

(Photos: San Francisco 49ers)



Above: Start of concrete works for the stadium foundations.

Left: Artist's illustration of the completed Santa Clara Stadium.

Foundations are 'first down' for new 49ers stadium

In April, a ground-breaking ceremony took place in Santa Clara, California to mark the start of construction on a new stadium for the San Francisco 49ers.

CEI report

Located adjacent to California's Great America theme park and across from the 49ers current Santa Clara headquarters, the 1.85 million ft² (17 hectare) facility expects to host 68,500 at capacity on game days, with the potential to expand to up to 75,000.

The new Santa Clara Stadium is estimated to cost US\$1.2 billion. It will be designed with multi-purpose flexibility to host a range of events including, domestic and international soccer, college football, motocross, concerts and various civic events, and is expandable for major events such as the Super Bowl. The main, joint venture contractor is Turner/Devcon Construction.

Central Concrete, a US Concrete Company, has been selected to supply its high-performance, lower-carbon concrete. At 7am on 21 May, Central Concrete delivered the first concrete, kicking off another milestone in the stadium's development. Berkel Construction, the foundation contractor for the project, will take delivery of 500yd³ (380m³) of concrete per day with a projected production of approximately 120 piles per day.

Conco Cement, the concrete contractor for the stadium project, will soon start with construction of the pile caps.

Currently, concretes for pile caps, foundations, slabs, beams, and columns are being submitted to the structural engineer for review. All mixes are designed to meet the rigid requirements of the design team and satisfy the accelerated time sched-

ule of the owners, all the while using US Concrete's EF Technology (a process that uses PC-alternative cementitious materials) to deliver the highest sustainable concrete possible.

Central will be supplying an estimated 80,000yd³ (61,000m³) of lower-carbon concrete for the auger cast piles and the overall stadium structure. The mixes selected are expected to reduce the overall carbon footprint by 23 million pounds (9600 tonnes) of CO₂.

"As anyone who has ever seen a football stadium can attest, concrete is a significant material in building," says Gary Filizetti, president of Devcon Construction. "For that reason, it was important for us to select a supplier with demonstrated success in large-scale, high-performing concrete projects."

"We're literally laying the foundation," says project executive Jack Hill, as trucks from the Central Concrete Supply Company began to deliver 12-yard (9m³) loads of fluid grout every ten to 15 minutes for the first 3000 piles to be drilled at the stadium project site. If laid end to end, the piles would stretch more than 31 miles, almost identical to the direct distance between the new stadium and Candlestick Park.

In order for the piles to be solidified, five high-torque rigs from Berkel drilled on average about 55ft (17m) below the ground to make the piles that were then filled over a 25-day period.

"It's been a great team effort," says Hill.

"In the last month, we worked 24/7. The first 30 days, we spent getting all the utilities in and prepared for this day."

By using an innovative process called auger pressure grouted displacement (APGD), Tom Albanese of Central Concrete Supply believes the project is well intentioned to fall in line with environmentally friendly construction. The auger, which can drill up to 75ft (23m) into the ground, removes penetrated earth and replaces it with fluid grout, which is pumped down the hollow auger system.

Auger cast piles have unique requirements in that the grout must remain fluid for up to three hours while the pile is drilled and then pumped 60–70ft (18–21m) through a small-diameter hose, ultimately gaining 5000psi (35MPa) in 28 days.

"This is a more efficient way and more structurally sound way," explains Albanese. "It's environmentally friendly. It achieves the early strength they need. It's a tremendous use of a recyclable product and as a reduction of our cement. It has to be timed just perfectly: where they drill the hole, the reinforcement cage goes in and they have to fill it immediately," Albanese adds. "It takes roughly 4yd³ (3m³) per hole."

Taking shape

Hill says the project will begin to take greater shape to the untrained eye in August. "We've moved over 40,000yd³ (30,500m³) of dirt and 30 miles of pipe, there's been so much work that's been done that people can't appreciate it because you can't see it," he adds.

"We welcome the 49ers to the South Bay and are proud to be a part of this landmark project," says Albanese.

Central will be featuring 49er graphics on its trucks, demonstrating its support and enthusiasm for the team's football legacy.

During construction, the 49ers will continue to host games at Candlestick Park in San Francisco – the team's home for the past 43 years – for two more seasons. ■