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The Silicon Valley Wire

The latest news from the electrical industry in Silicon Valley 1st Quarter 2015

Photography By Scott Portzline

49ers Fans Love The New High-Tech Levi's Stadium, Wired By Cupertino Electric

Cupertino Electric, electrical contractor for the Levi's Stadium, opened is doors for the San Francisco 49ers' first regular season game on September 14, 2014.

For Cupertino Electric, Inc., one of the nation's largest and most skilled electrical contractors, wiring the San Francisco 49ers' new home, Levi's® Stadium, was a once-in-a-lifetime opportunity.

Photography By Cupertino Electric, Inc.

Cupertino Electric coordinated the logistics of incoming items for the wiring at Levi's Stadium.

Acting in a design-build capacity, Cupertino Electric, Inc. (CEI) fast-tracked the electrical construction for the complex, 1.85 million square foot project in 18 months, bringing it in on time and on budget.

(View drawing of CEI's work at Levi's Stadium on pages 4-5)

At the peak of construction, CEI employed 260 electricians and 60 technicians, all from IBEW Local 332 in San Jose. Turner Construction Company and Devcon Construction Inc. served as the general contractor in a joint venture. The architect was HNTB Corporation.

CEI wired many interrelated projects at the stadium, building out the massive electrical infrastructure and installing a 375 Kilowatt (kW) solar energy system. (Levi's Stadium is LEED Gold Certified.)

CEI built complex teledata; wireless and distributed antenna systems (DAS); designed the stadium's sports field lighting and club lighting; installed the power distribution and control system; and installed a state-of-the-art fire alarm system. The various systems serve many different areas within the stadium. In addition to over 68,000 seats, the stadium contains 400,000 square-feet of meeting space, an interactive museum, concession areas that can feed 70,000 people, hotel-quality luxury suites, sophisticated broadcast studios and a team store.

The mammoth sports venue has enough wire to link San Francisco to Los Angeles, is lit by 16,000 luminaires and contains enough wireless access points to support 70,000+ fans logging on simultaneously to their mobile device during a game.

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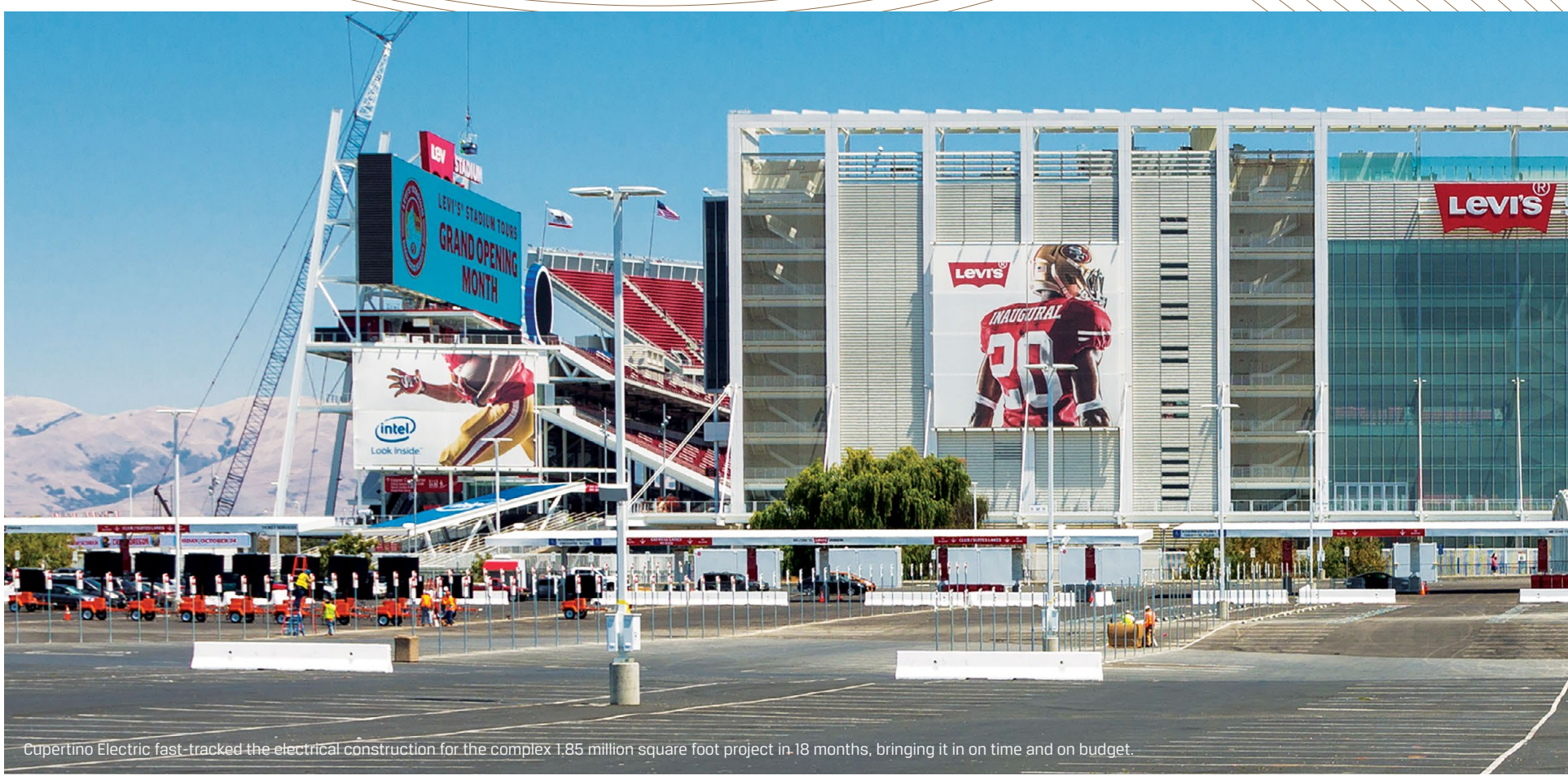


Cupertino Electric fast-tracked the electrical construction for the complex 1.85 million square foot project in 18 months, bringing it in on time and on budget.

The state-of-the-art wireless system has 1,250 wireless access points, a distributed antenna system (DAS), 600 antennas and 400 amplifiers to boost coverage for the major telecommunications carriers.

Photography By Nick Gerles

Cupertino Elecrtric installed solar panels on three 'energy bridges' and on the green roof.

The wireless system offers fans the ability to watch videos and high-definition replays only seconds after a play via the Levi's® Stadium mobile app. Through the app, fans from any seat in the stadium can order food, drinks and merchandise, which can be hand-delivered by stadium staff. Fans can also utilize the stadium app to purchase or transfer tickets and parking passes, and find the nearest concession stand or bathroom.

State-Of-The-Art

Under the supervision of Low Voltage Project Manager Dave Dorcak, CEI also installed Zebra Technologies' real-time location system (RTLS), an innovative technology that tracks players and officials, providing location-based data known as "NextGen Stats" to fans. The NextGen statistical system operates through sensors placed in players' shoulder pads that send signals to receivers CEI installed in the stadium. Signals are then routed to a software program, allowing coaches, players and the NFL to access precise player tracking of distance and speed, says Dorcak.

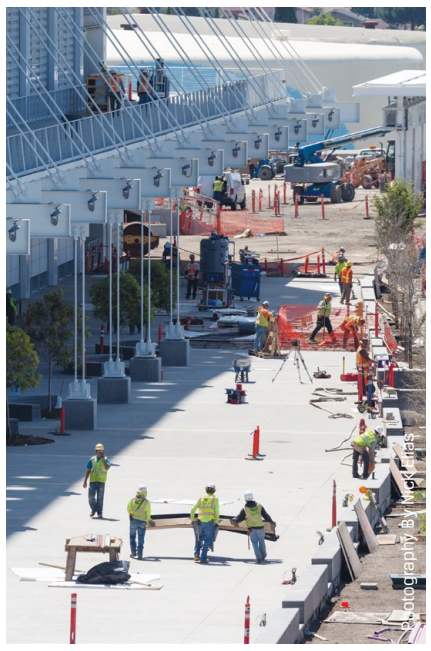
Working with a system designed by NRG Energy, Inc. and Sunora™ Energy Solutions, LLC, CEI installed the stadium's 375 kW solar panel system, comprised of more than 1,150 solar panels which sit on the solar terrace of the Levi's Stadium green roof and on three 'energy bridges' serving as the main entry and exit avenues to the stadium. The system generates enough electricity over the course of a year to offset the power consumed during 49ers home games.

"It's not every day you get to work on an NFL stadium," said Jim Medefesser, Cupertino Electric project executive for Levi's Stadium. Dave Dorcak, the low-voltage project manager, added "They wanted a contractor that could handle the schedule, the manpower and the technical aspects. We had the horsepower, with the ability to design/engineer and to do a fast-track schedule."

CEI was awarded the stadium project through a competitive bid and began working on the electrical design in February 2012. As a design-build contractor, CEI's engineers mapped out the entire electrical project before it got started. They used building information modeling (BIM) to foresee any electrical problems before they occurred. Four CEI engineering staff members worked to input electrical drawings into a BIM system, while in-house engineering and BIM teams oversaw and completed the stadium's electrical design two months ahead of schedule and within the construction budget.

Breaking Ground

CEI began working on the underground wiring at the stadium shortly after the approval of the design. Because of the fast-track time schedule, CEI's real-time engineering/construction approach was fundamental to the success of the project. CEI designers put concepts for the stadium to paper as those designs were being vetted by the architect. A specially tailored process for issuing updated sketches to the field allowed the CEI engineering team to transmit over 3,000 recordable changes quickly.



Photography By Nick Gerles

At the peak of construction Cupertino Electric employed 270 electricians and 60 technicians, all from IBEW Local 332 in San Jose.

CUPERTINO ELECTRIC TEAM LIST:

LEVI'S STADIUM

SERVICES:
Electrical, Data Communications, Wireless, DAS, Fire Alarm, Solar Electric, LED Lighting

OWNER:
The Stadium Authority of the City of Santa Clara

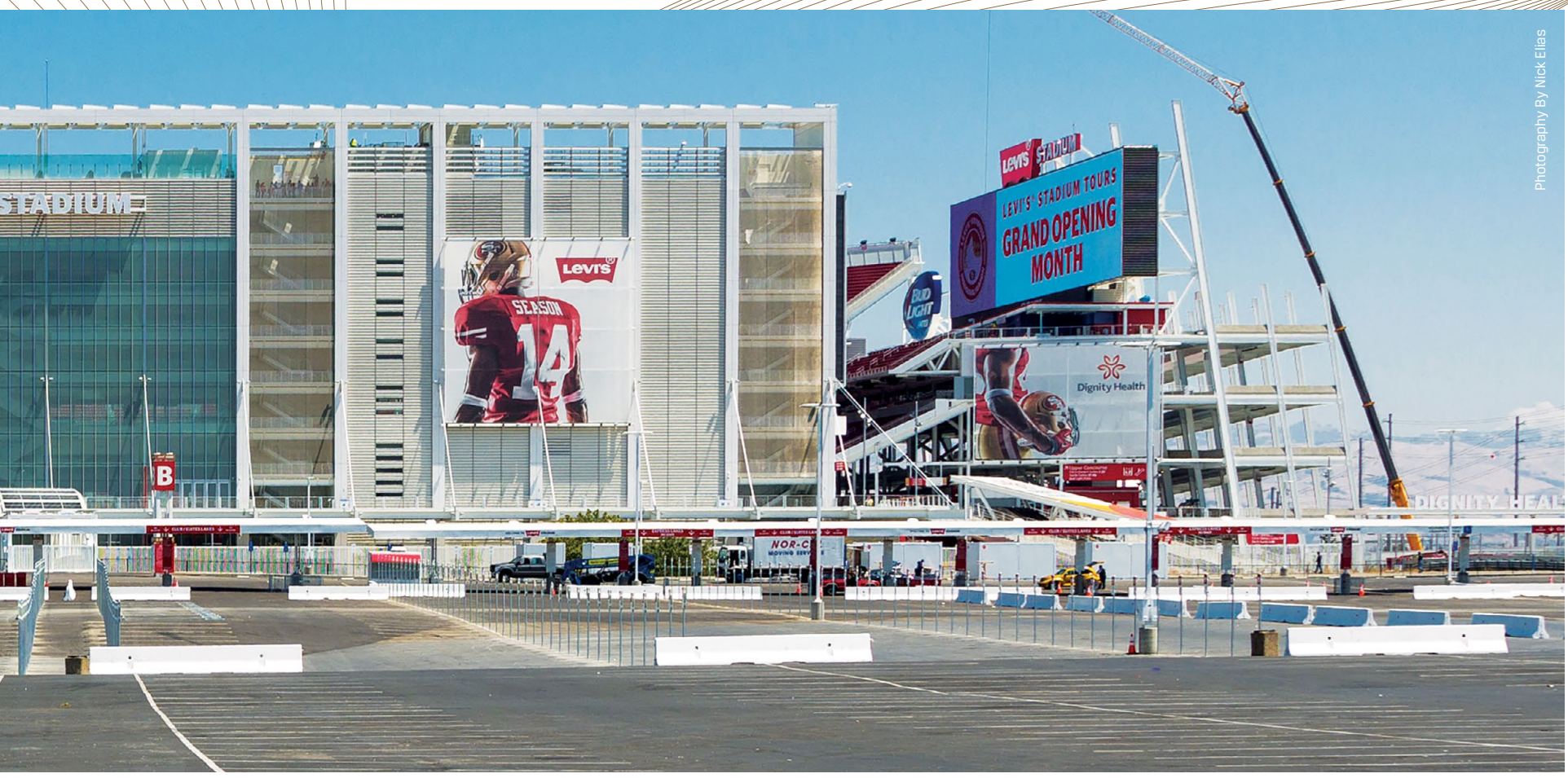
OWNER'S REPRESENTATIVE:
Jack Hill

ARCHITECT:
HNTB Corporation, Kansas City, MO

GENERAL CONTRACTOR:
A joint venture of Turner Construction Company, New York and Devcon Construction, Milpitas, CA
Jonathan Harvey and Kesor Kim from Turner Devcon JV

ELECTRICAL CONTRACTOR:
Cupertino Electric, San Jose, CA

mmunity Icon: Levi's Stadium



Photography By Nick Elias

"If there were any changes, then our foremen were notified instantly and they could access the latest drawings instantly on their iPads," said Medefesser.

Looking Forward

CEI designed and built the entire electrical infrastructure for the stadium. The main service consists of two 12 Kilovolt (kV) feeders, rated at 12 megawatt (MW) each that have an automatic transfer contingency in the event that one feeder goes down. Each circuit can handle the facility's load on its own.

CEI installed four 3,333 Kilovolt-amp (kVA) doubled-sided substations in geographical quadrants of the stadium, with eight 4,000 amp and 480 volt switchboards. There are also two 500 kVA scoreboard substations and one 865 kVA substation for the DAS and communications. In addition, CEI installed a 1,330 kVA substation, with a 4,000 amp and 208 volt switchboard for show power and broadcast trucks, and one 200 kVA substation for the fire pump.

CEI also installed the structured cabling network, with network backbone cabling, built-out over 50 communications rooms throughout the stadium and also cabled the main server room. They also installed wiring for 2,400

Photography By Cupertino Electric, Inc.

Cupertino Electric worked with both NRG Energy and Sunwa Solar to install a 375 kW solar panel system.

Photography By Cupertino Electric, Inc.

A 'Hard Hat Hall Of Fame' features those that were worn by Cupertino Electric and other contractors who helped build Levi's Stadium.

internet protocol televisions (IPTV). Working with ICS-Integration, CEI installed and commissioned a state-of-the-art fire system.
(See story on page 6)

Lighting The Future

CEI wired the stadium's sports lighting and suite lighting systems. 80% of the 16,000 luminaires feature LED technology, chosen for its performance, long life and reduced warm-up time. Through a central lighting control system with a graphical display, stadium staff can easily and conveniently illuminate only certain areas of the stadium for special events.

Project executive Jim Medefesser said there's something special about working on a project that will be a community icon for decades. "Every member of our team is just so proud to have worked on this job," he said.

For more information about Cupertino Electric, or its work on the stadium, contact Autumn Casadonte at Autumn_Casadonte@CEI.com or call 408.808.8034.

CUPERTINO ELECTRIC, INC. EXECUTIVE TEAM:

Project Executive:
Jim Medefesser

Engineering:
Don Boresch, P.E.

Senior Project Manager:
Mark Montana

Project Managers:
Matt Sims; Jeff Lanpher

Low Voltage Project Manager:
Dave Dorcak

BIM:
Damien Dudley

Field Staff:
Brian Copland; Dave Coffaro; Kyle Hirayama; Tom Stone; Jason Buchanon

Over 300 electricians and technicians from IBEW Local 332, San Jose

FIRE SYSTEMS CONTRACTOR:
ICS-Integration

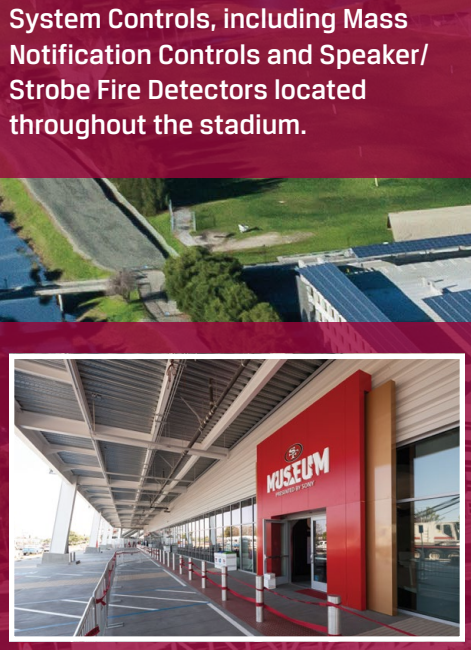
Services:
Design and engineering, materials, permitting, programming and commissioning

Project Executive:
Amir Mohammadian

SOLAR SYSTEMS VENDORS:
NRG Energy and Sunora™ Energy Solutions

Wiring 1.85 Million Square Feet At The San Francisco 49ers, Is A Multi

Wiring for state-of-the-art Fire Alarm System Controls, including Mass Notification Controls and Speaker/ Strobe Fire Detectors located throughout the stadium.



Wiring for Hall of Fame and Museum, Team Store, Box Office and Broadcast Studios

Wiring of 1,150 solar panels located across Solar Terrace on Green Roof (174kW) and three 'Energy Bridges' (210 kW)

Wiring for scoreboard and two 500 kVA scoreboard substations

Wiring 52 communication closets and main server room

Power Distribution and Control Systems for lighting

Cabling for Internet Protocol Television system including 2,400 IPTV's

Wiring for luxury suites, meeting spaces, food facilities and restaurants

Receivers for NextGe player tracki statistica system

Wiring of four 3,333 k doubled-sid substations lo geographical quadrant o stadium

Levi's Stadium, The New Home Of -Faceted Job For Cupertino Electric

Wiring of the state-of-the-art wireless system, which has 1,250 wireless access points, and distributed antenna system (DAS), which has 600 antennas and 400 amplifiers to boost coverage for the major telecommunications carriers

Network backbone cabling, structured cabling systems and raceway for all low-voltage systems

Lighting system controls 16,000 Luminaries (80% LED lights) for club and field lighting

Cabling for Security Camera System

FAST FACTS ABOUT LEVI'S STADIUM WIRING:

- More than 2.5 million linear feet of Cat 6A cable
- 450 miles of conduit
- 1700 miles of conductor
- 16,000 luminaries
- 13,000 circuit breakers
- 1,250 wireless access points
- 600 DAS antennas
- 52 telecom rooms
- Full server room/data center on site
- 2400 Internet Protocol Televisions
- 174 kW rooftop solar system
- 210 kW solar system installed on pedestrian bridges

Wiring for stadium's main service including two 12 kV feeders each rated at 12 megawatts (MW), distribution circuits for main feeders

Emergency Power Systems

One 1330 kVA substation for Show Power and Broadcast trucks

Aerial Photography By Hawkeye Photography
Inset Photography By Nick Elias, Scott Porter, and Cupertino Electric, Inc.

ICS-Integration Designs Fire/Life Safety System At Levi's Stadium

Photography By Nick Elias

ICS-Integration's Fire Systems Group designed the state-of-the-art fire life safety system at Levi's Stadium.

How do you design a fire alarm and live voice evacuation system for a massive 1.8 million square-foot facility like Levi's® Stadium? How difficult is it to obtain the necessary permits and approvals? And how do you develop an evacuation plan for a large stadium and its many public spaces?

ICS-Integration and its Fire Systems Group faced all of these challenges and more when they designed the fire alarm system for Levi's Stadium. The system includes fire alarm, voice evacuation, and smoke control. ICS supplied engineering, materials, permitting, programming, and commissioning, while Cupertino Electric installed the system.

ICS-Integration Senior Project Executive Amir Mohammadian, a veteran of fire system design and permitting, oversaw the development of the engineering of the system and coordinated with the City of Santa Clara Fire Department and the Santa Clara Building Department to secure permits, approvals, and inspections. ICS provided an Edwards EST™ peer-to-peer network system, drawing on the company's reputation as a world leader in innovative life safety solutions for large projects and entertainment venues.

Photography By Nick Elias

ICS-Integration Senior Project Executive Amir Mohammadian is a veteran of fire system design and permitting.

ICS initiated project design in 2012, and completed commissioning and inspections in the summer of 2014. The fire system was designed to embrace multiple challenges, including a broad interpretation of applicable codes, and the need to integrate with the MEP (Mechanical, Electrical, Plumbing) design build contractors.

Photography By Nick Elias

In addition to designing the fire system, ICS also oversaw the development of the engineering of the system and secured permits, approvals, and inspections.

The system in total consists of several thousands of programmable detection and control points, which include multiple smoke control zones both in the tower and bowl spaces, and interfaces with the elevators, HVAC, fire pump, generators, sprinkler system, card access, corridor roll down doors, and elevator lobby smoke guards. The Fire Command Center, which monitors and graphically displays system status, is located in the Security Command Center. In addition, this system incorporates an emergency override of the "house" audio systems. In the event of an emergency requiring evacuation, this system shunts the normal audio program and the life safety takes over to broadcast emergency announcements and instruction.

The sheer size of the 1.8 million square-foot stadium added an exponential degree of difficulty to every aspect of construction. Scheduling inspections and demonstrating system functionality alone was almost a full-time job.

The stadium has an extensive staff of first responders including dedicated fire department personnel that are present at every event. Trained personnel are on site to monitor and respond to all alarms and emergencies. The Fire Alarm/Life Safety system and its ability to provide live voice evacuation notification is a critical tool for these emergency workers.

To learn more about the services of the ICS Fire Systems Group, contact Amir Mohammadian at amir.mohammadian@ics-integration.com, or Aaron Colton, CEO of ICS Integration at aaron.colton@ics-integration.com or call 408.491.6000.

Sprig Electric Wires Comprehensive Security System At Levi's Stadium

Photography By Sprig Electric, Inc.

Sprig Electric used a custom swing stage in order to install the CCTV system in the suites at Levi's Stadium.

State-of-the-art security is in place at the new Levi's Stadium, thanks to the installation of a $1,000,000 security system wired by Sprig Electric, Inc.

The new security system, designed by Johnson Controls Inc (JCI), is wired throughout all areas of the 1.8 million square-foot stadium. Sprig worked with JCI in a design-assist capacity.

Sprig Electric wired all system components, including a mammoth CCTV installation that features over 650 IP cameras, a card access system, an intrusion panic button system and 19 Infrared (IR) illuminators for use in the stadium bowl area during evening events other than football games. Five types of state-of-the-art cameras are used in the IP system and in certain cases all five types of cameras are included within one enclosure.

Sprig Electric also provided cabling infrastructure to support all of the systems, including installation of security monitoring rooms and all head-end work.

The scope of the wiring project encompassed computers, power supplies, Power over Ethernet (PoE) switches, CAT6 patch cables, along with testing and assisting with system commissioning. Some 20 technician installers worked on the project, all from IBEW Local 332 in San Jose. The network-wide system is monitored within the stadium's control rooms.

"We were able to complete the project within a tight 12-month schedule," said Heather Gard, Project Engineer. "We brought it in on time and with much customer satisfaction."

Photography By Sprig Electric, Inc.

Sprig Electric installed a CCTV system and card readers across various areas of the stadium including the north suites at Levi's Stadium.

Security for the stadium begins in the main parking lot, where 60 pole-mounted cameras can pan the surrounding area on a 360-degree scan, providing surveillance of all visitors. Security cameras are also mounted above the solar energy bridges which are used as a walkway into the stadium.

Cameras are installed at the stadium's entry gates, throughout the facility (offices areas, walkways, etc...), as well as within the stadium seating area. Over 240 cameras are mounted within nine levels of walkways and some 50 cameras are mounted on pedestals in the seating area.

In addition to the CCTV system, the stadium is equipped with a card access security system. Sprig Electric installed 622 card readers on doors throughout the stadium, including doors for all the tower suites. Intrusion panic button systems have been added to administrative areas for cash rooms and ticketing areas.

"Our job was to help make sure that the security system protects the facility, as well as increases safety for all visitors to the stadium," Gard added. "This state-of-the-art security system meets that goal."

To learn more about the security services provided by Sprig Electric, Inc. contact Tim Martin at tmartin@sprigelectric.com or call 925.989.9031.

Photography By Nick Elias

Sprig Electric installed 60 pole-mounted cameras in the main parking lot.

SPRIG ELECTRIC, INC. TEAM LIST:

LEVI'S® STADIUM:

SERVICES:
Security System Wiring and Installation; Design-Assist

SECURITY SYSTEMS DESIGN AND ENGINEERING:
Johnson Controls Inc.

Engineering:
Matt Nixon; Jess Duran; Patrick Bockert

SECURITY SYSTEMS DESIGN-ASSIST CONTRACTOR:
Sprig Electric Inc., San Jose, CA

Project Executive:
Tim Martin, Vice President

Project Engineering:
Heather Gard

Project Manager:
Kevin Kincaid

Field Staff:
Jeronimo Medina, Fidel Estrada, Ben Sarellano, Carl Coloma, Erik Wentworth, Gary Gonzales
IBEW Local Union 332, Santa Clara

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Silver Creek Electric Connects Main Scoreboard Sign At Levi's Stadium

Silver Creek electricians donned body harnesses and anchored themselves safely as they went up in the air over 100 feet to complete wiring of the Levi's Stadium scoreboard.

It's lights up for the big Levi's® Stadium scoreboard sign, thanks to Silver Creek Electric, Inc.

Working with Integrated Sign Installations of Hayward, Silver Creek Electric brought in the final connections to the scoreboard from a neighboring electrical junction box (J-box). Cupertino Electric, who wired the main cabling in the stadium, brought in the wiring to the J-box.

In order to finalize the connections, the Silver Creek electricians donned body harnesses and anchored themselves safely as they went up in the air over 100 feet to wire the scoreboard.

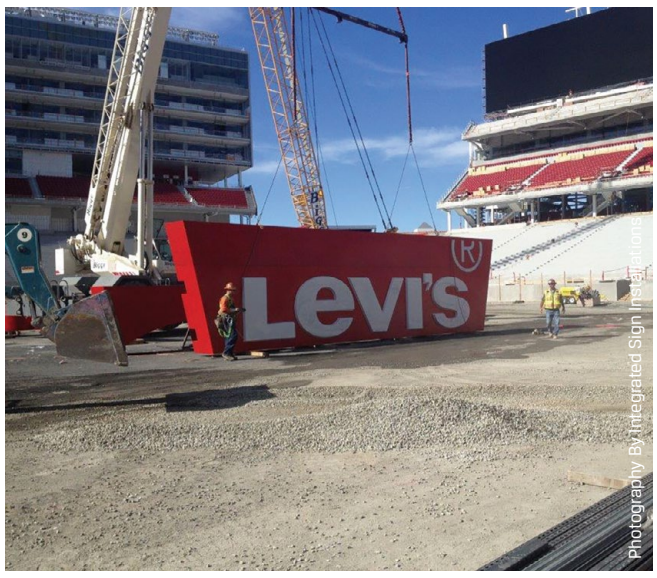
Silver Creek Electric team members include:
LEFT TO RIGHT: Rudy Salazar, Foreman; Paul Sudano, Journeyman; Joe Lovecchio, Foreman

Using catwalks on the back of the sign, they installed gutters to run wiring from the J-box. They then spliced the sign's pre-installed wiring whip into the J-box cabling, making the final connection that lights the sign. The scoreboard wiring project took over 200 hours, according to Silver Creek Electric Project Executive Juan DeHaro.

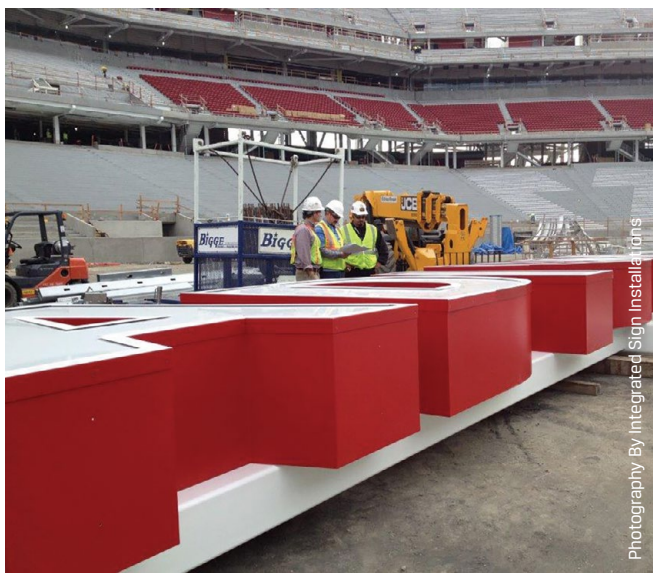
The sign's first trial run was for a Sunday Night Football presentation, before the stadium's official opening.

DeHaro said lighting the scoreboard was a challenging project, but a rewarding one. "How many times do you get the chance to connect the main sign?" he asked. "It was a great opportunity for us."

For more information about Silver Creek Electric and its services, contact Juan DeHaro, CEO at 408.321.9094, or jdeharo@silvercreekelectric.com or go to www.silvercreekelectric.com.



The scoreboard wiring project took Silver Creek Electric over 200 hours to complete.



Workers prepare the Levi's® Stadium scoreboard sign to bring in the final connections from a neighboring electrical junction box.