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CASE STUDY | Project NEON



Project NEON Hits Jackpot with Rinker Materials Mega Box

PROJECT INFORMATION

Location: Las Vegas, NV
Product(s) Used: REINFORCED CONCRETE BOX CULVERTS – U.S.

PROJECT TEAM

Owner: Nevada DOT
Engineer: Atkins
Contractor: Kiewit Infrastructure West



The Challenge

Las Vegas sits in a 600 square mile dense desert basin with only one outlet for stormwater to Lake Meade making it susceptible to flooding during heavy rain events common in the area. In addition, mountain ranges surround Las Vegas on all sides, so runoff also contributes to excessive flooding along I-15.

The Solution

The largest public works infrastructure project in Nevada history, Project NEON upgraded a 3.7- mile stretch of Interstate-15 (1-15) to improve travel efficiency and safety on the state's busiest stretch of highway. A nationally celebrated undertaking by the Nevada Department of Transportation (NDOT), Project NEON required a stormwater management conveyance system constructed of reinforced concrete pipe (RCP) and mega reinforced concrete box culverts (MRCB) with custom beveled fittings to meet the performance specifications, unique layout, geographic location, and timeline of the job. Designed by Atkins Engineering, Kiewit Infrastructure West installed nearly 10-miles of new stormwater management conveyance infrastructure using proven and resilient structural concrete components from Rinker Materials.

About 300,000 vehicles travel on I-15 between U.S. Route 95 and Sahara Avenue through the "Spaghetti Bowl" in downtown Las Vegas every day. With those numbers expected to double by 2035, 63 lane miles of new concrete and asphalt surface were paved, and 29 bridges built as part of Project NEON. To accommodate the high-volume of rainwater and mountain runoff, a system of RCP and mega box culverts was critical in the success of Project NEON.

"Las Vegas is like a large bowl with rocky soils that will not absorb water so high runoff and flash floods are frequent. The mega box culverts create huge underwater conveyance channels to help address the problem," said Steve Nilforoushan, Regional Engineer for Rinker Materials. *"Our reinforced concrete mega box culverts are ideal for preventing potential flash flooding in the Las Vegas Valley because they can move massive volumes of stormwater necessary to channel stormwater off of streets and highways."*

The Project NEON stormwater management system includes MRCB ranging from 12' x 6' to 22' x 6' and RCP from 18" to 72". The maximum flow capacity for 20 x 8 MRCB is 1,450 cfs. Installed using traditional crane and push method, the process was complicated because 46 girders had to be set including the longest precast girders in the state, measuring 168 feet long. The decision to install precast concrete produced locally rather than using cast-in-place not only helped keep the project on schedule, but also assured all components were ASTM 1577 certified including the custom beveled fittings that made S-shaped curves in the design possible. The result is a system with a peak Q capacity of 92 cfs, which is much higher than the older storm drain capacity of only around 26-30 cfs.

"It took a lot of coordination and teamwork in collaborating with the consultant and contractors to make sure things went seamlessly, but the decision to use precast concrete culverts from our Las Vegas plant definitely allowed us to keep a fast pace," said Nilforoushan. *"There was no waiting for cast-in-place concrete to cure, and as soon as our precast culverts were in place, cranes and other equipment could operate from on top them if needed. This minimized traffic closures and kept the project moving."*

Project NEON expanded the High Occupancy Vehicle (HOV) network more than 20 miles, added new north-south surface street connections reduced congestion, and accommodated regional economic development by improving access into downtown Las Vegas and Symphony Park as well as the medical and arts districts. While Project Neon was expected to be completed in four years, the design-build approach enabled each phase to be completed early and the entire project was completed within three years, despite the complexity of building new roadway and bridge structures while maintaining traffic and reducing ramp closures. Besides reducing congestion and facilitating vehicle movement, Project Neon was also intended to improve air quality by creating less idle time and vehicle exhaust. The $1 billion project was expected to reduce travel delays by 28 percent and generate $110 million in annual productivity savings.

"It's been a tremendous improvement on moving traffic flows through the center core of our community," said Cara Clarke, spokeswoman for the Las Vegas Metro Chamber of Commerce. *"It's the major freight route going through our communities. It's also a big tourism route, as well as just the day-to-day business traffic."* Project NEON earned Roads & Bridges magazine Top Road Construction Project in 2019 and the American Concrete Pipe Association 2019 Project Achievement Award.

Award-Winning
Las Vegas Infrastructure Project Designed for Flash Floods

