



# GN SURVEYS

Leading by innovation

## GN Surveys Ltd

[www.gnsurveys.co.uk](http://www.gnsurveys.co.uk)



# Proven Industry Track Record:

- We are regarded as Innovative problem solvers within our industry
- 23 years track record in professional surveying for major clients in the UK
- Pathfinders in UAV surveys
  - acquired the first Swinglet and EBEE platforms by Sensefly in UK (early 2012)
  - acquired the first DJI S800 platforms in UK (early 2011)
- Involved in Mobile Mapping
  - first Leica P2U scanner in Europe, scanning the entire Thames from a boat
- Zero lost time incidents since 2000



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UAV's

Aircraft

Waterborne  
Drones

360° Cameras

Mobile Scanners

We use the latest survey and scanning technologies to deliver the best and most appropriate solutions.



# Case study 1 - how we added value to one Housing developer:

- Spent 2020 getting to know their needs and challenges
- This allowed us to provide them with innovative surveying services/solutions
- The result being, we won a 2-year contract for monthly surveys
  - Monthly Aerial Survey
  - Monthly Mobile Mapping Survey
  - Monthly Aerial Panoramic Images
  - On demand Jetting and CCTV of new pipelines
  - On demand volumetric calculations, Material tracking
  - All data readily available on our SIR platform



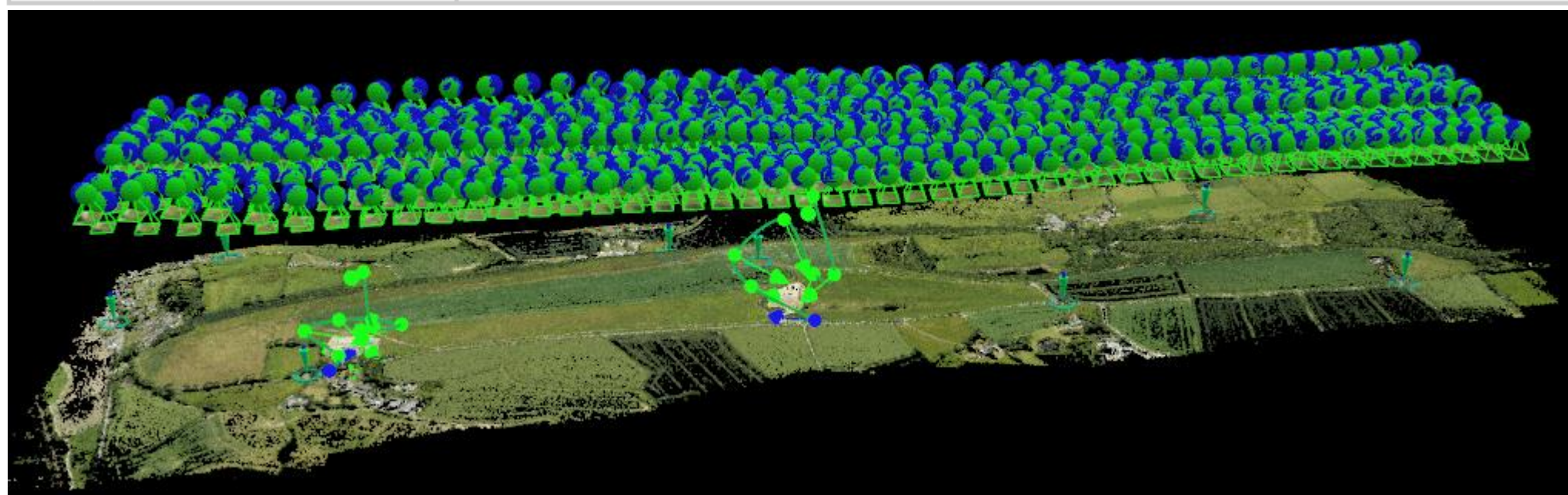
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# Case study 2 – Supporting a local authority with illegal quarrying:

- Completed a manned aircraft flight of two quarries



🔍 Images	median of 74411 keypoints per image	✓
🔍 Dataset	576 out of 576 images calibrated (100%), all images enabled	✓
🔍 Camera Optimization	0.76% relative difference between initial and optimized internal camera parameters	✓
🔍 Matching	median of 23052.2 matches per calibrated image	✓
🔍 Georeferencing	yes, 6 GCPs (6 3D), mean RMS error = 0.014 m	✓



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## Case study 2 – Supporting a local authority with illegal quarrying:

- Completed a manned aircraft flight of both quarries
- 3D point cloud data of one quarry from the flight



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## Case study 2 – Supporting a local authority with illegal quarrying:

- Completed a manned aircraft flight of both quarries
- 3D point cloud data of one quarry from the flight
- High Resolution image of the same quarry (record of time and date)



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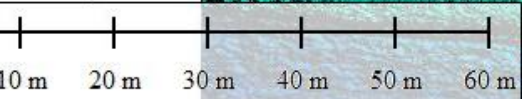
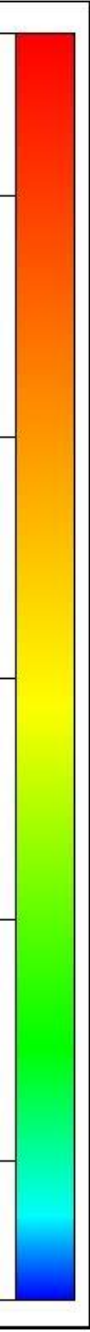
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- Completed a manned aircraft flight of both quarries
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- High Resolution of the same quarry (record of time and date)
- 3D model of the Quarry



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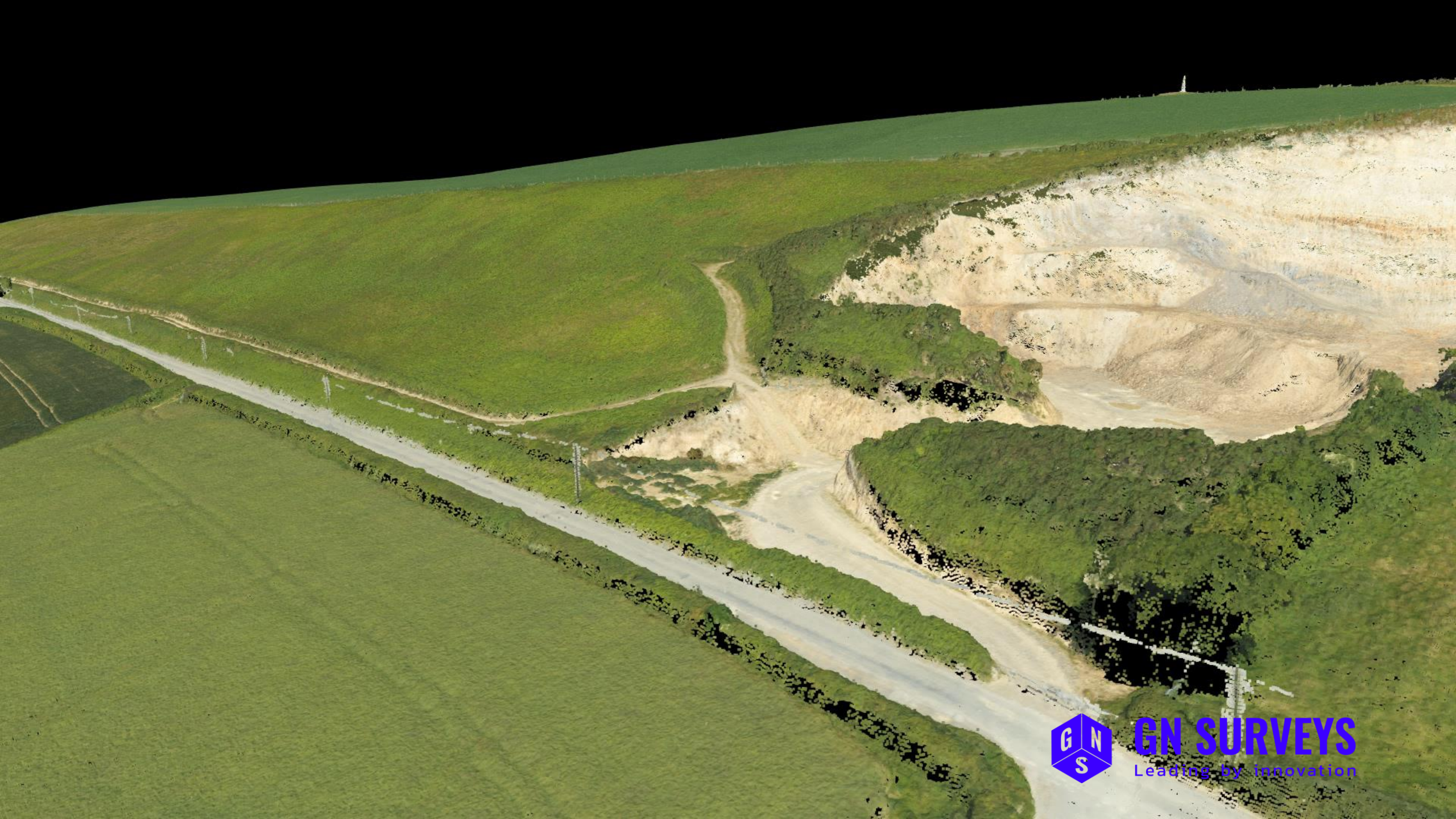
## Case study 2 – Supporting a local authority with illegal quarrying:

- Completed a manned aircraft flight of both quarries
- 3D point cloud data of one quarry from the flight
- High Resolution of the same quarry (record of time and date)
- 3D model of the Quarry
- Animated fly through of the quarry



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# Case study 2 – Supporting a local authority with illegal quarrying:

- Completed a manned aircraft flight of both quarries
- 3D point cloud data of one quarry from the flight
- High Resolution of the same quarry (record of time and date)
- 3D model of the Quarry
- Animated fly through of the quarry
- Here we used available DEFRA LiDAR data from 2006 and 2017 to compare against
  - Process includes QA between data sets and volume certainty as a guide

## Quality checks between data sets

<u>EAST</u>	<u>NORTH</u>	<u>GPS</u>	<u>2021</u>		<u>2017 DEFRA</u>		<u>2006 DEFRA</u>		
257311.797	129411.361	82.193	82.226	-0.033	82.146	0.047	82.065	0.128	QUARRY 1 - WEST
258308.811	129334.213	138.952	138.944	0.008	139.026	-0.074	138.951	0.001	QUARRY 2 - EAST

## Volume Calculations between data sets

Base Model	Comparison Model	Material removed	Material added	Net Result m <sup>3</sup>	Uncertainty band (m <sup>3</sup> )
2006	2017	14,122	2,462	11,660m <sup>3</sup> Removed	1,000
2017	2021	32,743	5,903	26,840m <sup>3</sup> Removed	1,500
2006	2021	44,793	6,293	38,500m <sup>3</sup> Removed	1,500



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# Case study 2 – Supporting a local authority with illegal quarrying:

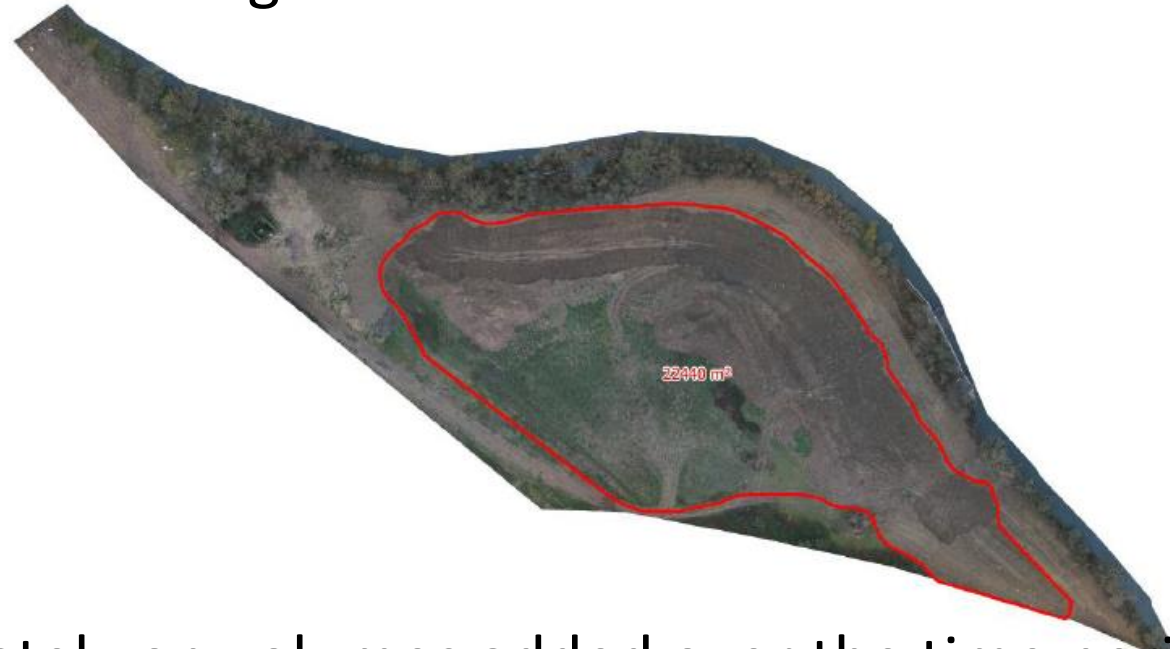
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- 3D model of the Quarry
- Animated fly through of the quarry
- Here we used available DEFRA LiDAR data from 2006 and 2017 to compare against
  - Process includes QA between data sets and volume certainty as a guide
- All results in a survey report explaining the process and findings



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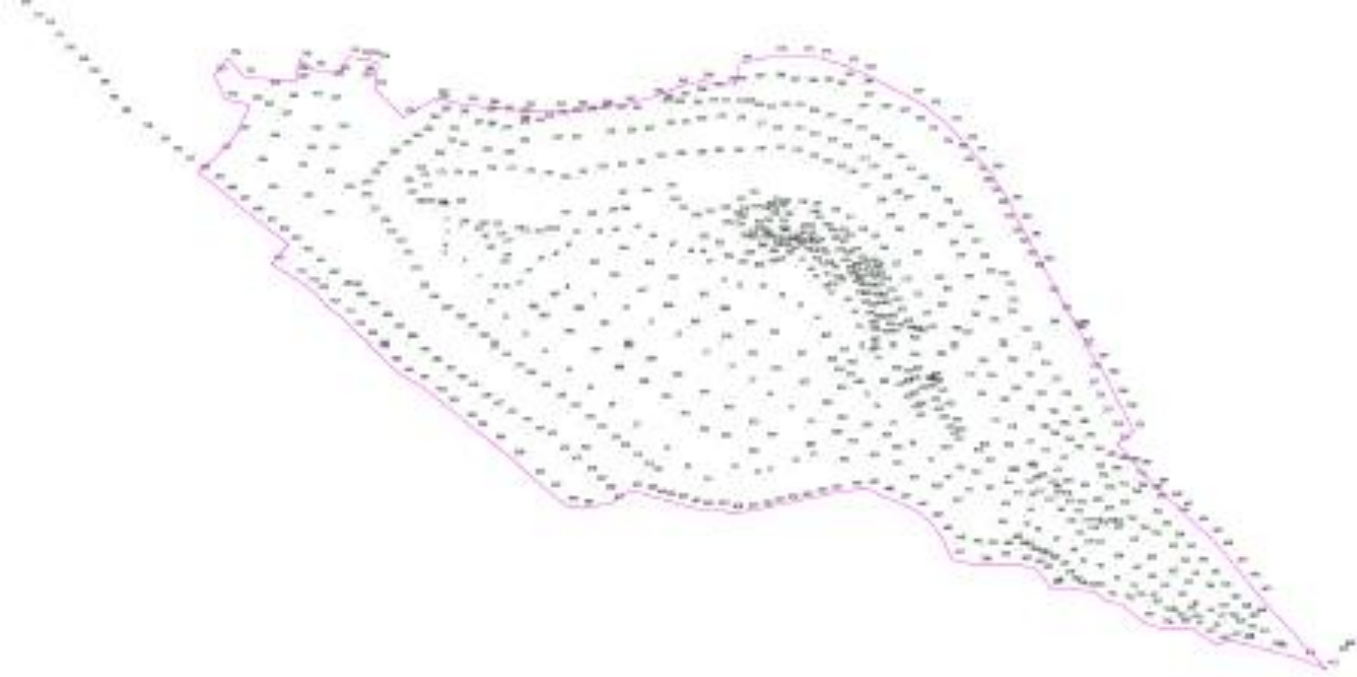
# Case study 3 – Supporting a local authority with illegal material dumping:

- GNS completed a Manual Survey of a dumping site in 2021
- Available data sets to track volume change were:
  - TOPO Survey data from 2020
  - UAV Survey data from 2018
  - DEFRA LiDAR data from 2010
- This allowed us to report accurately on volumes added over the time period

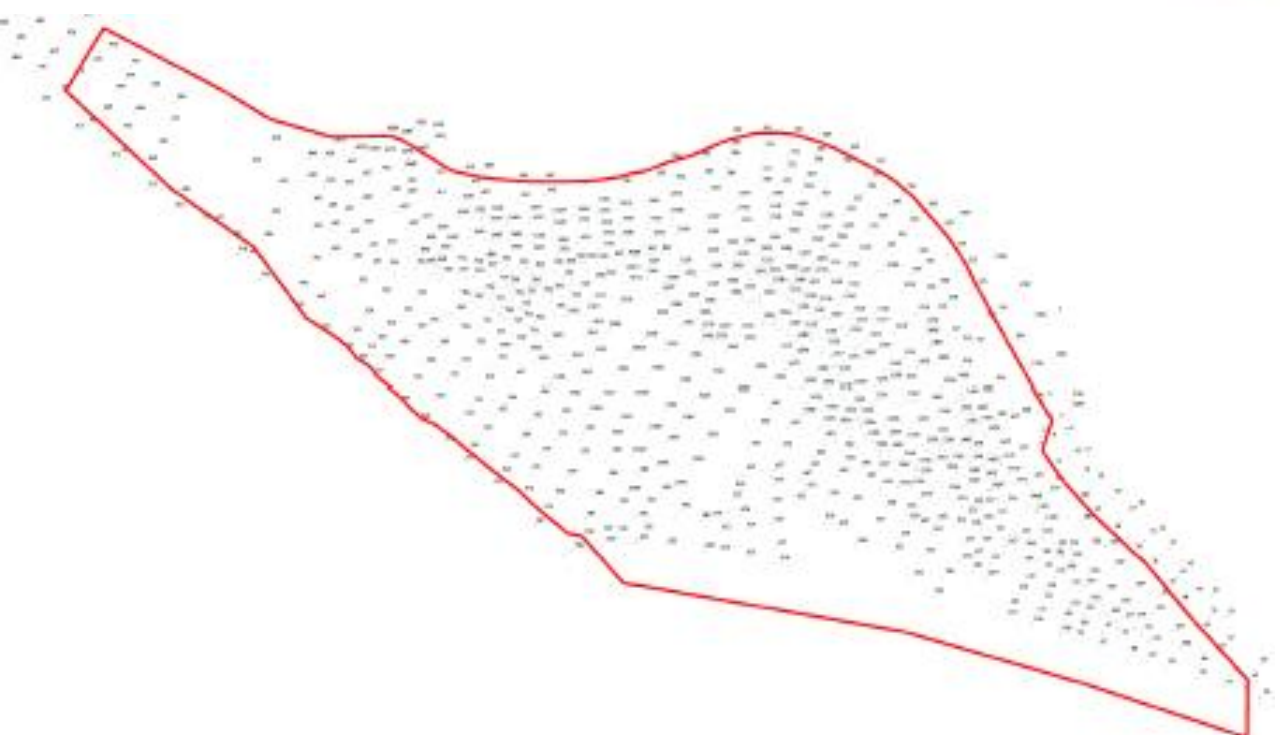


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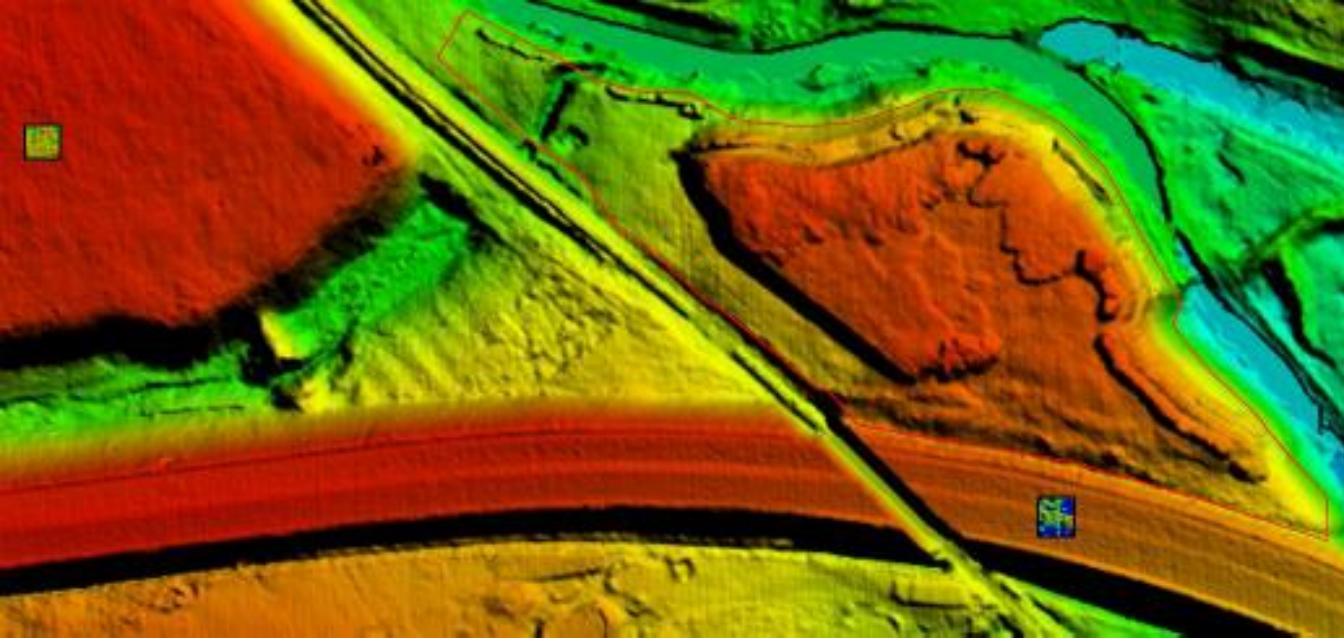
2020 TOPO Survey



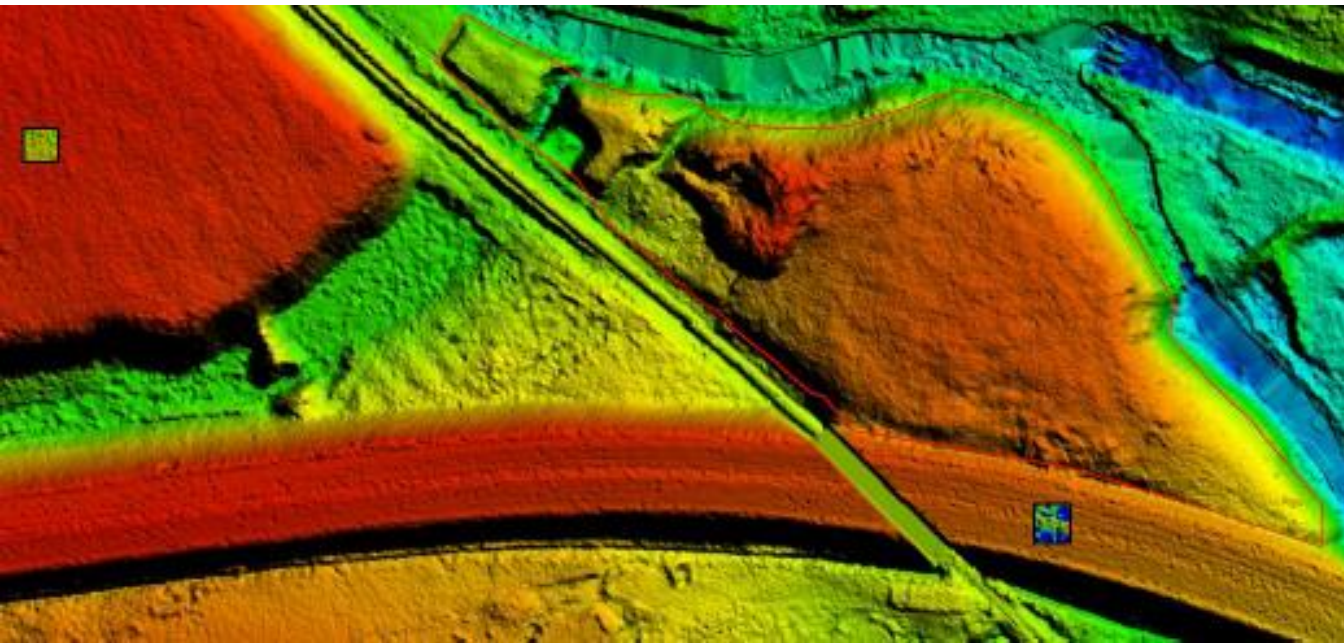
2021 TOPO Survey



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2018 UAV DTM



2010 DEFRA DTM



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# Case study 3 – Supporting a local authority with illegal material dumping:

- Our report below shows volume changes in the area
- Note volume allowance allowing for expected tolerances.

Base Model	Comparison Model	Material added	Material removed	Net Result	Volume allowance (m³)
2010	2018	14,055	12,478	1,577 Added	642
2010	2020	28,663	27,139	1,524 Added	642
2018	2020	18,683	18,759	76 Removed	642





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## Step into Reality™

GN Surveys' bespoke Data Delivery Platform





**Step into Reality™**