Each year, APWA presents the Public Works Projects of the Year awards to promote excellence in the management and administration of public works projects, recognizing the alliance between the managing agency, the contractor, the consultant, and their cooperative achievements. This year’s award winners will be recognized during APWA’s PWX, which takes place September 8-11 in Seattle, Washington.

The winners of the 2019 Public Works Projects of the Year Award are:

**Disaster or Emergency Construction/Repair**
- <5 million: Washington Street Culvert Emergency Repair
- $25 million–$75 million: Mud Creek Emergency Reopening

**Environment**
- <5 million: Fish Passage Enhancement Program
- $5 million but less than $25 million: Stony Island Habitat Restoration Project

**Historical Restoration/Preservation**
- <5 million: Central Avenue/Elliot Street Historic Bridge Rehabilitation
- $5 million but less than $25 million: Madison Municipal Building Renovation
- $5 million but less than $25 million: Yesler Way Bridge Reconstruction
- $25 million–$75 million: Minot Downtown Infrastructure Improvements Project
- >$75 million: Longfellow Bridge Rehabilitation Design-Build

**Structures**
- <5 million: Kiwanis Park Splash Playground
- $5 million but less than $25 million: Nine Mile Creek Regional Trail
- $25 million–$75 million: Oswego Public Safety Campus
- >$75 million: Calaveras Dam Replacement Project
- >$75 million: Gateway to Monroe County

**Transportation**
- <5 million: Marsh Creek Road Bridge Replacement Project
- $5 million but less than $25 million: Caltrain Santa Clara Station Pedestrian Underpass Extension
- $25 million–$75 million: Bayview Corridor Project
- $25 million–$75 million: Tangerine Road: Dove Mountain Boulevard to La Cañada Drive
- >$75 million: I-11 Boulder City Bypass Phase 2 Design-Build
- >$75 million: SouthEast Connector, Phase 2

**Small Cities/Rural Communities Projects of the Year:**
- Disaster/Emergency: Storm Disasters Recovery Project, February 2017–March 2018
- Environment: Bolton Reservoir Replacement
- Historical Restoration/Preservation: Downtown Afton Revitalization
- Structures: Warren Riverview Park Development
- Transportation: Grand Avenue Half Moon Lake Bridge Replacement
On Friday afternoon, September 21, 2018, the City of Waukegan Department of Public Works discovered a sinkhole that had opened along the eastbound lane of Washington Street near downtown Waukegan. In this area, Washington Street is a four-lane arterial street with sidewalks on each side. What lay beneath that sinkhole, 45’ below roadway grade, was a 10-foot diameter, 180-foot-long stone pipe arch constructed in 1904 carrying the Waukegan River. When the Department of Public Works investigated the interior of the arch, they discovered that a portion of the arch wall had collapsed causing the sinkhole on Washington Street.

The Department of Public Works was under pressure to deliver a quick solution, and the key decision was to establish a task force led by the Mayor that included the Director of Public Works, the contractor, the designer, and emergency services to expedite the decision process to reconstruct the culvert and reopen the road to traffic.

The nature of the project was such that the best way to proceed was to replace the 1904 half-collapsed stone arch culvert, which required an open excavation. The large amount of excavation material required offsite temporary storage. The daily issue was to maintain stability of the steep slopes during rain events. To complicate things, an unrelated water-main failure at the Lilac Ledge retirement home created additional erosion to the slopes of the ravine.

A 10-foot diameter concrete pipe was determined to be the best option from a combined hydraulic, constructability, and availability perspective. The material was readily available to the contractor and could be delivered to the project site on short notice. The invert of the new culvert was set six inches below the stream bed elevation to allow the bottom of the culvert to fill in with sediment to mimic a natural streambed scenario. This provides a better habitat for fish and other stream creatures.

Due to constructability concerns with trying to build a large cast-in-place concrete headwall for this 10-foot diameter culvert at the bottom of a 45-foot deep ravine, the decision was made to build a headwall and wingwalls out of gabions to improve the stability of the banks of the ravine.

As a measure of sediment control, turbidity barriers were installed downstream of the project site. Each of these sediment control practices was maintained throughout the life of the construction project. Lake County Stormwater Management Commission inspections indicated that the project remained in compliance with erosion and sediment control requirements.
Highway 1 through Big Sur is a symbol of Caltrans’ ability to design and construct infrastructure that strikes a balance with nature. This route includes a 70-mile-long ribbon of pavement which straddles a rugged coastline and is world-renowned for transporting people to a most beautiful, tranquil and serene place. Part of this natural beauty includes the dynamic landscapes, making every drive and bicycle ride a truly unique experience. Since the highway was completed in the 1930s, countless landslides and unceasing erosion have changed how the roadway traverses the coast. In 2017, nature reminded us of its mighty power with some of the most catastrophic storms in recent history, severely damaging the highway and closing it for more than a year. There were numerous emergency highway closures on Highway 1, including Paul’s Slide and the Pfeiffer Canyon Bridge, due to the harsh weather conditions. These major storms cut off critical access for those who lived, and worked on, or traveled along the Big Sur Coast.

In January 2017, about nine miles north of the Monterey-San Luis Obispo County line at a place called Mud Creek, sections of embankment hundreds of feet above the ocean failed. Rock, mud and debris continually slid down the mountainside above the highway and quickly became more than Caltrans maintenance forces could address. In response, the Department executed an emergency contract with John Madonna Construction (JMC) of San Luis Obispo to maintain that section of roadway while keeping it open. On May 20, 2017, 50 acres of land and more than five million cubic yards of earth broke free from the mountainside. With a thunderous roar—likened to an earthquake by a nearby resident—a new 15-acre peninsula was created. 1,000 feet of Highway 1 was now buried beneath 160 feet of earth materials. The new coastline measured 2,400 feet long and jutted out 550 feet into the Pacific Ocean.

Caltrans and JMC, along with their public and private partners, immediately reacted to the emergency to quickly analyze the situation and develop a solution. By realigning the highway over the compacted slide material and protecting it with a series of embankments, berms, rocks, netting, culverts and other stabilizing material, Highway 1 was reopened on July 18, 2017, only 14 months after the landslide.

An automated total station and Trimble T4D system were used to continuously monitor the slide in near-real time. Mirrors attached to key points within the slide area and around the perimeter tracked movement of the surface. Solar arrays and satellite Wi-Fi enabled onsite communications not previously available and relayed the data back to the District Office. From there, trendlines could be developed to see which areas of the slide were more active than others.
hurston County, home to hundreds of salmon-bearing streams, has successfully implemented the first comprehensive program to replace fish-blocking culverts in the region.

The Thurston Board of County Commissioners directed Thurston County Public Works to develop the program after reviewing the damaging environmental impacts of fish-blocking culverts and the challenges Washington State faced managing and replacing culverts on state roadways.

A total of $4.5 million was budgeted from the Thurston County Real Estate Excise Tax (REET) to pay for the initial start of the program and the first project cycle (2017-2018).

The foundation of the program, which resulted in the opening of more than 7.5 miles of fish habitat in 2018, was the development of a holistic process for prioritizing culvert replacement. County culverts were inventoried, cataloged and scored based upon anadromous fish access and potential habitat, barrier status, culvert condition and maintenance history.

The result was a database of fish-blocking culverts in Thurston County. Priority culverts were then identified, field tested, and recommended for construction based upon the highest collective return of fish habitat for the budget cycle.

Of the more than 3,000 culverts in use on Thurston County roadways, engineers and environmental specialists identified 150 potential fish-blocking culverts and successfully completed five projects under the Fish Passage Enhancement Program in 2018, within budget and on time.

Replacement of the outdated culverts opened passable stream habitat that allows fish to spawn and rear their young in areas not available to anadromous fish for decades.

Stabilizing the stream crossings also reduced erosion, improved downstream water quality and helped reduce flooding and maintenance issues associated with high flow rain events.

Results of the program have been swift, with the first fish in nearly 100 years passing underneath Hunter Point Road on its way upstream in November 2018.

Photo courtesy of Thurston Public Works
The project purpose of the Stony Island Habitat Restoration Project was to prevent erosion of the island and to enclose the previously lost wetland areas by constructing emergent and submergent shoals offshore. These shoals were constructed to protect the island from strong lake-driven waves and to allow for the regeneration of wetlands. The Detroit River Area of Concern Public Advisory Council (PAC) identified Stony Island as one of the primary habitat restoration sites in the Beneficial Use Impairments (BUIs) (Loss of Fish and Wildlife Habitat and Degradation of Fish and Wildlife Populations) removal guidance document. This major restoration project directly addressed these sources of impairment the Detroit River PAC is focusing on to contribute to the future removal of the two fish and wildlife-related BUIs. The project focused on improving coastal habitat of the island, constructing habitat shoals and shoal islands to prevent further erosion of the island, and creating backwater wetland habitat behind the shoals.

The Stony Island Habitat Restoration Project constructed 3,487 linear feet of habitat shoals, 550 linear feet of shoal island, completed over 11 acres of vegetation management on the island, and established 105 habitat structures. The project created and will protect 50 acres of backwater habitat behind the shoals. Completion of this project will restore coastal wetland habitat within a Great Lakes ecosystem that has seen a dramatic loss of these sensitive areas over time. The habitat structures placed along the shoals, on the island, and in the lower bay will provide niche habitats in support of existing fish and wildlife species. The project also increased tern abundance, herpetofauna abundance and diversity, and vegetation management on the island; and fish abundance is expected to increase in the next spawning seasons post-construction.

During the design phase of the project, a threatened and endangered species report was developed, considering both plant, wildlife, and fish target species. Notable discoveries included an active great blue heron rookery on the island within a potential proposed staging area and that eastern fox snake were known to occur on the island. It was concluded from this report that the proposed project would have no negative effect on the majority of plant and wildlife target species. Protective measures were recommended and incorporated for the remaining target species that the project may have affected. For instance, when material needed to be temporarily stockpiled on the island the area had a double silt fence surrounding them to prevent snakes from entering.

An additional member of the project team is the Friends of the Detroit River, which did the contracting for the Michigan Department of Natural Resources on the project.
After stumbling on a lush valley with a plentiful spring in 1709, Spanish explorer Isidro de Espinoza wrote, “The river, which is formed by this spring, could supply not only a village, but a city, which could be founded here.”

Nine years passed before his words came true. The banks of the San Pedro Creek, where de Espinoza landed, were once the lifeblood of the frontier village that became San Antonio. Citizens were taught to fear the creek, due to its often and catastrophic flooding. In the 1980s, the city built a tunnel under downtown, which helped to prevent flooding but also nearly eliminated water from running through the creek. Constrained in concrete channels and hidden in culverts, the creek eventually became a social, cultural and economic barrier between Anglo and Hispanic parts of the city.

Fulfilling a plan mulled for decades, San Pedro Creek Culture Park revitalizes a once-sacred site with inspired art, splendid paseos (walkways), native plantings, unique plazas, places of respite and cultural reflections. By expanding and beautifying the creek with a linear park, the 100-year floodplain is wholly contained within the banks of the creek while building literal and metaphorical bridges to the past and connecting long-separated cultures with a one-of-a-kind creek improvement project.

As a drainage channel for 45.6 square miles of San Antonio, a small half-inch rain event causes up to 2 feet of water in the channel. In effect, each time it rains, the project site floods. With the channel being widened and deepened, the final portion of the Phase 1.1 is 8 feet below the existing channel at Phase 1.2—creating a dam at the end of the project, as Phase 1.2 has not been excavated. To solve this challenge during construction, the team over-excavated the area by 1 foot and placed filter fabric and drain rock in, which created a working surface during minor rains. A 6-inch perforated pipe was then installed in the main channel below the drain rock, which conveyed water to the 10-foot-diameter casing, with an automated submersible pump inside. When water entered the channel, it drained through the rock to the perforated pipe, into the casing, which was then piped over the “dam” and downstream.

The system was first tested in August 2017, when 4 inches of rain fell in four hours. The site ended up under 11 feet of water. With the system in place, the water was pumped out by the next morning and crews were back at work the day after. Without this, work would have shut down for nearly a week.
As the largest groundwater management agency in the State of California, the Water Replenishment District of Southern California (WRD or the District) manages two groundwater basins—the Central Basin and West Coast Basin—in Los Angeles County. These basins provide about 40% of the drinking water supply for 43 cities and almost four million residents—about 10% of all California residents. WRD has ensured a reliable supply of high-quality groundwater by managing and replenishing the groundwater basins since 1959.

California experienced a historic drought 2012-2016 and faces continued challenges with insufficient or unreliable water supplies. Nearly 51% of the water consumed in WRD’s service area is imported from the Colorado River and/or from the San Joaquin-Sacramento River Delta, in Northern California. The Delta and Colorado Rivers are both severely stressed and over-subscribed, and the reliability of these water supplies is uncertain. The cost for imported water is projected to rise substantially as solutions are implemented to protect environmental resources in the source areas and improve water quality. In 2010, WRD established the Water Independence Now Program (WIN) to accomplish the goal of creating a local, sustainable, and reliable water supply using advanced treated recycled water. Prior to completion of this project, WRD used 21,000 acre-feet-per-year (AFY) of imported water to replenish the Central Basin. 21,000 acre-feet is equivalent to the average water use of 40,000 households. In July 2019, when the project is fully operational, WRD will eliminate use of imported water for Central Basin replenishment.

A regional leader in sustainability, WRD developed the Groundwater Reliability Improvement Program Recycled Water Project with the goal of creating a local, sustainable, and reliable water supply using advanced treated recycled water. Permit coordination for the diversion structure was complex and required nearly a year to complete. The diversion structure permit required work with LACSD, County Public Works, ACOE and others. Because all parties understood the complexities and need for this regional project, they worked with WRD to overcome challenges related to permits.

The facility, which was recently named the Albert Robles Center for Recycled Water & Environmental Learning, is located on a 5.2-acre parcel in the City of Pico Rivera, California, and is directly adjacent to the San Gabriel River. Construction was substantially complete on December 31, 2018.

Managing Agency: Water Replenishment District of Southern California
Primary Contractor: J.F. Shea Construction, Inc.
Primary Consultant: GHD Engineers
Nominated By: Water Replenishment District of Southern California

PROJECT OF THE YEAR:
ENVIRONMENT
MORE THAN $75 MILLION

Groundwater Reliability Improvement Program Recycled Water Project

Managing Agency: Water Replenishment District of Southern California
Primary Contractor: J.F. Shea Construction, Inc.
Primary Consultant: GHD Engineers
Nominated By: Water Replenishment District of Southern California
The City of Oak Harbor is located near the northern end of Whidbey Island in Island County, Washington. On the island, the United States Navy operates two bases: the Seaplane Base, located in the eastern portion of the city, and Ault Field, which lies to the north of the city. The city comprises approximately 6,030 acres (9.4 square miles), of which the Seaplane Base occupies 2,820 acres (4.4 square miles), and owns and operates a wastewater system that serves approximately 24,000 people within the city and the Navy Seaplane Base.

The city’s Urban Growth Area (UGA) represents the area that will likely have to accommodate growth over the next 20 years. The UGA includes all of the city, as well as unincorporated areas to the north, between the city and Ault Field, and to the south and west of the city.

Before this project, wastewater was treated at two facilities: a rotating biological contactor (RBC) facility near Windjammer Park and the Seaplane Base Lagoon Plant on the Navy’s Seaplane Base. The base was originally operated by the Naval Air Station (NAS) Whidbey Island. In 1990, the City secured a 50-year lease from the Navy to operate the Lagoon Plant.

 Portions of the RBC Plant were over 50 years old and had reached the end of their service life. The City had also experienced a large number of mechanical failures at the plant, particularly from treatment equipment that was no longer prevalent in the treatment industry.

Similarly, the lagoon treatment process did not provide sufficient capacity to accommodate projected growth in the city. Increasing the capacity at the lagoons would trigger more stringent effluent standards that could not be met with conventional lagoon treatment. Expanding or modifying the existing lagoons was also infeasible because areas surrounding the lagoons were environmentally sensitive; the area surrounding the Seaplane Base Lagoon Plant had been reclaimed as a saltwater marsh in 2009 and was subject to frequent highwater conditions.

To carry out their environmental goals, the City needed to replace both treatment facilities with a single facility. This new facility would need to meet modern standards for reliability and performance and allow the City to provide continuous reliable wastewater service to the community while protecting and preserving the surrounding environment. Based on technical information and requirements associated with upgrading the City’s wastewater treatment system, the final recommendation was to install an MBR facility within the City’s Windjammer Park, with a marine discharge to Oak Harbor.
The Elliot Street Bridge, also known as Cook’s Bridge after one of the region’s first settlers, is on the site of one of the earliest bridge crossings of the Historic Charles River. At this location, a bridge connecting Needham and Newton was first built circa 1714 and rebuilt in 1857 in its current form as a three-span stone arch. The structure was widened in 1897 to support the operations of the Newton and Boston Street Railway and was further modified in 1970 with the addition of a sidewalk.

With its long and well-documented history, the bridge is listed as a contributing element to the Newton Upper Falls Historic District. However, over time the arch stones had shifted, cracked, and become dislodged, resulting in the bridge being weight posted and raising concerns over its sustainability. As a result, the two municipalities needed to rehabilitate the bridge in a manner that would preserve its historic integrity, while improving its load capacity and extending its service life. The resulting rehabilitation program not only preserved the original appearance of the 19th century stone construction, but also modified the appearance so that the entire bridge now has a homogenous, authentic and aesthetic look, while restoring capacity to serve the communities and region for many years to come.

The focal point of the rehabilitation was the installation of a reinforced concrete arch saddle that replaced the soil and gravel fill over the arches, essentially creating a new, hidden, concrete arch bridge above the existing stonework. This technique allowed the historic arch stones to remain in place, but no longer required to support the truck loads from above. In addition, to prevent future issues with the arches that could arise from movement of its foundations, the stone abutments and piers were underpinned by coring through them with concrete-filled micro-piles socketed into bedrock.

The north spandrel wall was in a dilapidated condition and required reconstruction. The rehabilitation program originally planned for this wall to be removed and rebuilt utilizing the existing stones; however, upon the start of construction it was determined that the stones were too soft and porous for reuse. Instead of replacing the stones, the side of the concrete arch saddle was formed using a custom form liner designed to resemble the appearance of the stonework. The form liner was made with extra-deep reliefs to help give the concrete the appearance of stonework. After the forms were removed, the concrete “stones” were stained to enhance the authenticity of their appearance.

Managing Agencies: Town of Needham, Massachusetts; City of Newton, Massachusetts
Primary Contractor: Aetna Bridge Company
Primary Consultant: BETA Group, Inc.
Nominated By: New England Chapter

PROJECT OF THE YEAR:
HISTORICAL RESTORATION/PRESERVATION
LESS THAN $5 MILLION

Central Avenue/Elliot Street Historic Bridge Rehabilitation

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he Madison Municipal Building is a local City of Madison Historic Landmark and National Register of Historic Places building originally completed in 1929. In the winter of 2014, after much debate—including considerations to sell the Madison Municipal Building to a private developer—the City of Madison Common Council affirmed through resolution that “keeping the Madison Municipal Building in civic use will help achieve the City’s desire to maintain a nexus of City offices together in the CBD and continue the historic use of the building as an important civic building.” After four years of significant efforts by the City of Madison, City staff, community stakeholder groups, architects, engineers, contractors and many others, the Madison Municipal Building reopened its doors to a completely renovated, reestablished, and redefined structure and facility.

In compliance with a 2008 City of Madison Common Council resolution, the renovated Madison Municipal Building meets Leadership in Energy and Environmental Design (LEED©) requirements and is targeted for a LEED© Gold rating. In addition to fulfilling important sustainability goals, the renovated Madison Municipal Building also has accomplished the following significant goals.

- Complete replacement of the HVAC/electrical/plumbing systems; added a full sprinkler system.
- Roof replacement, and 100% preservation of exterior historic masonry and historic windows.
- Comprehensive interior architectural remodel, and interior historic architectural renovation and restoration.
- Demolition of the existing non-contributing 1950s era rear annex and installation of a new addition at the rear of the Madison Municipal Building for staff and building support space.
- Restoration of landscape to the original 1920s grass border (i.e., removal of trees and residential landscaping borders) and preservation of existing historic site elements.

The renovated Madison Municipal Building is now in its operation phase and City staff, the public, and elected officials have quickly taken advantage of the new facility’s offerings. There have been many visitors in the first months of operation to meet and conduct business with City staff; and recently the Madison Municipal Building was host to events such as a public presentation and discussion of the future of Madison’s transportation system, presentation and discussion on climate change, and a community celebration and grand opening event.

PROJECT OF THE YEAR: HISTORICAL RESTORATION/PRESERVATION
$5 MILLION BUT LESS THAN $25 MILLION

Madison Municipal Building Renovation
Managing Agency: City of Madison, Wisconsin
Primary Contractor: J.P. Cullen and Sons
Primary Consultant: MSR Design
Nominated By: Wisconsin Chapter
Originally built in 1910, the Yesler Way Bridge is one of Seattle’s oldest permanent steel roadway and original streetcar bridges. Carrying the Y-intersection of Yesler Way and Terrace Street over 4th Avenue, it is one of Seattle’s most recognizable bridges.

As the center of Seattle’s business district moved north, Yesler Way remained the anchor for the city’s historic downtown—it connects residents, commuters and workers in the area. A major east/west arterial connection, the bridge carries more than 6,000 vehicles daily, including seven local and regional bus routes, and has unique, historic design elements. Crumbling abutment walls, seismic vulnerability, outdated design standards and the risk of catastrophic collapse from vehicle impacts meant that the bridge critically needed safety and accessibility improvements.

To address the many construction complexities, a number of aggressive construction management techniques were carried out throughout the project. These included: action-oriented weekly construction meetings with all participants (owner, designer, contractor) empowered to resolve issues; development of micro-schedules to control critical, short-fuse activities such as weekend roadway shutdowns; thorough integration of public utility staff into the project team for expeditious problem-solving; and a team-wide commitment at all levels to the speedy resolution of issues of concern.

Most construction was completed with public access maintained—at least one sidewalk and three traffic lanes—on 4th Avenue through the work area. This effort required shifting traffic between the east and west sides of 4th Avenue for bridge abutment construction. IMCO worked closely with the Seattle Police Department to coordinate the lane and sidewalk shifts and temporary roadway closures.

Keeping the project on schedule depended on getting the historical elements to the preservation subcontractor for refurbishment as soon as possible. IMCO removed the bridge railings early in the project to allow time for the preservation specialist to address any concerns.

During the removal process, the project management team made the existing features a priority. In the pre-planning phase, the team recognized that the original construction would be difficult to replicate, so the project team—including the engineer, owner and contractor—made adjustments that allowed reinstallation to be successful.

To assist with this process, the IMCO project team performed multiple 3D scans of the facia girders and cladding, obtaining accurate digital dimensions so the team could analyze the bridge after it was deconstructed.
Minot is known as “the Magic City” and is the fourth largest city in North Dakota. The title was earned due to how quickly the community grew over 100 years ago and reaffirmed after its recent growth during robust energy and oil activity in the area.

Like many others, Minot’s downtown serves as the heart of its community and puts on display the city’s history for all to see. Many of the buildings in downtown Minot date back decades—in some cases, more than a century. St. Leo’s Catholic Church, for example, was constructed in 1908.

The historical structures and area faced several significant challenges and threats that were addressed as part of this project. First, much of the infrastructure of downtown Minot, some of which dated back to pre-World War I, had reached the end of its service life. Second, in 2011, the Mouse River—which flows through Minot just north of downtown—reached historic flood levels and overwhelmed existing flood control structures, threatening and damaging much of Minot’s infrastructure, including the northeast portion of downtown. Finally, while the design and construction of this project focused on civil infrastructure, the historical buildings throughout downtown were very much part of the project. Abandoned coal and ash chutes, antiquated and abandoned utility vaults, old foundations, original façades, and more had to be carefully accounted for and worked around to avoid damage to the buildings.

It was vital for businesses and downtown residents that pedestrians had access to stores and homes during construction, but that presented some safety concerns that had to be addressed. Temporary sidewalks were put in place and were separated from the construction sites with chain-link fences. Shoppers and other pedestrians had a sturdy walking surface where the sidewalk had been removed and were kept a safe distance from construction activities while still having access to businesses. The temporary pedestrian access routes proved very beneficial during numerous downtown-hosted celebrations, such as Festival on Main.

Intersection bump-outs were constructed along Main Street, the corridor with the highest pedestrian traffic, to help facilitate safer movement. These bump-outs give pedestrians a shorter distance to cross from one sidewalk to the next, reducing their time on the roadway. The bump-outs also naturally slow motorist traffic by narrowing the intersection. The bump-outs were then utilized for placement of streetscape components, such as flower and shrub planters and bench seating.
A vital transportation link between Boston and Cambridge, the historic Longfellow Bridge carries Route 3 and the Massachusetts Bay Transportation Authority’s Red Line subway over the Charles River. The four signature neo-classically inspired granite towers give the bridge its popular nickname, the Salt and Pepper Bridge. The steel and granite structure was completed in 1907 and last rehabilitated in 1959. By 2013, it experienced deterioration of its arches, columns, ornate masonry and unique metal casting features. Massachusetts Department of Transportation Highway Division (MassDOT) decided a major rehabilitation was required and contracted the design-build team of the WSC joint venture of J.F. White Contracting Company/Skanska/Consigli Construction Co. and STV, as the lead designer. The project was one of the five largest in the state’s $3 billion Accelerated Bridge Program.

The Longfellow Bridge is a contributing feature of the Charles River Basin Historic District, so MassDOT had to comply with strict federal and state historic rehabilitation standards. Several factors contributed to the project’s complexity. Since it is an important regional connection, MassDOT had to maintain MBTA Red Line service for 90,000 transit users and access for a significant number of bicyclists and pedestrians who use the bridge daily. Developing a traffic plan to manage 28,000 motor vehicles per day was critical.

The bridge’s location in a dense urban area with hospitals, hotels and residences in very close proximity required intensive outreach and issues resolution during overnight work and activities that generated vibration. The scope encompassed the complete reconstruction of the original 11 arch spans and a 12th span installed later; the seismic retrofit of 12 masonry substructures; and the reconstruction of the four signature “salt and pepper” towers flanking the main span. Concrete and masonry repairs were critical elements of the overall rehabilitation.

Several unique construction methods were used to complement the bridge’s historic character, including riveting on exterior steelwork. The Red Line’s center tracks were improved with new traction power, communications and signals modifications. Red Line service was maintained during construction through a staging plan that made maximum use of construction windows during weekend closures and allowed the rapid return of revenue service in time for the Monday morning commute.

The bridge is now fully AASHTO compliant with two inbound travel lanes, one outbound lane, two rebuilt MBTA Red Line tracks, two bicycle lanes and two widened ADA-compliant sidewalks. The $305 million project not only restored and preserved a jewel of the Boston skyline, it also allowed the bridge to meet 21st century transportation demands, all while honoring the structure’s original architectural grandeur.

Photo credit: Mark Flannery
The City of Tempe contracted with ForeSite Design and Construction, Inc. and Dig Studio for a design-build contract for a new splash playground at Kiwanis Park. Once the site was established, the team led a process to determine the needs of the city and surrounding community. This process entailed community outreach events at the park, face-to-face conversations, as well as online surveys. Concurrently, the design team was developing a thorough list of design principles with the City to achieve common project goals and aspirations. These objectives included: create a safe and secure site; engage with the surrounding park and community; be an inclusive play experience; and create an oasis that was just as comfortable for the adults as it was fun for the kids. Most notably the City desired a multifunctional destination splash experience to maximize the value of their investment. The team synthesized all this information and developed a concept of “The Cloud”: an artful and playful floating structure that distributed water in an iconic way, while providing shade for the pad and surrounding seating. The team also worked with the splash pad features to ensure all elements could be easily maintained and removable during the “off-season”—allowing the City to host events and performances during the winter months, doubling the usability of the plaza space.

There were several conditions on the site that needed to be overcome. The site was nested in an existing park, requiring additional attention to safety and cooperation with the community. After obtaining results of the soils report, it was determined that the soil was too expansive to support the playground. This required an overexcavation of soil and import of fill soil to provide the proper pad to support the new splash playground. Spoils from this activity were used to fill low areas in the park, eliminating haul-off. Even though the team was designing an environment that was envisioned to be used wet, it was also intended to be a multifunctional facility, and the sun in Tempe can be intense and concrete surfaces can reach temperatures too hot for children. To overcome this obstacle, the team came up with three solutions to keep the facility usable in the summer months. First was the design and installation of an award-winning shade structure over the playground. Installed within the shade structure are misters that can be used to cool the ambient temperature and the temperature of the surrounding concrete. Mature trees were also left in place to help with shading of the area. The team also used a concrete additive manufactured by Solorchrome, which upon completion of the project proved to lower the temperature of the concrete 10 to 12 degrees compared to the adjacent concrete that did not contain the additive.

Kiwanis Park Splash Playground

Managing Agency: City of Tempe, Arizona
Primary Contractor: ForeSite Design & Construction
Primary Consultant: Dig Studio
Nominated By: Arizona Chapter
The 6.1-mile Nine Mile Creek Regional Trail (9MCRT) segment in Edina fills a critical gap of the overall 15.3-mile trail. Short Elliott Hendrickson Inc. (SEH®) was responsible for leading design that completed the challenging trail segment that is adjacent to private/commercial properties, runs through Nine Mile Creek wetlands, woodlands and floodplains, and crosses other significant developed infrastructure, including MnDOT trunk highways 62/100.

SEH worked together with Three Rivers Park District (TRPD) to overcome unique technical challenges and facilitate stakeholder outreach to accomplish the project’s goals and fill this trail segment. This particular project exemplifies TRPD’s commitment to creating facilities that inspire people to recreate and connect with nature while protecting the region’s water and natural resources.

Now constructed, the Edina segment offers users unique experiences to interact with nature that were not possible before the project. These opportunities include traversing the following sections:

- Over 1.7 miles of timber boardwalk, arguably the largest network of boardwalks in the State of Minnesota
- Over two MnDOT freeways via pedestrian bridges
- Along paved portions that intersect with six city parks and a roundabout
- Under a tunnel at 70th Street
- Through woodlands
- Along city streets adjacent to numerous homes and businesses

SEH worked with TRPD to identify creative design solutions that included 4.1 miles of at-grade pavement, 1.7 miles of timber boardwalks supported on helical anchors, 17,500 sq. ft. of modular block/reinforced soil slope retaining walls, decorative railings for those retaining walls, concrete barrier block, box culvert under 70th Street and two pedestrian bridges over TH 100 and TH 62.

These solutions led to a project that overcame a number of unique challenges and contributed to facilities that inspire people to connect with natural resources. Additional information about the project, including video, can be found on SEH’s website: http://www.sehinc.com/portfolio/nine-mile-creek-regional-trail.

In addition to supporting sustainability through manageable maintenance costs, this project also used alternate materials in certain cases, such as the use of recycled plastic products for trail amenities.
On October 26, 2018, the Village of Oswego opened its new Public Safety Campus in front of a crowd of nearly 1,000 dignitaries and residents. The Village constructed a new 70,000-square-foot police headquarters adjacent to the existing Fire Station No. 1 to create a Public Safety Campus to serve the community.

With thoughtful consideration to the Village’s community-oriented strategy of policing and public safety, the goal in creating the headquarters was to create a welcoming structure—a place that, rather than run away from, people would seek out and run to in an emergency.

The architecture realizes this goal in several ways. A central tower visible from more than a mile away provides a visual beacon to residents. A community room, set adjacent to the road and slightly apart from other policing operations, creates a safe, welcoming space for community groups to meet. Floor-to-ceiling glass on most of the building’s exterior and interior reinforces the department’s commitment to transparency as a means for maintaining the public trust.

By siting the new police headquarters adjacent to the existing Fire Station 1, the Village was able to reduce taxpayer costs by sharing parking, snowplowing services, and training facilities, and increase collaboration between the two agencies.

The planning for the new station began in May 2015 and construction took 20 months. Layout and amenities throughout the facility were designed to benefit both staff and the community by enhancing efficiency in myriad ways. A staff hub brings all the officers together to work collaboratively and keeps them informed with constantly updated monitors. Onsite fitness facilities give officers a convenient place to train for the physical demands of their job. An emergency operations center and training wing eliminates hundreds of wasted man-hours annually by eliminating travel to distant outdoor ranges and training facilities, and will be opened to other area agencies, reducing expense and increasing Oswego’s ability to coordinate with other communities during large-scale emergencies. Onsite evidence processing will speed investigations by months.

This highly efficient space for forward-thinking, collaborative policing and public safety was completed on schedule and within budget and has been embraced by staff and by the Oswego community. It will serve the needs of the Oswego community for years to come and offer a beacon of safety and the embodiment of the community’s values for future generations.

Image courtesy of HOK (Tom Rossiter, Photographer)
Calaveras Dam and Reservoir are a part of the Hetch Hetchy Regional Water System, owned and operated by the San Francisco Public Utilities Commission (SFPUC), the system’s largest source of water in the local Bay Area. The original Calaveras Dam, a 220-foot-high hydraulic fill structure, was completed in 1925. Due to seismic stability concerns, the reservoir level behind the dam was restricted in 2001 to approximately 39 percent of its total storage capacity of 96,850 acre-feet. Planning studies to either upgrade or replace the existing dam were initiated shortly thereafter. Due to significant uncertainty about repair alternatives, the SFPUC ultimately decided to replace the dam.

The Calaveras Dam Replacement Project (CDRP) includes construction of a 220-foot-high zoned earth and rock fill dam embankment, 1,550-foot-long reinforced concrete spillway, new intake/outlet tower, and 78-inch diameter outlet conduit. The dam embankment consists of seven different types of materials produced both onsite and imported from offsite.

The SFPUC designer created an extensive site plan so that the contractor could utilize the existing infrastructure to aid in the development of the site BMPs. The reservoir remained in operation during construction and functioned as a coffer dam to enable the contractor to excavate without draining the entire reservoir. In addition, the contractor used the existing spillway and stilling basin as stormwater detention basins and the staging area for the Active Treatment System (ATS). The central location for the ATS provided a simple framework for detention ponds and easy access to pipe stormwater and non-stormwater for treatment and discharge from around the site. The contractor also created large detention ponds at key locations around the site that were useful during construction. These ponds captured site runoff from disturbed areas and settled the fine sediments before the DFSJV pumped the water to the ATS. The central location minimized pumping distances and simplified implementation.

The project used state-of-the-art technology to manage grouting and earth-fill placement operations. The foundation was monitored in real time for uplift caused by grouting overpressure using surveying control. In addition, all the grading equipment (bulldozers and graders) featured GPS controls to maximize efficiency of the earth-fill placement operations. The GPS utilized a detailed 3D model derived from high-resolution scans after the foundation was excavated, cleaned and prepped. A Small Unmanned Aircraft System was used to map the surface of the dam at the different elevations for a check on material quantities of the different dam zones during construction.
PROJECT OF THE YEAR:
STRUCTURES
MORE THAN $75 MILLION

Gateway to Monroe County

Managing Agency: Monroe County, New York
Primary Contractors: Fabritec Structures LLC; Ramsey Constructors; Steve General Contractors; LeChase Construction Services
Primary Consultants: Passero Associates; CHA
Nominated By: New York Chapter

To increase its standing in the competitive aviation market of the 21st Century, the Greater Rochester International Airport, known in the aviation community as ROC, initiated a large-scale terminal renovation program to improve and revitalize its landside facilities. The airport requested the assistance of the New York State Department of Transportation (NYSDOT) to fund the renovation and rehabilitation of its facilities through the Upstate Airport Economic Development and Revitalization Grant Program. The airport revitalization was part of a statewide initiative energized by Governor Cuomo. This project capitalizes on this unique opportunity, through Governor Cuomo’s Upstate Airport Economic and Revitalization Competition, to combine this one-time State funding source with Passenger Facility Charge revenues and local funds. In November 2016, the airport was granted the requested funds toward the proposed development of its facilities.

The Terminal Renovation portion of the overall project consists of five main components: (1) Reconfiguration of the Security Checkpoint and Airport Exit; (2) Expansion of the Main Terminal Building; (3) Enhancement of the Concessions Area; (4) Implementation of Communication Technology for the Hearing Impaired; and (5) Major Upgrade of the Infrastructure Network.

The comprehensive program improves the airport’s market competitiveness by renovating and rehabilitating its terminal facilities. New facial recognition technology—the first of its kind in Upstate New York—combined with upgraded security cameras and readers and the consolidation of the airport’s existing security checkpoints and exit paths into a new centralized checkpoint, enhances the safety and security of employees and passengers, while ticket lobby, boarding gate, and concession area improvements improve the ease and comfort of travel. A 3D computer model was used to determine the optimal location for the facial recognition cameras. The 3D model enabled the team to input the exact camera specifications for each location.

Two passenger interactive play zones, the National Toy Hall of Fame and World Video Game Hall of Fame, created in partnership with Strong National Museum of Play educate, entertain and bring exposure to this must-see regional tourist attraction.

To accommodate the region’s large deaf population due to the proximity of the National Technical Institute for the Deaf, the project introduced cutting-edge American Sign Language (ASL) to-Voice technology to assist the deaf with conducting transactions and installed hearing loop technology. The project also implemented advanced passenger wayfinding to guide passengers to gates and queue their attention to informative messaging. Passengers are also able to use their mobile devices or fixed tablets located throughout the terminal for easy access to the Airport Passenger Information Network.

Photo credit: Donald Cochran
The $4.9 million Marsh Creek Road Bridge Replacement Project replaced an existing 29.5-foot-wide by 44.5-foot-long steel girder bridge that spans Marsh Creek five miles east of Clayton, California, with a new, wider, two-stage precast/pre-stressed wide-flange California Bulb Tee girder bridge. Each bridge abutment had either wingwall or retaining walls constructed in each corner of the bridge.

In addition to the new bridge construction, the project involved the removal of the existing steel girder bridge, installation of rock slope protection under the new bridge, realigning and reconstructing AC pavement, installing a soldier pile retaining wall, relocating an 8” water main attached to the bridge, and constructing new private driveways. The project was located in the unincorporated area of East Contra Costa County between Clayton and Brentwood. There were several environmental restrictions for work in Marsh Creek including a critical May 15 to October 31 work window with a wide variety of federal, state and local protected species to work around. The objective of this project was to replace an existing structurally deficient and geometrically obsolete bridge with a new, wider, 100-year flood-compliant, bridge built to current safety standards, all while accommodating through traffic (6,000 vehicles/day) and minimizing the impacts to the local stakeholders.

The most important objective of this project was to construct this two-season project in one construction season and several Accelerated Bridge Construction (ABC) techniques were utilized. The most critical milestone was to meet the environmental permit restriction deadline of October 31, 2018 for work inside Marsh Creek. Given the late start of the project on April 30, 2018, completion of this project to satisfactory quality on schedule was the critical driver of this project. Four stages of construction and traffic handling were required to build the new roadway section, retaining walls, bridge, and driveways. The end result was a bridge that has two 12’0” lanes and two 8’0” shoulders. In order to construct the bridge substructures, a temporary wildlife-proof work area had to be created by utilizing man-made stream diversion within the creek. The team was posed with the challenge of building two independent bridges from the ground up, in the creek, from June 15 to October 31, which they successfully completed.

The project team approved two special concrete mix designs, one with higher cement content and water reducers (Delvo), and another with concrete accelerator BASF MasterSet AC 534, which is pre-approved through Caltrans. By using one of these mixes in the abutment pours, retaining walls and approach slabs, the contractor was able to shave off several days from the project.

PROJECT OF THE YEAR:
TRANSPORTATION
LESS THAN $5 MILLION

Marsh Creek Road Bridge Replacement Project

Managing Agency: Contra Costa County, California, Department of Public Works
Primary Contractor: Bridgeway Civil Constructors, Inc.
Primary Consultant: Substrate Inc.
Nominated By: Northern California Chapter

www.apwa.net  /  July 2019  /  APWA Reporter
The Caltrain Santa Clara Station Underpass provides a vital link for pedestrians and bicyclists between the east and west sides of Santa Clara that is separated by a busy railroad corridor. There was an increase in illegal pedestrian and bicycle crossings over several railroad tracks that was jeopardizing the safety of Caltrain and Union Pacific railroads. This project enhances safety and supports a transit-oriented development close to Caltrain, Amtrak, ACE and Capitol Corridor train services and VTA bus routes. Also, this underpass extension seamlessly merges into a future BART station providing easy rail and bus connections. The project cut short the 1.5-mile detour for bikes and pedestrians and improved safety.

There are many small businesses on the east side of the tracks, many of whose employees commute on Caltrain. Before the project began, VTA conducted a demand and feasibility study, which included a survey of businesses on the east side of the tracks and Caltrain passengers. The study concluded that, based on existing demand, up to 1,200 bicyclists and pedestrians would use a crossing if there were a safe and legal way to cross the tracks.

The project included two major components: a tunnel structure below the tracks and pedestrian ramp that links the tunnel to the street level. This was an extremely challenging project trying to build the tunnel under three rail tracks in a busy railroad corridor that serves about 90 trains a day and had very close clearances for construction activity. The initial plan was to install temporary bridge sections beneath the tracks during frequent nighttime track closures and then install the permanent cast-in-place structure beneath the temporary bridge. Midway through the project, however, UPRR requested that the construction duration be limited to a long weekend (three to four days maximum). This request resulted in changing the underpass to a precast structure in order to shrink construction time to the barest minimum: 96 hours over the four-day Thanksgiving weekend. If the opportunity was missed, the construction would have to wait possibly another year for a suitable work window in railroad operations.

Securing funds for the project was a challenge. VTA, in partnership with City of San José, was able to identify the funds needed to complete the project. A public-private partnership was established when Hunter Properties, in coordination with City of San José, partially contributed to the development of the project. This project exemplifies the importance of multi-agency coordination and public-private partnership.

PROJECT OF THE YEAR:
TRANSPORTATION
$5 MILLION BUT LESS THAN $25 MILLION

Caltrain Santa Clara Station Pedestrian Underpass Extension

Managing Agency: Valley Transportation Authority, San José, California
Primary Contractor: Shimmick Construction
Primary Consultant: Biggs Cardosa Associates
Nominated By: Silicon Valley Chapter
Bayview Avenue is a major north-south arterial corridor under the jurisdiction of The Regional Municipality of York (York Region). Located in the Town of Richmond Hill, Ontario, the lower segment of the project corridor contains a principal tributary of the Rouge River that is fed, at this location, through significant steady-state groundwater upwellings (artesian conditions) from the Oak Ridges Moraine Aquifer directly below. The principal tributary and former road side ditches now all contain significant brook trout population and habitat.

York Region and the Town of Richmond Hill are undergoing tremendous growth in population and employment. In response to this growth, the Bayview Corridor Project improves mobility for all corridor users including motorists, pedestrians, cyclists and fish, with an innovative design enhancing the environment.

This project widens Bayview Avenue from two to four lanes within the study area, and creates 1.3 linear miles of new stream channel and over 97,000 square feet (2.2 acres) of new brook trout fish habitat along the east side of the corridor. Pedestrians and cyclists can view the new stream corridor and wildlife from a newly constructed multi-use trail and two lookouts also built on the east side of the corridor. The multi-use trail connects Richmond Hill with its neighboring municipalities to the north and south, and is a segment within the 75-mile Lake to Lake Cycling Route and Walking Trail, connecting Lake Ontario to Lake Simcoe. The majority of fish habitat along the west side of the corridor was protected and preserved during construction.

Depressurizing the groundwater upwellings from the Oak Ridges Moraine Aquifer was critical to project success. The Permit to Take Water required a detailed Groundwater Management Plan (GMP) which included safe excavation depth calculations, monitoring and adaptive management planning (pre-, during and post-construction). The dewatering contractor installed 40 production wells and 28 monitoring wells along a 4,920-foot-long alignment where dewatering activities occurred between spring 2016 and fall 2017.

Maintaining flow in the newly constructed stream channel was also critical to project success. This relied on an innovative dual storm sewer design, separating road surface runoff from groundwater upwellings into two separate storm sewer systems. An infiltration gallery (road drainage blanket) was installed north of 19th Avenue to permanently depress local groundwater pressures by approximately 15 feet. This independent system diverts the steady-state groundwater upwellings (which are isolated from road surface runoff) directly to the watercourses on the east and west sides of Bayview Avenue to maintain appropriate basal flow levels.
he Tangerine Road project is unique in that the five-mile corridor passes through the jurisdiction of three different municipalities: the Town of Marana (serving as the lead agency), Pima County, and the Town of Oro Valley. The three agencies joined to form a Technical Advisory Committee (TAC) to provide direction on the project, and all provided funding along with the Regional Transportation Authority (RTA) to bring this project to fruition. Tangerine Road was designed by Psomas as the prime consultant, leading a multi-disciplinary team consisting of Kittelson and Associates, CMG Drainage Engineering, Structural Grace, McGann and Associates, Westland Resources, and Kaneen Communications. The Town of Marana elected to utilize the CMAR delivery process for this project and selected Tangerine Corridor Constructors (TCC, a joint venture between Granite Construction and Borderland Construction) to serve as the prime contractor. The CMAR was brought on board early in the final design process and worked hand-in-hand with the design team to design and deliver the project.

The project included reconstruction of approximately five miles of two-lane roadway to four lanes of divided roadway from Twin Peaks/Dove Mountain Boulevard to La Cañada Drive, along with widening and improvements to four major cross-streets. The project also included four signalized intersections, a new multi-use path, extensive drainage upgrades including 42 cross drainage structures to enable all-weather access, five underground wildlife crossings, significant native plant preservation, and native landscaping. The project required right-of-way acquisitions from more than 60 property owners and five large Arizona State Land Parcels.

Prior to construction, this segment of roadway was highly susceptible to flooding, greatly hampering mobility and impacting public safety by making accessibility for emergency services difficult. There was not adequate capacity to accommodate mobility and access through this rapidly developing corridor, and pedestrian and bicycle facilities were virtually non-existent. Today, this section of Tangerine Road is a community staple providing a critical linkage between the Towns of Marana and Oro Valley that has enhanced development opportunities, enabled safe and efficient all-weather access for residents and businesses, and provided excellent facilities to accommodate the many bicyclists and pedestrians that utilize the corridor.

Tangerine Road by the Numbers:

- 375,000 Cubic Yards of Earthwork
- 80,000 Tons of Asphalt
- 12,000 Linear Feet of Culvert/Storm Drain Pipe
- 19 Concrete Arch and Box Culverts
- Four Signalized Intersections
- 32,000 Linear Feet of Joint-Utility Trench Installation
- 15,000 Linear Feet of Wet Utility Improvements
The I-11 Boulder City Bypass Phase 2 Design-Build project consisted of 12 miles of new 4-lane divided highway. Approximately 1 mile was constructed as Portland cement concrete paving (PCCP) with the other 11 miles consisting of asphalt paving. Over 6 million cubic yards of rock and soil were excavated with 5.2 million requiring blasting. 380,000 tons of asphalt was placed along Phase 2. Eleven bridges were constructed on the project including a pre-cast arch structure solely to be used as a wildlife crossing over I-11. Overall, over 850,000 man-hours were put into the project through design and construction with almost 70,000 apprentice hours.
The SouthEast Connector is a significant regional investment in the Truckee Meadows that addresses long-term transportation needs to improve the safety and mobility of people, goods and services in the Reno/Sparks area. The project provides a new five-mile, north-south, six-lane, arterial route in the Truckee Meadows, between South Meadows Parkway in the south to Greg Street in the north, connecting large residential and commercial areas. Construction of Phase 1, the northern 0.75 miles, was completed in July 2014.

The bulk of the project, Phase 2, was completed in 2018, opening to traffic in July. From its southern connection at South Meadows Parkway, Phase 2 traverses an environmentally sensitive area in Reno and Sparks, including wetlands and tributaries of the Truckee River. This project was built during the wettest two years in 150 years of recorded history in the area.

Built in a designated critical flood zone, the SEC Phase 2 (SEC) Project includes 8 bridges, 13 new precast multi-cell box culverts for floodwater equalization along the alignment, extension of two multi-cell arch culverts under Mira Loma Drive, two new and two reconstructed signalized intersections, 2,300 linear feet of mechanically stabilized earth retaining walls and a 1,200 linear foot sound wall. The project also incorporates a multi-use pathway for bicyclists and pedestrians, connecting South Meadows Parkway to the Truckee River, establishing a vital link needed in the larger pathway system in the greater basin area.

This new highway cuts many commute times in half and relieves congestion off of mainline routes in the community. The project was designed to accommodate a 117-year flood event while providing a net water surface elevation decrease benefiting residences near the corridor. In addition, one travel lane in each direction would remain above the high-water level providing critical emergency access.

The project consisted of 1.6 million cubic yards of earthwork to build embanked roadway entirely from onsite borrow. Soft soils required a combination of cement deep soil mixing, surcharge and settlement, and cement treatment of subgrade. High groundwater required a significant dewatering effort to facilitate access and construction of all elements of the work with limited room for storage and discharge due to environmental constraints.

The SEC created 150 acres of new wetlands, sequestered contaminated soils, disposed of four million pounds of trash left on open land, and removed hundreds of acres of noxious weeds, while incorporating continuous and future good stewardship of the environment and minimizing construction impacts to the surrounding community.
On February 24, 2017, Mariposa County was devastated by an atmospheric river event that was formally declared a State and Federal Disaster. This event destroyed two complete bridge structures and over 20 miles of heavily trafficked county roadways.

On July 16 the County was again hit with a Disaster Declaration due to the Detwiler Fire. The fire raged from July 16 through August 24, consuming 81,826 acres in its path and causing an estimated $130 million in economic losses to the County.

In March 2018 Mariposa County was again hit with a dramatic flood event causing the Declaration of Emergency by the California governor. In this flood event a critical bridge structure was lost as well as 38 individual sections of heavily used road sections representing approximately 30 miles of critical roadway infrastructure.

On July 13, 2018, Mariposa was struck by the Ferguson Fire. The Ferguson Fire lasted between July 13 through September 19, consuming 96,901 acres in its path.

After all these disasters the County Public Works Department played a major role in recovery, not only rebuilding roadway systems, bridges and the like, but also ensuring that the County could remain open to response of emergency responders, transportation, resident travel, and for commerce.

Both flood events caused massive damage to the County roadway and bridge systems. Immediately following each event Public Works assessed alternative roadway routes to ensure that emergency responders could reach each and every doorstep with the county. This massive undertaking, which was achieved within one day, included the specific task deployment of in-house staff as well as the hiring of numerous outside contractor forces given that the magnitude of damage well outpaced the County’s ability to complete these tasks internally.

During the two recent large fire events, staff were deployed to handle many tasks not normally associated with a “normal” public works department’s projects. A vast amount of the staff was deployed to assist with population evacuation, especially those with medical or mobility considerations. The team learned to drive transit buses with wheelchair lifts; operated emergency fueling delivery services for those who did not have enough fuel in their vehicles to evacuate as the power had been turned off throughout the county; and transported large and small animals to shelter and provided shelter supply delivery to the residents throughout the region.
Originally constructed in 1915, the 2.5-million-gallon (MG) Bolton Reservoir was an open, finished drinking water reservoir comprised of a concrete slab-on-grade “hopper bottom” structure with 2:1 (horizontal: vertical) side slopes. In 1989, a floor liner was installed to keep the structure water tight, and a Hypalon floating cover was placed over the reservoir in 1995 to protect water quality. The existing Bolton Pump Station was constructed in 1999 to pump water from the reservoir to higher elevations in the City’s Horton pressure zone, replacing the Old Bolton Pump Station.

While the reservoir structure had served as the “hub” of the City’s water system for 100 years, it had safety, operational, and maintenance issues that needed to be addressed. The primary concern was that the antiquated design did not meet current seismic codes and the structure would be unstable under the design-level earthquake. Inspections showed concrete spalling and cracking. The floating cover, patched and repaired many times, was at the end of its service life. From an operational perspective, only 2.0 MG of the total 2.5 MG volume of water in the existing reservoir was usable due to the inlet/outlet piping’s location, several feet above the reservoir floor. This piping configuration also caused inlet/outlet short circuiting and reservoir bypassing, as the Bolton Pump Station drew water directly from the supply main, resulting in excessive water age and in-tank water quality issues.

The City of West Linn, Oregon, is located in the Cascadia subduction zone, and is highly susceptible to seismic activity. The entire region will face extreme impact to water systems during a large seismic event. The City chose a partially-buried, seismically resilient structure that could provide a long service life with low maintenance. The team designed and constructed a strand-wound, circular, prestressed concrete reservoir to AWWA D110, Type I standards. The walls of this type of prestressed concrete reservoir incorporate circumferential prestressing strand, vertical prestressing threadbars, along with mild steel circumferential and vertical reinforcement. By keeping the walls in permanent biaxial compression, the reservoir can withstand the varying operational hydrostatic loads, as well as thermal and seismic loads, without cracking.

To provide an unrestrained connection and to reduce bending moments induced by hydrostatic, thermal, backfill, and seismic forces on the tank wall, the roof and floor are separated from the corewall by neoprene bearing pads and connect with seismic cables. This “free-sliding” connection at the wall base and wall top enhances the seismic performance of the tank by allowing the floor, wall, and roof to act independently of each other.
he City of Afton and Wash-
ington County partnered to
reconstruct the 160-year-old
Old Village of Afton. Together
with financial support from the Min-
nesota Board of Water and Soil Resources
(MNBWSR), Minnesota Department of
Natural Resources (MNDNR), Min-
nesota Pollution Control Agency
(MNPCA), Minnesota Public Facilities
Authority (MN PFA), and the Valley
Branch Watershed District (VBWD),
WSB led an eight-year process that
assembled the project vision, procured
stakeholder funding, prepared prelimi-
nary design, final design, construction
administration, and coordination
with tribal communities to protect the
Rattlesnake Effigy Mound. The project
revitalized the Old Village of Afton,
protecting the historic properties and
restoring the opportunity to revitalize
the downtown area.

This $20 million effort included new
sanitary collection and treatment
system; reconstruction of all county and
local roads; new trails; levee reconstruc-
tion; stormwater enhancements; ADA
improvements; and provided 100-year
flood protection to protect the Old Vil-
lage of Afton over the next century.

The City of Afton was notified by the
United States Army Corp. of Engi-
neers (USACE) in 2008, that the levee
protecting the Old Village did not meet
standards to remain in the voluntary
assistance program. In 2009, the City
hired WSB to develop a multidisci-
plinary approach to preserve the down-
town area and reconstruct the levee
to USACE standard. To support
the reconstruction process, WSB recom-
ended the appointment of an Old
Village public task force to lead the
development and project planning for
the City Council to consider.

WSB, Washington County and the
City of Afton teamed up to deliver the
project under one letting and admin-
istration. Close coordination with all
stakeholders was required for success-
delivered of the project. The project
was originally scheduled through two
construction seasons (2017-2018). To
achieve project completion in one year,
the contractor had three pipe crews, two
grading crews and multiple subconsul-
tants working on the project simultane-
ously. This presented a challenge in con-
struction administration and inspection
to ensure construction activities adhered
to plans and specifications.

Maintaining traffic control and coor-
dination with businesses and residents
proved to be especially challenging.
The pace of construction also pre-
sented a challenge with private utility
relocations. Construction operations
had to be flexible to accommodate
scheduling issues with private utilities
outside the City or County’s jurisdic-
tion. The close coordination between
project partners in the development
and planning processes led to the
successful delivery of the Downtown
Afton Revitalization project.
surrounded by stone benches and lawn terraces, the rustic-themed Warren Riverview Park features a canoe launch, ropes course, an interactive boulder wall and a handicap-accessible playground, as well as a covered shelter and a 3,000-square-foot climate-controlled structure—The Lodge—a community event space with an open area for gathering and a river overlook.

The park, located at the former City of Derby Public Works site, embraces and celebrates its neighbor—the Arkansas River. The river view is an impressive point for park visitors. Most people driving by quickly on Market Street don’t have time to soak in the beauty of the river. The park offers the public a space to take that river view in.

The riverside facility is different than the city’s other parks in that it is oriented toward older youth and has an active tack to it. In that regard, there will be a ropes and rocks course and direct access to the river.

The park design includes a direct commitment to sustainability. The entire parking lot drains to a bio swale. The bio swale filters stormwater runoff prior to introduction into the river. An existing spring discovered during construction was incorporated into the park and bio swale design to create a bog which further enhances the plant diversity and enhance wildlife habitat, as well as filters stormwater runoff.

The park incorporates 34 different varieties of trees from commonly-found pines and oak species, to the more unusual such as the bald cypress and tulip tree.

During the development of the park, contaminated soils were removed from the previous public works site. The storage capacity of the river has been increased because the park design allows it to back up into the park during high flood events.

The park was designed to work with a flood event. The different levels (terraces) allow the park to continue to be usable as the water rises. The materials selected for the park were chosen to withstand flooding events without damage, which has already been tested—and it works. Derby had a major flood event the week of grand opening and the park features functioned as designed to withstand water levels.
The City of Eau Claire selected Ayres Associates to design the replacement of the Grand Avenue bridge over Half Moon Lake—but this was a bridge replacement beyond the ordinary. Since the bridge is situated on one of two entrances to Carson Park—the signature, 134-acre park in the heart of downtown Eau Claire—it was a high-profile project for the community. The City needed not only a safe and structurally sound replacement bridge but also one that incorporated improvements and aesthetic enhancements that would serve the community well for generations to come.

From a technical standpoint, the project involved replacing a narrow concrete arch bridge built in 1933 with an aesthetically enhanced, 50-foot-long by 77-foot-wide concrete slab bridge and 600 feet of approaches. With a bridge sufficiency rating of 40.8 out of a possible rating of 100, the former structure was classified as structurally deficient and functionally obsolete. Bridge deterioration included horizontal cracks in the concrete arch, vertical cracks and spalls in the concrete abutments, and exposed rebar in the concrete deck.

The narrow bridge presented a substantial safety concern for the city, considering the variety of activities that took place there year-round, including driving, biking, walking, jogging, kayaking, and fishing, with all users sharing the same constrained space. The project required creative engineering and inventive problem-solving to design a replacement structure that not only met the multi-modal, fishing, navigation, hydraulic, and geometric requirements of the site but also delivered a series of “softer” treatments to enhance the aesthetic appeal of the new structure and approaches. The bridge and causeway at Half Moon Lake are now not just a safe means to access historic Carson Park; the area is a destination and an extension of the park.

To widen the causeway and improve multi-modal accommodations, Ayres’ project team went above and beyond to give the City a project of which it could be proud. Special considerations included extensive and varied types of fishing accommodations, including fishing areas designed for those with disabilities and creation of a fish habitat with trees placed in the water along the project; user-friendly and context-appropriate landscaping; lighting; environmental impacts coordination with regulatory agencies; removal and proper treatment of contaminated lakebed material; increased navigational clearance; and minimizing disruption during construction.

Public involvement during the design was critical, and the project team worked extensively on public outreach efforts, developing a tri-lingual project website and flyer to share information with concerned and affected residents living near the project site and creating detailed renderings and “fly-through” animations to help stakeholders visualize the future finished product.