Archaeological Impact Assessment

Proposed Hondekloof Nickel Mine:
Portion 6 of farm Nuwefontein, Kliprand District
Western Cape Province:

prepared for
Site Plan Consulting on behalf of Hondekloof Nickel (Pty) Ltd.

by

J.L. Lanham and A.H. Manhire

on behalf of:

CHARM
PO Box 176
Great Brak River
6525

Company No. CK 2006\133900\23
VAT No. 4240230989

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Executive Summary

An Archaeological Impact Assessment was conducted of the above named property from 31 July to 4 August 2007. The area was surveyed on foot and from a vehicle. Very little surface disturbance was encountered and conditions very favourable for locating artefacts and other archaeological occurrences.

The great many identified archaeological occurrences – covering the whole span of prehistoric human occupation of the area – are of considerable significance. Graves and materials of the recent colonial period were also encountered.

Archaeological material occurs mostly on the surface. It was noted that some sub-surface material does occur in alluvium deposits along the present drainage, but that this is almost certainly secondary in occurrence, being washed downslope from concentrations higher up. The proposed open-cast mining operations will severely impact much if not most of the prehistoric material. Consequently, it is recommended that the archaeological occurrences are systematically sampled by professional archaeologists before the outset of mining operations and that further developments at the property which deviate from the given plan be preceded by similar mitigation. These measures will ensure that representative samples of the archaeological materials are available for further study. At this stage it appears that the graves are not under threat of disturbance, but their presence should be noted and their protection ensured. If human remains are exposed during mining operations, then they must be dealt with in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the developer(s) and/or property owner(s).

Table of Contents

1. Introduction

1.1 Background

Site Plan Consulting appointed CARM to conduct an Archaeological Impact Assessment (AIA) on Portion 6 of the Farm Nuwefontein, Kliprand District, Western Cape Province as a consequence of a proposal to mine the property for nickel (refer to Plate 1).

Proposed nickel mining incorporates:

- Three opencast pits and access roads;
- Activities on site will include load and haul, plant, waste rock dump and fine tailings dam;

1.2. Purpose and Scope of the Study

Objectives of the Archaeological Impact Assessment are:

- To assess the study area for traces of archaeological materials;
- To identify options for archaeological mitigation in order to minimize potential negative impacts; and
- To make recommendations for archaeological mitigation.

Terms of Reference (ToR):

To visit the proposed mining site and to compile a Phase 1 Archaeological Assessment Report for submission to Site Plan Consulting.

1.3 Study Area

The site for proposed nickel mining is located immediately to the west of Kliprand Village, Western Cape. The study area is approximately 740 hectares in extent, and its main boundary points are as follows (map datum WGS 84):

A	30°35'42.21"S	18°41'2.03"E
B	30°35'56.81"S	18°40'47.21"E
C	30°36'48.46"S	18°38'27.81"E
D	30°36'15.08"S	18°38'5.54"E
E	30°35'13.95"S	18°38'32.92"E

The area is typical Namaqualand Klipkoppe Shrubland, almost uncultivated except for some disused fields in the south. The area has been used for small stock farming and the veld is in good condition.

The topography comprises low, rocky hills that descend from the northern side of the property to a shallow, east-west valley roughly in the middle of the study area. Along the southern boundary lies another wide shallow valley. The highest and lowest areas are approximately 980 m and 900 m above mean sea level. The area consists of gneissic rocks of the Namaqualand group. A feature of the area is the large number of glacial dropstones of Dwyka age which litter the landscape and which have provided abundant raw material for artefact production.

1.4 Approach to the Study

Very little archaeological work has been carried out in this area. Studies from the broader northern and western Cape lead to an expectation of small Late and Middle Stone Age sites with the possibility of Early Stone Age occurrences. The geomorphology makes the formation of caves or other "deposit-traps" such as pans unlikely, which militates against the formation of stratified deposits.

Site Plan Consulting, consultants to Hondekloof Nickel (Pty) Ltd provided a layout plan and surveyor's coordinate data indicating the location and extent of the study area. GPS fixes were taken of the walk tracks to show the area covered during the survey as well as locations of archaeological occurrences. Notes, digital memos and digital photographic records were also made.

2. Results

Plate 1 shows the AIA walk tracks and waypoints as fixed with a hand held GPS during the foot and vehicular surveys. Archaeological visibility was everywhere moderate to good.

Many archaeological occurrences of Stone Age origin were identified and recorded. The majority of these took the form of open surface scatters of Middle Stone Age artefacts although some buried material was also noted, being exposed by erosion along drainage courses. There were also a smaller number of Later Stone Age artefact concentrations, very different in character and generally spatially distinct from the earlier material. A sizable number of the artefacts were of a heavy, highly patinated form and almost certainly of Early Stone Age origin despite the almost complete lack of any diagnostic bifaces.

It is probably fair to say that no part of this property is entirely free of archaeological material. The rockier parts certainly have less material, but there is a low-level scatter, mainly Middle Stone Age (MSA), everywhere. There were some areas of concentration where the scatters became extraordinarily dense and widespread. This report mostly will concern these areas.

Site 1 (KR1, 2, 3, 4 and 5) (refer to Plates 2 to 6)
The most extensive scatter lies at the north-western corner of the property. It covers a very large area from about 400 m south of the boundary (KR5) and extends well north into the next property. We were unable to determine the most northerly extent of this scatter.

The majority of the artefacts appear to be of early Middle Stone Age origin. Raw materials include quartzite, quartz, banded-ironstone and various other minor categories. The number of artefacts is startling – a very rough guess could easily put the number in the region of a million to several million.

The assemblage is characterised by thick, oval to sub-round flakes with very rough retouch on the distal end. Also common were short, thick flake-blades. A few scrapers, mainly end-scrapers, as well as notched and denticulate pieces (again very robust in form) were also present. The vast majority of pieces were blocky cores and chunks with lesser numbers of flakes. The assemblage is characterised by a remarkable absence of points or blades and the complete absence of any backed pieces.

Many pieces have been carried by drainage down the slope and litter the stream bed and alluvium leading to the main valley. There are few smaller (less than 40 mm) flakes amongst the artefacts along the watercourse, but they are abundant in the main scatter. A much more detailed study is necessary to verify the exact nature of the assemblage but typologically it

would appear to contain elements common to both MSA 1 and MSA 2 tool assemblages. This being so, it could date to between 200 000 and 100 000 years ago.

Site 2 (KR6) (refer to Plate 7)
This comprised a single, small rock shelter less than 100m north of the boundary fence with Later Stone Age (LSA) material (a quartz blade and a few quartz flakes). There was no occupation deposit.

Site 3 (KR8) (refer to Plate 8)
KR8 is a built rock feature, some 1 to 1.5 m round by up to 1 m high on the bank of the stream. It is made up of large boulders assembled into a sub-round structure. It does not seem to be a grave, and might be the remains of an animal trap. The presence of this feature should be noted and it should be investigated if it comes under threat from the mining activities.

Site 4
A thin rather enigmatic and undifferentiated scatter (probably early LSA in origin) was noted on the stream bank of the side tributary some 10 m extending about 30 m south of the stone feature. It is comprised mostly of quartz and a few silcrete pieces. There is also one broken upper grindstone. No formal artefacts were seen in this rather rough assemblage.

Site 5 (KR10) (refer to Plates 9 to 11)
An isolated LSA occurrence was found about 150m west of a gate (KR9) close to the western boundary but within the study area. A medium-dense scatter of LSA stone artefacts and ostrich eggshell fragments was found on a level platform on the western side of a large rocky promontory overlooking the stream and the valley to the west. Raw materials included silcrete and banded ironstone. Several silcrete scrapers and a single trough-like grinding surface in the bedrock were noted.

A point of difference between the LSA and MSA at Kliprand was that silcrete was the favoured raw material in the LSA scatters but was barely present at any MSA site.

Site 6 (KR11, KR12) (refer to Plate 12)
In the main stream running to the west there is MSA material buried between 20 and 30 cm below surface exposed by erosion. There is also a continuous thin scatter on the surface. Waypoint 13 in the main valley is a further scatter. Here there appear to be appreciably more retouched pieces with a higher incidence of the round, almost spatulate pieces which, along with denticulates, seem to be the most commonly recurring retouched form. Also here are ESA occurrences which are everywhere mixed with the MSA. The ESA material is heavily rounded, and abraded, in contrast to the MSA material which is fresh and sharp where it has not been subjected to high energy transport. There are also occasional re-worked pieces.

Site 7 (KR13)
KR13 is another small mixed MSA/ESA scatter. Again the typical spatulate flake occurs here.

Site 8 (KR14 & 15) (refer to Plates 13 to 16)
KR14 is an extensive site in main valley. Evidence of the quarrying of bedrock. The scatter is on a flat sandy area extending some 150 m east and 20 m south, mostly just on the south side of the fence. The density of pieces is lower than the big site in the northwest of the property,

but again there is a higher incidence of retouched pieces here, with the most common of these being the spatulate and denticulate forms. Two end-scrapers were also noted. KR15 marks the end of the site where the density has dropped to close to background levels

Sites 9 (KR16) and 10 (KR17)
KR16 and 17 very small MSA scatters. There was a spatulate flake and one MSA point, rather rough and ready, perhaps accidental. Around northern side of hill there is some rough stone walling. This is probably of recent origin as a means of improving the natural kraal formed by the encircling low koppies.

Site 11 (KR18 &19)
Waypoints KR18 and 19 are along the southern boundary fence. The site is located by a small stream which passes beneath the fence. A small MSA scatter similar to the KR14 scatter but with fewer artefacts.

Site 12 (KR20 & 21) (refer to Plate 17)
KR 20 is a sandy area with thin scatter of MSA material. More spatulate and notched pieces. KR21 has MSA flakes on surface and exposed by erosion up shallow sandy valley. ESA material also present at low density.

Site 13 (KR23)
A small shepherd's thatch shelter on crest of hill at KR23. There is also a thin LSA scatter of silcrete, quartz and pieces of ostrich egg shell. There are 2 fairly large natural rock basins about 100m to the west which elsewhere have proved to be a local focus of Late Stone Age land use.

Site 14 (KR28 to 31) (refer to Plates 18 to 20)
A series of smaller artefact locations occur in the main valley at waypoints KR28 to 31. These are mostly smaller MSA scatters with frequent admixture of heavily worn ESA material. A single very worn rough ESA biface was found (Plates 36, 37). Because these occurrences are closely spaced, and because their density is often related to erosion, perturbation (heuweltjies), and exposure, it is probably fair to infer a general scatter extending all along the whole valley floor and towards the valley sides on the sandy surface. One LSA scraper on jasper-like material was also noted.

Site 15 (KR32 to 36) (refer to Plates 21 to 23)
There is an abandoned mudbrick farmhouse very close to Kliprand, just after where the road from the town enters the property (KR32). The mud plaster has almost all been eroded, and the structure is in the process of disintegration. It has a corrugated iron roof, but was probably thatched when it was first built. Behind the house are the stone remains of the demarcations for a laid out garden. Right next to the road in front of the house is a rough stone structure, of some 7 by 4 m internal measurements. It was probably a shed as it looks as if it was once roofed. East of this there is a threshing floor about 12 m in diameter. There are also at least 4 graves (KR33, 34 and 35) in the area near the threshing floor. There is another grave (KR36) next to the fence near the windmill and dam. This is a much more elaborate grave, with a cement structure and headstone of a Mrs van Zyl (1900 – 1953). There is also a thin, but ubiquitous MSA scatter over the homestead area. Assuming that Mrs van Zyl was an occupant of the house, the date of her death marks that the house is older than 60 years and thus subject to the provisions of the NHRA of 1999.

Site 16 (KR37) (refer to Plate 24)
Small (probably fewer than 50 artefacts) MSA scatter KR37 near northern boundary on a sandy area on higher ground, north of the main valley.

Sites 17 and 18 (KR38 to 40) (refer to Plates 25 and 26)
There Is a sizeable MSA scatter at waypoint KR38. Waypoint KR39 is less than 100 m east of KR38 and shows the MSA scatter becoming thinner as it extends downslope to KR40 which is a big MSA scatter at least 100 m east-to-west and 250 m north-to-south near the northern boundary. The assemblage is very similar in nature to the big site to the west, with little formal material, and consisting mostly of blocks and chunks. Also present is a great amount of unworked raw material and quartz blocks.

Site 19 (KR41).
KR41 is a low-density MSA scatter at least 100 m across. Again very similar material is present.

Site 20 (KR42).
KR42 is a low-density MSA scatter on a wide shallow saddle about 200m wide looking south over the main valley.

General
It should also be noted that an enormous amount of MSA material was seen along the track which crosses the veld north of the northern boundary of the property. This would indicate that the MSA occurrences in the general district are very extensive, so extensive even, that the main road through the town of Kliprand is densely littered with MSA artefacts. It is not possible to say whether these are in primary context or not.

3. Sources of Risk, Impact Identification and Assessment

- The proposed nickel mining as outlined in 1.1 above will involve vegetation clearing and earthmoving activities that will have a permanent negative impact on archaeological resources. Archaeological traces of Stone Age origin are very common and extensive and in primary context and are therefore of considerable significance.
- Mining activities will disturb large areas. It is very likely that archaeological materials occur in the undisturbed soil. Archaeological monitoring of vegetation clearing and earthmoving activities associated with mining should minimize negative impact on archaeological remains.
- It is the writers' understanding that the historical remains, homestead precinct and graves, fall outside the area for mining operations and, provided that the access road avoids encroaching to the south of the existing road in that area, there should be no danger to the historical remains. Ensuring that this is the case is the responsibility of the proposed mine operators.

Table 1 summarizes the potential impact of the proposed development on all of the Stone Age archaeological heritage resources with and without mitigation. As many of the occurrences are so similar only the major concentrations are seen as needing mitigation and that this mitigation serve as representative of the minor occurrences as well.

Table 1. Potential Impact on and Loss of Archaeological Heritage Resources

	With Mitigation	Without Mitigation
Extent	Local 1	Local 1
Duration	Permanent 3	Permanent 3
Intensity	Low 1	Low 2
Probability	Definite	Definite
Significance	Low	Medium
Status	Negative	Negative
Confidence	High	High

4. Required and Recommended Mitigation Measures

The following measures are required:

- Unmarked human burials may occur anywhere in the landscape and are often exposed during earthmoving activities. Human remains are protected by law and, if pre-colonial in age are dealt with by Heritage Western Cape, and if younger than 1500 AD by the South African Heritage Resourcs Agency.

It is recommended that:

- That Sites 8 and 17/18 should be thoroughly sampled by mapping and collection by a professional archaeologist. The total removal of the sites is not possible given their enormous size but the archaeologist should acquire a sufficient quantity of materials from different areas so as to provide the means to characterise the occurrence robustly.
- That Sites 1, 3. (the stone structure) and 5 be fenced off under supervision of a professional archaeologist, as current plans for the proposed mine do not indicate activities directly impacting on these localities, and that the fenced areas be declared in a legally enforceable manner as “no-go” zones within the mine precinct.
- The graves and historical homestead should be protected from destruction or disturbance by mining operations as is a requirement of law. *A fence must be erected around the graves under supervision of a professional archaeologist so that accidental destruction or damage cannot take place.* The new access road should avoid the historic homestead, associated structures and graves. If it becomes necessary to disturb the homestead or the graves this will require implementation of a full HIA of the homestead and implementation of the exhumation process mandated by law under the guidance of the SAHRA. Given the small size of the local population there are quite likely to be relatives of the buried people living in the village.
- Archaeological monitoring of vegetation clearing and earthmoving activities should be conducted by a professional at the start of mining and then whenever mining operations affect new areas.

5. Plates on following pages

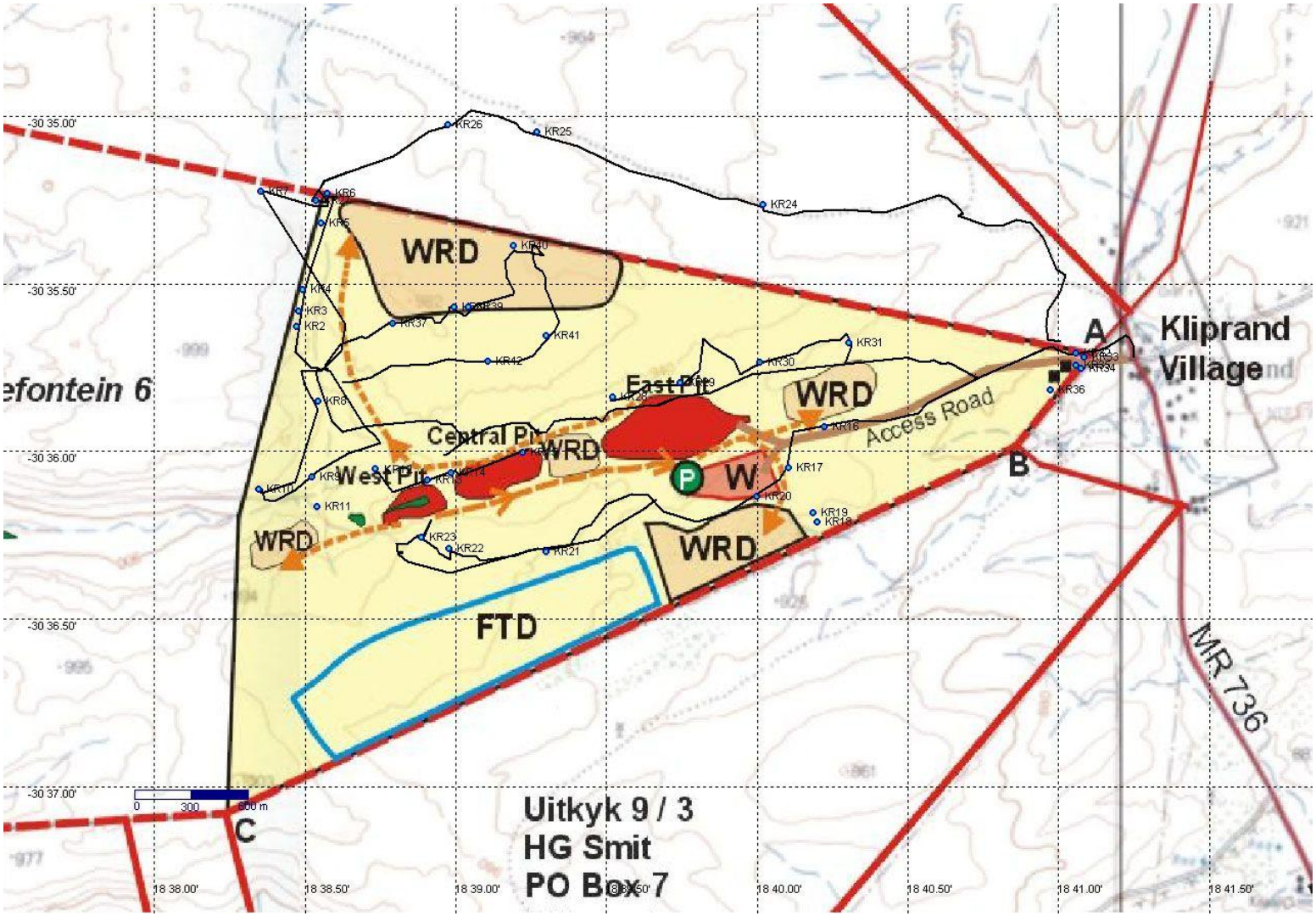

Plate 1: Study area. Red areas are proposed opencast pits, WRD – waste rock dump, FTD – fine tailings dam and W –plant location.

Plate 2: View southwards towards main valley showing erosion channel.

Plate 3: Artefacts in stream bed.

Plate 4: Site 1. General view of major north-west scatter.

Plate 5: Site 1. MSA Artefacts.

Plate 6: Site 1. General view of artefact scatter.

Plate 7: Site 2. small rock-shelter with LSA artefacts.

Plate 8: Site 3. Stone feature.

Plate 9: View from LSA Site 5.

Plate 10: Site 5. Grinding trough on bedrock.

Plate 11: Site 5. LSA scraper.

Plate 12: Artefacts in alluvium 20 to 30 cm below surface in drainage from Site 1.

Plate 13: Site 8. Big scatter in main valley, general view.

Plate 14: Site 8. Showing small flakes abundant in this site.

Plate 15: Site 8. MSA end-scraper.

Plate 16: Site 8. MSA quartzite scraper, showing retouch.

Plate 17: Site 12. Retouched banded-ironstone MSA artefacts.

Plate 18: Site 14. General view westwards up main valley. Many artefact occurrences are found along this drainage.

Plate 19: Site 14. Heavily worn ESA biface.

Plate 20: Site 14. LSA scraper.

Plate 21: Site 15. Front (east) of farmhouse.

Plate 22: Site 15. Kraal/shed immediately in front of farmhouse.

Plate 23: Site 15. Graves.

Plate 24: Near Site 16. Natural point – dorsal view.

Plate 25: Site 18. View north from Site 17.

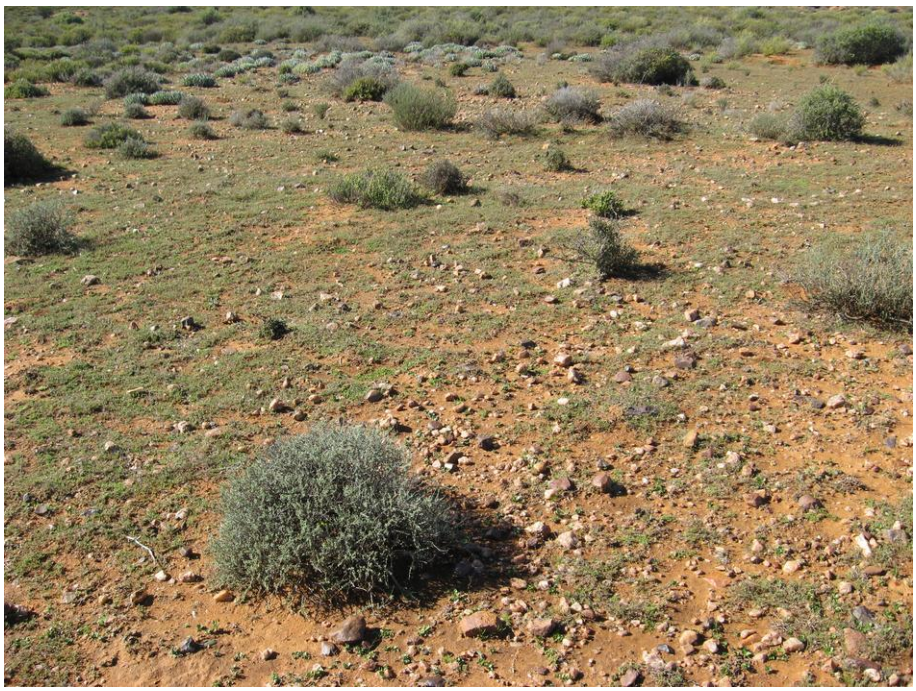

Plate 26: Site 18. Artefacts and raw materials.

6. Appendix 1.

GPS co-ordinates for waypoints. Datum,WGS84.

Waypoint	Site no.	Latitude (°S)	Longitude (°E)
2	1	30 35.63197'	18 38.47537'
3		30 35.58466'	18 38.48148'
4		30 35.52222'	18 38.49629'
5		30 35.32362'	18 38.55615'
6	2	30 35.23511'	18 38.57772'
7	fence	30 35.22964'	18 38.35885'
8	3	30 35.85438'	18 38.54618'
9	gate	30 36.07936'	18 38.52783'
10	5	30 36.11702'	18 38.35080'
11	6	30 36.16723'	18 38.54231'
12		30 36.05619'	18 38.73833'
13	7	30 36.09063'	18 38.91149'
14	8	30 36.06874'	18 38.98745'
15		30 36.00534'	18 39.22596'
16	9	30 35.93002'	18 40.22824'
17	10	30 36.05265'	18 40.10658'
18	11	30 36.21423'	18 40.20217'
19		30 36.18622'	18 40.19058'
20	12	30 36.13923'	18 40.00133'
21		30 36.30274'	18 39.30417'
22	a few tools	30 36.29469'	18 38.98134'
23	23	30 36.25961'	18 38.88896'
28	14	30 35.84215'	18 39.52368'
29		30 35.80063'	18 39.74705'
30		30 35.73819'	18 40.01324'
31		30 35.67864'	18 40.30774'
32	15	30 35.71115'	18 41.06252'
33		30 35.72274'	18 41.08794'
34		30 35.75686'	18 41.07925'
35		30 35.74656'	18 41.06155'
36		30 35.82091'	18 40.97626'
37	16	30 35.62296'	18 38.79401'
38	17 & 18	30 35.57178'	18 38.99840'
39		30 35.57307'	18 39.04603'
40		30 35.38929'	18 39.19441'
41	19	30 35.65965'	18 39.30546'
42	20	30 35.73432'	18 39.11008