



**Digital Asset Benefits –
LiDAR and BIM for Asset Management & Design**

ANTARCTIC ADVENTURES

National Science Foundation (NSF) Large Facilities Workshop
April 3, 2019



www.merrick.com



WELCOME to **ANTARCTICA**



Antarctica is the coldest, windiest, harshest continent. With roughly 2” of precipitation a year, it is the driest place on Earth. It is roughly 5.4 million square miles, has an average elevation of 6,500 feet, and 98% of the landmass is covered by an ice sheet estimated to be 7 million cubic miles.

*- United States Antarctic Program
www.usap.gov*



US ANTARCTIC STATIONS

Research Station and Position	Summer Staff	Winter Staff	Occupied	Use	Average Summer High Temps	Average Winter High Temps
Amundsen-Scott South Pole Station, South Pole 90° S, 0° E	200 max	50	1956 - present	Year round	-18° F	-76° F
McMurdo Station, Ross Island, Ross Sea 77° 50'43.4"S, 166° 40'11.2"E	1,258 max	200	1955 - present	Year round	24° F	-1° F
Palmer Station, Anvers Island, Antarctic Peninsula 64° 46'27.1"S, 64° 03'11"W	46 max	15-20	1965 - present	Year round	36° F	14° F

How to get there.

R/V Lawrence M Gould
R/V Nathaniel B Palmer
Polar Star / Polar Sea
LC-130 ski equipped turboprop
C17 Globemaster

What's there.

McMurdo Station
Palmer Station
South Pole Station



McMURDO



PALMER



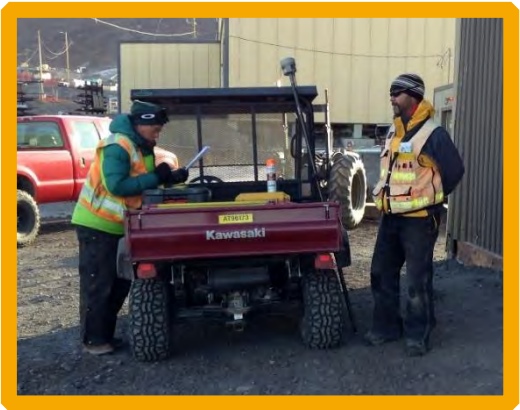
POLE



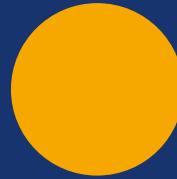
McMURDO STATION

AIMS — ANTARCTIC INFRASTRUCTURE MODERNIZATION FOR SCIENCE





McMURDO: LiDAR



LiDAR MAGAZINE ARTICLE – 28 JUNE 2016
ACEC NATIONAL ENGINEERING EXCELLENCE AWARD 2017



ANTARCTICA
IN HIGH DEFINITION

ACEC

ASC

INITIATIVE INNOVATE

- High Definition LiDAR
- Master Planning
- 3D visualization

Master Planning in 3D on the "Bottom of the Earth"

Stacy Baker, Antarctica Chief, Skanska Infrastructure Operations, Skanska USA Building Construction

High Definition LiDAR with GPS Accuracy

Skanska Staff in The Annetts Dome

Established the Project Lead Doctor

3D visualization of the Project Lead Doctor



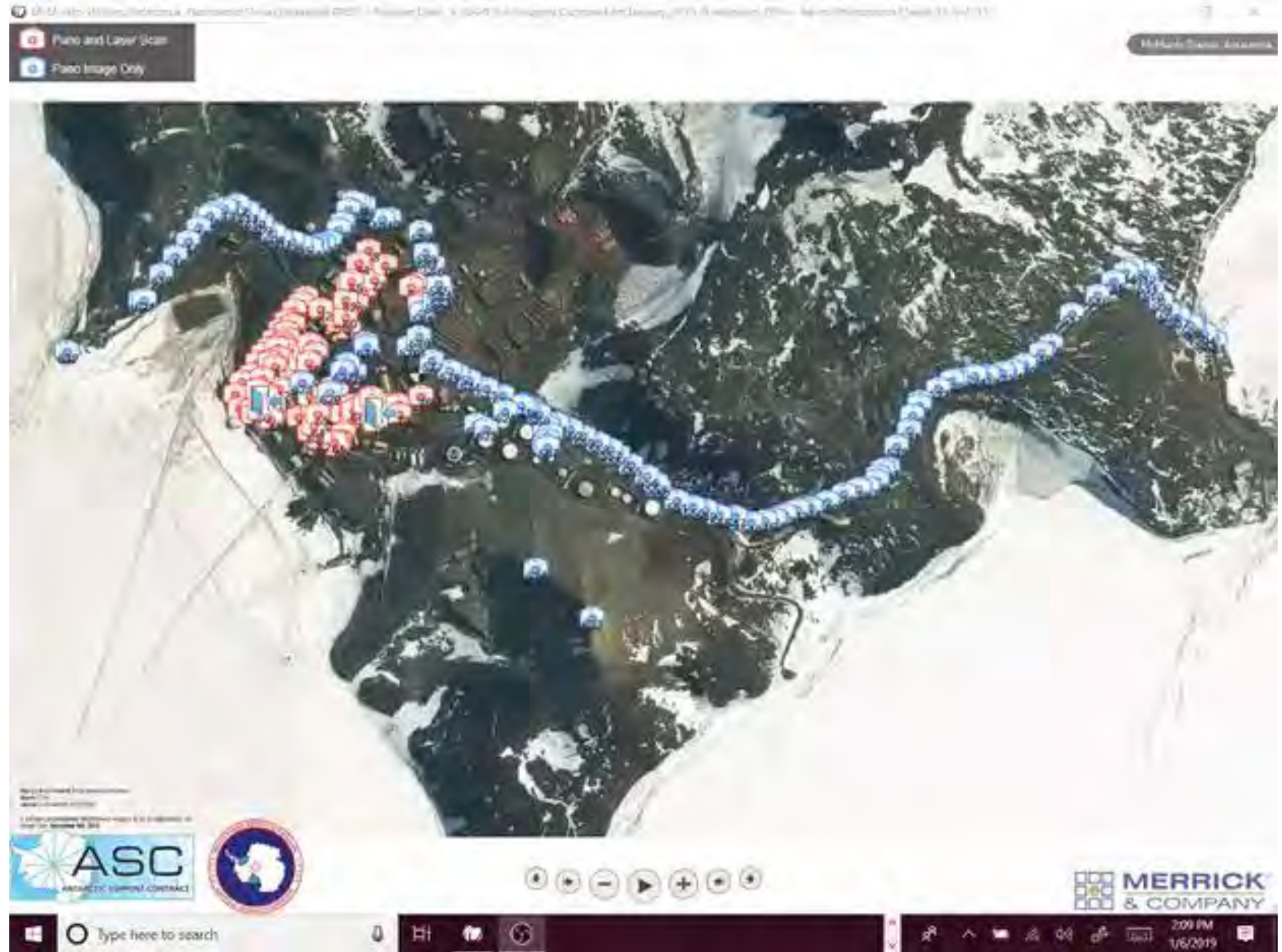
SCANNING SCOTT'S DISCOVERY HUT

BY JAVIE YOUNG

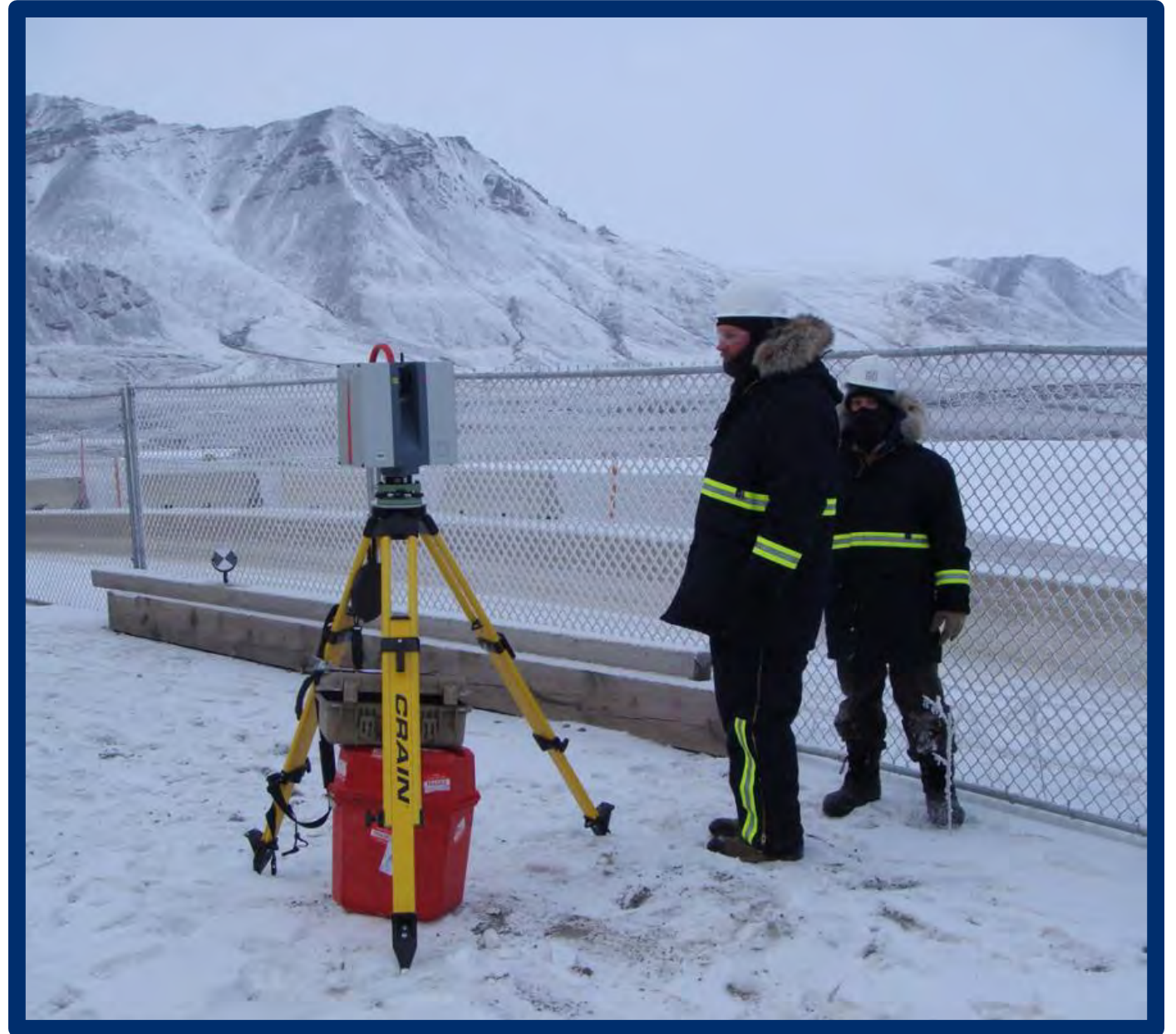
The Discovery Hut was built in 1962 and is located at the Scott and Amundsen bases on Ross Island, Antarctica. The hut was designed by Professor Sir Hubert Gregory who was appointed as leader of the scientific staff by the British Antarctic Survey in 1956. The hut was used as a quarters and storage for Scott and his crew during their expedition. The Discovery Hut has been used as a museum since 1994.



LiDAR: PVD FILE



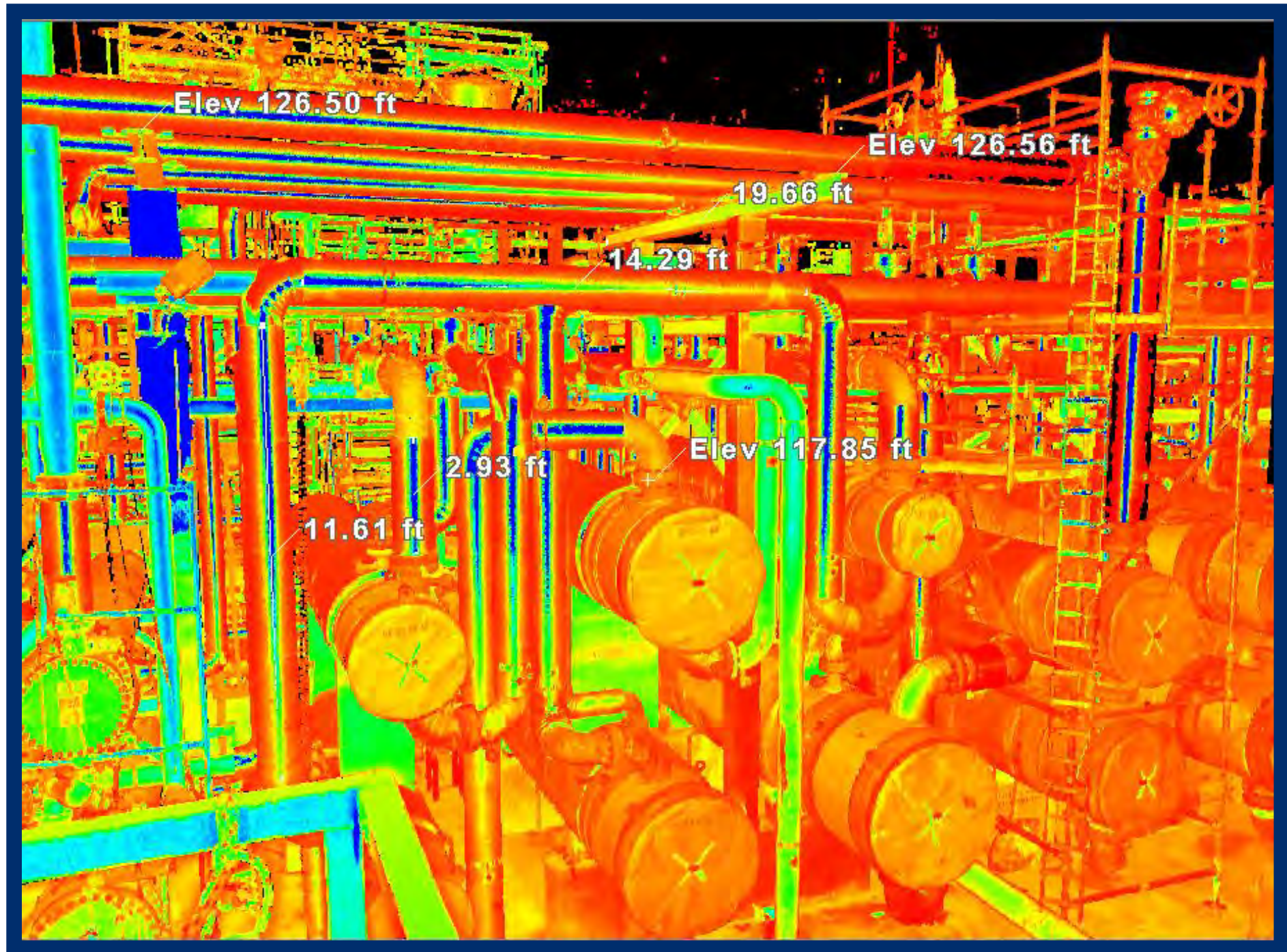
SAFETY:
**NO - CONTACT
SURVEY**



PVD
**PHOTO
IMAGE**



IMAGE:
**POINT
CLOUD**



MODELING PROGRAMS

Wide Flange Info

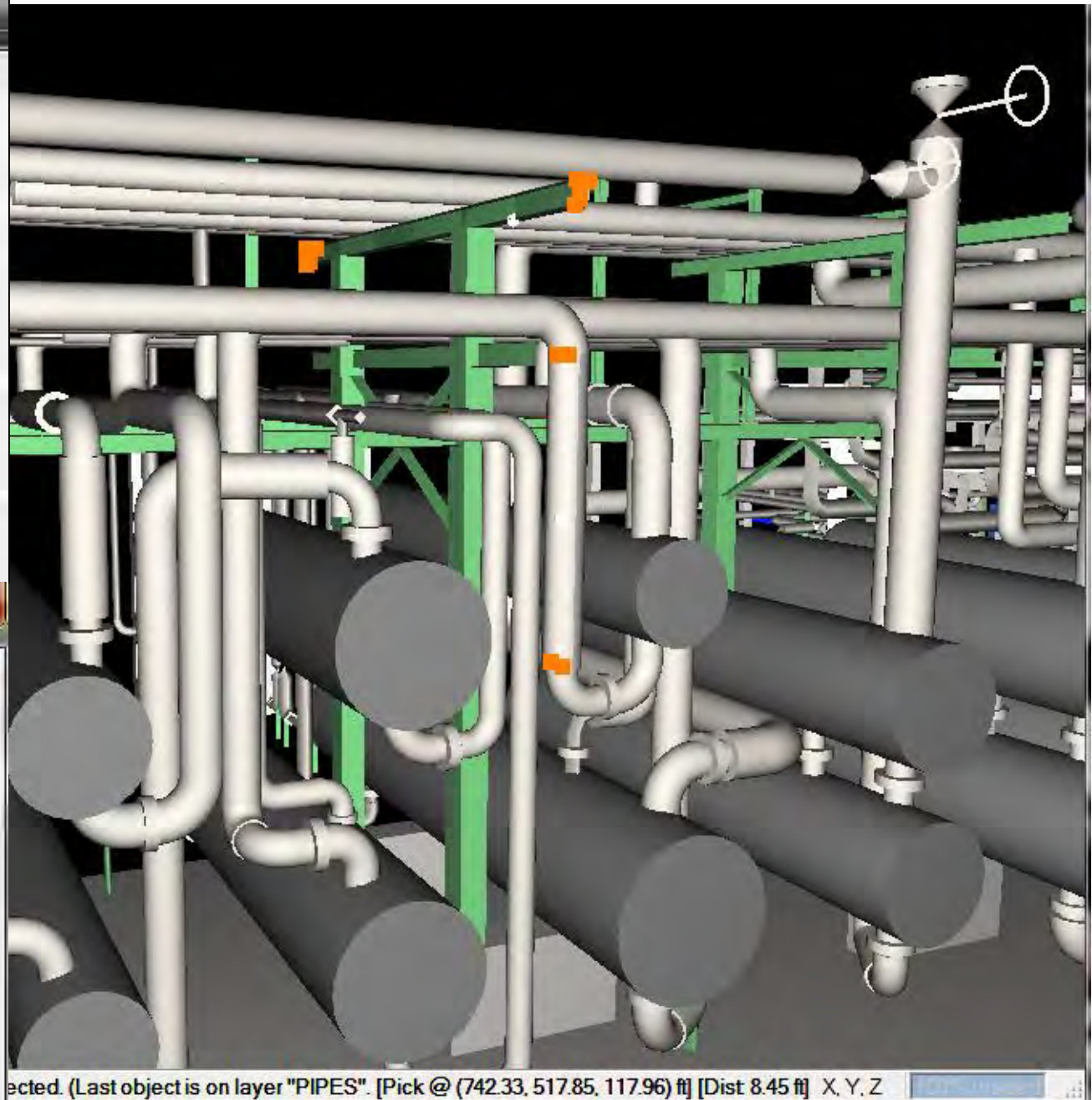
Object Info:
Depth = 0.65 ft
Width = 0.51 ft
Web Thickness = 0.02 ft
Flange Thickness = 0.02 ft
Length = 20.04 ft
Origin = (761.79, 517.88, 126.35) ft
Axis = (-1.0000, -0.0027, -0.0055)
Flange Axis = (0.0027, -1.0000, 0.0035)
Color = [75, 150, 255]
Insulation Thickness = 0.00 ft

Meta Info:
Layer: STEEL MEMBER

Cylinder Info

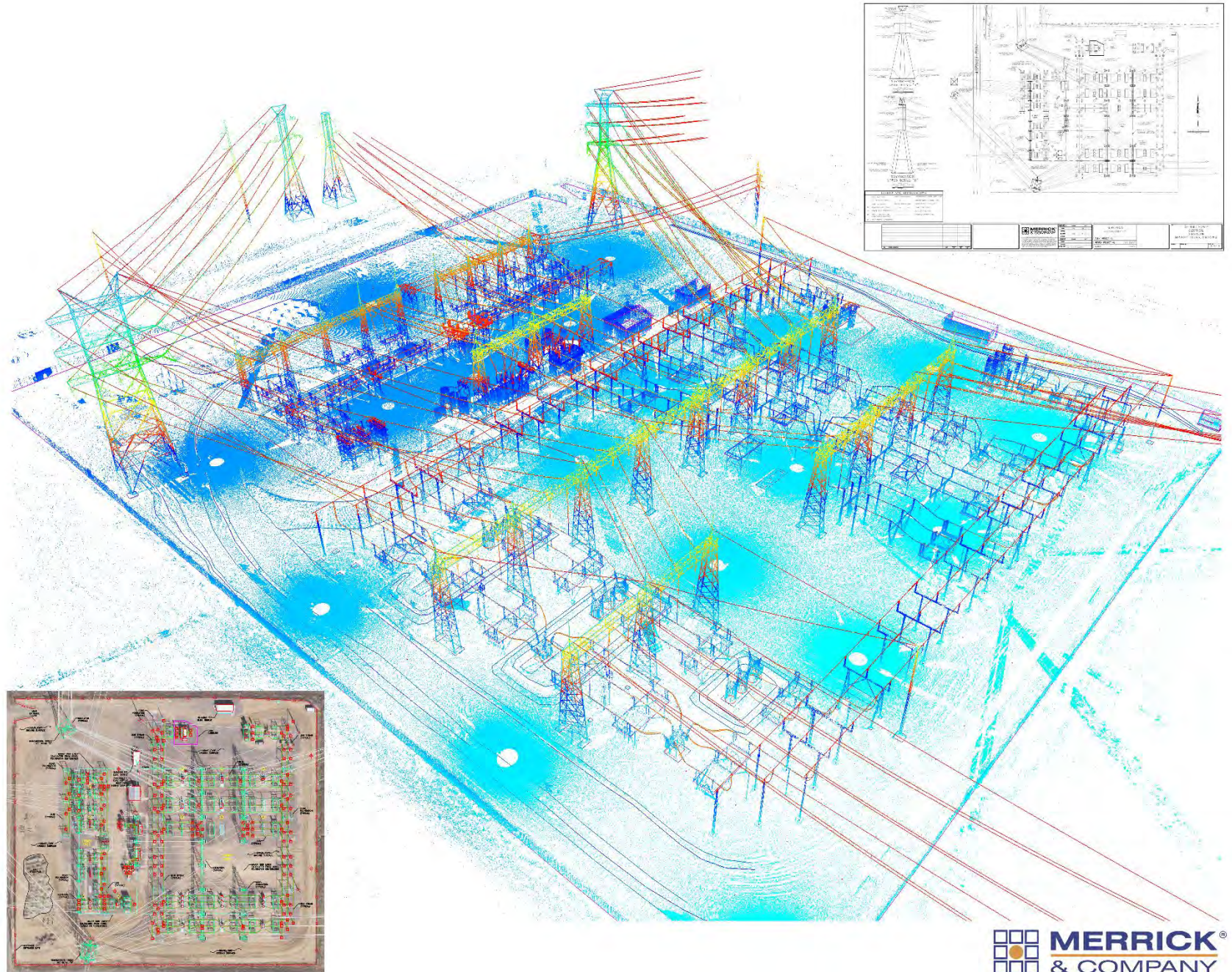
Object Info:
End Point 1 = (742.76, 517.49, 113.86) ft
End Point 2 = (742.72, 517.48, 122.24) ft
Origin = (742.76, 517.49, 113.86) ft
Axis = (-0.0044, -0.0012, 1.0000)
Diameter = 1.09 ft
Height = 8.38 ft
Color = [190, 190, 190]
Insulation Thickness = 0.00 ft

Meta Info:
Layer: PIPES

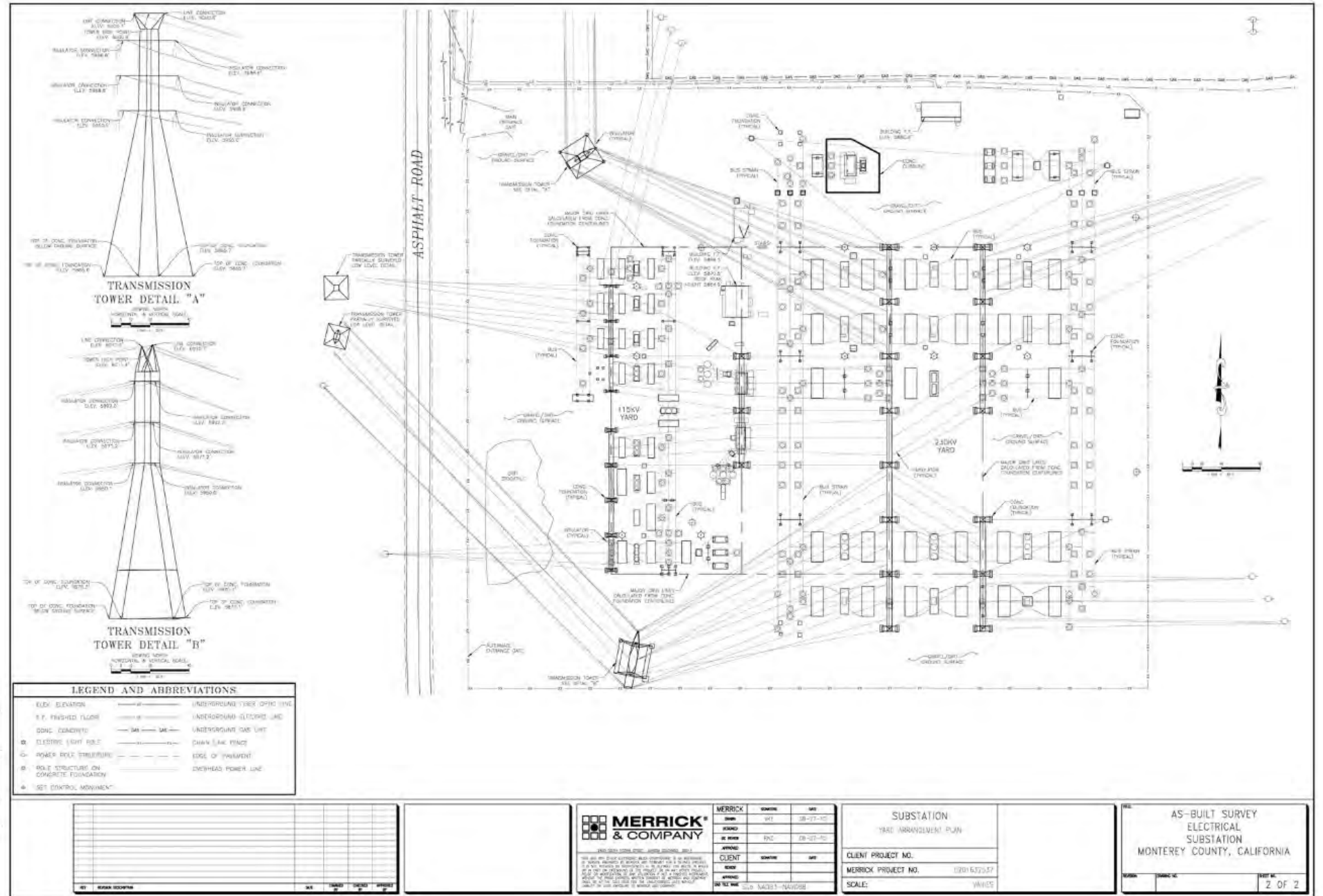


ected. (Last object is on layer "PIPES". [Pick @ (742.33, 517.85, 117.96) ft] [Dist 8.45 ft] X, Y, Z

PROJECT:
EXAMPLE



EXAMPLE OUTPUT



MERRICK & COMPANY

REGISTERED ELECTRICAL ENGINEERS

1000 S. GATEWAY AVENUE, SUITE 100, SAN JOSE, CA 95128

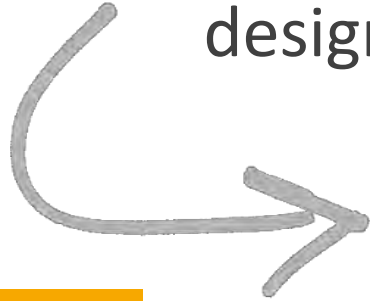
TEL: (408) 291-1111 FAX: (408) 291-1112

MERRICK	OWNER	DATE
DESIGN	WT	08-17-10
APPROVE	ENC	08-17-10
CLIENT	OWNER	DATE
ISSUE		
APPROVE		

SUBSTATION	
YARD ARRANGEMENT PLAN	
CLIENT PROJECT NO.	
MERRICK PROJECT NO.	1001532027
SCALE:	AS SHOWN

AS-BUILT SURVEY ELECTRICAL SUBSTATION MONTEREY COUNTY, CALIFORNIA		
DATE	SCALE	REV. NO.
		2 OF 2

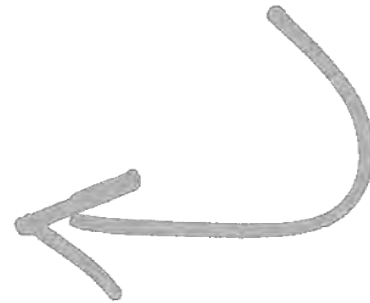
Import/convert point cloud to Revit model for use during design



Compare daily construction to Revit design model (VR and AR also)

**FUTURE:
USES**

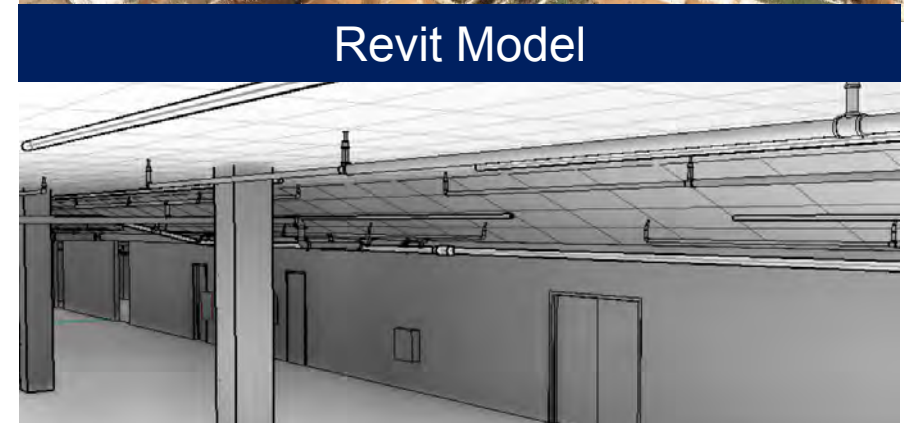
Update Revit model to as-built condition and utilize the data for asset management / O&M database



Photograph



Point Cloud Scan



Revit Model

