

Phase 1 Heritage Impact Assessment of Disco Chicks Farm 2 (Farm 713), Sundays River Municipality.

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Executive Summary

- A Phase 1 Heritage Impact Assessment was carried out on Farm 713 (Disco Chicks Farm 2), Sundays River Municipality where the applicant (Venter Wildlife Trust) intends to establish a poultry broiler housing facility and citrus orchards with associated infrastructure.
- The proposed development area is underlain by Kirkwood Formation bedrock, which is capped by a >1m - thick cover of Quaternary colluvium and residual soils of low palaeontological sensitivity.
- There are no indications of aboveground prehistoric structures, rock art, graves, graveyards or historical structures older than 60 years within the survey area.
- The survey has yielded number of stone tools distributed as contextually derived surface scatters at the site.
- The site is considered to be of low archaeological sensitivity.

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Introduction

At the request of Public Process Consultants, a Phase 1 Heritage Impact Assessment was carried out on Farm 713 (Disco Chicks Farm 2), Sundays River Municipality where the applicant (Venter Wildlife Trust) intends to establish a poultry broiler housing facility and citrus orchards with associated infrastructure (**Fig. 1**). The survey is required as a prerequisite for new development in terms of the National Environmental Management Act and is also called for in terms of the National Heritage Resources Act 25 of 1999. The site visit and subsequent assessment took place in May 2013. The task involved identification of possible heritage sites or occurrences in the proposed zone, an assessment of their significance, possible impact by the proposed development and recommendations for mitigation where relevant.

Site information

Locality data

1:50 000 scale topographic map 3325 BC Coerney

1:250 000 scale geological map 3324 Port Elizabeth

Site Coordinates (**Fig 2**): A) 33°25'29.65"S 25°38'22.71"E

- B) 33°25'27.27"S 25°38'59.16"E
- C) 33°26'5.15"S 25°39'2.29"E
- D) 33°26'10.06"S 25°38'26.98"E

The site is located on Disco Chicks Farm 2 (Farm 713) in the Sundays River Valley Municipality, which is situated directly off the gravel road between the R335 (Zuurberg Road) and the town of Kirkwood (**Fig. 2**). The farm is made up of undulating plains and low mountains and foothills. The site is located against a 20° - 30° slope and is covered with dense thicket dominated by trees, shrubs and succulents (**Fig. 3 & 4**).

The poultry facility will consist of 12 broiler houses while the citrus orchards will entail the clearing of approximately 90 hectares of vegetation and the establishment of agricultural activities, as well as associated infrastructure for agriculture production.

Construction Phase activities are anticipated to be as follows:

- Clearing of vegetation for the establishment of broiler houses and associated infrastructure (30 ha).
- Levelling of the site for the foundations for 12 broiler houses measuring 120 m x 15 m each.
- Clearing of vegetation from portions of the site proposed for agriculture (90 ha).
- Levelling and landscaping the site to provide runoff control.
- Establishment of internal roads to provide access to orchards.
- Establishment of a storage dam for irrigation water.
- Establishment of citrus trees.
- Establishment of a farm managers house.

Geology

The geology of the area has been described by McLachlan & McMillan 1976; Toerien and Hill 1989; Le Roux 2000 and Shone 2006). The study area forms part of the Algoa Basin which is represented by a succession of sediments of Late Jurassic to Cretaceous age (**Fig. 5**). These sediments are represented by a diverse sediment fill, comprising the Enon, Kirkwood and Sundays River Formations of the Uitenhage Group. The Disco Chicks site is entirely underlain non-marine sediments of the Kirkwood Formation (*J-Kk*) which in turn overlies the Enon Formation (*Je*) to the north. To the south, the Sundays River Frm. (*Ks*) overlies and grade laterally into the Kirkwood Frm. The

Kirkwood Formation (*J-Kk*) represents the largest surviving area of mid-Mesozoic sedimentation in South Africa and is estimated to be Late Jurassic - Early Cretaceous in age. It is highly fossiliferous and consists of porous and permeable, coarse- to medium-grained channel sandstones, silty overbank mudrocks and palaeosols, characterized by variegated hues of green, grey and red, which were accumulated as a result of fluvial sedimentation. Superficial sediments (Quaternary) at the site are made up of red-brown soils containing localized gravel clasts and calcrete profiles (**Fig. 6**).

Methodology

The site was surveyed by vehicle and on foot, using a Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera for recording purposes. Relative surface distribution density of uncapped lithic material was calculated by conducting two 500m arbitrary transects across the study area. Relevant archaeological and paleontological information were assimilated for the report and integrated with data acquired during the on-site inspection.

Terms of reference for assessment

- Identify and map possible heritage resources;
- Determine and assess the potential impacts of the proposed development on potential heritage resources;
- Recommend mitigation measures to minimize potential impacts associated with the proposed development.

Background

Palaeontology

There is a long history of vertebrate fossil collection from the Kirkwood Formation, beginning in 1845 with the discovery of a number of fragmentary bones including a partial skull with teeth now identified as the stegosaur *Paranthodon africanus* (Galton and Coombs, 1981). Several key fossil sites are found to the west of the present study area along the junction of the Bezuidenhouts, Wit and Sundays River near Dunbrodie and Blue Cliff Station, as well as near Kirkwood (Kirkwood Cliffs) (**Fig. 7**) Fossils

include a range of plant remains (fern, cycad and conifer taxa) and vertebrate bones, including those of large dinosaurs (McLachlan and Anderson 1976; Rich *et al.* 1983; Ross *et al.* 1999; de Klerk *et al.* 1998; de Klerk *et al.* 2000). Invertebrate fossils associated with the Kirkwood Frm. plant bed localities seem to be commonly associated with either fresh-water or estuarine conditions. Calcrete-rich palaeosols and palaeobotanical evidence within the Kirkwood alluvium indicate that semi-arid and warm climates prevailed at the time of its formation.

Archaeology

Earliest human habitation in the Sundays River Valley is indicated by the presence by bifacial stone tools, which are assigned to Early Stone Age. ESA bifaces that possibly dates back to between 1.5 million and 300 000 years ago, and younger, Middle Stone Ages flake-blade industries generally occur as contextually derived individual finds on the landscape or occasionally as capped assemblages within Quaternary alluvial deposits. Stone Age sites have been recorded along the Sundays River Valley near Addo and Kirkwood. The incidence of surface scatters usually declines further away from localized areas such as riverine or spring sites. At Amanzi Springs, west of Grassridge near Addo, ESA *in situ* artefacts were found along with well-preserved plant and faunal remains within spring sediments (Deacon 1970).

Cave and rock shelters in the adjacent mountains to the north and east frequently contain archaeological remains and rock art associated with San hunter-gatherers who inhabited the area during the last ten thousand years (Deacon 1976). The Melkhoutboom Cave, located in the Suurberg Mountains, is a Later Stone Age site that dates back 15000 years. Nearby rock paintings in the Suurberge confirm that this area was inhabited by San hunter-gatherers. Khoi pastoralists occupied the region some 2000 years ago and introduced domesticated animals and pottery to the region (Deacon 1984). Khoi pastoralist sites are often found close to the banks of large streams and rivers. Khoi groups who lived in the area during historical times include the Iqua, Damasqua and Gonaqua clans. The Suurberg area is also known for numerous skirmishes that took place between the Xhosa inhabitants, European settlers, British military and Khoi pastoralists during the 18th and 19th centuries and some historical remains related to these events may still be preserved.

Results of Survey

There are no bedrock (Kirkwood sandstones and mudrocks) exposed at the site. Test pits show that it is capped by a substantial Quaternary (superficial) overburden (**Fig. 8**). The foot survey was at times hampered by dense vegetation (**Fig. 9**), but several features, including artefacts were located in secondary context on the surface near open clearings and tracks (**Fig 10 & 11, Table 1**). The stone tools are mainly represented by large, irregular flakes, chunks and reduced pieces made from quartzite (**Fig. 12**). Investigation of exposed topsoils shows no evidence for the accumulation and preservation of intact fossil material within the Quaternary sediments covering the underlying sedimentary rocks.

Impact Statement and Recommendations

The proposed development area is underlain by Kirkwood Formation bedrock, which is capped by a >1m -thick cover of Quaternary colluvium and residual soils of low palaeontological sensitivity.

- As a result of the comparatively thick mantle of superficial sediments that blanket the affected area, potential palaeontological impact during the construction and operational phase of the development is considered to be improbable. There are no major palaeontological grounds to halt the proposed development.

There are no indications of aboveground prehistoric structures, or rock art within the survey area. There is no evidence of graves, graveyards or historical structures older than 60 years at the site. The survey has yielded number of stone tools distributed as contextually derived surface scatters at the site. The artefacts are not associated with any other archaeological material. Overall, the site is considered to be of low archaeological sensitivity.

- It is anticipated that potential archaeological impact during the construction as well as the operational phase of the development will affect material that are not significant enough to warrant surface collection as part of a Phase 2 procedure.

- However, although there are no major archaeological grounds to halt the proposed development it is noted that the archaeological assessment is based solely on surface visibility and evidence provided by existing soil cuttings.
- It is advised that any **in situ** archaeological material found during the course of excavation/ ground clearing activities should be reported to the relevant heritage resources authority (ECPHRA Contact details: Mr Sello Mokhanya, 74 Alexander Road, King Williams Town 5600; smokhanya@ecphra.org.zaso) and that possible intact finds may require further investigation and/or a rescue operation at the cost of the developer.

References

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Declaration

L. Rossouw does independent specialist consulting and is in no way connected with the proponents of the development, other than delivery of consulting services.

Figures & Tables

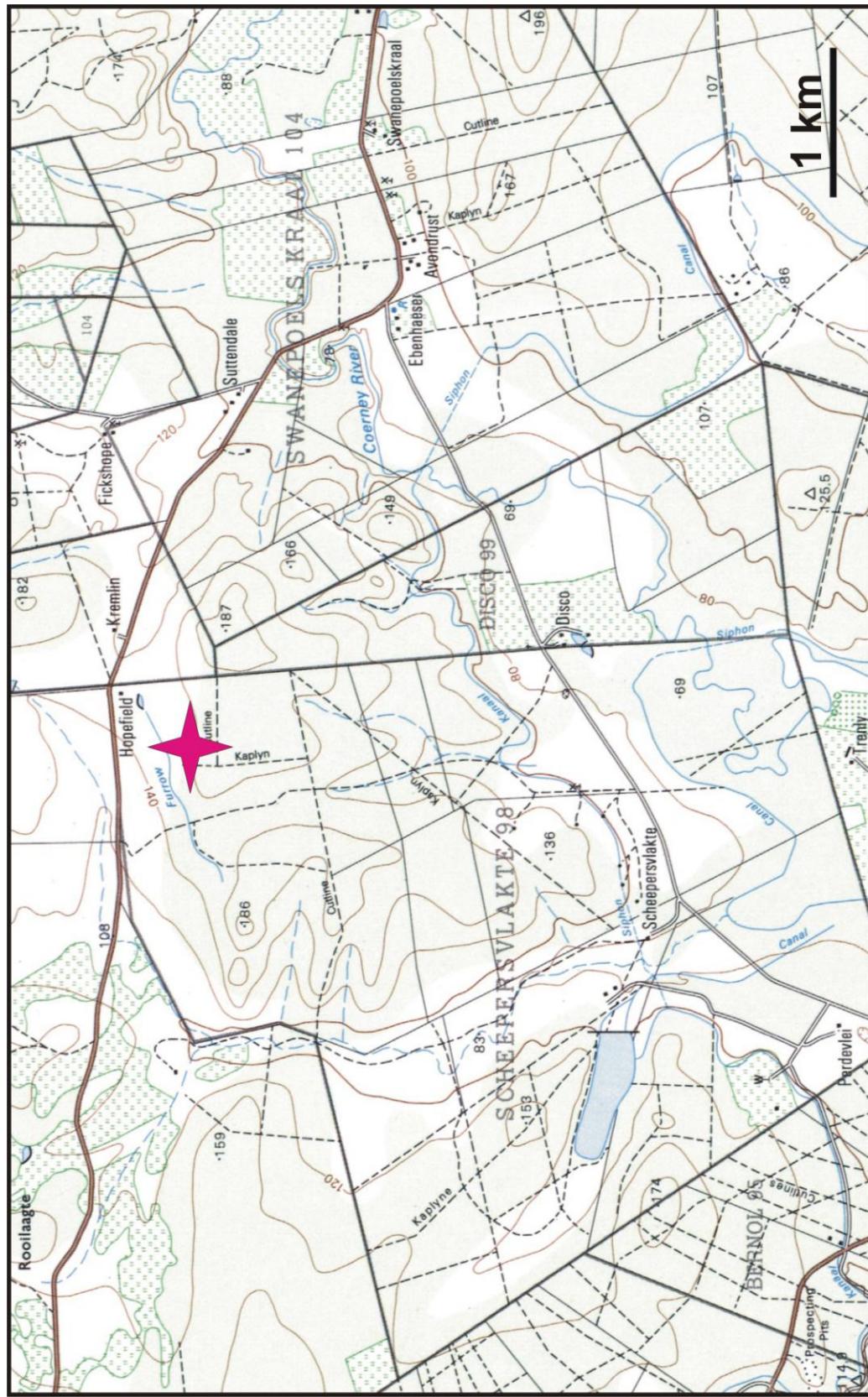


Figure 1. Portion of 1:50 000 topographical map of the locality (3325 BC Coerney).

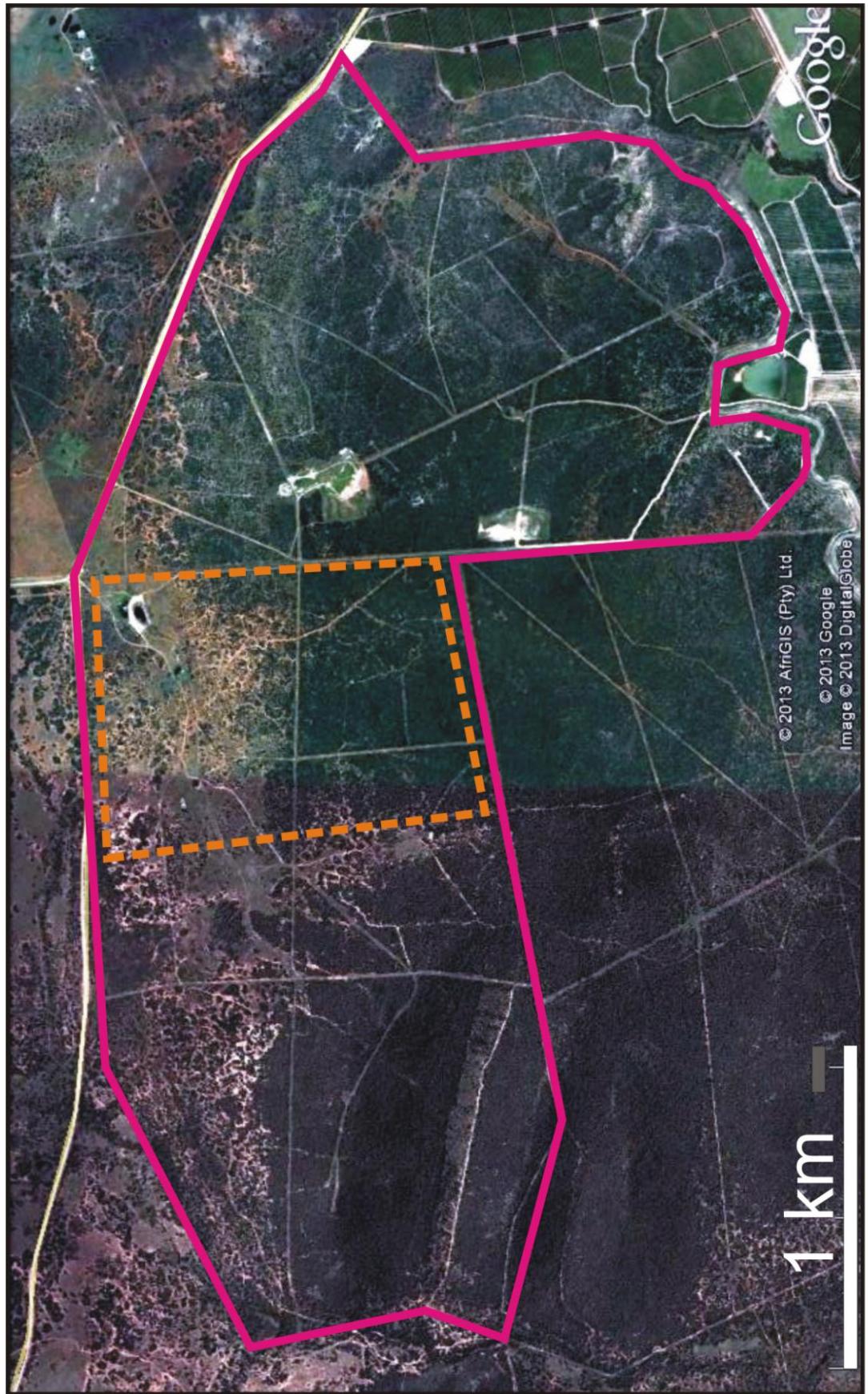


Figure 2. Aerial view of Farm 713. The affected area is indicated by the dotted line.

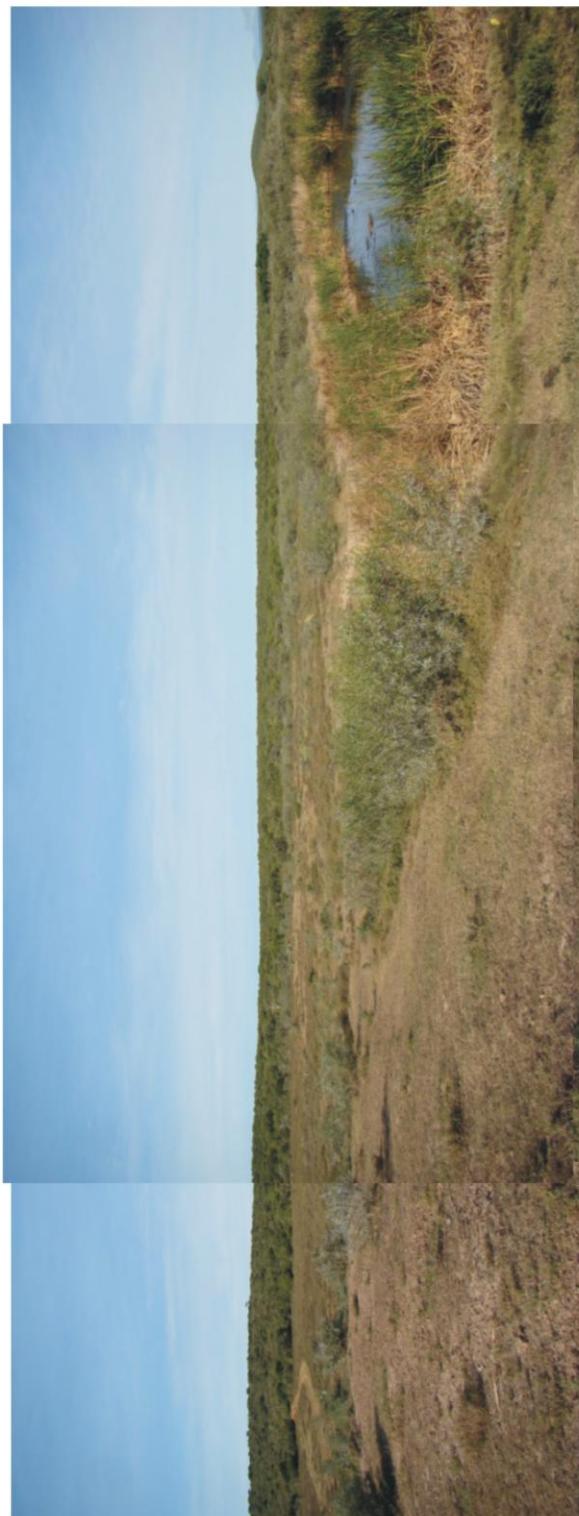
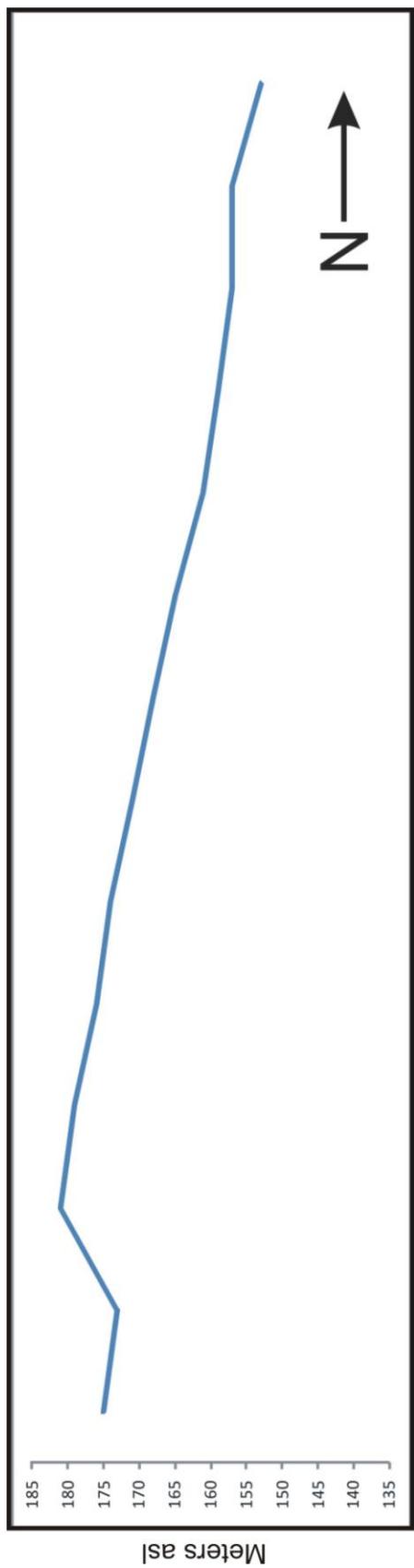


Figure 3. The site is located against a 20° - 30° hillslope (above) and covered with dense thicket dominated by trees, shrubs and succulents (below).



Figure 4. Panoramic view of the site, looking northeast

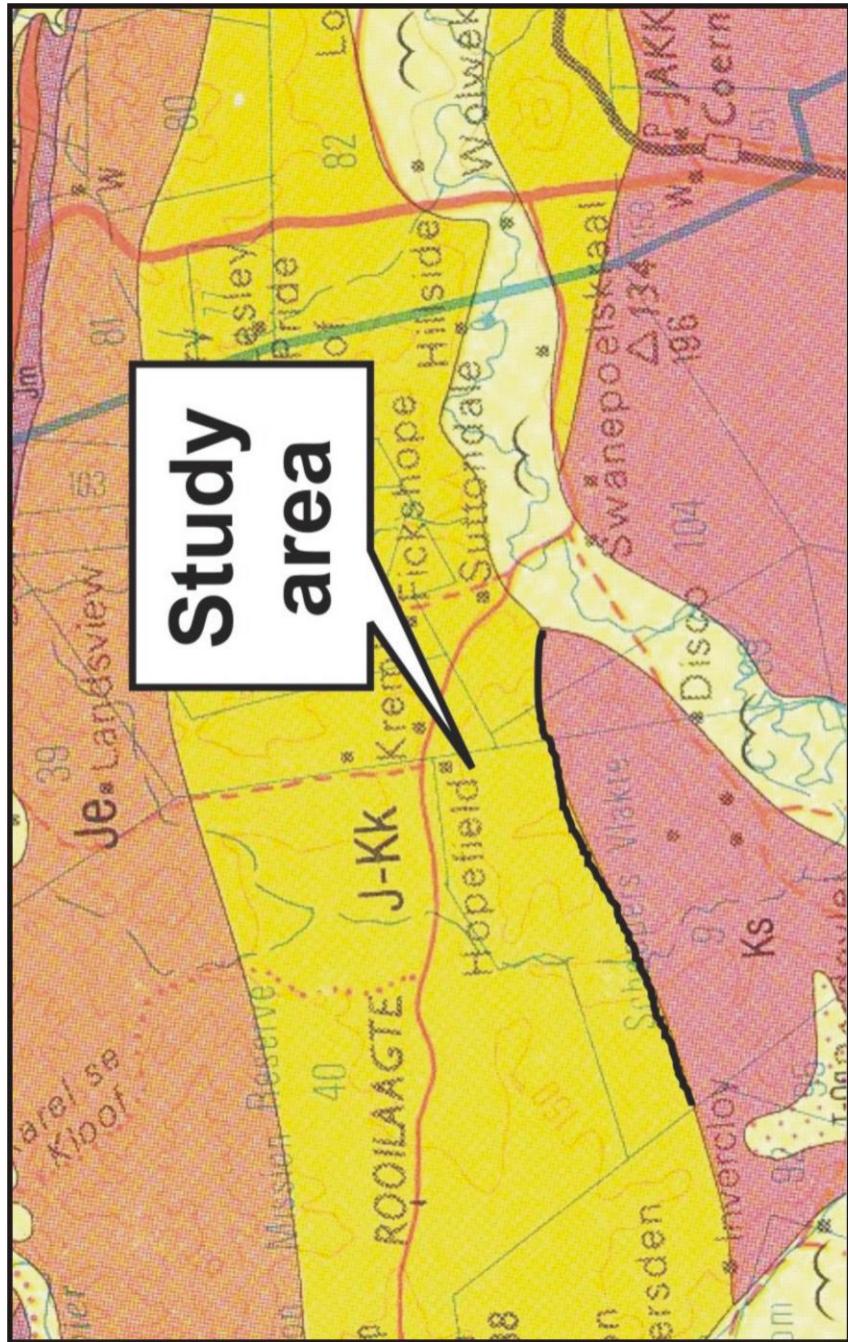
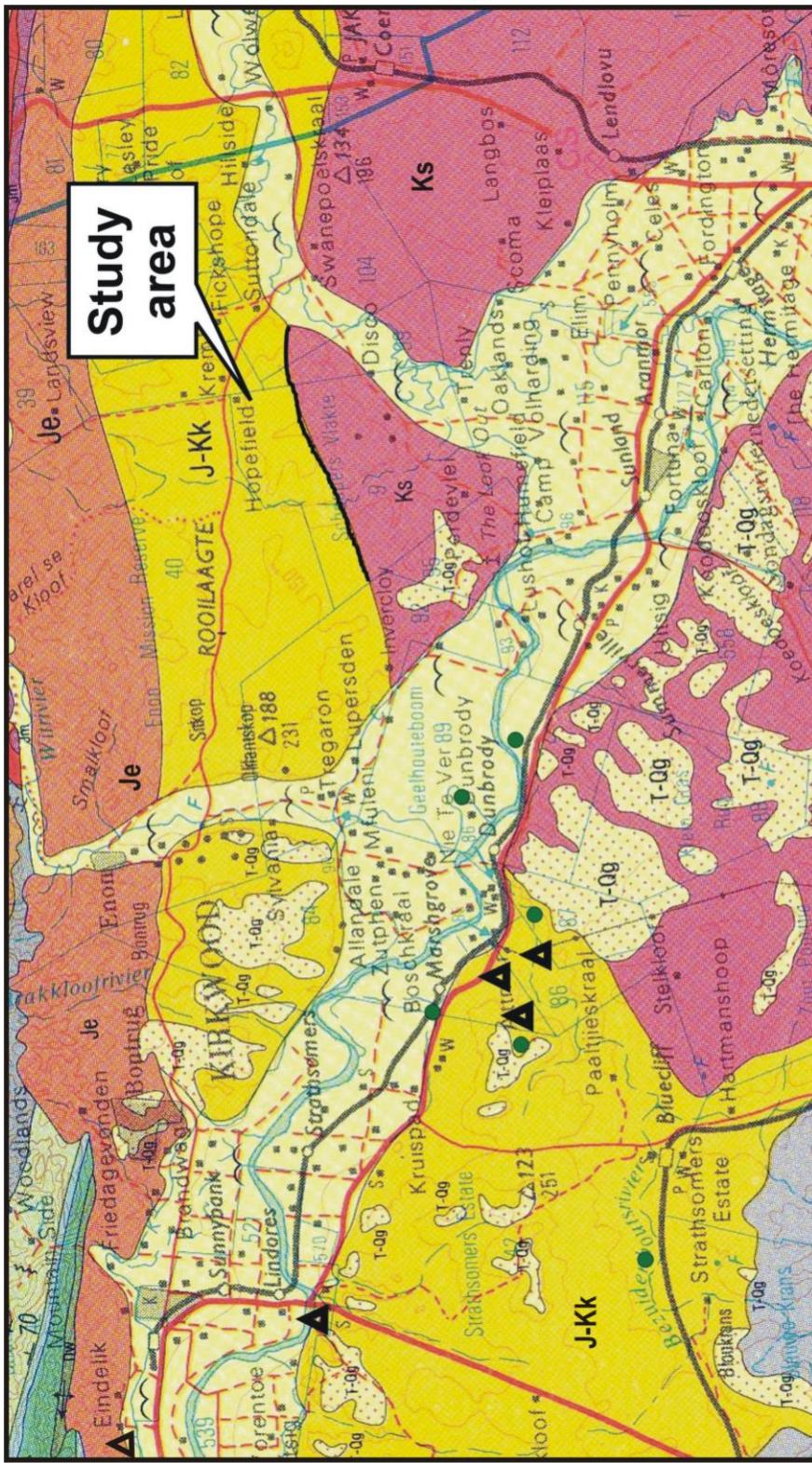


figure 5. Portion of the 250 000 scale geological map 3324 Port Elizabeth illustrating the geology of the region. The Disco Chicks site is entirely underlain non-marine sediments of the Kirkwood Formation (J-Kk) which in turn overlies the Enon Formation (Je) to the north. To the south, the Sundays River Fm. (Ks) overlies and grade laterally into the Kirkwood Fm.



Figure 6. Superficial sediments (Quaternary) at the site are made up of red-brown soils containing localized gravel clasts and calcrete profiles.



▲ Fossil reptile site ● Fossil plant site

Figure 7. Portion of the 250 000 scale geological map with key palaeontological localities (3324 Port Elizabeth).



Figure 8. Test pits indicate that the site is capped by a >1m -thick mantle of Quaternary colluvium and residual soils of low palaeontological sensitivity.



Figure 9. The affected area is characterized by dense vegetation.



Figure 10. several features, including farm related (modern) structures such as workers' huts (above left) and dam walls (above right) are located near open clearings and tracks.

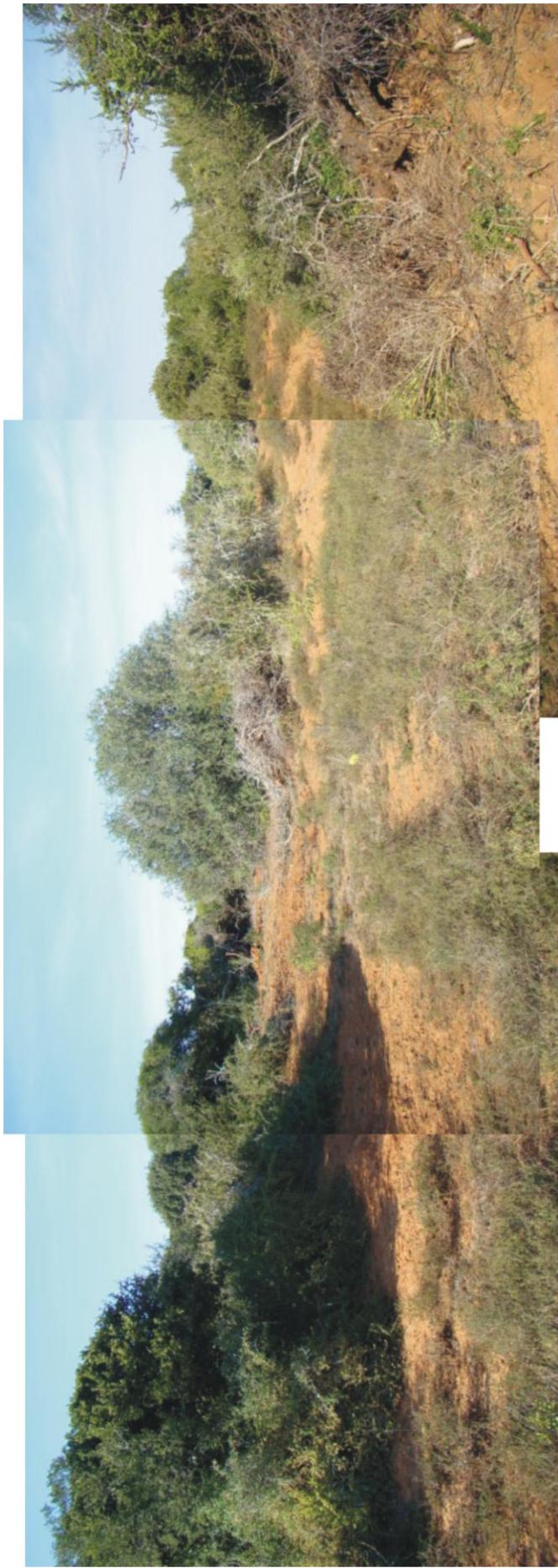


Figure 11. Surface scatters of individual stone tools occur in secondary context near open clearings.

Table 1. Features recorded during survey.

	Feature	Coordinates	
1	Homestead	33°25'31.33"S	25°38'55.73"E
2	Man-made dam	33°25'33.15"S	25°38'54.48"E
3	Dilapidated building	33°25'37.53"S	25°38'47.65"E
4	Man-made dam	33°25'39.17"S	25°38'33.78"E
5	Stone tool (surface find)	33°25'44.60"S	25°38'50.04"E
6	Stone tool (surface find)	33°25'43.08"S	25°38'53.47"E
7	Stone tool (surface find)	33°25'43.70"S	25°38'53.06"E
8	Stone tool (surface find)	33°25'46.15"S	25°38'42.44"E
9	Stone tool (surface find)	33°25'37.51"S	25°38'45.51"E
10	Stone tool (surface find)	33°25'38.71"S	25°38'42.27"E
11	Stone tool (surface find)	33°25'42.10"S	25°38'35.58"E
12	Stone tool (surface find)	33°25'44.16"S	25°38'37.87"E
13	Stone tool (surface find)	33°25'42.98"S	25°38'39.61"E
14	Stone tool (surface find)	33°25'47.96"S	25°38'40.14"E
15	Stone tool (surface find)	33°25'53.10"S	25°38'52.40"E
16	Stone tool (surface find)	33°26'0.13"S	25°38'54.22"E
17	Stone tool (surface find)	33°25'35.31"S	25°38'56.64"E



Figure 12. Stone tools are mainly represented by large, irregular flakes, chunks and reduced pieces made from quartzite.

Appendix 1: Survey Log.

Index	Elevation	Leg Length	Course	Position
1	100 m	22 m	330° true	S33 26 40.4 E25 39 21.4
2	103 m	7 m	5° true	S33 26 39.8 E25 39 20.9
3	103 m	118 m	11° true	S33 26 39.6 E25 39 21.0
4	103 m	118 m	351° true	S33 26 35.8 E25 39 21.8
5	103 m	7 m	356° true	S33 26 32.1 E25 39 21.1
6	104 m	11 m	350° true	S33 26 31.8 E25 39 21.1
7	105 m	6 m	334° true	S33 26 31.4 E25 39 21.0
8	106 m	16 m	329° true	S33 26 31.3 E25 39 20.9
9	107 m	7 m	344° true	S33 26 30.8 E25 39 20.6
10	107 m	20 m	329° true	S33 26 30.6 E25 39 20.5
11	109 m	27 m	307° true	S33 26 30.0 E25 39 20.1
12	111 m	65 m	297° true	S33 26 29.5 E25 39 19.3
13	115 m	8 m	297° true	S33 26 28.6 E25 39 17.1
14	115 m	31 m	296° true	S33 26 28.4 E25 39 16.8
15	117 m	31 m	299° true	S33 26 28.0 E25 39 15.7
16	121 m	8 m	297° true	S33 26 27.5 E25 39 14.6
17	121 m	23 m	295° true	S33 26 27.4 E25 39 14.4
18	122 m	15 m	298° true	S33 26 27.1 E25 39 13.6
19	123 m	23 m	297° true	S33 26 26.8 E25 39 13.1
20	125 m	35 m	298° true	S33 26 26.5 E25 39 12.3
21	128 m	31 m	294° true	S33 26 26.0 E25 39 11.1
22	129 m	15 m	309° true	S33 26 25.6 E25 39 10.0
23	130 m	17 m	316° true	S33 26 25.2 E25 39 09.5
24	133 m	32 m	302° true	S33 26 24.9 E25 39 09.1
25	137 m	28 m	304° true	S33 26 24.3 E25 39 08.0
26	140 m	21 m	303° true	S33 26 23.8 E25 39 07.1
27	142 m	7 m	300° true	S33 26 23.4 E25 39 06.4
28	143 m	13 m	306° true	S33 26 23.3 E25 39 06.2
29	144 m	19 m	298° true	S33 26 23.1 E25 39 05.8
30	146 m	19 m	295° true	S33 26 22.8 E25 39 05.2
31	148 m	18 m	336° true	S33 26 22.5 E25 39 04.5
32	151 m	21 m	359° true	S33 26 22.0 E25 39 04.2
33	153 m	30 m	357° true	S33 26 21.4 E25 39 04.2
34	154 m	65 m	356° true	S33 26 20.4 E25 39 04.1
35	156 m	40 m	356° true	S33 26 18.3 E25 39 04.0
36	160 m	8 m	356° true	S33 26 17.0 E25 39 03.8
37	160 m	25 m	356° true	S33 26 16.7 E25 39 03.8
38	163 m	17 m	356° true	S33 26 15.9 E25 39 03.8
39	164 m	52 m	356° true	S33 26 15.4 E25 39 03.7
40	167 m	133 m	355° true	S33 26 13.7 E25 39 03.6
41	171 m	73 m	355° true	S33 26 09.4 E25 39 03.1
42	175 m	10 m	353° true	S33 26 07.1 E25 39 02.9
43	175 m	68 m	355° true	S33 26 06.8 E25 39 02.9
44	176 m	2 m	7° true	S33 26 04.6 E25 39 02.7
45	177 m	1 m	85° true	S33 26 04.5 E25 39 02.7
46	175 m	0 m	192° true	S33 26 04.5 E25 39 02.7
47	178 m	1 m	174° true	S33 26 04.5 E25 39 02.7
48	176 m	1 m	196° true	S33 26 04.6 E25 39 02.7
49	176 m	2 m	284° true	S33 26 04.6 E25 39 02.7
50	176 m	1 m	348° true	S33 26 04.6 E25 39 02.6
51	175 m	26 m	354° true	S33 26 04.6 E25 39 02.6
52	178 m	80 m	355° true	S33 26 03.7 E25 39 02.5
53	178 m	162 m	355° true	S33 26 01.2 E25 39 02.2
54	181 m	130 m	356° true	S33 25 55.9 E25 39 01.7

55	181 m	61 m	354° true	S33 25 51.7 E25 39 01.3
56	179 m	21 m	337° true	S33 25 49.7 E25 39 01.1
57	178 m	57 m	349° true	S33 25 49.1 E25 39 00.8
58	176 m	6 m	357° true	S33 25 47.3 E25 39 00.4
59	176 m	25 m	353° true	S33 25 47.1 E25 39 00.4
60	174 m	24 m	359° true	S33 25 46.3 E25 39 00.3
61	172 m	62 m	356° true	S33 25 45.5 E25 39 00.2
62	168 m	18 m	356° true	S33 25 43.5 E25 39 00.1
63	166 m	45 m	357° true	S33 25 43.0 E25 39 00.0
64	163 m	74 m	355° true	S33 25 41.5 E25 38 59.9
65	160 m	37 m	355° true	S33 25 39.1 E25 38 59.7
66	157 m	17 m	0° true	S33 25 37.9 E25 38 59.5
67	157 m	21 m	344° true	S33 25 37.4 E25 38 59.6
68	156 m	11 m	319° true	S33 25 36.7 E25 38 59.3
69	157 m	64 m	324° true	S33 25 36.5 E25 38 59.1
70	154 m	74 m	339° true	S33 25 34.8 E25 38 57.6
71	153 m	21 m	331° true	S33 25 32.6 E25 38 56.6
72	154 m	1 m	64° true	S33 25 32.0 E25 38 56.2
73	153 m	3 m	75° true	S33 25 32.0 E25 38 56.2
74	153 m	1 m	220° true	S33 25 31.9 E25 38 56.3
75	153 m	3 m	46° true	S33 25 32.0 E25 38 56.3
76	153 m	3 m	155° true	S33 25 31.9 E25 38 56.4
77	153 m	1 m	64° true	S33 25 32.0 E25 38 56.4
78	153 m	5 m	234° true	S33 25 32.0 E25 38 56.5
79	154 m	2 m	241° true	S33 25 32.1 E25 38 56.3
80	154 m	3 m	219° true	S33 25 32.1 E25 38 56.2
81	153 m	2 m	178° true	S33 25 32.2 E25 38 56.2
82	153 m	2 m	30° true	S33 25 32.2 E25 38 56.2
83	155 m	1 m	339° true	S33 25 32.2 E25 38 56.2
84	154 m	0 m	44° true	S33 25 32.2 E25 38 56.2
85	154 m	2 m	301° true	S33 25 32.2 E25 38 56.2
86	155 m	1 m	206° true	S33 25 32.1 E25 38 56.2
87	154 m	3 m	9° true	S33 25 32.2 E25 38 56.1
88	154 m	1 m	72° true	S33 25 32.1 E25 38 56.2
89	151 m	0 m	242° true	S33 25 32.1 E25 38 56.2
90	155 m	3 m	86° true	S33 25 32.1 E25 38 56.2
91	153 m	3 m	174° true	S33 25 32.0 E25 38 56.3
92	154 m	14 m	230° true	S33 25 32.1 E25 38 56.3
93	155 m	3 m	142° true	S33 25 32.4 E25 38 55.9
94	155 m	23 m	182° true	S33 25 32.5 E25 38 56.0
95	154 m	12 m	192° true	S33 25 33.2 E25 38 56.0
96	154 m	2 m	306° true	S33 25 33.6 E25 38 55.9
97	153 m	22 m	175° true	S33 25 33.6 E25 38 55.8
98	154 m	1 m	175° true	S33 25 34.3 E25 38 55.9
99	155 m	19 m	157° true	S33 25 34.3 E25 38 55.9
100	155 m	1 m	212° true	S33 25 34.9 E25 38 56.1
101	155 m	7 m	5° true	S33 25 34.9 E25 38 56.1
102	155 m	8 m	351° true	S33 25 34.7 E25 38 56.1
103	154 m	3 m	333° true	S33 25 34.4 E25 38 56.1
104	155 m	10 m	359° true	S33 25 34.3 E25 38 56.0
105	155 m	2 m	347° true	S33 25 34.0 E25 38 56.0
106	153 m	13 m	340° true	S33 25 33.9 E25 38 56.0
107	154 m	7 m	12° true	S33 25 33.5 E25 38 55.8
108	153 m	21 m	2° true	S33 25 33.3 E25 38 55.9
109	155 m	8 m	44° true	S33 25 32.6 E25 38 55.9
110	142 m	0 m	198° true	S33 25 32.4 E25 38 56.1
111	156 m	0 m	241° true	S33 25 32.4 E25 38 56.1
112	161 m	0 m	172° true	S33 25 32.4 E25 38 56.1

113	154 m	0 m	130° true	S33 25 32.4 E25 38 56.1
114	154 m	2 m	44° true	S33 25 32.4 E25 38 56.1
115	153 m	11 m	354° true	S33 25 32.4 E25 38 56.2
116	154 m	1 m	123° true	S33 25 32.0 E25 38 56.1
117	153 m	15 m	285° true	S33 25 32.1 E25 38 56.2
118	153 m	45 m	264° true	S33 25 31.9 E25 38 55.6
119	153 m	54 m	235° true	S33 25 32.1 E25 38 53.9
120	153 m	55 m	232° true	S33 25 33.1 E25 38 52.2
121	153 m	11 m	206° true	S33 25 34.2 E25 38 50.5
122	153 m	0 m	287° true	S33 25 34.5 E25 38 50.3
123	152 m	20 m	210° true	S33 25 34.5 E25 38 50.3
124	152 m	54 m	234° true	S33 25 35.1 E25 38 49.9
125	154 m	24 m	248° true	S33 25 36.1 E25 38 48.2
126	153 m	1 m	329° true	S33 25 36.4 E25 38 47.4
127	153 m	27 m	237° true	S33 25 36.3 E25 38 47.3
128	153 m	50 m	240° true	S33 25 36.8 E25 38 46.5
129	154 m	58 m	253° true	S33 25 37.6 E25 38 44.8
130	154 m	69 m	277° true	S33 25 38.2 E25 38 42.6
131	154 m	79 m	280° true	S33 25 37.9 E25 38 40.0
132	152 m	10 m	243° true	S33 25 37.4 E25 38 37.0
133	152 m	1 m	7° true	S33 25 37.6 E25 38 36.6
134	153 m	5 m	91° true	S33 25 37.5 E25 38 36.6
135	153 m	3 m	328° true	S33 25 37.5 E25 38 36.9
136	153 m	3 m	213° true	S33 25 37.5 E25 38 36.8
137	152 m	22 m	327° true	S33 25 37.5 E25 38 36.7
138	151 m	27 m	289° true	S33 25 36.9 E25 38 36.3
139	151 m	12 m	310° true	S33 25 36.6 E25 38 35.3
140	150 m	2 m	331° true	S33 25 36.4 E25 38 34.9
141	151 m	8 m	340° true	S33 25 36.3 E25 38 34.9
142	149 m	4 m	352° true	S33 25 36.1 E25 38 34.8
143	149 m	2 m	349° true	S33 25 36.0 E25 38 34.8
144	149 m	8 m	13° true	S33 25 35.9 E25 38 34.7
145	147 m	1 m	181° true	S33 25 35.7 E25 38 34.8
146	148 m	3 m	295° true	S33 25 35.7 E25 38 34.8
147	148 m	2 m	215° true	S33 25 35.7 E25 38 34.7
148	147 m	3 m	156° true	S33 25 35.7 E25 38 34.6
149	149 m	7 m	146° true	S33 25 35.8 E25 38 34.7
150	148 m	10 m	157° true	S33 25 36.0 E25 38 34.9
151	149 m	8 m	163° true	S33 25 36.3 E25 38 35.0
152	149 m	5 m	142° true	S33 25 36.6 E25 38 35.1
153	150 m	2 m	120° true	S33 25 36.7 E25 38 35.2
154	150 m	27 m	106° true	S33 25 36.7 E25 38 35.3
155	150 m	14 m	118° true	S33 25 37.0 E25 38 36.3
156	151 m	5 m	156° true	S33 25 37.2 E25 38 36.8
157	151 m	8 m	189° true	S33 25 37.3 E25 38 36.9
158	152 m	6 m	191° true	S33 25 37.6 E25 38 36.8
159	152 m	12 m	167° true	S33 25 37.8 E25 38 36.8
160	152 m	19 m	181° true	S33 25 38.2 E25 38 36.9
161	153 m	11 m	125° true	S33 25 38.8 E25 38 36.8
162	154 m	4 m	233° true	S33 25 39.0 E25 38 37.2
163	154 m	1 m	341° true	S33 25 39.0 E25 38 37.1
164	154 m	3 m	352° true	S33 25 39.0 E25 38 37.0
165	153 m	14 m	5° true	S33 25 38.9 E25 38 37.0
166	152 m	11 m	341° true	S33 25 38.4 E25 38 37.1
167	153 m	2 m	99° true	S33 25 38.1 E25 38 36.9
168	152 m	2 m	62° true	S33 25 38.1 E25 38 37.0
169	152 m	1 m	43° true	S33 25 38.1 E25 38 37.1
170	152 m	5 m	343° true	S33 25 38.0 E25 38 37.1

171	152 m	6 m	353° true	S33 25 37.9 E25 38 37.1
172	151 m	8 m	334° true	S33 25 37.7 E25 38 37.1
173	151 m	3 m	229° true	S33 25 37.5 E25 38 36.9
174	151 m	2 m	225° true	S33 25 37.5 E25 38 36.8
175	151 m	2 m	274° true	S33 25 37.6 E25 38 36.8
176	152 m	42 m	255° true	S33 25 37.6 E25 38 36.7
177	153 m	20 m	219° true	S33 25 37.9 E25 38 35.1
178	154 m	40 m	189° true	S33 25 38.4 E25 38 34.6
179	156 m	1 m	22° true	S33 25 39.7 E25 38 34.4
180	155 m	17 m	14° true	S33 25 39.7 E25 38 34.4
181	155 m	23 m	151° true	S33 25 39.1 E25 38 34.6
182	157 m	39 m	144° true	S33 25 39.8 E25 38 35.0
183	158 m	35 m	149° true	S33 25 40.8 E25 38 35.9
184	160 m	21 m	148° true	S33 25 41.8 E25 38 36.6
185	162 m	12 m	158° true	S33 25 42.3 E25 38 37.0
186	163 m	8 m	248° true	S33 25 42.7 E25 38 37.2
187	163 m	15 m	158° true	S33 25 42.8 E25 38 36.9
188	165 m	49 m	176° true	S33 25 43.3 E25 38 37.1
189	168 m	95 m	180° true	S33 25 44.8 E25 38 37.3
190	172 m	71 m	176° true	S33 25 47.9 E25 38 37.2
191	172 m	91 m	174° true	S33 25 50.2 E25 38 37.4
192	170 m	11 m	176° true	S33 25 53.1 E25 38 37.8
193	170 m	3 m	17° true	S33 25 53.5 E25 38 37.8
194	170 m	34 m	355° true	S33 25 53.4 E25 38 37.9
195	170 m	52 m	351° true	S33 25 52.3 E25 38 37.7
196	170 m	47 m	351° true	S33 25 50.7 E25 38 37.4
197	172 m	0 m	205° true	S33 25 49.2 E25 38 37.2
198	171 m	6 m	99° true	S33 25 49.2 E25 38 37.2
199	171 m	39 m	87° true	S33 25 49.2 E25 38 37.4
200	171 m	117 m	90° true	S33 25 49.1 E25 38 38.9
201	171 m	125 m	90° true	S33 25 49.2 E25 38 43.5
202	172 m	73 m	91° true	S33 25 49.2 E25 38 48.3
203	172 m	45 m	89° true	S33 25 49.2 E25 38 51.2
204	173 m	4 m	78° true	S33 25 49.2 E25 38 52.9
205	173 m	27 m	90° true	S33 25 49.2 E25 38 53.1
206	172 m	2 m	260° true	S33 25 49.2 E25 38 54.1
207	174 m	21 m	84° true	S33 25 49.2 E25 38 54.1
208	174 m	68 m	91° true	S33 25 49.1 E25 38 54.9
209	178 m	14 m	90° true	S33 25 49.1 E25 38 57.5
210	179 m	56 m	91° true	S33 25 49.1 E25 38 58.1
211	181 m	14 m	97° true	S33 25 49.2 E25 39 00.2
212	182 m	4 m	267° true	S33 25 49.2 E25 39 00.8
213	182 m	1 m	354° true	S33 25 49.2 E25 39 00.6
214	181 m	4 m	98° true	S33 25 49.2 E25 39 00.6
215	183 m	6 m	95° true	S33 25 49.2 E25 39 00.8
216	182 m	8 m	234° true	S33 25 49.2 E25 39 01.0
217	182 m	3 m	324° true	S33 25 49.4 E25 39 00.7
218	182 m	74 m	323° true	S33 25 49.3 E25 39 00.7
219	178 m	30 m	322° true	S33 25 47.4 E25 38 59.0
220	175 m	11 m	322° true	S33 25 46.6 E25 38 58.3
221	174 m	26 m	320° true	S33 25 46.4 E25 38 58.0
222	172 m	6 m	305° true	S33 25 45.7 E25 38 57.4
223	172 m	6 m	18° true	S33 25 45.6 E25 38 57.2
224	172 m	4 m	207° true	S33 25 45.4 E25 38 57.3
225	171 m	14 m	133° true	S33 25 45.6 E25 38 57.2
226	172 m	58 m	144° true	S33 25 45.9 E25 38 57.6
227	177 m	39 m	143° true	S33 25 47.4 E25 38 58.9
228	179 m	30 m	144° true	S33 25 48.4 E25 38 59.8

229	181 m	19 m	95° true	S33 25 49.2 E25 39 00.5
230	182 m	1 m	23° true	S33 25 49.2 E25 39 01.2
231	181 m	14 m	204° true	S33 25 49.2 E25 39 01.2
232	182 m	6 m	303° true	S33 25 49.6 E25 39 01.0
233	181 m	4 m	289° true	S33 25 49.5 E25 39 00.8
234	180 m	3 m	314° true	S33 25 49.5 E25 39 00.7
235	181 m	41 m	350° true	S33 25 49.4 E25 39 00.6
236	180 m	48 m	357° true	S33 25 48.1 E25 39 00.3
237	176 m	67 m	357° true	S33 25 46.6 E25 39 00.2
238	173 m	53 m	356° true	S33 25 44.4 E25 39 00.1
239	170 m	52 m	356° true	S33 25 42.7 E25 38 59.9
240	166 m	72 m	356° true	S33 25 41.0 E25 38 59.8
241	162 m	41 m	356° true	S33 25 38.7 E25 38 59.6
242	160 m	24 m	341° true	S33 25 37.4 E25 38 59.5
243	160 m	84 m	326° true	S33 25 36.7 E25 38 59.2
244	157 m	11 m	339° true	S33 25 34.4 E25 38 57.4
245	156 m	9 m	116° true	S33 25 34.1 E25 38 57.2
246	155 m	10 m	191° true	S33 25 34.2 E25 38 57.5
247	156 m	39 m	153° true	S33 25 34.5 E25 38 57.5
248	157 m	30 m	143° true	S33 25 35.6 E25 38 58.2
249	158 m	17 m	139° true	S33 25 36.4 E25 38 58.9
250	157 m	17 m	160° true	S33 25 36.8 E25 38 59.3
251	158 m	6 m	179° true	S33 25 37.4 E25 38 59.5
252	158 m	20 m	179° true	S33 25 37.6 E25 38 59.5
253	160 m	57 m	176° true	S33 25 38.2 E25 38 59.6
254	163 m	62 m	174° true	S33 25 40.0 E25 38 59.7
255	166 m	13 m	176° true	S33 25 42.0 E25 39 00.0
256	167 m	45 m	176° true	S33 25 42.5 E25 39 00.0
257	170 m	66 m	176° true	S33 25 43.9 E25 39 00.1
258	174 m	18 m	178° true	S33 25 46.1 E25 39 00.3
259	175 m	44 m	176° true	S33 25 46.6 E25 39 00.3
260	177 m	22 m	179° true	S33 25 48.1 E25 39 00.5
261	178 m	14 m	279° true	S33 25 48.8 E25 39 00.5
262	178 m	62 m	325° true	S33 25 48.7 E25 38 59.9
263	175 m	54 m	323° true	S33 25 47.1 E25 38 58.5
264	171 m	13 m	324° true	S33 25 45.7 E25 38 57.3
265	168 m	1 m	135° true	S33 25 45.3 E25 38 57.0
266	170 m	7 m	146° true	S33 25 45.3 E25 38 57.0
267	170 m	8 m	31° true	S33 25 45.5 E25 38 57.2
268	170 m	1 m	358° true	S33 25 45.3 E25 38 57.3
269	168 m	0 m	129° true	S33 25 45.3 E25 38 57.3
270	172 m	0 m	107° true	S33 25 45.3 E25 38 57.3
271	170 m	3 m	199° true	S33 25 45.3 E25 38 57.4
272	170 m	5 m	249° true	S33 25 45.4 E25 38 57.3
273	170 m	2 m	243° true	S33 25 45.4 E25 38 57.1
274	169 m	0 m	114° true	S33 25 45.5 E25 38 57.1
275	169 m	9 m	249° true	S33 25 45.5 E25 38 57.1
276	169 m	9 m	241° true	S33 25 45.6 E25 38 56.8
277	170 m	7 m	240° true	S33 25 45.7 E25 38 56.4
278	170 m	5 m	234° true	S33 25 45.8 E25 38 56.2
279	169 m	2 m	246° true	S33 25 45.9 E25 38 56.1
280	169 m	4 m	237° true	S33 25 45.9 E25 38 56.0
281	169 m	11 m	286° true	S33 25 46.0 E25 38 55.9
282	169 m	1 m	344° true	S33 25 45.9 E25 38 55.4
283	169 m	4 m	326° true	S33 25 45.9 E25 38 55.4
284	168 m	1 m	289° true	S33 25 45.8 E25 38 55.3
285	167 m	8 m	292° true	S33 25 45.8 E25 38 55.3
286	167 m	3 m	304° true	S33 25 45.7 E25 38 55.0

287	167 m	14 m	336° true	S33 25 45.6 E25 38 54.9
288	167 m	7 m	42° true	S33 25 45.2 E25 38 54.7
289	165 m	0 m	246° true	S33 25 45.1 E25 38 54.9
290	170 m	1 m	96° true	S33 25 45.1 E25 38 54.9
291	167 m	13 m	124° true	S33 25 45.1 E25 38 54.9
292	167 m	1 m	37° true	S33 25 45.3 E25 38 55.4
293	168 m	1 m	346° true	S33 25 45.3 E25 38 55.4
294	167 m	4 m	321° true	S33 25 45.2 E25 38 55.4
295	167 m	1 m	269° true	S33 25 45.1 E25 38 55.3
296	166 m	5 m	250° true	S33 25 45.1 E25 38 55.2
297	165 m	11 m	214° true	S33 25 45.2 E25 38 55.0
298	167 m	6 m	250° true	S33 25 45.5 E25 38 54.8
299	166 m	18 m	234° true	S33 25 45.6 E25 38 54.6
300	167 m	2 m	198° true	S33 25 45.9 E25 38 54.0
301	168 m	2 m	183° true	S33 25 46.0 E25 38 54.0
302	166 m	9 m	155° true	S33 25 46.0 E25 38 54.0
303	165 m	0 m	236° true	S33 25 46.3 E25 38 54.1
304	169 m	1 m	210° true	S33 25 46.3 E25 38 54.1
305	165 m	0 m	23° true	S33 25 46.4 E25 38 54.1
306	169 m	0 m	78° true	S33 25 46.4 E25 38 54.1
307	165 m	1 m	51° true	S33 25 46.4 E25 38 54.1
308	168 m	4 m	127° true	S33 25 46.3 E25 38 54.1
309	167 m	7 m	162° true	S33 25 46.4 E25 38 54.3
310	167 m	5 m	186° true	S33 25 46.6 E25 38 54.3
311	169 m	4 m	27° true	S33 25 46.8 E25 38 54.3
312	169 m	3 m	15° true	S33 25 46.7 E25 38 54.4
313	169 m	6 m	47° true	S33 25 46.6 E25 38 54.4
314	168 m	6 m	56° true	S33 25 46.4 E25 38 54.6
315	169 m	7 m	51° true	S33 25 46.3 E25 38 54.8
316	168 m	6 m	68° true	S33 25 46.2 E25 38 55.0
317	169 m	1 m	57° true	S33 25 46.1 E25 38 55.2
318	168 m	18 m	75° true	S33 25 46.1 E25 38 55.3
319	169 m	13 m	62° true	S33 25 45.9 E25 38 55.9
320	169 m	15 m	62° true	S33 25 45.7 E25 38 56.4
321	169 m	6 m	85° true	S33 25 45.5 E25 38 56.9
322	170 m	2 m	24° true	S33 25 45.5 E25 38 57.1
323	171 m	12 m	51° true	S33 25 45.4 E25 38 57.2
324	170 m	8 m	49° true	S33 25 45.2 E25 38 57.5
325	166 m	0 m	85° true	S33 25 45.0 E25 38 57.7
326	168 m	0 m	351° true	S33 25 45.0 E25 38 57.7
327	172 m	0 m	12° true	S33 25 45.0 E25 38 57.7
328	170 m	7 m	54° true	S33 25 45.0 E25 38 57.7
329	170 m	8 m	77° true	S33 25 44.9 E25 38 58.0
330	169 m	9 m	65° true	S33 25 44.8 E25 38 58.3
331	171 m	0 m	21° true	S33 25 44.7 E25 38 58.6
332	165 m	0 m	145° true	S33 25 44.7 E25 38 58.6
333	169 m	1 m	69° true	S33 25 44.7 E25 38 58.6
334	175 m	1 m	55° true	S33 25 44.7 E25 38 58.6
335	171 m	0 m	318° true	S33 25 44.7 E25 38 58.6
336	170 m	0 m	326° true	S33 25 44.7 E25 38 58.6
337	165 m	1 m	245° true	S33 25 44.7 E25 38 58.6
338	170 m	2 m	258° true	S33 25 44.7 E25 38 58.6
339	174 m	1 m	228° true	S33 25 44.7 E25 38 58.5
340	171 m	0 m	177° true	S33 25 44.7 E25 38 58.5
341	174 m	1 m	77° true	S33 25 44.7 E25 38 58.5
342	171 m	2 m	70° true	S33 25 44.7 E25 38 58.5
343	170 m	13 m	63° true	S33 25 44.7 E25 38 58.6
344	170 m	3 m	164° true	S33 25 44.5 E25 38 59.1

345	171 m	2 m	280° true	S33 25 44.6 E25 38 59.1
346	170 m	17 m	245° true	S33 25 44.6 E25 38 59.0
347	170 m	3 m	264° true	S33 25 44.8 E25 38 58.4
348	170 m	16 m	346° true	S33 25 44.8 E25 38 58.3
349	169 m	5 m	358° true	S33 25 44.3 E25 38 58.1
350	169 m	7 m	3° true	S33 25 44.1 E25 38 58.1
351	168 m	1 m	282° true	S33 25 43.9 E25 38 58.1
352	168 m	10 m	195° true	S33 25 43.9 E25 38 58.1
353	168 m	5 m	176° true	S33 25 44.2 E25 38 58.0
354	168 m	9 m	230° true	S33 25 44.4 E25 38 58.0
355	169 m	4 m	255° true	S33 25 44.6 E25 38 57.7
356	168 m	8 m	154° true	S33 25 44.6 E25 38 57.6
357	169 m	5 m	337° true	S33 25 44.9 E25 38 57.7
358	168 m	5 m	60° true	S33 25 44.7 E25 38 57.6
359	168 m	10 m	38° true	S33 25 44.6 E25 38 57.8
360	168 m	3 m	32° true	S33 25 44.4 E25 38 58.0
361	168 m	13 m	165° true	S33 25 44.3 E25 38 58.1
362	169 m	3 m	220° true	S33 25 44.7 E25 38 58.2
363	169 m	16 m	233° true	S33 25 44.8 E25 38 58.1
364	169 m	9 m	229° true	S33 25 45.1 E25 38 57.6
365	166 m	0 m	211° true	S33 25 45.3 E25 38 57.4
366	173 m	0 m	301° true	S33 25 45.3 E25 38 57.4
367	169 m	6 m	242° true	S33 25 45.3 E25 38 57.4
368	168 m	1 m	0° true	S33 25 45.4 E25 38 57.2
369	169 m	8 m	324° true	S33 25 45.4 E25 38 57.2
370	168 m	56 m	318° true	S33 25 45.1 E25 38 57.0
371	165 m	71 m	320° true	S33 25 43.8 E25 38 55.5
372	162 m	34 m	318° true	S33 25 42.1 E25 38 53.8
373	160 m	3 m	111° true	S33 25 41.2 E25 38 52.9
374	156 m	0 m	52° true	S33 25 41.3 E25 38 53.0
375	161 m	0 m	59° true	S33 25 41.3 E25 38 53.0
376	161 m	1 m	90° true	S33 25 41.3 E25 38 53.0
377	160 m	7 m	216° true	S33 25 41.3 E25 38 53.0
378	160 m	4 m	222° true	S33 25 41.4 E25 38 52.9
379	159 m	6 m	255° true	S33 25 41.5 E25 38 52.8
380	160 m	3 m	290° true	S33 25 41.6 E25 38 52.5
381	160 m	1 m	133° true	S33 25 41.6 E25 38 52.4
382	164 m	0 m	296° true	S33 25 41.6 E25 38 52.5
383	160 m	0 m	343° true	S33 25 41.6 E25 38 52.5
384	157 m	0 m	24° true	S33 25 41.6 E25 38 52.5
385	157 m	0 m	349° true	S33 25 41.6 E25 38 52.5
386	164 m	0 m	43° true	S33 25 41.5 E25 38 52.5
387	160 m	0 m	287° true	S33 25 41.5 E25 38 52.5
388	157 m	1 m	220° true	S33 25 41.5 E25 38 52.5
389	162 m	0 m	227° true	S33 25 41.6 E25 38 52.4
390	159 m	0 m	227° true	S33 25 41.6 E25 38 52.4
391	159 m	9 m	324° true	S33 25 41.6 E25 38 52.4
392	159 m	14 m	265° true	S33 25 41.4 E25 38 52.2
393	159 m	8 m	247° true	S33 25 41.4 E25 38 51.7
394	158 m	1 m	111° true	S33 25 41.5 E25 38 51.4
395	158 m	8 m	56° true	S33 25 41.5 E25 38 51.4
396	160 m	15 m	100° true	S33 25 41.3 E25 38 51.7
397	159 m	6 m	99° true	S33 25 41.4 E25 38 52.3
398	159 m	12 m	78° true	S33 25 41.5 E25 38 52.5
399	160 m	4 m	35° true	S33 25 41.4 E25 38 52.9
400	159 m	1 m	8° true	S33 25 41.3 E25 38 53.0
401	159 m	2 m	136° true	S33 25 41.2 E25 38 53.1
402	159 m	0 m	93° true	S33 25 41.3 E25 38 53.1

403	159 m	7 m	155° true	S33 25 41.3 E25 38 53.1
404	160 m	25 m	142° true	S33 25 41.5 E25 38 53.2
405	160 m	69 m	140° true	S33 25 42.1 E25 38 53.8
406	163 m	4 m	108° true	S33 25 43.8 E25 38 55.5
407	164 m	3 m	227° true	S33 25 43.9 E25 38 55.7
408	163 m	3 m	47° true	S33 25 43.9 E25 38 55.6
409	163 m	11 m	143° true	S33 25 43.9 E25 38 55.7
410	164 m	34 m	137° true	S33 25 44.1 E25 38 55.9
411	167 m	30 m	142° true	S33 25 45.0 E25 38 56.8
412	170 m	23 m	143° true	S33 25 45.7 E25 38 57.6
413	173 m	42 m	142° true	S33 25 46.3 E25 38 58.1
414	176 m	8 m	141° true	S33 25 47.4 E25 38 59.1
415	176 m	30 m	141° true	S33 25 47.6 E25 38 59.3
416	179 m	22 m	146° true	S33 25 48.4 E25 39 00.0
417	179 m	15 m	231° true	S33 25 48.9 E25 39 00.5
418	178 m	90 m	273° true	S33 25 49.2 E25 39 00.1
419	176 m	10 m	269° true	S33 25 49.1 E25 38 56.6
420	175 m	20 m	273° true	S33 25 49.1 E25 38 56.2
421	174 m	106 m	270° true	S33 25 49.1 E25 38 55.4
422	171 m	13 m	267° true	S33 25 49.1 E25 38 51.3
423	170 m	28 m	91° true	S33 25 49.1 E25 38 50.8
424	171 m	53 m	270° true	S33 25 49.1 E25 38 51.9
425	172 m	23 m	269° true	S33 25 49.1 E25 38 49.9
426	169 m	8 m	110° true	S33 25 49.1 E25 38 49.0
427	170 m	42 m	269° true	S33 25 49.2 E25 38 49.3
428	170 m	13 m	274° true	S33 25 49.2 E25 38 47.6
429	169 m	19 m	267° true	S33 25 49.2 E25 38 47.1
430	171 m	72 m	271° true	S33 25 49.2 E25 38 46.4
431	171 m	123 m	271° true	S33 25 49.2 E25 38 43.6
432	172 m	40 m	271° true	S33 25 49.1 E25 38 38.8
433	168 m	2 m	278° true	S33 25 49.1 E25 38 37.3
434	168 m	25 m	272° true	S33 25 49.1 E25 38 37.2
435	171 m	90 m	270° true	S33 25 49.1 E25 38 36.2
436	169 m	39 m	271° true	S33 25 49.1 E25 38 32.7
437	166 m	143 m	270° true	S33 25 49.1 E25 38 31.2
438	163 m	30 m	270° true	S33 25 49.1 E25 38 25.7
439	160 m	4 m	273° true	S33 25 49.1 E25 38 24.5
440	160 m	6 m	304° true	S33 25 49.1 E25 38 24.3
441	158 m	36 m	22° true	S33 25 49.0 E25 38 24.1
442	160 m	13 m	49° true	S33 25 47.9 E25 38 24.7
443	160 m	107 m	51° true	S33 25 47.6 E25 38 25.0
444	162 m	21 m	54° true	S33 25 45.4 E25 38 28.3
445	162 m	26 m	54° true	S33 25 45.0 E25 38 28.9
446	161 m	102 m	57° true	S33 25 44.5 E25 38 29.7
447	160 m	7 m	42° true	S33 25 42.7 E25 38 33.0
448	160 m	27 m	24° true	S33 25 42.6 E25 38 33.2
449	159 m	26 m	3° true	S33 25 41.8 E25 38 33.6
450	156 m	28 m	27° true	S33 25 40.9 E25 38 33.7
451	156 m	21 m	19° true	S33 25 40.1 E25 38 34.2
452	155 m	27 m	11° true	S33 25 39.5 E25 38 34.4
453	153 m	2 m	47° true	S33 25 38.6 E25 38 34.6
454	153 m	32 m	50° true	S33 25 38.6 E25 38 34.7
455	152 m	18 m	80° true	S33 25 37.9 E25 38 35.6
456	153 m	42 m	74° true	S33 25 37.8 E25 38 36.3
457	153 m	100 m	99° true	S33 25 37.4 E25 38 37.9
458	153 m	19 m	99° true	S33 25 38.0 E25 38 41.7
459	153 m	8 m	96° true	S33 25 38.1 E25 38 42.4
460	153 m	54 m	73° true	S33 25 38.1 E25 38 42.8

461	153 m	20 m	76° true	S33 25 37.6 E25 38 44.8
462	153 m	54 m	54° true	S33 25 37.4 E25 38 45.5
463	152 m	16 m	63° true	S33 25 36.4 E25 38 47.2
464	153 m	29 m	67° true	S33 25 36.2 E25 38 47.7
465	154 m	50 m	48° true	S33 25 35.8 E25 38 48.8
466	153 m	22 m	26° true	S33 25 34.7 E25 38 50.2
467	153 m	59 m	8° true	S33 25 34.1 E25 38 50.6
468	152 m	56 m	39° true	S33 25 32.2 E25 38 50.9
469	153 m	21 m	64° true	S33 25 30.8 E25 38 52.2
470	152 m	36 m	75° true	S33 25 30.5 E25 38 53.0
471	153 m	38 m	57° true	S33 25 30.2 E25 38 54.3
472	153 m	77 m	42° true	S33 25 29.5 E25 38 55.6
473	153 m	32 m	41° true	S33 25 27.7 E25 38 57.5
474	151 m	12 m	300° true	S33 25 26.9 E25 38 58.3
475	149 m	69 m	266° true	S33 25 26.7 E25 38 58.0
476	153 m	112 m	266° true	S33 25 26.9 E25 38 55.3
477	150 m	101 m	266° true	S33 25 27.1 E25 38 51.0
478	147 m	110 m	267° true	S33 25 27.4 E25 38 47.1
479	144 m	45 m	266° true	S33 25 27.6 E25 38 42.8
480	141 m	85 m	266° true	S33 25 27.7 E25 38 41.1
481	140 m	137 m	265° true	S33 25 27.9 E25 38 37.8
482	137 m	79 m	269° true	S33 25 28.3 E25 38 32.5
483	135 m	7 m	272° true	S33 25 28.3 E25 38 29.4
484	135 m	111 m	266° true	S33 25 28.3 E25 38 29.1
485	134 m	51 m	266° true	S33 25 28.6 E25 38 24.8
486	133 m	185 m	266° true	S33 25 28.7 E25 38 22.9
487	132 m	73 m	266° true	S33 25 29.1 E25 38 15.7
488	128 m	142 m	266° true	S33 25 29.3 E25 38 12.9
489	124 m	6 m	259° true	S33 25 29.6 E25 38 07.4
490	124 m	7 m	174° true	S33 25 29.6 E25 38 07.2
491	124 m	28 m	161° true	S33 25 29.8 E25 38 07.2
492	126 m	33 m	165° true	S33 25 30.7 E25 38 07.6
493	128 m	46 m	167° true	S33 25 31.7 E25 38 07.9
494	131 m	26 m	166° true	S33 25 33.2 E25 38 08.3
495	132 m	51 m	166° true	S33 25 34.0 E25 38 08.6
496	136 m	9 m	169° true	S33 25 35.6 E25 38 09.1
497	136 m	52 m	168° true	S33 25 35.9 E25 38 09.1
498	138 m	34 m	176° true	S33 25 37.5 E25 38 09.6
499	140 m	16 m	175° true	S33 25 38.6 E25 38 09.7
500	142 m	43 m	176° true	S33 25 39.1 E25 38 09.7
501	145 m	8 m	174° true	S33 25 40.5 E25 38 09.8
502	145 m	57 m	177° true	S33 25 40.8 E25 38 09.9
503	147 m	22 m	178° true	S33 25 42.6 E25 38 10.0
504	148 m	67 m	173° true	S33 25 43.3 E25 38 10.0
505	150 m	7 m	347° true	S33 25 45.5 E25 38 10.3
506	150 m	35 m	177° true	S33 25 45.3 E25 38 10.3
507	152 m	17 m	177° true	S33 25 46.4 E25 38 10.3
508	153 m	75 m	176° true	S33 25 46.9 E25 38 10.4
509	157 m	7 m	169° true	S33 25 49.4 E25 38 10.6
510	155 m	33 m	177° true	S33 25 49.6 E25 38 10.6
511	159 m	23 m	176° true	S33 25 50.7 E25 38 10.7
512	162 m	8 m	175° true	S33 25 51.4 E25 38 10.8
513	162 m	17 m	176° true	S33 25 51.7 E25 38 10.8
514	163 m	27 m	175° true	S33 25 52.2 E25 38 10.8
515	165 m	26 m	176° true	S33 25 53.1 E25 38 10.9
516	167 m	17 m	176° true	S33 25 53.9 E25 38 11.0
517	169 m	49 m	175° true	S33 25 54.5 E25 38 11.0
518	173 m	42 m	177° true	S33 25 56.0 E25 38 11.2

519	176 m	9 m	174° true	S33 25 57.4 E25 38 11.3
520	177 m	35 m	175° true	S33 25 57.7 E25 38 11.3
521	179 m	106 m	175° true	S33 25 58.8 E25 38 11.4
522	181 m	77 m	185° true	S33 26 02.2 E25 38 11.8
523	178 m	26 m	189° true	S33 26 04.7 E25 38 11.6
524	174 m	33 m	189° true	S33 26 05.5 E25 38 11.4
525	171 m	18 m	187° true	S33 26 06.6 E25 38 11.2
526	169 m	27 m	188° true	S33 26 07.2 E25 38 11.1
527	166 m	36 m	188° true	S33 26 08.0 E25 38 11.0
528	163 m	9 m	188° true	S33 26 09.2 E25 38 10.8
529	163 m	49 m	187° true	S33 26 09.4 E25 38 10.7
530	162 m	63 m	186° true	S33 26 11.0 E25 38 10.5
531	164 m	18 m	135° true	S33 26 13.1 E25 38 10.2
532	164 m	93 m	77° true	S33 26 13.5 E25 38 10.7
533	165 m	33 m	79° true	S33 26 12.8 E25 38 14.2
534	166 m	48 m	79° true	S33 26 12.6 E25 38 15.5
535	169 m	93 m	79° true	S33 26 12.3 E25 38 17.3
536	168 m	31 m	81° true	S33 26 11.7 E25 38 20.8
537	165 m	14 m	80° true	S33 26 11.6 E25 38 22.0
538	164 m	29 m	79° true	S33 26 11.5 E25 38 22.5
539	163 m	22 m	78° true	S33 26 11.3 E25 38 23.7
540	159 m	43 m	80° true	S33 26 11.2 E25 38 24.5
541	155 m	7 m	80° true	S33 26 10.9 E25 38 26.1
542	155 m	48 m	79° true	S33 26 10.9 E25 38 26.4
543	152 m	6 m	79° true	S33 26 10.6 E25 38 28.2
544	151 m	103 m	79° true	S33 26 10.5 E25 38 28.5
545	151 m	26 m	77° true	S33 26 09.9 E25 38 32.4
546	154 m	62 m	76° true	S33 26 09.7 E25 38 33.4
547	157 m	36 m	80° true	S33 26 09.2 E25 38 35.7
548	161 m	37 m	80° true	S33 26 09.0 E25 38 37.1
549	165 m	7 m	79° true	S33 26 08.8 E25 38 38.5
550	165 m	21 m	77° true	S33 26 08.8 E25 38 38.8
551	167 m	15 m	78° true	S33 26 08.6 E25 38 39.6
552	169 m	147 m	79° true	S33 26 08.5 E25 38 40.2
553	172 m	134 m	79° true	S33 26 07.6 E25 38 45.8
554	168 m	150 m	78° true	S33 26 06.8 E25 38 50.9
555	170 m	69 m	78° true	S33 26 05.8 E25 38 56.6
556	174 m	44 m	78° true	S33 26 05.3 E25 38 59.2
557	178 m	18 m	80° true	S33 26 05.0 E25 39 00.8
558	178 m	30 m	73° true	S33 26 04.9 E25 39 01.5
559	179 m	0 m	291° true	S33 26 04.6 E25 39 02.6
560	179 m	11 m	357° true	S33 26 04.6 E25 39 02.6
561	179 m	9 m	168° true	S33 26 04.3 E25 39 02.6
562	179 m	9 m	212° true	S33 26 04.6 E25 39 02.7
563	178 m	11 m	149° true	S33 26 04.8 E25 39 02.5
564	179 m	87 m	177° true	S33 26 05.1 E25 39 02.7
565	178 m	71 m	175° true	S33 26 08.0 E25 39 02.9
566	175 m	9 m	174° true	S33 26 10.2 E25 39 03.1
567	175 m	144 m	174° true	S33 26 10.5 E25 39 03.2
568	172 m	22 m	174° true	S33 26 15.2 E25 39 03.7
569	170 m	33 m	176° true	S33 26 15.9 E25 39 03.8
570	167 m	22 m	175° true	S33 26 17.0 E25 39 03.9
571	166 m	33 m	176° true	S33 26 17.7 E25 39 04.0
572	162 m	32 m	176° true	S33 26 18.7 E25 39 04.1
573	159 m	30 m	175° true	S33 26 19.8 E25 39 04.2
574	156 m	18 m	174° true	S33 26 20.8 E25 39 04.3
575	155 m	26 m	178° true	S33 26 21.3 E25 39 04.4
576	152 m	1 m	303° true	S33 26 22.2 E25 39 04.4

577	152 m	7 m	168° true	S33 26 22.2 E25 39 04.4
578	152 m	2 m	26° true	S33 26 22.4 E25 39 04.4
579	152 m	3 m	337° true	S33 26 22.4 E25 39 04.5
580	152 m	9 m	180° true	S33 26 22.3 E25 39 04.4
581	151 m	10 m	109° true	S33 26 22.5 E25 39 04.4
582	150 m	7 m	256° true	S33 26 22.6 E25 39 04.8
583	151 m	24 m	347° true	S33 26 22.7 E25 39 04.5
584	152 m	63 m	356° true	S33 26 22.0 E25 39 04.3
585	156 m	25 m	355° true	S33 26 19.9 E25 39 04.1
586	158 m	18 m	356° true	S33 26 19.1 E25 39 04.0
587	162 m	38 m	355° true	S33 26 18.5 E25 39 04.0
588	165 m	20 m	355° true	S33 26 17.3 E25 39 03.8
589	166 m	31 m	355° true	S33 26 16.6 E25 39 03.8
590	167 m	41 m	355° true	S33 26 15.6 E25 39 03.7
591	171 m	89 m	354° true	S33 26 14.3 E25 39 03.5
592	175 m	106 m	355° true	S33 26 11.5 E25 39 03.2
593	178 m	133 m	355° true	S33 26 08.1 E25 39 02.8
594	182 m	100 m	355° true	S33 26 03.8 E25 39 02.4
595	185 m	190 m	356° true	S33 26 00.6 E25 39 02.1
596	185 m	139 m	355° true	S33 25 54.4 E25 39 01.5
597	183 m	20 m	337° true	S33 25 49.9 E25 39 01.0
598	181 m	68 m	322° true	S33 25 49.3 E25 39 00.7
599	178 m	40 m	322° true	S33 25 47.6 E25 38 59.1
600	174 m	51 m	322° true	S33 25 46.6 E25 38 58.1
601	171 m	35 m	321° true	S33 25 45.3 E25 38 56.9
602	168 m	82 m	321° true	S33 25 44.4 E25 38 56.1
603	165 m	32 m	321° true	S33 25 42.4 E25 38 54.1
604	161 m	8 m	323° true	S33 25 41.5 E25 38 53.3
605	160 m	2 m	147° true	S33 25 41.3 E25 38 53.1
606	161 m	5 m	322° true	S33 25 41.4 E25 38 53.2
607	161 m	0 m	96° true	S33 25 41.3 E25 38 53.1
608	156 m	0 m	287° true	S33 25 41.3 E25 38 53.1
609	158 m	1 m	211° true	S33 25 41.3 E25 38 53.1
610	165 m	0 m	190° true	S33 25 41.3 E25 38 53.1
611	161 m	2 m	247° true	S33 25 41.3 E25 38 53.1
612	161 m	9 m	352° true	S33 25 41.3 E25 38 53.0
613	160 m	0 m	140° true	S33 25 41.0 E25 38 52.9
614	161 m	4 m	201° true	S33 25 41.0 E25 38 52.9
615	161 m	10 m	116° true	S33 25 41.1 E25 38 52.9
616	162 m	7 m	138° true	S33 25 41.3 E25 38 53.3
617	162 m	88 m	142° true	S33 25 41.5 E25 38 53.4
618	167 m	41 m	143° true	S33 25 43.7 E25 38 55.5
619	170 m	17 m	144° true	S33 25 44.8 E25 38 56.5
620	171 m	67 m	143° true	S33 25 45.2 E25 38 56.9
621	175 m	32 m	141° true	S33 25 46.9 E25 38 58.5
622	178 m	8 m	145° true	S33 25 47.7 E25 38 59.2
623	178 m	23 m	139° true	S33 25 48.0 E25 38 59.4
624	180 m	13 m	142° true	S33 25 48.5 E25 39 00.0
625	180 m	19 m	223° true	S33 25 48.8 E25 39 00.3
626	180 m	39 m	272° true	S33 25 49.3 E25 38 59.8
627	178 m	13 m	270° true	S33 25 49.2 E25 38 58.3
628	177 m	18 m	269° true	S33 25 49.2 E25 38 57.8
629	176 m	71 m	272° true	S33 25 49.3 E25 38 57.1
630	172 m	99 m	270° true	S33 25 49.2 E25 38 54.3
631	172 m	44 m	266° true	S33 25 49.2 E25 38 50.5
632	170 m	6 m	19° true	S33 25 49.3 E25 38 48.8
633	170 m	1 m	105° true	S33 25 49.1 E25 38 48.9
634	170 m	8 m	126° true	S33 25 49.1 E25 38 48.9

635	170 m	8 m	149° true	S33 25 49.3 E25 38 49.2
636	171 m	8 m	163° true	S33 25 49.5 E25 38 49.3
637	171 m	10 m	115° true	S33 25 49.7 E25 38 49.4
638	172 m	1 m	102° true	S33 25 49.9 E25 38 49.8
639	173 m	4 m	260° true	S33 25 49.9 E25 38 49.8
640	172 m	3 m	206° true	S33 25 49.9 E25 38 49.7
641	171 m	14 m	160° true	S33 25 50.0 E25 38 49.6
642	173 m	1 m	320° true	S33 25 50.4 E25 38 49.8
643	174 m	12 m	351° true	S33 25 50.4 E25 38 49.8
644	173 m	10 m	326° true	S33 25 50.0 E25 38 49.7
645	173 m	12 m	348° true	S33 25 49.8 E25 38 49.5
646	171 m	0 m	310° true	S33 25 49.4 E25 38 49.4
647	172 m	3 m	322° true	S33 25 49.4 E25 38 49.4
648	167 m	0 m	125° true	S33 25 49.3 E25 38 49.4
649	172 m	1 m	174° true	S33 25 49.3 E25 38 49.4
650	172 m	4 m	346° true	S33 25 49.4 E25 38 49.4
651	171 m	4 m	297° true	S33 25 49.2 E25 38 49.3
652	172 m	5 m	271° true	S33 25 49.2 E25 38 49.2
653	171 m	0 m	90° true	S33 25 49.2 E25 38 49.0
654	171 m	3 m	157° true	S33 25 49.2 E25 38 49.0
655	171 m	0 m	25° true	S33 25 49.3 E25 38 49.1
656	170 m	3 m	301° true	S33 25 49.2 E25 38 49.1
657	167 m	0 m	258° true	S33 25 49.2 E25 38 49.0
658	168 m	0 m	231° true	S33 25 49.2 E25 38 48.9
659	175 m	0 m	325° true	S33 25 49.2 E25 38 48.9
660	172 m	2 m	356° true	S33 25 49.2 E25 38 48.9
661	171 m	11 m	267° true	S33 25 49.1 E25 38 48.9
662	172 m	74 m	268° true	S33 25 49.1 E25 38 48.5
663	173 m	180 m	270° true	S33 25 49.2 E25 38 45.6
664	173 m	39 m	270° true	S33 25 49.2 E25 38 38.6
665	171 m	4 m	53° true	S33 25 49.2 E25 38 37.1
666	170 m	5 m	81° true	S33 25 49.1 E25 38 37.2
667	170 m	10 m	192° true	S33 25 49.1 E25 38 37.4
668	171 m	47 m	175° true	S33 25 49.4 E25 38 37.3
669	169 m	47 m	173° true	S33 25 50.9 E25 38 37.5
670	169 m	129 m	174° true	S33 25 52.4 E25 38 37.7
671	170 m	112 m	174° true	S33 25 56.6 E25 38 38.3
672	169 m	124 m	174° true	S33 26 00.2 E25 38 38.8
673	169 m	102 m	174° true	S33 26 04.2 E25 38 39.3
674	167 m	38 m	174° true	S33 26 07.5 E25 38 39.7
675	166 m	2 m	323° true	S33 26 08.7 E25 38 39.8
676	168 m	0 m	206° true	S33 26 08.6 E25 38 39.8
677	167 m	6 m	344° true	S33 26 08.6 E25 38 39.8
678	167 m	8 m	128° true	S33 26 08.5 E25 38 39.7
679	168 m	3 m	304° true	S33 26 08.6 E25 38 40.0
680	168 m	7 m	322° true	S33 26 08.6 E25 38 39.9
681	168 m	10 m	212° true	S33 26 08.4 E25 38 39.7
682	168 m	7 m	259° true	S33 26 08.7 E25 38 39.5
683	167 m	3 m	244° true	S33 26 08.7 E25 38 39.2
684	168 m	15 m	261° true	S33 26 08.8 E25 38 39.1
685	165 m	1 m	248° true	S33 26 08.8 E25 38 38.6
686	165 m	1 m	78° true	S33 26 08.9 E25 38 38.5
687	166 m	15 m	259° true	S33 26 08.9 E25 38 38.5
688	165 m	22 m	258° true	S33 26 08.9 E25 38 37.9
689	161 m	6 m	259° true	S33 26 09.1 E25 38 37.1
690	161 m	30 m	259° true	S33 26 09.1 E25 38 36.9
691	157 m	6 m	258° true	S33 26 09.3 E25 38 35.7
692	157 m	32 m	260° true	S33 26 09.4 E25 38 35.5

693	154 m	4 m	259° true	S33 26 09.5 E25 38 34.3
694	154 m	41 m	258° true	S33 26 09.6 E25 38 34.1
695	151 m	46 m	259° true	S33 26 09.8 E25 38 32.6
696	150 m	50 m	259° true	S33 26 10.1 E25 38 30.8
697	150 m	17 m	263° true	S33 26 10.4 E25 38 28.9
698	151 m	10 m	328° true	S33 26 10.5 E25 38 28.3
699	151 m	5 m	19° true	S33 26 10.2 E25 38 28.1
700	152 m	2 m	71° true	S33 26 10.1 E25 38 28.1
701	154 m	29 m	355° true	S33 26 10.1 E25 38 28.2
702	154 m	87 m	350° true	S33 26 09.1 E25 38 28.1
703	156 m	67 m	353° true	S33 26 06.3 E25 38 27.5
704	156 m	2 m	338° true	S33 26 04.2 E25 38 27.2
705	157 m	25 m	353° true	S33 26 04.1 E25 38 27.2
706	156 m	14 m	351° true	S33 26 03.3 E25 38 27.0
707	156 m	25 m	4° true	S33 26 02.9 E25 38 27.0
708	157 m	47 m	359° true	S33 26 02.0 E25 38 27.0
709	157 m	7 m	354° true	S33 26 00.5 E25 38 27.0
710	156 m	28 m	1° true	S33 26 00.3 E25 38 27.0
711	156 m	100 m	6° true	S33 25 59.4 E25 38 27.0
712	158 m	25 m	348° true	S33 25 56.2 E25 38 27.4
713	158 m	21 m	296° true	S33 25 55.4 E25 38 27.2
714	159 m	26 m	329° true	S33 25 55.1 E25 38 26.5
715	159 m	13 m	344° true	S33 25 54.3 E25 38 25.9
716	159 m	19 m	353° true	S33 25 54.0 E25 38 25.8
717	160 m	78 m	340° true	S33 25 53.3 E25 38 25.7
718	161 m	72 m	351° true	S33 25 51.0 E25 38 24.7
719	160 m	35 m	30° true	S33 25 48.6 E25 38 24.3
720	161 m	79 m	54° true	S33 25 47.7 E25 38 24.9
721	164 m	22 m	45° true	S33 25 46.1 E25 38 27.4
722	165 m	29 m	52° true	S33 25 45.6 E25 38 28.0
723	164 m	38 m	58° true	S33 25 45.1 E25 38 28.9
724	162 m	21 m	69° true	S33 25 44.4 E25 38 30.1
725	163 m	86 m	50° true	S33 25 44.2 E25 38 30.9
726	161 m	20 m	15° true	S33 25 42.4 E25 38 33.5
727	160 m	16 m	0° true	S33 25 41.7 E25 38 33.7
728	159 m	15 m	14° true	S33 25 41.2 E25 38 33.7
729	158 m	5 m	34° true	S33 25 40.7 E25 38 33.8
730	158 m	25 m	33° true	S33 25 40.6 E25 38 33.9
731	158 m	52 m	12° true	S33 25 39.9 E25 38 34.4
732	155 m	10 m	308° true	S33 25 38.3 E25 38 34.9
733	154 m	3 m	229° true	S33 25 38.1 E25 38 34.6
734	155 m	8 m	157° true	S33 25 38.2 E25 38 34.5
735	155 m	6 m	45° true	S33 25 38.4 E25 38 34.6
736	155 m	14 m	45° true	S33 25 38.3 E25 38 34.8
737	154 m	26 m	78° true	S33 25 37.9 E25 38 35.2
738	155 m	44 m	74° true	S33 25 37.8 E25 38 36.1
739	154 m	55 m	102° true	S33 25 37.4 E25 38 37.8
740	156 m	69 m	97° true	S33 25 37.7 E25 38 39.9
741	156 m	28 m	82° true	S33 25 38.0 E25 38 42.5
742	156 m	56 m	74° true	S33 25 37.9 E25 38 43.6
743	155 m	28 m	57° true	S33 25 37.4 E25 38 45.7
744	155 m	30 m	53° true	S33 25 36.9 E25 38 46.6
745	155 m	28 m	69° true	S33 25 36.3 E25 38 47.5
746	154 m	0 m	246° true	S33 25 36.0 E25 38 48.5
747	154 m	18 m	249° true	S33 25 36.0 E25 38 48.5
748	153 m	10 m	114° true	S33 25 36.2 E25 38 47.9
749	154 m	71 m	138° true	S33 25 36.3 E25 38 48.2
750	156 m	44 m	140° true	S33 25 38.0 E25 38 50.1

751	157 m	29 m	144° true	S33 25 39.1 E25 38 51.2
752	159 m	55 m	141° true	S33 25 39.9 E25 38 51.8
753	163 m	65 m	141° true	S33 25 41.3 E25 38 53.2
754	165 m	52 m	141° true	S33 25 42.9 E25 38 54.8
755	168 m	44 m	141° true	S33 25 44.2 E25 38 56.0
756	172 m	57 m	142° true	S33 25 45.3 E25 38 57.1
757	176 m	32 m	142° true	S33 25 46.8 E25 38 58.5
758	178 m	46 m	142° true	S33 25 47.6 E25 38 59.2
759	180 m	29 m	145° true	S33 25 48.7 E25 39 00.3
760	182 m	25 m	162° true	S33 25 49.5 E25 39 01.0
761	185 m	136 m	176° true	S33 25 50.3 E25 39 01.2
762	186 m	126 m	176° true	S33 25 54.7 E25 39 01.6
763	183 m	103 m	175° true	S33 25 58.7 E25 39 02.0
764	182 m	17 m	176° true	S33 26 02.1 E25 39 02.3
765	184 m	31 m	174° true	S33 26 02.6 E25 39 02.3
766	180 m	7 m	174° true	S33 26 03.6 E25 39 02.5
767	180 m	34 m	174° true	S33 26 03.8 E25 39 02.5
768	180 m	1 m	285° true	S33 26 04.9 E25 39 02.6
769	178 m	29 m	176° true	S33 26 04.9 E25 39 02.6
770	178 m	118 m	176° true	S33 26 05.9 E25 39 02.6
771	175 m	5 m	175° true	S33 26 09.7 E25 39 03.0
772	174 m	46 m	172° true	S33 26 09.8 E25 39 03.0
773	172 m	0 m	186° true	S33 26 11.3 E25 39 03.3
774	172 m	3 m	339° true	S33 26 11.3 E25 39 03.3
775	172 m	11 m	21° true	S33 26 11.2 E25 39 03.2
776	172 m	1 m	104° true	S33 26 10.9 E25 39 03.4
777	172 m	2 m	20° true	S33 26 10.9 E25 39 03.4
778	171 m	2 m	85° true	S33 26 10.8 E25 39 03.4
779	171 m	1 m	273° true	S33 26 10.8 E25 39 03.5
780	166 m	0 m	47° true	S33 26 10.8 E25 39 03.5
781	173 m	1 m	31° true	S33 26 10.8 E25 39 03.5
782	169 m	1 m	0° true	S33 26 10.8 E25 39 03.5
783	176 m	0 m	305° true	S33 26 10.8 E25 39 03.5
784	173 m	1 m	342° true	S33 26 10.8 E25 39 03.5
785	171 m	1 m	303° true	S33 26 10.8 E25 39 03.5
786	172 m	5 m	201° true	S33 26 10.8 E25 39 03.4
787	167 m	1 m	201° true	S33 26 10.9 E25 39 03.4
788	176 m	1 m	201° true	S33 26 10.9 E25 39 03.4
789	173 m	1 m	223° true	S33 26 11.0 E25 39 03.3
790	172 m	3 m	223° true	S33 26 11.0 E25 39 03.3
791	172 m	5 m	186° true	S33 26 11.0 E25 39 03.3