STRAIGHT LINES

Winter 2020

TABLE OF CONTENTS

NEW HIRES

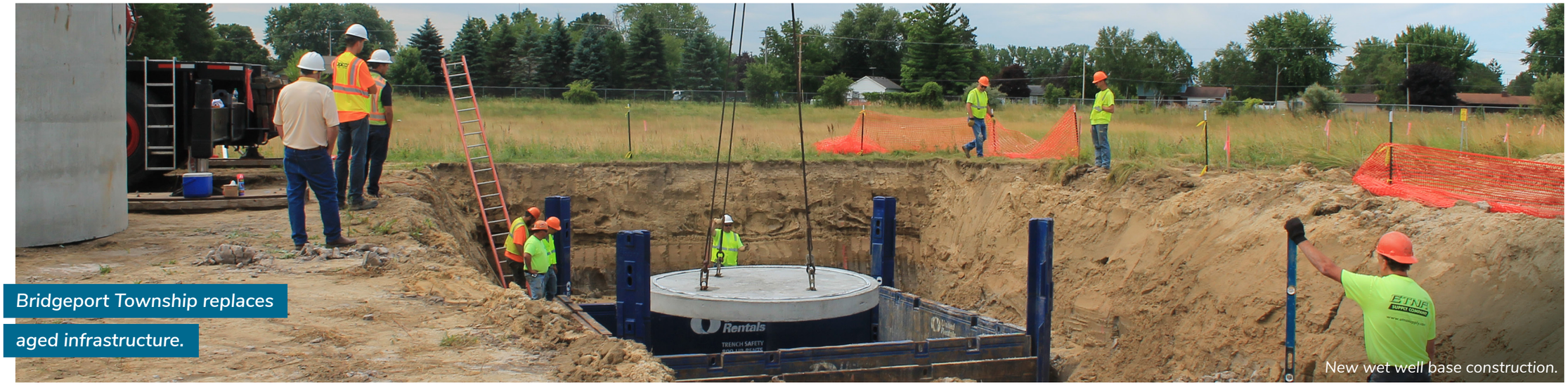
JERZY KOLANOWSKI
Jerzy was recently hired as a Design Engineer in our Saginaw Water Resources department after interning with us for three summers. He graduated with his bachelor's degree in Civil Engineering from Michigan State University.

MIA COCHRANE
Mia was recently hired as a Design Engineer in our Saginaw Planning department after interning with us for a summer. She graduated with her bachelor's degree in Civil Engineering from Michigan Technological University.

ANDREW KELLER
Andy was recently hired as a Project Manager in our Water Resources department. He has previous experience in sales, management, and as a GIS specialist. He graduated with his bachelor's degree in Geography and Environmental Studies from the University of Utah.

NEW PUMP STATION STRENGTHENS

TOWNSHIP WASTEWATER SYSTEM



Bridgeport Township replaces aged infrastructure.

New wet well base construction.

BRIDGEPORT CHARTER TOWNSHIP – The wastewater collection system in Bridgeport Charter Township consists of six pump stations, nearly 50 linear miles of gravity sewer, and a wastewater treatment plant that has an 11-million-gallon maximum per day capacity.

This past year, the Township completed an improvement project that not only replaced a decades-old confined-space-entry pump station that was located at the northwest corner of Linger Lane and Larry Tim Drive called Southfield Pump Station, but also moved the entire station nearly 600 feet from its original location.

“We’ve been working to improve the system since I took over in 2010,” Dan Billingsley, the Wastewater Treatment Plant Superintendent for Bridgeport Township said. “We have renovated the pump stations at Airport Road, Williamson Road, and King Road. This station was next on the list.”

The Southfield Pump Station was originally constructed in 1961. It had an eight-foot diameter underground metal drywell pump station that was equipped with duplex two-speed pumps, a six-foot diameter concrete wet well, and an adjacent valve vault. The station also had dual force mains, which were manually selected for use when the pumps were turned from low speed to high speed and back again.

Billingsley said to keep up with the different wet weather flow scenarios, his staff would have to manually change the pump speed at the station and insert a relay to shift pump speeds automatically from high to low to keep customers from flooding. The process was inefficient and not ideal.

The underground metal drywell required potentially hazardous confined-space-entry, and the wet well was undersized for the flow the pump station received. In addition, the pump station’s pumps, valves, and controls were nearing the end of their useful life and needed replacement. New controls that would bring the station in conformance with today’s standards would not fit in the existing drywell.

“The station was located at an intersection right behind the curb, which is a very tight area for access and maintenance,” Jennifer Garza, P.E., the Project Manager for Spicer Group, said. “The drywell entrance tube used to climb down was in the grass between the curb and the sidewalk, and the wet well lid was located in the roadway. To install new controls, the panel would have to be installed outside of the station, but we couldn’t do that in this location without protecting it from traffic, and the road commission does not allow bollards in the road right-of-way.”

Placement of gasket fitting on wet well section.

> **“Everything at this station is new, beautiful, more efficient, and more reliable for the Township.”**

“So, you’re in a difficult situation,” Garza said. “All around, for many reasons, it needed to be totally relocated.”

Spicer Group has been working with Bridgeport Charter Township consistently throughout the years to improve their wastewater treatment system. The Southfield Pump Station was the most recent improvement project Spicer Group has helped the Township complete.

To conform with all the regulatory agencies’ standards and provide a safer, more reliable, and more efficient pump station for the Township, Garza said the solution was to build a brand new station less than two blocks away from the original station on a Township-owned parcel of land used for stormwater retention.

Spicer Group’s team designed a new submersible pump station for the Township that includes two new Flygt integral VFD “smart” pumps that have the ability to vary their speed automatically based on a level sensor, a 10-foot diameter wet well, a valve vault with a bypass connection, pressure transmitter, and flow meter, a new stainless steel control cabinet, and a new dedicated HDPE force main. The station is also equipped with an on-site natural gas emergency generator, so Township staff no longer have to bring in a portable generator during power outages.

Completed Southfield Pump Station.

“Everything at this station is new, beautiful, more efficient, and more reliable for the Township,” Garza said.

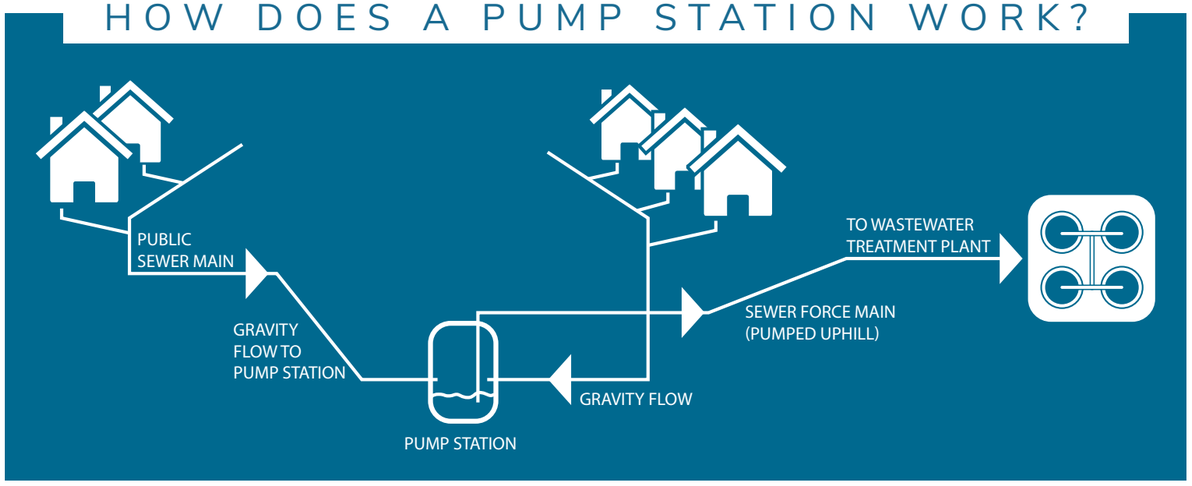
The project also included extending the gravity sewer lines down Larry Tim Drive to bring the gravity flow to the new pump station.

The general contractor on the project was Rohde Brothers Excavating, a construction company based in Saginaw. To install the gravity sewer to the pump station and the wastewater system, “they basically had to thread a needle through a complicated area between the back of curb and right-of-way line with existing utilities located in the front of residents’ properties,” Garza said.

“Any one severe rain event could have really messed us up – but mother nature was kind to us,” Billingsley said. “This project is really going to benefit the residents that are on that portion of the system and prevent any potential backups. As tough of a job as this was it came together pretty damn good.”

Newly installed wet well that is ready for backfill.

HOW DOES A PUMP STATION WORK?



MICHIGAN BRIDGE INSPECTIONS

Driving over bridges is as routine as getting in your car and driving to the store. Everywhere we drive there are bridges providing easy access over areas that would otherwise cause us to reroute and make our commutes to wherever we are going a hassle.

However, like any other man-made structure, bridges are subject to the constant stresses of traffic, weight, and weather. While working hard to safely support our daily lives, they are constantly fighting the war on age. Unfortunately, it took an event like the fatal bridge collapse over the Silver River in Ohio in the 1960s to remind us that bridges are susceptible to failure.

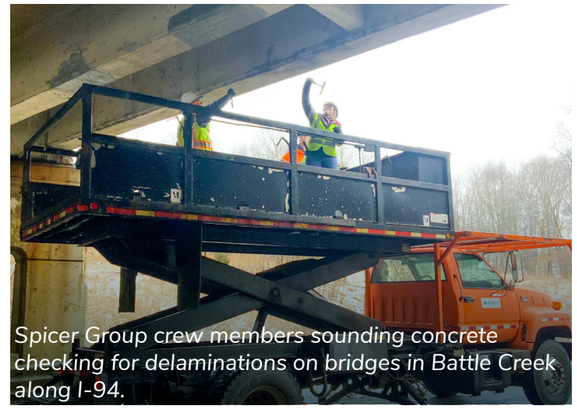
As a result of this failure, which caused 46 deaths, Congress established the Highway Act of 1968 which led to the establishment of the National Bridge Inspection Standards (NBIS). This federal law requires all bridges with a span of at least 20 feet to be routinely inspected at a maximum of 24 months. Since the inception of the bridge safety inspection program there have been a number of improvements and requirements added to the program, except they were after more failures of structures that caused fatalities.

“In 1986, the requirement to identify non-redundant steel bridges and perform hands-on inspections was implemented as a result of a fracture-critical steel girder failure that killed three people,” Rich Kathrens, P.E., Spicer Group Structural Project Manager said. “In 1987 ten people were fatally injured during an extreme flood event causing erosion (scour) along the bridge supports resulting in a bridge collapse.”

Again, the NBIS was enhanced to provide additional inspection requirements for bridges over water. And one of the more recent events to impact the bridge safety program was the sudden Minnesota bridge collapse in August of 2007 killing 13 and injuring 145 people.

“After this collapse, Congress required the Federal Highway Administration (FHWA) to significantly enhance their oversight responsibilities to ensure all States are completing the requirements of the NBIS and ensuring the safety of the traveling public,” Kathrens said. “FHWA has implemented a data-driven and in-depth review for every NBIS requirement as part of their annual review process, and this process is consistent with every State’s Bridge Inspection program across the nation.”

Steel Inspection with access provided by MDOT’s Reachall Crew.


Spicer Group crew members sounding concrete checking for delaminations on bridges in Battle Creek along I-94.

INSPECTION REPORTS

Project team members complete all required Inspection Reports applicable to each bridge. These inspection reports include:

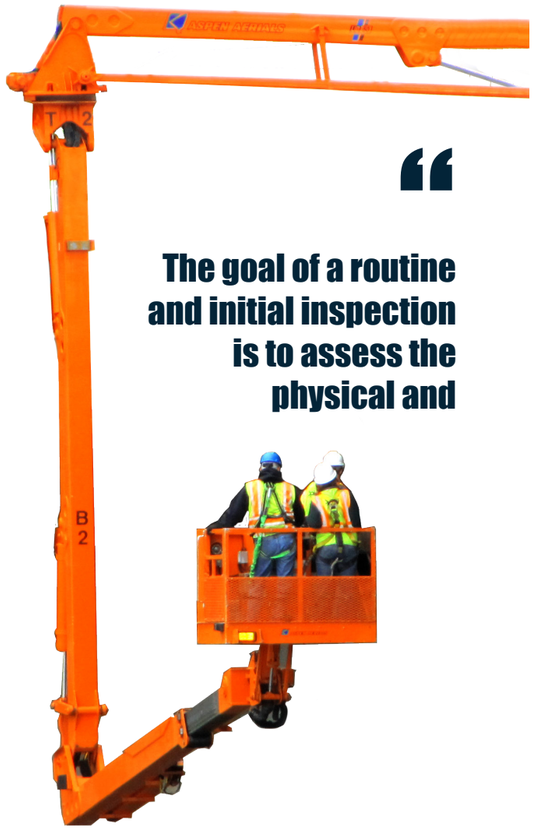
- Bridge Safety Inspection Report (BSIR)
- Structure Inventory and Appraisal Report (SI&A)
- Observations
- Work Recommendations
- Digital Photographs
- Electronic submittal of reports

In Michigan, there are 11,000-plus bridges that carry traffic and span greater than 20 feet. Generally, 60 percent of these bridges are locally owned and maintained, and the remaining 40 percent are owned by the Michigan Department of Transportation (MDOT). Any bridge falling into this category is required by Federal law to be inspected every two years.

Spicer Group's structural engineers have been conducting bridge inspections to determine the structural integrity of bridges for decades. Safety inspections are simply an assessment of a bridge's condition. The most common means of evaluating a bridge for safety is the completion of a routine inspection. A routine inspection as defined is "*regularly scheduled inspection consisting of observations and/or measurements needed to determine the physical and functional condition of the bridge, to identify any changes from initial or previously recorded conditions, and to ensure that the structure continues to satisfy present service requirements.*" A routine inspection is typically a visual inspection, and the first inspection is typically called the initial inspection and establishes a baseline for the structural conditions.

"The goal of a routine and initial inspection is to assess the physical and functional condition of a bridge, Kathrens says. "This inspection consists of rating the three major structural components of a bridge such as the deck, superstructure (girders), and substructures (piers and abutments)."

According to Kathrens, there are several safety and functional elements that are evaluated during the inspection and some of those include approaches, bridge railing, waterway characteristics, slope and channel protection and clearance requirements. The overall bridge's condition is determined by National Bridge Inventory (NBI) ratings using a 0–9 scale.



"The goal of a routine and initial inspection is to assess the physical and functional condition of a bridge."

Bridge inspection requires all types of access, including waders, boats, and sometimes divers are necessary to perform underwater inspections.

Inspectors measure differential settlement at bridge approach railing.

The conditions encountered during a routine visual inspection may require additional investigation to determine the overall severity and quantity of the defects. An in-depth inspection is used to identify deficiencies to enhance the quality of the data collected during a routine inspection. Typically, routine inspections have little impact to the traveling public. However, when there are indications of deterioration located during the routine inspection, a detailed inspection will be recommended which can typically result in specialized access equipment and traffic control to allow the inspector access to complete the in-depth inspection. Should a bridge suffer from damage such as a high-load hit or an environmental cause such as a flood, an emergency inspection can be performed.

Generally, routine inspections of concrete, steel, and timber members include limited cleaning to determine the extent of the defects such as section loss, cracking, or timber rot. For structures crossing waterways, data is collected to evaluate the stability of the channel and this includes stream bed cross sections and completing scour inspections using waders, boats and probing along the foundations. In-depth inspections include more intense cleaning, and hands-on inspection of the members to accurately quantify the extent of the defects. Section loss for steel members include the use of a ultrasonic thickness gauge to determine the amount of steel remaining. Potential cracks are evaluated using dye penetrate or mag particles for verification and to determine the crack limits.

The information collected during all types of inspections are recorded electronically in the field and judgment rendered as to the need for additional investigation such as a structural analysis of the given structure as a result of observed deficiencies. In some cases, the defects encountered result in temporary or permanent load restrictions for safe operation of the structure.

It's important to note that Spicer Group is also using the latest in surveying technology to support bridge inspections especially those crossing relatively deep fast moving waterways.

"In addition to regular use of 3D river bottom scanning using multi-beam sonar, Spicer Group's fleet of drones are beginning to be used to capture high-resolution imagery of hard-to-access bridge components, that otherwise would not be able to be inspected," Eric Barden, P.S., Spicer Group's Director of Survey and Geospatial Services said. "Bridge Safety Inspections play a critical role in ensuring the safety of the traveling public and in collecting accurate data for bridge owners to manage their structures."

LOAD RATINGS

Spicer Group's structural engineers are also experienced at completing load ratings. Depending on the project, load ratings are typically performed for the following reasons:

01

Identified deficiencies or changes from previous load rating assumptions in the calculations.

02

Current FHWA (QA/QC) requirement for the owner to have a copy of all load ratings in their files.

03

Future/Anticipated requirement to have bridges re-rated using the new 28 truck load factor method.

NEW FIRE STATION UNDER CONSTRUCTION IN JEROME TOWNSHIP

New 11,000-square-foot facility will provide more room to meet fire department's current and future needs.

JEROME TOWNSHIP – In early January of this year, construction crews began clearing the parcel of land located at 680 West Saginaw Road in Jerome Township to make way for a brand new 11,000-square-foot fire station.

The new site is less than half a mile from the fire department's current main fire station, which is located along Irish Street and was built in 1974. This fire station has served the department for more than 45 years, but the municipality has recognized the need for a larger, more efficient station to better serve the needs of the community.

"The current station we have is in need of costly repairs," Jerry Cole, a firefighter for the Jerome Township Volunteer Fire Department, said. "Plus, so much has changed in the fire service since 1974. Our biggest engine was 25 feet long then. Today, our biggest engine is 43 feet long. We've just outgrown the building."

The department's existing fire station has no form of vehicle exhaust ventilation and does not have any facilities to decontaminate the firefighters' turn-out gear, both of which are safety concerns for the firefighters. The station also lacks dedicated showering facilities for women, it only has a small bathroom.

Additionally, the firefighters have no room inside the current station to perform truck checks or replace hoses and equipment on trucks after an emergency run. All those tasks must be completed outside the facility regardless of the time of day or weather, which can present unsafe working conditions, Cole said.

Jerome Township encompasses 35.6-square-miles in Midland County near Sanford Lake and is home to more than 4,700 people. On any given day, the 21-member volunteer fire department can respond to fire or rescue emergencies that involve structure fires, medical emergencies, vehicle extractions, wellness checks, or mutual aid calls to 10 surrounding communities.

In 2018, the department ran 488 fire and rescue calls throughout the year. In 2019, that number increased to 525 calls, and Cole said the department expects to see the number of calls continue to increase in the future.

"We want to build a replacement for our current fire station that our entire community can be proud of," Cole said. "We want it to meet our current and future needs of the department and the Township in the most cost-effective manner."

In 2017 Spicer Group was hired by the Township to design the new fire station for the department. The parcel of land had already been purchased by the Township years ago in anticipation of this project.

Spicer Group's team of architects went through the department's program of needs and their wish list before developing the schematic design and plans for the new station.

"The new design allows the firefighters to drive around the building and pull thru into the apparatus bays, where before they had to back everything in. They are now also able to stack equipment in the bays, two-pieces-of-equipment deep. There are now four apparatus bays, instead of three." Dave Marr, the Project Manager for Spicer Group, said.

Aerial view of new site.

The new building will have a generator that will maintain the whole building during a power outage, decontamination areas, dedicated storage areas for air tanks and masks, hose dryers and hose storage areas, a men's locker room, a women's locker room, a dispatch room, offices, and a meeting room that is double the size of their previous meeting area.

The building also has radiant floor heating in the apparatus bays to allow snow and ice to easily melt off trucks and equipment.

"The doors of the apparatus bays will also have a lot of glass so when you drive by, you can look in and see the firetrucks," Marr said. "It will also bring daylight into the space."

David Boersma, AIA, a Senior Project Architect with Spicer Group, said the team also designed screening for the building around the edges of the property to help keep noise and light from going into the homes of the surrounding residents. Low-profile sight lighting was also added to minimize light pollution on the property.

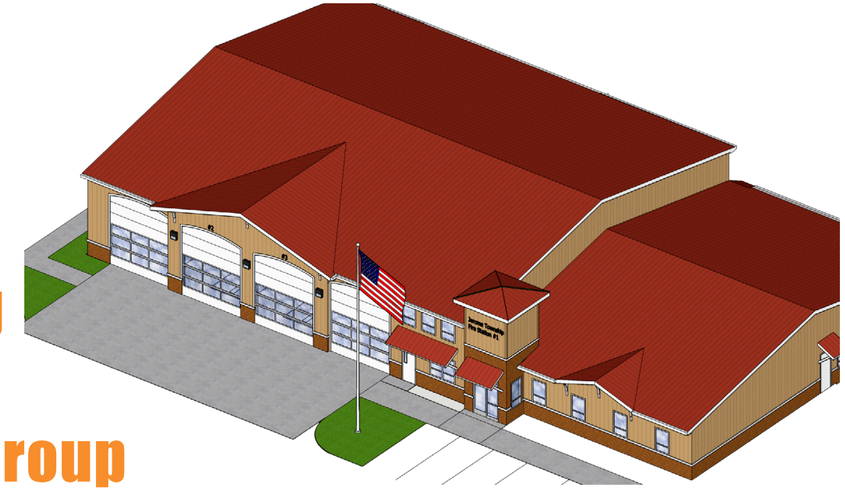
Stormwater, septic system, and drinking water designs were also developed for the property by Spicer.

Three Rivers Corporation, a construction company based in Midland, is the general contractor on the project. Boersma said that building construction is scheduled to begin once the weather clears up.

"We have started putting together a strategy for relocating to the new station, planning everything from how we move the vehicles and equipment over, right down to what goes with us and what goes in the dumpster," Cole said. "Working with Spicer Group has been a very positive experience. The guidance they have offered has been very important and we are very excited to see construction begin on our new station."

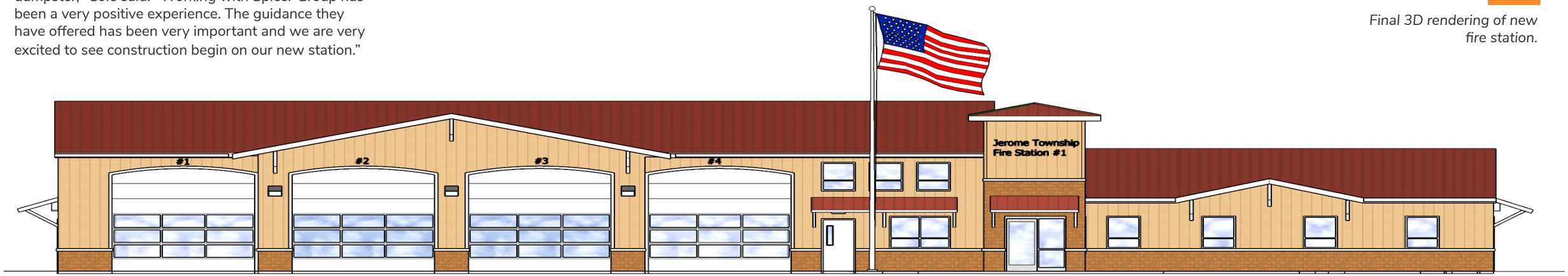
Original/existing fire station.

New site cleared and ready for construction.



"Working with Spicer Group has been a very positive experience. The guidance they have offered has been very important and we are very excited to see construction begin on our new station."

Final 3D rendering of new fire station.



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