



ASHE
Southern New Jersey

Winter
2019/2020

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A Message from Mike Frabizzio ASHE SNJ President

This is a re-write of the original “Message” I had prepared, a re-write to address the COVID-19 outbreak that has affected the entire world. I was planning to mention all of the exciting events that we have to look forward to in closing out the ASHE year. However, just like everything else in our lives over these past few weeks and looking forward, the need for social distancing has forced the cancellation of the remaining ASHE dinner meetings this Spring. While we are fortunate in terms of our engineering and construction work being allowed to continue for the most part, more fortunate than many other professions, COVID-19 poses a real threat to us all and, on behalf of the ASHE Southern NJ section, I hope you all and your families and friends are doing well and staying healthy. I think we should look for the “rainbows” that have already come out and will continue to make themselves visible as this virus storm passes. We have seen individuals adjust their way of life for the greater good of others, schools and workplaces utilize technology for remote learning and productivity, and I’m sure many other positive outcomes await as this challenge stimulates our creativity for solutions. If nothing else, social distancing has forced us to slow down our lives a little bit and spend more time with the ones we love, which are good things.

Putting COVID-19 aside for a moment, the ASHE Southern NJ section sure has been busy since our last newsletter. Thanks to your very generous donations, we were able to collect a truckload of toys and gifts for HomeFront NJ at our December gathering. In January, we held our annual Ethics PDH meeting, then followed that by giving out a highway engineering-themed award to Collingswood Middle School at the Philadelphia region’s Future City competition. February brought a presentation on the Rt. 206 White Horse Circle project, which included a lively Q&A discussion, as many of us use the new roundabout and took great interest in learning the background on the design improvements. A social gathering (bowling!) provided a fun way to close out February.

At our January meeting, we posed a survey question to gauge our members interest in what you all would like in terms of a meeting in December (including the option of no meeting at all). With the holiday season, there are many competing events in December, both personal and professional, and we want to provide something that is worthwhile to all. Over 75% of you indicated that you would like some

kind of event with mixed preferences on whether you’d like a standard PDH meeting or a more informal gathering. Our program planning committee will take this into consideration, as we plan for future December meetings. If you have specific ideas, please share them on the PDH forms at the monthly meetings.

As reported at a recent meeting, our joint bid with the North Central NJ section to host the 2023 ASHE National Conference fell a bit short, as 2023 was awarded to ASHE’s Georgia section. While this was disappointing, we are hoping to make slight tweaks to our proposal and submit a winning bid for 2024! Thanks to all the great work done by Lori Wade, Scott Cortese, Carrie Strehle, and many others in preparing the proposal. On the student outreach front, I would like to make an appeal to you all to please consider volunteering to speak at one of our ASHE student chapter meetings – either at Mercer County CC or Rowan University. These student chapters were set up as a way to start getting the next generation of engineers interested in the highway engineering field. Having real-life engineers come out and explain what we do and engage with the students is a great opportunity for us to spark and nurture this interest. Email Richard Grubb (rgrubb@rgaincorporated.com) if you are willing to speak.

As we look to finish out the 2019-2020 ASHE year, we are certainly disappointed to have to cancel the remaining March through May dinner meetings, which were slated to include a field trip to the Scudder Falls Bridge Replacement site and our annual Projects of the Year (POTY) Awards. Know that we will look to get the Scudder Falls field trip on the schedule for this coming Fall, if at all possible. Regarding the POTY Awards, our judging continues as we speak and winners will be determined and announced this Spring with a celebration planned for the Fall. Of course, we are uncertain when it will become safe again to hold our gatherings, but at this point we are still hoping to be able to hold our annual scholarship fund-raiser Golf Outing on July 15 at Little Mill Country Club.

Trying times like this make us stronger in the long run and serve as a reminder to appreciate things we sometimes take for granted. Looking forward to our next chance to stand side by side and reconnect in person ... In the meantime, continue to do your part and stay healthy!

Spotlight on Dewberry Things We Take for Granted National Security and the Convenience of Consumer Goods



The newly installed straddle carrier RPM scanning system at Maher Terminal has vastly improved the flow and efficiency of the shipment of imported containers from vessel to train, while also freeing up operating space on the terminal.

Photo courtesy of Dewberry

Black Friday and Cyber Monday have come and gone, as another holiday season passes. This year may have felt a little bit more intense, given that Thanksgiving happened on the latest day possible in the calendar year. The Port of New York and New Jersey is humming along like a fine-tuned machine with another record set for the volume of containers handled in the month of October. In the last year, the port's total container volume jumped from the third highest in the U.S. to second behind Los Angeles. This is the result of many things, but today, given the subject of this blog, the focus is on "things we take for granted," which ties into the holiday season and follows up on a project we recently participated in at Maher Terminals in Elizabeth, New Jersey, as the engineer of record.

Getting to Know Port Terminology

Maher operates one of the world's largest multi-user container terminals. The highly efficient container terminal operation is located within the Port of New York and New Jersey, which is the gateway to one of the most concentrated consumer markets in the world and the busiest container port on the east coast of the U.S.

Most imported goods that eventually end up in malls or delivered to your doorstep in Amazon boxes are shipped thousands of miles in intermodal containers on huge ocean-going vessels that are capable of handling upwards of 14,000 containers or TEUs. Containers are mostly 20 or 40 feet long, and the container volumes are measured in "twenty-foot equivalent units," thus TEUs. Containers are discharged by enormous ship-to-shore cranes into container terminals and then transferred to trucks or trains for distribution across the U.S.

Today's modern container terminals can vary in levels of automation, but all employ specialized computer systems that utilize geospatial information systems (GIS) and artificial intelligence (AI) to maximize

operational efficiency and reduce the time it takes to process and move containers off the terminal. At Maher Terminal, straddle carriers are used to transport containers from the ships to nearby trains for cross-country delivery. A straddle carrier is a large, fast moving, eight-wheeled piece of equipment—like something out of a Star Wars movie—that carries containers without the need for a truck chassis. In effect, a straddle carrier "straddles" over the container and picks it up for transport within the container terminal.

National Security

Not too long after September 11, 2001, all imported containers were required to be scanned for the presence of radioactive material before leaving the port. Manual individual searches of the literally tens of thousands of containers imported into the U.S. on a daily basis are simply not feasible, so the Department of Homeland Security (DHS)—partnering with other intelligence agencies, shippers, and terminal operators—developed Radiation Portal Monitors (RPMs) that are capable of quickly scanning containers for the presence of radioactive material when they leave the port facilities by truck.

Creating an Efficient Process

Until recently, there wasn't a similarly seamless process for scanning containers transferred by straddle carriers to be loaded onto trains. Traditional RPMs are unable to scan containers being moved by a straddle carrier due to the size and design of the equipment. All containers being transferred to rail cars needed to be staged in an area on the terminal so they could be manually scanned by a mobile RPM unit. This created inefficiencies, such as double handling and loss of precious terminal space to allow for container scanning.

Contributed by Ken Spahn of Dewberry

Spotlighton Arora and Associates, P.C. Pulaski Skyway Piers 76 & 77 Replacement Project



The Pulaski Skyway is a 3.5-mile-long bridge located in Hudson and Essex Counties that serves as a direct link to and from New York City via the Holland Tunnel. Each day, more than 74,000 vehicles use the Skyway, which serves as an important lifeline to the world's largest metropolitan area.

Built in the late 1920s and early 1930s, the Pulaski Skyway was opened to traffic in November 1932. Since that time, the condition of the original concrete piers has steadily declined,

with only minor patching performed to maintain them. In 2013, Arora and Associates, P.C. was retained by the New Jersey Department of Transportation (NJDOT) to design the rehabilitation project. In 2017, the NJDOT awarded a construction contract to joint venture partners Ferreira Construction and Tutor Perini Corporation for the rehabilitation of Kearny Ramp and Piers 76 and 77, which support both the ramp and the mainline.

Studies of the Kearny Ramp indicated that the ramp and its supporting piers were extensively deteriorated and in need of repair/replacement. It was concluded that the best time to replace piers 76 and 77 was while the Kearny Ramp was being reconstructed.

The Pier Replacement project included a seismic analysis using a finite element model to understand how the foundations interacted with the subsoils. Structural evaluations of the truss indicated where the foundations of the piers had to be modified to meet structural and seismic standards. After taking into consideration the site constraints, local conditions and geotechnical properties of the underlying soils, new footings supported on drilled shafts were selected as the most appropriate means of increasing the footing capacity, limiting settlements and ensuring structural and seismic resilience. The piers' existing foundation caissons were left in place and new foundation were built around them.

Rehabilitation work performed on the piers included:

New drilled shaft and micro-pile foundations surrounding the old pier caissons (isolated and left in place) and new pier columns to support the steel truss.

Structural steel repairs / replacement of all steel truss members exhibiting severe pack rust and section losses within the influence of truss jacking operations.

The construction challenge was replacing the piers while the Skyway remained open to traffic. The replacement of piers 76 and 77 marked for the first time in the Skyway's history that the truss was jacked and placed on temporary structures, while the piers and foundation underwent complete replacement.

The foundations included a combination of drilled shafts and micro-piles. To replace the piers, Arora recommended a three-phase construction staging of the foundation. This allowed the temporary support to make use of the first phase permanent foundation, while new columns and second phase foundation caps were constructed over the existing caisson that was isolated from the new foundation and left in place.

During the jacking operation, a temporary structure was built to take approximately 3,000 tons of load from the Skyway. The temporary support was designed to resist vertical and longitudinal load and to accommodate longitudinal movement. The Skyway was jacked from the temporary support to lift bridge about 1/8" from the bearings and placed on the temporary support. The existing bearings and pier columns were demolished and reconstructed once the bridge rested on temporary support. Finally, the ramp was placed back on new piers and bearings. The Skyway remained open to traffic throughout the construction of the new piers and was only temporarily closed during the jacking operations.

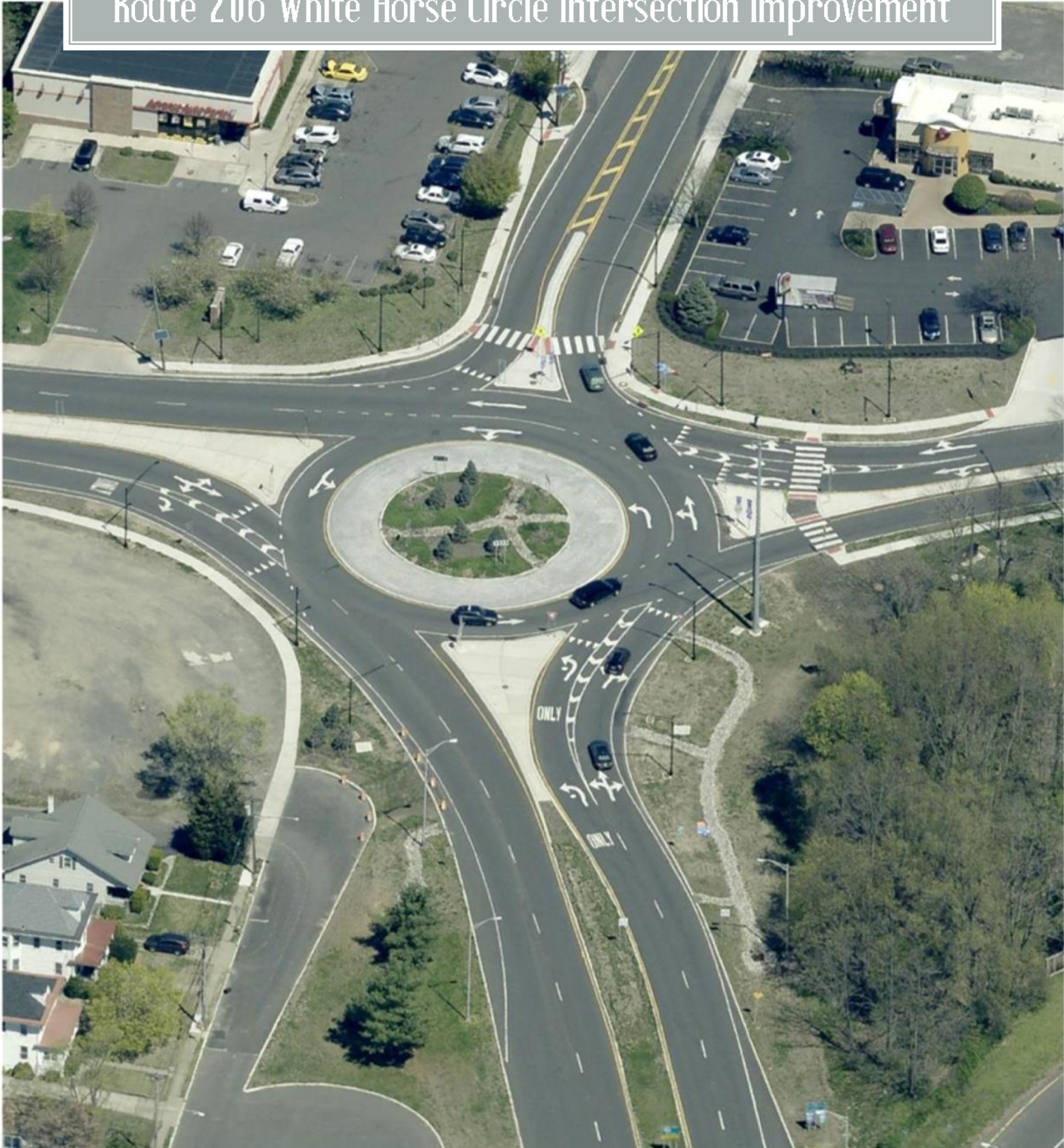
The new foundations and piers were designed to last a minimum of 75 years and to withstand a seismic event. Arora's replacement design concept will serve as a template for future Skyway pier replacement projects, facilitating extending the lifespan of this vital four-lane bridge-causeway.

Arora and Associates, P.C., along with NJDOT, Ferreira Construction and Tutor Perini Corporation are the proud recipients of a Professional Engineers Society of Mercer County (PESMC) Project of the Year Award for the Pulaski Skyway Piers 76 & 77 Replacement Project.

Khairul Alam, P.E., P.M.P., is the Vice President of the Structures Department for ARORA and ASSOCIATES, P.C., which is headquartered in Lawrenceville, New Jersey. Mr. Alam is a professional engineer with more than 30 years' experience in transportation and holds both an MS and BS in civil engineering. Mr. Alam is a Licensed Professional Engineer in the states of New Jersey, New York, Pennsylvania and Delaware and is a recognized Project Management Professional by the Project Management Institute. A past president of the Raritan Valley Society of Professional Engineers, he has served as the Project Manager for several recently constructed major bridge projects, including the award-winning Rehabilitation and Repair of the Pulaski Skyway; Route 7 Bridge Over Conrail; Port Authority of New York & New Jersey Raise the Roadway Bayonne Bridge Project (as a subconsultant) and many others.



Spotlighton Urban Engineers Route 206 White Horse Circle Intersection Improvement





Once referred to as a “death trap” by the Times of Trenton, the intersections of Route 206, South Broad Street and White Horse Avenue was long overdue for a change. For drivers in Hamilton Township, White Horse Circle was more akin to a maze than an intersection, and it was often avoided by drivers because of the confusing crisscrossing lanes at the intersection. Between 2006 and 2008, there were a total of 161 crashes at the intersection of which 56 included injuries.

The New Jersey Department of Transportation (NJDOT) began exploring ways to improve safety at the circle and enlisted Urban Engineers to develop conceptual designs for several options, including a modern roundabout that was ultimately selected for construction. Rather than cutting through the circle, all approaching vehicles would yield to circulating vehicles within the roundabout which would in turn remove several conflict points that existed in its original configuration.

Promoting a modern roundabout as a solution in a State known for removing “traffic circles” was not an easy task. Along with NJDOT, Mercer County, and Hamilton Township, Urban created and executed a public involvement process; engaging and educating the public on the difference between roundabouts and traffic circles, demonstrating

how the modern roundabout was the best solution through pamphlets, presentations, virtual modeling, and Q&A’s. Urban worked with partners to create a multi-staged traffic control plan with limited detours. The firm designed a single/double lane hybrid roundabout that was 170 feet in diameter with 16-foot wide lanes. Each approach has a splitter island and the White Horse Avenue and South Broad Street approaches both include high-visibility crosswalks.

Completed in April, 2018 by South State, Inc., the new roundabout serves as an aesthetically pleasing gateway into Hamilton Township that is much safer for drivers and pedestrians. It also provides a smooth transition from the multilane highway section of Route 206 to the residential streetscapes of town. In the first six-months since its competition, the improvements to White Horse Circle have decreased the average total crashes per month by 71% and total injury crashes by 93%. The immediate positive impact these improvements are having on the traffic flow and safety of the traveling public is clearly evident. The success of this project would not be possible without the commitment of our local and state partners, and the commendable performance of the contractor and construction managers.

Section News & Meetings

The December Social Event and Toy Drive

The 2019 holiday drive benefited HomeFront NJ, whose mission is to end homelessness in Central New Jersey by harnessing the caring, resources, and expertise of the community. They help homeless families advocate for themselves individually and collectively.

Ivy Landon was presented with a plaque for winning the 2023 ASHE National



Conference Logo Contest.

A Lego Holiday Construction Competition was also held with some creative entries.

ASHE SNJ gathered January 15th, 2020 for the annual ethics presentation at Maggiano's in Cherry Hill.

Presenters Anthony S. Potter and Gunther O. Carrle have over 50 years combined experience dealing in engineering law. The presentation got off to a boisterous start through their nuanced back and forth style of presenting the material. Audience engagement was encouraged as Potter and Carrle guided attendees through the history and implementation of the Code of Ethics for Engineers. The crux of the presentation focusing on The Six Fundamental Canons with practical applications given for each subsequent canon from the list. The presentation was punctuated with deep dives into several case studies from the presenters' own personal careers; these case studies, accompanied by several "hypothetical" scenarios, were applied to common modern working environments to highlight the sometimes blurry, and sometimes less-so, line of ethical practices in the modern engineering world.

ASHE SNJ gathered February 12th, 2020 for a presentation of the Route 206 White Horse Circle at the Hamilton Manor.

Presenters William McGarrigel, PE, Scott Diehl, PE, and Adam Brown, PE brought over 70 combined years of engineering experience to the presentation floor Wednesday to discuss the process of rebuilding an unsafe traffic circle into the safer, roundabout alternative. The presentation took attendees through the history of the intersection and which developments to the region warranted the adjustment to a safer intersection, highlighting the interconnectivity throughout the construction world.

Time was dedicated to elaborate on the traffic studies and survey that ultimately decided the final design; emphasis was placed on the struggles with permitting and utility relocation requiring adaptability on the construction site with regard to scheduling and design concerns. The presenters also touched on the adaptation of the MUTCD when dealing with non typical intersections and the need for clear communication with NJDOT concerning traffic striping and signage on the approach and within the roundabout.

Keeping the overall presentation segment succinct allowed for a higher focus on audience (and presenter) participation with an extended Q&A. Presenters fielded questions concerning design speeds, traffic and highway standards, field inspection techniques, budget, scheduling, dealings with local residents and businesses, and more. Read more about the White Horse Circle project in the Spotlight on Urban Engineers, beginning on page 8.



Section News & Meetings

Scudder Falls Field Trip & Meeting Cancelled

The ASHE March Field Trip and Meeting were cancelled due to safety concern regarding the COVID-19 pandemic. The current plan is to reschedule in October, 2020, assuming that the outbreak has passed. Construction of the second span over the Delaware River will still be in full-swing this fall, and with luck, the tour may extend to the new pedestrian walkway located on the new span. Keep your calendar open.



“pong”. While there was considerable interest in all three areas, pong appeared to be the most popular as many students walked away with the coveted prize, a GPI milk glass.



Mercer County Community College Club Day

In February, ASHE SNJ participated in the Mercer County Community College Club Day. The College holds club day at the beginning of each semester, where we took the opportunity to meet students and discuss scholarships, opportunities in the Transportation Engineering field and the game of

Pizza, Pins and Pop

On a chilly evening in Mt Laurel, ASHE SNJ Members and friends gathered for a spirited round of bowling at Laurel Lanes. Attendees also enjoyed pizza and appetizers in support of our scholarship fund.



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Upcoming Events

LOOKING AHEAD

Scudder Falls
Field Trip & Meeting

March 2020
(Cancelled)

Project of the Year

April 15, 2020
(Cancelled—Project of the
Year winners will be hon-
ored at the September
2020 meeting)

Golf Outing

July 15, 2020
(Tentative)