

Salt of Earth: Not Always the Best Thing

A Utah highway project posed a string of challenges, one of which was solved through the use of high-density polyethylene pipe.

By Steve Cooper

Accommodating the population growth occurring north of Salt Lake City, Utah while maintaining a peaceful coexistence with the sensitive surrounding environment was made possible through thoughtful planning for a new highway, which included the materials and the design of it underground, stormwater-drainage system.

The Legacy Parkway, which opened in September 2008, is unique in that it consists of ten neighborhood trail heads, created and protected wetlands in the median, user-friendly and visually pleasing, raised pedestrian crossings, native-walk pedestrian trails, a nature preserve consisting of more than 2,200 acres, of which more than 700 acres are wetlands, plus size limitations for trucks, and reduced speeds. The \$685 million project is 100 percent state funded through the Centennial Highway Funding program.

During the course of the project's development, there were many adaptations and changes from the original layout design and even the bidding process. The original Environmental Impact Statement (EIS) was started in 1997 with a projected project-completion date before the 2002 Olympic Games in Salt Lake City. Although construction had started in January 2001, work was restricted by a court injunction in November due to environmental concerns. The Great Salt Lake is recognized as an international flyway for migratory birds.

The Utahans for Better Transportation and the Sierra Club had filed suit listing 46 items of con-

cern. A total of 46 issues were brought forth and the court favored UDOT in 41 of the issues with only five outstanding issues. The five issues were related to the right-of-way width, wildlife, sequencing, Denver and Rio Grande Railway (D&RG) alignment, and the integration of mass transit with the highway. UDOT was required to perform a Supplemental Environmental Impact Statement (SEIS) address these outstanding issues.

During the SEIS process, UDOT chose to meet with the plaintiffs and structure a settlement agreement that required legislative and governor approval. The agreement was signed November 2005 by UDOT, the Sierra Club, and Utahans for Better Transportation. In addition, the legislature mandated the construction schedule. Some provisions included:

- 125 acres of additional nature preserve,
- 55 mph speed limit,
- Trucks with five or more axles or more than 80,000 pounds were prohibited (except for emergencies),
- Trail systems and neighborhood, trailheads were incorporated.,
- Quiet pavement to reduce the noise,
- Funding of a \$2.5 million study to assess the possibility of Bus Rapid Transit and Light Rail.

Another change was the bidding process. The project was originally a de-





More than 56,000 feet of corrugated HDPE was used for the Legacy Parkway stormwater drainage system north of Salt Lake City. (Photo by Sarah Brummel for ADS)



sign-build project which was partially terminated due to the court decision that a SEIS was required. After the SEIS was completed and the settlement agreement was signed, the project was contracted as three design-bid-build projects to encourage industry competition and because the parkway concept was a rather new design concept within the United States.

During the research to find existing parkways for comparison, UDOT found very little information. The closest concept was the George Washington Parkway in the District of Columbia. Due to this concern, UDOT retained design ownership and proceeded with the traditional design-bid-build process. UDOT believed that this process would best incorporate citizen concerns and the best design practices for this concept.

One of the key components of the design was how to construct the highway for the longest lasting life, which was a

bit tougher than for other highway projects due to the severe nature of the area. This was foremost in the design of the stormwater system as corrosion can limit the life of pipe made from concrete or steel and the system needed to provide a sustainable infrastructure. Pipe made from high-density polyethylene (HDPE) was selected for the Legacy stormwater drainage system because of economics, ease of

installation and service life with its ability to withstand the corrosive nature of the soil.

HDPE pipe is structurally sound, cost competitive, abrasion and corrosion resistant, long lasting, and less intrusive to the environment. More than 56,000 feet of Advanced Drainage System (ADS) HDPE pipe along with 400 feet of Hancor HDPE pipe was used for the new stormwater drainage system.

"HDPE was the pipe of choice because it stands up to corrosive environments like the high levels of salt and minerals naturally found in this area near the Great Salt Lake," said Larry Listello, Hancor sales representative for Utah. "The overriding concern was protecting the environment by using pipe that would last the longest time possible and would not have to be dug up and replaced in just a few years because the environment ate away at it."

The parkway was built with more than 10 miles of various sizes of HDPE pipe from 18 to 60 inch diameters. Advanced Drainage Systems, Inc. ADS N-12® and Hancor BLUE SEAL® watertight pipe, fittings, tees and wyes were specified and selected. The pipe has an integral bell and spigot system and is widely used in gravity flow storm sewer systems. The products also fit the Environmental Protection Agency's (EPA) Phase II best management practices for long-term service reliability.

With a corrugated exterior and smooth interior, the HDPE pipe provides both strength and optimum hydraulic capacity. Because of its weight, pipe sections can be easily handled with minimal equipment by one or two-person crews, providing a favorable alternative to the much heavier and shorter length sections of concrete pipe. While an eight-foot section of reinforced concrete pipe can weigh a few thousand pounds, a section of HDPE pipe of the same diameter will weigh just a few hundred pounds. And because HDPE pipe has nominal 20-foot lay lengths, the number of joints are reduced, which also save labor and installation time.

Soil conditions were also a factor in the design. The Great Salt Lake has a high concentration of salt which would amplify corrosion. According to UDOT pipe specs, the HDPE pipe meets the highest classification for corrosiveness.



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- The Legacy Parkway is a 14-mile, four-lane highway that is an alternate road between Salt Lake City and Farmington that alleviates congestion in one of Utah's most heavily traveled areas now served mainly by I-15.
- The goal of the Legacy Parkway is to provide a single, continuous alternate north-south route through the North Corridor and to reduce traffic congestion and increase safety.
- The need for the Legacy Parkway is based on a projected increase in vehicle traffic. Population along the Wasatch Front in the counties of Salt Lake, Davis and Weber, is forecasted to increase by approximately 60 percent by 2020. The Legacy Parkway is expected to take some 30 percent of the traffic off nearby I-15 which, on an average day, carries more than 130,000 cars.

The designers didn't worry about the corrosive nature to the soil because the corrugated pipe from ADS meets all the criteria such as ASTM and certain AASHTO standards and for Class A, B and C materials.

Special aspects contributed to some unique design concepts such as independent horizontal and vertical alignments to minimize the impact on the wetlands and visual impact to the neighborhoods. This use was approved by the Army Corps of Engineers and the Federal Highway Administration (FHWA).

Additionally, UDOT chose to raise the pavement section to 4,217 feet, higher than the floodwater elevation of 4,212 feet, which was reached in 1983. Throughout the project, there are multiple HDPE pipe sections for equalizing the flow of the floodwaters of the Great Salt Lake.

The impact of excavation, building, construction traffic and materials were important considerations in this environmentally sensitive area. Construction crews are required to learn about environmental standards and pass a test before performing work on the project. Minimum intrusion into the sensitive areas and durability of materials were goals of the design team and contractors.

The Legacy Parkway project follows the expansion of I-15 north of Salt Lake City and the success of the 1997 I-15 South reconstruction completed just before the 2002 Winter Olympic Games. Both these other projects also used HDPE pipe. **SLDT**

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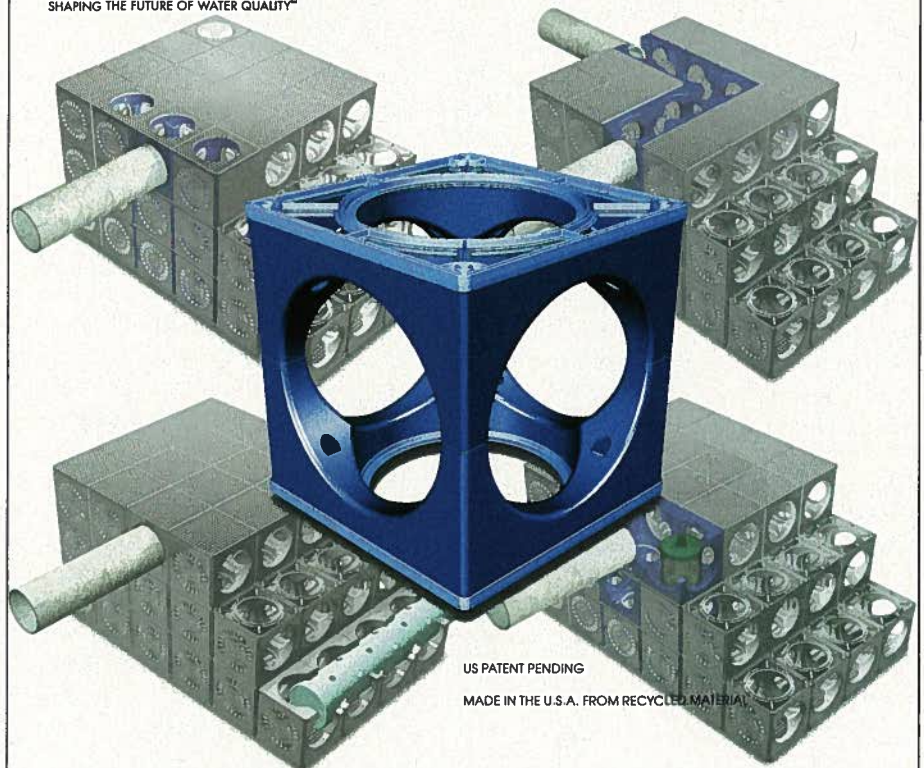
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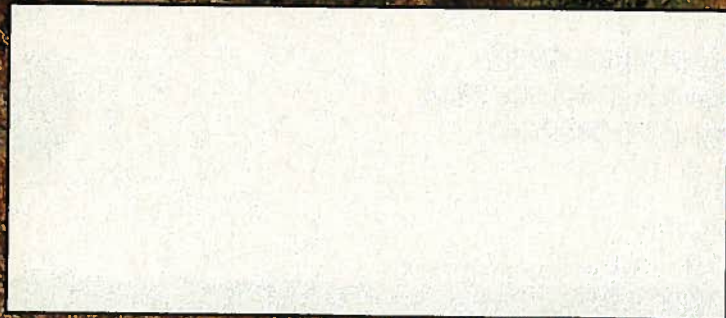
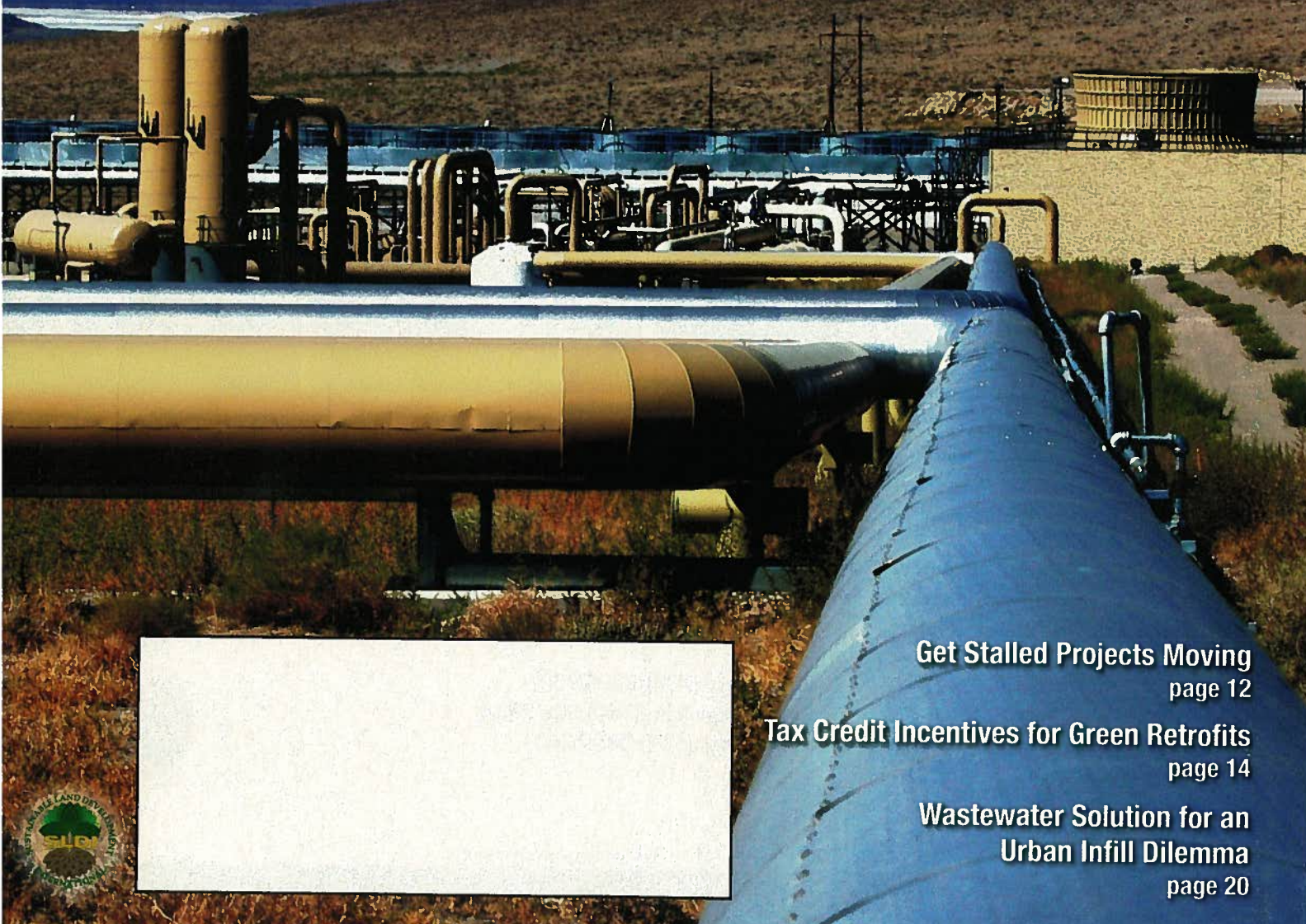
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