AERIAL MAPPING · CASE STUDY

SITE INTELLIGENCE REPORT

High-resolution drone mapping of a 20.42-acre site — orthomosaic, terrain model, and aerial intelligence captured in a single coordinated flight.

- PLATFORM · DJI Matrice 4E
- RTK FIXED
- GSD · 1.4 CM/PX
- COVERAGE · 20.42 AC

DRONE MAPPING & GEOSPATIAL ANALYSIS · SOUTHERN CALIFORNIA

FILE / AA-CS-001

EXECUTIVE SUMMARY

SITE INTELLIGENCE OVERVIEW

Prepared from mission data, quality metrics, and site observations.

EXECUTIVE SUMMARY

The aerial mapping project conducted by Aerial Atomics LLC aimed to document a church site in Escondido, utilizing advanced drone technology to capture high-resolution imagery and generate a comprehensive point cloud. The mission focused on assessing site conditions, infrastructure, and terrain characteristics, providing valuable insights for the client while ensuring adherence to strict confidentiality protocols.

Data quality was paramount, with the project employing RTK Fixed positioning to achieve centimeter-grade accuracy, ensuring precise geospatial data collection. The mission generated 822 images, resulting in a point cloud comprising 46.1 million points, with a Ground Sampling Distance (GSD) of 1.4 cm/px. These metrics reflect the high fidelity of the data captured during the flight.

Aerial imagery reveals potential indicators of vegetation density and surface drainage patterns, which may influence site development decisions. Visual analysis suggests observable surface features and infrastructure conditions, including existing structures and road/path accessibility. Additionally, elevation variations across the site are evident, providing critical information for planning and potential construction activities.

KEY FINDINGS

1. Point cloud generated with 46.1M points for detailed analysis.
2. GSD of 1.4 cm/px ensures high-resolution imagery quality.
3. Area covered by the project measures 20.42 acres.
4. Aerial imagery reveals potential drainage indicators across the site.
5. Visual indicators suggest varying vegetation density and access conditions.

MISSION AT A GLANCE

20.42 ac	1.4 cm/px	822	RTK Fixed	46.1M
SITE AREA	RESOLUTION	IMAGES	POSITIONING	POINT CLOUD

SECTION 01 · MISSION BRIEF

PROJECT BRIEF

A single coordinated UAV mission documented the site — capturing a georeferenced orthomosaic, digital surface model, and derived geospatial products for planning and documentation purposes.

PREPARED BY

AERIAL ATOMICS

Curtis Emmanuel
Director of Aerial Intelligence

- RTK FIXED
- CENTIMETER RESOLUTION

MISSION SCOPE

LOCATION
Escondido

DATE
2026-05-30

COVERAGE
20.42 acres

EQUIPMENT · HW

- DJI Matrice 4E
- RTK Fixed
- Mechanical-shutter camera

FLIGHT PARAMETERS · OPS

- Front overlap 85%
- Side overlap 85%
- Fixed altitude

DELIVERABLES PRODUCED · OUT

- 1.4 cm/px orthomosaic
- Digital Surface Model (DSM)
- Dense point cloud (46.1M pts)
- Site condition layer
- Condition analysis report
- Drainage analysis layer
- Interactive GIS web map
- PDF assessment report

FIG. 01 · ORTHOMOSAIC

SURVEY FOOTPRINT

The full property was reconstructed from 822 images into a seamless 1.4 cm/pixel orthomosaic — one georeferenced base layer for every measurement and condition call.

TOTAL AREA **20.42** ac	IMAGES **822** shots
AVG GSD **1.4** cm/px	ELEV. RELIEF **28.1** m
REPROJ. ERR **1.06** px	POINT CLOUD **46.1M** pts

SECTION 02 · QUALITY ASSURANCE

DATA QUALITY & ACCURACY

The photogrammetric report confirms centimeter-grade RTK Fixed positional control and reliable image alignment — the basis for confident measurement and condition interpretation.

RECONSTRUCTION READOUT	QA / GEOREF
GPS RMS ERROR ✓ WITHIN TOLERANCE	1.1 cm
ABSOLUTE HORIZONTAL · CE90 ✓ WITHIN TOLERANCE	1.7 cm
ABSOLUTE VERTICAL · LE90 ✓ WITHIN TOLERANCE	1.1 cm
REPROJECTION ERROR ✓ WITHIN TOLERANCE	1.06 px
SPARSE RECONSTRUCTION RATE ✓ WITHIN TOLERANCE	95.8 %

INTERPRETATION

- Centimeter-grade RTK Fixed accuracy
- Excellent image alignment
- Reliable orthomosaic generation
- High confidence in observations

RTK FIXED CLASS

Sub-5 cm horizontal/vertical confidence

POSITIONAL ACCURACY REFERENCE · PLAIN LANGUAGE

METRIC	WHAT IT MEASURES	THIS PROJECT	INTERPRETATION
GPS RMS Error	Overall 3D position accuracy	1.1 cm	Absolute position of each pixel
CE90 Horizontal	90% of points within X cm horiz.	1.7 cm	Horizontal measurement confidence
LE90 Vertical	90% of points within X cm vert.	1.1 cm	Elevation surface reliability
Reprojection Err	Image-to-model alignment quality	1.06 px	Lower is sharper orthomosaic

FIG. 02 · ELEVATION

DIGITAL SURFACE MODEL

The DSM records the elevation of every feature — structures, vegetation, and terrain — across the 20.42-acre footprint.

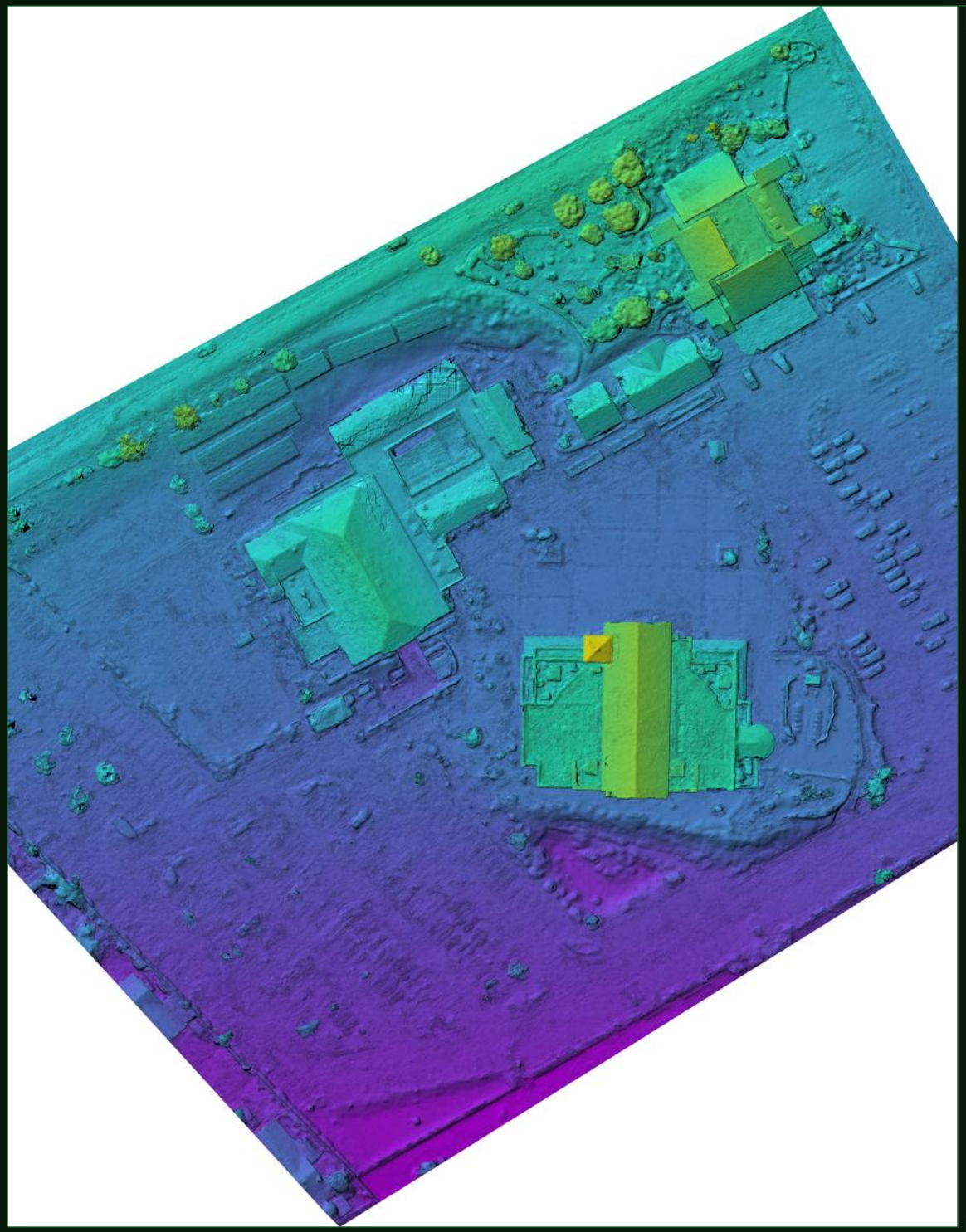
RELATIVE ELEVATION

LOW · 181.51 m

209.58 m · HIGH

KEY INSIGHTS

- Identifies high and low points across the property
- Highlights drainage patterns and ponding-prone areas
- Visualizes structure and vegetation height
- Supports grading and stormwater analysis



SECTION 03 · ASSET CONDITION

ASSET CONDITION ANALYSIS

At 1.4 cm/pixel, surface conditions, wear patterns, and drainage indicators are clearly resolved across the entire site footprint.

OBSERVED INDICATORS

- Observable surface features
- Vegetation density
- Drainage indicators
- Access conditions

OWNER VALUE

- Prioritize areas needing attention
- Quantify area for contractor bids
- Track condition over time
- Document for insurance / records

STAKEHOLDER VALUE

- Build accurate proposals remotely
- Reduce on-site time & risk
- Support capital planning
- Improve documentation quality

WEATHERING & DEBRIS DISCOLORATION

SCOPE NOTE — All observations are derived from aerial imagery and constitute visual indicators only. This report does not constitute a structural inspection, engineering assessment, or certified condition report.

SECTION 04 · SITE SURFACES

SITE SURFACES & DRAINAGE

The DSM converts surface form into actionable drainage and condition analysis — pairing what the orthomosaic shows with where water actually moves.

SITE SURFACE OVERVIEW

SURFACE CONDITIONS

- Existing structures
- Road / path condition
- Utilities visible
- Boundary features

DRAINAGE VALUE

- Plan grading & swales
- Locate ponding areas
- Reduce flood risk
- Support permitting

ADDITIONAL FINDINGS

- Access conditions
- Vegetation noted
- Boundary features
- Infrastructure visible

BENEFICIARIES

- Property owners
- Engineers & planners
- Maintenance teams
- Insurance / legal

SECTION 05 · OUTPUT PACKAGE

DELIVERABLES & APPLICATIONS

Every engagement produces a GIS-ready dataset that drops directly into maintenance systems, engineering workflows, and budgeting models — no specialized software required to view it.

CORE DELIVERABLES

- Orthomosaic (GeoTIFF)
- Digital Surface Model (DSM)
- Condition assessment report
- Site surface documentation
- Interactive GIS web map
- Area & distance measurements

DELIVERY FORMATS

- Cloud-optimized GeoTIFF
- DSM raster (GeoTIFF)
- Point cloud LAS / LAZ
- Hosted ArcGIS Online map
- PDF condition report

COMMON APPLICATIONS

- Condition inspections
- Capital planning & budgeting
- Drainage & grading evaluation
- Insurance condition records
- Monitoring & change detection

STAKEHOLDER BENEFITS

- Detect missing or damaged surface areas
- Document pre-existing conditions
- Support capital planning & budgeting
- Reduce manual inspection exposure
- Identify standing water / poor drainage
- Reduce risky manual site access
- Enable repeatable change detection
- Deliver reports within 48–72 hours
- Measure area for contractor bids
- Integrate into existing GIS & CMMS
- Build accurate proposals without site visit
- Establish measurable condition baseline

PROFESSIONAL DISCLOSURE

This report is produced from aerial photogrammetric data and is intended for planning, due diligence, and asset management purposes only. It does not constitute or substitute for a licensed land survey, boundary determination, structural engineering assessment, environmental report, or any professional certification required by law. All measurements, elevations, and visual observations are derived from aerial imagery and are subject to the accuracy specifications stated in the Quality Assurance section of this report. Aerial Atomics LLC is not a licensed land surveyor or professional engineer. Consult a licensed professional for any regulatory, legal, or engineering application.

SECTION 06 · WHY IT WORKS

OPERATIONAL ADVANTAGES

01

CENTIMETER PRECISION

Centimeter-resolution data for confident condition calls.

02

REPEATABLE MISSIONS

Future flights compare against the same baseline.

03

FULL-SITE COVERAGE

One mission documents large sites efficiently.

04

SIMPLE DELIVERY

PDF reports and web maps — no special software needed.

TRADITIONAL INSPECTION VS AERIAL INTELLIGENCE

DIMENSION	TRADITIONAL MANUAL INSPECTION	AERIAL ATOMICS MAPPING
FIELD TIME	Multi-day, crew on site	**Single coordinated flight**
COVERAGE	Sampled / spot checks	**Continuous 20.42-acre dataset**
RECORD	Notes & loose photos	**Georeferenced, measurable layers**
SAFETY	Ladder & roof exposure	**No manual access required**
RE-SURVEY	Restart from scratch	**Repeat against same baseline**
DELIVERABLES	Written report, loose photos	**GIS dataset + interactive web map**
TURNAROUND	Days to weeks for report	**48–72 hour standard delivery**

METHOD

AERIAL ATOMICS

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