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NETC 13-3 Phase II: Development of Implementation Plan for Unified Quality Assurance (QA) Processes of Precast and Prestressed Concrete Elements [PCE/PSE] for New England

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16. Abstract

The use of quality assurance (QA) systems in highway infrastructure is critical to ensure durable, safe, and economical transportation operations. These processes ensure that the desired level of quality is maintained throughout the manufacturing and construction processes. For regions such as New England, a significant cost savings can be realized if uniform QA processes are acceptable to all states, as this enables sharing of QA resources and streamlines producer and construction contractor operations. The objectives of this phase of the study were to understand existing transportation agency cost-sharing mechanisms, develop uniform QA inspection paperwork, and to select projects for pilot testing of shared QA resources. Through interviews with transportation agency financial personnel and a survey of agency technical personnel, current cost-sharing practices among agencies were understood, and a list of upcoming agency PSE/PCE projects has been identified. This phase obtained information that will aid in selection of project for pilot testing as well as in development of interagency agreements that will allow for sharing of QA inspection resources.

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
		LENGTH		
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
		AREA		
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yard	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
		VOLUME		
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
	NOTE: volumes greater than 1000 L shall be shown in m^3			
		MASS		
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
		TEMPERATURE (exact degrees)		
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
		ILLUMINATION		
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m^2	cd/m^2
		FORCE and PRESSURE or STRESS		
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
		LENGTH		
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
		AREA		
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
		VOLUME		
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.314	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
		MASS		
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
		TEMPERATURE (exact degrees)		
°C	Celsius	1.8C+32	Fahrenheit	°F
		ILLUMINATION		
lx	lux	0.0929	foot-candles	fc
cd/m^2	candela/m^2	0.2919	foot-Lamberts	fl
		FORCE and PRESSURE or STRESS		
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in^2

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.

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List of Acronyms

- AASHTO – American Association of State Highway and Transportation Officials
- AMRL – AASHTO Materials Reference Laboratory
- CFR – Code of Federal Regulations
- DOT – Department of Transportation
- FHWA – Federal Highway Administration
- IA – Independent Assurance
- NETTCP – Northeast Transportation Technician Certification Program
- PCT – Process Control Technician
- PG – Performance Grade
- PWL – Percent Within Limits
- QA – Quality Assurance
- QAP – Quality Assurance Program
- QAT – Quality Assurance Technologist
- QC – Quality Control
- QCP – Quality Control Plan
- QCPA – Quality Control Plan Administrator
- QCT – Quality Control Technician

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1. Introduction

This report for the NETC 13-3 phase-II research study presents the findings from surveys and interviews conducted with New England State Transportation Agencies (DOTs) to understand existing cost-sharing mechanisms between agencies, current precast and prestressed concrete element (PCE and PSE) quality assurance (QA) inspection checklists/forms/reports, and to select projects for pilot implementation in future phase of this study. Interviews were conducted with the financial departments of Connecticut Department of Transportation (CTDOT), Maine Department of Transportation (MEDOT) and Vermont Agency of Transportation (VTrans). The New Hampshire Department of Transportation (NHDOT) responded to the cost-sharing mechanism survey via an emailed response. CTDOT, Massachusetts Department of Transportation (MassDOT), MEDOT and Vtrans have responded to the QA inspection paperwork/pilot project selection survey at this time. MEDOT has also agreed to provide bi-weekly updates on their PSE/PCE fabrication schedule for pilot project selection in support of future phase of this project.

The primary objectives for this phase of the study are:

1. Review various cost-sharing and cost-reimbursement mechanisms for the NETC member agencies to recover costs of shared QA inspection resources.
2. Compile upcoming PCE/PSE projects, identify current QA inspection contracts, list fabricators that will be manufacturing for the NETC member agencies.
3. Propose uniform paperwork for QA process to be adopted by NETC member agencies.
4. Identify suitable projects for pilot implementation of shared QA resources and/or unified QA processes (developed in NETC 13-3 Phase-I study).
5. Identify and communicate prerequisite activities to NETC member agencies that have to be undertaken prior to pilot implementation.

From the above list of objectives, at the time of writing of this report, objectives 1, 2 and 4 were accomplished. Limited progresses were made on objectives 3 and 5 due to the time limitation for the project and lack of response from some of the agencies in terms of interviews and surveys.

This report is divided into 4 chapters:

1. The purpose of the report along with standard terms and definitions that are applicable to the PSE/PCE QA process;
2. Reporting of cost-sharing mechanism questionnaire and interviews;
3. Comparison of existing agency QA inspection paperwork and a suggestion for a unified set of inspection forms for PSE/PCE QA inspections;
4. Presentation of viable potential pilot projects to be used in phase III; and,
5. Summary, findings and recommendations on basis of the research conducted in this project.

1.1 Definition of QA Terms

The following terms are listed and defined to aid in the understanding of the language used throughout this report.

Acceptance Program

A thorough and consistent evaluation of all factors that are to be used by the Owner to determine the quality and acceptability of the product or work as specified in the contract requirements. These factors include, but are not necessarily limited to, *material certifications*, *acceptance sampling and testing* and inspection.

Acceptance Sampling and Testing

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Sampling, testing, and the assessment of test results to determine the quality of produced material or construction is acceptable, in terms of the specifications.

Agency Laboratory

An Agency owned laboratory other than the c*entral laboratory* where *acceptance* samples are processed by Agency personnel or representatives.

Accredited Laboratory

It is a laboratory that is accredited by the AASHTO Material Reference Laboratory (AMRL).

Consultant Laboratory

An Independent Laboratory in which independent and *qualified personnel* process *acceptance* samples.

Central Laboratory

The Agency's primary laboratory.

Certified Personnel

Any person determined qualified by an appropriate certification program, as determined by the Owner.

Clarification and Resolution of Material Test Results

The procedure used to resolve disagreements between the Owner and its *Contractor* regarding material quality and material test results.

Confirmation

The act of determining whether the product supplied matches the product identified in the material certification submitted.

Contractor

The individual, partnership, firm, corporation, any acceptable combination thereof, or a joint venture which is a party to the Contract with the Owner which is undertaking the performance of the work under the terms of the Contract and acting directly or through its agent(s) or employee(s). The term "*Contractor*" means the prime *Contractor* as differentiated from a *Subcontractor*.

Contractor Laboratory

A laboratory which may be owned and/or operated by a *Producer or Contractor*. This laboratory may be located on a construction site for the purpose of processing *Acceptance* or *quality control* samples.

Fabricator or Producer

A company that produces or fabricates materials for use on a specific project (i.e. Aggregate, Hot Mix Asphalt (HMA), Portland Cement Concrete (PCC), Precast/Prestressed Concrete) by either the *Contractor* or *Subcontractor*.

Independent Assurance (IA) Comparison

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The act of evaluating the variation between the Acceptance and IA test results. The results of a comparison are documented in an IA Comparison Report.

Independent Assurance (IA) Sampling and Testing

Sampling and testing that is conducted by the Certifications and Independent Assurance (C&IA) Unit of the Materials & Research Section to provide an unbiased and independent evaluation of the Acceptance Program.

Independent Assurance (IA) Program

Unbiased activities that are performed by *certified personnel* that are not directly responsible for *quality control* or *acceptance*. These activities provide for an independent assessment of equipment, and evaluation of the sampling and testing methods employed during the *Acceptance Program* to ensure conformance with established procedures. Test procedures used in the *Acceptance Program* performed at the c*entral laboratory* are exempt from this program. Test results of IA tests are not to be used as basis of material *acceptance*.

Lot

A defined quantity of material from a single source assumed to be produced and/or placed essentially by the same controlled process.

Manufacturer

A company that manufactures and supplies *standard manufactured materials* or fabricated materials for use on a project.

Material Certifications

Documents submitted pursuant to Subsection 700.02 of the Agency's "Standard Specifications for Construction" by the *Manufacturer* or *Producer* of a product that assures (or certifies) that the product used in the work conforms to all applicable requirements of the Owner's standard specifications, drawings, and contract provisions for the intended project.

National Highway System

The *National Highway System* (NHS) includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility. The NHS was developed by the United States Department of Transportation (USDOT) in cooperation with the states, local officials, and metropolitan planning organizations (MPOs).

Non-Structural Concrete Elements

Non-structural concrete is concrete that has a low strength and will be used when only small compression or temporary loading is involved.

Population

All of the specimens obtained from a *lot* that are used to represent the entire *lot* of material.

Qualified Laboratory

A non-accredited, Owner approved laboratory that provides test results used to determine acceptance.

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Qualified Personnel

Personnel that have successfully completed the Agency's Qualified Technician Program or an Owner approved qualified technician program.

Quality Assurance Program

Documented, predicted, and systematic actions conducted to provide sufficient confidence that a product or service will satisfy given or specified requirements.

For example, it identifies the various elements of the Owner's sampling, testing and inspection programs that are in place to assure that the materials and workmanship incorporated into the Owner's construction projects are in conformity with the requirements of the approved plans and specifications including approved changes.

Quality Characteristics

The specific material properties evaluated by *quality control* and *acceptance sampling and testing.*

Quality Control

All activities performed by the *Contractor*, *Producer*, and *Manufacturer* in the manufacturing, production, transport and placement to ensure the materials incorporated and work performed on a project meet or exceed contract specification requirements. These activities include material handling, construction/manufacturing procedures, calibration and maintenance of equipment, production process control, sampling and testing, and inspection that are accomplished to complete the work involved in an Owner project.

Quality Control Plan

A detailed document prepared by the *Contractor* or *Producer* identifying the processes to ensure the quality of material.

Referee Sample

A split or replicate sample that is taken, prepared and stored in an agreed upon manner for the purpose of settling a dispute.

Replicate Samples

Two or more material samples taken at the same location and time. These samples are taken to estimate sampling and testing variability.

Split Sample

A split sample is a single material sample that has been divided into two or more portions. These samples are taken to estimate testing variability.

Standard Manufactured Materials

These are items produced routinely (i.e. not for a specific project) by a *Manufacturer*.

Structural Concrete Element

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A structural element is a member or part of a building, e.g. a beam, column, wall or floor slab, designed to carry loads of various kinds imposed upon it. The element is usually subjected to bending or direct forces or a combination of these.

Subcontractor

An individual or legal entity to whom or which the *Contractor* sublets part of the work.

Sublot

A defined portion of the production lot typically represented by a single sample.

Validation

The process of comparing two independently obtained sets of test results to determine whether they came from the same *population*.

Verification

Sampling and testing conducted by the agency, or its designated agent, to evaluate acceptability of the final product.

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2. Review of cost-sharing mechanism questionnaire

2.1 Introduction

After the completion of phase-I of the NETC 13-3 project, it was identified that development of a cost-sharing mechanism would be required for the use of shared QA resources. A questionnaire was created in order to better understand existing the cost-share mechanisms of New England state transportation agencies. Questionnaire interviews were conducted with financial representatives of New England state transportation agencies, with one questionnaire completed without an interview. This section of the report discusses the development of the questionnaire and discusses the results of questionnaire and the interviews.

2.2 Questionnaire Development

A questionnaire was designed to understand and gain examples of existing cost-share agreements between New England transportation agencies. It sought examples of situations where agencies were provided with services in exchange for payment and vice versa. The questionnaire was also intended to gain information on agency inspector cost and qualification level. Questionnaire consists of nine general questions about agency billing and payments, it is attached to this report as Appendix A. This appendix also provides transcript of responses revised from the four agencies that responded to the questionnaire. During interview with agency personnel, two primary questions were focused to be addressed. These questions summarize the needs that would enable cost-sharing of QA resources:

1. Does your State have the capability to enter into a contract with another State agency whereby that other State provides services that are project specific? This would include billing you for services and your State's paying for same.

2. Does your state have the ability to enter into a contract with another state to provide them with services and bill them for those services and receive payment?

As seen in Appendix A and table 1 below, four agencies responded to the questionnaire. Table 1 summarizes the responses to the two key questions. All four agencies that responded provided positive responses to the two key questions about ability to bill and receive funds for services and for developing a cost-sharing contract.

Table 1: Key Question Responses from Agency Financial Departments

	CT	MA	ME	NH	RI	VT
Question 1	Yes	n/a	Yes	Yes	n/a	Yes
Question 2	Yes	n/a	Yes	Yes	n/a	Yes

2.3 Interview Results and Discussion

Interviews were conducted with CTDOT, MEDOT and VTrans; NHDOT responded to the survey via email without interview. MassDOT and RIDOT did not respond to the survey. VTrans was able to provide copies of existing interagency agreements and cost estimates for use of consultant inspection services. The samples form VTrans are attached with this report as Appendix D. The remaining New England agencies have not provided examples of interagency agreements for analysis.

The responses during the interviews and to the survey suggest that interagency cost-sharing is entirely dependent on standing interagency agreements and project-based agreements. It was also found that use

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of shared resources is typically project based, thus billed through project resources/funds. This implies that cost sharing of QA resources could be billed directly to the corresponding project according to the project-based agreement. If the shared QA resources are billed to a project, then a second interagency agreement would not be necessary for the exchange of funds. Specific findings, along with examples of some projects where costs were shared between agencies are summarized below:

- According to MEDOT, during the construction of the Sarah Mildred Long Bridge between Portsmouth, NH and Kittery, ME, MEDOT took the lead on the project and provided all inspection resources and billed NHDOT according to a project-oriented cost distribution agreement. VTrans and MEDOT noted the existence of other agreements between agencies (state to state, or state to municipal) pertaining to roadway maintenance and snow removal on roads that cross state lines in irregular ways that make access easier for a neighboring agency.
- VTrans has provided copies of agreements with NHDOT and Washington County, NY DPW regarding bridge construction projects that cross state lines. Copies of the agreements are available in Appendix D. These agreements address the division of design, survey, construction, traffic mediation, environmental and unforeseen costs between the two parties. The agreements do not specifically address the division of QA inspection costs but do mention the right of the non-leading party to inspect all work, plans, contracts, documents, books, vouchers and records pertaining to the project at any reasonable time. This poses the possibility of increased inspection costs due to multiple inspections, but standard inspection costs are covered by the original agreements.
- The agreements between VTrans and other agencies suggest that services are typically completed by one agency with the cost then divided according to the interagency agreement. This allows state agencies the flexibility of implementing different strategies in accomplishing QA inspections. For example, using agency hired inspectors versus consultant inspectors would not impact the cost sharing aspect of these agreements. This supports the notion that inspection resources could be shared pending the agreement on a unified QA process, similar to the one outlined in phase I of this study.
- Interviews with financial personnel clearly identified that while agencies can invoice for QA inspection services as part of an agreed upon division of costs for a project, at present agency's own QA inspectors (or their own consultants) are traveling to other states to perform inspections. If agencies were able to invoice all QA inspectors (Agency employed or consultant) as consultants based on specific qualifications, inspectors could stay within their own states to perform inspections. VTrans stated that the loaded rate for agency and consultant inspectors is $38-60/hour and $60-80/hour, respectively. They do not cover the costs for travel and lodging for consultant inspectors. MEDOT prorates per diem services provided by consultant QA inspectors to the nearest whole hour. This allows for the same QA inspector to perform multiple inspections for multiple agencies at one location without over-billing each agency. This avoids multiple agencies simultaneously sending inspectors to one fabricator for QA inspections.
- QA inspector hours and activity can be recorded using Shift Planning scheduling software. VTrans reports using Shift Planning successfully with relative ease and reliability. This study group was granted access to the VTrans Shift Planning software for analysis. The software allows for employees to add their availabilities, view other employees' planned shifts, request time off, switch shifts with other employees, make notes at the end of each shift, view one's own and other's notes. The application also

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makes use of email and cell phone communication for shift reminders and other messaging services. The use of Shift Planning, or a similar application, would aid in tracking billable hours for QA inspectors as well as in planning inspections for multiple agencies.

Based on this cost-sharing mechanism analysis, the main obstacle to a unified PSE/PCE QA inspection program would be technical uniformity and agreement on inspection paperwork and criteria. Suggestions for inspection criteria were presented in phase I of this study could alleviate this obstacle. All New England agencies adopting such a system would alleviate out of state travel costs associated with fabrication QA inspections and still allow for inspection services to be billed with corresponding projects. While this solution would alleviate billing issues associated with interagency and consultant inspectors, the QA process/paperwork needs to be approved and agreed upon by all six New England state agencies and incorporated into their current specifications.

2.4 Summary

A major finding from this effort was that there are already multiple interagency agreements between various New England DOTs that allow for invoicing and payment of activities conducted by one agency on behalf of other. Most agencies are also set up with sufficiently sophisticated financial systems that the costs and efforts of activities conducted by their employees can be reimbursed to a project cost of other agency. It was determined that agencies typically share costs on multi-agency projects according to agreements developed during the initial phases of specific projects, with services provided by one agency and costs divided according to the agreement. Thus, an agreement is needed to be developed between two agencies to be able to used shared resources. A joint agreement between all six New England agencies would be optimal, however it will require efforts and involvement from different units within DOTs, such as, materials and research, construction, financial administration and legal.

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3. Review of QA Inspection Paperwork Survey

3.1 Introduction

Along with the understanding of agency cost sharing, it is necessary to understand how agencies document QA inspections, what are the required qualifications for their inspectors (specifically consultant inspectors), plans for upcoming PSE/PCE projects, and any projects that may be suitable for pilot implementation in Phase III of this study. A survey was designed using UNH Qualtrics survey development software to gather information on and samples of current agency QA inspection paperwork such as checklists and standard reports. The survey also sought information on current QA inspector employment (agency or consultant) and on upcoming PSE/PCE fabrications for pilot implementation. This chapter focusses on briefly describing the online survey development, discussion on current QA inspection paperwork as well as current QA inspection contracts for the New England DOTs. Next chapter focusses on summarizing upcoming PCE and PSE projects and some recommendations for conducting a pilot test.

3.2 Survey Development

A set of questions were designed to determine if agencies used standard inspection checklists or checklist software to compile data during QA inspections. If a standard form is used, a copy was requested for interagency comparison. Agencies were also asked questions about upcoming PSE/PCE fabrications divided by PSE, structural PCE, and non-structural PCE fabrication along with who will be conducting the fabrication of elements. Along with what will be fabricated and by who, the survey requested design specifications and suggestions for projects to be used in phase III.

3.3 Survey Results and Discussion

At the time of writing of this report, responses to survey were obtained from CTDOT, MassDOT, MEDOT and VTrans. On the topic of the format that is used by QA inspectors for PCE and PSE, CTDOT, MassDOT, and VTrans use paper checklists to gather data during inspections, while MEDOT uses documentation software with some form of tablet/iPad (Figure 1).

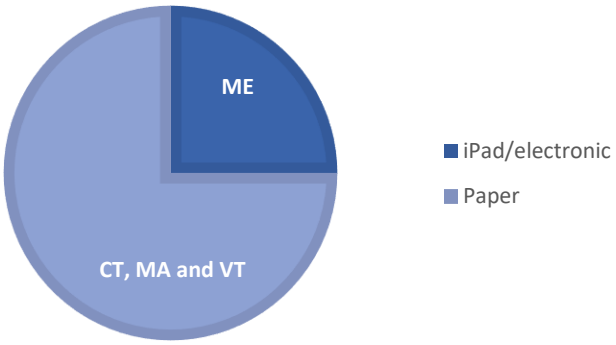

Figure 1: Distribution of inspection checklist format.

CTDOT and VTrans provided researchers with examples of a QA and QC inspection checklists. VTrans also provided sample copies of a precast materials sampling list, weekly plant report, and a PSE/PCE job worksheet. VTrans also included multiple design specifications for concrete elements and plant inspector workflow expectations regarding PSE and PCE. MassDOT and MEDOT did not provide samples of QA checklists or other paperwork at this time. All QA paperwork provided by agencies is available in Appendix C of this report.

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The QA inspection checklist forms provided by CTDOT and VTrans lists sections to record information about fabrication plant information, the items being inspected, concrete pour information, cylinder break data, travel information, and a section for open remarks. The VTrans PR4 inspection form also contains additional room for more details pertaining to concrete placement information and cylinder break data such as: quantity (cubic yards) and unit weight during placement, and data from multiple breaks. Both forms gather the same essential information, but the Microsoft Excel format may be an easier way to store inspection data.

Regarding use of in-house versus consultant inspectors, MassDOT uses exclusively consultant QA inspectors and CTDOT, MEDOT, and VTrans use a combination of consultant and agency QA inspectors. Table 2 lists the current consultant QA inspection contracts that are in-place with various New England DOTs. This table clearly shows that multiple agencies have contract with most of these firms. The use of common consultant QA inspectors suggests that agencies should be able to use a more uniform QA paperwork. This also suggests that there is an established billing/payment process for using consultant inspectors, which can aid in implementation of a unified QA program with shared inspection resources between agencies.

Table 2: Consultant Inspectors used by New England agencies

	Advance Testing Co. Inc.	ATC Group Services, LLC	HRV Conformance Verification Associates, Inc.	John Turner Consulting	KTA Associates	Pennoni Associates Inc.	Terracon	TRC
CT				X	X	X	X	
MA	X	X	X					X
ME	X		X		X	X		
VT			X	X			X	

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4. Review of Potential Pilot Projects

4.1 Introduction

In the second part of the QA survey, agencies were asked about upcoming projects that will require fabrication of PSE/PCE elements between February 2019 and March 2020. Based on these responses, the survey then requested further information on dates of fabrication and fabrication location. The survey requested design plans for the previously mentioned projects as well as suggestions for projects that may be utilized in the QA inspection pilot test, during Phase III of this study.

4.2 Survey Results and Discussion

The surveys provided list of immediate fabrications that various agencies are anticipating (typically up to 1 month in advance). A summary of upcoming fabrications for the New England DOTs, that responded to the survey, are provided in Table 3. As it can be seen in the table, there are multiple overlapping fabrication locations for the immediate future. Specifically, it can be seen that both CTDOT and MEDOT have structural precast items that were planned to be fabricated by CRH (Oldcastle) Infrastructure in Rehoboth.

Table 3: PSE/PCE fabricators to be used in upcoming agency projects.

	CSI Hudson, NH	JP Carrara Middlebury, VT	Northeast Prestress Products LLC	CRH (Oldcastle) Infrastructure Rehoboth, MA	Precast Concrete Products of Maine Topsham, ME	SD Ireland Williston, VT	Strescon Limited St. John, New Brunswick	Superior Concrete LLC Auburn, ME	United Concrete LLC Yalesville, CT
CT	sPCE		PSE	sPCE					PSE/sPCE
ME	PSE			sPCE	PCE		PSE/sPCE	PSE, sPCE	
VT		sPCE				sPCE			sPCE

PSE: Prestressed Concrete Element; sPCE: Structural Precast Element; and, PCE: Non-structural Precast Element.

Specific notes from each survey regarding upcoming PCE and PSE fabrications are provided below:

- CTDOT has upcoming PSE fabrications to be completed by United Concrete in Avon, MA; Northeast Prestress Products, LLC; and Oldcastle Infrastructure in Rehoboth, MA. Upcoming structural PCE fabrication are to be completed by CSI in Hudson, NH; by United Concrete Products Inc in Yalesville, CT; and by Oldcastle Infrastructure in Rehoboth, MA. CTDOT has not yet determined the dates up these upcoming fabrications.
- VTrans has upcoming PCE fabrications to be completed by SD Ireland in Williston, VT; JP Carrara in Middlebury, VT; and United Concrete Products Inc in Yalesville, CT. VTrans has not yet determined the dates of these fabrications and has noted that PSE are forthcoming, but fabrications and fabricators are not yet selected. VTrans has also provided general PSE and PCE design specifications and plant inspector workflow expectations. The inspector workflow expectation paperwork will aid in design of the pilot projects for Phase III of this study.
- A follow up phone call was conducted with MEDOT in order to further explain this study and to discuss upcoming projects for pilot implementation. MEDOT has upcoming

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fabrications of MSE and NEXT beams to be completed by Superior Concrete LLC in Auburn, ME; voided slabs to be completed by CRH (Oldcastle) Infrastructure in Rehoboth, MA; and a PCC arch to be completed by CSI in Hudson, NH. They also use Strescon Limited in New Brunswick for fabrication of PSE/PCE and Precast Concrete Products of Maine in Topsham, ME. MEDOT has also agreed to continue updating this study group on newly scheduled fabrications on a bi-weekly basis for pilot implementation.

4.3 Summary

The main finding from the survey of agencies regarding upcoming projects was a reaffirmation that multiple agencies often have common types of PSE or PCE fabrications occurring at same producers. While this project aimed to make recommendations for conducting pilot testing of shared QA inspection resources and also possibly using unified QA processes, the limited lead time before fabrication date makes it challenging for researchers to make such recommendation. It is strongly recommended by the research team that an online repository be made where each agency can list their upcoming fabrication projects (as and when they become known), having single repository that is accessible and visible to all six New England DOTs can provide the necessary means to plan a pilot implementation project.

`

5. Summary, Findings and Recommendations

A questionnaire and survey were developed to obtain information on New England state transportation agency cost-sharing mechanisms, QA paperwork, and upcoming PSE/PCE projects for use in a pilot test during the next phase of this study. Four states responded to the cost-share mechanism questionnaire and four states responded to the QA paperwork/pilot project survey. Paperwork was obtained from two state agencies for comparison, and three agencies shared a list of fabricators for their upcoming PSE/PCE manufacture.

This study found that agency cost sharing is agreement and project based, therefore inspection services can be billed to a project, regardless of the employer of the QA inspector. A list of PSE/PCE fabricators to be used in upcoming agency projects was compiled from the survey responses. Shiftplanning software was explored as a possible candidate for tracking and documenting shared QA resources.

These findings suggest the following recommendations for the coming stages of this study:

- Since majority of agencies (all that responded to surveys) use consultant QA inspectors, in future, the QA inspection consultant companies should also be surveyed regarding the information on QA checklists and other associated paperwork. Furthermore, only two agencies provided samples of their QA inspection checklists and forms, it would be helpful to have these from all six New England DOTs in order to provide a single check-list.
- The Shift Planning system that is currently used by VTrans has tremendous potential to serve as a single system with access to shared QA resource inventory, scheduling of QA inspectors, and for tracking of effort (hours). All New England DOTs are strongly recommended to use the trial provided by VTrans to explore this system and consider it as part of the pilot test for shared QA inspection of PCE and PSE.
- Selection of project for pilot testing requires a continuous update from all agencies. A shared web repository for upcoming projects is recommended as a way for all agencies to be aware of upcoming projects and their timing. A cost-share agreement (similar to agreements in appendix to this report and those discussed in chapter 2) will be necessary between the agencies participating in the pilot testing.

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Appendix A: Cost-share Mechanism Questionnaire and Results

Cost-share Mechanism Questionnaire

1. Are there established mechanisms in place to invoice and receive funds if the Agency were to conduct work for out of state agencies?

2. Are there established mechanisms for paying invoices that are submitted to the Agency for work done on a specific project by a different State's DOT?

3. Has the Agency previously received invoices from a different public agency (outside of state jurisdiction) for work that was conducted for the Agency? How were funds transferred to the unit that conducted the work?

4. Has the Agency received funds for work that they conducted for a different public agency? What was the mechanism for invoicing? How were funds transferred to the unit that conducted the work?

5. Will there be any additional paperwork or approvals necessary if a project needed to use a different DOT's effort (whereby that DOT will invoice the Agency for the work)?

6. Do you have any recommendations for processes that should be adopted to streamline the use of shared resources by DOTs in terms of invoicing and payment?

7. Are there examples of interstate agency projects where two agencies worked in the same border area? Were there any funds transferred between agencies in such projects? How were the funds transferred to the unit that conducted the work?

8. What are the current rates that the Agency pays for PSE/PCE inspections? (Rates for Consultants or Agency Employees)

9. Do current state regulations allow for third party (private and State Agencies) inspections?

The above questions were provided to agencies prior to interviews and allowed for agency staff to develop responses that were then collected during the interviews. During the interview, two main questions as shown below were focused:

1. Does your State have the capability to enter into a contract with another State's agency for that other State to provide services that are project specific? This would include billing you for services and your State's paying for same.
2. Does your state have the ability to enter into a contract with another state to provide them services and bill them for those services and receive payment?

For clarification, the services that you or the other State would provide would include inspection performed by in house personnel as well as services provided by contracts that other state would have in place. The contract personnel would have to be approved ahead of time by the agency from your State that the services are provided to.

`

CTDOT: cost-share mechanism interview, notes

1. Are there established mechanisms in place to invoice and receive funds if the Agency were to conduct work for out of state agencies?
   - MassDOT
     - Share a Federal Grant using billing and reimbursement
   - NYSDOT
   - Towns and Counties
     - Municipalities pay up front for sevices

2. Are there established mechanisms for paying invoices that are submitted to the Agency for work done on a specific project by a different State's DOT?
   - Yes, with MassDOT right now.
   - NYSDOT

   Each agreement is different. Really depends on the business terms.

3. Has the Agency previously received invoices from a different public agency (outside of state jurisdiction) for work that was conducted for the Agency? How were funds transferred to the unit that conducted the work?
   - PeopleSoft Statewide Accounting System

4. Has the Agency received funds for work that they conducted for a different public agency? What was the mechanism for invoicing? How were funds transferred to the unit that conducted the work?
   - PeopleSoft Statewide Accounting System

5. Will there be any additional paperwork or approvals necessary if a project needed to use a different DOT's effort (whereby that DOT will invoice the Agency for the work)?
   - Agreement beforehand. May be able to get sample agreement between MassDOT and CTDOT. State Attorney General for approval.

6. Do you have any recommendations for processes that should be adopted to streamline the use of shared resources by DOTs in terms of invoicing and payment?
   - Pilot would help inform the question
   -

7. Are there examples of interstate agency projects where two agencies worked in the same border area? Were there any funds transferred between agencies in such projects? How were the funds transferred to the unit that conducted the work?
   - With MassDOT on FEMA project.

8. What are the current rates that the Agency pays for PSE/PCE inspections? (Rates for Consultants or Agency Employees)

`

Consultants:

- Classification and rates for the consultant inspectors
- Panoni and KTA are consultants for CTDOT.
    - Are consultants held responsible if the inspection is not done correct?
- Very project specific to consultant inspectors regarding accounting and coding so that costs are billed to the project.

Agency Employees:

- Actual agency cost will have reimbursed along with fringe

9. Does the Agency pay for additional Inspector training?

10. Do current state regulations allow for third party (private and State Agencies) inspections?

Miscellaneous:

- State of Connecticut cannot hold other parties harmless in context of liability of the state.

`

MEDOT: cost-share mechanism interview, notes

1. Are there established mechanisms in place to invoice and receive funds if the Agency were to conduct work for out of state agencies?
   -yes
2. Are there established mechanisms for paying invoices that are submitted to the Agency for work done on a specific project by a different State's DOT?
   -yes
3. Has the Agency previously received invoices from a different public agency (outside of state jurisdiction) for work that was conducted for the Agency? How were funds transferred to the unit that conducted the work?

4. Has the Agency received funds for work that they conducted for a different public agency? What was the mechanism for invoicing? How were funds transferred to the unit that conducted the work?
   -Yes, Sarah M Long Bridge project. ME took lead, billed NH for services based on interagency agreement
5. Will there be any additional paperwork or approvals necessary if a project needed to use a different DOT's effort (whereby that DOT will invoice the Agency for the work)?

   Process will have to be laid out better.

6. Do you have any recommendations for processes that should be adopted to streamline the use of shared resources by DOTs in terms of invoicing and payment?

7. Are there examples of interstate agency projects where two agencies worked in the same border area? Were there any funds transferred between agencies in such projects? How were the funds transferred to the unit that conducted the work?

   Samples tested by other DOTs would be charged against a project. Everything is assigned a specific project number.

8. What are the current rates that the Agency pays for PSE/PCE inspections? (Rates for Consultants or Agency Employees)

   Rates are different with every consultant. Kevin can provide agency employee cost information.

9. Do current state regulations allow for third party (private and State Agencies) inspections?

`

Summary Questions:

1. Does your State have the capability to enter into a contract with another State's agency for that other State to provide services that are project specific? This would include billing you for services and your State's paying for same.

   Yes, NHDOT is one that they have contracted before. Maintenance of bridge and road. Samples are possible.

2. Does your state have the ability to enter into a contract with another state to provide them services and bill them for those services and receive payment?

   Yes, MaineDOT has contract with NHDOT where they are taking lead of contract.

   Yes, system is set up to recover costs at personnel level.

   For clarification, the services that you or the other State would provide would include inspection performed by in house personnel as well as services provided by contracts that other state would have in place. The contract personnel would have to be approved ahead of time by the agency from your State that the services are provided to.

   Would be concerned about risk and liability. Potential for unnecessary administrative burden.

   One potential would be to advertise as a group (all New England DOTs) to inspection services. Then issue assignment letter.

   Sarah Long Mildred: Maine lead, MaineDOT hired all inspectors, inspectors did all QAI and taking the total bill at the final point is split.

`

VTrans: cost-share mechanism interview, notes

1. Are there established mechanisms in place to invoice and receive funds if the Agency were to conduct work for out of state agencies?

   Billing agreements with other states and well as Canada.

2. Are there established mechanisms for paying invoices that are submitted to the Agency for work done on a specific project by a different State's DOT?

   Billing agreements with other states and well as Canada.

3. Has the Agency previously received invoices from a different public agency (outside of state jurisdiction) for work that was conducted for the Agency? How were funds transferred to the unit that conducted the work?

   VTrans has ability to recuperate their costs for use of agency employee. They have a slightly different system for overhead calculation that is FHWA approved.

4. Has the Agency received funds for work that they conducted for a different public agency? What was the mechanism for invoicing? How were funds transferred to the unit that conducted the work?

   Does not seem to have difficult in receiving funds. Mechanisms might be there to receive funds, may struggle with politics.

5. Will there be any additional paperwork or approvals necessary if a project needed to use a different DOT's effort (whereby that DOT will invoice the Agency for the work)?

   Depending on dollar amount assign-off by CFO, possibly Legal and possibly Secretary depending on the scope of such agreement. Agreement will also be reviewed by their contract admin unit.

6. Do you have any recommendations for processes that should be adopted to streamline the use of shared resources by DOTs in terms of invoicing and payment?

7. Are there examples of interstate agency projects where two agencies worked in the same border area? Were there any funds transferred between agencies in such projects? How were the funds transferred to the unit that conducted the work?

8. What are the current rates that the Agency pays for PSE/PCE inspections? (Rates for Consultants or Agency Employees)

`

State employees: $38 - $60/hours (loaded rate) + Overtime $30 - $40/hour (without benefits); (Payroll load factor does not apply to overtime). Usually stay 30% of time and have hotel and meal expenses.

Consultants: $60 – $80 (PCI Level 2 or 3) and overtime $80 - $120 (Overtime) + Additional Costs (Hotels and Meals). Consultant inspectors staying out of time about 97% of time. Consultants don't get paid for travel but receive mileage once per job.

Current Consultants: JTC, HRV, Terracon (good until October 2019)

9. Do current state regulations allow for third party (private and State Agencies) inspections?

Maintenance and operations conducts winter maintenance and sometimes summer projects.

Responses to Summary Questions:

1. Does your State have the capability to enter into a contract with another State's agency for that other State to provide services that are project specific? This would include billing you for services and your State's paying for same.

2. Does you state have the ability to enter into a contract with another state to provide them services and bill them for those services and receive payment?

For clarification, the services that you or the other State would provide would include inspection performed by in house personnel as well as services provided by contracts that other state would have in place. The contract personnel would have to be approved ahead of time by the agency from your State that the services are provided to.

Miscellaneous:

For consultant contracts they have contract manager, not sure if it might be a barrier. At present, financial system is not set-up to be able to do Consultant to DOT to DOT billing and invoice.

Another challenge might be where there would have to be pre-authorization to bill/pay other state within the project.

VTrans already has approval to be able to share use of ShiftPlanning for all six New England agencies. Consultant inspectors are also in ShiftPlanning. Kyle sets up QA inspections in ShiftPlanning and that is what consultant inspectors use to plan their visits. They also clock-in and clock-out when at plant.

ShiftPlanning allows to look at capacity of inspectors at plant so that planning can be done in terms of how many inspectors are at a site.

`

For non-critical PCE it might be better since lot of times there is no one at plant, however if sharing of inspection resources is done then there is greater chance that at least someone is there.

`

NHDOT: cost-share mechanism survey

1. Are there established mechanisms in place to invoice and receive funds if the Agency were to conduct work for out of state agencies?
    a. –Yes, there are established mechanisms/processes in place to invoice and receive such funds.

2. Are there established mechanisms for paying invoices that are submitted to the Agency for work done on a specific project by a different State's DOT?
    a. -Yes, there are established mechanisms/processes in place to pay such invoices.

3. Has the Agency previously received invoices from a different public agency (outside of state jurisdiction) for work that was conducted for the Agency? How were funds transferred to the unit that conducted the work?
    a. -Yes, Invoice submitted would be paid thru the NH ERP system and a check or ACH deposit would follow.

4. Has the Agency received funds for work that they conducted for a different public agency? What was the mechanism for invoicing? How were funds transferred to the unit that conducted the work?
    a. -Yes, invoicing occurs thru the NH ERP system, typical payment from a non-state agency entity is usually received in the form of a check (ACH typical for Federal billings/draws) and is deposited to the revenue accounts associated with the activity billed.

5. Will there be any additional paperwork or approvals necessary if a project needed to use a different DOT's effort (whereby that DOT will invoice the Agency for the work)?
    a. As the question is posed, we are not aware of any.

6. Do you have any recommendations for processes that should be adopted to streamline the use of shared resources by DOTs in terms of invoicing and payment?
    a. No recommendation for processes that should be adopted to streamline invoicing and payments. Current mechanisms/processes in place work well.

7. Are there examples of interstate agency projects where two agencies worked in the same border area? Were there any funds transferred between agencies in such projects? How were the funds transferred to the unit that conducted the work?
    a. -Yes-Invoicing performed by one state would be invoiced to the other state on projects on shared ownership of assets. Funds would be transferred as mentioned above.

8. What are the current rates that the Agency pays for PSE/PCE inspections? (Rates for Consultants or Agency Employees)
    a. -Varies between employees (actual salary and determined benefits) and the various approved consultant contracts.

`

9. Do current state regulations allow for third party (private and State Agencies) inspections?
    a. –Yes, for example, State of New Hampshire, Department of Environmental Resources (DES) will perform bridge scour inspections on behalf of the Department of Transportation.

`

Appendix B: QA Survey

NETC 13-3 QA Survey

Start of Block: Default Question Block

NETC 13-3 Phase-II: Agency Survey

The purpose of this survey is to understand and gather samples of all quality assurance process documentation for precast and prestressed concrete elements (PSE/PCE) used in highway construction. This survey is being conducted as part of the New England Transportation Consortium (NETC) study 13-3 (phase II). The following questions aim to identify all PSE/PCE QA documentation that is generated, from project planning through fabrication and project completion, by State Transportation Agencies or by third-party manufacturers/inspectors. The next phase of the study will undertake pilot implementation of the unified QA process for various New England transportation agencies. This survey also intends to identify construction projects occurring between March 2019 and February 2020. This survey should take approximately 15 minutes to complete.

Thank you for taking the time to help us learn more about streamlining this QA process.

During inspections, does the Agency use a standard checklist/forms/reports or inspection documenting software of PSE/PCE QA inspections? (select all that apply)

- ☐ Yes, Inspection checklists and/or forms
- ☐ Yes, Inspection documenting software (iPad, etc.)
- ☐ No
- ☐ Other (briefly describe) _____

`

As part of this study we would to collect samples of different standard forms and checklists that are used by your agency during the QA inspection process. Please upload samples of various forms and checklists (please combine all files into a single ZIPPED file prior to upload). Alternatively you can email them by clicking here: UPLOAD FILES VIA EMAIL

Are there any projects planned at your agency between March 2019 and February 2020 that require fabrication of PSE/PCE?

- ○ Yes
- ○ No

Will any of the projects occurring between March 2019 and February 2020 that will require fabrication of any of the following items (or comparable items) from your agency's specifications? Select all that apply.

	Element Type		
	PSE	Structural PCE	Non-structural PCE
	☐	☐	☐

Which fabricator(s) will produce the Pre-stressed Elements (PSE) for the upcoming project(s), where are they located and when (tentatively) are the elements scheduled to be produced?

_____

_____

_____

`

_____

_____

Which fabricator(s) will produce the Structural Precast Elements for the upcoming project(s), where are they located and when (tentatively) are the elements scheduled to be produced?

_____

_____

_____

_____

_____

Which fabricator(s) will produce the Non-structural Precast Elements for the upcoming project(s), where are they located and when (tentatively) are the elements scheduled to be produced?

_____

_____

_____

_____

_____

Can the Agency provide design plans for the upcoming project(s)?

- ○ Yes
- ○ No

`

In your opinion, are any of the upcoming Agency projects good candidates for pilot implementation in Phase III? If yes, please identify projects?

- ○ Yes (please identify projects) _____
- ○ No

Please identify whether your agency uses employed inspectors, consultant inspectors or both for QA process of PCE and PSE.

- ○ Only agency employees
- ○ Only consultants
- ○ Both agency employees and consultants

Please provide list of consultant inspection companies that your agency currently use (will have contracts with in 2019 and potentially 2020):

- ○ Consultant Company Name _____
- ○ Consultant Company Name _____
- ○ Consultant Company Name _____
- ○ Consultant Company Name _____

End of Block: Default Question Block

Start of Block: End of Survey

`

END OF SURVEY

Please click on "Submit Survey!" button to submit your survey.

NOTE: By clicking "Submit Survey!" button here you will end the survey and you will be unable to go back and review or revise your responses.

Thank you for your willingness to participate in this NETC 13-3 Phase-II study! If you need any additional information about this survey or about the project, please contact Dr. Eshan Dave eshan.dave@unh.edu

End of Block: End of Survey

`

Appendix C: QA Paperwork and Design Specifications

CTDOT: PCC Inspector's Daily Work Report:

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS TESTING
PORTLAND CEMENT CONCRETE (PCC) INSPECTOR'S DAILY WORK REPORT
MAT-108 PCC

Rev. 6/2017

PLANT INFORMATION
DATE:
PLANT NAME:
LOCATION:
PLANT MANAGER & PHONE NUMBER:
INSPECTOR'S NAME:
PROJECT #:

ITEM BEING INSPECTED
ITEM DESCRIPTION:
FORM INSPECTED:
DID FORM MEET REQUIREMENTS?
NON CONFORMANCE:
REMARKS:

CONCRETE POUR
TIME:
TEMP. OF CONCRETE:
TEMP. OF BUILDING:
AIR:
SLUMP:
DID CONCRETE POUR MEET REQUIREMENTS?
NON CONFORMANCE:
REMARKS:

WITNESS CYLINDER BREAKS
BREAKS:
DID BREAKS MEET REQUIREMENTS?
NON CONFORMANCE:
REMARKS:

`

TRAVEL INFORMATION

Enter Start and End times for actual time at the plants or projects.

Start Time: _____
End Time _____

Total Overtime Hours: _____
Check off appropriate box for vehicle used for travel.

☐ **State Vehicle** ☐ **Personal Vehicle**

END OF DAY REMARKS

VTrans Cement/Rebar Sample Card:

for Cement & Flyash samples

TA 182H Rev. 1000 8-07

VERMONT AGENCY OF TRANSPORTATION
MATERIALS AND RESEARCH DIVISION
MONTPELIER, VERMONT 05602

REPORT ON SAMPLE OF PORTLAND CEMENT

Proj. Name _____ **Proj. No.** _____

Lab No. _____ **I.D. Marks** _____ **Quant. Represented** _____

Name _____ **Pay Item** _____ **Type** _____

Sample/Submitted By _____ **Title** _____ **Tested By** _____

Sampled _____ **Received** _____ **Tested** _____ **Reported** _____

Date Ground _____ **Resident** _____

Sample From _____ **Plant** _____

Source _____

Location Used/To Be Used _____ **Exam, For** _____

for rebar samples

LABORATORY NO. _____ Date Rcv'd @ Lab. ___/___/___

Name of Pay Item _____ Pay Item No. _____

Material Name _____ Type _____ Mat. Spec. No. _____

Quantity Rep. _____ Line Item No. _____ Date Sampled ___/___/___

Sample Type: A=☐ = ☐ Where Sampled _____ _____ Time _____
(In-Place, Stockpile, Pit, Truck, etc.) Tank

Sample Source _____
(Location on Project, Plant Name etc.)

Material Source _____
(Supplier, Producer, Manufacturer etc.)

Project Name _____ No. _____

Ident. No. _____ Comparison Sample? ☐ X-Ref No. _____
(Release, Lot, Cert.)

Sampled by (Print Name) _____

Comments _____
(Rebar, Hot-Mix, Admixtures, and/or any other pertinent information)

`

VTrans PR4 PCE/PSE Concrete QC Report:

Click to Name PR4 Sheet

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS AND CERTIFICATIONS DIVISION - STRUCTURAL CONCRETE SUBDIVISION

PRECAST-PRESTRESSED CONCRETE QUALITY CONTROL REPORT

Project Name & Number	GEORGIA IM CULV(25)	Req. Release	2500
Fabricator	American Concrete	Date of Cast	01-08-17
		Amb. Temp	75

QC Post pour (Who and date)	Post Pour Dimensions ok date	Post Pour Repair Done date*	Certifications Complete	NCR (name and completion date)	Final inspection and Shipping Date	Remarks:
John Doe	02-05-17	09-05-17	Yes	NCR #1 5/7/17	10-06-17	NCR for large spall

* Don't forget to fill in the post pour Info for each piece here

*Use this button to name PR4 ***AFTER*** member ID added to list

*Fill in below required stengths for each:

Concrete Test Record											Cylinder Test Record												
Member	Date	Truck No.	Cubic Yards	Time Loaded	Time Empty	Slump (in.)	Air (%)	Temp (F)	Vsi	Unit Weight	Test Cyl. 1	Test Cyl. 2	Test Cyl. 3	Date	Time	Age	Psi of Test Cyl. 1	Psi of Test Cyl. 2	Psi of Test Cyl. 3	Test Ave.	Stripping xxxx PSI 2,500	Moving xxxx PSI 2,500	Design xxxx PSI 6,000
C4-1	01-08-17		2.25	11:18 AM	11:25 AM	26 1/4"	6	83	1	143	66,330	67,930		02-08-17	6:25 AM	17	5,278	5,406		5,342	5,342	5,342	6,313
											79,580	79,080		03-08-17	10:45 AM	2 day	6,333	6,293		6,313			
																				0			
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																				0			

*Enter Member ID above and then use button to generate name for sheet

*one member per sheet

*Once test cylinders reach each strength needed, copy the PSI from test Ave column to the appropriate spot above, replace the # with the PSI

No. & condition of Temperature Recorders:		**Remarks:**	**Inspected By:**
Accelerated Curing Delay Period:			K. Moulton
Curing:			**Final Report Prepared By:**
Rate of Temperature Increase:			
Maximum Temperature Reached:			**Date:**

`

510 Pre-Stress Concrete
Plant Inspector Workflow and Expectations

Pre-Production Activities:

Review VTrans Specifications and Applicable Quality documents:
- Standard Specifications, specifically the 510 section.
- Material Sampling Manual
- The producer's Quality System Manual

Become familiar with the contract documents that apply to the Pre-Cast items.
- Project Plans
- Standard Details
- Special Provisions

Become familiar with the Shop Drawings

Develop a Sampling and Certification table. The intent of the table is to document what samples will be taken and what certifications are required before production starts. Contact the Concrete Technician Supervisor with any questions regarding testing protocol.

Attend the pre-production meeting. The pre-production meeting is the best time to clarify any questions or concerns that may have come up during your review of the project. The production schedule will be discussed at the Pre-Production meeting. Exchange contact information with key personal.

Production Activities:

Materials

Verify the Mix design on the shop drawings has been approved for use in the last 12 months.
Verify the Calibration records for the testing equipment are up to date.
Start taking material samples. Samples should be taken randomly throughout production of the pieces. Arrange for delivery of the samples to the Central Lab.
Collect Notice of Certifications and compare to the material that is being incorporated into the work.
If a material is being used that requires a certification, and you have not received the Notice of Certification yet, document the material so that it can be checked against the Notice of Certification when it is received.
Continue to track and document the Materials utilizing the Material and Certification table.

Pre-Pour activities

Monitor the forms being constructed and compare to the project requirements. It is in everyone's interest to bring forward any deficiencies that you notice, but it is important that VTrans does not take the place of good QC practices at the plant.

`

Ensure that the work is progressing in accordance with the Quality Systems Manual.
Witness the tensioning of the strands, verify the tension force and elongation.
Before you start your pre-pour inspection make sure that the producer has completed all the "checks" in their Quality Systems Manual.
If a deficiency is found in the pre-pour inspection notify Quality Control. If the situation is not addressed to your satisfaction notify the Concrete Technician Supervisor. Photograph the deficiency and document it in your daily work report. If the producer insists on pouring concrete before the issue is resolved do not authorize or inspect the pour. Specification 540.07 (e) requires the inspector to approve the placement of concrete. VTrans will not accept any work that has not had the placement approved or the work was not properly inspected. As an inspector do not feel compelled to debate acceptance decisions with a Fabricator.

Concrete Placement
Verify that the required Quality Control has occurred for the batching of the concrete.
Verify that the correct concrete wet tests are being conducted, and they meet specification; document the results on the PR 4 form.
Verify that the forms are not deflecting and inserts and rebar are not being displaced by the placement method.
Observe the pour to make sure that the concrete has the required consistency and that the consolidation is adequate.
If something does not look right as the pour progresses notify QC.
If QC is not available or not responsive to your concerns, document as effectively as you can the issue and notify Concrete Technician Supervisor as soon as you're able to. Pictures and even Video is invaluable! You may need to wait until after the pour to contact the Concrete Technician Supervisor. The Concrete Technician Supervisor may direct you to request a Non-Conformance Report from the fabricator.
Verify that the correct finish is being applied to the piece.
Ensure that the initial cure is being applied as soon as practical.

Post Pour
Witness cylinder breaks to confirm that the de-tensioning strength has been attained.
Ensure the de-tensioning pattern is followed.
Periodically make sure that the cure is being maintained.
Record and Document temperatures if steam is being used.
If production is during cold weather, make sure that the temperatures are meeting specification.
Points of interest include cool down rate and the difference between ambient and the piece.
Get a copy of the temperature records and include them in the project file.
Ensure cylinders are with the piece so that the breaks are representative.
Observe cylinder breaks to ensure that stripping strength has been reached.
If possible, as the piece is stripped perform a cursory inspection of the piece to identify any spalls or cracking. The intent is to identify any significant damage as soon as possible so that we can have a better idea as to the cause of the damage.

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Once the piece is stripped make sure that the handling procedures detailed on the shop drawings are adhered to.
Ensure all stenciling and labeling is in an area that will be covered once the piece is installed.
Receive a copy of the producers post pour inspection from QC before you conduct your post pour. The QC and your inspection can be concurrent as long as the producer does not begin to rely on VTrans for post pour QC services.
Document all areas that need repair or are deficient in some way.
Does the repair classify as a minor repair outlined on the Specifications?
Does the repair meet the requirements for a pre-approved repair?
Document in the DWR any repair done that meets the definition of a pre-approved repair or a minor defect. If you are seeing a re-occurring trend notify Concrete Technician Supervisor.
If the repair needed is beyond the scope of a pre-approved repair procedure, notify the Fabricator that they need to submit a Non Conformance Report (NCR). Document the deficiency or non-conformity in your DWR. When you send in your DWR highlight the need for an NCR in the body of the e-mail in addition to the DWR.
If a NCR is submitted, you will be asked to review the NCR. Points of emphasis will be substantiating the condition of the piece and verifying the proposed repair is "constructible".
Inspect any repairs that are being conducted for conformance to the accepted repair procedure.
Take possession of the 28 day cylinders and make arrangements for them to be delivered to the Central lab.

Pre-Shipping

Verify that all certifications have been accepted and all samples have been taken. The sampling and Certification table should be completed.
Verify that all NCR's have been resolved and all repairs have been performed as required.
Perform one last inspection of the piece.

- Any damage that has not been identified?
- All dimensions correct?
- The required shipping strength has been attained?

Stamp the piece, and document the piece has been authorized to ship in your DWR and on the PR 7.

Post-Shipping

Assemble Project File containing:

- Weekly report
- Material Sampling and Certification Table
- Daily Work Reports
- Inspection Forms
- Producer QC reports and Test data sheets
- Approved NCR's
- Photos
- Certifications
- Aggregate reports

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VTrans PCE Workflow and Expectations:

540 Pre-Cast Concrete
Plant Inspector Workflow and Expectations

Pre-Production Activities:

Review VTrans Specifications and Applicable Quality documents:
- Standard Specifications, specifically the 540 section.
- Material Sampling Manual
- The producer's Quality System Manual

Become familiar with the contract documents that apply to the Pre-Cast items.
- Project Plans
- Standard Details
- Special Provisions

Become familiar with the Shop Drawings

Develop a Sampling and Certification table. The intent of the table is to document what samples will be taken and what certifications are required before production starts. Contact the Concrete Technician Supervisor with any questions regarding testing protocol.

Attend the pre-production meeting. The pre-production meeting is the best time to clarify any questions or concerns that may have come up during your review of the project. The production schedule will be discussed at the Pre-Production meeting. Exchange contact information with key personal.

Production Activities:

Materials

Verify the Mix design on the shop drawings has been approved for use in the last 12 months.
Verify the Calibration records for the testing equipment is up to date.
Start taking material samples. Samples should be taken randomly throughout production of the pieces. Arrange for delivery of the samples to the Central Lab.
Collect Notice of Certifications and compare to the material that is being incorporated into the work.
If a material is being used that requires a certification, and you have not received the Notice of Certification yet, document the material so that it can be checked against the Notice of Certification when it is received.
Continue to track and document the Materials utilizing the Material and Certification table.

Pre-Pour activities

Monitor the forms being constructed, compare to the project requirements, and take pictures of the process. It is in everyone's interest to bring forward any deficiencies that you notice, but it is important that VTrans does not take the place of good QC practices at the plant. Ensure that the work is progressing in accordance with the Quality Systems Manual. Before you start your pre-

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pour inspection make sure that the producer has completed all the “checks” in their Quality Systems Manual.

If a deficiency is found in the pre-pour inspection notify Quality Control. If the situation is not addressed to your satisfaction notify the Concrete Technician Supervisor. Photograph the deficiency and document it in your daily work report. If the producer insists on pouring concrete before the issue is resolved do not authorize or inspect the pour. Specification 540.07 (e) requires the inspector to approve the placement of concrete. VTrans will not accept any work that has not had the placement approved or the work was not properly inspected. As an inspector do not feel compelled to debate acceptance decisions with a Fabricator.

Concrete Placement

Verify that the required Quality Control has occurred for the batching of the concrete.
Verify that the correct concrete wet tests are being conducted, and they meet specification; document the results on the PR 4 form.
Verify that the forms are not deflecting and inserts and rebar are not being displaced by the placement method.
Observe the pour to make sure that the concrete has the required consistency and that the consolidation is adequate.
If something does not look right as the pour progresses notify QC.
If QC is not available or not responsive to your concerns, document as effectively as you can the issue and notify Concrete Technician Supervisor as soon as you’re able to. Pictures and even Video are invaluable! You may need to wait until after the pour to contact Concrete Technician Supervisor.
Concrete Technician Supervisor may direct you to request a Non-Conformance Report from the fabricator.
Verify that the correct finish is being applied to the piece.
Ensure that the initial cure is being applied as soon as practical.

Post Pour

Periodically make sure that the cure is being maintained.
Record and Document temperatures if steam is being used.
If production is during cold weather, make sure that the temperatures are meeting specification. Points of interest include cool down rate and the difference between ambient and the piece.
Get a copy of the temperature records and include them in the project file.
Ensure cylinders are with the piece so that the breaks are representative.
Observe cylinder breaks to ensure that stripping strength has been reached.
If possible, as the piece is stripped perform a cursory inspection of the piece to identify any spalls or cracking. The intent is to identify any significant damage as soon as possible so that we can have a better idea as to the cause of the damage.
Once the piece is stripped make sure that the handling procedures detailed on the shop drawings are adhered to.
Take pictures of the finished piece.

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Receive a copy of the producers post pour inspection from QC before you conduct your post pour. The QC and your inspection can be concurrent as long as the producer does not begin to rely on VTrans for post pour QC services.
Ensure all stenciling and labeling is in an area that will be covered once the piece is installed.
Document all areas that need repair or are deficient in some way.
Does the repair classify as a minor repair outlined on the Specifications?
Does the repair meet the requirements for a pre-approved repair?
Document in the DWR any repair done that meets the definition of a pre-approved repair or a minor defect. If you are seeing a re-occurring trend notify Concrete Technician Supervisor.
If the repair needed is beyond the scope of a pre-approved repair procedure, notify the Fabricator that they need to submit a Non Conformance Report (NCR). Document the deficiency or non-conformity in your DWR. When you send in your DWR highlight the need for an NCR in the body of the e-mail in addition to the DWR.
If a NCR is submitted, you will be asked to review the NCR. Points of emphasis will be substantiating the condition of the piece and verifying the proposed repair is "constructible".
Inspect any repairs that are being conducted for conformance to the accepted repair procedure.

Pre-Shipping
Verify that all certifications have been accepted and all samples have been taken. The sampling and Certification table should be completed.
Verify that all NCR's have been resolved and all repairs have been performed as required.
Perform one last inspection of the piece.

- Any damage that has not been identified?
- All dimensions correct?
- The required shipping strength has been attained?

Stamp the piece, and document the piece has been authorized to ship in your DWR and on the PR 7.

Post-Shipping
Assemble Project File containing:

- PR4
- PR 7
- Weekly reports
- Material Sampling and Certification Table
- Daily Work Reports
- Inspection Forms
- Producer QC reports and Test data sheets
- Approved NCR's
- Photos

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VTrans PCE Sampling List/Record:

PRE-CAST MATERIALS SAMPLING LIST/RECORD					
Materials	**Frequency**	**Date sample**	**Sampled by**	**Date received Certifications**	**Date sent to lab**
#3 rebar					
Rebar certification					
#4 rebar					
Rebar certification					
#5 rebar					
Rebar certification					
#6 rebar					
Rebar certification					
#7 rebar					
Rebar certification					
#8 rebar					
Rebar certification					
#9 rebar					
welded wire					
welded wire certification					
splice coupler					
splice coupler certification					
Cement					
Fly ash					
slag					
lifters certification					
inserts certification					
Misc. metal items certification					

Appendix D: Interagency Agreements

VTrans Interagency Agreement 1:

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

LEON S. KENISON
COMMISSIONER

RECEIVED
SEP 11 2000
STRUCTURES DIVISION

September 8, 2000

Mr. Warren Tripp
State of Vermont
Agency of Transportation
133 State Street
Montpelier, VT 05633

Re: Hinsdale, NH – Brattleboro, VT BRF-T-2000(019), 12210

Dear Sir or Madam:

Enclosed is your original copy and a copy of the approved Agreement covering the above subject project.

Sincerely,

Cindy Underhill
for *Michelle Drouin*
Contracts Administrator

md/s
Enclosure

JOHN O. MORTON BUILDING - 1 HAZEN DRIVE - P.O. BOX 483 - CONCORD, N.H. 03302-0483
TELEPHONE: 603-271-3734 FAX: 603-271-3914 TDD ACCESS: RELAY NH 1-800-735-2964

INTERSTATE AGREEMENT

STATE OF NEW HAMPSHIRE AND STATE OF VERMONT

HINSDALE, N.H. - BRATTLEBORO, VT

FEDERAL PROJECT NO. BRF-T-2000(019)

STATE PROJECT NO. 12210

DESIGN PHASE - PART I
TYPE-SIZE-LOCATION (TSL) STUDY

THIS AGREEMENT is made this July 24, 2000 by and between the Department of Transportation, State of New Hampshire and the Agency of Transportation, State of Vermont, as follows:

1. The State of New Hampshire will perform a Type-Size-Location (TSL) Study, to include a preliminary geotechnical program, for the new bridge carrying relocated NH Route 119 over the Connecticut River and New England Central Railroad between the Towns of Hinsdale, New Hampshire and Brattleboro, Vermont.

2. The division of costs for this design phase only will be 50% Vermont and 50% New Hampshire. This division of costs shall apply to all Study costs incurred after the date of approval of this Agreement.

3. The State of New Hampshire will pay all of the costs for work performed under this Agreement. The State of Vermont will reimburse the State of New Hampshire for their portion of the costs as indicated in paragraph 2 of this Agreement.

4. The State of Vermont will make progress payments, if requested, based upon bills rendered by the State of New Hampshire. The State of Vermont will pay the State of New Hampshire for its portion of the costs following completion and final acceptance by the State of Vermont of the TSL Study and the rendering of bills based on the audited final costs.

5. The State of Vermont shall have the right at all reasonable times to inspect and review all work, plans, contracts and documents contemplated by this Agreement, including, but not limited to, accounting and auditing records upon which the costs to the State of Vermont are to be based.

6. The State of Vermont will conduct all necessary hearings or meetings required to be held in Vermont, and the State of New Hampshire will provide the necessary plans or other information for those meetings.

7. Upon completion of this design phase by the State of New Hampshire and the written acceptance by the State of Vermont, a new Agreement covering further design services and the associated division of costs will be processed.

HINSDALE, N.H. - BRATTLEBORO, VT

FEDERAL PROJECT NO. BRF-T-2000(019)

STATE PROJECT NO. 12210

DESIGN PHASE – PART I
TYPE-SIZE-LOCATION (TSL) STUDY

8. This Agreement, and all obligations of the parties hereunder, shall become effective on 9/1/00 or on the date of approval of this Agreement by the Governor and Executive Council of the State of New Hampshire, whichever is later.

This Agreement executed on the day and date first above written.

STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

By: _____
Commissioner

STATE OF VERMONT
AGENCY OF TRANSPORTATION

By: _____
Secretary

This Agreement has been reviewed and is approved as to form and execution.

8/22/00
7-24-2000
Date

Office of Attorney General
State of New Hampshire

7-24-00
Date

Office of Attorney General
State of Vermont

This is to certify that the GOVERNOR AND EXECUTIVE COUNCIL of the State of New Hampshire on 9/6/00 approved this Agreement.

Dated: 9/6/00

Attest:

By: _____
DEPUTY Secretary of State
State of New Hampshire

VTrans Interagency Agreement 2:

INTERSTATE AGREEMENT

STATE OF NEW HAMPSHIRE AND STATE OF VERMONT

CORNISH, NH – WINDSOR, VT

CONNECTICUT RIVER BRIDGE NO. 9 - NH BR. NO. 064/108

NH FEDERAL PROJECT NO. A003(035) - NH STATE PROJECT NO. 25067

DESIGN AND CONSTRUCTION PHASES

THIS AGREEMENT is made this 05 day of January, 2016 by and between the State of New Hampshire, represented by its Department of Transportation, hereinafter referred to as the NHDOT, and the State of Vermont, represented by its Agency of Transportation, hereinafter referred to as VTrans, as follows:

1. The NHDOT will prepare and administer the design and construction of a project to rehabilitate the existing bridge carrying Cornish Toll Bridge Road over the Connecticut River (NH Br. No. 064/108 and Connecticut River Br. No. 9) between the Towns of Cornish, NH, and Windsor, VT. The work will design and construct/install Partially Grouted Riprap (PGR) as scour protection for the abutments and pier of the 2-span timber covered bridge and all associated work.

2. The NHDOT was successful in applying for and receiving $1,632,000.00 in funds from the Federal Highway Administration (FHWA) National Historic Covered Bridge Preservation Program for the proposed work. The $1,632,000.00 grant amount will be applied to the costs for the entire project, with $1,600,000.00 being designated for construction costs and $32,000.00 being allocated for preliminary engineering (design) costs. The division of all remaining costs for this project that exceed the total $1,632,000.00 amount shall be shared as follows:
   a. Design Costs:
      - All design costs for the bridge portion of the project, as designed by the NHDOT and reviewed and approved by VTrans, shall be charged at 33% Vermont and 67% New Hampshire. This division of costs is computed based on there being three (3) total substructure units for this bridge; one (1) abutment in Vermont; and; one (1) pier and one (1) abutment (2 substructure units) in New Hampshire. The above percentages shall apply to preliminary design, final design, and design overhead costs. Of the $32,000.00 of grant funds allocated for design efforts, $21,334.00 (67%) shall be applied to the NHDOT share of these costs and $10,666.00 (33%) shall be applied to the VTrans share of these costs. All remaining design costs shall be shared at 33% Vermont and 67% New Hampshire and currently estimated at $76,000.
      - NHDOT shall perform all the necessary design for the PGR scour countermeasures for the westerly abutment located in Vermont, the pier located in New Hampshire, and the easterly abutment located in New Hampshire, and shall incorporate that design in the overall project plans. For work performed by NHDOT relative to project scoping and determination of project and structure limits, the costs shall be shared on the basis of the percentages indicated above. Costs incurred by VTrans in coordinating the design with NHDOT or in providing review of the NHDOT design shall be paid 100% by VTrans.
   b. Environmental, Archaeological, and Cultural Resource Costs:
      - VTrans shall reimburse NHDOT 100% for the cost of any work regarding environmental, archaeological, and cultural resources that is located in or associated with Vermont but that is performed or administered by NHDOT.
      - NHDOT shall be responsible for 100% of the cost of any work regarding environmental, archaeological, and cultural resources that is located in or associated with New Hampshire.
   c. Right-of-Way Costs:
      - All Right-of-Way costs incurred for this project by each State shall be paid in their entirety by the State for which the costs were incurred and shall not be included in any shared costs.

d. Construction Costs:

- The NHDOT will pay all costs for all work performed by the NHDOT, other NH agencies, consultants, and contractors in the construction of this project, including construction engineering and overhead costs. VTrans shall reimburse the NHDOT for its share, as follows:

  - It is the general intent that all construction costs be shared as described above in Paragraph 2(a) of this Agreement, i.e., 33% Vermont and 67% New Hampshire. However, VTrans shall reimburse NHDOT for all costs for constructing the scour countermeasures to protect the abutment located in Vermont, based on the actual cost of materials and work performed for the Vermont abutment. This shall include the costs for any substructure repairs (if needed) and all environmental work. The contract plans will indicate estimated quantities to install scour countermeasures for and perform repairs to the Vermont abutment.
  - VTrans shall reimburse NHDOT for the Vermont portion of the costs for Field Offices, all Traffic Control items, Mobilization, and any other items not otherwise specified. These costs shall be shared as described above in Paragraph 2(a) of this Agreement, i.e., 33% Vermont and 67% New Hampshire.
  - Of the $1,600,000.00 of grant funds allocated for construction efforts, $528,000.00 (33%) shall be applied to the VTrans share of these costs and $1,072,000.00 (67%) shall be applied to the NHDOT share of the construction costs. The current Construction estimate for the project is $2,500,000.00.

3. VTrans will make progress payments, if requested, based upon bills rendered by the NHDOT. Any bills sent to VTrans for project payment shall show all previous payments made by VTrans for this project as a credit toward the amount owed to the NHDOT for each phase. Following completion, final inspection, and acceptance by VTrans of the portion of the project within the State of Vermont and the rendering of bills for that portion by the NHDOT to VTrans, VTrans will pay the NHDOT for the remainder of its portion of the audited final costs.

4. VTrans shall have the right at all reasonable times to inspect and review all plans, contracts, documents, books, vouchers and records pertaining to the bridge project contemplated by this Agreement, including, but not limited to, accounting and auditing records upon which the costs to VTrans are to be based.

5. VTrans will be responsible for acquiring any permits, utility agreements or other agreements, and any right-of-way acquisitions that relate solely to the Vermont portion of the project. Prior to advertisement for construction, VTrans shall provide copies to NHDOT of all permits, clearances, and agreements for which VTrans is responsible. All other permits, agreements, and acquisitions will be the responsibility of the NHDOT. All costs associated with obtaining the permits and agreements that are specifically for the bridge shall be shared as described above in Paragraph 2 of this Agreement.

6. The NHDOT will coordinate with VTrans relative to any Public Meetings. Further, the NHDOT will attend any such Public Meetings held in Vermont or New Hampshire to present the project and participate in discussions, as needed and as appropriate.

7. The NHDOT will submit preliminary plans to VTrans for review and comment. VTrans will respond in writing with their comments and approval prior to any substantive work being performed on the final design of the project by NHDOT. VTrans shall process its review and comment in a timely manner.

8. The NHDOT will send final contract documents to VTrans for review and comment. No portion of this project shall be advertised for construction until the review is complete and all comments resolved, at which time VTrans will approve in writing the advertisement of the project. VTrans shall process its review and comment in a timely manner.

INTERSTATE AGREEMENT
Cornish, NH – Windsor, VT
NH Federal Project No. A00(035)
NH State Project No. 25067

9. The NHDOT will give VTrans the opportunity to review the contract bids. The construction contract will not be awarded until NHDOT receives a letter of concurrence from VTrans. VTrans shall process its review and comment in a timely manner.

10. In exercising any of its rights under this contract to review documents and records pertaining to the pre-award process to select a Contractor to perform the work contemplated in this Agreement ("Confidential Information"), VTRANS recognizes and agrees that RSA 21-I:13-a renders such information confidential and nonpublic. Under this Agreement, therefore, VTRANS shall not be considered to be a member of the public for purposes of RSA 21-I:13-a and hereby agrees to not further disseminate the Confidential Information beyond VTRANS personnel essential to the project. VTRANS hereby represents that it is entitled to refuse to disclose the Confidential Information if such disclosure is requested by others pursuant to 1 V.S.A. 315 et seq., and that VTRANS agrees that it will refuse to disclose the Confidential Information upon such request.

11. NHDOT will notify VTrans when construction of this project is complete, at which time VTrans will inspect the portion of work located in Vermont and will notify the NHDOT of either acceptance of the project or items needing correction. The NHDOT will not make the final billing to VTrans until the Vermont portion has been accepted in writing by VTrans.

12. This Agreement, and all obligations of the parties hereunder, shall become effective on the date of approval of this Agreement by the Governor and Executive Council of the State of New Hampshire.

This AGREEMENT executed on the day and date first above written.

STATE OF NEW HAMPSHIRE
Department of Transportation

By: _____
Commissioner

STATE OF VERMONT
Agency of Transportation

By: _____

This AGREEMENT has been reviewed and is approved as to form and execution.

Date: 1/6/16

_____
Office of Attorney General
State of New Hampshire

Date: 12/1/2015

_____
Office of Attorney General
State of Vermont

This is to certify that the GOVERNOR AND COUNCIL of the State of New Hampshire on the _____ day of _____, 20____ approved this AGREEMENT as Item # _____.

Date: JAN 2 7 2016

ATTEST:

By: _____
Secretary of State of New Hampshire

DEPUTY SECRETARY OF STATE

VTrans Interagency Agreement 3:

INTERSTATE AGREEMENT

**STATE OF VERMONT, AGENCY OF TRANSPORTATION,
JOINED BY TOWN OF WEST HAVEN, VERMONT,
AND
WASHINGTON COUNTY, NEW YORK
WEST HAVEN TOWN HIGHWAY 3 BRIDGE NO. 10
OVER THE POULTNEY RIVER
PROJECT: WEST HAVEN BO 1443(51)**

THIS AGREEMENT is made this July 30, 2015 by and among the State of Vermont, Agency of Transportation ("State of Vermont" or "VTrans"), joined by the Town of West Haven, Vermont ("Town of West Haven"), and the Department of Public Works, Washington County, New York ("Washington County") as follows:

1. Bridge Replacement Project; VTrans as Lead Agency. VTrans will design and complete a bridge replacement for bridge #10 on Town Highway #3, in the Town of West Haven, County of Rutland, State of Vermont, over the Poultney River between the towns of West Haven, Vermont and Whitehall, New York. The Vermont portion of the bridge is owned by the Town of West Haven, Vermont.

2. Work to Date; Responsibility for Costs. The State of Vermont is responsible for all costs for work to date to finalize a Scoping Report, which outlines the objectives of the project and the goals that need to be met to achieve a satisfactory result. This includes the development of Conceptual plans and NEPA approval. The Final Scoping Report has been approved by VTrans management.

3. Design, Environmental Studies; Development of Right-of-Way Plans; Responsibility for Costs. The State of Vermont will pay for all costs for work performed during the design of the bridge and the approaches, including preliminary engineering, foundation investigation, design, environmental studies, and will assist Washington County with development of right-of-way plans. Washington County will reimburse the State of Vermont for 50% of these costs related to the bridge and the approaches based on the cost of the preferred alternative.

4. Washington County; Letter of Concurrence. Upon receipt, Washington County will provide timely review of the final scoping report, conceptual plans, and the federally approved NEPA document. Final design will not advance until the State of Vermont receives a letter of concurrence from Washington County.

5. Progress Payments; Final Costs. Washington County will make progress payments, as requested, based on upon bills rendered by the State of Vermont. Washington County will pay the State of Vermont for its portion of the final costs following completion and final acceptance by Washington County of the design portion of the project and the rendering of bills by the State of Vermont based on audited finals costs to Washington County.

6. Inspection of Records. Washington County will have the right at all reasonable times to inspect and review all work, plans, contracts, documents, books, vouchers and records pertaining to the bridge project contemplating by this Agreement, including but not limited to, accounting and auditing records upon which the costs to Washington County are to be based.

7. Hearings or Meetings. Washington County will conduct any necessary hearings or meetings required to be held in New York, and VTrans will provide the necessary plans or other information for those meetings. VTrans, with the cooperation of the Town of West Haven whenever appropriate, will conduct any necessary hearings or meetings required to be held in Vermont, and VTrans will provide the necessary plans or other information for those meetings.

8. Property Acquisition; Permits; Utility or Other Agreements. Upon the State of Vermont's providing information on additional right-of-way needed for the project, Washington County will be responsible for acquiring in timely manner all property within New York necessary for the construction of this project. VTrans, as agent for the Town of West Haven, will be responsible for acquiring all property within Vermont necessary for the construction of this project. All permits and utility or other agreements which relate solely to Washington County portion of the project will be obtained by Washington County. All other permits and agreements will be the responsibility of the State of Vermont.

9. Pre-bid Review and Approval of Plans; Additional Interstate Agreement. The State of Vermont will give Washington County the opportunity to review and approve the plans prior to advertising the project for bids. The project will not be advertised for construction until an interstate agreement covering the construction and construction inspection phase has been executed among the parties and approved by the Federal Highway Administration's New York Division.

10. Review of Construction Bids; Pre-award Concurrence. The State of Vermont will give Washington County the opportunity to review Contract bids. The construction contract will not be awarded until the State of Vermont receives a letter of concurrence from Washington County.

11. Effective Date. This agreement and all obligations of the parties hereunder, shall become effective on July 30, 2015.

* * * [Signature page follows] * * *

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed on the day and year first written above.

WASHINGTON COUNTY, NEW YORK
DEPARTMENT OF PUBLIC WORKS

By: _____
_____, Chairperson
Board of Supervisors

STATE OF VERMONT
AGENCY OF TRANSPORTATION

By: _____
Susan M. Minter/Christopher J. Cole
[Deputy] Secretary of Transportation

TOWN OF WEST HAVEN,
VERMONT

By: _____
_____, Chairperson
Board of Selectmen

This agreement has been review and is approved as to form and execution:

_____ Date: 6/8/15
Washington County Attorney

_____ Date: 4/28/2015
Office of the Attorney General
State of Vermont

_____ Date: 7/24/15
Town of West Haven, Vermont
Town Attorney