
To: dot.sm.mo.tzbsite; brian.conybeare@thruway.ny.gov
Cc: gulia114@verizon.net
Subject: RE: Your Tappan Zee Bridge Questions
Auto forwarded by a Rule

At the TZB DEIS Public Hearing of 3/12/12, it was stated at its page 20 that "it has been estimated that it would take approximately $1.3 billion in the next decade to maintain the bridge's viability". This is not the same as the $700 million/year figure that is currently being used and I do not understand this discrepancy or why:

1. A 14 lane bridge (the width of the Delaware Memorial Bridge) is needed.
2. Composite materials cannot be used to reduce future maintenance costs on the exisiting structure or on new structure.

From: Arthur [mailto:wino1515@gmail.com]
Sent: Tuesday, August 07, 2012 6:07 PM
To: 'Arthur'
Subject: RE: Your Tappan Zee Bridge Questions

Thank you for your response and I look forward to the results of the audits that you mentioned.

From: Arthur [mailto:wino1515@gmail.com]
Sent: Tuesday, August 07, 2012 4:34 PM
To: 'Kevin Zawacki'
Cc: 'gulia114@verizon.net'
Subject: FW: Your Tappan Zee Bridge Questions

FYI.

From: Brian Conybeare [mailto:Brian.Conybeare@thruway.ny.gov]
Sent: Tuesday, August 07, 2012 4:19 PM
To: wino1515@gmail.com
Subject: Your Tappan Zee Bridge Questions

Mr. Winoker,

Its Brian Conybeare from Gov. Cuomo's Tappan Zee Bridge Team.
I understand you went on our new website with some questions.
I'll do my best to answer them.

1. The Tappan Zee Bridge is a vital link for both Interstate commerce and commuters traveling to and from Rockland and Westchester with many going into New York City. Like the GWB it is also a main artery for trucks transporting goods from around the nation into the NYC area and Connecticut. Both the GWB and TZ have more than double the daily traffic that the Newburgh-Beacon Bridge does. The TZ is in constant need of

repair and the Governor is committed to replacing it with a safer, more reliable span that will also include express bus lanes and the ability to handle any form of mass transit in the future.

2. There are investigations underway into the toll hikes at the GWB. The Federal Government Accountability Office (GAO) is currently looking into the recent increases to find out where all the toll money is going. The Port Authority, which operates the GWB, also hired an outside consultant called Navigant to do an audit of its books but the final assessment has not been released. That same company has been called in by Gov. Cuomo to take a look at the Thruway Authority.

3. The $5Billion plan to replace the Tappan Zee Bridge is being financed by future toll revenues. The state has applied for a $2B long-term low interest loan through the Federal TIFIA program (Transportation Infrastructure Financing and Innovation Act). If approved that loan will be used along with toll-backed Thruway Authority Bonds to cover the cost of the project. Both the loan and the bonds would be paid back with future toll revenues.

4. The main reason the current TZ bridge has such high future maintenance costs is because the span does not meet Federal highway or "seismic" standards. Not only is the road itself in constant need of repair, if the bridge is not replaced it would cost $3-4Billion dollars to get it up to code and make it structurally sound. That is a lot of money to keep the same overcrowded span and it still would not have breakdown and emergency vehicle lanes, a highway speed toll plaza, dedicated bus lanes, and a pedestrian/bike path. The Army Corps of Engineers is one of a dozen state and federal agencies that have thoroughly reviewed the environmental impact statement for the new Tappan Zee Bridge.

I hope that helps answer your questions.
Thank you for reaching out to us.
If you have any more questions feel free to contact me using this email address or the phone number below.

Brian Conybeare
Special Advisor to the Governor
for the New Tappan Zee Bridge
845-705-3302

From: Arthur [mailto:wino1515@gmail.com]
Sent: Monday, August 06, 2012 9:11 AM
To: 'carlucci@nysenate.gov'; 'kim@patch.com'
Cc: 'gulia114@verizon.net'
Subject: TZB v. Beacon Newburgh Bridge ($1.50 for cars)

The real comparison for toll increases should be using the above bridges and not with the GWB which goes into a major city and commerce area. This is aside from the question of whether the tolls on the latter have been diverted for uses other than for the maintenance of that bridge and is now under investigation (litigation.)

Apparently, no outside agency (like the Army Corps of Engineers) has been brought in to verify the future costs of maintaining the TZB or whether it could be widened as was done to the Beacon Newburgh Bridge years ago. Moreover, I believe current income (tolls) should be used for maintenance purposes not for capital replacement items which is a long term liability and should be bonded as such.

I have emailed my above issues to the NYS Thruway Authority and would appreciate your contacting the office of the NYS Comptroller to have it determine whether tolls can be used to finance a a capital improvement.