BY NICK WRIGHT, EXECUTIVE EDITOR

Motor City streetcar

In a move to rejuvenate downtown, crews lay over 1,000 tons of fabricated rail through the heart of Detroit

Detroit demonstrates what happens when a city lives and dies by one industry—auto manufacturing. From its peak population of 1.8 million in the 1950s down to its bankruptcy filing in 2013, Detroit's struggle is emblematic of a region's reliance on a single economic engine. However, bright spots are dawning for the Motor City. Within the last year, this "company town" emerged from 15 months of bankruptcy, broke ground on a new hockey arena, and attendance at last month's North American International Auto Show surpassed that of the previous dozen years.

At the very center of downtown Detroit,

Photos/map: M-1 Rail

A worker polishes a flash-butt weld.

a major infrastructure project is in the works, largely unknown to people outside southeast Michigan. Crews are laying 1,324 tons of rail down the center of the iconic M-1 Woodward Avenue for a new 3.3-mi. rail system.

Officially dubbed the M-1 Rail Streetcar Project, playing off Michigan's "M" designation for state routes, the streetcar line extends northwest from Congress Street to Grand Boulevard, near the city's Amtrak station. Woodward Avenue has always been associated with Detroit's swagger, as each year tens of thousands of rumbling muscle cars roll down the road at the Woodward Dream Cruise parade (although, several miles north from the M-1 Rail construction).

For those familiar with Detroit, the M-1 Rail is

M-1 RAIL ROUTE

The newly-installed rail line extends 3.3 mi. northwest from downtown Detroit.

a different animal than the elevated People Mover, the automated monorail that makes a short loop to connect the Renaissance Center—home to General Motors Co.—with hotels, casinos and other downtown destinations. The M-1 Rail is expected to do more than cart riders through the city; developers hope it will revitalize economic activity, filling vacant storefronts along Woodward Avenue, to the tune of $3.5 billion over the next 10 years.

Underpinning the project is the two-step welding process common to any rail fabrication crew: flash-butt and thermite welding. As 2015 began, about one third of the required rail was installed on Woodward Avenue, a process that has included Michigan subcontractors, and revealed infrastructure remnants below decades of pavement.

Laying rail

Crews broke ground for M-1 Rail on July 28, 2014. The project should take about two years to complete. The 6.6 mi. of steel rail is supplied by Pittsburgh-based L.B. Foster Co., which shipped 80-ft. sections on a stretch flatbed truck. All the material, which makes up about $3 million of the total $140 million project cost, is melted and molded in the United States. The sections are unloaded at select project sites and then welded into 560-ft. sticks of continuously welded rail (CWR).

With a track excavator, crews feed those 80-ft. rail sections into a portable welding assembly line. Before the rail is moved through a flash-butt welder, workers grind the edges by hand. Flash-butt welding requires no filler metal to join the rails. Instead, the gap in between the rails creates resistance and generates the arc, which melts both ends of the rail together at temperatures as high as 1,600 F.

After the red-hot molten edges are joined, the welds are polished. One weld takes about 10 to 15 minutes. Those CWR sections are then lifted into place on the roadway. As many as seven workers partake in the welding operation. Along with contractor Stacy and Witbeck Inc., Detroit-based Farrow Group Inc. and Crystal Lake, Illinois-based Holland LP assist in joining the rail.

Because the M-1 Rail will run along each curb lane of Woodward Avenue with car traffic flowing in the center lanes, steel rail isn't the only component going into the road. Before anything is installed, old asphalt is scraped away. Approximately 400,000 lbs. of rebar will ultimately be installed in the track slab, the concrete bed of the rail. Harris Rebar, based in Stoney Creek, Ontario, has and will continue to supply No. 4, No. 6 and No. 7 rebar, and it's being installed by Ace Steel Erection Inc. of Shelbyville, Michigan. New electric and communications conduit is laid concurrently, as well as elastromeric grout pads or "rubber boots" to dampen vibration and absorb noise. Once those are anchored, the 560-ft. sticks of CWR are laid into place with a Pettibone Speed Swing, which resembles a bulldozer with a swing arm instead of a plow.

"Fortunately we've been able to forge some great strategic partnerships that have given us access to a lay-down space that we can use to store the rail," says Paul Childs, CEO of M-1 Rail. Aside from storage, simply maneuvering sections that are more than one-tenth of a mile long around downtown Detroit is not easy. Some lengths will be moved over one mile from the welding location to their final installation area along the roadway.

Contractor Stacy and Witbeck used thermite welding kits, supplied by Railtec Boutet, to join the 560-ft.-long sticks of rail after they're installed in the roadway.

Below: Illinois-based Holland LP flash-butt welded 80-ft. sections of rail into 560-ft. sticks on-site.

A worker removes molten metal following a flash-butt weld.

Alameda, California-based contractor Stacy and Witbeck Inc. uses heavy equipment to move the rail into place.

Once rail sections are in place, crews come along to perform thermite welding. This process may seem primitive but it's ideal for rail because it doesn't require crews to maneuver unwieldy equipment into tight spaces. The process relies on an exothermic chemical reaction rather than the electrical resistance of a flash-butt weld. Railtech Boutet, based in Napoleon, Ohio, is supplying the thermite welding kits to contractor Stacy and Witbeck. Tom Gilman, project manager at Stacy and Witbeck, says about 250 thermite welds total will be made.

Woodward, above and below

Like any infrastructure work, this project is not as simple as digging up pavement, installing rail and finishing the roadway. Historically, Woodward Avenue was a two-lane roadway with buildings situated well back of the sidewalk. But after the roadway was widened, some of the foundations weren't removed. The M-1 Rail crews are discovering them as they excavate, according to Childs.

"We have also discovered lots of historic abandoned utilities, which include wooden waterlines, wooden conduit duct-banks, old steam lines and many other outdated underground infrastructure items," he says.

Lastly, crews are removing hundreds of feet of old track work from the defunct Detroit streetcar system, which was an electric-based service that was replaced by buses in the 1950s. Many sections of that track are still in place, buried under layers of asphalt.

As a part of the M-1 Rail project, the Michigan Department of Transportation is rebuilding two freeway overpasses. The bridges traverse Interstates 75 and 94, and will both be rebuilt with steel girders. Additionally, MDOT wants to incorporate a rotatable traffic signal pole and mast arm. These particular signals would hang over Woodward Avenue, but can be swung out of the way when parades or other major events occur. A ball bearing system at the base of the pole lets the mast arm swing 90 degrees.

New rail legacy

In a city where the car is king, Detroit has embraced the M-1 Rail project, according to Childs. "Overall, people are excited for the promise the M-1 Rail streetcar system brings Detroit—from connectivity to jobs to business growth opportunities," Childs says. "We've also taken measures to ensure community involvement by hosting a multitude of community meetings in addition to regular outreach to businesses along the line to help mitigate construction impacts as much as possible."

Along with residents, both the philanthropic and business communities in Detroit have been supportive, coming together with local, state and federal levels to form a public-private partnership, which has helped to raise the necessary funds. M-1 Rail says this is the only public transportation project in the U.S. that uses this type of funding model. While it remains an important economic center of the Midwest, Detroit is redefining its urban core with the help of this transportation project. That key section of the city that brackets Woodward Avenue has seen its population and business activity dwindle due to the suburbanization enabled by the very automobiles around which the city once thrived. And aside from the long-term benefits the rail should bring, short-term transportation needs will be addressed. The influx of people to Detroit during the MLB All-Star Game in 2005 and Superbowl XL in 2006 inspired the need for easier ways to get around town without relying on thousands of people getting into their cars.

Detroit is by no means extricating itself from the iconic American dream machine: the automobile. However, by gutting a segment of its best-known street, bringing together public-private funds, and applying engineering and fabricating muscle, the city is showing its future flex appeal. FFJ

M-1 Rail, Detroit, www.m-1rail.com.