

Save California Streets
 Efficient and Sustainable Road Maintenance, Construction, and Reconstruction Projects
2018 Roller Compacted Concrete Project
 City of Roseville



Project Description



Conditions before



Washington Boulevard

Construction Complete
2018

Project Cost
\$7.9 Million

Project Owner
City of Roseville –
Department of Public Works
Jason Shykowski, PE, TE
Acting Public Works Director

Noah Siviglia, PE
Project Manager

Consultant Team
Bennett Engineering Services
Civil Engineering Design
Twining
Geotechnical Engineering
Unico Engineering
Surveyor

Project Description and Need

The City of Roseville's 2018 Roller Compacted Concrete (RCC) Pilot Project reconstructed more than two miles of existing asphalt pavement roadway with RCC in multiple locations. Three diverse roadways were chosen for the pilot project. Washington Boulevard is a five-lane arterial, Atkinson Street is a two-lane collector road, and Hickory Street is a small, quiet, residential street.

The three roadways rehabilitated by the project were originally constructed in the early to mid 1900s. Atkinson Street runs adjacent to the Union Pacific Railroad near the largest rail yard on the West Coast. Atkinson Street (which was originally named PFE or the Pacific Fruit Express) and Hickory Street were built in the early 1900s as the City of Roseville developed around the railroad and rail yard. Surrounded by the rich, agricultural lands of Placer County, the rail yard and Atkinson Street were used to deliver produce around the country. Washington Boulevard was part of the original Highway 65 built in the 1940s. Eventually the new Highway 65 was built and a widened Washington Boulevard was constructed piece by piece as Roseville continued to develop. This fragmented construction resulted in several different pavement conditions across the width of the road.

Potholing and roughness were a frequent complaint as area residents regularly made requests to the City to rehabilitate these roads. The streets required regular maintenance and the City repeatedly had to send crews to make repairs.



Denio's Market



Atkinson at Denio Loop



George A. Buljan Middle School



Washington at Halissy

Community Relations

The City sought to alleviate any concerns expressed by residents regarding the change from a familiar asphalt pavement to a new concrete pavement. A public meeting was held to survey the residents impacted by the project to determine if they were agreeable to having the City test the innovative pavement. There was unanimous response in favor of the project.

Rapid construction was necessary to minimize impacts to schools and businesses. Construction was phased on Washington Boulevard so that work adjacent to George A. Buljan Middle School was completed by the time school started in the fall.

The City coordinated with Denio's Market, a large community marketplace that operates on the weekends and is adjacent to Atkinson Street, to minimize construction impacts on their business and traffic flow in the area on the weekends. Sidewalks were kept open during construction for public observation and the City hosted a tour of the paving process for area public works departments.

Construction Team

Vanguard Construction Services
Bay Cities Construction
Griffin Soil Group
Cemex

Project Description



Hickory Street before RCC



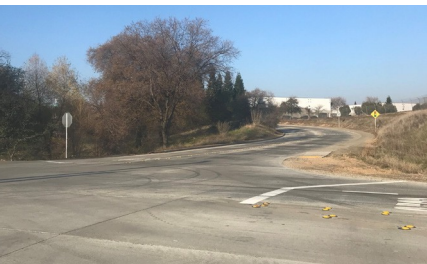
Hickory Street after



Washington Boulevard at Roseville Parkway after RCC



Denio Loop before RCC



Denio Loop after



Atkinson Street after

Challenges and Solutions

During design the largest challenge was producing a construction staging plan for Atkinson Street that would allow the roadway to accommodate the traffic for Denio's Market. Our project team coordinated with Denio's Market to determine when the road needed to be open for their customers on the weekend. Then, working with our industry partners, we were able to develop a staging plan that met the needs of the Denio's Market and the City while also being biddable and buildable. Before construction began, the team developed a concrete mix design that was able to reach the City's specification of at least 2,500 psi unconfined compressive strength within two days allowing the roads to be opened to traffic quickly.

During construction in the summer of 2018 the ambient air temperature reached 108°F during the day. A concern was that the heat might affect the curing of the concrete. Covered haul trucks, increased curing compound application rates, and paving at night were the key solutions implemented during construction to fight the heat's effect on the concrete.

Benefits of Roller Compacted Concrete Pavement

Roller Compacted Concrete (RCC) is a revolutionary pavement that blends the speed and cost savings of asphalt construction with the longevity and environmental benefits of concrete pavement. Although the upfront costs for RCC are similar to an asphalt pavement, the overall lifetime cost of RCC is less than asphalt due to reduced maintenance costs throughout the pavement's useful life. Furthermore, RCC can be ready for traffic in as little as two days versus the 10 days typically required for conventional concrete. RCC can receive cross traffic almost immediately after being paved, making it a viable option for pavement rehabilitation projects along roadways with many commercial driveways.



Atkinson Street



Hickory Street



Washington Boulevard at Halissy Drive

Increased Preservation

With a 50-year pavement life, RCC's lifecycle is more than double that of asphalt, which has only a 20-year expected life. RCC is more durable than asphalt and there is reduced maintenance throughout the life of the pavement. An asphalt pavement requires surface treatments, either crack sealing, slurry seal, or microsurfacing, approximately every seven years. With RCC, the first maintenance does not typically occur until approximately 20 years when there can be pavement smoothing and spot panel replacement.

Increased Safety

The reduced maintenance with RCC ensures that road closures for maintenance will be lessened; increasing safety for drivers and road crews that no longer need to be on the roadways as often. Concrete pavement is also lighter in color than asphalt, requiring less lighting and enabling better visibility at night.

Improved Access and Overall Quality of the Local Street and Road System

RCC is more durable for a longer period of time than asphalt pavement. It offers a similar driving experience to asphalt

An Innovative and Unique Project

RCC is a relatively new pavement in California. Only a few other streets currently exist in Northern California using this innovative and cost-effective pavement method. The City of Elk Grove incorporated approximately 2,000-feet of RCC on a local street. This project, however, was much larger; repaving approximately 2.5 miles of roadway including the first residential street and first five-lane arterial in the region.



Washington Boulevard at Roseville Parkway

Project Description



The APWA-sponsored site visit was attended by more than 75 professionals

Detailed drone footage of this innovative project can be seen on YouTube at: <https://www.youtube.com/watch?v=w1KtQwo7eIM>

Other public works departments in the region are observing the outcome of this project before proceeding on their own. A site visit sponsored by the local APWA chapter and hosted by the City drew more than 75 people from public agencies and engineering firms to observe the RCC placement on Hickory Street.

The goal of the project was to prove the viability of concrete as a pavement in Roseville and encourage developers to incorporate these longer-lasting concrete roads when developing future City infrastructure. Building RCC roadways will ultimately reduce City maintenance costs and costs to City taxpayers.

Environmental Benefits of RCC vs. Asphalt Pavement

- ▶ RCC, as a light colored pavement, reduces the heat island effect in urban settings caused by asphalt pavements heating up in the sun
- ▶ Less maintenance results in lower energy costs required for the pavement over its lifetime versus asphalt pavement
- ▶ Studies indicate there is a slight increase in miles-per-gallon while driving on a concrete road due to its rigidity, as opposed to asphalt, a more flexible pavement.
- ▶ RCC reduces the use of the oil and petroleum used in in binders and emulsions for asphalt pavements.



A Collaborative Effort

The 2018 Roller Compacted Concrete Project would not have been possible without the City's collaboration with industry experts, suppliers, design engineers, and construction contractors. The design team traveled to Kansas and Texas to visit actual sites where RCC was implemented successfully. A multi-state team from Texas, Arizona, and South Carolina collaborated to develop new standards and specifications for RCC.

All of the information on specifications, design, plans, and bid results for this project are available to other agencies.

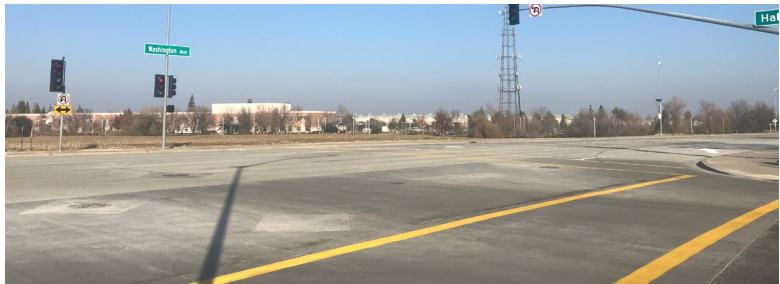
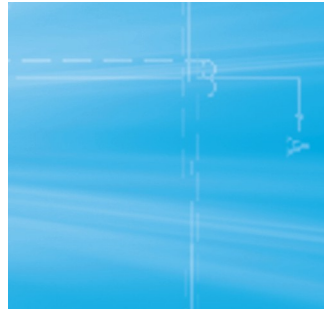
RCC and the League of California Cities (League) and the California State Association of Counties (CSAC)

RCC clearly offers cost and longevity benefits that are more favorable than asphalt. As a new and developing method for roadway rehabilitation in California, it is entirely appropriate for the League and the CSAC to promote RCC as an alternative to traditional asphalt paving.

This project, as one of the first to use this innovative technique in California, can become an example for the League and CSAC to refer to when promoting alternative pavement rehabilitation methods and developing improvements to this new technology.

The City and Bennett Engineering Services developed specifications and details for the project that are reusable and sharable.





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