

**NORFOLK SOUTHERN RAILWAY COMPANY FILES: BR0013844 &
BR0013129**

**COLUMBIA, CHEROKEE COUNTY, SOUTH CAROLINA I-85 UNDERPASS
PROJECT**

**(1) REPLACEMENT OF EXISTING I-85 UNDERPASS BRIDGE –
MILEPOST SB-141.35 – DOT/AAR #7214064M – FILE: BR0013129**

**REQUEST FOR RAILROAD ENGINEERING REQUIREMENTS FOR INCLUSION INTO
DESIGN-BUILD PROJECT BID PACKAGE:**

- 1) Visit project site with SCDOT to identify existing or potential issues or conflicts

A site investigation was performed on January 30, 2017 and the following comments pertain to this site.

Site – The Railroad's **SBC**- Line runs from Railroad East (Charleston, SC) to Railroad West (Columbia, SC). There is currently one NS main Line track at this location. Henson Road runs parallel to I-85 and there is a public at-grade crossing south of the bridge location. North of the bridge location there is a private at-grade crossing used by Sloan Construction Upstate.

Signal Conflict – There were no way side signals observed in the proximity of the Dual Overhead Grade Separations. The proposed project should not impact the railroad's signal facilities.

Access Roadway – Henson Road runs parallel to I-85 and there is a public at-grade crossing south of the bridge location.

Utilities – Overhead utilities span the tracks near the South abutment. No other utilities or NS facilities appear to be in the area or on the existing structure. The North Abutment approach is constructed of fill. The State and/or its contractor are responsible for locating utilities within the project on NS Right-of-Way. Access on NS Right-of-Way to locate utilities requires a Right-of-Entry Permit, Protective Liability Insurance, and flagging protection. Right-of-Entry application can be obtained at the Norfolk Southern website at the following URL:

<http://www.nscorp.com/content/nscorp/en/real-estate/norfolk-southern-services/access-norfolk-southern-property.html>

Other Conflicts – There is a billboard sign located southwest of the bridge. If the sign is to be impacted during construction, it is to be reinstalled at its current location. If the sign is to be removed/reinstalled, coordination with Norfolk Southern's Real Estate Department will be required.

- 2) Provide a Val Map establishing Railway ROW width

Valuation Maps can be requested by contacting Brad Hart with Norfolk Southern by email: Brad.Hart@nscorp.com. Valuation Map V-42/26, Val Map ID 05071 shows the

NS Right-of-Way is 100 feet wide which is 50 feet from either direction of the track centerline.

- 3) Provide train counts and define whether or not this is an Amtrak line

This location currently handles no trains per day and is NOT an Amtrak line.

- 4) Provide the Right-of-Entry requirements for surveying, soil borings, etc. (Railway web-site and path is acceptable)

Right-of-Entry application(s) for soil borings, surveying and other access to property can be found at the Norfolk Southern website at the following URL:

<http://www.nscorp.com/content/nscorp/en/real-estate/norfolk-southern-services/access-norfolk-southern-property.html>

- 5) Provide Railway current standards, clearances, construction criteria, insurance requirements, etc. (Railway web-site and path is acceptable)

Current Standards – Information regarding design and construction can be found in Section H of the Public Projects Manual. The Public Project Manual can be downloaded at the Norfolk Southern website at the following URL:

<http://www.nscorp.com/content/nscorp/en/transportation-terms/other-requirements/public-project-guidelines.html>

Construction Criteria - Additional requirements, restrictions, and/or limitations may be imposed by NS based on PE review of the Preliminary Design Plans and review of the Construction Submittal Plans and calculations provided by the contractor. When performing calculations and designs for review, the contractor's engineer shall conform to AREMA (American Railway Engineering and Maintenance-of-Way Association) Manual for Railway Engineering.

For additional information please refer to the Public Projects Manual which can be downloaded here:

<http://www.nscorp.com/content/nscorp/en/transportation-terms/other-requirements/public-project-guidelines.html>

Insurance Requirements – Norfolk Southern Insurance Requirements can be found in Appendix E. Norfolk Southern – Special Provisions for Protection of Railway Interests - Section 14 of the Public Projects Manual which can be downloaded here:

<http://www.nscorp.com/content/nscorp/en/transportation-terms/other-requirements/public-project-guidelines.html>

- 6) Provide any additional information/requirements specific to the Project site

Approval of the proposed structure will be provided once the Preliminary Engineering review has been completed. MSE abutments will not be allowed for this project.

The foundation of the existing structure should be verified with the as-built drawings

to determine the necessary procedures to remove the existing substructure below grade.

As the existing vertical clearance over I-85 is posted as 23'-3" and this section of the line is out of service, the bridge is expected to be reconstructed on the current alignment without the use of a detour structure. The line may be brought back into service at any time.

Rail will be 136 pound CWR and will be furnished by Norfolk Southern at project cost and will be paid for by SCDOT. The scope of NS involvement will be removing the track on the existing bridge and constructing the new track on the new bridge. Track construction includes installation of rail, ties, and other track material, including placement of ballast. This work will be covered under the standard project agreement between NS and SCDOT, and SCDOT will reimburse NS for the cost of this work. ~~Other track materials will be supplied by the contractor and approved by Norfolk Southern. The contractor will be responsible for all trackwork installation.~~ Norfolk Southern's Design & Construction Department will review and approve trackwork plans.

The standard typical section for underpass structures includes six (6) girders spaced at 3'-6" for a single track and provides for derail load. The superstructure is to be comprised of steel girders. Concrete girders will not be permitted. Options other than a ballasted deck bridge, may include a thru-girder bridge or truss bridge, but only when a ballasted deck-girder superstructure is determined to not be feasible. This replacement underpass is expected to be a deck-girder structure. ASTM A588 Weathering Steel is permitted, but will be required to be painted in accordance with NS Specifications. Galvanized bolts are to be installed by the Turn-Of-Nut-Method; DTI's are not permitted. Waterproofing of the deck will be required. A spray-on waterproofing that does not require asphalt plank is common practice, however a butyl-rubber membrane is also acceptable with a one (1) inch asphalt plank protection course. Conduits in the concrete parapets will be required.

The required structure drainage system should outfall into the roadway drainage system. It appears that a roadway drainage system is currently present at this location.

NS Material Specifications will be available and are to be adhered to.

Pier caps are to be level and are not typically stepped, but may be stepped for differing depth spans at a given substructure unit provided standard bearing clearances are provided. Although NS prefers solid-web pier construction, columns in a post-and-beam construction are acceptable. SPT and CSL testing will be required for all drilled shaft construction. 2:1 bridge end slopes are required at abutments unless a slope stability analysis determines a 1.5:1 will be stable. The analysis is required only for cut slopes. In either event, concrete slope protection will be required. Full-height vertical abutments, while not preferred, are permitted on a case by case basis. Waterproofing and Dampproofing will be required behind the abutments. A French drain system will be required behind the abutments that outfalls into the roadway drainage system. Drains are not permitted to outfall on bridge end slopes.

The bridge can be replaced at the current horizontal and vertical alignment.

It is the expectation of NS for the new bridge to be an independent bridge, replacing as much structure as will be required to widen I-85 under NS, accommodating for a 2-to-1 slope and abutment and ties to the existing vertical grade on the track.

- 7) Provide preliminary engineering and construction requirements to replace railroad bridge, with estimated costs, conflicts, parties responsibilities, etc.

Actual expenses related to the Preliminary Engineering Review may vary from the estimate provided due to project conditions, duration of reviews, number of submittals and other variables. Based on experience, for projects requiring two (2) reviews of preliminary design plans plus a final review of the plans, the Preliminary Engineering review cost for this project is usually ranges between \$30,000 and \$50,000 per bridge. This estimated cost assumes no significant changes to the span lengths and structure type to be made after an initial review. This estimated cost does include a site visit, two (2) reviews of preliminary roadway and bridge plans and one (1) review of final roadway and bridge plans with calculations, the development of the construction engineering cost estimate, routing of the construction agreement, ongoing project administration and coordination, and distribution of a Notice to Proceed to mobilize NS forces to assist in construction activities. This estimated cost does not include expenses related to the Construction Reviews as outlined below. Assuming the conditions aforementioned are met, the PE review for this type of construction project is estimated to cost approximately \$50,000. Additional PE reviews are required whenever project plans are revised and resubmitted. Also additional Preliminary Engineering expenses may be incurred for work performed by NS for attendance in pre-design meetings, design development coordination correspondence, documentation, reports, review of design concepts, and other work performed in support of the design-build team prior to delivery of the preliminary design plans and calculations for initial PE review.

Once the Preliminary plans are submitted, a detailed estimate of Preliminary Engineering costs will be prepared to include the cost of all services that NS will perform during the preliminary engineering review.

- 8) Develop an estimate of the projected Railway Bridge design and construction costs

PE Review - Scope and cost estimates described in Comment 7 represent a typical PE review consisting of up to three (3) submissions of the plans, calculations, and project special provisions as required. Turnaround for a typical review is thirty (30) days. Additional reviews may be necessary depending on design changes made to accommodate comments and adherence to AREMA and NS standards and requirements. See Public Projects Manual for Review Schedule. Estimated cost for Preliminary Engineering is approximately \$50,000.

Construction Engineering Management and Inspection - Construction Engineering Management and Inspection services will be provided on behalf of Norfolk Southern by a contract engineering firm. All applicable designs, calculations, project special provisions and plans submitted, as indicated in the Public Projects Manual, must be reviewed and approved by the NS representative before work related to those submissions are allowed to commence on NS Right-of-Way. Typical submissions may take up to thirty (30) days for review however every effort will be made to return sooner. Inspection services will also be provided on-site to ensure that work is being completed in accordance with the approved designs and plans. Once the preliminary design plans have been submitted a detailed CEM&I estimate will be prepared. Based on experience an order of magnitude cost estimate for this service should be approximately \$150,000. Actual expenses related to the Construction

Engineering Management and Inspection may vary from the estimate value due to project conditions, construction duration, amount of submittals for review, and other variables.

Submittal Submission Protocol - Submittals shall be submitted electronically if possible. Responses will be electronic in accordance with NS Policy. All submittal responses will be returned through the Sponsor. No submittals shall be larger than 11 x 17 sheets. Submittals will be returned as: 1) "Satisfactory", 2) "Satisfactory If Corrected As Noted", or 3) "Correct and Resubmit". Resubmittal is only expected with "Correct and Resubmit". Typical reviews include but are not limited to:

Shop Drawing Submittals:

Structure Steel Shop Drawings (including Bearings)
Structure Drainage System
Stainless Steel Expansion Plates
Bridge Handrail
Signal Conduit

Material Specification Submittals:

Concrete Mix Design
Waterproofing and Dampproofing
Expansion Joint Materials
Waterstops

Other Submittals:

Temporary Shoring or other temporary works on or adjacent to NS property
Blasting Plans
Temporary Construction Crossing
Jack-N-Bore Plans for culverts/utilities
Casing Plan for Drilled Shaft Construction

Documentation – The contractor or sponsor shall provide the following to NS: soil density reports, H-pile heat numbers, concrete cylinder break reports, certification for other materials (waterproofing, dampproofing, joint materials, etc.), structural steel welder certifications and structural steel shop inspection reports.

Required meetings – A preconstruction meeting is to be held prior to contractor entering NS property. A structural steel pre-fabrication meeting must be held. Other issues may arise during construction which constitute a meeting with contractor and/or sponsor with NS personnel and/or representatives.

NS Flagging Services - Flagging services will NOT be required since there is no current train activity at this location.

Signal Relocation - The proposed project should not impact the railroad's signal facilities. However, if during the PE or CEM&I phase of the project it is found that signal facilities will have to be relocated, an estimate will be provided to relocate those signals outside of the construction limits and be replaced after completion of the project. All signal work will be performed by NS forces. Appropriate coordination will be performed during the PE phase of the project to ensure that the signals are relocated prior to the contractor's scheduled start date for work within NS Right-of-Way.

- 9) Provide an estimated cost for the preliminary engineering review of the roadway plans

Norfolk Southern typically does not review roadway plans other than to check for clearances which doesn't apply to this project.

- 10) Provide a brief description of the typical Railway services, with a schedule of typical project expenditures, which are required during roadway construction

Norfolk Southern's contract engineering firm will do monthly inspection services for the roadway construction portion of the project to insure foundations are not being damaged or undercut.

- 11) Identify if a separate Easement Document will be required

Since the structure is to be replaced along the current railroad alignment, a separate easement is not anticipated but will be determined by NS Real Estate.

- 12) Engineering may also include office reviews, field reviews, attendance at meetings, and preparation of correspondence, reports, and other documentation in connection with the Project. Nothing contained in this Agreement shall oblige Railway to perform work which, in Railway's opinion, is not relevant to Railway's participation in the Project

If additional work is required by Norfolk Southern following the execution of the Preliminary Engineering Agreement or the Construction Agreement, the Department or its Contractor shall submit written or email request(s) to NS requesting or authorizing additional services. NS will provide additional field reviews, attend design and coordination meetings, prepare correspondence and reports, or generate other documentation needed to assist in facilitation of project design and/or construction schedule. If additional services will cause the approved PE and/or CEM&I authorization to be overrun, a revised cost estimate will be provided to the Department for approval of the increase in PE and/or CEM&I authorization.