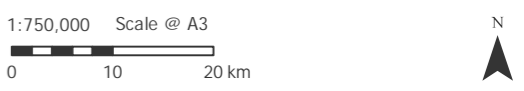


- Grid Site
- WEF Site
- Gamma Substation
- Local Municipality
- District Boundary
- Eastern Cape
- Western Cape
- Northern Cape



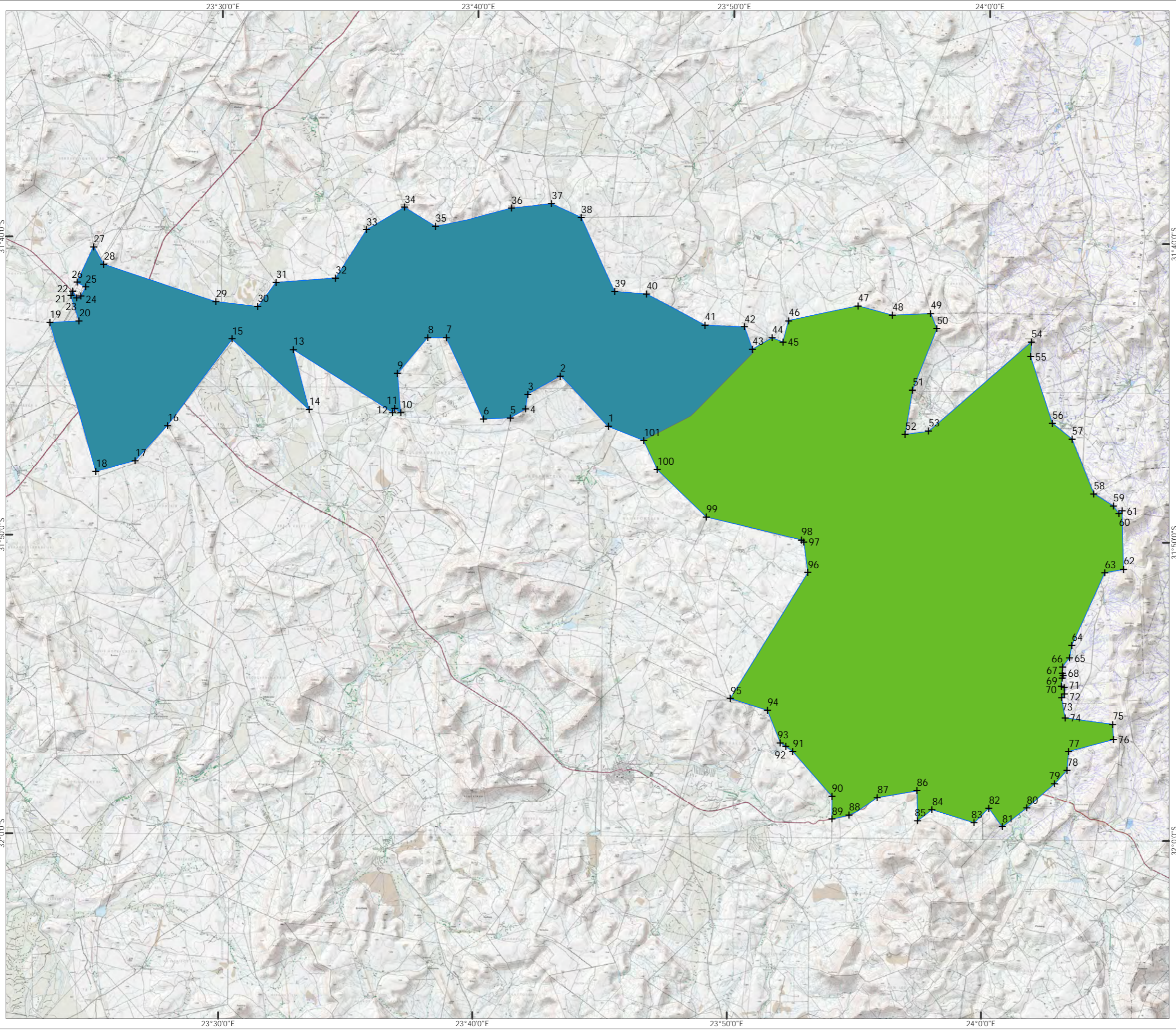
Projection: Transverse Mercator  
 Datum: Hartbeeshoek 94  
 Reference Ellipsoid: WGS 84  
 Central Meridian: 23°



Produced: AT	Ref: 2146/REP/001
Reviewed: SC	Date: 29/03/2016
Approved: AB	

Site Location  
Figure 1.1

Umsinde Emoyeni WEF  
Grid Connection Phase 1  
Final EIA Report



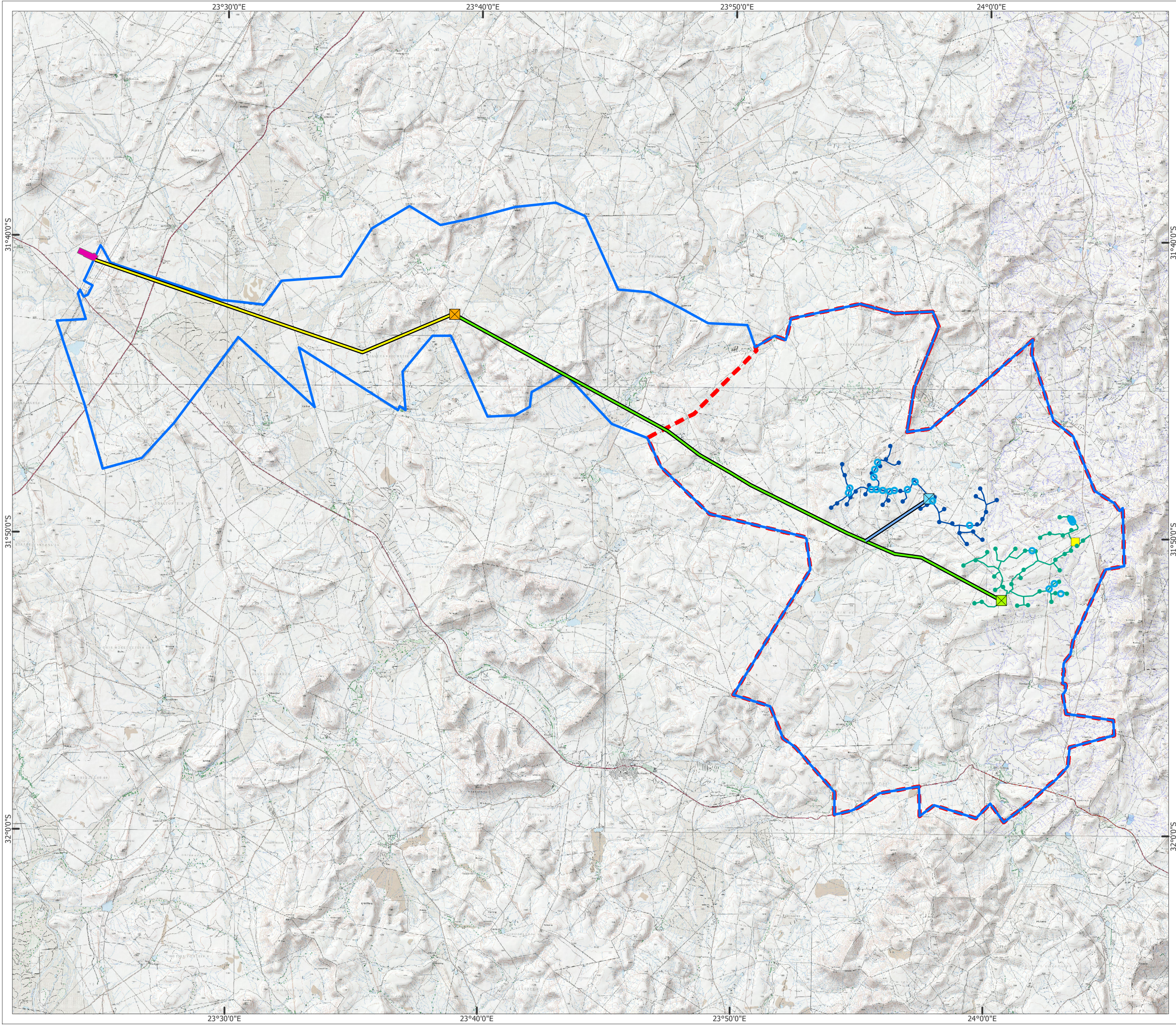
ID	Longitude	Latitude	ID	Longitude	Latitude
1	23.7532	-31.7711	51	23.9517	-31.7495
2	23.7215	-31.7432	52	23.9471	-31.7742
3	23.7004	-31.7535	53	23.9623	-31.7724
4	23.6990	-31.7617	54	24.0290	-31.7221
5	23.6891	-31.7667	55	24.0286	-31.7303
6	23.6716	-31.7674	56	24.0432	-31.7674
7	23.6470	-31.7221	57	24.0562	-31.7760
8	23.6350	-31.7223	58	24.0706	-31.8065
9	23.6152	-31.7423	59	24.0835	-31.8132
10	23.6177	-31.7641	60	24.0873	-31.8174
11	23.6137	-31.7619	61	24.0893	-31.8158
12	23.6122	-31.7642	62	24.0906	-31.8484
13	23.5471	-31.7292	63	24.0785	-31.8505
14	23.5577	-31.7626	64	24.0573	-31.8912
15	23.5071	-31.7235	65	24.0559	-31.8984
16	23.4653	-31.7721	66	24.0514	-31.9034
17	23.4442	-31.7917	67	24.0513	-31.9068
18	23.4186	-31.7977	68	24.0518	-31.9083
19	23.3881	-31.7147	69	24.0511	-31.9095
20	23.4072	-31.7137	70	24.0508	-31.9142
21	23.4019	-31.6996	71	24.0525	-31.9150
22	23.4031	-31.6972	72	24.0528	-31.9183
23	23.4056	-31.7009	73	24.0510	-31.9207
24	23.4083	-31.6999	74	24.0534	-31.9318
25	23.4114	-31.6949	75	24.0845	-31.9352
26	23.4058	-31.6922	76	24.0851	-31.9436
27	23.4166	-31.6724	77	24.0559	-31.9506
28	23.4232	-31.6822	78	24.0549	-31.9611
29	23.4964	-31.7027	79	24.0469	-31.9687
30	23.5238	-31.7052	80	24.0288	-31.9823
31	23.5357	-31.6919	81	24.0129	-31.9929
32	23.5745	-31.6892	82	24.0040	-31.9827
33	23.5945	-31.6622	83	23.9944	-31.9908
34	23.6192	-31.6495	84	23.9668	-31.9838
35	23.6395	-31.6600	85	23.9575	-31.9899
36	23.6890	-31.6496	86	23.9569	-31.9732
37	23.7151	-31.6470	87	23.9309	-31.9773
38	23.7346	-31.6546	88	23.9125	-31.9872
39	23.7567	-31.6958	89	23.9013	-31.9895
40	23.7775	-31.6971	90	23.9012	-31.9768
41	23.8157	-31.7141	91	23.8754	-31.9519
42	23.8416	-31.7151	92	23.8708	-31.9490
43	23.8470	-31.7274	93	23.8672	-31.9471
44	23.8597	-31.7210	94	23.8586	-31.9289
45	23.8668	-31.7232	95	23.8343	-31.9226
46	23.8705	-31.7113	96	23.8843	-31.8519
47	23.9156	-31.7028	97	23.8814	-31.8348
48	23.9381	-31.7078	98	23.8799	-31.8337
49	23.9630	-31.7067	99	23.8176	-31.8212
50	23.9672	-31.7150	100	23.7854	-31.7950
			101	23.7763	-31.7789



Produced: AT	Ref: 2146/REP/002
Reviewed: SC	Date: 29/03/2016
Approved: AB	

Grid Site Boundary  
Phase 1 and 2  
Figure 1.2

Umsinde Emoyeni WEF  
Grid Connection Phase 1  
Final EIA Report



- WEF Site Boundary
- Grid Site Boundary
- Phase 1 Turbine Position
- Phase 1 Laydown yard
- Proposed Substation Phase 1
- Phase 2 Turbine Position
- Proposed Substation and Laydown Yard Phase 2
- Proposed Road Phase 1
- Proposed Road Phase 2
- Watercrossing
- Phase 1 Preferred Grid Route
- Phase 2 Preferred Grid Route
- Approved Ishwati Emoyeni Grid Route
- Approved Ishwati Emoyeni Substation
- Eskom Gamma Substation

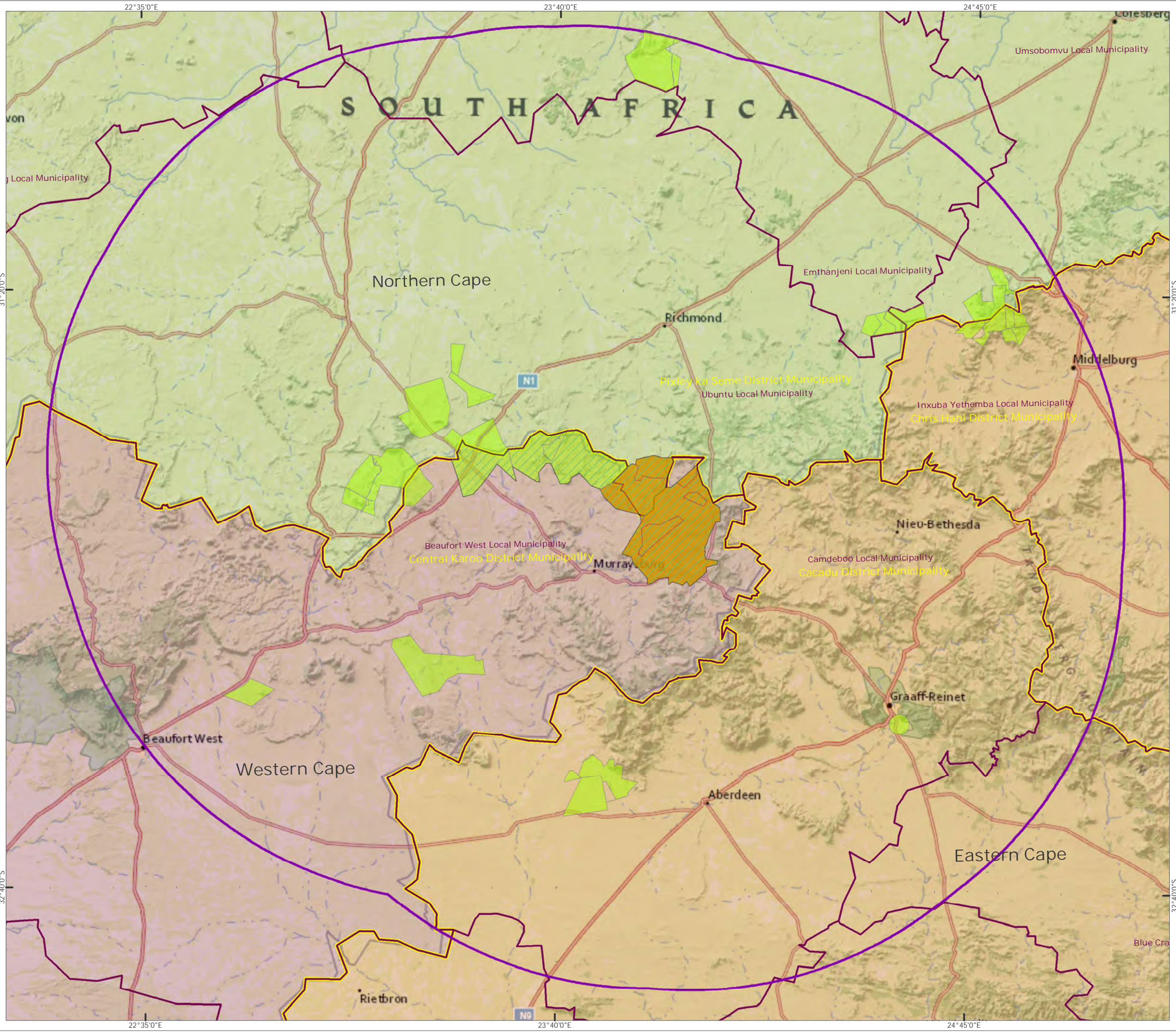











1:225,000 Scale @ A3  
 0 5 10 km

Produced: JA	Ref: 2146/REP/036
Reviewed: SC	Date: 07/02/2018
Approved: AB	

**The Proposed Development Layout**  
Figure 1.3

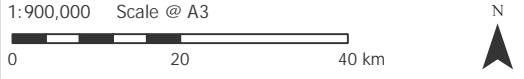
Basemapping from Chief Directorate: National Geo-Spatial Information of South Africa



-  Grid Site
-  WEF Site
-  WEF applications DEA 2017 Q4
-  Local Municipality
-  District Boundary
-  100 km Radius
-  Eastern Cape
-  Western Cape
-  Northern Cape



Projection: Transverse Mercator  
 Datum: Hartebeeshoek 94  
 Reference Ellipsoid: WGS 84  
 Central Meridian: 23°



Produced: AT	Ref: 2146/REP/004
Reviewed: SC	Date: 05/02/2018
Approved: AB	

Proposed Regional  
 Wind Energy Projects  
 Figure 2.1

Umsinde Emoyeni WEF  
 Grid Connection Phase 1  
 Final EIA Report



Basemapping from Chief-Directorate: National Geo-Spatial Information of South Africa



- WEF Site Boundary
- Grid Site Boundary
- NFEPA River
- Eastern Lower Karoo
- Eastern Upper Karoo
- Gamka Karoo
- Karoo Escarpment Grassland
- Southern Karoo Riviere
- Upper Karoo Hardeveld



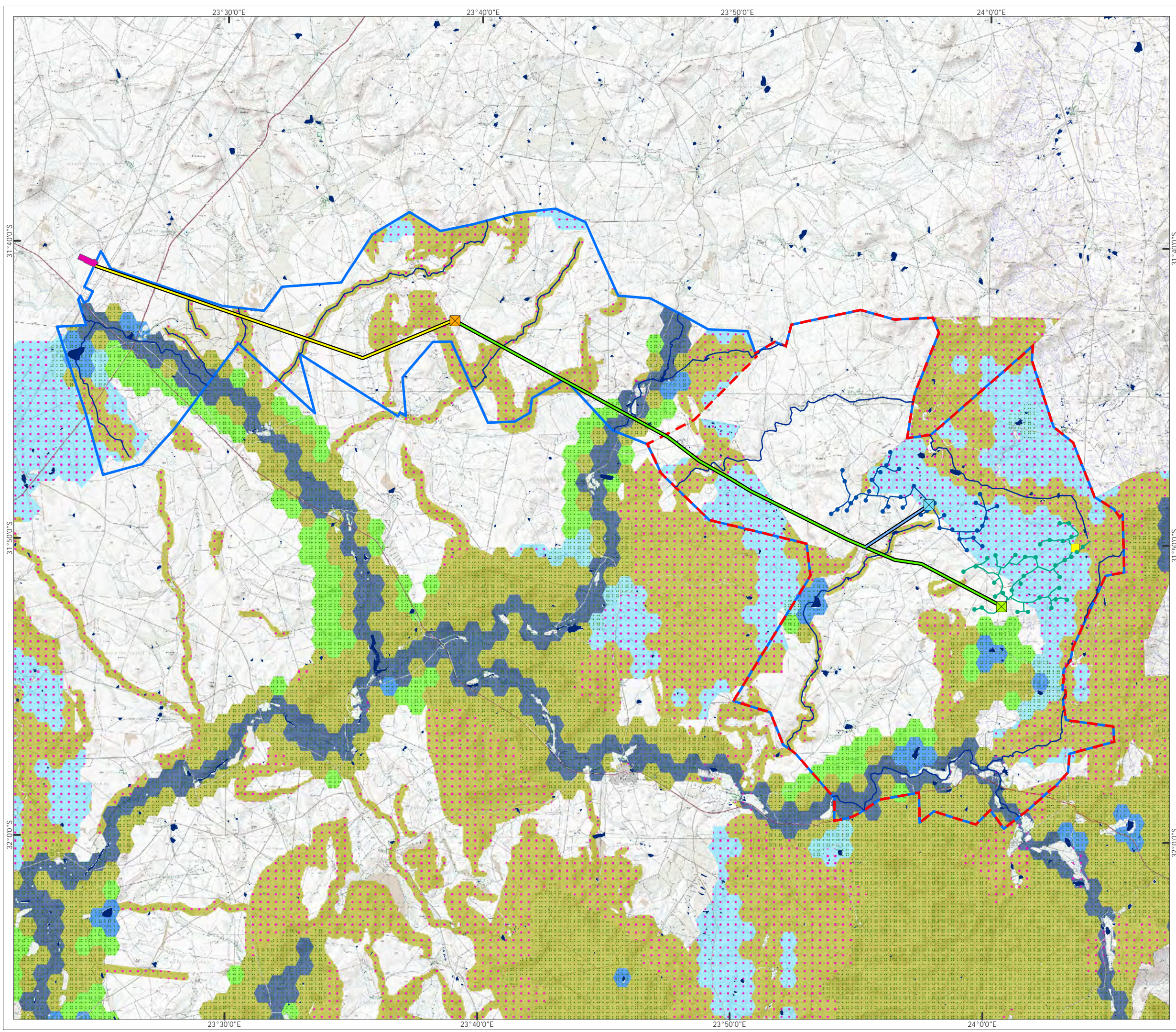
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 Datum: Hartebeeshoek 94  
 Reference Ellipsoid: WGS 84  
 Central Meridian: 23°



Produced: JA	Ref: 2146/REP/005
Reviewed: SC	Date: 29/03/2016
Approved: AB	

Vegetation Map  
Figure 5.1

Umsinde Emoyeni WEF  
Grid Connection Phase 1  
Final EIA Report

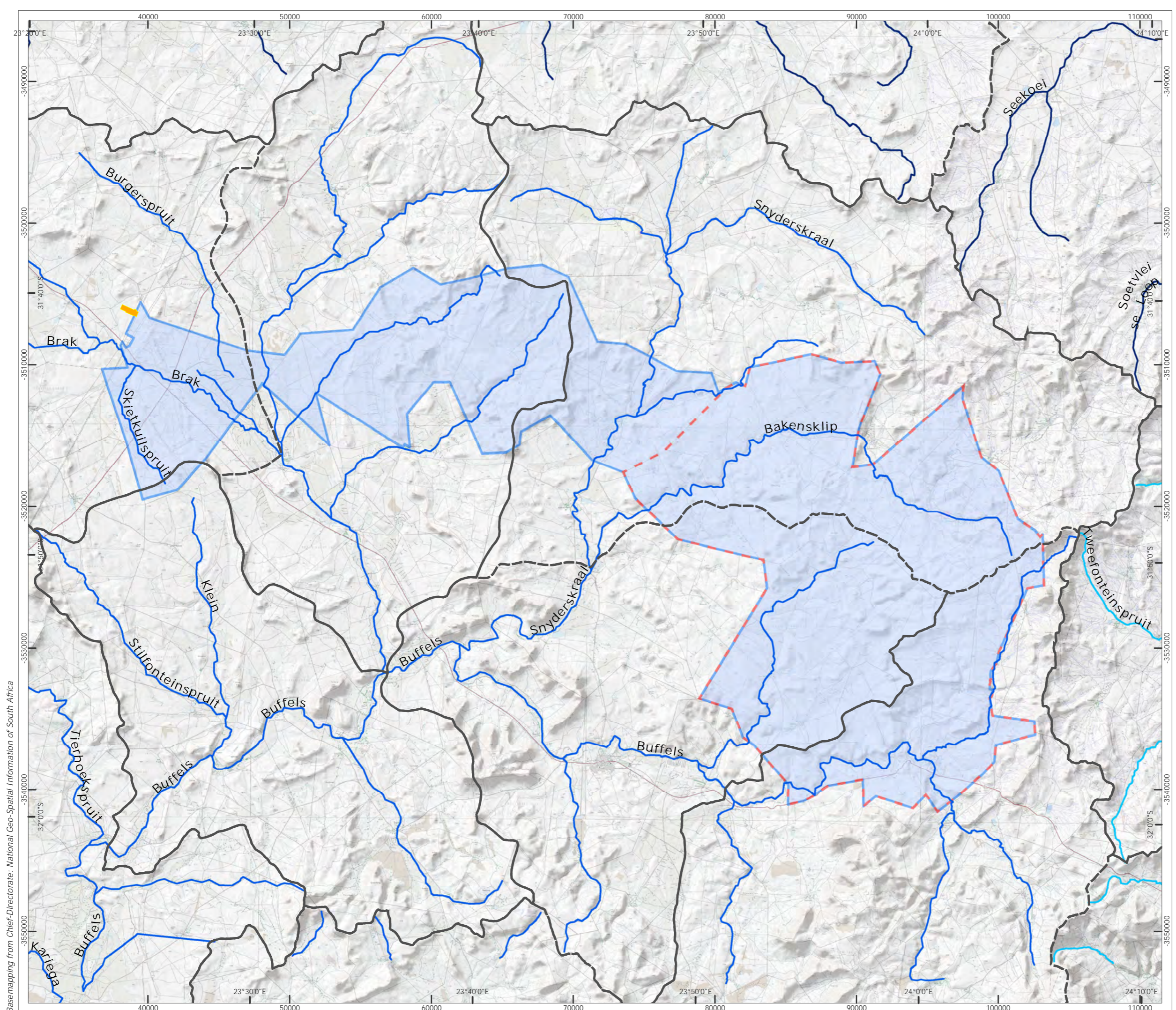


- WEF Site Boundary
- Grid Site Boundary
- Phase 1 Turbine Position
- Proposed Substation Phase 1
- Phase 1 Laydown yard
- Phase 2 Turbine Position
- Proposed Road Phase 1
- Approved Ishwati Emoyeni Substation
- Proposed Substation and Laydown Yard Phase 2
- Proposed Road Phase 2
- Phase 1 Preferred Grid Route
- Phase 2 Preferred Grid Route
- Approved Ishwati Emoyeni Grid Route
- Eskom Gamma Substation
- NFEPA Wetland
- NFEPA Rivers
- Critical Biodiversity Area
- Ecological Support Area
- Priority River Reach
- Priority Catchment
- Potential Wetland
- Maintain ecological processes
- Habitat Required as part of Best Design

1:225,000 Scale @ A3  
 0 5 10 km

Produced: JA	Ref: 2146/REP/006
Reviewed: SC	Date: 05/02/2018
Approved: AB	

Critical Biodiversity Areas  
Figure 5.2



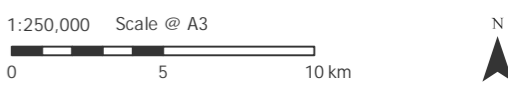
Basemapping from Chief Directorate: National Geo-Spatial Information of South Africa



- WEF Site Boundary
- Grid Site Boundary
- Gamma Substation
- Quaternary Catchments
- PES Scores of NFEPA Rivers**
- Class B: Largely Natural
- Class C: Moderately Modified
- Class D: Largely Modified



Projection: Transverse Mercator  
 Datum: Hartebeeshoek 94  
 Reference Ellipsoid: WGS 84  
 Central Meridian: 23°

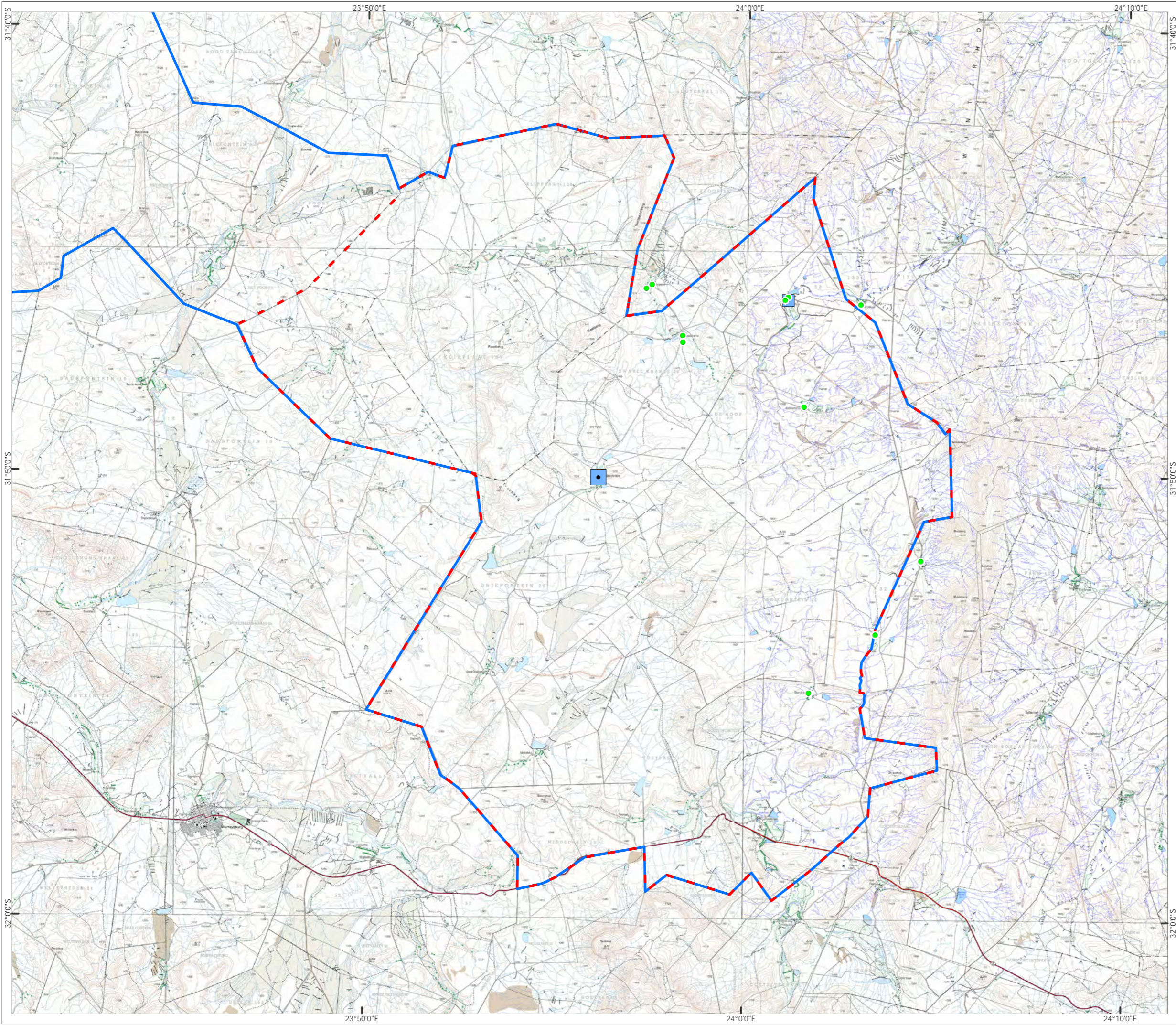






Produced: AT	Ref: 2146/REP/007
Reviewed: SC	Date: 29/03/2016
Approved: AB	

Quaternary Catchments  
and Rivers  
Figure 5.3





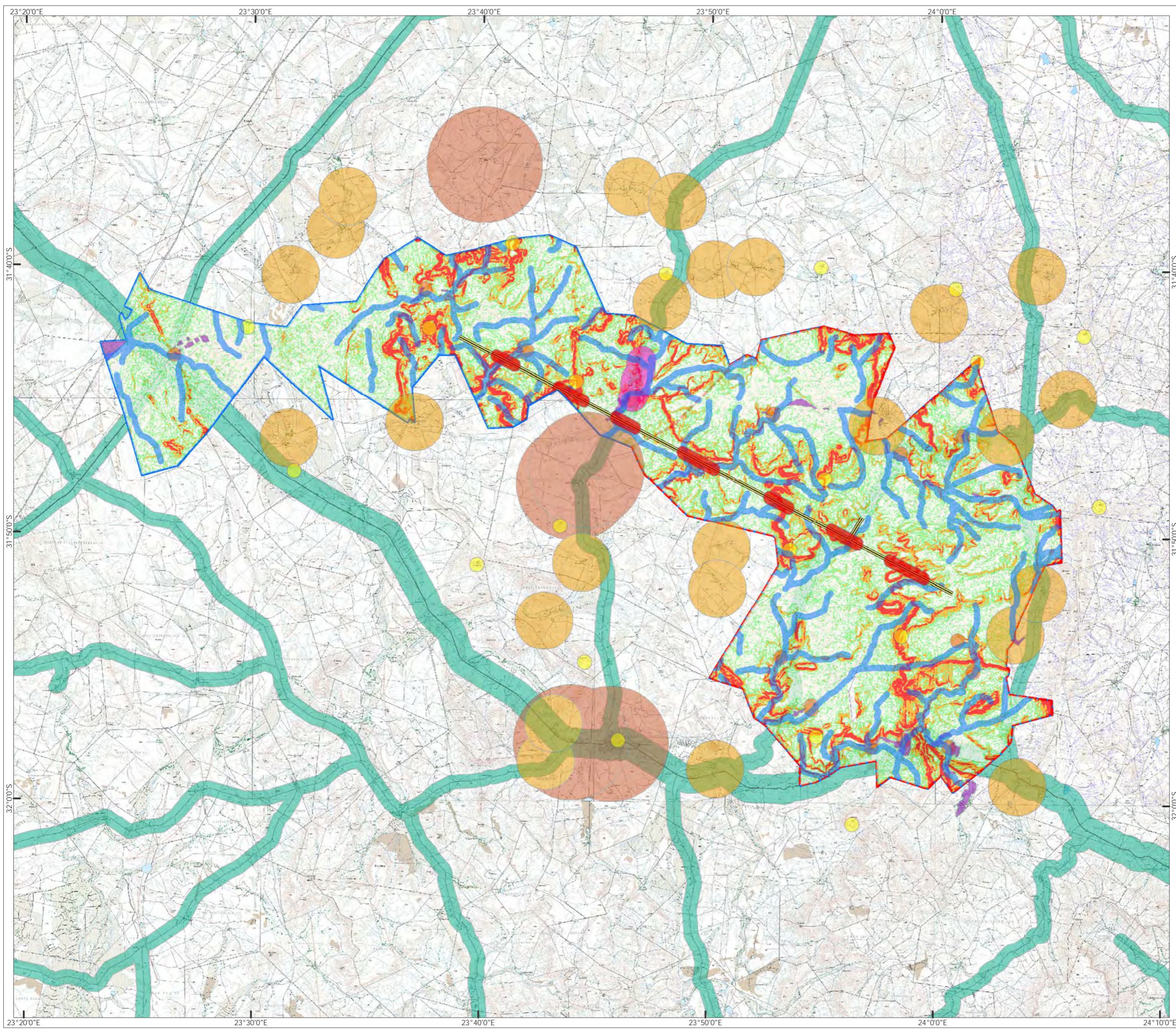


















-  WEF Site Boundary
-  Grid Site Boundary
-  Noise Sensitive Receptor
-  Ambient Sound Measurement Location

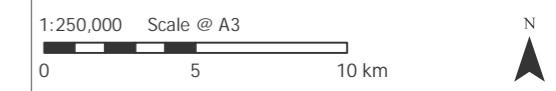


Produced: AT	Ref: 2146/REP/009
Reviewed: SC	Date: 29/03/2016
Approved: AB	

Noise Sensitive Receptors and Recording Sites on the WEF Site  
Figure 5.5

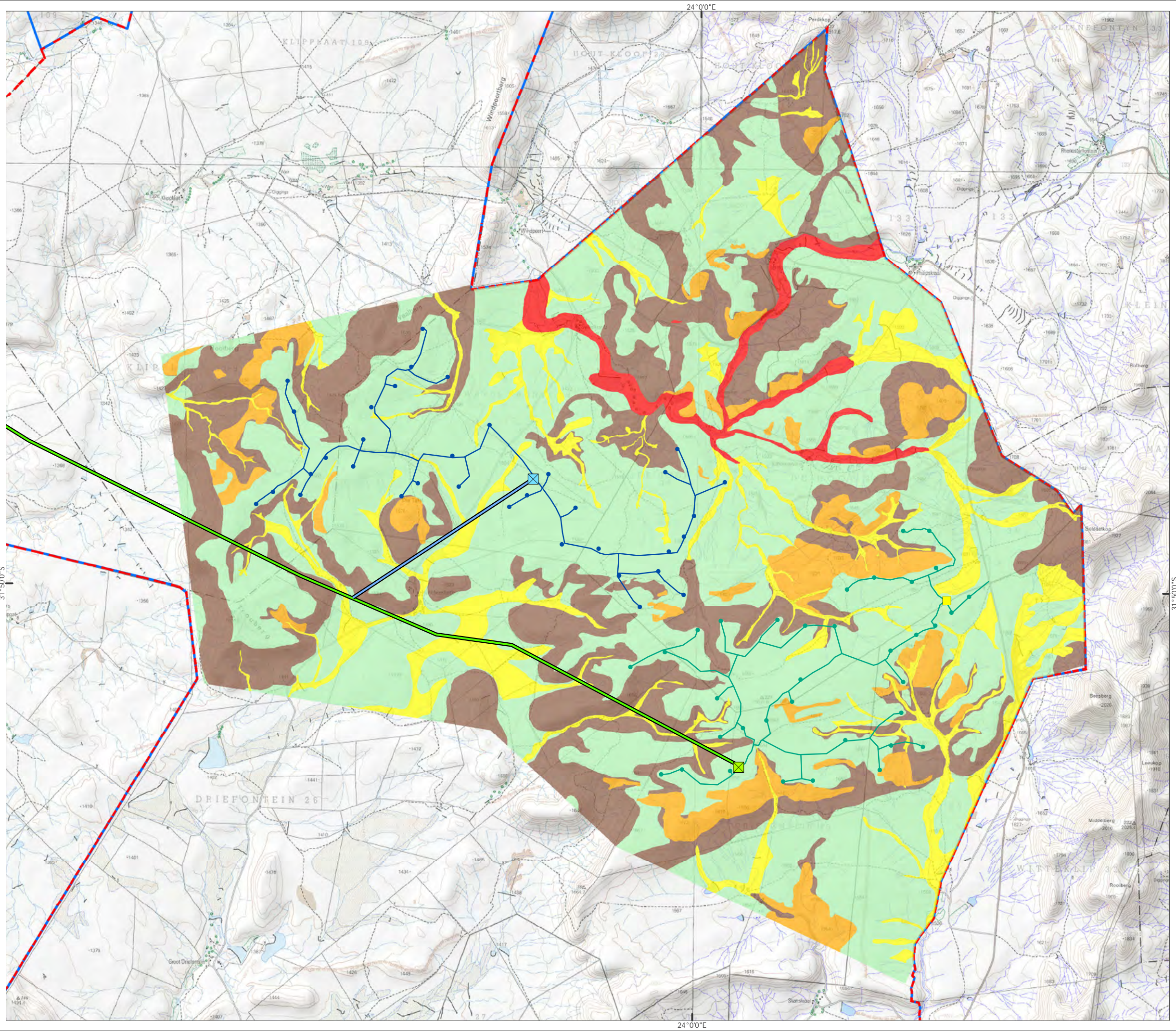


-  WEF Site Boundary
-  Grid Site Boundary
-  Grid Micro-siting Region
-  Proposed Grid Connection
-  Cultivated Landscape
-  500 m Buffer Farmsteads within Site
-  2 km Buffer Farmsteads
-  4 km Buffer Towns and Guestfarms
-  500 m Buffer of Peaks
-  River Buffer
-  1 km / 500 m Buffer of National / Regional Roads
-  1 km Buffer Scenic Poort
-  Slope less than 1:20
-  Slope at 1:20
-  Slope at 1:10
-  Slope at 1:5



Produced: AT	Ref: 2146/REP/010
Reviewed: RMc	Date: 31/03/2016
Approved: AB	

Visual Constraints  
Figure 6.1

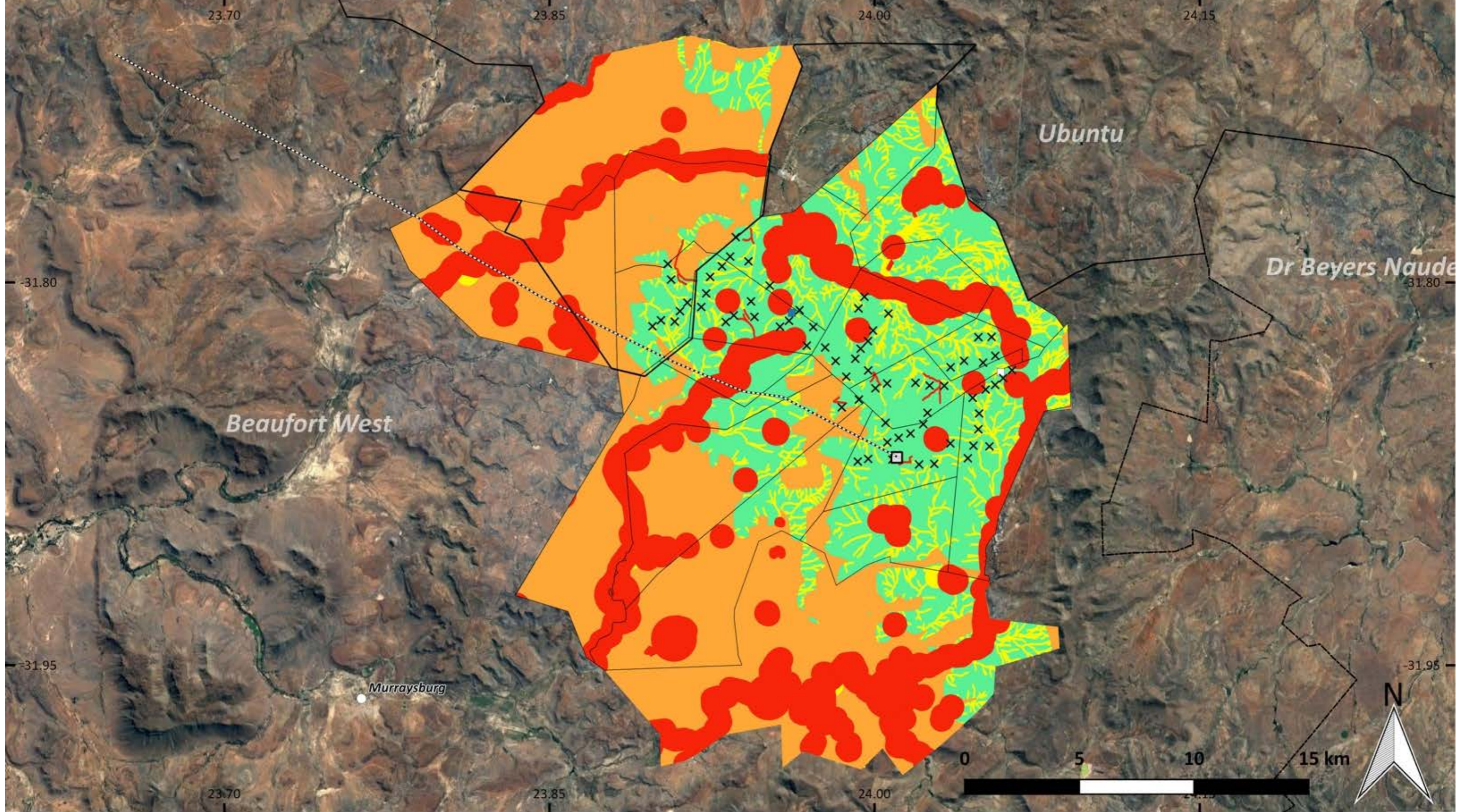


- WEF Site Boundary
  - Grid Site Boundary
  - Phase 1 Turbine Position
  - Phase 2 Turbine Position
  - Proposed Substation Phase 1
  - Phase 1 Laydown yard
  - Proposed Substation and Laydown Yard Phase 2
  - Phase 1 Preferred Grid Route
  - Phase 2 Preferred Grid Route
  - Proposed Road Phase 1
  - Proposed Road Phase 2
- Ecological Sensitivity
- Medium (Plains)
  - High (Washes and Minor Drainage)
  - High-Slopes (Steep slopes and Hills)
  - High-Very High (Dolerite Outcrops)
  - Very High (Steep)

1:80,000 Scale @ A3  
 0 2 4 km

Produced: JA	Ref: 2146/REP/011
Reviewed: RMc	Date: 05/02/2018
Approved: AB	

Ecological Sensitivity  
Figure 6.2



Inkululeko Wildlife Services  
 Mobile: +27 (0) 79 175 1758  
 Fax: +27 (0) 86 549 2322  
 Email: info@iws-sa.co.za



Arcus Consultancy Services  
 Tel: +27 (0) 21 412 1529

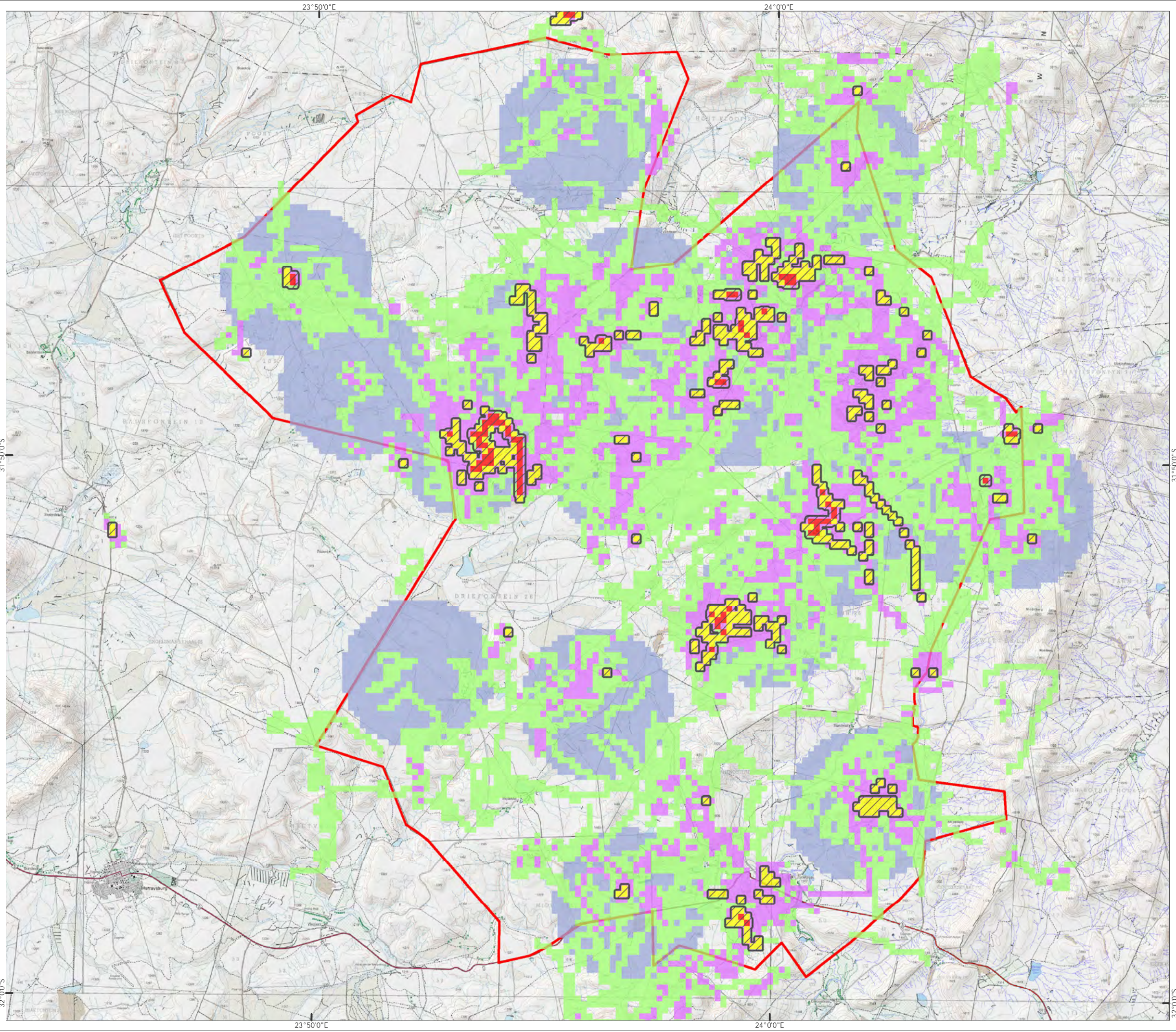
Map produced by Inkululeko Wildlife Services, 2018  
 Data source/s:  
 (e.g.)  
 Aerial Imagery - TerraMetrics (Google Earth) (2018)  
 Topography - SANBI (2006); Municipal Demarcation Board (2016)  
 WEF Infrastructure - Arcus (2017-2018)  
 Sensitivity Map - NSS (2015) and IWS (2017-2018)  
 Scale=1:266 000








**Legend**

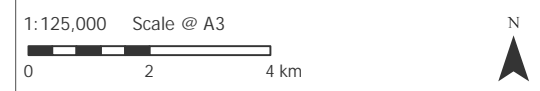
Bat Sensitivity  
 Figure 6.3

× Wind Turbine (Both Phases) (Proposed)	□ Umsinde Key Properties	Orange Medium-High
□ Phase 1 Substation (Proposed)	⋯ Municipal Boundary	Yellow Medium
⋯ Grid Transmission Line (Proposed)	○ Town	Green Low
□ Phase 1 Laydown Yard	<b>Bat Sensitivity</b>	Red High
■ Phase 2 Substation and Laydown Yard		

Umsinde Emoyeni WEF  
 Grid Connection Phase 1  
 Final EIA Report

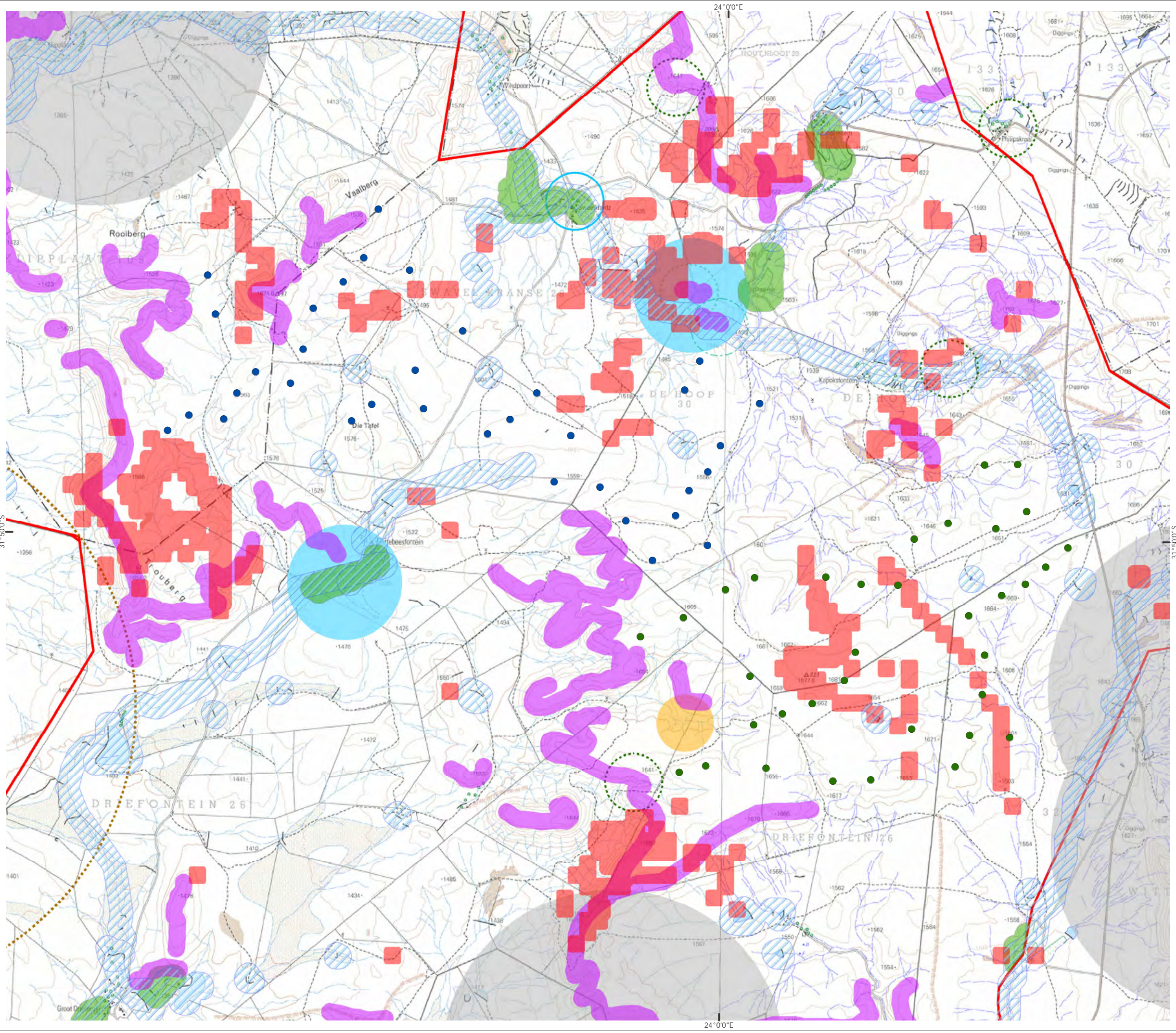


-  WEF Site Boundary
-  No-go for turbine and powerline placement
- Flight Sensitivity Score**
-  Areas with no observed activity within viewshed
-  Low
-  Medium
-  Medium - High
-  High

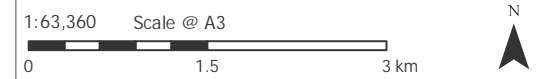


Produced: AT	Ref: 2146/REP/014
Reviewed: SC	Date: 05/02/2018
Approved: AB	

Avifauna Flight Sensitivity  
Figure 6.4



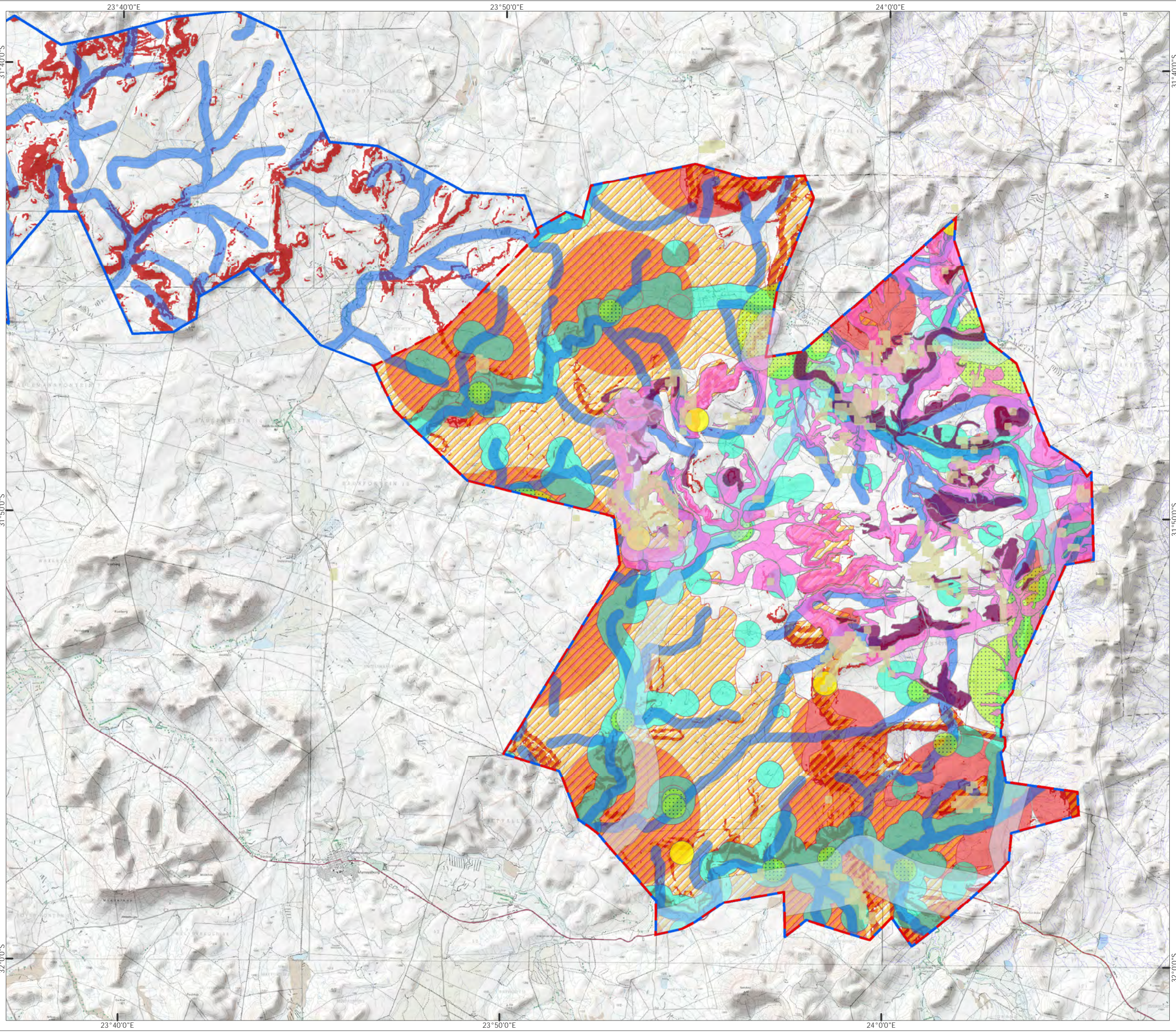
- Proposed Turbine Phase 1
- Proposed Turbine Phase 2
- WEF Site Boundary
- 3 km Verreaux's Eagle Nest Buffer
- 1 km Buffer of Verreaux's Eagle Roost
- No-Go for Turbines and Overhead Powerlines
- 200 m buffer of NFEPA Wetlands and Rivers
- 150 m Ridge Buffer
- 200 m Cultivated Lands Buffer
- Bee-eater Colony Buffer
- 500 m Rock kestrel Nest Buffer
- 500 m Buffer of Jackal Buzzard Nest
- 500 m Buffer of Rufous-breasted Sparrowhawk
- 5 km Buffer of Martial Eagle Nest



Produced: AP	Ref: 2472/REP/020
Reviewed: SC	Date: 01/02/2018
Approved: AB	

**Avifaunal No-Go Areas**

Figure 6.5



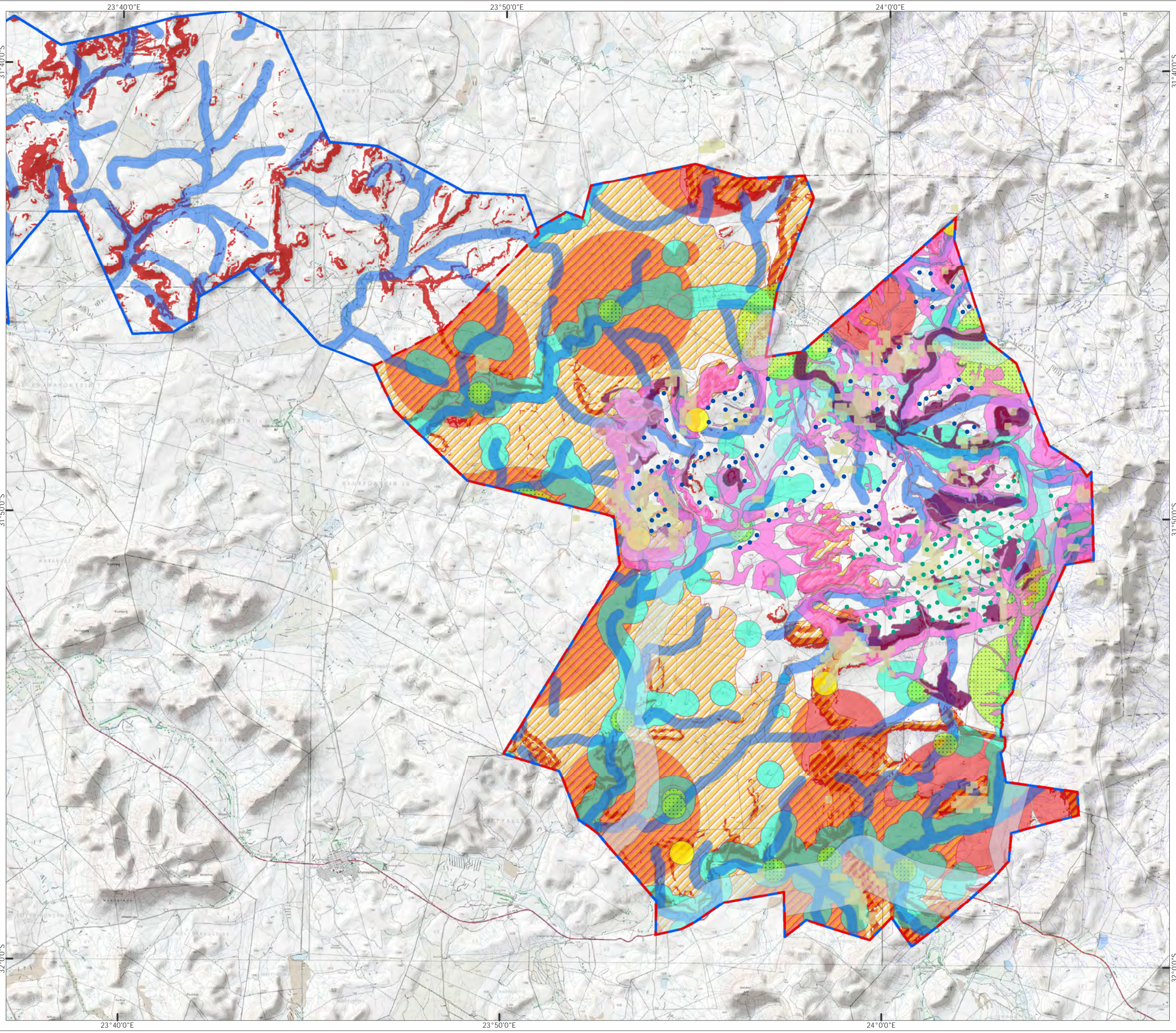
-  Grid Site Boundary
-  WEF Site Boundary
-  500 m River Buffer
-  Visual Ridgeline Buffer
-  High-very high Ecological Sensitivity
-  High Ecological Sensitivity
-  Avifaunal Buffers
-  Avifaunal Nest Buffer
-  High Bat Sensitivity
-  Medium-high Bat Sensitivity
-  500 / 2000 m Farm Buffer
-  500 m Buffer of Peak
-  National / Regional Road Buffer
-  Slope 1:5

1:150,000 Scale @ A3  
 0 4 8 km 

Produced: AT	Ref: 2146/REP/016
Reviewed: SC	Date: 06/02/2018
Approved: AB	

Environmental Constraints  
Figure 6.6

Umsinde Emoyeni WEF  
Grid Connection Phase 1  
Final EIA Report



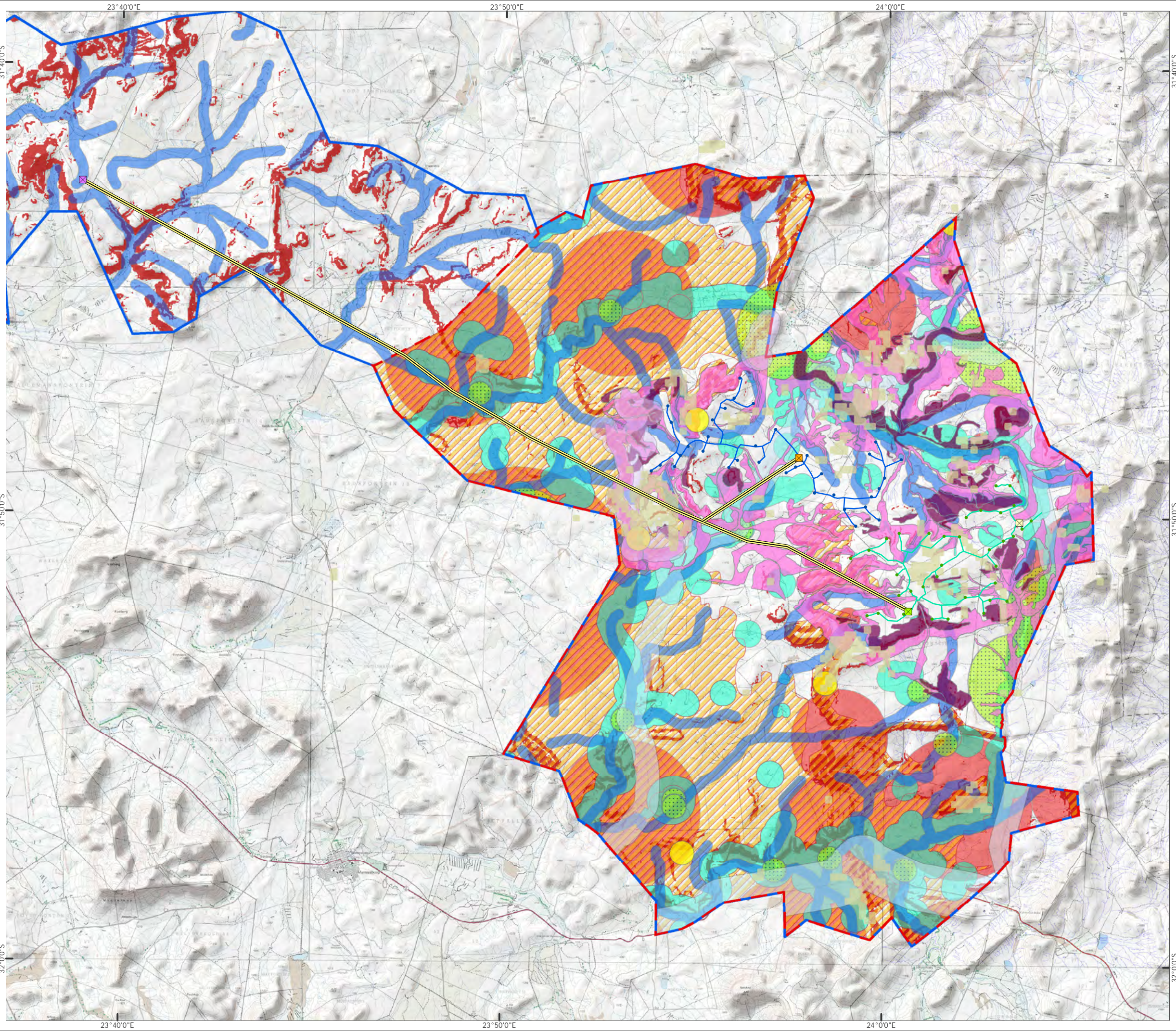
- Grid Site Boundary
- WEF Site Boundary
- Initially Proposed Turbine Position Phase 1
- Initially Proposed Turbine Position Phase 2
- 500 m River Buffer
- Visual Ridgeline Buffer
- High-very high Ecological Sensitivity
- High Ecological Sensitivity
- High Avifaunal Sensitivity
- Avifaunal Nest Buffer
- High Bat Sensitivity
- Medium-high Bat Sensitivity
- 500 / 2000 m Farm Buffer
- 500 m Buffer of Peak
- National / Regional Road Buffer
- Slope 1:5



Produced: AT	Ref: 2146/REP/016
Reviewed: SC	Date: 06/02/2018
Approved: AB	

Environmental Constraints and Initial 98 Turbine Layout  
Figure 6.7





- Grid Site Boundary
- WEF Site Boundary
- Mitigated Turbine Position Phase 1
- Mitigated Turbine Position Phase 2
- ✕ Approved Ishwati Emoyeni Substation
- Proposed Substation Phase 1
- Phase 2 Substation and Laydown Yard
- Phase 1 Laydown Yard
- Phase 1 Road
- Phase 2 Road
- 500 m River Buffer
- Visual Ridgeline Buffer
- High-very high Ecological Sensitivity
- High Ecological Sensitivity
- Avifaunal Buffers
- Avifaunal Nest Buffer
- High Bat Sensitivity
- Medium-high Bat Sensitivity
- 500 / 2000 m Farm Buffer
- 500 m Buffer of Peak
- National / Regional Road Buffer
- Slope 1:5



Produced: AT	Ref: 2146/REP/016
Reviewed: SC	Date: 06/02/2018
Approved: AB	

Environmental Constraints and Mitigated 35 Turbine Layout  
Figure 6.8