

Approach to Construction Inspection, Oversight and Statistical Validation I-595 Express: Public Private Partnership Oversight CEI

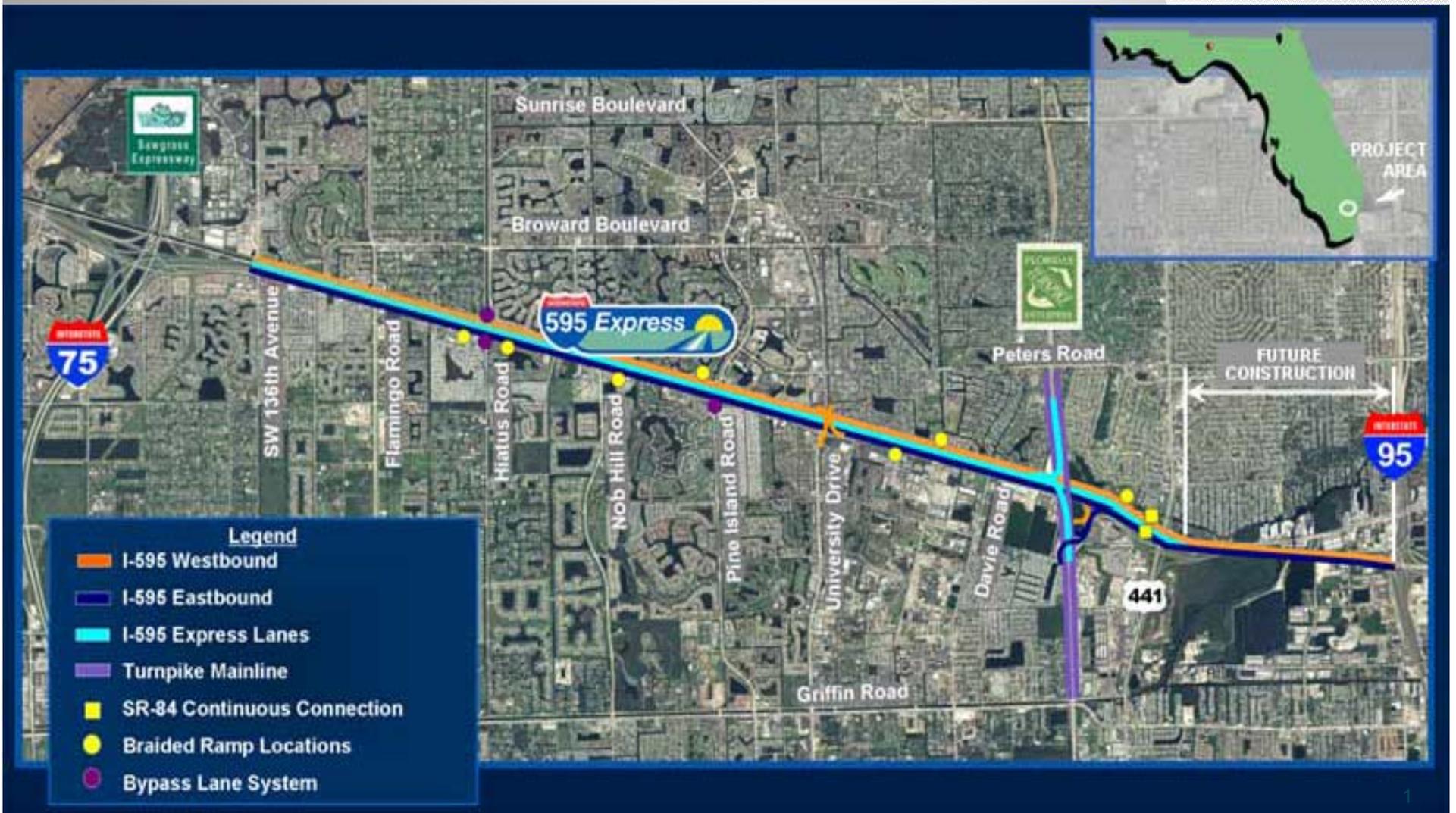


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 - ✓ Sample Personnel Proficiency Checklist

Project Overview

Project Description:

The east-west limits of the project extend from the I-75/Sawgrass Expressway interchange to the I-595/I-95 interchange in Central Broward County, Florida, for a total project length of approximately 10.5 miles. The north-south limits of the project include widening and reconstruction of the Florida's Turnpike mainline from Griffin Road to Peters Road (2.7 miles) to accommodate a direct connection to the express lanes. Highlights of the major improvement components include:

- Tolled reversible ground level express lanes to be known as 595Express, serving traffic to/from I-75/Sawgrass Expressway from/to east of SR 7, with a direct connection to Florida's Turnpike.
- Geometric improvements to the I-595 / Florida's Turnpike Interchange.
- Additional auxiliary lanes on the eastbound and westbound I-595 and SR 84 roadways.
- Continuous connection of the SR 84 frontage road between Davie Road and SR 7.
- Grade separated (braided) entrance and exit ramps.
- Combined ramps and cross-road bypasses.
- Construction of the New River Greenway, a component of the Broward County Greenways System.
- 13 sound barriers providing noise abatement for 21 communities.
- Implementation of Bus Rapid Transit (BRT) / Express Bus Service within the I-595 corridor.
- Accommodation of a transit envelope within the corridor, currently under development as part of the Central Broward East-West Transit Analysis.

Project Overview

Project Execution:

Under the Public Private Partnership (PPP) design-build-finance-operate-maintain agreement, FDOT received a fixed price for design, construction, operations and maintenance of I-595 for 35 years.

The private partner, I-595 Express, LLC (a consortium created by ACS Infrastructure Development), will be compensated using availability payments – a single, maximum annual amount based on the number of lanes made “available” which will pay for construction, operations and maintenance, including the future repaving of I-595. FDOT will make no payments until the project is completed – protecting the public interest and serving as a powerful incentive to accelerate construction.

Oversight Role

The Oversight CEI (OCEI) and the District Material's Office will monitor the Concessionaire's work to determine the progress and quality of work. Any deficiencies discovered will be addressed with the Concessionaire for resolution.

What are we validating?

- Concessionaire's Material Management
- Concessionaire's Inspection Management

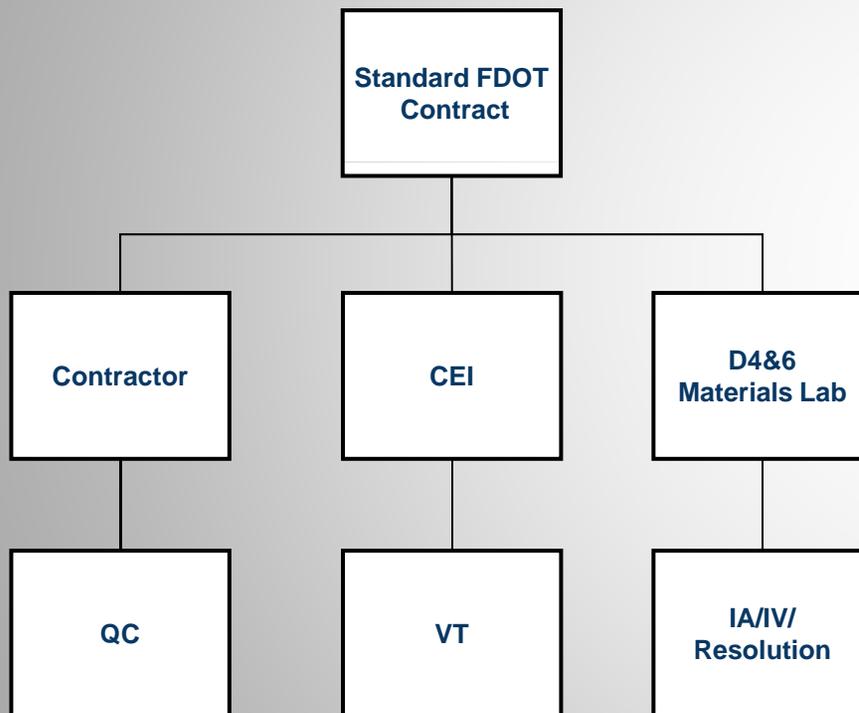
Why are we validating?

- To analyze/minimize the risk to the Department, based on the financial investment of all parties.

How will we validate?

- Through custom audit checklists compiled from: FDOT Standard Specifications for Road and Bridge, Contract Documents, FDOT Quality Assessment Critical Requirements, and FDOT's Witness & Hold Point Inspections List.
- Task-Specific Proficiency Checklists
- Independent Verification Testing by FDOT Materials Lab

Materials Testing Management



Standard FDOT Contract

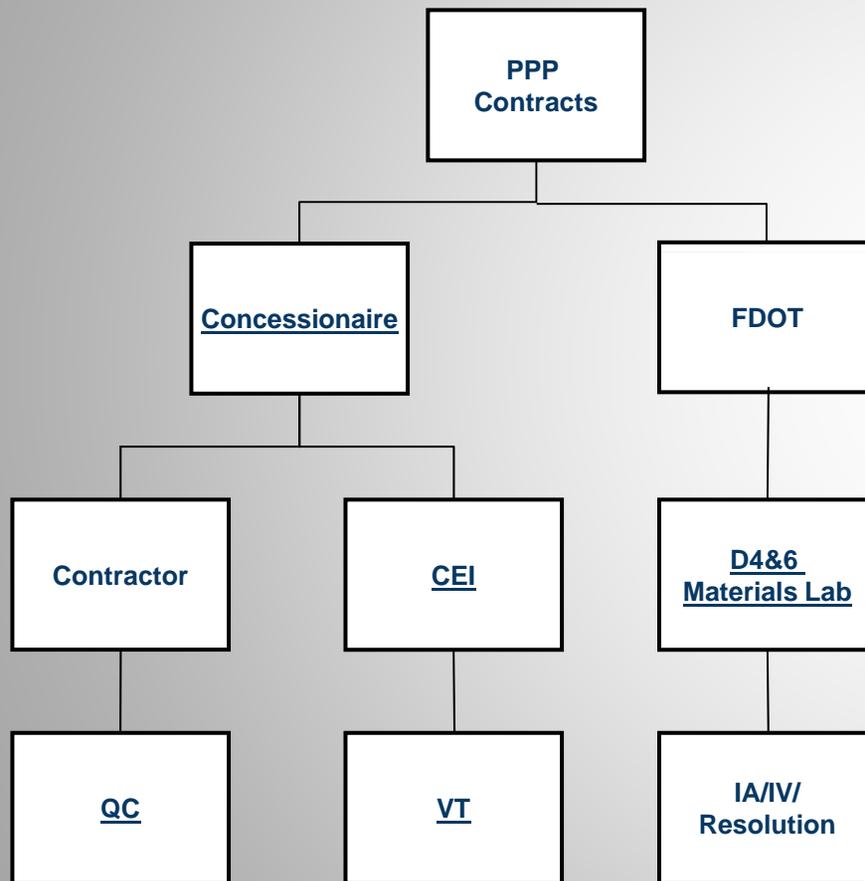
FDOT contracts with:

- CEI to provide field VT
- Contractor
- Verification Lab

Contractors contract with:

- QC Field
- QC Lab

Materials Testing Management



PPP Contract

FDOT contracts with:

- Concessionaire

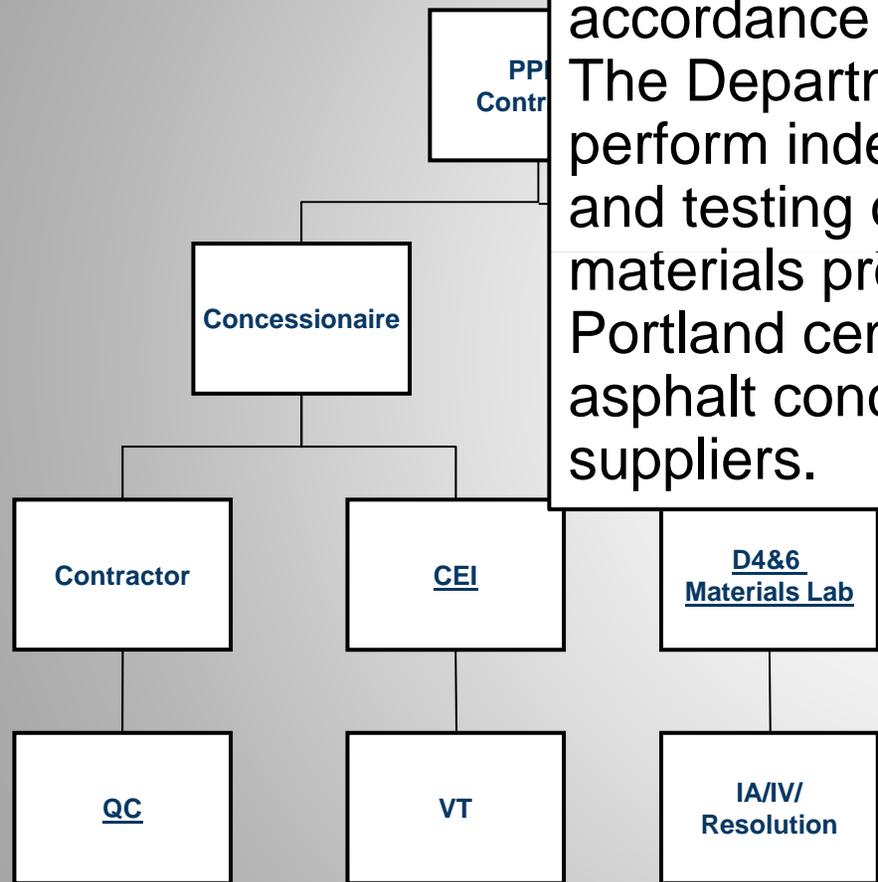
Concessionaire contracts with:

- Construction Contractor
- CEI Consultant
- Maintenance Contractor
- ITS Contractor

Contractor contracts with:

- QC Field Testing
- QC Lab Testing
- Design Team

Materials Test



FDOT Materials Lab: The Department, or its representative, will perform independent verification (IV), independent assurance (IA) and resolution testing services in accordance with the latest Specifications. The Department, or its representative, shall perform independent verification sampling and testing on-site as well as at off-site materials producer locations, including all Portland cement concrete plants, hot-mix asphalt concrete plants and aggregate suppliers.

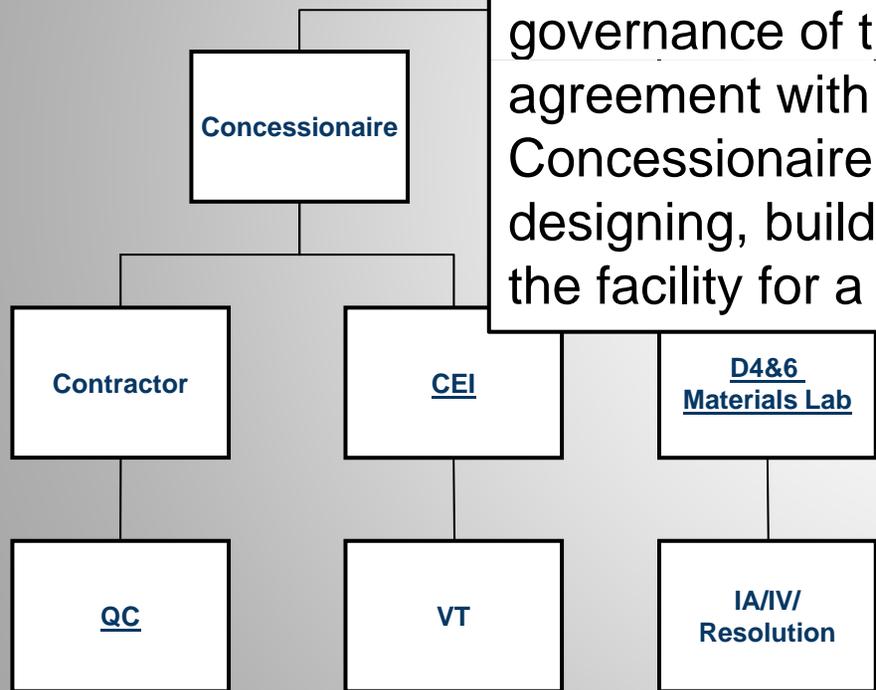
- ITS Contractor

Contractor contracts with:

- QC Field Testing
- QC Lab Testing
- Design Team

Materials Testing Management

A Concessionaire is a private entity that holds a concession or a right granted (for example, by a government) to conduct a certain business for a defined term as specified in an agreement. For I-595, the State maintains ownership and governance of the facilities, and entered into an agreement with a private entity called the Concessionaire which is responsible for funding, designing, building, maintaining and operating the facility for a 35 year term.

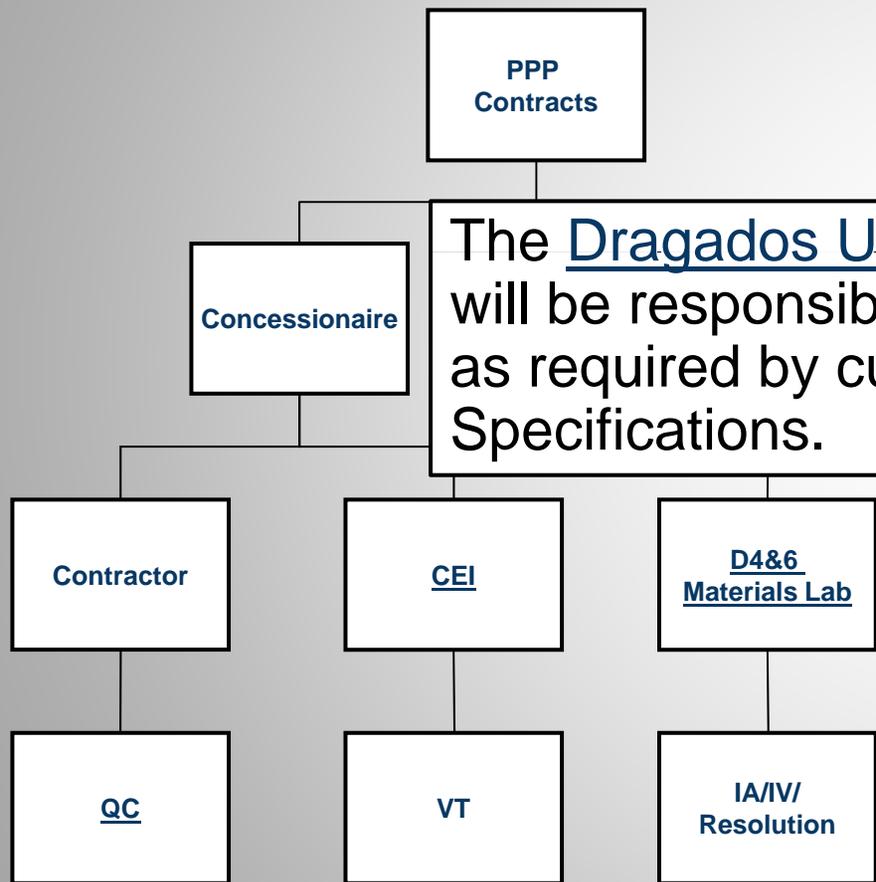


- ITS Contractor

Contractor contracts with:

- QC Field Testing
- QC Lab Testing
- Design Team

Materials Testing Management



PPP Contract

FDOT contracts with:

- Concessionaire

The Dragados USA's QC, MACTEC, Inc., will be responsible for sampling and testing as required by current FDOT QC Specifications.

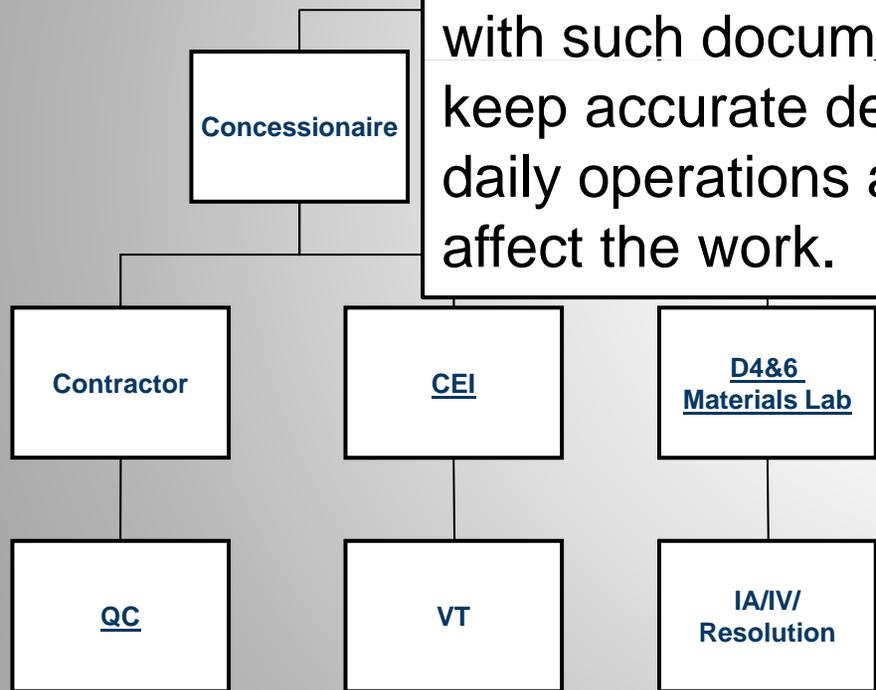
- Maintenance Contractor
- ITS Contractor

Contractor contracts with:

- QC Field Testing
- QC Lab Testing
- Design Team

Materials

The I-595 Express, LLC's CEI, HNTB Corporation, Inc., will monitor the Contractor's on-site construction activities and inspect materials entering into the work in accordance with the plans, Specifications and Special Provisions set forth in the Contract Documents to determine that the Project is constructed in reasonable conformity with such documents. The Concessionaire shall keep accurate detailed records of the Contractor's daily operations and of significant events that affect the work.



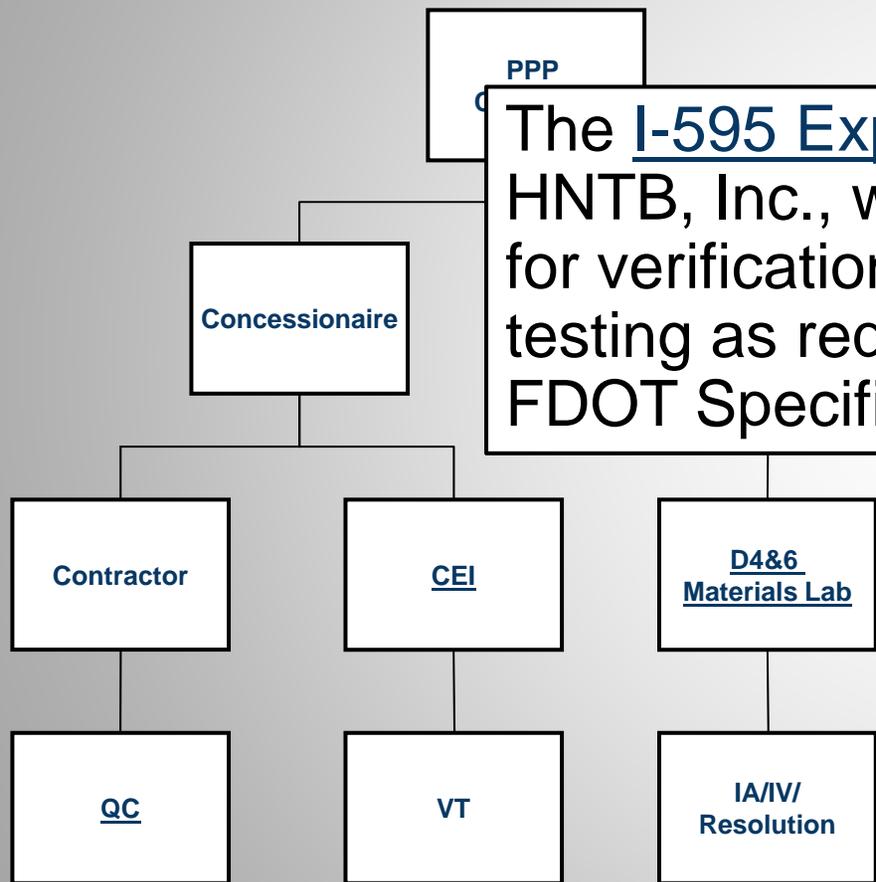
Maintenance Contractor

- ITS Contractor

Contractor contracts with:

- QC Field Testing
- QC Lab Testing
- Design Team

Materials Testing Management



PPP Contract
 The I-595 Express, LLC's CEI, HNTB, Inc., will be responsible for verification sampling and testing as required by current FDOT Specifications.

Contractor contracts with:

- Maintenance Contractor
- ITS Contractor

Contractor contracts with:

- QC Field Testing
- QC Lab Testing
- Design Team

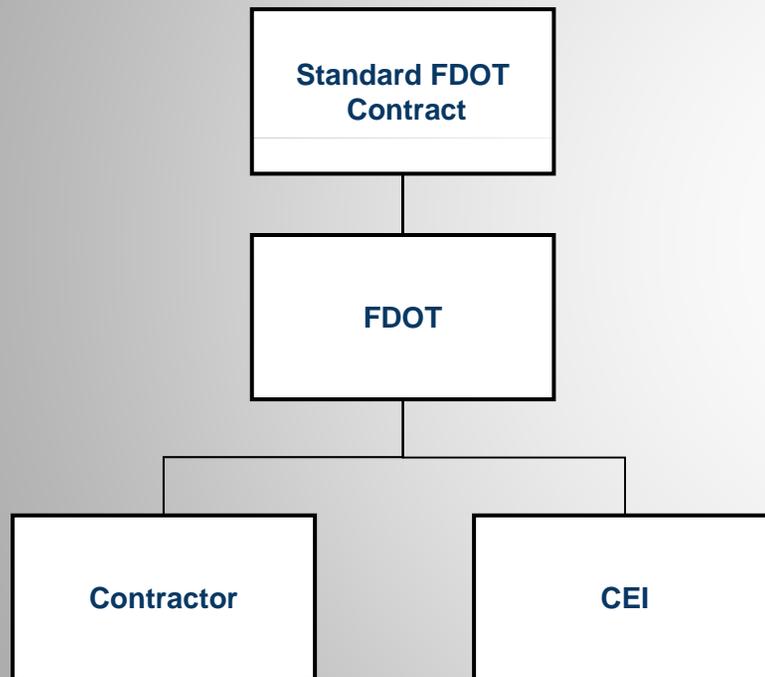
Materials Testing Comparison

	TESTING FREQUENCY ⁽¹⁾					
Earthwork ⁽²⁾	STANDARD DOT CONTRACT			I-595 PPP CONTRACT		
	QC	VT	IV	QC	VT	IV
Embankment & Pipe Backfill						
Field Sampling	1 / Type	1 / Type	Engineer's Option	1 / Type	1 / Type	1 / 8 Types
Field Testing	1 / Lot	1 / 4 Lot	Engineer's Option	1 / Lot	1 / 4 Lot	1 / 64 Lots
Lab Testing	1 / Type	1 / Type	Engineer's Option	1 / Type	1 / Type	1 / 8 Types
Subgrade						
Field Sampling	1 / 2 Consec Lots	1 / 8 Consec Lots	Engineer's Option	1 / 2 Consec Lots	1 / 8 Consec Lots	1 / 64 Consec Lots
Field Testing	1 / Lot	1 / 4 Lot	Engineer's Option	1 / Lot	1 / 4 Lot	1 / 64 Lots
Lab Testing	1 / 2 Consec Lots	1 / 8 Consec Lots	Engineer's Option	1 / 2 Consec Lots	1 / 8 Consec Lots	1 / 64 Consec Lots
Base						
Field Sampling	1/ 8 Consec Lots	1/16 Consec Lots	Engineer's Option	1/ 8 Consec Lots	1/16 Consec Lots	1 / 64 Consec Lots
Field Testing	1 / Lot	1 / 4 Lot	Engineer's Option	1 / Lot	1 / 4 Lot	1 / 64 Lots
Lab Testing	1/ 8 Consec Lots	1/16 Consec Lots	Engineer's Option	1/ 8 Consec Lots	1/16 Consec Lots	1 / 64 Consec Lots
Asphalt						
Initial Lots						
Field Sampling	4 / 2000 Tons	1 / 2000 Tons	1 / 4000 Tons	4 / 2000 Tons	1 / 2000 Tons	1 / 4000 Tons
Lab Testing	4 / 2000 Tons	1 / 2000 Tons	1 / 4000 Tons	4 / 2000 Tons	1 / 2000 Tons	1 / 4000 Tons
Production Lots						
Field Sampling	4 / 4000 Tons	1 / 4000 Tons	1 / 8000 Tons	4 / 4000 Tons	1 / 4000 Tons	1 / 8000 Tons
Lab Testing	4 / 4000 Tons	1 / 4000 Tons	1 / 8000 Tons	4 / 4000 Tons	1 / 4000 Tons	1 / 8000 Tons
Concrete ⁽²⁾						
Field Sampling	1 / 50 CY	1 / 200 CY	NA	1 / 50 CY	1 / 200 CY	1 / 1600 CY
Lab Testing	1 / 50 CY	1 / 200 CY	NA	1 / 50 CY	1 / 200 CY	1 / 1600 CY

⁽¹⁾ IV Testing may be further increased or reduced based on the Concessionaire's performance.

⁽²⁾ Not less than once per month.

Inspection Management



Standard FDOT Contract

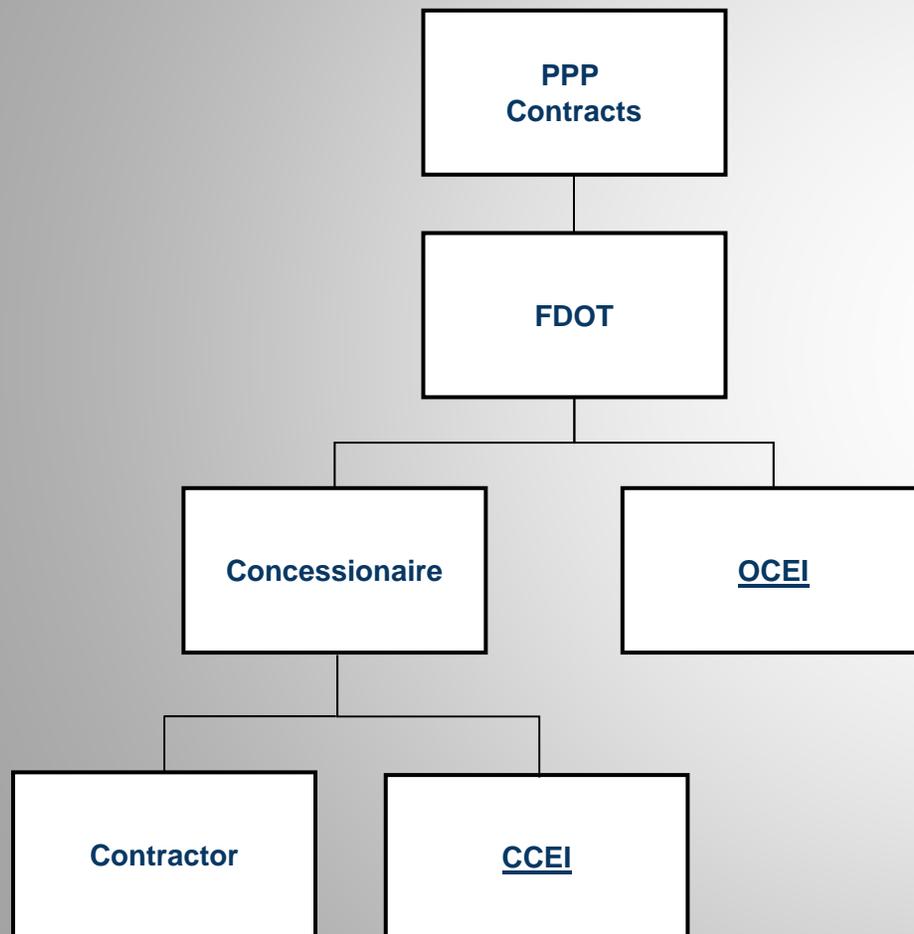
FDOT contracts with:

- CEI to provide full inspection and contract management
- Contractor
- Verification Lab

Contractors contract with:

- QC Field
- QC Lab

Inspection Management



PPP Contract

FDOT contracts with:

- Concessionaire
- OCEI

Concessionaire contracts with:

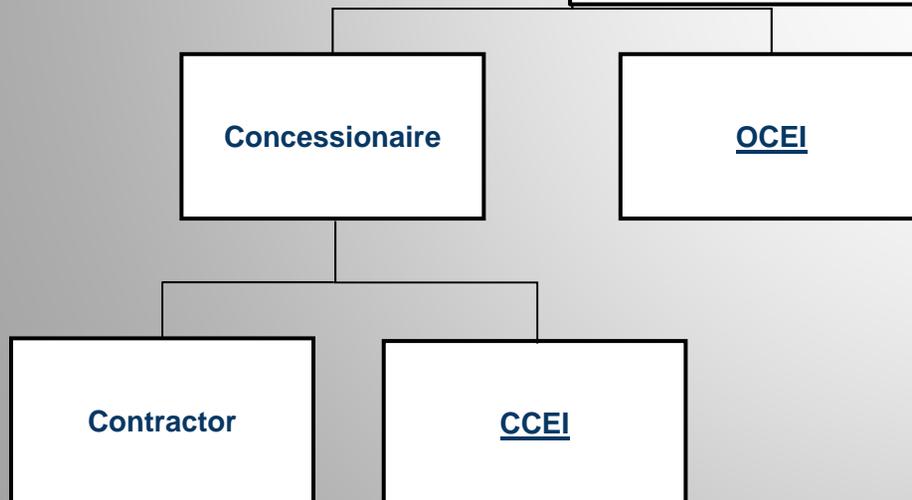
- Construction Contractor
- CEI Consultant
- Maintenance Contractor
- ITS Contractor

Contractor contracts with:

- QC Field Testing/Inspection

Inspection Management

The OCEI will provide statistical validation, oversight and construction inspection to assess whether the Concessionaire is performing the work in accordance with the Concession Agreement and the facility will meet the end-user's requirements by providing the following.

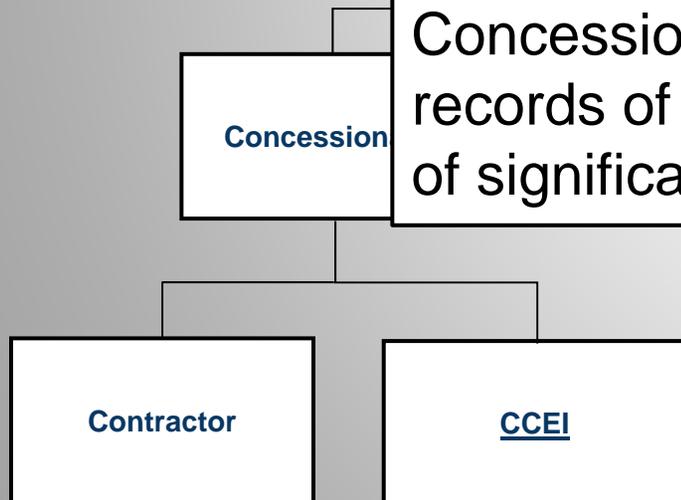


- Construction Contractor
- CEI Consultant
- Maintenance Contractor
- ITS Contractor

- Contractor contracts with:
- QC Field Testing/Inspection

Inspection Management

The I-595 Express, LLC's CEI, HNTB Corporation, Inc., will monitor the Contractor's on-site construction activities and inspect materials entering into the work in accordance with the plans, Specifications, and Special Provisions set forth in the Contract Documents to determine that the Project is constructed in reasonable conformity with such documents. The Concessionaire shall keep accurate detailed records of the Contractor's daily operations and of significant events which affect the work.



Contractor contracts with:

- QC Field Testing/Inspection

Audit of Concessionaire's Operations

- Independent audits of ongoing operations

Audits are based on: Statewide inspection guidelists, witness/hold points, Division I of the Concessionaire's Agreement, Design and Construction Criteria, and the latest Standard Indices and Specifications (including workbooks).

- Point system developed for critical requirements

Critical requirements are those which affect safety, Governmental permits or the long term asset value at handback. These items have the greatest impact to the overall total if deficiencies are discovered and are not being properly addressed.

- The point total after the audit will then be converted to a percentage grade.

- | | |
|---------|---|
| 100% | - Excellent – no further action |
| 90%-99% | - Good - PA to send the report to the Concessionaire for review |
| 80%-89% | - Fair – Re-inspection to be made in 7 days.
Any deficiency in a critical item will automatically require re-inspection within 7 days regardless of points. |
| <80% | - Poor - Re-inspection to be made in 3 days and request immediate remedial action (Reference RFP, Volume II, Division II, Section 3, Attachment 3) |

The screenshot shows a digital inspection form titled "CORRADINO STATEWIDE INSPECTION GUIDELIST". The header includes the company logo "CORRADINO ENGINEERS • PLANNERS • CONSTRUCTORS" and the document details: "FY 2008/2009 QC Category No. 1 STATEWIDE INSPECTION GUIDELIST" and "Date: 12/27/2008".

Form fields include:

- Area: Area 3
- Inspector CEI: Jenkins, Monica
- Category: 1
- Inspector OCEI: Ward, Jeannine

The main section is titled "ALL DRILLED SHAFTS INCLUDING SHAFTS UNDER MISCELLANEOUS STRUCTURES". It contains three numbered items:

- Item 1: "The Foundation Plan* has been submitted and accepted by the Department. (Spec. 455-15.1.2 and RFP, Volume II, Division II, Section 3.G.4 (Addendum 5))". It includes a detailed description of the foundation plan's purpose and a "Yes/No" radio button selection.
- Item 2: "Details in the Foundation Plan are being followed during drilled shaft construction work, including outlined equipment, construction methods, and testing (i.e. crosshole sonic logging and gamma-gamma density logging test (integrity) and Osterberg Load Cell or Statnamic Load tests (static) (Foundation Plan and RFP, Volume II, Division II Section 3.G.4 (Addendum 5)) [10 POINTS]". It includes a "Yes/No" radio button selection.
- Item 3: "The proper forms are being utilized for recording data and submitted to the Department within 24 hours of concrete placement. [15 POINTS]". It includes a "Yes/No" radio button selection and a list of required logs: Soil Excavation log, Rock Excavation log (FDOT Form 700-010-86), Rock Core log (FDOT Form 700-010-86), Shaft Inspection Log (FDOT Form 700-010-84), and Concrete Placement log (FDOT Form 700-010-89).

(Full Sample Attached)

Distribution of Audits

- The Contractor’s proposed work activities will establish the audits.
- Audits will have a distribution as follows:
 - 50% from bridge critical categories and features that will outlive the term of the Concession Agreement (caps, drilled shafts, foundations, etc.).
 - 30% from safety related categories (MOT, ADA Compliance, guardrail, signal, lighting, etc).
 - 20% from the remaining categories (which relate to ongoing field activities).

Bridge Audits	
Beams	
Caps	
Columns	
Concrete Barrier Walls	
Concrete Decks	
Drilled Shafts	
Noise / Vibration	
Mass Concrete	
Post Tension	
Piling	
• Lighting/Signal/ITS Audits	
ITS, Lighting	Roadway Audits
Signal	Asphalt Lot
Utility/MOT Audits	Asphalt Paving
Utility	Landscaping
MOT Signing	Concrete Barrier Wall
MOT General	Concrete Pavement
MOT Inspection	Drilled Shafts
	Fencing
	Guardrail
	Drainage
	Embankment
	Limerock Base
	Noise Barrier
	Pavement Marking
	Stabilization
	Subsoil
	Milling
	Auger Cast
	Signs

Approach to Statistical Validation

Our statistical validation is consistent with the principles established in FHWA TA 6120.3. Non-Regulatory Supplement NS 23 CFR 637B (which is referenced in the FHWA TA 6120.3) of the Federal-Aid Policy Guide does not specifically address frequency of inspections to verify acceptance of operations. Using the project approach for materials, the frequency should be approximately 10 percent of the frequency of the tests used in the acceptance decision.

The statistical validation of the Concessionaire's performance, is based on [statistical formulas](#) using the following parameters:

- **Population size**, the number of construction operations in a given month.
- **Anticipated Failures**, the number of those operations where the grade is below passing.
- **Level of Confidence**, the desired level of reliability in the data.

Approach to Sta

Our statistical validation is consistent with the Regulatory Supplement NS 23 CFR 637B (Federal-Aid Policy Guide does not specifically address acceptance of operations. Using the projected frequency of approximately 10 percent of the frequency

The statistical validation of the Concession is based on using the following parameters:

- **Population size**, the number of construction operations
- **Anticipated Failures**, the number of the operations
- **Level of Confidence**, the desired level of confidence

We calculate the sample size (SS) for known population with the following formula:

$$SS := \frac{SSU}{\left[1 + \left[\frac{(SSU - 1)}{Pop} \right] \right]}$$

Sample Size Unknown (SSU) = 246 (see calculation below)

% Fail = Percent Failure: (actual/estimated – the worst case for percent failure is 20%)

$$SSU := [\%Fail \cdot (1 - \%Fail)] \cdot \left(\frac{K^2}{interval^2} \right)$$

Population (**POP**) = 600 [based on an average of 4 operations per day for each of the 5 contractors anticipated, [4 operations X 5 contractors X 30 days]

$$SSU := \left[0.2 \cdot (1 - 0.2) \cdot \left(\frac{1.96^2}{0.05^2} \right) \right]$$

SSU = 246

Confidence "level" factor (**K**): for each of these confidence levels:

% K	C
80%	- 1.28
90%	- 1.64
95%	- 1.96
99%	- 2.58

$$SS := \frac{246}{\left[1 + \left[\frac{(246 - 1)}{600} \right] \right]}$$

SS = 175

Reporting and Process Control Charts

The Audit results will populate a performance database which will report on the Concessionaire's operations in a wide range of performance indicators:

Average Audit Grades

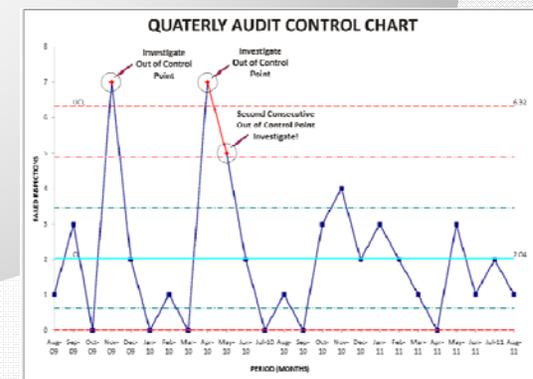
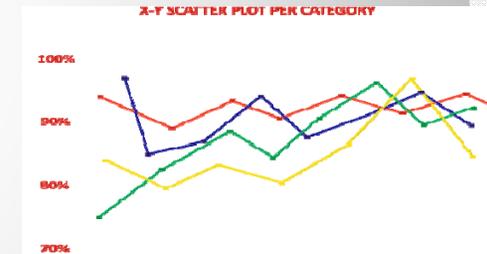
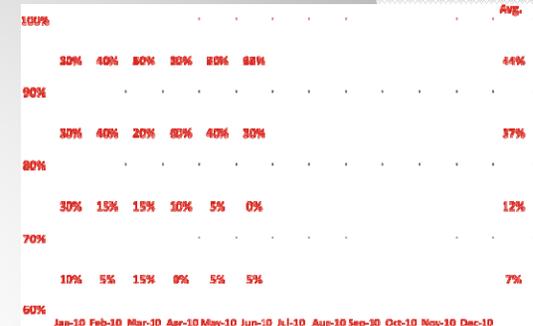
This chart provides a snapshot of the Concessionaire's performance across all categories using the established grading scale.

Work Type

The Concessionaire's performance in each audit category over a period of time using the established grading scale.

Process Control

This graph will demonstrate the number of audits per month within 3 standard deviations of the Control Line. The control line is the average number of failures over the reporting period. This table is to identify "out-of-control" tendencies in the Concessionaire's operations.



Incentive for a Quality Project

Contract Performance Measures:

Payment adjustments are built into the Concession Agreement and tied directly to availability of the system and FDOT's existing asset maintenance program.

Availability – measured continuously per hour per segment of roadway with unavailability resulting from:

- Closures - full or partial blockage of the travel lanes on the corridor, making the lanes unusable for the traveling public, that are not permitted.
- Availability Faults - failures to meet certain O&M performance requirements which directly affect safe travel on the facility and therefore constructively close lane(s) to traffic.

O&M Violations – failures to meet FDOT requirements and tests (i.e. MRP) for the facility. Considered to be discreet violations which are measured per instance (and in some cases recur if not cured within defined timeframes).

- Handback & MRP Requirements, and Value Added Specifications

