

Less than an hour north of San Diego lies Escondido, a quaint city surrounded by rocky hills and beautiful skylines. Escondido was founded in 1888 and currently has a population of 143,911. The Escondido-Vista Water Treatment Plant supplies water to over 25,000 residential, commercial and agricultural customers. As the city has continued a steady growth, the water treatment plant's aging infrastructure has continued to deteriorate, therefore a solution was sought.

The plant, constructed in 1976, currently treats 75 million gallons per day (mgd) but has the capacity to treat up to 90 mgd. The local water originates from the watershed and well fields located near Lake Henshaw. It's then transferred to Lake Wohlford via an open canal. Additional water is purchased from the Colorado River and Northern California via the State Water Project. The water is then stored in Dixon Lake, and then enters the plant through a 54 inch diameter pipe. The treatment of the water includes coagulation, sedimentation, filtration and disinfection to ensure destruction of pathogenic organisms. After treatment, water is distributed from the Escondido-Vista Water Treatment Plant to the Vista Irrigation District, part of Rincon del Diablo MWD and throughout Escondido through a system of pipes and reservoirs.

Problem:

Upon inspection of the facility, it was concluded that the plant's 90,000 square foot of concrete showed signs of concrete degradation with exposed aggregate. To decrease the probability of building a new facility, it was decided to rehabilitate the current facility to save taxpayers' money.

The City of Escondido put out a call for bids and Murrieta, California based National Coating and Lining Company (NCLC), a Raven Certified Applicator, won the project for being low bidder. NCLC's brings 40 years of combined expertise in the restoration and protection of concrete and ferrous metals throughout the water & waste water industry so it was an exceptional fit for the type of project at Escondido.

Neil Greenwood, , City of Escondido Utility Construction Manager feels NCLC is the most experienced contractor of all those who submitted bids, when it comes to concrete coatings and all the issues that are encountered in a project with this magnitude. Aquatapoxy's long successful proven history in potable water infrastructures gave Greenwood confidence to specify Raven A-6 in the bid specifications. Greenwood was familiar with NCLC's ability, as one of the top applicators of Raven products, having had many successful projects with the City of Escondido

Challenges and issues:

The biggest challenge was accommodating the city's needs while accelerating a 150 day project in 60 days. The overall goal was to limit the time the plant was affected to allow operations to provide adequate water supply to the city, especially with the summer approaching.

Other challenges included:

- Coating application was restricted to declining temperatures typically during late night shifts to aid in diminishing moisture vapor transmission
- Coating concrete with excessively rough surface profile without a cementitious resurfacing
- Minor infiltration

When asked how NCLC planned to tackle these challenges, Tom Unsell, NCLC Vice President, states, “NCLC opted to increase the film thickening from the specified 80 mil to 160 mils in lieu of concrete restoration in order to expedite the completion date. To accommodate for the accelerated turn-around, we increased manpower and equipment as well as working nights.”

Solutions:

The surface of the structure was degrading due to the chemicals used in water treatment. After the City of Escondido assessed the facility, it was determined a 100% Epoxy product, which must be NSF ANSI 61 certified, would protect and reinforce the structure from further deterioration. The technology to be used by NCLC would be a fluid applied plural component 100% solids epoxy in lieu of a cementitious underlayment with an epoxy top coat. The solution to use AquataPoxy as the resurfacer and epoxy top coat would allow faster turn-around while providing a superior coating system.

Time and money were saved by eliminating cementitious repair, considering not having to wait for the concrete to cure and eliminating a secondary surface preparation of the cementitious repair. By utilizing the coating over a rough substrate, it increases the adhesion to the structure, as well as reinforcing the structural integrity.

Other benefits include:

- Two times the millage increased thickness of the polymer and allowed for improved resistance to hydrostatic loading, as well as additional abrasion resistance.
- Increased the service life of the structure versus a rebuild of structure

“The Escondido-Vista Water Treatment project was the largest structure with the quickest turn around (60 days) in the history of Raven. This was also the fastest application of its kind of Raven A6 Thick, measuring 90,000 square feet”, states Donald Wroble – SR VP Sales & Marketing Raven Lining Systems.

Process:

The basins were drained and all remaining solids and debris were physically removed. A combination of a 5000 psi hydro blast and abrasive blasting was performed over entire structure with the goal to achieve a minimum concrete surface profile of csp3. At the edge of where the coating application ceased, termination grooves and key ways were utilized to assure superior adhesion exists. After completing surface preparation, a final low-pressure water rinse was conducted to wash away the loose dust and debris. Once the substrate had dried, two coats of primer were applied to reduce moisture vapor transmission. The first coat of Aquatapoxy A6 Thick was applied with a back trowel to smooth the surface of the coating and once that coat was tack free a second coat was applied. Any pinholes found after holiday testing was then repaired within the recoat window. Pinholes discovered after the recoat window had expired were prepared and then repaired according to Raven recommended procedures.

During the project, NCLC provided full time project management, as well as QA-QC officer to ensure all procedures implemented per Raven’s specifications and NCLC SOP. Also, two visits to the facility were made by a Raven technical service specialist to ensure NCLC followed proper recommended procedures. Both of which pleased Greenwood to ensure quality and application efficiency.

The solution implementation benefits the city of Escondido, along with its citizens, by providing an increased service life of the structure, as well as protecting the life of their investment

Unsell concludes, “To have the reputation of Raven behind NCLC, with Raven’s training, experience and superior product, gives NCLC’s clients a peace of mind.”

Cost of the project?

\$1.2 million

Products used:

A6 Thick, Raven 155, SikaTop Plus 122, 123, Sikaflex 1A, Sika 2CNS

Third party vendors used:

NACE inspection

National Coating & Lining Company, a Raven Certified Applicator, was started back in 2003 by core members of other construction companies based on building upon their expertise, experience and dedication to carry on the same types of projects as they have for a number years in the coatings and linings industry. By pooling all of these resources, this has provided our company an unlimited opportunity to promote our business and opportunities.

The NCLC painting and coating staff have over 40 years of consecutive experience and strive to protect infrastructure investments by providing full service industrial coating solutions specializing in the restoration and protection of concrete and ferrous metals throughout the water & waste water industry. They are primarily engaged in the application of Epoxy Coatings, Calcium Aluminates, Polyurethane Linings, Manhole Restoration, T-Lock Installation and Welding, Secondary Containment, Lead Abatement, and High Performance Painting, working with an array of municipalities, engineering firms and general contractors while providing quality and reliable service with integrity and financial stability. NCLC is a proud member of NACE, SSPC, and is a Voting Member of LAP-FCA, PDCA. NCLC is licensed as a General Contractor and a “Specialty Painting Contractor” with licenses in California, Washington, Arizona and Nevada.

Raven Lining Systems has been offering comprehensive solutions for the protection and renewal of wastewater and potable water infrastructure since 1988. A cornerstone offering is the Raven Engineered System which is a combination of high performance protective coatings matched with specialized dispensing equipment and methods.

Conscious of the environmental needs of our global community, the Raven Engineered System is an environmentally friendly solution that exceeds EPA and Clean Air Act regulations. Our proven hybrid epoxy system offers superior adhesion, chemical resistance and structural renewal strength. Specially designed application equipment meets the demands of difficult access in underground structures, collection systems, treatment plants, tanks and storage. This system has performed for more than 20 years in infrastructure corrosion control, containment and renewal projects nationwide.

Raven delivers its products and services via its [network of Certified Applicators](#). We provide our Certified Applicators continuous education on methods and technology along with proven products,

enabling them to deliver the solutions demanded by today's aging and deteriorating infrastructure. Currently there are more than 50 Certified Applicators serving customers nationwide.

Embracing the opportunity to serve people and communities everywhere, Raven will continue to lead this growing market by offering cost effective environmentally friendly infrastructure solutions.

