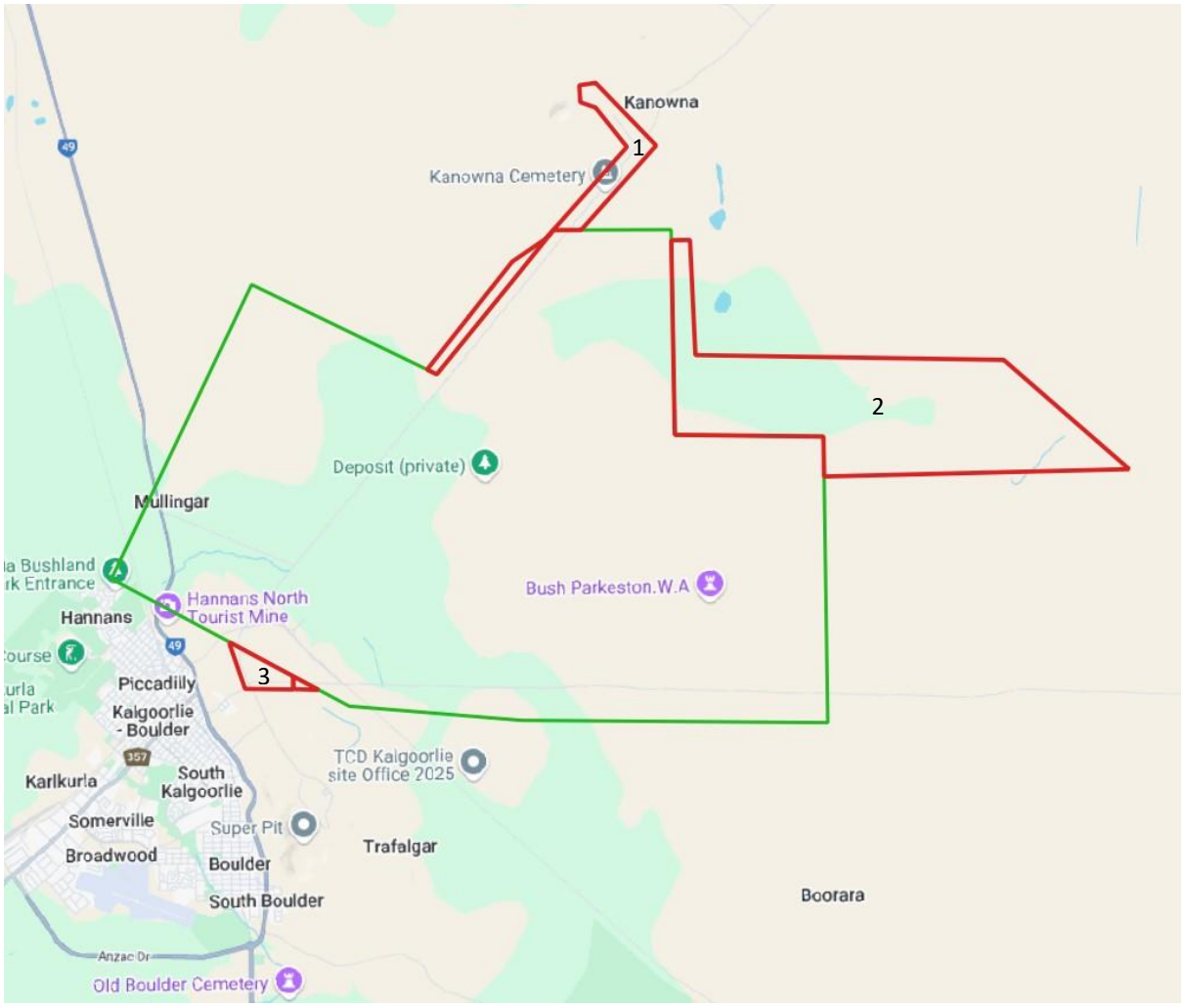
ANDITI

REPORT: Black Flag KRRE Malleefowl Mound Analysis from LIDAR

Date: 20 June 2025

PROJECT AREA

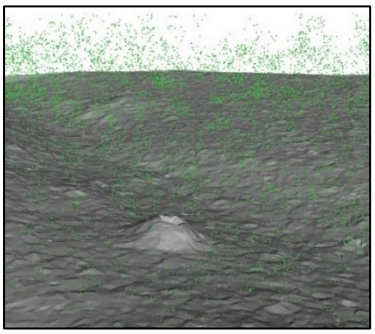
This is an extension to the KCGM project area of 160km² - shown in Green. This area adds 32km² across 3 separate areas – as shown in Red. This is a complex area for analysis as much of the area appears to have seen human activity. This area is directly adjacent to, and to the North East of, the Kalgoorlie-Boulder Town.

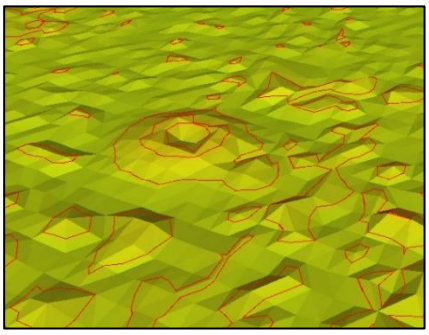


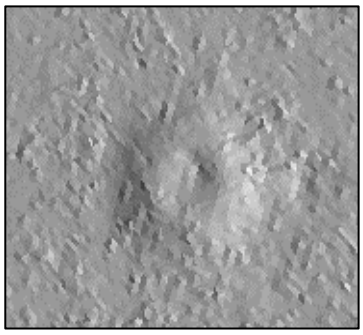
DATA ANALYSIS

Utilising the LiDAR data and the Anditi data processing engine, Anditi classified the data into ground, vegetation and other non-ground classifications creating an accurate DEM that includes potential mound-like features. The data was then further analysed to identify Malleefowl mounds. These were found using Anditi's patented near-ground feature detection algorithms to identify potential sites, which are then ranked depending on the degree of certainty. Certainty is affected by the intactness of the mound, any overly dense obscuring vegetation and other factors, including the data gaps and general data variability.

While Anditi performed much of this automatically, some time was allowed for manual checks to ensure a high level of accuracy. Some manual checks compared ratings 1-3 against satellite imagery to check for false positives.







RATING MOUNDS

The Anditi Malleefowl mound analysis algorithms look for ground features in the point cloud that best approximate a typical Malleefowl mound shape. Based on the algorithm match to shape and manual checks, a mound is classed from 1 to 4.

1 = Very closely matches a typical Malleefowl mound shape and is highly likely to be a Malleefowl mound

2 = Is similar to a Malleefowl mound shape and could be a Malleefowl mound

3 = Is a mound shape that is approximately within the parameters of size for a Malleefowl mound. This could be an old Malleefowl mound, a mound of earth around living or dead tree/vegetation, natural hummocks around waterways, etc.

4 = Is a mound shape that is approximately within the parameters of size for a Malleefowl mound but isn't very similar to a typical Malleefowl mounds. This could be a broken Malleefowl mound, a mound of earth around living or dead tree/vegetation, natural hummocks around waterways, tussock vegetation etc.

Manual checking is usually completed using the Anditi point cloud reviewing tools.

- The following criteria for category 1 mounds are applied:
- The mound should be circular in shape and look like a classic Malleefowl mound shape.
- Contours displayed on the mound should be concentric.
- There must not be any obvious human activity; like digging, water dams, road clearing; close to the mound.
- There must not be a tree originating from the mound.
- The mound should not be on a very steep surface. Normally mounds are found on flat surfaces or on ground with a gentle slope.

An orthophoto provides an excellent final check and can often clearly show Malleefowl mounds or check for and exclude false positives such as mound-like vegetation.

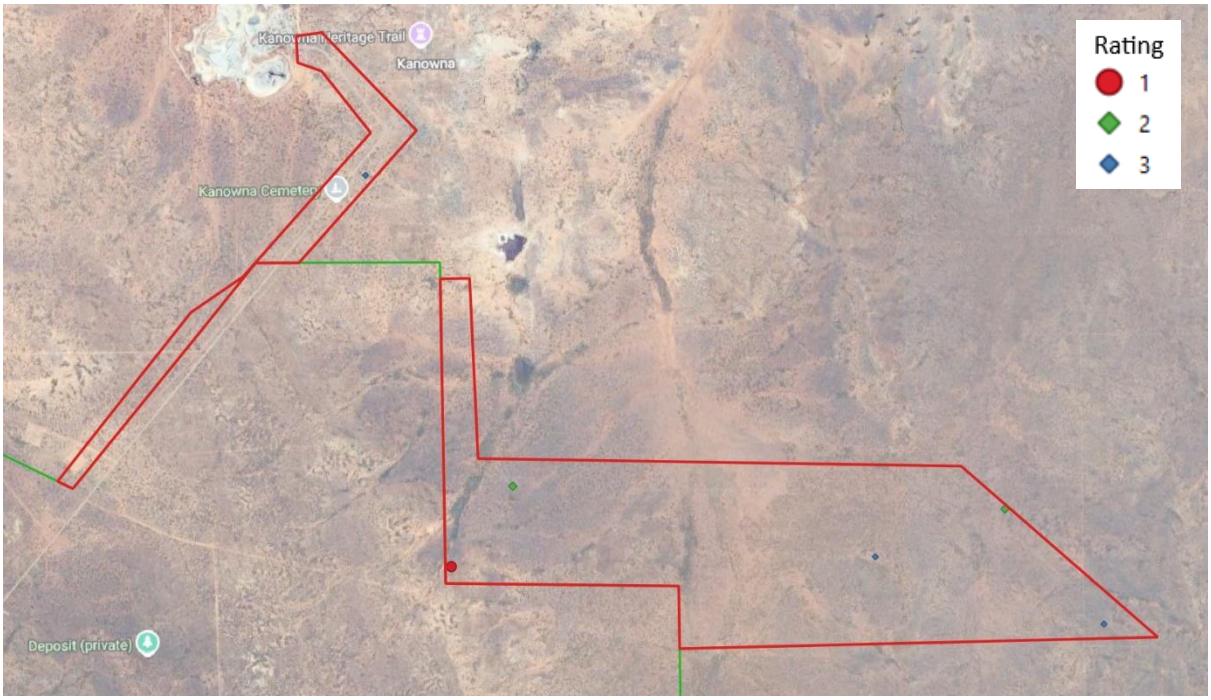
ATTRIBUTES

Anditi extracted and supplied a range of attributes: Rating (rating), Location (minx, miny), height above sea level (z) for each mound, mound radius (radius, m), mound height (height, m) and Mound ID (id).

Data is supplied as a Shapefile with attributes in coordinates of MGA94, zone 51.

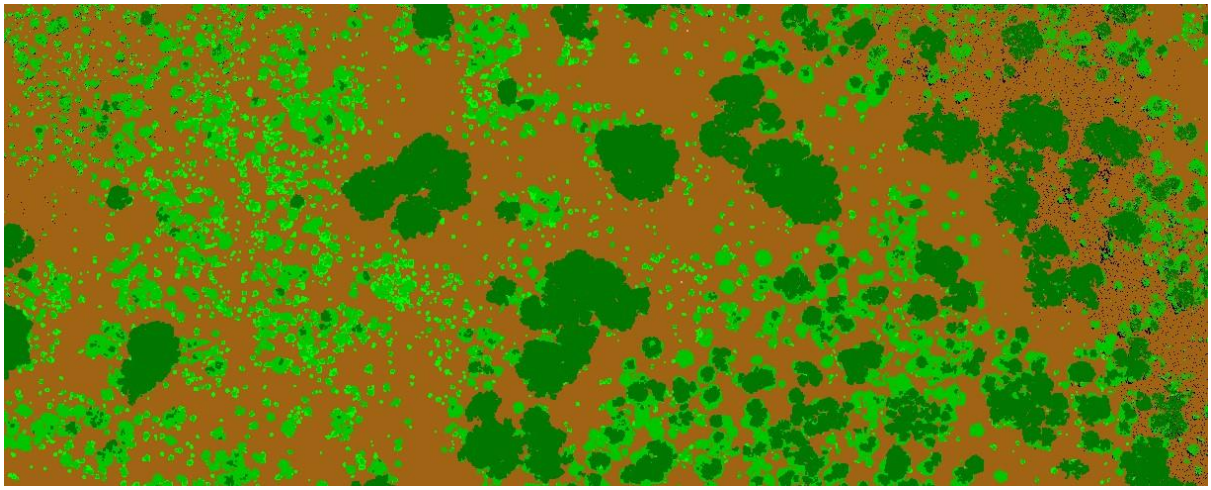
	id	z	minx	miny	radius	height	rating
1	3640	387.8031688300...	355461.5000000...	6598146.700000...	0.7	0.46903455	4
2	3182	386.6480458600...	355238.9000000...	6598784.099999...	0.7	0.59151106	4
3	27632	363.8430106199...	373349.5000000...	6605047.500000...	0.7	0.26681802	4
4	6380	380.3491894499...	355726.2999999...	6598653.700000...	0.7	0.59351517	4
5	24957	373.8552957800...	373364.7000000...	6603541.299999...	0.7	0.30757329	4
6	6302	380.9607028400...	355727.2999999...	6598605.900000...	0.7	0.43159873	4
7	21094	355.4547399200...	369872.9000000...	6604517.099999...	0.7	0.36041693	4
8	37993	351.7409552500...	369985.0999999...	6606112.700000...	0.7	0.38741604	4
9	78830	364.2376564699...	364798.2999999...	6610918.099999...	0.7	0.562148	4
10	3119	387.7680116199...	355302.2999999...	6598702.700000...	0.7	0.82526045	4
11	28043	373.7970672999...	374989.5000000...	6604382.900000...	0.7	0.55169293	4
12	6010	365.5286179500...	367332.0999999...	6604829.099999...	0.7	0.35402719	4
13	19363	359.2948871799...	368294.5000000...	6605971.700000...	0.7	0.51276836	4
14	10449	354.6748690900...	369234.9000000...	6605569.299999...	0.7	0.30339539	4
15	69018	352.7758814900...	371365.2999999...	6605634.900000...	0.7	0.84428133	4
16	29834	364.9536276800...	373415.2999999...	6604920.900000...	0.7	0.29983867	4
17	59996	357.1701551500...	368637.0999999...	6605537.099999...	0.7	0.30110879	4
18	40669	356.1294692899...	368896.7000000...	6605474.500000...	0.7	0.29220581	4
19	19749	360.1024740500...	372228.2999999...	6604427.099999...	0.7	0.25782829	4
20	17793	359.9111523999...	372316.7000000...	6604530.700000...	0.7	0.33534506	4
21	11220	382.3220631300...	355749.9000000...	6598077.299999...	0.7	0.52665217	4

SITE RATING OVERVIEW

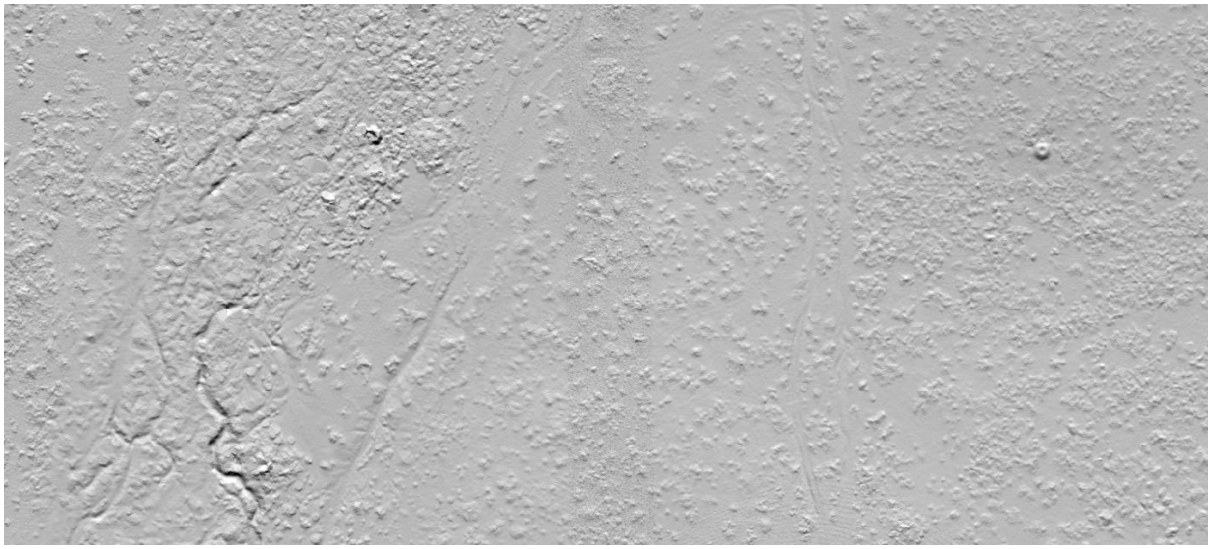


DATA

Anditi Classified Point Cloud example



Anditi Ground model example



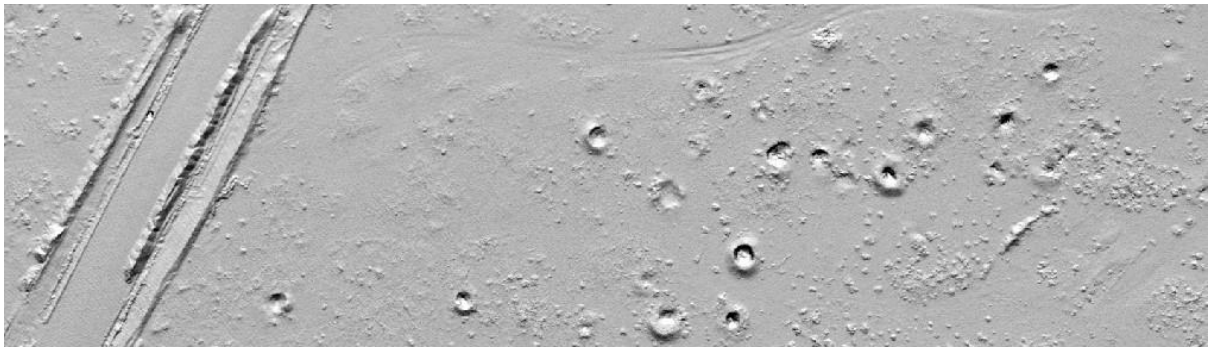
DATA ANALYSIS RESULTS

Issues discovered in this area that impact Malleefowl mound analysis and rating accuracy.

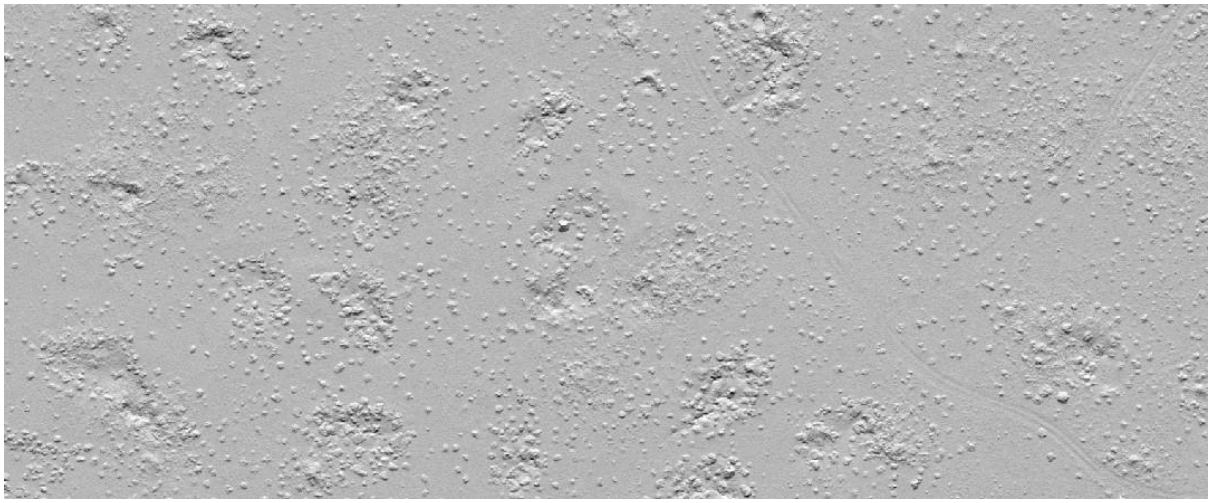
There is significant human impact on large parts of this area. This impact has created ground modification that is often very similar to Malleefowl mound earthworks or earthwork remnants. These human ground modifications take the form of conical mounds, circular mounds and ground depressions.

Where these features can be clearly identified as being likely to be false-positive Malleefowls mound they have been rated 4 – not likely to be a Malleefowl mound.

Malleefowl mound-like shapes. These features have the signature ground shape that defines Malleefowl mounds however they are not Malleefowl mounds.

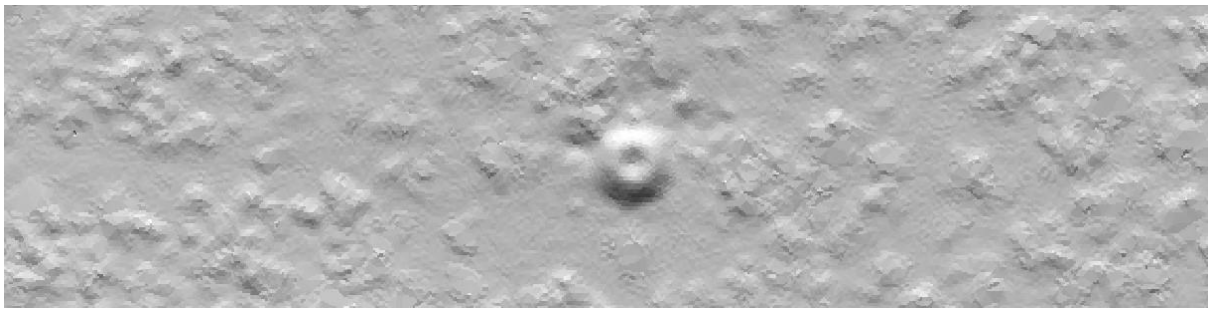


Human modified ground that has some of the characteristics that would cause the Anditi algorithms to identify these areas as being potential Malleefowl mounds. Especially where localised depression shapes occur.

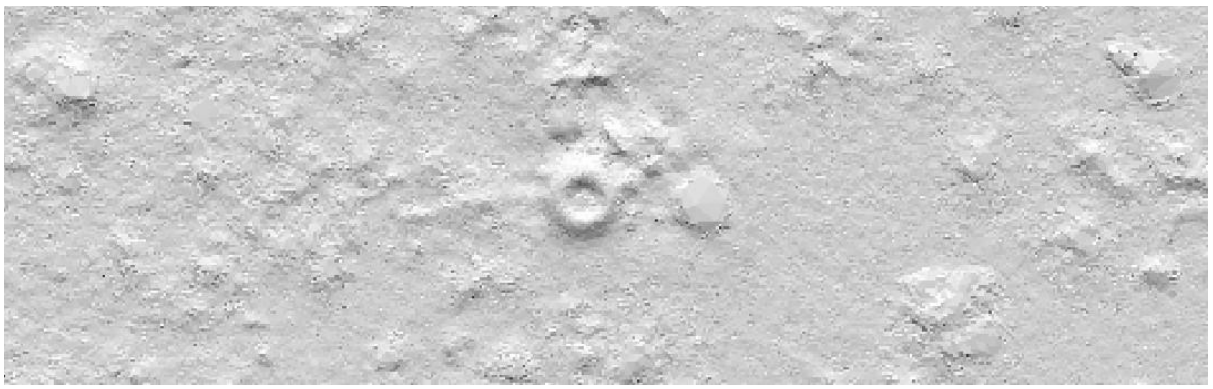


Site	Rated 1	Rated 2	Rated 3
1	0	0	1
2	1	2	2
3	0	0	0

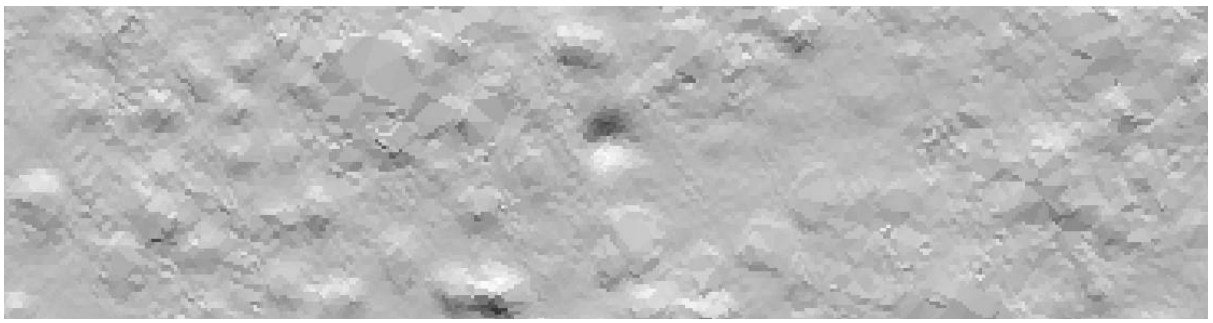
1 Rated mounds example



2 Rated mounds example



3 Rated mounds example



Conclusions

There is significant terrain and vegetation variation across this site, There is extensive mining terrain modification in the North of Site 1, extensive ground modification in Site 3, and Site 2 has natural terrain and vegetation.

There are very few good candidates for actual Malleefowl mounds, and these are almost exclusively found in Site 2 where natural terrain and vegetation are prevalent.

A round of visual inspection was completed to significantly reduce the false positives rated 3. It should be noted that there may still be false-positives in this dataset as man-made features mimic the shape and size of Malleefowl nests and depressions to the extent that it is not possible to exclude these accurately from remote-sensing data (LIDAR and Imagery).