Transportation

PAT McCRORY
Governor

NICHOLAS J. TENNYSON
Secretary

June 21, 2016

Addendum No. 1

Contract No.:	C 203474
TIP No.:	B-2500B
County:	Dare
Project Description:	NC 12 - Rodanthe Breach Long Term Improvements (Phase IIb)

RE: Addendum No. 1 to Final RFP

September 20, 2016 Letting

To Whom It May Concern:

Reference is made to the Final Request for Proposals dated June 9, 2016 recently furnished to you on the above project. We have since incorporated changes, and have attached a copy of Addendum No. 1 for your information. Please note that all revisions have been highlighted in gray and are as follows:

The second page of the *Table of Contents* has been revised. Please void the second page in your proposal and staple the revised second page thereto.

Page Nos. 80, 81, 82, 84 and 86 of the *Structures Scope of Work* have been revised. Please void Page Nos. 80, 81, 82, 84 and 86 in your proposal and staple the revised Page Nos. 80, 81, 82, 84 and 86 thereto.

Page No. 102 of the *Hydraulics Scope of Work* has been revised. Please void Page No. 102 in your proposal and staple the revised Page No. 102 thereto.

Page No. 113 of the *Environmental Permits Scope of Work* has been revised. Please void Page No. 113 in your proposal and staple the revised Page No. 113 thereto.

If you have any questions or need additional information, I can be reached by telephone at (919) 707-6900.

Sincerely,

R.A. Garris, PE
Contract Officer

RAG / dth

SCOPES OF WORK

STANDARD SPECIAL PROVISIONS

STRUCTURES SCOPE OF WORK (6-21-16)

Unless noted otherwise elsewhere in this RFP, all elevations referenced throughout this Request for Proposals (RFP) are referenced to the North American Vertical Datum of 1988 (NAVD 88).

Project Details

The Design-Build Team shall design and construct a bridge on new location over the Pamlico Sound from the Town of Rodanthe to existing NC 12 north of Rodanthe. Throughout this RFP, the section of the aforementioned bridge from Station 23+39.12 -L- to Station 147+26 -L- shall be referred to as the main bridge. The Design-Build Team shall design and construct bridge transition sections on both ends of the main bridge. These transition sections shall be designed to reduce the grade from the main bridge to an elevation no higher than 14.0 and no lower than 10.0. Retaining walls may be used at the end of each transition span to return to existing grade.

The Design-Build Team shall design and construct the main bridge such that the future extensions noted below can occur without disruption of traffic on the main bridge. The Design-Build Team shall describe the structure details that will accommodate the future main bridge extension noted below in the Technical Proposal.

- The Design-Build Team shall design and construct the main bridge such that it can be extended northward in the future with the last span of the main bridge remaining in place.

- The Design-Build Team shall design and construct the main bridge such that it can be extended northward along the -L- Line tangent alignment between Station 44+69.79 -L- and Station 113+34.26 -L-.

- The Design-Build Team shall design and construct the main bridge such that it can be extended northward, as noted above, while maintaining a temporary two-lane two-way traffic pattern, consisting of minimum 11-foot lanes with minimum two-foot barrier offsets, on the bridge.

Except as allowed otherwise below, the low chord elevation of the main bridge shall be 17 feet mean sea level (MSL) or higher. The main bridge superstructure subjected to wave forces shall be kept to a minimum, resulting in an allowable reduction of the aforementioned main bridge minimum vertical clearance for a maximum distance of 300 feet from each end of the bridge. The Design-Build Team shall indicate the distance on each end of the main bridge with a low chord elevation less than 17 feet MSL in the Technical Proposal. The transition sections shall provide a minimum vertical clearance of four feet above natural ground to allow for bridge inspection access.

The requirements for vessel impact will not apply to the bridge transition sections.

In accordance with AASHTO Guide Specifications for Bridges Vulnerable to Coastal Storms, all components of the main bridge, transition sections and retaining walls below elevation

17 feet MSL shall be designed to resist coastal wave forces. The main bridge, transition sections and retaining walls shall be designed for scour as detailed in the Hydraulics and Geotechnical Scopes of Work found elsewhere in this RFP. The Design-Build Team shall evaluate Equation 5.2-1 as an extreme event limit state and design accordingly. Wave forces will not be required in any other loading combinations.

Using a base wind velocity of 105 mph, the 2014 AASHTO LRFD Bridge Design Specifications may be used for wind loading. Should the Design-Build Team use the 2016 interims to the 2014 AASHTO LRFD Bridge Design Specifications for wind loading, the wind gust velocities shall be per the figures.

Sand lightweight concrete will only be permitted in the bridge deck. Lightweight concrete, of any kind, shall not be used on any other part of the proposed bridge.

Superstructure - General

The bridge typical section shall consist of a 40-foot clear roadway with 2-Bar Metal rail and a 3'-0" concrete parapet (parapet height has been increased from the Standard Drawing BMR34). However, the final design of the rail must be reviewed and endorsed by the SHPO, as required by Section 106 commitments, and the NPS and USFWS as required by Section 7 commitments. The Design-Build Team shall use the aluminum rail option detailed in Standard Drawing BMR34, and all associated hardware and anchorage shall be stainless steel.

The following will not be allowed:

- Cast-in-place and precast deck slabs as primary structural members, precast girders with an integrally cast deck, and steel girder superstructures
- Voided slabs (cored slabs or box beams) will not be allowed in the main bridge. (Voided slabs used in the transition sections shall have a concrete overlay adhering to the corrosion protection requirements for bridge decks.)
- Structures that require external tendons or strands (e.g. cable-stay, extradosed, suspension)
- Precast partial or full depth deck panels
- Precast bridge barrier rails
- Empirical method for deck design
- Steel diaphragms
- Modular Expansion Joints

The Design-Build Team shall provide an initial load rating for the proposed main bridge and transition sections. For all design and legal loads, prestressed concrete members shall not be in tension (0 psi) at the Service Limit State in the longitudinal direction. Stresses for all precast, pretensioned members shall be in conformance with the NCDOT Structure Management Unit Manual and associated memos.

Design for an additional superimposed dead load 30 psf for future wearing surface, regardless of the superstructure type.

Vessel impact calculations for the bridge superstructure will not be required.

The Design-Build Team shall use one type of expansion joint throughout the main bridge. Expansion joint seals shall have a maximum four-inch joint opening and a minimum ¾" opening. Creep and shrinkage movement may be excluded from the total movement calculations. Foam joint seals will only be allowed in the transition sections, and between the transition sections and the main bridge. The Department prefers that the number of bridge expansion joints be minimized. The Design-Build Team shall indicate the type and number of bridge expansion joints in the Technical Proposal.

Substructure – Vessel Impact

All main bridge substructure units shall be designed in accordance with the AASHTO LRFD Bridge Design Specifications using the Minimum Impact Vessel as defined in LRFD 3.14.1 and using one half of the Final Design Scour Elevation, as defined in the Geotechnical Scope of Work found elsewhere in this RFP. The flow velocities used shall be the 100-year velocities at the bridge location, with the vessel impact applied at the water surface elevation corresponding to the 100-year velocities, as determined by the Design-Build Team's final 100-year scour analysis. If the Design-Build Team's flow velocities are based on the May 2016 *Pea Island Bridge Hydraulics Report* and Addendum provided by the Department, then the velocities shall be considered perpendicular to the proposed bridge. The AASHTO requirement for applying 50% of the vessel impact load to the substructure in the direction longitudinal to the bridge will be sufficient. Substructure units shall be designed for an extreme Vessel Collision load by a Minimum Impact Vessel vessel simultaneously with scour. Dynamic analysis techniques that take into account force-deformation or other dynamic interaction between vessel and bridge during collision will not be permitted.

When the length to the width ratio (L/W) is 2.0 or greater for long narrow footings in the waterway, apply the longitudinal force within the limits of the distance that is equal to the length minus twice the width, (L-2W).

No reduction on design loads via pier protection by "island" construction or fender systems will be allowed.

Substructure – Vessel Collision and Scour Limit States and Design Criteria

In addition to the requirements of AASHTO LRFD Bridge Design Specifications, design the substructure units in accordance with the following Limit States:

- Limit State 1 (Always required – Scour may be "0") Conventional LRFD loadings (using load factor combination groups as specified in LRFD Table 3.4.1-1), but utilizing the most severe case of scour up to and including that from a 100-year hurricane storm event.

- Limit State 2 (Applies when vessel collision force is specified) Extreme Event of Vessel Impact (using load factor combination groups as specified in the LRFD) utilizing scour depth described above for Vessel Collision with Scour.

- Limit State 3 (Applies only if scour is predicted) Stability Check during the superflood (most severe case of scour up to and including that from the Final Design Scour Elevation, as defined in the Geotechnical Scope of Work found elsewhere in this RFP) event.

Voided column sections and / or post-tensioning (and associated hardware) will not be allowed below an elevation 12.0 feet above mean high water (MHW).

If the Design-Build Team proposes post tensioned bridge elements, the Design-Build Team shall develop a Corrosion Protection Plan that recommends **ONLY** specific detailed provisions for post-tensioning tendon corrosion protection for the Department's review and approval. All corrosion protection details in the Corrosion Protection Plan shall provide a minimum 100-year corrosion service life. At a minimum, the aforementioned Plan shall specify corrosion allowances, and outline detailed provisions with regards to reinforcing steel and structural steel protection. In regards to concrete performance, the aforementioned Plan shall assess the effects on concrete permeability, corrosion thresholds, corrosion rate, impacts on cracked concrete, time-to-repair, and provide recommendations on the use of calcium nitrite, silica fume, sealers, membranes, reinforcing coatings, increased cover, corrosion inhibitors, etc.

For all bridge elements, the Design-Build Team shall adhere to the approved Corrosion Protection Plan recommendations / conclusions or the requirements noted below, that are deemed sufficient to meet a 100-year corrosion service life, whichever is deemed more stringent, in the Department's sole discretion.

- All concrete shall include mineral admixtures in the mix designs. Mineral admixtures shall replace the cement content at a 1:1 ratio by weight. For concrete other than mass concrete:

  - The superstructure shall contain a minimum of 25% fly ash Class F or a minimum of 40% ground granulated blast furnace slag (GGBFS).

  - The substructure shall contain a minimum of 25% fly ash Class F or a minimum of 40% GGBFS. In addition, silica fume at a minimum of 5% shall be used in piles, footings and columns.

- For mass concrete elements, reference the NCDOT Structure Management Unit *Mass Concrete* Project Special Provision for additional ranges of pozzolan substitution.

- Calcium nitrite shall be used in the superstructure and substructure concrete at a minimum rate of four gallons per cubic yard. Calcium nitrite will not be required in cast-in place concrete elements containing only stainless steel rebar or bridge decks with stainless steel rebar extending into the bridge barrier rails.

- Reinforcement for both cast-in-place and precast elements shall have a minimum concrete cover of 2" except:

  - The greater limits listed in the NCDOT Structure Management Unit Manual Section 10 for Corrosive Sites and structure standard drawings shall be met.

  - Concrete cover in box girder sections shall be a minimum of 2" for both the external and internal sides and a minimum of 2.5" for the top deck cover after all grinding.

reinforcing steel requirements. Precast soffits shall be sacrificial and shall not contribute to footing strength. All reinforcing steel within and extending from the precast soffit into footings shall be stainless steel. All steel precast soffit supports to remain within the cast-in-place footing shall be stainless steel.

- Permanent steel casings shall be required for all drilled piers. The Design-Build Team shall determine and include a minimum of 0.125" of additional sacrificial casing thickness or more as needed to account for corrosion during the design life of the bridge.

** Note ** Deleted precast concrete stay-in place panels allowance

- Cathodic protection will not be required.

Mass Concrete

Mass Concrete shall be defined and shall be in accordance with the NCDOT Structure Management Unit *Mass Concrete* Project Special Provision.

Miscellaneous

The Design-Build Team shall stamp identification numbers for every span and every tenth bent into the roadway face of the bridge barrier rail. The size of the identification numbers shall be in accordance with Section 710-8 of the 2012 *Standard Specifications for Roads and Structures* pavement marking criteria.

The Design-Build Team shall design and construct the bridge for the installation of a future utility hanger system in an outside girder bay. For the conduit hanger system, the design and construction shall accommodate a unit weight of 80 pounds per linear foot for the entire bridge length. For splice enclosures, the design and construction shall accommodate six individual loads of 6000 pounds each, spaced evenly along the main bridge. The Design-Build Team shall design and construct 2.5' * 1.5' (H * W) blockouts in all diaphragms to accommodate the future utility conduit hanger system. The Design-Build Team shall indicate the outside girder bay provided for the future utility hanger system installation in the Technical Proposal.

General

The Design-Build Team's primary design firm shall be on the Highway Design Branch list of firms qualified for structure design and maintain an office in North Carolina.

Bridge geometry (width, length, skew, span arrangement, typical section, grade, alignment, etc.) shall be in accordance with the accepted Bridge Survey Report, Structure Recommendations and Roadway Plans prepared by the Design-Build Team.

Alternate details or construction practices (such as those employed by other states, but not standard practice in NC) are subject to Department review and will be evaluated on a case by case basis. Use of Florida Department of Transportation Prestressed Florida I-Beams (FIB), the Prestressed Concrete Committee for Economic Fabrication (PCEF) prestressed concrete girders, and Modified Bulb Tee girders will be allowed. However, the structural details associated with

- Throughout the project limits, the Design-Build Team shall analyze all existing pipes within the existing / proposed right of way for hydraulic and structural deficiencies. Based on these analyses, the following shall be adhered to:

  - The Design-Build Team shall provide the appropriate hydraulic mitigation for all hydraulically deficient pipes; and for all hydraulically and structurally deficient pipes, including but not limited to replacement. The Design-Build Team shall identify all hydraulically deficient pipes and their proposed hydraulic mitigation in the Technical Proposal.

  - To ensure that all cross pipes retained for drainage purposes are structurally sound, the Design-Build Team shall provide appropriate documentation obtained from video inspections for the Department's review and approval prior to any hydraulic design submittal. Prior to performing any storm drain clean-out required for the aforementioned video inspections, the Design-build Team shall obtain approval form the Engineer. In accordance with Subarticle 104-8(A) of the 2012 *Standard Specifications for Roads and Structures*, required storm drain clean-out for video inspections will be paid for as extra work.

  - As directed by the Engineer, the Design-Build Team shall provide the appropriate structural mitigation for all structurally deficient pipes. Structural mitigation, for structural deficiencies in pipes, including but not limited to all repairs, will be paid for as extra work in accordance with Subarticle 104-8(A) of the 2012 *Standard Specifications for Roads and Structures.*

- In accordance with FHWA's publications HEC-18 (Evaluating Scour at Bridges) and HEC-25 (Highways in the Coastal Environment), the Design-Build Team shall perform scour analyses. If vertical abutments are proposed, the Design-Build Team shall provide abutment scour calculations, in accordance with HEC-18, for the Department's review and acceptance. The Design-Build Team shall perform scour analyses for the proposed final bridge design for the 100-year storm. Data from the 1880 Hurricane in the May 2016 *Pea Island Bridge Hydraulics Report* and Addendum to the May 2016 *Pea Island Bridge Hydraulics Report*, provided by the Department may be used to develop the scour analyses. If the Design-Build Team elects to use the May 2016 *Pea Island Bridge Hydraulics Report* and Addendum to the May 2016 *Pea Island Bridge Hydraulics Report*, the Design-Build Team will not be required to perform additional two-dimensional (2D) flow modeling. If the Design-Build Team does not use the May 2016 *Pea Island Bridge Hydraulics Report* and Addendum to the May 2016 *Pea Island Bridge Hydraulics Report*, the Design-Build Team 1) shall develop a new 2D Flow Model for the Pamlico Sound to determine scour velocities using an Oregon Inlet sized breach, prior to the installation of the Terminal Groin, as described in Section 3.5 of the May 2016 *Pea Island Bridge Hydraulics Report*, and 2) must be experienced in two-dimensional (2D) flow modeling. At a minimum, the 2D Flow Model shall include the following:

  - Cross-sections, soundings, etc.
  - Water velocities and elevation survey for 2D Flow Model calibration info

All work by the Design-Build Team must be accomplished in strict compliance with the plans submitted with the permit applications and in compliance with all conditions of the permits and certifications issued by the environmental agencies. The Design-Build Team shall provide each of its contractors and / or agents associated with the construction or maintenance of this project with a copy of the permits and certifications.

Unless noted otherwise elsewhere in this RFP, the Design-Build Team shall strictly adhere to these commitments, as well as others, including but not limited to, those included in the B-2500 ROD, the B-2500A ROD, the B-2500B Phase IIb ROD when issued, revised Final Section 4(f) Evaluation, Biological and Conference Opinions and subsequent amendments, all permits, interagency meetings, and site visits. The Design-Build Team will not be responsible for the commitments contained in the Section 106 Programmatic Agreement or Project Commitment Nos. 1, 6, 7, 24, 28, 29, 30, 32 and 34 in the Revised B-2500B Phase IIb EA. The Design-Build Team will not be required to jet all bridge piles in open water to the tip elevation as required by Project Commitment No. 5.

If the Design-Build Team discovers any previously undocumented historic or archeological remains while accomplishing the authorized work, they shall immediately notify, in writing, the NCDOT Archaeology Supervisor and NCDOT Project Development Engineer, as listed below, who will initiate any required State / Federal coordination after a timely initial assessment. The Design-Build Team shall also immediately notify a representative from the Design-Build Unit. Inadvertent or accidental discovery of human remains shall be handled in accordance with North Carolina General Statutes 65 and 70. All questions regarding these discoveries shall be addressed to Mr. Matthew Wilkerson, NCDOT Archaeology Group Leader at (919) 707-6089, or Mr. Brian Yamamoto, PE, NCDOT Project Development Group Supervisor (919) 707-6051.