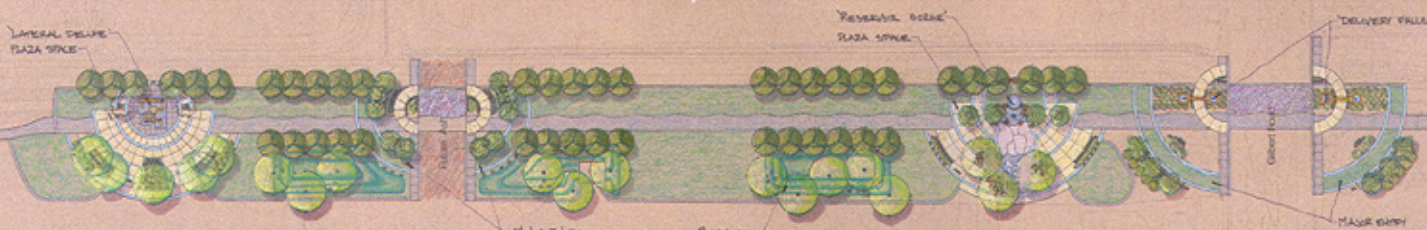




# Tales of the Western Power Line Trail

By J2 Engineering and Environmental Design, Phoenix • LASN Editor Stephen Kelly



**W**hen you think of “trails,” the Appalachian, Oregon and Santa Fe naturally come to mind. Editor’s note: Just happened to have finished reading Hampton Sides’ engrossing tale *Blood and Thunder*. It’s about the settlement of the Southwest, and the Santa Fe Trail plays a leading role.

Our featured project, also in the Southwest, is the Western Power Line Trail, along historic Wallace Feeder Canal, better known as Western Canal, about a half-mile between Elliot Road and Guadalupe in Gilbert, Ariz. The site was a largely neglected two-mile linear corridor traversed by the irrigation canal and a 500 kV power transmission corridor. The irrigation canal, like the power lines, necessary and functional, yet uninspiring, particularly given they are adjacent to established residential and commercial developments.

This particular section of the Western Power Line Trail constitutes over two miles and 25 acres of multiuse trails that follow the banks of the Western Canal. As a continuation of the Sun Circle Trail, it connects two of the town’s recreational cornerstones: Freestone Park at Lindsay Road and McQueen Park just beyond Cooper Road. This section of multiuse path is a vital link to Gilbert’s and Arizona’s overall commitment to multimodal connectivity and the continuing development of the necklace of interconnected trails and passageways under development throughout the valley.

## Former “Hay Capital of the World”

Gilbert, situated in the southeast valley of the Phoenix metro area, is a community that has made the transition from an agriculture-based economy to one of diverse suburbanity. Every community has a back-story and Gilbert’s is a curious one. One William Gilbert provided land to the Arizona Eastern Railway in 1902 to make way for a rail line between Phoenix and Florence. The initial European ancestry-based settlers to the area were Mormons, but it wasn’t their first choice. Mormon missionaries made their way to Mexico as early as 1875, but beginning in 1912, Mormon groups began moving north from enclaves in Mexico to settle what would in 1918 be christened Gilbert Ward.

Mormon settlements in Mexico? Yes, explains Thomas Cottam Romney in *Mormon Colonies in Mexico*. Some Mormon groups in the early 1900s ventured south of the border to escape scrutiny of polygamy practices frowned upon, indeed declared illegal, by the U.S. government. These Mormon colonies however soon fled back north after encounters with

Left: Looking north at the Reservoir Gorge water feature plaza on the Western Power Line Trail in Gilbert, Ariz., children are walking across the water feature on concrete stepping-stones.

Bottom left rendering: The park area consists of two major outdoor plaza areas, turf and tree-lined paths, informal seating nodes and four unique water features. Two water features stand on either side of Gilbert Road, forming a gateway to downtown. At the center of each plaza is a distinctive water feature representing a tie to Gilbert's agricultural past and tells the story of how water is delivered to the valley.

Right, top: This view looks west down the trail from Reservoir Gorge Plaza. The water feature has a sunken level seating area. Concrete seat pods resembling baffle blocks punctuate the turf berms and the periphery of the plaza to offer informal gathering areas.

Right, below: Looking east you see the Delivery Falls water feature at Gilbert Road. This water feature, replicated on the other side of Gilbert Rd., forms a gateway into the Heritage District. Davis Colors (San Diego Buff, Palomino, Green Slate, Rustic Brown and Kahlua) were used for the water features, walls and flatwork. The decomposed granite here is 1/4" minus "Tuscan Gold" (Pioneer Sand and Gravel).

revolutionary general José Doroteo Arango Arámbula ("Pancho Villa") and his troops.

Gilbert, incorporated in 1920, became the "Hay Capital of the World" and retained that title until the late 1920s.

Well, enough history.

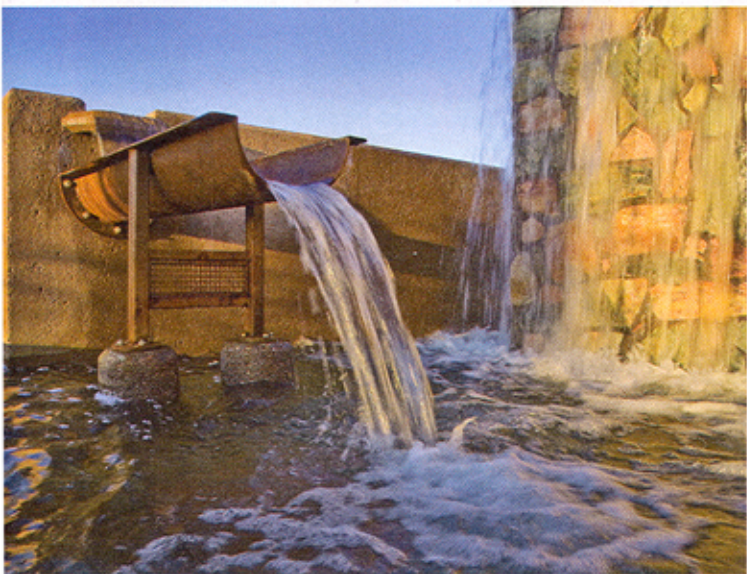
### Heritage District

The development and creation of the Western Power Line multiuse trail was a step toward achieving the vision established in September 1990 with the creation of a special zoning area called the "Heritage District," a vision of creating a family-friendly, pedestrian-oriented, convenient and safe experience for Gilbert residents to enjoy. This zoning category was a catalyst to preserve and enhance the environmental quality of the downtown area, with a focus toward celebrating the town's history. The culmination of the trail construction and the associated civic spaces created along the corridor is one of the many accomplishments in the rebirth of the heart of historic downtown Gilbert. The preservation of this open space, coupled with the enhancements, provide the Heritage District and Gilbert residents with an environmental quality that was not available or welcoming before these improvements occurred.

The aesthetic quality and function of this multiuse path and linear park is a harkening to the past relationship between the agrarian founders of Gilbert and Salt River Project (SRP). SRP is the local utility company, providing electricity to some 934,000 retail customers in the Phoenix area, operating or participating in 11 major power plants and numerous other generating stations, including thermal, nuclear, natural gas and hydroelectric sources. SRP also delivers nearly 1 million acre-feet of water annually to central Arizona customers.

Aspects of this project include a preserved and enhanced irrigation canal water supply, a civic space with room for a wide variety of activities, including farmers' markets that bespeak the town's agricultural past, art walks to celebrate the heritage district architecture, a hard and soft surface trail system that links two of the town's premier recreational amenities, and the celebration of SRP, which has provided the valley's water resource and electric power for over 100 years.





## Enter J2

J2 Engineering and Environmental Design, LLC (J2) was the prime consultant for the project and provided all landscape architecture, civil engineering, drainage design, irrigation design and storm water pollution prevention. J2 was responsible for managing public involvement, master plan development, town departments and design review board approvals, creation of the construction documents and postdesign construction observations. The design team was able to address each of these complex issues and successfully integrate them into the overall design and final product.

## Challenges and Complexity

The most complex issues the design team faced were dealing with all aspects of the 500 kV overhead power lines, which had a direct effect on each and every feature of the project: clearance of light poles; pavement cross-sections; grounding of water features; selection of any vertical element; and routing of water lines and utilities. Every feature had to be tested against Salt River Project (SRP) requirements relative to line access and clearance requirements.

Among the many challenges was integration of the project into existing residential and light industrial development, existing groundwater recharge facilities, existing mature landscape, future commercial development, existing agricultural uses, and the influence of the open, earthen lined, historic Wallace feeder canal.

## On the Ground

In essence, the goal of the landscape architects and engineers was to metamorphose this neglected corridor into one of the premier multi-modal civic spaces in the east valley. The canal sides were dirt, rutted out by maintenance and other practices not conducive to public use. The open canal, normally a dry earth lined canal that collected trash, made the entries and exits to the narrow corridor from the major arterials appear blighted and uninviting. The landscape necessary to provide shade, color, texture and form to the area were in a state of decline or nonexistent.

The introduction of hard and soft surfaces define the trail system and offer a safe mode of transportation for the widest variety of trail users, from joggers to bikers to equestrians. The scalloped edges of the multi-use path and curbing, embedded with recycled blue glass beads, frame a swath of turf that represents the past alignment of the canal.

The highlight area of the project is the linear park, nestled in the redeveloping Heritage district. To gain the area for the linear park the town and SRP converted approximately 1,200 linear feet of earthen channel to a piped system. The park area consists of two major outdoor plaza areas, turf and tree-lined paths, informal seating nodes and four unique water features. Two water features stand on either side of Gilbert Road, forming a gateway to downtown. At the center of each plaza is a distinctive water feature representing Gilbert's agricultural past and tells the story of how SRP delivers water to the valley.

Far left, above: The water features recycled equipment from Salt River Project's "bone yard," materials destined for the utility's scrap pile. This view looks southeast at the reflecting pool of the Lateral Deluge water feature. Brightly colored stone lines the negative edge central column. Stone veneer 'Paint' and 'Cloud' (Pioneer Sand and Gravel) accent the water features and paving. Inscriptions are etched into the water features on the conservation and practical use of water.

Far left, below: The water features were designed to showcase the movement of water from mountainous reservoirs, to SRP turnout structures, to water delivery systems that continue to feed the agricultural areas outside of town. The stone cladding on the central water column used to be on all SRP irrigation turn-out structures.

Left: The metal troughs for the Lateral Deluge water feature were salvaged from SRP well casings. SRP provides electricity to some 934,000 retail customers in the Phoenix area, operating or participating in 11 major power plants and numerous other generating stations, including thermal, nuclear, natural gas and hydroelectric sources. SRP also delivers nearly 1 million acre-feet of water annually to central Arizona customers.

Right, top: View looking west at sunset across the reflection trough at Lateral Deluge. Overhead power lines parallel the trail as it continues to the west.

Right, middle: Looking west down the trail, the SRP stone designates the pedestrian crossing at a speed table for the future Ash St. The grass area is framed by scalloped edged concrete embedded with blue glass beads.

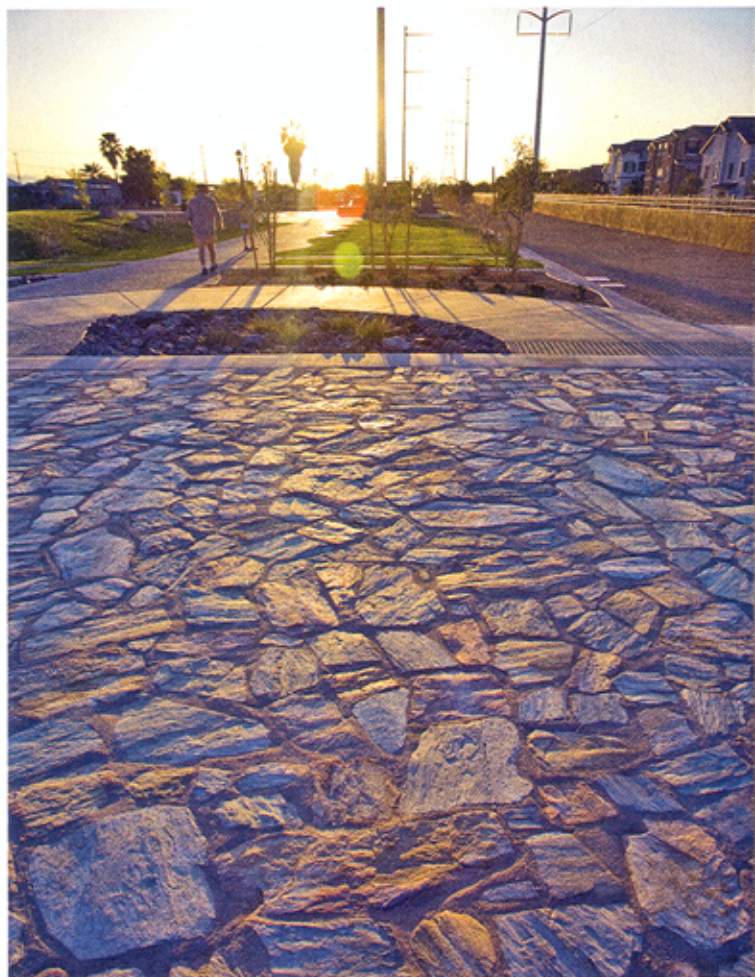
Right, bottom: The hardscape at Lateral Deluge Plaza (pictured) and the Reservoir Gorge Plaza ("Desert Jewel" Pavestone Plaza I & II tumbled concrete pavers) are designed in concentric rings radiating out from the water features. The light fixtures (Capital Series, Niland, Co.) replicate historic luminaires.

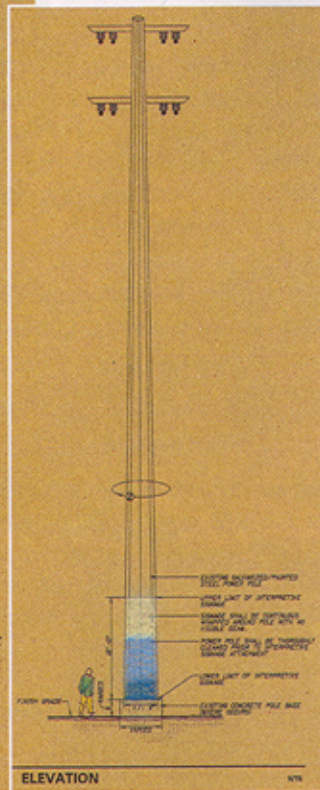
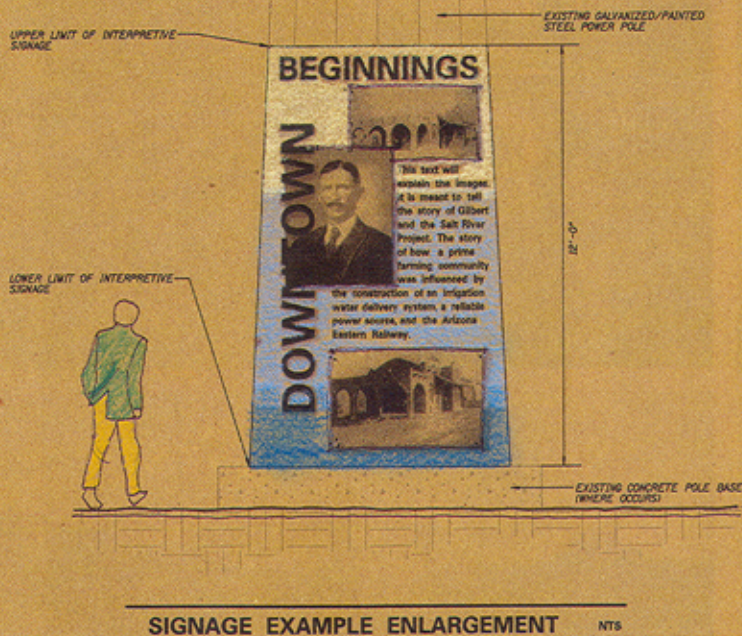
The power line corridor also has specific and unique access requirements from SRP. These requirements dictated the trail system cross-section be designed to sustain prolonged periods of heavy crane equipment use. Incorporation of turf reinforcement cylinders on a compacted AB base along the edges of the trail system support the load of these trucks if they leave the pavement. Additional clear turnaround and setup areas also had to be incorporated into the design for SRP access to the lines. These features all required unique and innovative design approaches that resulted in analysis and design of all features and infrastructure relative to these impacts.

### Celebrating Water Farmers

The celebration of water throughout the space harkens to the history and positive relationship maintained between the town and Salt River Project. The water features and pedestrian street crossings use stone SRP had on their turnout structures. Concrete and steel used to create the forms of the park have an elegant rustic appearance reminiscent of baffle blocks, reservoir structures and irrigation delivery structures prevalent on most SRP delivery structures. The outdoor plazas are concentric rings, emulating ripples in water, radiating from the water features. These plazas offer a place to sit, relax and enjoy the cooling effects of water.

Constructing open, accessible water features directly under power lines required specific designs relative to grounding the entire feature and steel reinforcement placement. In addition to the water features under the power line corridors, these features were also positioned over the top of a new 60" concrete pipe that served as the conduit for the canal that used to cut through the space. The innovative application of





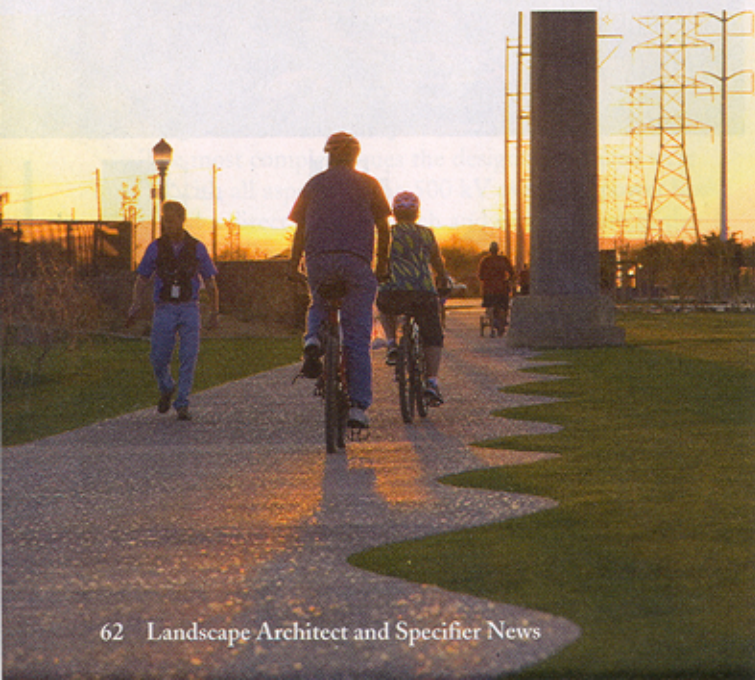
Top + inset: Historical signage will wrap the large metal power poles to tell the history of Gilbert and the water and power delivery to the entire valley.

Middle, left: We're looking east toward Gilbert Rd. and the Reservoir Gorge water feature plaza area. Dormant desert willow trees line the south side of the pathway. The multiuse path paving incorporates blue glass beads ('Cobalt Blue,' Vitrohue tumbled glass, TriVitro Corp.) finished with WR Meadows Vocomp, a water-based acrylic concrete sealer.

Middle, Right: This view looks west through a column of water at the Delivery Falls water feature. A remnant parcel of agricultural land is the immediate background with new residential development beyond that.



Far left and below: The grass is EZ Turf 'Midiron' (Western Sod), a medium-dense turf Bermudagrass variety. Bermudagrass is considered the best adapted grass for the low desert valleys of Phoenix. SRP required the trail cross section be designed to sustain prolonged periods of heavy crane equipment use. Incorporation of turf reinforcement (Grasspave2, Invisible Structures) on a compacted AB base along the edges of the trail support the load of these trucks if they leave the pavement.



spread footings and other structural designs were incorporated into the design to avoid any negative impact to the piping below.

### Social, Economic Considerations in the Design

This project demonstrates on multiple levels response to social and economic considerations. One social consideration in the design is giving residents an opportunity to go to an open space that links it to the greater community. There was a positive social aspect associated with this project through the reconnection of neighborhoods that were once divided by a neglected and uninviting corridor. The project also connects the downtown to the pedestrian multi-modal corridor and provides open civic and social space within and integral to the design. The diversity of seating allows social interaction and respite, both driving forces behind the site development.

From an economic vantage point the creation of open space within the heart of downtown was designed to accommodate larger crowds with its paved plazas and allow space for special events that both draw and create the economic engine desired in any commercial corridor.



Gabion baskets (right) with 4"-8" angular riprap ("Mountain Vista Brown," Kilauea Crushers) adorn the accessible route to the sunken plaza and the Reservoir Gorge water feature. Salvaged on-site boulders and surface select boulders, 2-6 ft., were treated with Permeon. Permeon was developed to blend or restore color to desert environments disrupted by construction. The Federal Hwy. Admin. used Permeon recently to blend/conceal marks on rock walls during construction of the Hoover Dam Bypass Bridge [www.landscapeonline.com/research/article/14255](http://www.landscapeonline.com/research/article/14255). Accent lighting punctuates the stepping-stones.

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### Sustainable Design

This project contributes to environmental awareness and sustainability on several different fronts. The project includes inscriptions etched into the water features about the conservation and practical use of water. The water features themselves recycled equipment from SRP's "bone yard" that were destined for the scrap pile. The water features were designed to showcase the movement of water from mountainous reservoirs to SRP turnout structures, to water delivery systems that continue to feed the agricultural areas outside the town. The large metal power poles, often deemed unsightly, will be the backdrop for historical signage telling the story of Gilbert and water and power delivery to the entire valley. These items, along with others within the project, were developed to stress the importance of conserving water, celebrating Gilbert's past, while maintaining an eye towards the future. The Heritage District has seen a surge of new development as a result of the creation of this welcoming civic space.

### Exceeding Client/Owner Needs

The transformation of this neglected, barren and all but forgotten linear corridor has received the greatest compliment possible through its constant and varying use every day of the week by bicyclists, joggers and equestrians. The linear park has already been used for the town's first art walk and is schedule for additional annual events. The open turf areas and plazas are often used as picnic and social spaces by residents and those enjoying the cultural and restaurant experiences of the surrounding commercial area. School age children have safe routes

### Western Power Line Trail

**Project Cost:** \$6,081,000 (Includes all design fees, construction, and construction administration fees)

### Awards

- Valley Forward Association, Merit Award, 2009
- Arizona Chapter American Society of Landscape Architects, Honor Award, 2010
- Arizona Chapter American Council of Engineering Companies, Honor Award, 2009

### Project Team

J2 Engineering and Environmental Design, Phoenix

**Role on Project:** Prime Consultant- Landscape Architecture, Civil Engineering, Water Resource Engineering, Irrigation Design, and Storm Water Pollution Prevention

Aqua Engineering, Fort Collins, Colo.

**Role on Project:** Water Feature Mechanical Design

Wright Engineering, Chandler, Ariz.

**Role on Project:** Electrical Engineering

Aztec Engineering, Phoenix

**Role on Project:** Ground Survey, Structural Engineering

Cooper Aerial, Phoenix

**Role on Project:** Aerial Mapping

Hoque & Associates, Phoenix

**Role on Project:** Geotechnical Engineering

Ricker, Atkinson, McBee, Morman and Associates, Tempe, Ariz.

**Role on Project:** Geotechnical Engineering

JG Engineering, Phoenix

**Role on Project:** Structural Engineering



## Tales of the Western Power Line Trail *(continued from page 64)*

Left: SRP stone faces the spillway in this view looking north over the top of Reservoir Gorge, with an agricultural field in the distance. Elastomeric urethane form liners ("Yosemite Rock" and "Split Stone") were also used on the water features.

to the schools north and south of the main corridor and easily connected by this new trail. The expectations that were met and exceeded are exemplified by the heavy use of this site. The town receives regular compliments from its citizens about the beauty and diversity of experiences that this multiuse space provides. This project has established a standard for quality and creativity the town uses to measure success on future projects.

### **Future Value to the Profession**

Power line corridors, regardless of size of transmission line, do not have to remain barren wastelands. These corridors offer tremendous potential as positive and inviting civic and public use space. The development of these special use corridors require the design team establish from the project onset open communication with all active utilities in the corridor to best understand their maintenance requirements, setup areas, turning movements and

vehicle weights. When a designer can couple that understanding, with solid and defensible design relative to each site feature within the corridor, then the utility company concerns can be addressed. This project deserves recognition for its ability to function as one of the economic engines helping to revitalize historic downtown Gilbert and for a complex project that required innovative thinking and an approach that focused on teamwork from concept development to grand opening.

### **The Firm**

*J2 Engineering and Environmental Design, LLC (J2), a minority-owned business, has offices in Phoenix, Ariz. and Olathe, Kansas and was established in 2002. Founding partners Jeff Holzmeister, PE and Jeff Engelmann, RLA combine over 50 years of experience in hydraulic and water resources engineering, general civil engineering, landscape architecture and public involvement. The J2 staff's professional experience has been gained through the completion of numerous public works projects for local governments and state, county and federal agencies.*

*J2 civil engineering expertise is in water, sewer, paving and grading, with an emphasis on water resource engineering. The landscape architecture department specializes in master planning, urban design, park and recreation design, multiuse trails, environmental restoration and commercial and municipal facilities. Project sizes have ranged from 1/2 acre and 1 acre urban pocket parks to over 600-acres of environmental restoration. The staff comprises 31 technical, design and support professionals, including nine professional engineers and six registered landscape architects.*