

Airport Link Protects Wildlife Habitat

Missing stretch of highway crosses sensitive ground.

By John F. Muscatell

Adams County, CO, and its cities started planning and developing the 120th Avenue corridor more than 20 years ago to facilitate mobility and address regional growth. With the construction of the missing stretch of roadway between Quebec Street and US 85, 120th Avenue became the major east-west regional arterial throughout northern metro Denver. With the 120th Avenue extension in place, citizens, commuters, and freight traffic are able to travel continuously along the arterial from Boulder County to the north entrance of Denver International Airport, and continue to the eastern part of Adams County, with connections to US 85, I-76, and E-470.

The solution was easy to envision, but difficult to enact; designing and constructing the missing link of 120th

The South Platte River, the largest river in the region, had been encroached upon by gravel mining, residential communities, and agricultural, industrial, and commercial businesses. All the same, the river provided a riparian corridor that is home to mule deer and white-tailed deer, red-tail hawks, bald eagles, great-horned owls, coyotes, red foxes, belted kingfishers, great blue herons, and hundreds of other small mammals, birds, reptiles, amphibians, fish, and insects. Maintaining the riparian corridor was essential to the success of the project.

Wetlands and Wildlife Protected

Since the project would unavoidably disrupt the wetlands, URS Corporation (www.urscorp.com) created another wetland area, replacing every acre with two new acres of wetland. The extensive wetlands preserved a wilderness feel with open space for urban residents traveling through the project area.

About 800 new trees and 3,300 shrubs were added, providing cover and forage for resident and migrating wildlife. Much of the affected areas contained many non-native species, and Adams County was dedicated to replacing them with higher quality vegetation. In riparian areas, pole cuttings were used to propagate trees. Branches trimmed from existing cottonwood trees were stripped of bark, soaked in water for 14 days, and planted deep enough in the ground to reach the water table. The plantings reduced landscaping costs, prevented water runoff, increased wildlife habitat, and had a first-year establishment rate of 90 percent.

A total of 18 acres of riparian habitat were designed to fit in the existing right-of-way. In addition, a stormwater deten-

tion pond was reconfigured for riparian plantings, a borrow-pit for roadway construction was turned into a second riparian planting area, and a portion of the floodplain that was to be re-graded for flood-control purposes was transformed into valuable habitat.

Project engineers and ecologists worked together to modify the design of a stormwater detention pond so it could double as a riparian woodland area. The team designed the pond so that water quality was enhanced and newly planted trees and shrubs could access groundwater for a portion of the growing season.

A series of small ponds was included to trap incoming sediment and debris from stormwater runoff. The small ponds were situated within a larger pond that only floods during major storm events. The larger pond was designed to resemble a natural swale, and the site was planted with trees and shrubs. Requiring minimal maintenance, the larger pond also will function as a wildlife habitat. The smaller ponds were designed to be easily accessible for regular maintenance and dredging by highway personnel.

Reservoir Preserved for Water Storage

Another serious challenge involved a proposed water-storage reservoir. The 120th Avenue right-of-way intersected a gravel pit that was intended as a future water-storage reservoir for the Denver Water Board. In order to protect it, a 1,350-ft long cutoff wall was designed to separate the reservoir from groundwater and prevent seepage through the highway embankment.

A two-stage process was used to create the impervious barrier. First, a slurry



Pedestrians and bicyclists are able to enjoy the scenic landscape from overlooks included on several bridges.

Avenue between Quebec Street and US 85 proved to be a challenge in several sensitive areas. The most critical was the existence of a natural habitat for wildlife and several acres of wetlands that required special attention.

mixture formed from powdered bentonite and water was pumped into the cutoff wall trench to keep the steep walls of the trench from collapsing. Behind the slurry came a backfill mixture of native soil and bentonite about the consistency of lava that formed a water-tight barrier.

An innovative technique was required at the eastern end of the cutoff wall where the 65-ft depth exceeded the reach of the excavator. In this section, the wall was constructed in two phases. The first phase was built by benching down and installing the wall up to 53 ft below the bench elevation. Twelve ft of fill was placed over the bench, and the second-phase wall was constructed through the fill, keying into the top of the first-phase wall. The wall allowed the gravel pit to be dewatered in advance, increasing the miner's productivity by saving the constant dewatering costs. It also eliminated groundwater depletion, allowed the county to place the roadway embankment through the gravel pit in a dry condition, and provided Denver Water with a sealed liner for its reservoir.

Denver Water owned a portion of the land necessary for the 120th Avenue extension project and had plans to construct a reservoir in an old quarry on the site. The exchange of property rights could have diminished the amount of storage capacity available to Denver Water, but the unique design used to carry the project over the South Platte River actually increased the storage capacity despite the lost reservoir surface area.

The loss of water storage resulting from the roadway alignment bisecting the future water storage reservoir also was mitigated. The proposed South Platte River bridge created a rise in the floodplain, which caused the reservoir to be flooded more frequently. The problem was solved with the help of detailed design and floodplain modeling.

Permitting Process and Public Approval

The 120th Avenue project involved numerous agencies, making the permitting process unusually complex. Since the construction of the road impacted



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jurisdictional wetlands of the South Platte River, the Corps of Engineers required several permits. Other property owners on the project right-of-way included Adams County Regional Park, local farmers and residents, and a mining company. Utilities on the site included three irrigation companies, water and sewer agencies, two electric power companies, and gas and communication lines.

A high degree of attention was paid to the aesthetics of the project. Details on the bridges, pedestrian hand rails, and multi-use trails were created to blend with their surroundings. Several bridges contained an overlook, allowing pedestrians and bicyclists to enjoy the picturesque landscape while remaining safely separated from vehicular traffic.

Late in the design process it was determined that the project needed to mitigate for noise impacts and relocate prairie dogs from the project site. For the prairie dogs, this additional effort included the need to identify a suitable location approved by the Division of Wildlife and Colorado Department of Transportation environmental staff. Noise mitigation work included close and continuous coordination with residents in three subdivisions, one of which was an environmental justice community, the City of Thornton, and agreements with a Metro District for the long-term maintenance of the noise walls.

Without expediting these efforts, the project would have been delayed and

additional federal funding that had also been identified late in the process would have been forfeited. These additional monies were used to build two additional lanes for the ultimate four-lane project. The communities affected by the project were consulted, kept informed, and participated in the process every step of the way.

Meetings with stakeholders were held throughout the design process, engaging active participation in the environmental and public outreach programs. Monthly meetings were held with the county administration, assuring that the project moved forward in an efficient manner.

From an economic perspective, the project provided a cost-effective solution for all parties. The gravel miner extracted more material, the water district gained additional water storage area, and Adams County received a significant cost saving.

The 120th Avenue extension project created a major arterial while protecting a natural wildlife habitat. National Environmental Policy Act mitigation measures were incorporated into the design process, allowing engineers, ecologists, and the contractor to incorporate environmental features while solving engineering requirements. The result was a park-like area along the South Platte River teeming with wildlife in their natural habitat, preserved by context sensitive engineering design. **GE**

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