

Rehabilitating Medford's Iconic Cradock Bridge

by Joseph M. Allwarden, PE, Vice President and New England Structures Department Manager, AECOM

The historic Cradock Bridge over the Mystic River in Medford has seen many incarnations since it was first built as a timber bridge in 1637. The original bridge (over which Paul Revere rode during his midnight ride) was replaced with an 80-foot two-span stone masonry arch bridge in the late 1880s. In the early 1900s, a dam was built at the bridge location and a 20-foot channel span was added for a new boat canal and lock system. In the early 1920s, the upstream side of the bridge was widened with steel stringers supported by the dam structure below. In the late 1970s, the dam was removed and the supporting walls left in place. Routine inspection resulted in the bridge being placed on the list of structurally deficient bridges in Massachusetts and designated for rehabilitation under MassDOT's Accelerated Bridge Program.

While the bridge is not itself listed on the Historic Register, it is a contributing element to the Medford Historic District. The project



An earlier road widening in the 1920s had obscured the arched spans of the original bridge.

demonstrates how a more than 100-year old structure can be successfully replaced in the heart of a busy downtown area while minimizing disruption to traffic, utilities and adjacent properties. The project is nearly completed as of October 2018 with only punch list items remaining.

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President's Report

by Geoffrey B. Schwartz, PE, Sr. Project Manager, GZA



Dear Members,

Hope everyone is enjoying this busy stretch right before the holiday season! Here at BSCES, our events have been underway, so please check in with our events calendar and weekly email blasts to look at upcoming programs, there should be plenty to choose from.

The BSCES Younger Member Group is holding an annual holiday meal drive, with the goal to provide Thanksgiving meals to families in need in the Greater Boston area. To make a donation, please [click here](#).

We are currently searching for a BSCES Legislative Fellow starting in January 2019 and running through June 2020. If you or someone

you know is interested and might be a good fit, I encourage you to apply. [Click here](#) for more information.

I would like to congratulate BSCES' Dr. Allen Marr, CEO of Geocomp & GeoTesting Express, for being selected by ASCE's Geo-Institute to receive the 2019 H. Bolton Seed Medal for "continuous and cumulative distinguished contributions to our understanding of the behavior and interaction of geotechnical materials and to advancement of research, practice, teaching and professional service in geotechnical engineering." Congrats Dr. Marr!

The November *BSCESNews* theme is structures. Please read the article by Nate Rosencranz, the chair of the BSCES Chapter of the Structural Engineering Institute. If you are interested in

UPCOMING EVENTS

MA AEER Task Force: Disaster Assistance Building Evaluator Training Workshop
November 27, 2018

Presentation Workshop
November 29, 2018

CI Boston Chapter Day Summit
November 30, 2018

**Unmanned Aerial Vehicles—
Another Tool for Assessing Structures**
December 3, 2018

Geotechnical Challenges at Encore Boston Harbor
December 11, 2018

YMG and T&DI Boston Chapter: Holiday Party
December 12, 2018

Bridge Inspection Refresher Training
February 12–14, 2019

Further Details Inside



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submitting an article, please contact our Newsletter Editorial Board chair, Bruce Jacobs, at sr.vp1@bsces.org.

I'd like to once again thank our Society Sponsors. This month's sponsor of the newsletter is AECOM. I would encourage you to read AECOM's page 1 and page 5 articles entitled, "Rehabilitating Medford's Iconic Cradock Bridge" and "Replacing the Deck of the Airport Road Bridge in Fall River, Massachusetts," respectively.

Please do not hesitate to reach out with comments, questions, and feedback, so that we may continue to serve you.

Respectfully submitted,
Geoffrey
president@bsces.org



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Boston Society of Civil Engineers



Creating a Complete Street on a Gateway Bridge

by Edward T. Baumann, PE, Sr. Project Manager, Alfred Benesch & Company

Boston's 120-year-old North Washington Street Bridge over the Boston Inner Harbor carries 42,000 vehicles per day, heavy pedestrian traffic and numerous utilities from Boston's North End and West End areas to Charlestown. In addition to carrying commuters and event goers to the nearby North Station and TD Garden, the east sidewalk carries Boston's Freedom Trail to Charlestown's Bunker Hill Monument and U.S.S. Constitution.

The North Washington Street Bridge was classified as structurally deficient in 2003. At that time the center two lanes of the 240 ft. long truss span were permanently closed to traffic due to deterioration. Ongoing inspections and repairs have been performed in order to keep the remaining four travel lanes and sidewalks open to traffic.

A Memorandum of Agreement regarding the bridge design was issued and signed by the Federal Highway Administration, The State Historic Preservation Officer, MassDOT-Highway Division, and the City of Boston. This agreement stipulated that the proposed replacement structure would be a Gateway bridge with architectural design elements that would incorporate the new bridge structure into its surroundings. The narrow sidewalks of the old bridge and the noise and vibrations encountered during crossing made the experience encountered by pedestrians and cyclists less than ideal. The MOA asserted that the new bridge design would incorporate features that would encourage use of the bridge by people of all ages and interests. The design team consisted of the Boston Public Works Department, The Massachusetts Highway Department, Alfred Benesch and Company, and Rosales + Partners.

The Enhanced User Experience

The new design incorporates "Complete Streets" design elements to support vehicular, bicycle and pedestrian traffic. Key design features include:

- Two travel lanes in each direction
- A separate southbound rapid transit lane for bus traffic.
- Bicycle lanes separated from both pedestrians and auto traffic.
- Wide sidewalks (10½ feet) on both sides of the bridge.
- Scenic overlooks at the bridge crest that will contain benches, tree planters and plaques that describe each of the landmarks that are visible from the bridge.



Rendering of final bridge design with existing Charles River Dam in lower left (Provided by City of Boston—Public Works Department)

A 285 ft. long by 33 ft. high architectural trellis will be constructed in barrier/planters that will mark the center of the navigation channel crossing and will extend up to 26 ft. over the bicycle lane and widened sidewalk to provide partial shade. The architectural trellis will be illuminated with accent lighting visible from the water and banks. The overlooks, benches, trees, information panels and the architectural trellis will create a unique destination that is separated from vehicular traffic and accessible for use by people of all ages and interests.

The Contextual Structure

The North Washington Street Bridge is located adjacent to the iconic Leonard P. Zakim Bunker Hill Memorial Bridge (Zakim Bridge). The proposed structure would need to compliment and not compete with the highly visible Zakim Bridge.

After studying many alternatives, the selected design consisted of a bridge that also functioned as a viewing platform for the Zakim Bridge. The proposed structure was not to rise above the roadway as that could compete or conflict with the towers of the Zakim Bridge. The architectural trellis described above would instead mark the crossing for the motorists, cyclists, pedestrians and boaters. Due to the corrosive marine environment, the superstructure needed to remain as high above the water as possible. This led to the concept of having a very simple superstructure with a uniform depth and allowing the substructure to create the unique identity of the proposed bridge.

One desire was to create an open substructure that would increase visibility and reflective light rather than the dark shadows and obstructed

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Rehabilitating Medford’s Iconic Cradock Bridge

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The overall bridge length is approximately 100 feet and the out-to-out deck width is approximately 63 feet. Abutting buildings on each corner on the Medford Square (north) end of the bridge complicated the rehabilitation project. The substructure consisted of a stone masonry abutment at the north end, two stone masonry piers which were extended with reinforced concrete, and a reinforced concrete abutment at the south end. Reinforced concrete was also added to the south face of the south pier when the stringer span was constructed.

Structural Modifications

The superstructure of the simple span over the channel was replaced with a steel beam supported composite slab superstructure conforming to bottom chord elevation limitations. The existing substructure—the South Abutment—and the South Pier have also been rehabilitated and the bridge seats have been modified to support the new superstructure. The bridge rails for this span are ornamental steel rails with the existing stone pylons re-used as part of the system. The profile of the roadway over the bridge has been maintained as much as possible, due to the abutting buildings and roadways.

The entire widening structure on the west side just upstream of the stone arches has been removed along with the remains of the dam structure below. The removed structure has been replaced by a precast concrete arch system that replicates the dimensions of the adjacent stone arch structure.

Traffic Management Plan

Traffic volumes are very high since Main Street leads into Medford Square with an Annual Average Daily Traffic of approximately 42,000 vehicles. A temporary bridge was constructed to allow for two lanes of rush hour traffic in each direction. The temporary bridge was installed to the east (downstream side) of the bridge and



New arch spans and granite on upstream face makes the bridge an attractive component of the adjacent Medford Historical District.

connected to Clippership Drive. Pedestrian and bicycle traffic were also maintained at all stages of construction.

Utilities

Utility lines crossing the bridge include two 10-inch diameter water mains, two 10-inch diameter gas mains, electrical conduits, and a fiber optic and copper telecommunications conduit. The large number of utilities was a major concern during planning and design and affected the constructability of the phasing schemes. The original plan had been to reroute the utilities during construction along a temporary utility-river crossing.

During utility coordination meetings, it was determined that the relocation of the existing copper communications conduit would take a minimum of 18 months. To move the conduit back onto the bridge would take another 12 months or so. Because there are 17,000 copper conductors located in this conduit, requiring 18 months for splicing and relocating, utility trucks would need to be located over manholes in Main Street disrupting traffic. Given this constraint, a plan was implemented to support

the existing conduit in place and “build around them” in their current location.

The gas line and electrical conduit were able to be relocated to the new structure using more traditional phased techniques. The water line was able to be temporarily taken out of service during construction and the new line installed in the appropriate phase. The temporary bridge structure foundation appeared to be in conflict with an existing decommissioned 115kV Electric Transmission line and the original design was revised to avoid this conflict.

Historic and Aesthetic Considerations

The bridge is within a designated Historic District and considered to be eligible for listing on the National Historic Register. Installing the two-span arch upstream presented an opportunity to respect the historic nature of the site while also removing the restriction caused by the existing dam walls.

It was an interesting moment when the original upstream spandrel of the stone arch was exposed during construction. Those stones had not seen the light of day since the 1920s. The existing spandrel also served to support the traffic lanes while the new arch extension was built. New foundations were constructed for the new precast concrete arch spans and the arch spans erected. Colored concrete was used for these arch spans in order to blend them into the existing stone work. Granite stone veneer, required to closely match the existing stone of the arch and spandrels, was installed on the entire upstream face including the channel span. Aesthetic light poles which match the light poles in Medford Square and steel ornamental railing were installed on both sides of the bridge as well as along the river walls. In order to protect the pedestrians, a low-profile traffic rail was installed along the curb lines.

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Creating a Complete Street on a Gateway Bridge

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views created by the existing massive stone wall piers. The proposed structure would necessitate staged construction in order to maintain the vehicular traffic and utility operations during the bridge reconstruction. The proposed structure would also be required to be constructible in the 12-foot tidal fluctuations of the harbor and would have to stay within the limited funding available from FHWA, MassDOT and the City of Boston. The substructure would also have to be positioned at locations that do not interfere with the existing bridge foundations and that allow for navigation during the bridge reconstruction.

After many studies, investigations and design iterations, it was decided that the proposed bridge would be constructed with five reinforced concrete V-Piers. These V-Piers would provide a unique notable structure that complements and reflects the iconic inverted Y-Pylons of the Zakim Bridge. These piers will be illuminated with accent lighting with colors that can change to match those of the Zakim Bridge with each holiday or special event.

Designing for Constructability

The first stage of the project is the construction of a full-length temporary utility bridge along the existing west sidewalk. This utility bridge would be used to support the transmission lines in place. All other utility lines would be temporarily relocated onto this temporary utility bridge to clear the way to reconstruct the main portions of the bridge. Separately, a temporary vehicular bridge will carry three lanes of traffic and pedestrians to allow the bridge to be constructed in two main stages.

The replacement superstructure requires that it be constructed in place and be able to support cantilevers that could be added later to support the sidewalks and the overlooks on the main span. The resulting design consists of four torsionally rigid trapezoidal steel box girders with



Rendering of bridge design on the pedestrian walkway facing Charlestown end of bridge (Provided by City of Boston–Public Works Department).

a conventional reinforced concrete composite deck. Continuous transverse steel floorbeams will cantilever out 13 feet from the box girders to support two stringers, the sidewalk, transmission lines and other utilities. The length of the cantilevered floorbeams increases to up to 21 feet in the main span to support the overlooks. Fiber reinforced polymer panels along the bridge fascia would serve as an architectural screen to conceal the numerous utilities.

The trapezoidal box girders will consist of eleven continuous spans over the 1,087-foot length. The V-Piers were located to avoid the existing piers and to allow continual navigational traffic to the three locks entering the Charles River Basin.

The stems and arms of the V-Piers will be constructed with high performance concrete with conventional epoxy steel reinforcement. The top of the arms will be tied together with a post tensioned concrete tie-beam. The vertical portions of the V-Piers will be exposed during low tide and hidden during high tide.

The four columns of each individual V-Pier share a common concrete pile cap footing. In order to minimize the cost of the cofferdams, dewatering and excavation into the riverbed

while minimizing the visibility of the footings, the top of the pile cap footings will be set below the mean low water elevation. This will place the bottom of the pile cap footings anywhere from 6 feet below the mudline to 12 feet above the mudline.

Each of the pile caps will be supported by eight 6-foot diameter reinforced concrete drilled shafts that extend down 30 to 80 feet through layers of silt, sand and till and another 10 to 27 feet into bedrock. The top 6 to 10 feet of the drilled shafts will be encased within a concrete tremie that will aid in the dewatering of the areas in order to construct the pile caps and columns of the V-Piers.

Summary and Project Status

The bridge reconstruction contract was awarded to J.F. White. They received Notice to Proceed in August of 2018 with an estimated completion date of November 2023.

For project updates, visit:

www.mass.gov/north-washington-street-bridge-replacement

<http://keepbostonmoving.org/portfolio/north-washington-street-bridge>

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Replacing the Deck of the Airport Road Bridge in Fall River, Massachusetts

by Dustin J. Virgilio, PE, Structural Engineer, New England Transportation, AECOM

Opened in 1951, the Airport Road Bridge spans the north-south trending Route 24. Recent inspections found the bridge's existing concrete deck to be in "serious" condition with cracks up to ¼-inch wide, sporadic delaminations, and scattered spalls with exposed rebar. Implemented repairs have been recently completed to address these structural deficiencies. The principal design challenges in doing these repairs were to execute a full deck replacement, with abutment modifications, while maintaining at least one-way traffic over the bridge throughout construction.

The overall bridge length is 112 feet, with two 56-foot spans. The existing bridge had two lanes, with a 40-foot curb to curb width, and a 6-foot sidewalk on the north side. The bridge has a two-span continuous superstructure consisting of nine rolled steel beams bearing on concrete gravity abutments and a concrete pier wall. The steel beams supported a reinforced concrete deck with stay-in-place forms in three of the bays and expanded steel protection shielding in the other five bays. There was also a gas main, water line, and sewer line on the north side of the bridge.

Structural Modifications

The project was scoped as a preservation project with the concrete deck to be replaced and the steel superstructure painted. Minor work was proposed for the substructure including replacing the abutment backwalls and modifying the "U-back" wingwalls to construct crash tested bridge railings. The proposed structure was designed using the American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) Bridge Design Specifications and MassDOT's Bridge Manual. The proposed bridge also includes two lanes of traffic, however, the curb to curb width was reduced to 38 feet with an 8-foot sidewalk on the north side.



Lowering the pre-cast deck panels into place on the existing beams.



Shear studs installed on the existing beams at breakout of the precast deck panels.

In order to minimize disruption of traffic, the proposed deck is made up of full-depth precast concrete deck panels. The panels were constructed by United Concrete Products, Inc. Shear studs were added to the existing beams to make them composite with the proposed deck. The panels are post tensioned together longitudinally. There are two rows of panels transversely with a cast-in-place closure pour in between the panels along the baseline of the bridge.

In addition to the deck replacement, other components of the bridge that were replaced include the abutment backwalls, abutment end diaphragms, approach slabs, safety curbs for the railings on the wingwalls, bridge railings with protective screens, and guardrail transition barriers.

Traffic Management Plan

The construction sequence was accelerated to maintain one westbound lane of traffic on the bridge at all times since a City fire station is located on the east side of the bridge. First, the

abutment backwalls were replaced in a series of overnight closures with steel plates used to open the bridge up to traffic the next morning. The construction sequence involves detouring all eastbound traffic off of the bridge and transferring all westbound traffic to the south side of the bridge. Then, the northern side of the existing bridge deck, sidewalk, and railing were demolished and replaced with the proposed precast deck panels, end closure pour, and end diaphragms. This was carried out over a two-week period. The same procedure was then completed for the southern side. Two lanes of traffic in each direction were maintained at all times on Route 24 below except during certain non-peak periods.

Once the precast deck panels and closure pours were constructed, both eastbound and westbound traffic were transferred back onto the bridge. Two lanes of traffic were maintained for the remainder of the construction. This included utility work, safety curbs, sidewalks, bridge railings, and wingwall modifications.

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Typically 300 to 700 words, BSCESNews featured articles are about technical topics or professional matters of interest to civil engineers. The January 2019 issue of the newsletter for example, will highlight the Engineering Management Group and feature one or more articles on the theme of Engineering Management & Policy.

Editorial Board members meet monthly via conference call to plan upcoming issues of the newsletter. They also solicit, write and/or review newsletter articles.

For more information on how you can become a *BSCESNews* contributor contact BSCES Newsletter Editorial Board Chair Bruce Jacobs at sr.vp1@bsces.org or BSCES Association Manager Rich Keenan at rkeenan@engineers.org or at 617/305-4110.

Black Brook Road Reconstruction and Slope Stabilization

by Peter Grandy, PE, LEED® AP BD+C, Technical Leader, Structural, Weston & Sampson

Large sections of Black Brook Road in the Town of Savoy were destroyed in 2011 by storm flows resulting from 11 inches of rain that accompanied Tropical Storm Irene. These flows overtopped culverts that crossed the road and eroded the banks resulting in damage to the paved surface along a 1.3-mile length. Following the devastation, a project team led by Weston & Sampson worked with the town to evaluate the storm-ravaged roadway and banks of the brook, propose innovative solutions, assist in securing critical funding, prepare final designs, and provide construction administration for roadway reconstruction and slope stabilization. The resulting project involved reconstruction of the destroyed roadway, repair of seven slope failures, culvert replacement, and storm drainage improvements. Other members of the project team included New England Environmental, Crawford Drilling Services, and Ludlow Construction Company.

The final design resulted in the achievement of four substantial challenges:

1. Stabilization of the failed slope between Black Brook and the roadway utilizing a specialized soldier pile and lagging wall system.
2. Replacement of a washed-away 36-inch-diameter culvert with a precast concrete box culvert.
3. Reconstruction of the roadway and storm drainage collection systems.
4. Increased resilience to withstand the high-intensity storm events anticipated to occur as a result of climate change.

The innovative approach merited awards from both the American Council of Engineering Companies of Massachusetts (ACEC/MA) and the American Public Works Association (APWA).

Innovative Stabilization Approach

Weston & Sampson's geotechnical, structural, and transportation engineers evaluated the storm damage, estimated the work and costs required, developed reconstruction/stabilization options, and designed plans to reconstruct Black Brook Road. The design included the installation of nearly 1,500 linear feet of soldier piles/lagging walls with tiebacks. This design feature limited environmental impacts and facilitated roadway restoration.

With the steep roadway embankment susceptible to scour, a conventional cast-in-place concrete wall system was not feasible. Weston & Sampson's innovative stabilization design



Post-Irene washout of sections of Black Brook Road rendered it nearly impassable.

approach included coring into encountered ledge rock and placing W14 steel soldier piles for a lagging wall that traversed the road's topography. Between the piles, the team placed precast concrete panels bedded within a channel excavated into the existing ledge rock for roadway support. Rock sockets were 9-foot-deep with a 36-inch-diameter core into the ledge. The wall height ranged from 12 to 28 feet, with taller portions requiring tiebacks to support roadway backfill. The tiebacks were drilled through the soil and into the rock; steel cables were inserted through the cored holes, and grout was added. Once the grout set, the cables were post-tensioned, tested, and then tied off at a prescribed load. After construction, the team backfilled with compacted gravel and installed the roadway drainage system and pavement structure.

While technically sound, the soldier pile and lagging wall system was also the most cost-effective method. The design avoided construction in Black Brook, which streamlined the permitting process and limited the project's environmental impact. Weston & Sampson also replaced a washed-out culvert with a new 9-foot by 8-foot precast box culvert lined with native stone fragments to replicate a natural stream bed and protect the existing habitat.

Social | Economic | Sustainable Considerations

The repair of Black Brook Road was important to the town, surrounding communities, and emergency response services within Savoy. Rebuilding and restoring Black Brook Road provided social, economic, and sustainable benefits to the town, but the social considerations were the most critical. The town needed the road fixed to restore this vital connection between Savoy and neighboring towns that was severed



Lagging wall consisting of pre-cast concrete wall panels and soldier piles stabilize the embankment.



Restored roadway and supported embankment renders it resilient against climate-change induced extreme storms.

by storm damage; reduce the lengthy travel time to the store, nearby restaurants, health services, work; and, more importantly, reduce the response time of detoured emergency vehicles. With many residents aged over 60, waiting 45 minutes for help to arrive is unacceptable and life-threatening. This reconnection project restored emergency and routine access to residents in previously cut-off areas of town.

With \$194.5 million in storm damage to Massachusetts communities, funding was scarce. FEMA's initial damage/repair estimate for Black Brook Road was \$1,600,000, which was not nearly enough to repair the roadway. Seeking a viable solution, the town was adamant about protecting their residents and infrastructure and refused to settle for inadequate funding. Thanks to the dedication of the town, the efforts of their state representatives, the Patrick and Baker administrations, MADEP, US Army Corps of Engineers, and Weston & Sampson, FEMA eventually covered 75% of the total project cost and several other sources provided the remainder. No local taxpayer money was required.

Let's Write a Better Transportation Story

by Josh Ostroff, Partnerships Director, Transportation for Massachusetts coalition

Mobility is an evergreen issue in Massachusetts. Getting around has never been easy, but the last few years have tested the patience of the most stoic commuters. Better things are on the horizon, and a transportation network worthy of our region is well within our grasp. But we are playing defense when we should be seizing the initiative.

The structures and services that make up our transportation system leave a lot to be desired. Let's put the bad news on the table first.

Many roads are terrible, plenty of bridges are substandard at best, the T is frequently unreliable, long commutes are legendary, and ridesharing is making bad congestion worse. New ideas – from scooters to AVs to variable tolling to actual new revenue – are too often regarded with skepticism, where the reaction starts with “yeah, but...”.

How grim is it?

Traffic is costing every driver thousands of dollars a year. Air pollution from cars and trucks is a public health emergency (Springfield is the asthma capital of the US, and the air in Chelsea and many other communities is literally unsafe to breathe), while greenhouse gases from transportation are contributing to a climate crisis.

Far too many people must commute crazy distances by car, because housing prices force them to live far from work, while our public transportation network was built decades before expansion became a dirty word. The regular breakdowns of that system, and its limited capacity, keep people off our buses and trains who would actually prefer to use them. To ride a bike to most major job centers is to put your life in the hands of a distracted driver.

Away from Boston, many communities have no public transit in evenings and weekends, so second- and third-shift workers without cars, or students or many elders, have limited transportation options as a result. For too many of us, the transportation experience in Massachusetts is a drag on our quality of life.

But that's not where this story ends.

We did not become a hub of innovation and a world center of technology, education, health care and culture by shrinking from challenges. We excel as a region when we tackle our problems. And the transportation woes of

Massachusetts are things that other regions have taken on, and bested. We've got this.

The tribulations of our sclerotic commutes have to be seen in context. Things can get better. We just have to force the issue. And to make it all work as it should – as it must – will require bold leadership. What's important to remember is that we have the means. We just need the will.

And we've made a start.

- In Boston, Cambridge, Watertown, Arlington and Everett, local and state leaders have traded on-street parking for dedicated bus and bicycle lanes during rush hours. This simple change has already made for improved commutes for thousands of people.
- Tearing up paper-and-pencil procurement and inventory systems at the MBTA has sped up purchases and improved operations.
- Developing a new fare collection system that provides a better rider experience will pay dividends. We've tested it and seen it in action.
- Replacing toll booths with gantries and cameras has improved traffic flow and reduced pollution hot spots.
- Charging a nominal fee for ride sharing while pioneering driver background checks shows that we take this new business model seriously.
- Testing Autonomous Vehicles in designated urban zones is delivering real-world lessons for the companies and communities that must adapt to this inevitable evolution.
- MassDOT, with the participation of advocates, local officials and legislators, has embarked on Rail Vision, a top-to-bottom study of our regional rail network, to see what service models and capital investments will deliver the greatest benefit to the most people on this legacy system.

These are not steps that timid regions take. They may be incremental, but they demonstrate a sense of direction. So, let's apply these same lessons and tackle big transportation problems:

- Ensure transportation equity for everyone in Massachusetts. This means prioritizing better mobility for people whose paths in life depend on it, whether they are urban residents in disadvantaged communities, rural communities with limited transit, or disabled people everywhere with barriers to access.

- Dedicate lanes for buses and shuttles on every major highway, starting during summer months when traffic is lightest. We need to get people out of single-passenger cars by providing a better public transit experience.
- Hike the rideshare fee to help fund public transportation and reduce congestive “trolling” by rideshare drivers by collecting this fee on a per-mile basis.
- Lead a regional plan to cap transportation carbon emissions through pricing and invest new revenue into clean transportation solutions that will directly benefit the greatest number of people.
- Promote safe and efficient cycling by replacing on-street parking with separated bike lanes leading to and from job centers.
- Experiment with roadway pricing to encourage alternatives to rush-hour driving, as part of a move towards embracing the concept of actively managing our roadway network.
- Remove barriers to creating new, attainable housing that is much closer to public transportation and to jobs.
- Allow voters at the local level to raise funds for transportation at the ballot, as is common in more than 40 other states.

Of course, this is not everything we can start to do today to deliver on better transportation, and to demonstrate that we are serious about redeeming our regional potential. What's key is that we embrace ideas have been proven to work.

This is truly a shared journey. The people of Massachusetts will benefit, they are demanding improvements, and civil engineers in the private sector and in our state, regional and local agencies are well suited to translate ideas into concrete. If our state leaders see that this is achievable, they will step up.

My point is this: to our credit, we've laid a strong foundation for smart, transformative investments, by road-testing innovation, and by restoring credibility as stewards of public funds for transportation. Now is the time to lay out a plan to invest the political capital to safeguard our future. And that should be the next chapter in transportation. It's our move to write it.

Accelerated Bridge Construction Approach Used to Replace the Tommy Leonard Bridge

by Joseph Tierney, PE, Structural Engineer, Stantec and Brian Brenner, PE, Principal, Stantec

In May 2018, accelerated bridge construction (ABC) techniques were used to replace the Massachusetts Avenue bridge spanning the Commonwealth Avenue underpass. The original bridge, also named the Tommy Leonard Bridge, was built in 1937 by the City of Boston Public Works Department. The original framing consisted of 16 concrete encased steel girders. The structure was detailed not just as a bridge, but as a tunnel section, in that the superstructure carried axial load from soil pressure against the abutment walls.

Commonwealth Avenue passes below Massachusetts Avenue with concrete-framed boat section approaches to the east and west. Access roads connect Commonwealth Avenue at grade to signalized intersections at Massachusetts Avenue. The site is densely built up and largely residential, featuring older brownstone residences that are typical of 19th Century construction in the Back Bay. It is adjacent to city park land which is part of the Commonwealth Mall in the median of Commonwealth Avenue at both approaches.

Conventional superstructure replacement was estimated to require up to three years for construction, with continuous disruption to Massachusetts Avenue as well as ongoing impacts to Commonwealth Avenue crossing underneath. The span is relatively small, approximately 50 feet long, but the site is very congested and heavily travelled with an average of 22,000 vehicles passing each day. Furthermore, the location is the site of several high-profile community events, including the Boston Marathon, in which thousands of runners pass beneath the bridge every April on Patriots' Day.

Taking advantage of MassDOT's increasing use of accelerated bridge construction, we proposed a design similar to the Fast 14 approach that had been used for I-93 in Medford, using prefabricated bridge units (PBUs). One unique feature of the project was the development of an early utility relocation contract. The previous bridge supported several utility types over Commonwealth Avenue, including natural gas, telephone, fiber optic, electrical, traffic signal and street lighting. Conventional construction would have required a complex utility staging sequence, with temporary phases and frequent excavation and disruption on Massachusetts Avenue.

To take advantage of an ABC approach for replacement of the superstructure, it was necessary to clear the site of utilities. Working with the City

and stakeholders, Stantec developed an innovative early utility contract to relocate utilities away from the bridge. The approach was innovative in that a separate relocation contract of this type had not been let previously by MassDOT. The contract was developed in coordination with FHWA, which provided overview for the work. Utilities were successfully relocated on schedule by February 2017.

With utilities relocated, the existing superstructure was ready for demolition and replacement. This was performed during Mother's Day weekend in May 2018. Prior to superstructure replacement, rehabilitation work was needed on the existing wingwalls and abutment walls. Work included:

- Removal of architectural panels on walls;
- Concrete patching and crack repair;
- Construction of a new concrete roadway slab;
- Construction of a new structural facing wall on both abutments and each wingwall.

To stage this work, westbound traffic in the bypass on Commonwealth Avenue was closed for a period of several months, and traffic was routed to the existing ramps. Construction alternated between each abutment until the new roadway slab and structural facing walls were complete.

The superstructure was replaced by Prefabricated Bridge Units. Each PBU consisted of two steel W-sections spaced at 6.14 feet and an 8-inch composite slab. After PBU placement, the deck was completed with high strength concrete pours between each PBU and at each end diaphragm.

Before PBU's were placed, the abutment sections were extended vertically to receive the units. New walls could only be built so high under the existing structure. The remaining distance was provided by prefabricated, precast concrete units which were installed after demolition of the existing bridge.

A unique feature of the crossing is that the deck carries compression from side walls. In effect, the bypass functions as a tunnel section. Therefore, during demolition, without temporary support, existing abutment walls, which by then were strengthened by new cast-in-place (CIP) facing walls, would have to act as cantilever walls from their base. Review of the existing structure indicated that reinforcement was insufficient to provide strength for cantilever behavior. The design package included loads and details for



Rapid placement of Prefabricated Bridge Units minimized traffic disruptions.



Reconstructed bridge replicated historic design features, while expanding clearance for underpass traffic.

temporary struts to be placed before demolition. Plates were embedded in the CIP-facing walls to accommodate placement of struts.

The existing bridge had an historic parapet fascia detail that was iconic for the site. The new bridge design duplicated the historic shape and appearance of the fascia, but updated it to include current reinforcement details as specified by the MassDOT bridge manual. The new superstructure is shallower than its predecessor, providing additional vertical clearance for Commonwealth Avenue at what is a tight location. The net result of the design overall was a replication of the historic look and feel of the bypass crossing. It is interesting that this was achieved using modern detailing and rapid bridge construction techniques.

Accelerated bridge construction in May was successful. The contractor, SPS New England, opened Massachusetts Avenue to traffic one day ahead of schedule. As the first Boston-owned bridge constructed using ABC techniques, the Boston Department of Public Works has been pleased with the results and looks forward to taking advantage of ABC methods for future projects.

Ten Could've, Should've Infrastructure Projects That Would've Landed Amazon's HQ2

by Dan McNichol, contributor to NY Times and Boston Globe and author of "The Roads that Built America," and "The Big Dig, The Largest Urban Construction Project in the History of the Modern World"

The Big Dig was a twenty-year infrastructure building binge that left Bostonians hungover. Shaking off construction fatigue, frugal New Englanders showed the world it plays hard-to-get by just saying "no" to footing the bill for a two-week infrastructure construction party known as the Summer Olympics. General Electric, however, flattered us by asking if they could call our home HQ1. We said, "Yes."

But, we've been saying "no" to infrastructure for too long. Understandably, we're careful when making lifelong decisions when choosing what we construct. Amazon would be lucky to land us—and we them. Let's take a deep breath and meditate on our world class institutions: universities, research labs, innovative centers. Then, let's visualize supporting those societal institutions by building better brick-and-mortar foundations for the pillars of our society.

Today's building boom finds the Commonwealth drifting between undecided and paralyzed. Generating momentum in the inert infrastructure movement is easy to demand but proving too difficult for politicians to do. Without the needed infrastructure there is less wealth generation and arguably less public health. The Declaration of Independence makes the "pursuit of happiness" paramount. A "pursuit" which happens over public structures.

Think: a speedy transit ride to a higher paying job, an historic bridge rebuilt along with a wooden-boat center like Seattle's Center for Wooden Boats, that's an ocean oasis providing access to the Atlantic for landlocked citizens thirsty for a respite but walled off from the harbor by highways (Dorchester, Mattapan, Roxbury). Speaking of walls, it's time to seriously secure the homeland by building a wall that's needed—a seawall—to keep ever more superior storms at bay.

Amazon is delivering 900 jobs new jobs to the Seaport in a matter of months, plopping the newcomers into an old warehouse that abuts GE's supposed HQ1. Additionally, Amazon is considering taking another million square feet, and an entire office building, in the Seaport. HQ2 or not, Boston is already a city that Amazon is investing in. If Boston were to build just one or two of the ten projects below, Amazon might have already said "yes" to building there HQ2 here.

1. GLX Project, a.k.a. the Green Line Extension, is the most famous thing never built. Plans for its imminent construction dates to 1991. The 4.7-mile line of light transit was officially restarted in 2017 after its original start was "canceled" (how is a start canceled once it starts?) due to cost overruns on the project which had barely broken ground. Building new rail lines, next to old rail lines, in an existing right-of-way should've been easier, could've been done by now, and for far less than today's nearly \$3 billion-dollar burden. Optimistically, GLX officials declare seven new stations will be open for service in 2021, in time to celebrate its 30th year as a good idea.

2. Blue Line/Red Line Connector: Would've connected transit challenged East Boston, as well as Amazon's potential site at Suffolk Downs, to the Red Line at Massachusetts General Hospital. The Blue Line is the only subway line not connected to the Red Line—our subway system's mainline. In the early 1990s, as payback for enduring decades of upcoming construction from The Big Dig project, East Boston was promised a direct connection between the Blue Line and Red Line which would've extended the tracks 1,500 feet from Bowdoin Station at Boston's city hall, to the Red Line stop at Charles/MGH Station. Governor Mitt Romney's administration quashed hopes for building the Blue Line/Red Line Connector in the early 2000s.

3. Northern Avenue Bridge: The Northern Avenue Bridge began swinging over Fort Point Channel waters in 1908. Today, New England Patriots' televisive prime-time beauty shots of span that's cooler than half-time shows. One of the last swinging bridges in the country, it was closed to vehicle traffic in 1997. The powerful Congressman Moakley demanded the bridge be demolished—he hated it. General Electric Corporation asked that the span be rebuilt—to celebrate the machine age and relieve the traffic burden on its HQ1 employees in the Seaport. Allegedly, it was deemed unsafe for even bicyclists and pedestrians. In 2014, the still swinging bridge was closed to all. The bridge could've, should've, would've been restored and swinging by now. Residents, daily grinders and tourists would've had Boston's version of the New York City High-Line experience and Boston would look that much better during prime time.

4. Fort Point Tunnel: Escaping from the Seaport District during the evening traffic panic over the Fort Point bridges has become the gridlocked peninsula's biggest drawback. In the 1990s, appointed government officials managing The Big Dig terminated plans to build a tunnel under the Fort Point Channel (nearly below the old Northern Avenue Bridge) that could've, would've, should've connected Sea Port Boulevard with the Interstate System—without traffic lights. Today the ill-suited Evelyn Moakley Bridge is a parking lot during the evening rush as cars from the Seaport trying to get to I-93, clash with Atlantic Avenue vehicles.

5. North/South Rail Link: Imagine big passenger trains rolling through—beneath Boston and its Big Dig tunnels. Since the 1980s planners have dreamed of it. North Station is a dead-end known in railroad speak as a terminal. Amtrak's Down Easter, out of Portland, Maine, and commuter rail trains, end and begin their journeys at North Station. Boston's South Station is a terminal too. Amtrak and commuter rail rolling stock screech to a halt coming up from Washington, D.C and southern and western points. Linking Boston's two terminals into one subterranean station in downtown connects the New England Seaboard with rail. This in turn brings happiness in the form of somewhat-affordable housing in the Boston Metro area by connecting the core with towns north and south. Recreational endeavors of locals and tourists spread along the Atlantic Coast. Head north, Bostonians, Portland is booming like it hasn't since the Civil War.

6. Downtown Silver Line Tunnel: Roxbury residents were punished in 1987 when its most important link to downtown, an elevated rapid transit line running along Washington Street, was torn down. Substitute rapid transit Silver Line buses took more than a decade to deliver. Worse, the Silver Line buses failed from the start to meet the definition of Bus Rapid Transit. To this day, Roxbury's Dudley Square remains a rapid transit desert. Had a missing tunnel been built, the egregious situation would be mitigated. A still on the books, but unconstructed Silver Line tunnel, could've, would've, should've allowed buses to travel unobstructed between Chinatown and the Seaport District by way of South Station. Imagine a single seat ride between Roxbury and Logan Airport—most of it in tunnels. That's rapid transit.

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Featured Group

Structural Engineering Institute (SEI) Boston Chapter

by Nate Rosencranz, PE, SE, SEI Boston Chair and Senior Engineer at TranSystems Corporation

The mission of the Structural Engineering Institute Boston Chapter is to *advance the science of structural engineering through an increased awareness of sound engineering and scientific principles and the provide a forum for gathering and disseminating information on the latest developments in the methods of analysis and design, structural systems, structural materials used in construction, building codes, and the methods of fabrication and construction.*

To ensure the above mission is achieved SEI Boston has an executive committee comprised of 27 members (the largest the group has ever been) split up into the following subcommittees: Lecture Series, Programs, Membership, and External Affairs. The Lecture Series subcommittee focuses on planning the Biennial Lecture Series, our signature event which occurs every two years. The Programs subcommittee focuses on planning additional events. These typically include technical lectures or presentations of case studies. The Membership subcommittee focuses on SEI membership, the executive committee itself, and also teams up with BSCES's Younger Member Group to plan a structural themed social event every June. The External Affairs subcommittee is our newest subcommittee and is focused on

community service, outreach, and publicity. The full executive committee typically meets once a month and each subcommittee meets or holds a conference call one additional time per month.

This past year our group held our Biennial Lecture Series—Construction Aspects of Structural Engineering—“If You Design It, Can They Build It?” which contained five separate lectures on *Virtual Design and Construction, Blurred Lines of Responsibility in Design Build Contracts, Structural Issues During Construction, Legal Aspects / Risk Management, and Case Studies on the Tappan Zee Bridge and the High Roller Ferris Wheel Projects.* We also organized a two-day seminar on Steel Bridge Coatings, a dinner meeting on doing business with Massport, and a construction-site tour followed by a social.

In addition to the above events we also conducted a survey of our membership to ensure that we are meeting their needs and that we are holding events that they find useful, affordable, and that they would like to attend. Based on the survey results, we will try to ensure that our future events are focusing more on technical information as opposed to case studies and that we are holding budget conscious events as opposed to fancy dinner meetings.

We are in the process of planning a number of events for the upcoming year which will include a presentation on the use of drones for bridge inspections in early December, a joint event on Bridge Construction with the Boston Chapter of the ASCE Construction Institute, a joint event with SEAMass on timber construction, and a Structural Engineering Feud event (based on Family Feud) jointly with the Younger Member's Group in June. We have also begun planning the Lecture Series event which will be held in October of 2019. Please stay tuned for more information on these events.

If you have a question regarding SEI Boston, want to attend an event, or get involved, please feel free to contact any member of our current executive committee leadership:

Nate Rosencranz, PE, SE, Chair
sei@bsces.org or
nrosencranz@transystems.com

Michael Cruz, PE, Vice Chair
mcruz@greenintl.com

Brent Vollenweider, PE, LEED AP, Secretary
bvollenweider@thorntontomasetti.com

Ten Could've, Should've Infrastructure Projects

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7. Fourth Harbor Tunnel: Every thirty-years Boston has built a set of tunnels under the harbor. In the early 1900s, one of the first subaqueous tunnels to carry an electric train was built. Today it is called the Blue Line tunnel. In the 1930s it was the Sumner Tunnel, one of the world's first highway tunnels underwater with ventilation. In the 1960s it was the Callahan Tunnel. In the 1990s it was the “Third Harbor Tunnel,” a.k.a. the Ted Williams Tunnel. Pressed to deliver a less costly Big Dig project, officials canceled additional tunnels under Boston Harbor. “The Fourth Tunnel” would have provided possible rail service and a faster route for high-occupancy vehicles. Even if we started digging today, we'd be late in delivering the next set of tunnels we already need.

8. D Street Silver Line Tunnel: “D” stands for dead-stop. Silver Line buses run over capacity during rush hours. When they enter into or exit

from the Silver Line tunnels under Seaport Boulevard, the double-elongated behemoths come to a stop at a gate. The gate lifts and the buses cross D Street. All street traffic there, much of it also trying to get to and from the Logan Airport, comes to a standstill. Yes, you guessed correctly: The Big Dig's original plans called for a tunnel to be dug under D Street. It's time to start digging. Before Phase II of the convention center, more hotels, condos, stores and offices are built, we need tunnels, tunnels and more tunnels to keep the Seaport Boston's engine of economic development.

9. Urban Ring: Yesteryear's transit geek's dream, the Urban Ring, is a work-around Boston's older way of thinking. Currently, our subways run on a hub-and-spoke pattern. The center of Boston being the hub and the transit lines being spokes. Going into and out of the hub is too often required. The Urban Ring lets people connect

from burb-to-burb along a circumferential set of routes that avoid trips into the hub just to get out to another suburb. The Urban Ring forms a beltway by linking transit lines together that are both tracked trolleys and trackless rapid buses.

10. Super-Storm Seawall: Sea Rise, Climate Change and Super-Storms are here for real. Seawalls help protect assets from Cyclone Bombs and Super Tides. Super Storm Sandy nearly made landfall here. Instead the meteorological monster hit New York City, shoving a storm the size of Texas up its bay—on a high tide. Billions and billions of dollars of damage means the cheap fix would have been better seawalls. Learning by examples set by those in the Netherlands, the people most famously fighting back the sea, means we should've already begun building the wall we really do need—the seawall.

Recent News and Updates

BSCES Seeks 2019–2020 Legislative Fellow

The Legislative Fellow is a professional engineer and BSCES member who serves as a technical resource at the Massachusetts State House. The Legislative Fellow generally works with the staff of the Joint Committee on Transportation on current issues that can benefit from the input of an engineering professional. Most efforts focus on transportation or environmental initiatives can vary. BSCES is currently seeking applicants for the 2019–2020 Legislative Fellowship. The extended application deadline is Friday, December 7, 2018 for the Fellowship year beginning in January 2019 and ending July 31, 2020. For more information visit the [BSCES Legislative Fellow page](#) on the BSCES website and see the application process. You may also contact Rich Keenan with further questions at 617/305-4110 or rkeenan@engineers.org.

BSCES Welcomes its New Members

The BSCES Board of Government is pleased to welcome the following new members who joined BSCES in September and October 2018:

Affiliate

Vanessa Beutel, Jacobs

Associates

Tensin Lobsang, Stantec

Alexis Moser, Kleinfelder

Joe Nault, Consigli Construction

Qiu Zheng, TranSystems

Students

Ali Al Hady, Wentworth Institute of Technology

Hussam Almakdisi, Northeastern University

Reed Allen, Northeastern University

Daniel Mark Ankiewicz, University of Massachusetts Amherst

Krishnaveni Balakrishnan, University of Massachusetts Amherst

Liam Patrick Bettez, Purdue University

Eleni Blanas, Northeastern University

Maria Boucher, Trinity College

Joey William Briffett, Merrimack College

Gustavo Arenzano Chagas, Northeastern University

Zhao Chen, Northeastern University

Jason Chin, Northeastern University

Alexan Cinar, Bunker Hill Community College

Catherine Clement, Northeastern University

Clare Creedon, Northeastern University

Brian Colleoni-Pimenta, Merrimack College

Gabriel Joseph Cutrone, Northeastern University

Alfonso Depalma, Quinnipiac University

Sanmitra Sanjay Desai, Northeastern University

Erin M Dillmann, Northeastern University

Xinlong Du, Northeastern University

Caleb Graham Farnham, University of Massachusetts Amherst

Neil Feinberg, University of Massachusetts Amherst

Catarina Figueiredo Mendes, Wentworth Institute of Technology

Maria Firan, Northeastern University

Hossein Ganji, University of Massachusetts Amherst

Judith Gibson-Okunieff, University of Massachusetts Amherst

Shubham Goski, Northeastern University

William Henry Green, III, University of Massachusetts Amherst

Leah Grodstein, Northeastern University

Robert Hannula, Northeastern University

Lauren Howe, Northeastern University

Yuxiang Huang, Northeastern University

Sam J Hubbard, Norwich University

Carly Hundertmark, Lehigh University

Murtaza Hussain, University of Massachusetts Lowell

Max Huynh, University of Massachusetts Amherst

Yiming Jia, Northeastern University

Hamid Kaboli, University of Massachusetts Amherst

Noah Kappel, Rensselaer Polytechnic Institute

Jason Cahill Kearns, Quinnipiac University

Grayson Lorenzo Kivel, Norwich University

Wooseong Kwon, University of Massachusetts Amherst

Ryan Landers, University of Massachusetts Amherst

Viet Quoc Le, Northeastern University

Gavin Like, Norwich University

Wenfeng Liu, University of Connecticut

Juan Lopez, George Mason University

Evan James Marohn, University of Pittsburgh

Brian Martin, Massachusetts Institute of Technology

Katherine McCombs, University of Massachusetts Dartmouth

Hailey Medeiros, Northeastern University

Tucker Merritt, University of Delaware

Randall Miller, Purdue University

Thomas Michael Muir, University of Massachusetts Amherst

Ethan Neilan, Northeastern University

Hayley Neugarten, Quinnipiac University

Elizabeth Anne Newport, Lehigh University

Edward James Orde, Northeastern University

Philipp Osanna, Worcester Polytechnic Institute

Garrett Paquette, Rensselaer Polytechnic Institute

Phillip Paventa, Northeastern University

Zachary Pessin, University of Massachusetts Amherst

Daniel C. Pettit, Northeastern University

Kevin Power, University of Massachusetts Amherst

Daniella Roitman, Northeastern University

Reina Romero, Tufts University

Benjamin Saint-Fort, Northeastern University

Smit Sanghvi, Northeastern University

Zachary Schladenhauffen, University of Massachusetts Amherst

Jeremy Shohet, University of Massachusetts Amherst

Daniel Stephen Smith, Norwich University

Quinn Nicholas Stamps, University of Maine Orono

Andrew Summerfield, Northeastern University

Julia Ubertini, Northeastern University

Dennis Vertiyev, Wentworth Institute of Technology

Vithal Bhuva, Northeastern University

Dunick Voltaire, University of Massachusetts Dartmouth

Jingxuan Wang, Northeastern University

Andrew Patrick Welcome, University of Vermont

Zheng Wen, Northeastern University

Didong Xu, Northeastern University

Delaney York, University of Massachusetts Lowell

Renew Your 2019 ASCE and BSCES Membership Today!

By acting now to ensure your ASCE membership continues through 2019, you will be able to enjoy all your Society benefits and resources uninterrupted. Early renewal will enter you into drawings for Amazon.com gift cards. The earlier you renew, the more chances to win. Visit asce.org/drawing to renew and enter now. When renewing your ASCE membership, please don't forget to also renew your BSCES membership to continue to receive the numerous member benefits that BSCES has to offer.

Engage Your Peers at the New ASCE Collaborate

Do you have work-related questions, either about your career or about help you need on a project, that fellow members could answer? Could you answer others' such questions? [Click here](#) to join in discussions with members around the world.

See How Your Pay Stacks Up with Free Uses of the ASCE Salary Calculator

The 2018 ASCE Salary Report provides an industry snapshot of civil engineers' compensation—both salary and benefits—by location, discipline, experience level, and other metrics. The report's Salary Calculator allows civil engineers to sort and compare the results to their individual pay and benefits. ASCE members get five free uses of the calculator. The report and calculator are available at asce.org/civil-engineering-salaries.

SEND US YOUR NEWS! Looking to strengthen the community that is BSCES, the BSCES Executive Committee and Newsletter Editorial Board has decided to expand the content of this *BSCESNews* Recent News and Updates column by including more member news. Have you recently been recognized for a professional accomplishment, passed the Professional Engineer Exam, received a promotion, or changed employers? If so, send your news items to BSCES Association Manager, Rich Keenan, rkeenan@bsces.org.

Upcoming Events

For more information and to register for events, please visit www.bsces.org

To register online for an event at the BSCES member rate you must login using your BSCES assigned username and password. If you do not know your BSCES member login information, call 617/227-5551.

Disaster Assistance Building Evaluator Training Workshop

Hosted by MA Architects & Engineers Emergency Response Task Force with support from BSCES

Tuesday, November 27, 2018

Boston Convention and Exhibition Center
8:00 AM- 4:30 PM

This workshop certifies attendees as building evaluators in the nationally recognized Safety Assessment Program (SAP). Professional architects, engineers, and building inspectors will become certified to assist local governments and perform safety evaluations of the built environment in the aftermath of a natural disaster or catastrophe. It will teach participants to conduct rapid damage assessments of structures affected by earthquakes, as well as wind and water damage.

Please see the Insert at the end of this month's newsletter for further details.

Presentation Workshop

Sponsored by the Younger Members Group

Thursday, November 29, 2018

CDM Smith, Boston, MA

5:30 PM Registration & Dinner
6:00 PM Workshop

Speaker: Joanne Linowes, Founding Principal, Linowes Executive Development Institute

Whether you are presenting to a client, at a public hearing, or energizing a team, the power of your presentation skills can make the difference. Join the BSCES Younger Member Group for a presentation workshop and gain valuable training on public speaking and effective presenting.

Please see the Insert at the end of this month's newsletter for further details.

Boston Day-Summit

Sponsored by the Construction Institute Boston Chapter

Friday, November 30, 2018

Revere Hotel Boston Common, Boston, MA
7:30 AM – 5:00 PM

Speakers include:

Luciana Burdi, Deputy Director of Capital Programs and Environmental Affairs, Massport
Anne Gorczyca, Director of Design Build Project Management, MassDOT

This encompassing summit should be attended by anyone with an interest in construction and construction engineering; including structural engineers, geotechnical engineers, civil engineers, architects, planners, contractors, real estate developers, construction law and facility managers, both public and private.

Please see the Insert at the end of this month's newsletter for further details.

Unmanned Aerial Vehicles— Another Tool for Assessing Structures

Sponsored by the Structural Engineering Institute Boston Chapter

Monday, December 3, 2018

VHB, Watertown, MA

6:00 PM Registration, Social & Dinner
7:00 PM Presentation

Speakers:

Robert Blunt, PE, Project Manager-Chief Inspector, VHB

Anthony Darlington, Technology Specialist-Drone Operator, VHB

During this presentation, the speakers will discuss the highlights of drone-based bridge inspection projects completed around New

England, including the planning and preparation that preceded the flights, the methods used to obtain the inspection findings, and lessons learned. They will also show short videos from inspections; highlight upcoming capabilities of drone-based inspection; and provide examples for other uses for drones in engineering projects beyond inspection.

Please see the Insert at the end of this month's newsletter for further details.

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Save the Date!

Tuesday, January 15, 2019

Envision™ 101: New Release and Current Trends

Sponsored by Committee on Sustainability and EWRI Boston Chapter

CDM Smith, Boston, MA

5:30 PM Reception
6:00 – 7:30 PM Panel Discussion

Join a panel of local and national experts assembled to discuss the recent release of Envision™ v3, and current industry trends for its application to planning sustainable infrastructure projects. The relevance of the Envision Sustainability Professional (ENV SP) credential will also be covered. Questions may be submitted to the panel in advance by registrants. Food and beverages will be provided during the reception.

Look to future issues of BSCESNews for more information!

2018–2019 BSCES Program Sponsors

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Upcoming Events *(continued from page 12)*

Geotechnical Challenges at Encore Boston Harbor

Sponsored by the Geo-Institute Boston Chapter

Tuesday, December 11, 2018

Tufts University, Medford, MA

5:30 PM - 9:00 PM

Speakers:

Mary B. Hall, PE, Senior Principal, GZA

Michael P. Smith, PE, Project Manager, GZA

This presentation features an examination of the geotechnical challenges faced in the construction of the Encore Boston Harbor Resort. The resort consists of a 29-story tower as well as a low-rise structure across the remainder of the building's footprint. With a large portion of the building footprint constructed over a multilevel below grade garage, groundwater control was an important issue for both construction and for building design. Given the variety of building loads and highly variable subsurface conditions across the site, multiple foundation types were utilized for the building's foundations.

Please see the Insert at the end of this month's newsletter for further details.

Holiday Party

Sponsored by the Younger Member Group and Transportation & Development Institute Boston Chapter

Wednesday, December 12, 2018

The Hub Pub, Boston, MA

6:00 PM - 9:00 PM

Join the T&DI Boston Chapter and YMG for a fun and festive evening at the annual Holiday Party! We will be hosting a Toys-for-Tots drive; bring a new, unwrapped toy to donate (all ages) to get one entry into the raffle for a prize!

Please see the Insert at the end of this month's newsletter for further details.

FHWA-NHI-130053 Bridge Inspection Refresher Training

Sponsored by the Program Committee

Tuesday–Thursday, February 12–14, 2018

AECOM, Boston, MA

8:00 AM – 4:30 PM

The major goals of this course are to refresh the skills of practicing bridge inspectors in fundamental visual inspection techniques; review the background knowledge necessary to understand how bridges function; communicate issues of national significance relative to the nations' bridge infrastructures; re-establish proper condition and appraisal rating practices; and review the professional obligations of bridge inspectors. This course is based on the "Bridge Inspector's Reference Manual," 2002 (updated 2006), with reference to the AASHTO Manual as defined by the National Bridge Inspection Standards regulation.

Please see the Insert at the end of this month's newsletter for further details.

FHWA-NHI-130055

Safety Inspection of In-Service Bridges

Sponsored by the Program Committee

Monday – Friday, December 10–21, 2018

Hilton Garden Inn Worcester

This two-week course and provides training on the safety inspection of in-service highway bridges. Satisfactory completion of this course will fulfill the training requirements of the National Bridge Inspection Standards (NBIS) for a comprehensive training course.

One seat may become available. If you are interested, please email bscesreg@engineers.org.

Suggest a Seminar Topic

Is there an engineering topic that you would like BSCES to feature in an upcoming seminar? If so, members of the BSCES Program Committee would like to hear from you.

Charged with developing technical training programs that address members' professional development needs, the Program Committee oversees the Society's National Highway Institute training, spring and fall Professional Engineer Refresher Courses and other topical workshops. If you have a technical topic that you would like the Program Committee to consider, send your suggestion to BSCES Program Committee Chair Jeff Lewis at jlewis@garfaloassociates.com or BSCES Association Manager Rich Keenan at rkeen@engineers.org.

Classifieds

University of Massachusetts Lowell— Visiting Lecturer – Civil Engineering

The Department of Civil & Environmental Engineering at the University of Massachusetts Lowell invites applications for a Visiting Lecturer position for January 2019. Responsibilities will consist primarily of teaching the senior Capstone Design course.

Minimum Qualifications (Required):

- Registration as a Professional Engineer and relevant industrial experience
- Undergraduate and Master degrees in Civil Engineering
- The ability to work effectively with diverse groups

To learn more or to apply, please visit: [UML Visiting Lecturer – CE](#)

Review of applications will continue until the position is filled.

The University of Massachusetts Lowell is an Equal Opportunity/Affirmative Action, Title IX employer. All qualified applicants will receive consideration for employment without regard to race, sex, color, religion, national origin, ancestry, age over 40, protected veteran status, disability, sexual orientation, gender identity/expression, marital status, or other protected class.

Disaster Assistance Building Evaluator Training Workshop

Hosted by the MA Architects & Engineers Emergency Response Task Force
6.5 HSW CEUs | 6.5 PDHs | Credit has been approved for Building Officials

Tuesday, November 27, 2018 – 8:00am to 4:30pm

Light Breakfast and Lunch Included

The course will be held at the Boston Convention & Exhibition Center

Cost for Participants : \$150 - Architects/Engineers, \$125 - Building Officials

This workshop certifies attendees as Building Evaluators in the nationally recognized Safety Assessment Program (SAP). Professional Architects, Engineers, and Building Inspectors will become certified to assist local governments and perform safety evaluations of the built environment in the aftermath of a natural disaster or catastrophe. It will teach participants to conduct rapid damage assessments of structures affected by earthquakes, as well as wind and water damage. Upon completion of this workshop, participants will be able to consistently and safely assess structures for habitability and will receive a nationally recognized Cal OES registration ID card from the state of CA.

ELIGIBLE PARTICIPANTS

All building industry professionals are welcome to attend. In addition, certain licensed practitioners will be eligible to perform post-disaster assessments after successfully completing SAP training as certified Building Evaluators:

- Licensed Architects
- Registered Civil, Structural, and Geotechnical Engineers
- Certified Building Inspectors

LEARNING OBJECTIVES

At the end of this training, the participant will be able to:

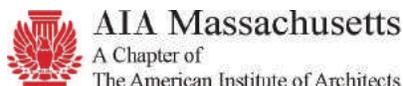
- Accurately conduct post-disaster rapid building assessments and complete appropriate damage assessment forms.
- Demonstrate understanding of the Applied Technology Council's ATC-20 Post- earthquake Safety Evaluation of Buildings and ATC 45 Safety Evaluation of Buildings after Windstorms and Floods damage assessment procedures.

This workshop is being offered as part of the Pre-Show Education series at ABX 2018.

Limited Seats Are Available. Click Here to [Register Now](#)

Questions? Contact Registration at 866-452-2815 or email registration@abexpo.com

This program is offered with cooperation from professional organizations, including the American Institute of Architects Massachusetts Chapter, the Boston Society of Architects, the Boston Society of Civil Engineers Section, the Structural Engineers Association of Massachusetts and The Engineering Center Education Trust.





Presentation Workshop

Thursday, November 29, 2018
5:30 PM Registration & Dinner
6:00 PM Workshop

Featuring:

Joanne Linowes

Founding Principal, Linowes Executive Development Institute

Whether you are presenting to a client, at a public hearing, or energizing a team, the power of your presentation skills can make the difference. Join the BSCES Younger Member Group for a presentation workshop featuring Joanne Linowes, Founding Principal, Linowes Executive Development Institute (LXDi) and gain valuable training on public speaking and effective presenting. Joanne will be touching on concepts from last years presentation workshop but will mainly be introducing new material and methods at this years workshop to help you succeed in your professional endeavors!

Registration Information

Register and pay by credit card online at <https://bit.ly/2PbDJgY>. To register online at the member rate you must login using your BSCES assigned username and password. If you do not know your login information, call 617/227-5551. To register by mail or email, complete an [Event Registration Form](#) and follow the submission instructions.

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Where:
CDM Smith
75 State Street, #701
Boston, MA

Registration Fees:
\$60 Member
\$75 Non-Member
\$55 Public Sector Member
\$60 Public Sector Non-Member
\$30 Student Member

Registration Deadline:

November 27, 2018

Online Registration:

<https://bit.ly/2PbDJgY>

Registration fee includes dinner. Space is limited, register today!

For more information, contact YMG@BSCES.org



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American Society of Civil Engineers



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Boston Day-Summit

Construction Institute Boston Chapter

Sponsored by: **Robinson+Cole**

Friday, November 30, 2018

Silver Ballroom, Revere Hotel Boston Common

200 Stuart Street, Boston, MA

7:30 AM Registration; 7:50 AM – 5:00 PM Speakers, Presentations, & Vendor Exhibits

This full-day seminar will take on the typical ASCE conference format. It will begin with an opening keynote breakfast presentation, a keynote lunch presentation and a series of technical sessions separated by networking breaks and exhibitor interaction. Breakfast and lunch will be provided. Each technical session will include thematically grouped presentations, including a mix of project case studies, technical review, legal issues in construction, technology and innovative planning and construction techniques, and specific construction projects and detailed challenges.

The event should be attended by anyone with an interest in all things construction and construction engineering (history through innovative techniques) including structural engineers, geotechnical engineers, civil engineers, architects, planners, contractors, real estate developers, construction law and facility managers, both public and private.

Registration Deadline: Tuesday, November 26, 2018

\$200 Members, \$250 Non-Members

\$170 Public Sector Members, \$200 Public Sector Non-Members

\$70 Student Members, \$70 Senior Members (65+),

\$2,000 Table of 10

Information/Registration:

Register to attend this meeting and pay by credit card online at <http://bit.ly/2QYVII3>. To register online for an event at the BSCES member rate, you must login using your BSCES assigned username and password. If you do not know your BSCES member login information, call 617/227-5551. You can also register for this event by mail or email. To do so, download and complete a [BSCES Event Registration Form](#) and follow the submission instructions. Cancellations received after November 15 and no-shows will be billed.

A list of confirmed presenters is attached. Presentation times and titles to follow.



This presentation provides Six Professional Development Hours (6 PDHs)

Supported by the staff of The Engineering Center Education Trust

Boston Day – Summit
Construction Institute Boston Chapter
Friday, November 30, 2018
Confirmed Presenters

Morning Keynote Speaker:

Luciana Burdi, Deputy Director of Capital Programs and Environmental Affairs, Massport

Afternoon Keynote Speaker:

Anne Gorczyca, Director of Design Build Project Management, MassDOT
Alex Murray, Project Manager Design Build, MassDOT

Featured Presenters:

Paul Pedini, Vice President of Operations, Skanska

Joe O'Farrell, Managing Director of Harvard Capital Projects, Harvard University

David Ponte, Principal Project Director, Construction Claims Manager, Arcadis

Joe Barra, Partner, Robinson Cole LLP

Brian Brenner, Principal, Stantec
Tim McLaughlin, Senior Vice President, SPS New England

Paul Schuman, Senior Project Manager, Simpson Gumpertz and Heger

Robbie Burgess, Associate Principal and Manager of Construction Services, Howard Stein Hudson

Seth Hamblin, Principal, Geosciences Testing and Research, Inc.
Les Chernauskas, President, Geosciences Testing and Research, Inc.

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Unmanned Aerial Vehicles – Another Tool for Assessing Structures

Robert Blunt, PE

Project Manager-Chief Inspector, VHB

Anthony Darlington

Technology Specialist-Drone Operator, VHB



Monday, December 3, 2018

VHB Office, 101 Walnut Street, Watertown, MA 02471 (plenty of parking available)

6:00 PM Registration, Social & Dinner; 7:00 PM Presentation

Recent advancements in unmanned aerial vehicle (UAV or “Drone”) technology can now provide owners with the capability and flexibility to obtain visual inspection and assessment data of their infrastructure quickly, accurately, at low cost, and with significantly reduced impacts to the public.

During this presentation, we will discuss the highlights of drone-based bridge inspection projects completed around New England, including the planning and preparation that preceded the flights, the methods used to obtain the inspection findings, and lessons learned. We will also show short videos from inspections; we will highlight upcoming capabilities of drone-based inspection; and we will show other uses for drones in engineering projects beyond inspection.

Registration Deadline: Thursday, November 29, 2018

\$30 Members, \$40 Non-Members

\$20 Public Sector Members, \$30 Public Sector Non-Members

\$10 Senior Members (65+) and Student Members

Information/Registration:

Register to attend this meeting and pay by credit card online [here](#). To register online for an event at the BSCES member rate you must login using your BSCES assigned username and password. If you do not know your BSCES member login information call 617/227-5551. You can also register for this event by mail or email. To do so, download and complete a [BSCES Event Registration Form](#) and follow the submission instructions. Cancellations received after November 29th and no-shows will be billed.



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Geotechnical Challenges at Encore Boston Harbor

Mary B. Hall, P.E.
Senior Principal, GZA

Michael P. Smith, P.E.
Project Manager, GZA

Tuesday, December 11, 2018

Tufts University

Registration and Dinner: Science & Engineering Atrium, 200 College Ave, Medford, MA

Seminar: Robinson Hall Room 253, 212 College Ave, Medford, MA

5:30 PM – 9:00 PM (Dinner Included)

The site's approximately 32-acre property was occupied by the Monsanto Chemical Company and other chemical companies from the late 1800s until the late 1960s. During this time period, the local salt marsh was filled, extending the original shoreline out toward and around an island within the Mystic River. The buildings on the property were razed in the 1970s and the property used primarily as a material storage and staging yard since the mid-1990s, when rock and low-permeability muck (tunnel muck) from the construction of the Deer Island Outfall project were stockpiled on it and later spread out.

The Encore Boston Harbor resort consists of a 29-story tower as well as a low-rise structure across the remainder of the building's footprint. With a large portion of the building footprint constructed over a multilevel below grade garage, groundwater control was an important issue for both construction and for building design. Given the variety of building loads and highly variable subsurface conditions across the site, multiple foundation types were utilized for the building's foundations including: load bearing elements to support the tower; slurry walls and mat foundations to support the building across the below grade garage; precast prestressed concrete piles and drilled micropiles to support building across the at-grade portions; and rock anchors to help resist hydrostatic uplift pressures on the below grade garage.

The project also included the construction of a new waterfront and landscaped open space. These site improvements included demolition of historic shoreline features, installation of steel bulkhead and pile supported wharf structure as well as a floating dock system. Due to the soft soils at the site, a timber pile supported load-transfer platform with lightweight fill was used for raises in grade behind the bulkhead and EPS foam blocks were used to raise site grades in the landscape areas to mitigate long-term settlement.

Registration Deadline: Wednesday, December 5, 2018

\$75 Members, \$85 Non-Members

\$65 Public Sector Members, \$75 Public Sector Non-Members

\$25 Senior Members (65+), Students



This presentation provides 1 Professional Development Hour (PDH)

Supported by the staff of The Engineering Center Education Trust



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Information/Registration:

Register to attend this meeting and pay by credit card online at bit.ly/EncoreBostonHarbor. To register online for an event at the BSCES member rate you must login using your BSCES assigned username and password. If you do not know your BSCES member login information call 617/227-5551. You can also register for this event by mail or email. To do so, download and complete a [BSCES Event Registration Form](#) and follow the submission instructions. Cancellations received after December 5, 2018 and no-shows will be billed.

Speaker Bio

Mary B. Hall, P.E.

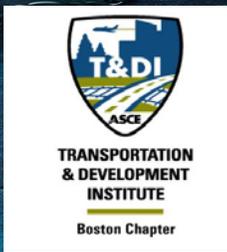
Senior Principal, GZA

Ms. Hall has been with GZA for over 30 years, previously managing the firm's Boston office. A geotechnical engineer by training, Hall specializes in evaluating geotechnical and environmental conditions and their potential impact on development and infrastructure projects for both private and public clients. She is a registered Professional Engineer in several states and earned her Bachelor of Science in Civil Engineering from Bucknell University and her Master's Degree in Civil Engineering from University of California at Berkeley. She is a past President of the American Council of Engineering Companies (ACEC) of Massachusetts where she was on the board for 10 years, an ACEC Fellow and a past Trustee of the Boston Groundwater Trust.

Michael P. Smith, P.E.

Project Manager, GZA

Mr. Smith is a project manager and geotechnical engineer with 11 years of experience in geotechnical design and consulting. He is a registered Professional Engineer in Massachusetts and earned his Bachelor of Science and Master of Science in Civil Engineering from University of Massachusetts Lowell. His experience includes geotechnical and environmental site investigations, environmental remediation, geotechnical analyses, preparation of reports and contract documents and construction oversight. He has worked on a variety of projects that include private developments, municipal and industrial facilities, pipelines, tunnels, dams/levees, hazardous waste sites, and bridges.



Please join us!

BSCES YMG & TDI Holiday Party

Wednesday, December 12, 2018

The Hub Pub, 18 Province Street, Boston MA

6:00 PM – 9:00 PM

Join the T&DI Boston Chapter and YMG for a fun and festive evening at the annual Holiday Party! We will be hosting a Toys-for-Tots drive; bring a new, unwrapped toy to donate (all ages) to get one entry into the raffle for a prize!

Register Today! Email YMG@BSCES.org to Register

Registration Deadline: Thursday December 6, 2018

Free for BSCES Member & Non-Members

Hors d'oeuvres included with registration, cash bar.

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FHWA-NHI-130053

Bridge Inspection Refresher Training Tuesday, February 12, 2019 – Thursday, February 14, 2019

AECOM, 1 Federal Street, 8th Floor, Boston, MA
Tuesday through Thursday, 8:00AM – 4:30PM

The major goals of this course are to refresh the skills of practicing bridge inspectors in fundamental visual inspection techniques; review the background knowledge necessary to understand how bridges function; communicate issues of national significance relative to the nations' bridge infrastructures; re-establish proper condition and appraisal rating practices; and review the professional obligations of bridge inspectors. This course is based on the "Bridge Inspector's Reference Manual," 2002 (updated 2006), with reference to the AASHTO Manual as defined by the National Bridge Inspection Standards regulation.

Core course topics include inspector qualifications and duties, bridge mechanics, record keeping and documentation, fatigue and fracture in steel bridges, traffic safety features, safety, National Bridge Inventory (NBI) component ratings, superstructure type identification, inspection techniques and case studies for decks, superstructures, bearings, substructures, channels and culverts, and a mock bridge inspection classroom exercise. Optional topics include inspection of truss gusset plates, adjacent box beams, and post-tensioning tendons.

Registration Deadline: Tuesday, January 15, 2019

Registration Fees: \$1,400 Members, \$1,600 Non-Members

Registration fee includes course materials, continental breakfast, breaks, and lunch

Information/Registration:

Attendance for this program is limited to 30 participants. Individuals who attempt to register after the course is closed will be added to a waiting list.

Reservations will be accepted on a first-come first-serve paid reservation basis. Payment must be received with registration to secure a slot. Register to attend this course and pay by credit card online at <http://bit.ly/NHIBridgeRefresher>. To register online for an event at the BSCES member rate you must login using your BSCES assigned username and password. If you do not know your login information call 617/227-5551. You can also register for this event by mail or email. To do so, download and complete a [BSCES Event Registration Form](#) and follow the submission instructions. Cancellations or no shows after January 15, 2019 will be billed.