

Barton & Loguidice, D.P.C.

MEMO TO: Matt Dutcavich, P.E.
Dutchess County Dept. of Public Works

DATE: March 16, 2018

FROM: Jeremy M. Bourdeau, Senior Managing Engineer
Barton & Loguidice, D.P.C.

FILE: 1046.003.121

SUBJ: Design Approval Document
U-27 (BIN 3343920) and U-28 (BIN 3343930) Bridge Replacements
County Route 21 (Bruzgul Road) over Fishkill Creek
Town of Union Vale, Dutchess County, NY

A. Executive Summary

In accordance with our Scope of Services, Barton & Loguidice, D.P.C. (B&L) is pleased to provide herein the Design Approval Document for the replacement of Dutchess County Bridges U-27 (BIN 3343920) and U-28 (BIN 3343930). The bridges carry County Route 21 over Fishkill Creek in the Town of Union Vale. Based on field reconnaissance and review of record information, the proposed structures were evaluated for feasible alternatives that meet the project objectives and current design standards. This memorandum will assess the existing conditions and needs of the project site, identify the project objectives, establish the design criteria, analyze potential alternatives for structure replacement and evaluate the environmental effects resulting from implementation of the recommended alternative.

B. Conditions and Needs

This project is being developed to replace the bridges that carry County Route 21 over Fishkill Creek at two locations, referred to as Bridge U-27 (BIN 3343920) and Bridge U-28 (BIN 3343930). The structures are in need of complete replacement due to significant deterioration of the superstructures. The 2015 Biennial Inspections by NYSDOT resulted in the structures receiving a Computed Condition Rating of 4.034 (U-27) and 4.051 (U-28) out of 7.000 while both bridges received a General Recommendation of "4". Most notably, for both bridges, the joints received a condition rating of "3" due to active leaking through the deck joints and the bearings received a condition rating of "3" due to severe corrosion and section losses. Both bridges exhibit moderate to severe deterioration of the concrete bridge deck and corrosion and section losses up to 30% on the girders.

1. **Structure:** The existing bridges were originally constructed in 1939. Bridge U-28 underwent minor steel repairs in 2009. The bridges are steel multi-girder structures with cast-in-place concrete decks supported on solid stem gravity abutments. The bridges are single span bridges with a span length of 38 feet. The existing bridges carry two 10 foot lanes with two 1 foot wide shoulders. The bridges also have provisions for railings on both sides of the bridge. Available record information of the structure and field survey indicate the following controlling dimensions for this structure:

Bridge U-27 (BIN 3343920) & Bridge U-28 (BIN 3343930):

- Span Length – 38 feet
- Total Bridge Length – 40 feet
- Curb-to-Curb Width – 22.5 feet
- Out-to-Out Width – 26 feet

2. **Highway Approaches:** County Route 21, in the vicinity of the structures, is a Rural Major Collector with uncontrolled access. The roadway approaches to the west and east of the bridges carry two ten foot wide travel lanes with one wide paved shoulders and gravel/grass shoulders that vary in width from 1 to 3 feet. Immediately adjacent to each end of the bridge, the existing roadway pavement width is approximately 22 feet (10 foot lanes, 1 foot shoulders). The roadway width of the proposed bridges of 26 feet (10 foot lanes, 3 foot shoulders) would meet current design standards for bridge replacements projects (see section D for additional information) and would be wider than the adjacent roadway segments of County Route 21. The approach roadway will be tapered from 1 foot shoulders to the 3 foot shoulders across the bridges. The 3 foot shoulders will be maintained between the bridges due to the bridges' close proximity to each other and to eliminate non-standard shoulder transitions.

The horizontal alignment of County Route 21 on the west approach lies on a horizontal tangent segment of roadway that extends across bridge U-28. There is a short horizontal curve (5000 ft. radius) between the bridges. Bridge U-27 lies on a horizontal curve with a radius of 1050 feet that begins 100 feet west of the bridge, extends across the bridge and ends 75 feet east of the bridge. The vertical roadway alignment to the west of bridge U-28 consists of tangent grade of -5.85% and a sag vertical curve that result in a minimum stopping sight distance of 179 feet. The bridges lie on tangent vertical grades of -0.32% (U-28) and 0.28% (U-27). The stopping sight distance of the vertical curve on the west approach does not meet current standards (see Section D); however, improving the roadway geometries to meet current standards is outside the scope of this bridge replacement project. The highway reconstruction limit under this project will be limited to the area disturbed during construction of the bridge and will begin approximately 75 feet west of bridge U-28 and extend to 75 feet east of bridge U-27. The roadway between the two bridges will be widened through reconstruction of the shoulders.

Surface runoff of the roadway approaches currently drain transversely off the pavement, down the embankments and into Fishkill Creek. The roadway drainage patterns will remain unchanged by this project. The replacement bridges will utilize curb-less details allowing runoff from the bridge to pass directly into the Fishkill Creek.

There is existing w-section guide railing across both bridges and at all four of each of the bridge's quadrants. On the south side of the road, the w-beam guide railing is continuous across and between the bridges. On the north side of the road, there is an opening in the railing that provides access to a field driveway for the adjacent private property. The project proposes to replace the existing approach railing and provide three-rail steel bridge railing in order to provide railing that meets current NYSDOT standards for length, transition and termini or transition to w-section.

3. **Traffic Volumes:** Existing traffic count data for Bruzgul Road was obtained from the NYSDOT and was collected in 2016. Forecasted traffic volumes were derived for the estimated time of completion (ETC) of the project (2019) and the ETC+30 design year (2049). The design year of ETC+30 was selected per PDM Appendix 5 for bridge reconstruction projects. Based on conversations with the County and evaluation of population data, the forecasted traffic volumes are based on a growth rate of 0.5% per year.

Exhibit 1 Existing and Future Traffic Volumes – County Route 21		
	CR 21 (Bruzgul Road)	
Year	ADT	DHV
Existing (2016)	1,872	182
ETC (2019)	1,900	185
ETC+30 (2049)	2,207	215

4. **Hydraulics:** Existing hydraulic conditions at both project sites have been reviewed. The Fishkill Creek crosses the beneath CR 21 at both bridge locations. Both existing bridges are located within an area that has been included in a detailed FEMA Flood Insurance Study (FIS) and a mapped floodplain as illustrated on FEMA's Flood Insurance Rate Map (FIRM) for the Town of Union Vale. The roadway bisects the floodplain which straddles County Route 21 in the project area. According to the FEMA FIS Flood Profiles, neither bridge is inundated under the 50 or 100 year storm events, with both bridges having positive freeboard. Based on the width of the floodplain in this area, construction of the replacement bridges outside of the floodplain is not feasible, therefore, it will be the project objectives to maintain or make incremental improvements to the hydraulic opening of the structures by designing longer span structures, while maintaining or increasing the low chord elevation of the bridges. Since FEMA FIS indicates a positive freeboard during the 50 and 100 year storm events, and because the hydraulic improvements at the bridge crossings are limited based on site topography, a full Hydraulic Analysis is assumed not to be required for this project.

5. **Geotechnical/Foundations:** Two (2) soil borings have been taken at each bridge site. The two borings at bridge U-28 were advanced to depths of 73.2 feet (Boring B-1) and 83.6 feet (Boring B-2) below the roadway surface. Boring B-1 and B-2 encountered a loose silt/clay material, with blow counts ranging from 1 to 15 blow per foot, from a depth of approximately 12 feet to 40 feet. Below this depth, a dense silt/gravel soil, with blow counts ranging from 50 to 100+ blows per foot was encountered until bedrock was reached. Boring B-1 encountered a silt Grey Limestone bedrock at 68.2 feet while Boring B-2 encountered Grey Limestone bedrock at a depth of 78.6 feet.

The two borings at bridge U-27 were advanced to depths of 31.3 feet (Boring B-3) and 39.5 feet (Boring B-4). Both borings encountered wet and loose sand and gravel mixture, with blow counts ranging from 5-20 blows per foot, from a depth of approximately 12 feet until bedrock was reached. Boring B-3 encountered a Grey Limestone bedrock at a depth of 26.3 feet. Boring B-4 encountered a Grey Limestone bedrock at a depth of 34.5 feet.

Record information and site investigations indicate that the existing concrete substructures are gravity type construction and are found on spread-on-earth footings. Current NYSDOT policy requires that structures over waterways either be founded on sound rock or supported by deep foundations. Due to the depth to bedrock at the bridge locations, the replacement bridges will be founded on driven steel h-pile foundations. The piles will be driven to refusal or bedrock.

6. **Utilities:** Within the project limits there are overhead utilities extending along the south side of County Route 21. At Bridge U-28, the overhead lines will be in conflict with the bridge removal and pile driving operations. It is anticipated that the utility pole between the two bridges (Sta. U14+20) will need to be relocated approximately 10 feet to the south, which would move the overhead lines beyond the limits of the Bridge U-28 wingwall construction. Coordination with

the impacted utility companies will be completed in Spring of 2018 in order to review utility relocation needs and schedule requirements.

7. **Work Zone Traffic Control:** During construction, the existing bridges will be closed and a temporary off-site detour route will be established. The anticipated detour length is approximately 1.9 miles and utilizes CR 21, CR9 and Shaughnessy Road. Special consideration will need to be taken for the driveway that is located between the two bridges.

C. Project Objectives

The following objectives have been established for this project:

- (1) Eliminate the structural deficiencies of the existing bridges by providing new structures designed to current structural and safety standards that provide a 75-year service life in a manner that is cost effective and environmentally sensitive.
- (2) Provide improved waterway opening, hydraulic conditions, and scour protection.
- (3) Provide for a short construction duration to minimize disruption to the public.

D. Design Criteria

Design criteria has been established based on the NYSDOT *Highway Design Manual* (HDM) (Chapter 2), AASHTO *Policy on Geometric Design of Highways and Streets* (2004), and NYSDOT *Bridge Manual* (BM) (4th ed., 2006).

Critical Design Elements County Route 21 (BIN 3343920 and 3343930)				
		NHS (Y/N):	No	
Route No. & Name:		Country Route 21	Functional Classification:	Major Rural Collector
Project Type:		Bridge Replacement	Design Classification:	Collector
% Trucks:		N/A	Terrain:	Rolling
AADT:		2207 vpd (ETC+30)	Truck Access/Qualifying Hwy.	Access-No; Qualifying-No
Element		Standard	Existing Condition	Proposed Condition
1	Design Speed	55 mph ⁽¹⁾ HDM Section 2.7.3.1 A	55 mph	
2	Lane Width	11 ft HDM Section 2.7.3.1 B, Exhibit 2-5	10 ft	10 ft
3	Shoulder Width	4 ft HDM Section 2.7.3.1 C, Exhibit 2-5	1 ft	3 ft *
4	Bridge Roadway Width	28 ft. (approach travel way + 4ft. each side) BM App. 2A Tables R & N	22.5 ft	26 ft *
5	Maximum Grade	7% HDM Section 2.7.3.1 G, Exhibit 2-5	5.85%	5.85%
6	Horizontal Curvature	695 ft Min. (at e _{max} =6%) HDM Section 2.7.3.1 D, Exhibit 2-5	1050 ft.	1050 ft.
7	Superelevation Rate	8% Max. HDM Section 2.7.3.1 E	2%	2%
8	Stopping Sight Distance	452 ft Min. HDM Section 2.7.3.1 F, Exhibit 2-5	179 ft (HSD) *	179 ft (HSD) *
9	Vertical Clearance (above traveled way)	14 ft Min. BM Section 2.4	N/A	N/A
10	Travel Lane Cross Slope	1.5% Min. to 3% Max. HDM Section 2.7.3.1 H	2%	2%
11	Structural Capacity	AASHTO HL-93 Live Load	N/A	HL-93
12	Control of Access	N/A	N/A	N/A
13	Pedestrian Accommodation	Complies with HDM Chapter 18	N/A	N/A
14	Median Width	N/A	N/A	N/A
(1) Per the HDM Section 2.6.1, the design speed shall be the anticipated off-peak 85 th percentile speed or maximum design speed within the range of functional class speeds for the terrain and volume. The off-peak 85 th percentile speed of 55 mph has been used for this project.				
*Denotes non-standard feature.				

E. Alternatives Considered

Three (3) feasible alternatives have been investigated for this project. Two alternatives (Alternative 1A and 1B) include complete replacement of the bridge superstructure and substructures, while Alternative 2B includes superstructure replacement only.

The new structures under all alternatives would accommodate a 26 foot roadway width and an out-to-out width of 29.5 feet (10 ft. travel lanes, 3 ft. shoulders and provisions for railings). New bridge rail would be carried across the structures and new box beam guide rail would be installed along the bridge approaches. Approximately 500 feet of adjacent roadway would be reconstructed include full depth reconstruction on the immediate bridge approaches along with shoulder widening between the bridges. The proposed structures under all alternatives would be constructed without curbs, allowing surface water to drain transversely from the bridges.

The following alternatives have been consider for this project;

Alternative 1A – Bridge Replacement, Prestressed Concrete Beams or Steel Beams supported on Integral Abutments

Under this alternative, the existing bridges would be completely removed and replaced with new single span structures at both bridge locations. The proposed superstructures would be prestressed concrete beams or steel multi-girder structures with composite concrete decks. The new abutments would be constructed 5-10 feet behind the existing abutments resulting in a span length of 55 feet. The existing foundations would remain in place to act as cofferdams during construction. The proposed abutments would be cast-in-place concrete, integral type abutments founded on driven steel H-Piles. Stone fill would be installed in front of the abutments and wingwalls to provide erosion and scour protection.

Per Section 2.6.2 of the NYSDOT Bridge Manual, the replacement superstructures will be designed in accordance with NYSDOT LRFD Bridge Design Specifications and HL-93 live loads. The new bridges would be designed for a 75 year service life in accordance with LRFD.

The estimate construction cost for Alternative 1A is \$1,700,000. Preliminary cost estimates are included in Appendix B.

Alternative 1B – Bridge Replacement, 3-sided Rigid Frames supported on Concrete Footings

Under this alternative, the existing bridges would be completely removed and replaced with new single span structures at both bridge locations. The span length of the replacement structures would be increased slightly to 42 feet. The proposed structures would be precast concrete, 3-sided rigid frames. The wearing surface would consist of a hot mix asphalt pavement with a waterproofing membrane over the rigid frame units. The rigid frames would be supported cast-in-place concrete footings founded on driven steel H-Piles. Stone fill would be installed in front of the frame legs and wingwalls to provide erosion and scour protection.

Per Section 2.6.2 of the NYSDOT Bridge Manual, the replacement superstructures will be designed in accordance with NYSDOT LRFD Bridge Design Specifications and HL-93 live loads. The new bridges would be designed for a 75 year service life in accordance with LRFD.

The estimate construction cost for Alternative 1B is \$1,630,000. Preliminary cost estimates are included in Appendix B.

Alternative 2 – Bridge Rehabilitation, Superstructure Replacement with Prestressed Concrete or Steel Beams

Under this alternative, the existing bridges would be rehabilitated including complete replacement of the superstructures and repairs to the existing substructures. The superstructures would be replaced prestressed concrete beams or steel multi-girder structures with composite concrete decks. The tops of the existing abutments and wingwalls would be removed and reconstructed as necessary to accommodate the replacement superstructure. Concrete repairs would be completed to the lower portions of the abutments and wingwalls as necessary. Also, steel sheet piling would be installed in front of the existing abutments to provide long-term scour protection. Medium stone fill would be installed in front of the abutments and wingwalls to provide erosion and scour protection.

Per Section 2.6.2 of the NYSDOT Bridge Manual, the replacement superstructures will be designed in accordance with NYSDOT LRFD Bridge Design Specifications and HL-93 live loads. While the existing substructures would be modified to accommodate the new superstructure and repaired to fix existing deterioration, they are not required to be upgraded to meet current LRFD Specifications. The new superstructure would be designed for a 75 year service life in accordance with LRFD, however a service life of 30-50 years is assumed for the existing substructures to be retained.

The estimate construction cost for Alternative 2 is \$1,380,000. Preliminary cost estimates are included in Appendix B.

F. Recommended Alternative

Alternative 1B, Bridge Replacement, 3-sided Rigid Frames is identified as the recommended alternative due to service life, construction duration, hydraulic improvements and cost.

In comparing Bridge Replacement (Alt. 1A/1B) to Bridge Rehabilitation (Alt. 2) it was determined that the cost of bridge rehabilitation would be approximately 80% of the cost of bridge replacement. The existing concrete substructures that would be retained under Alternative 2 are nearly 100 years old and would likely require future maintenance and repair in order to remain in service for the life of the new superstructures. As such, the life cycle cost of bridge replacement would be less than the life cycle cost of bridge rehabilitation. Also, in order to accomplish the widening of the structures under the bridge rehabilitation alternative, significant modifications to the existing wingwalls, abutments and backwalls would be required. The exact condition and configuration of the existing substructures is unknown which could result in increased construction costs due to field modifications that may be necessary. Based on the life cycle cost and uncertainties associated with bridge rehabilitation, Alternative 1A/1B, Bridge Replacement, is preferred.

Alternative 1A and 1B each provide for hydraulic improvements at the site. Alternative 1A would increase the clear span between the bridge abutment to 52 feet, however, the low chord elevation of the structure would be maintained. Alternative 1B would increase the clear span between the bridge abutments to 42 feet and the low chord elevation would be increased. Also, the 3-sided Rigid Frame structure would provide a smooth bottom structure which would minimize the potential for snagging of any floating debris in the stream during a storm event.

Alternative 1B would require a shorter construction duration as it would not require the 4 to 6 weeks to form, pour and cure the concrete bridge decks and approach slabs. This shorter construction duration would reduce the impact to the traveling public and the owner of the private property located between the

two bridges. If the bridges need to be replaced in sequence in order to allow access to this property, the shorter construction duration required for the 3-sided rigid frame construction would allow for both bridges to be replaced in a single construction season.

The recommended alternative will retain three (3) non-standard features, as identified in the design criteria table in Section D. The improvement of non-standard stopping sight distance on the west approach is outside of the scope of this project. The proposed travel lane widths and shoulder widths are non-standard, however, they are consistent with the approach roadway and the County does not have any future plans for widening the adjacent roadway segments. Improvement to these non-standard features would require roadway realignment and widening, resulting in significant increases in construction costs, environmental impacts and Right-Of-Way takings. Retention of these non-standard features is justified based on the factors discussed above and the scope of the project.

The proposed plan, profile and typical sections for the recommended alternative (Alternative 1B) are included in Appendix A.

G. Environmental Considerations

1. State Environmental Quality Review Act (SEQRA)

In accordance with 6 NYCRR Part 617, it has been determined that this project is a SEQRA Type II Action. No further SEQRA processing is required. The project does not meet or exceed any threshold contained in the Type I list in section 617.4, or one that is on an agency's locally adopted Type I list. The project has been identified as a Type II Action per 6 NYCRR Part 617.5, subdivision (c), items (2) and (4). The proposed project is of a scale and scope that is summarized by the following:

6 NYCRR Part 617

(2) Replacement, rehabilitation of a structure or facility, in kind, on the same site, including upgrading buildings to meet building or fire codes; and

(4) Repaving of existing highways not involving the addition of new travel lanes.

2. Surface Waters

One stream feature, Fishkill Creek (Waters Index No. H-95) is crossed by both bridges and is part of the Lower Hudson River Drainage Basin. Fishkill Creek is a Class C stream with C(T) Standards.

Since Fishkill Creek flows into the Hudson River, a Traditionally Navigable Water (TNW), the U.S. Army Corps of Engineers (USACE) will likely assume jurisdiction for the stream as it meets the definition of a Water of the U.S. Therefore, a permit from the USACE will be needed for any discharge of fill into this waterbody under Section 404 of the Clean Water Act (CWA). Disturbance of the bed and banks of the stream will also require an Article 15 permit from the New York State Department of Environmental Conservation (NYSDEC) as it meets the jurisdictional stream classification (Class C with C(TS) Standards or above) for the Protection of Waters Program.

The project activities would require temporary and permanent fills in Waters of the U.S. for cofferdams, dewatering of the work site and placement of stone fill. It is anticipated that this work can be authorized under the USACE Section 404 Nationwide Permit (NWP) #3 – Maintenance. NWP #13 for Streambank Stabilization may also be required if riprap erosion protection is utilized

in bank areas not directly associated with the bridge structure. The permits would be obtained once the location and the extent of the impacts are ascertained. NYSDEC has granted blanket 401 Water Quality Certification for these NWP. A pre-construction notification (PCN) is not required to be submitted to the USACE to receive NWP authorization prior to undertaking the proposed activities if all of the NWP conditions will be met. If a PCN is required, the Article 15 Protection of Waters permit application to NYSDEC will also be submitted to USACE as the PCN.

All appropriate measures will be taken to avoid and minimize any impacts to the stream bed and banks of Fishkill Creek. Work would not commence until the required permits/authorizations are acquired and project activities will adhere to any conditions set forth by the permit conditions. Additionally, as Fishkill Creek is a coldwater trout fishery, it is assumed in-water work will not be permissible during the spawning season, from October 1 through April 30.

3. Wetlands

NYSDEC's Freshwater Wetland Maps show the locations and boundaries of wetlands regulated by NYSDEC. As shown on Figure 1 in Appendix F, one mapped NYSDEC wetland is located on or within 100 feet of the project area. NYSDEC Wetland VB-26, a Class 2 wetland of 253.9 acres, is mapped directly abutting the roadway (north) at the easternmost bridge and roughly 28 feet north of the westernmost bridge. It is also mapped approximately 85 feet south of both bridge locations.

National Wetland Inventory (NWI) mapping was reviewed for the project area to identify potential locations for focused field assessment for federally-regulated wetland identification. The NWI wetlands mapped within the wetland assessment area are closely associated with the NYSDEC wetland mapping. The easternmost portion of the wetland is identified with the Cowardin Code PFO1A (Palustrine, Forested, Broad-leaved deciduous, Temporarily flooded) while the westernmost portion is predominantly PEM1E (Palustrine, Emergent, Persistent, Seasonally flooded/saturated). Additionally, the Fishkill is identified as R2UBH (Riverine, Lower Perennial, Unconsolidated Bottom, Permanently flooded). The Fishkill Creek is considered a Water of the U.S. as it is a direct tributary to the Hudson River, a TNW.

An onsite wetland assessment occurred on July 10, 2017 that identified two wetland resources (Wetlands A and B) in the project area. Both wetlands are assumed to be under NYSDEC jurisdiction as Wetland A is mapped within the mapped boundary of New York State Freshwater Wetland VB-26 and Wetland B is mapped within the 100-foot regulated adjacent area of Wetland VB-26. Work within these wetlands will require an Article 24 Freshwater Wetland Permit. Additionally, the wetlands are likely under federal jurisdiction due to direct hydrologic connection to Fishkill Creek, a Water of the U.S. USACE is responsible for making final jurisdictional determination for Waters of the U.S. upon request. If concluded to be jurisdictional, a Nationwide Permit (#3 for Maintenance) would be required from USACE for the deposition of fill into these wetlands. The scope of work into the wetlands has not been currently defined.

4. Threatened/Endangered Species

The proposed project does not involve work in, or adjacent to, a wildlife or waterfowl refuge. A site walkover was conducted by B&L environmental staff on July 10, 2017 to confirm that no rare or unique habitat areas were present within the project site. No rare species (plant or animal) or significant natural communities were noted.

To aid the project's involved NYS and federal agencies with their threatened/endangered species review/determinations and potential consultation process under Section 7 of the Endangered Species

Act, an assessment was completed to determine the extent of impacts that the proposed project may have on federal and/or state-listed protected species and/or their habitats.

To obtain information regarding state-listed protected species that may utilize the proposed project area, a general query letter was submitted for the project location to the NY Natural Heritage Program (NHP). A response from the NHP was received on August 1, 2017, stating that there were no records of state-listed animals or plants, or significant natural communities directly on the project site. However, NHP identified the presence of a documented Indiana bat maternity roost approximately 1 mile from the project area. A copy of the response from the NHP is included in Appendix C.

The U.S. Fish and Wildlife Service (USFWS) New York Field Office's website was reviewed to determine whether any federally listed endangered, threatened, or candidate species are reported for the project site or adjacent areas. The USFWS' Information for Planning and Consultation (IPaC) System reported four federally listed species for the project site: the Indiana bat (*Myotis sodalis* – Endangered), the northern long-eared bat (*Myotis septentrionalis* - Threatened), the bog turtle (*Clemmys muhlenbergii* – Threatened), and the dwarf wedgemussel (*Alismidonta heterodon* – Endangered).

Indiana and Northern Long-eared Bat

In accordance with the 2017 Range-wide Indiana Bat Summer Survey Guidelines, which applies to both Indiana and northern long-eared bats, most species of trees greater than 3 inches in diameter at breast height (DBH) are considered potential roosting habitat for the bats. Riparian areas within the project area contained trees greater than 3 inches in diameter at breast height (DBH), which could provide potential roosting habitat for bats. A copy of the completed Summer Habitat Assessment Form is provided in Appendix C. Up to 18 mature trees are proposed to be removed for the project. The trees will be removed during the bat hibernation period (winter), to avoid impacts to roosting bats. Any tree removals required will be completed during NYSDEC cutting window (November 1-March 31). By following the NYSDEC cutting window the recommended determinations for the project are "Take Not Likely" for the NYSDEC, and "May Affect, Not Likely to Adversely Affect" for the USFWS for both bat species.

Bog turtle

No site wetlands were determined to have suitable silty loam soils substrate for the bog turtle. All wetlands were inundated with no evidence of microtopographic relief that would facilitate bog turtle basking. Since no suitable habitat was identified for the bog turtle in the project area, a determination of "No Effect – No Suitable Habitat" is recommended for this species for this project.

Dwarf wedgemussel

In New York, the dwarf wedgemussel is known to inhabit the lower Neversink River drainage basin in Orange County (NYSDEC Dwarf Wedgemussel Fact Sheet, 2015). This resource is located on the west side of the Hudson River, over 30 miles from the project location. Additionally, the stream observed on site did not contain the appropriate substrate to support any stage of the dwarf wedgemussel's life cycle. Therefore, it is concluded that the dwarf wedgemussel is not likely to inhabit Fishkill Creek at the project location. Nevertheless, erosion and sediment controls will be maintained for the duration of the project to limit impacts to surface water resources within the project area as well as downstream locations. Based on the absence of suitable habitat, a "No Effect – No Suitable Habitat" determination is recommended for the dwarf wedgemussel for this project.

5. Historic, Cultural, Archaeological Resources and Parklands

The project has been submitted to NYSOPRHP through the Cultural Resource Information System (CRIS) database. The CRIS database showed that the project site is not located within and archeologically sensitive area, nor is the bridge listed on NYSDOT's Historic Bridge Inventory and Management Plan. In addition, there are no properties listed in the National Register of Historic Places within the project area. A request for determination has not been received, however, it is assumed that SHPO coordination will result in a No Effect or No Adverse Effect determination. Additional information regarding SHPO coordination is included in Appendix D.

6. Hazardous Waste and Contaminated Materials

A Hazardous Waste/Contaminated Materials Site Screening was conducted to evaluate the presence or absence of hazardous/contaminated environmental conditions, such as lead paint or petroleum products. Prior to the site visit, background information was obtained and reviewed from the following NYSDEC databases: Spill Incidents Database Search, Remedial Site Database Search, and Bulk Storage Database Search. The search time frame was from January 1, 1990 to present day and included all roadways within 1/8 –mile of the project site. No database hits were noted.

A site visit was completed on July 10, 2017 to look for environmental concerns or issues in the project area. Based on the site visit results, B&L concluded that there is little or no likelihood to encounter hazardous or contaminated materials on site, with the potential exception of lead based paint on the bridges.

Two paint samples were collected for lead analysis, one from guardrails at each bridge structure. Lead analysis of these paint samples was completed by Phoenix Environmental Laboratories, Inc. in Manchester, Connecticut. Green paint samples collected from the guardrail were found to be 16.8% (U-27) and 20% (U-28) lead containing.

The Occupational Safety & Health Administration (OSHA) considers paint with any concentration of lead to fall under the OSHA Construction Standard for lead. Contractors disturbing lead-based or lead-containing paint must comply with the OSHA Standard (29 CFR 1926.62). Contractors must also comply with lead-based paint collection and disposal as required by the NYSDEC. Based on the presence of lead-containing paint at the bridge location, it is anticipated that such compliance will be necessary during the project. The lead analysis results are available upon request. The potential risk for other undocumented inactive hazardous waste/contaminated materials is low and no further hazardous waste or contaminated material surveys are proposed for the project.

7. Asbestos

An asbestos screening was performed at the project site in accordance with New York State Department of Labor (NYSDOL) Industrial Code Rule No. 56. An asbestos survey was completed by a certified asbestos inspector from B & L on the existing bridges, during which potential asbestos containing materials were sampled. These samples were tested and found not to be asbestos containing. The asbestos survey was non-invasive in nature, with examination of surface and miscellaneous material being sampled. When demolition of the existing bridge occurs, care should be taken to make sure no hidden asbestos containing materials are present. If possible materials are discovered during demolition or construction; samples should be collected and analyzed for the possibility of containing asbestos. The detailed Asbestos Screening Survey Report is available under separate cover.

8. Anticipated Permits/Certifications/Coordination

New York State Department of Environmental Conservation (NYSDEC):

- Water Quality Certification, Section 401 - Clean Water Act
- Article 24, Freshwater Wetlands
- Article 15, Stream Disturbance

Army Corps of Engineers (USACE):

- Section 404 - Clean Water Act Nationwide Permit #3

Coordination

- Coordination with New York State Historic Preservation Officer (SHPO)
- Coordination with the US Fish and Wildlife Service
- Coordination with the New York Natural Heritage Program

9. Floodplains

The CR 21 over Fishkill Creek project is mapped within a Federal Emergency Management Agency (FEMA) Federal Insurance Rate Map (FIRM) 100 year flood zone (Zone AE). Zone AE is identified as a low to moderate flood risk area. This flood zone designation represents an area that is subject to inundation by the 1-percent-annual-chance flood event (100 year flooding). Additionally, the project site is located within the FEMA-designated regulatory floodway. Currently, permanent adverse impacts to this FEMA mapped flood zone are not expected. The project will increase the clear span lengths from 38 feet to 42 feet and bridge low chord elevations will be maintained or increased. Hydraulic assessments indicate that the base flood elevations will not increase as a result of the project. The proposed project will not alter the floodplain; work will remain within previously disturbed roadway ROW. In order to comply with EO 11988, potential effects of actions taken within the floodplain and alternatives to avoid any adverse effects have been evaluated.

10. Stormwater Management

The proposed project will result in less than one acre of soil disturbance; therefore, a NYSDEC State Pollution Discharge Elimination System (SPDES) General Permit for construction activities (GP-0-15-002) will not be required. Erosion and sediment control measures will be employed during the construction of this project to prevent the movement of sediment-laden stormwater off-site.