Botanical Screening Report of the Old Everite Asbestos Waste Consolidation Site, Brackenfell, Cape Town

Report compiled by Ross C. Turner

for Chand Environmental Consultants

June 2012

National Legislation and Regulations governing this botanical screening report

This specialist report is compiled in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), and the Environmental Impact Assessment (EIA) Regulations, 2010 promulgated under the said Act.

Appointment of Specialist

Ross C. Turner has been appointed by Chand Environmental Consultants to perform a botanical screening survey of the old Everite asbestos waste consolidation site, Brackenfell, Cape Town

Details of Specialist

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Expertise

Ross C. Turner:

- Qualifications: B. Soc. Sci (UCT) 1991
- MSc Ecology (UKZN) 2012
- Botanical ecologist with 15 years field experience of the Fynbos biome, as well expert knowledge of the genus *Erica*.
- Member of SAAB, 2011-12
- Has performed the botanical component of environmental impact assessments since 2005.
- Has been first and co-author of scientific papers published in peer-reviewed journals, research topics including taxonomy, plant threat assessment, plant community ecology and pollination biology.
- Has presented research at the AGM of the South African Association of Botanists, 2011 and 2012.

- Currently performing studies toward a PhD.
- Curriculum Vitae – See Appendix 1.

Independence

The views expressed in this report are the independent views of the specialist consultant, who has no personal or financial (business) interest in the study site, apart from remuneration for botanical services concerned with this report.

Conditions relating to this report

The content of this report is based on the consultant's best scientific and professional knowledge as well as available information. The consultant reserves the right to modify the report should new, relevant or previously unavailable information be published or become known to the consultant, pertaining to this survey / report. This report may not be altered or added to without prior written consent of the consultant. This also refers to electronic copies of the report. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report, which should be included in its entirety as an appendix or separate section of any such report.

General declaration:

- I have acted as the independent botanical specialist in this screening survey.
- I declare that I have the expertise necessary to conduct this specialist screening survey, and that there are no circumstances that may compromise my objectivity in performing this work.
- I have complied with the Act (1998), as well as regulations and applicable legislation (EIAR 2010).
- The survey data contained in this report are true and correct.

Ross C. Turner

22 June 2012

Contents

1. Introduction

The old Everite asbestos waste consolidation site ("The Site"), situated within the Everite Industrial Park, Brackenfell, Cape Town, occupies an area of ±10 ha.

The Site was partially decommissioned in 2000, and a waste management licence is required to complete the decommissioning process.

A geotechnical assessment of the Site was undertaken by GEOSURE (Pty) Ltd in 2011 and as a result of findings, some portions of the Site are proposed to be redeveloped for light industrial use (Appendix 7). To this end, consultation with the City of Cape Town, DWA, DEA&DP, and other relevant bodies has commenced.

2. Terms of reference

In terms of NEMA EIA Regulations (2010) a specialist botanical screening report is triggered as the Site falls within a Critically Endangered (CR) vegetation type, *Cape Flats Sand Fynbos* (*CFSF)* (Mucina and Rutherford 2006). The consultant has been contracted by Chand to provide a botanical screening report as well as a basic assessment of environmental process within the Site.

3. Evaluation method

Site inspection was performed on foot on 8th April 2012. A handheld Garmin Vista® HCx GPS unit was used to record localities of alien and indigenous flora, and photographs were taken with a digital camera for reference.

Current GIS and national biodiversity data (City of Cape Town GIS layers; SANBI BGIS; SANBI threatened terrestrial ecosystems 2011; SA IUCN Plant Red List, etc) were used to assess field data. Arcview© 3.2 and Google Earth™ were used for mapping purposes.

Recorded plant species were compared with data from vegetation survey in Northpine suburb, performed during November 2005, ±0.73km to the northeast of the Everite Site.

Recognised Mesembryanthemaceae expert, Dr. Cornelia Klak, (UCT Bolus Herbarium) was consulted for positive identification of *Lampranthus explanatus* (EN), not flowering at time of survey.

4. Study site locality

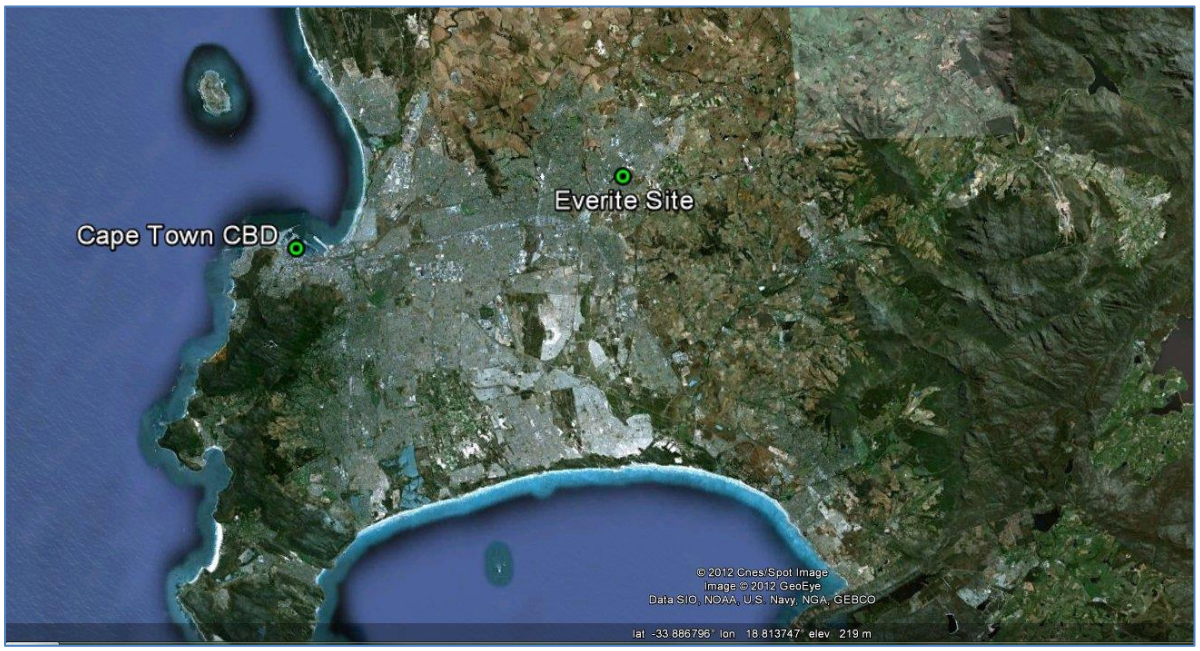

Figure 1: Everite Site location relative to Cape Town

The Site is situated ±26km ENE of Cape Town CBD, in Brackenfell suburb, and is easily reached by taking the Okavango N2 freeway off ramp and then turning right into Old Paarl Road (R101). An approximate central GPS co-ordinate is -33.875034 x 18.701308, altitude 112 m.a.s.l. The entire Site is surrounded by the Everite Industrial Park, comprising a variety of light industries.

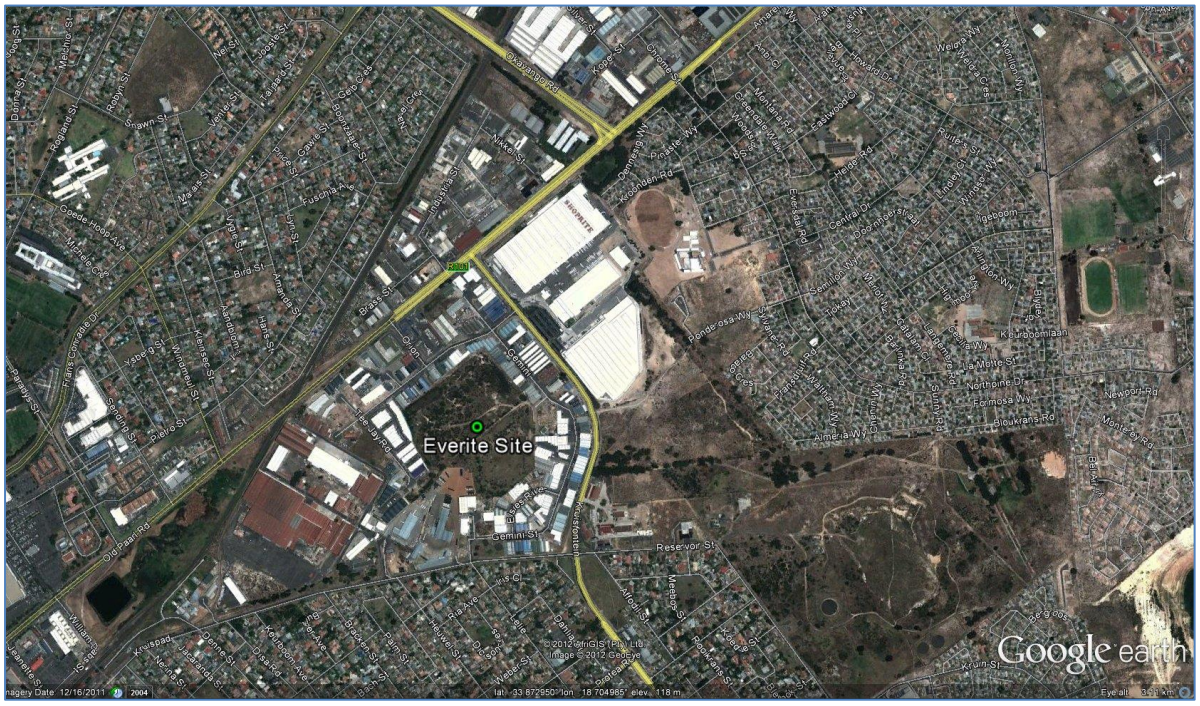

Figure 2: Everite Site locality, Brackenfell

4.1 Topography

The topography of the Site has been almost entirely transformed by prior landfill (asbestos waste consolidation) activities.

Prior to landfill activities the Site would have comprised a gentle, sandy, northwest-facing slope. In its current condition the Site consists of a moderately-steep northwest-facing hill slope with associated stormwater catchment on the northern boundary. Storm water culverts, constructed using cement and old tires, have been positioned on the (landfill) hill slope to facilitate run-off into the stormwater catchment.

4.2 Geology and soils

No surface rock occurs on the site. In its natural state the Site would have comprised Quaternary and / or Tertiary sands of marine and aeolian origin, described as "acid, deep, grey regic sands, usually white, often of the LaMotte form" (Mucina & Rutherford, 2006).

The only portions of the Site containing original surface sand-cover occur in the extreme north-eastern corner and in a small adjacent strip along the north-eastern boundary (Figures 5-9, 15).

With the exception of the two areas mentioned above, underlying and surface soils have been irreversibly transformed by landfill activities on Site, as well as by impacts associated with construction of surrounding light industry. Whereas in its natural state the Site would have consisted of relatively mobile wind-blown quartzitic sand, surface soils are now predominantly comprised of landfill soils, i.e. Granitic loam, Ferricrete (iron-rich) soil, and in places compacted builders' rubble. No corridor for replenishment of aeolian sand exists due to the surrounding urban and light industrial landscape.

From field survey it appears that the underlying geology of the Site is deeply weathered Granitic loam. Supporting this observation is the occurrence of *Swartland Granite Bulb Veld* only approximately 500m to the southeast of both the Everite Site and the Northpine *Cape Flats Sand Fynbos* (*CFSF*) remnant (Figure 4). Original underlying Granitic loam is observable on the northern boundary / stormwater catchment area of the Site, where surface sand has been stripped by water flow into the containment pool, as well as by grading.

However, at all other localities on Site it appears as if surface soils are the result of landfill activities, including deposition of *ex situ* soils.

4.3 Climate

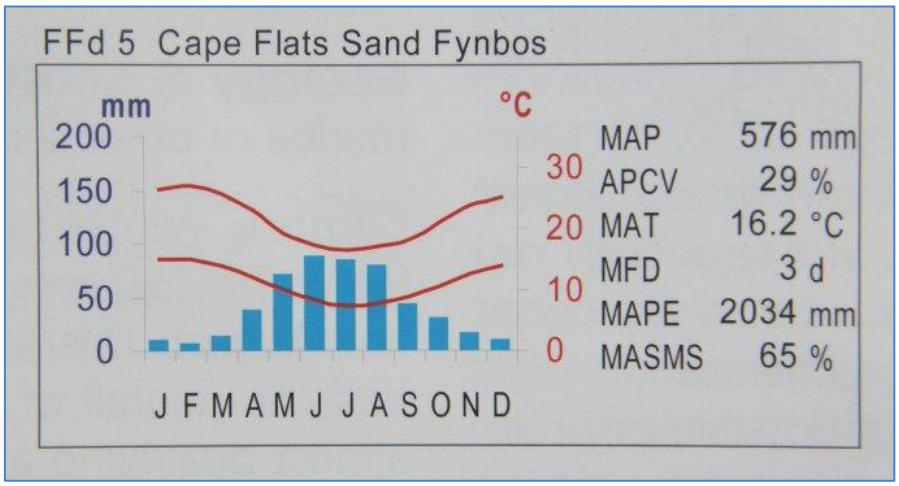

Figure 3: Climate statistics for *Cape Flats Sand Fynbos* after Mucina & Rutherford (2006)

CFSF is the wettest and coolest of the West Coast sand fynbos types, experiencing a winter-rainfall regime with precipitation peaking from May to August. Mists occur frequently in winter and frost incidence is approximately 3 days per year (Figure 3) (Mucina and Rutherford, 2006).

4.4 Vegetation type

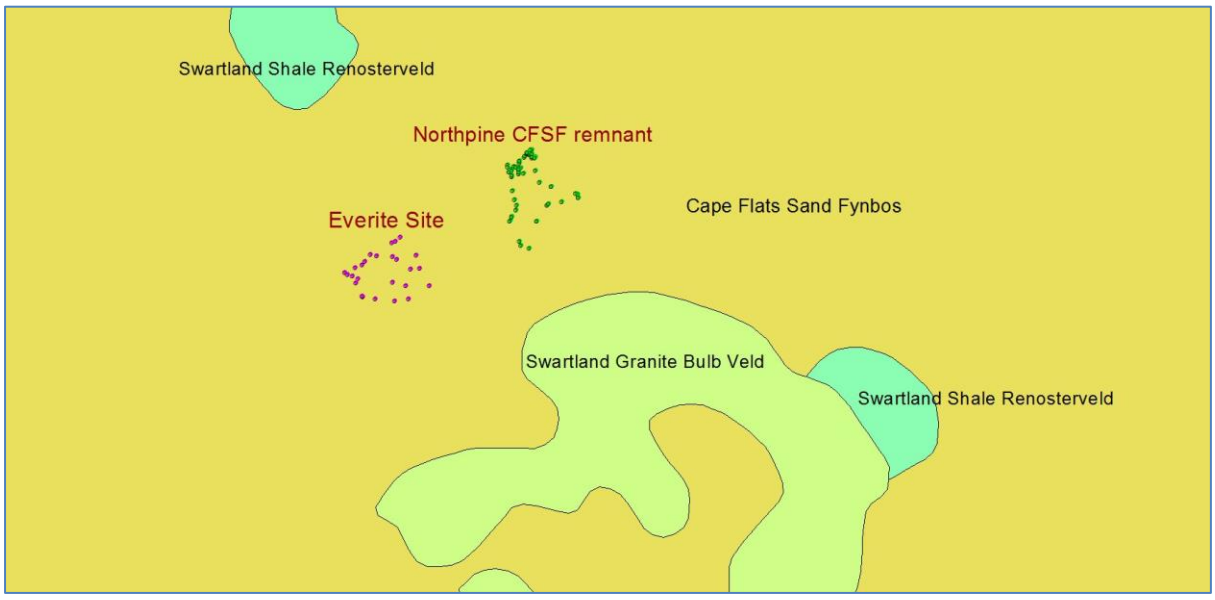

Figure 4: GIS for the Everite Site and Northpine Vegetation remnant (2005 data) in relation to vegetation types

The area in which the Site is situated formerly supported *Cape Flats Sand Fynbos* (*CFSF*) (Mucina and Rutherford, 2006).

This vegetation type (FFd 5) is Critically Endangered (CR), having suffered irreversible loss of natural habitat. Remaining natural habitat is thus a biodiversity target (conservation priority). http://bgis.sanbi.org/ecosystems/showecosystem.asp?CODE=FFd%205

Of an original ±54 000 ha, only ±8649 ha remain (±16%). Only 1% of original area is protected under law and at least 95 Red Listed plant species and 16 endemic plant species occur within this vegetation type (See Turner (2006) for examples of threatened *CFSF* plant species).

Historically *CFSF* occurred on the Cape Flats from Blouberg and Koeberg Hills west of the Tygerberg Hills to Lakeside and Pelican Park in the south near False Bay; from Bellville and Durbanville to Klapmuts and Joostenberg Hill in the east, and to the southwest of the Bottelary Hills to Macassar and Firgrove in the south (Mucina and Rutherford, 2006).

As the conservation status of *CFSF* is CR, no further loss of this vegetation type should occur. However, within the confines of the greater Cape Town metropolitan area, the reality is that there is ongoing loss of *CFSF* remnants, for example Northpine (see sections 5.2; 9; Conclusion; Appendix 4). These ongoing losses of area of occupancy (AOO), extent of occurrence (EOO) and plant biodiversity within *CFSF* amount to high negative cumulative impact.

4.5 Natural disturbance regime

CFSF vegetation units, as with all fynbos vegetation types, are typically subject to stochastic fires. In pristine vegetation units fire intervals vary according to variables such as rainfall, topographical aspect and fuel load (Cowling, 1992). Very broadly, typical fynbos fire intervals range between 15-35 years, and sometimes longer. However, due to the urbanised / industrialised nature of the Site surrounds, no opportunity exists for natural fire cycles. Due to the current alien-infested state of the Site and low numbers of remnant individual indigenous plants (<100 individuals, excluding *Carpobrotus edulis*), fire would likely be detrimental for reasons mentioned in section 6.2.1.

5. Botanical survey

5.1 Indigenous flora

A total of seven fynbos plant species were recorded on Site.

The only portion of the Site that supports a degraded *CFSF* vegetation community occurs in the extreme north-eastern corner where a remnant of original quartzitic surface sand-cover remains.

This small, ±50m long x 35m wide block, ±1.75% of the Site, (Figures 5-9, 15) contains five indigenous plant species: *Cliffortia polygonifolia* (Rosaceae, LC, <5 plants); *Phylica ericoides* (Rhamnaceae, LC, <5 plants); *Conicosia pugioniformis* (Mesembryanthemaceae, LC, <10 plants); *Ehrharta villosa* (Poaceae, LC, >250 plants), and *Lampranthus explanatus* (Mesembryanthemaceae, EN, ±30 plants).

Figure 5: *Phylica ericoides* (LC)

Figure 6: *Cliffortia polygonifolia* (LC) under *Acacia saligna* (alien)

L. explanatus appears to be slightly more resilient than the single-stemmed reseeding plants in the north-eastern corner – *C. polygonifolia*, *C. pugioniformis* and *P. ericoides* – having ±30 plants remaining. This is likely due to the fact that the species is specifically adapted to mobile quartzitic sands, having multiple long trailing stems that root at intervals along their length (Dr. C. Klak, pers. com. 2012).

It is the consultant's opinion that this *L. explanatus* locality is still viable, given prompt intervention (ongoing alien clearing and removal of cut wood; removal of rubbish and rubble; demarcation of water catchment, containment and green corridors; cultivation and re-establishment of *L. explanatus* – see section 9. Recommendations).

Plants of *E. villosa*, a grass species adapted to sand ("Dune Ehrharta") also appear to be relatively resilient, forming the dominant indigenous cover in the north-eastern corner (Figure 7).

Scattered plants of *Carpobrotus edulis* (Mesembryanthemaceae, LC, "Suurvy") occur in the north-western and western portions of the Site. Although this species is indigenous, plants on Site were likely introduced for soil stabilization, or arrived as seed or propagules in landfill soil.

Figure 7: *Ehrharta villosa*, north-eastern corner of the Site

One plant of *Rhus laevigata* (Anacardiaceae, LC, “taaibos”) occurs on the south-western boundary of the Site. *Senecio halimifolius* (Asteraceae, LC, “tabakbos”) is a weedy indigenous species common in degraded, seasonally-wet localities in the SW Cape, and occurs on the margins of the stormwater containment pool.

5.2 IUCN Threatened plant species

Figure 8: *Lampranthus explanatus* flowering: Photo N.A. Helme

Figure 9: *Lampranthus explanatus*, Everite Site: Photo R.C. Turner

One Endangered (EN) plant species occurs on site – *Lampranthus explanatus* (Figures 8 & 9; Appendix 2) (Raimondo et al., 2009). This formerly common species is now locally extinct at >50% of known locations due to habitat loss to crop cultivation, alien plant invasion, and suburban and coastal development over the past 120 years. Decline is continuing (e.g. this Everite Site and Northpine). Based on a regeneration time of 15 years and past rates of decline since 1975, Raimondo et al (2009) estimate a further 50% population reduction to be reached by 2020, i.e. *extinction of this species in the wild within the next eight years*. http://redlist.sanbi.org/species.php?species=88-76

The consultant recorded *L. explanatus* in a *CFSF* vegetation remnant in Northpine suburb in 2005, only ±0.73km to the NE of the Everite Site locality. The Northpine *CFSF* vegetation remnant has subsequently experienced large reduction in area of occupancy (AOO) since 2005 (see Appendix 4).

NB: Loss of a further sub-population of *L. explanatus* would equate to a high negative cumulative impact upon the species, resulting in a reduction of total area of occupancy (AOO), extent of occurrence (EOO), population numbers, and thus genetic diversity within the greater population.

5.3 Alien flora

The invasive alien *Acacia saligna* (Fabaceae, "Port Jackson") is the dominant plant species on Site. Seasonally wetter and sloping portions of the Site are currently densely infested in portions (>75% cover) by 4-6m tall plants of *A. saligna*.

A row of alien *Eucalyptus* sp. (Myrtaceae) were at some point planted along the central northeast to southwest running gravel track, approximately bisecting the Site. These trees were pollarded circa 2009-2010 (see Appendix 3) but have coppiced since then. Further scattered *Eucalyptus* plants occur throughout the site.

Figure 10: Dense *Acacia saligna* infestation, Everite Sit

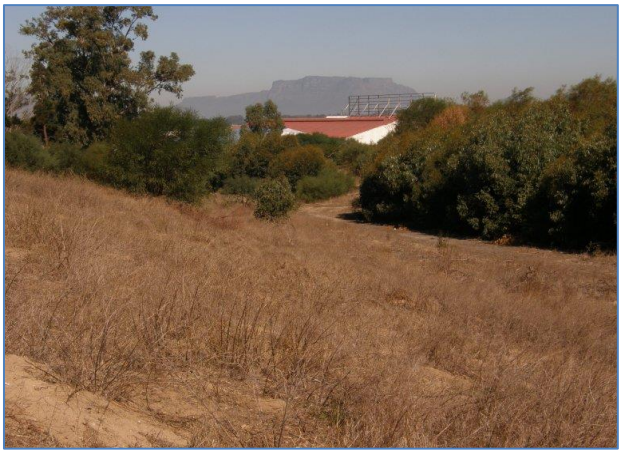

Figure 11: Dividing track showing landfill slope gradient and Eucalyptus

Typha capensis (Typhaceae, LC, "Bulrush") occurs in the north-western stormwater containment pool (see Figure 14). This cosmopolitan species is not endemic to South Africa (Raimondo et al., 2009) and is commonly indicative of eutrophied water bodies. It is therefore considered an indicator of disturbance.

The "plateau", the highest elevation on Site at approximately 117m.a.s.l, consists of sandy soils of multiple landfill origins, infested by *Pennisetum clandestinum* (Poaceae, "Kikuyu Grass") and *Lotus subbiflorus* (Fabaceae, "Lotus"). Scattered *A. saligna* plants occur on the plateau, although *P. clandestinum* is dominant.

Further alien plant species on site include *Cynodon dactylon* (Poaceae, "Kweek"); *Melia azedarach* (Meliaceae, "Syringa"); *Orobanche ramosa* (Orobanchaceae, "Branched Broomrape"); *Pinus* sp. (Pinaceae, "Pine"); *Ricinus communis* (Euphorbiaceae, "Castor-oil Plant"; and *Taraxacum officionale* (Asteraceae, "Dandelion" or "Perdekos").

Google Earth imagery (Appendix 3) shows the seasonal response of alien grasses and annuals to moisture availability.

Figure 12: Highest elevation of the Everite Site – the "plateau" – with Kikuyu infestation. This area has active Cape Dune mole-rat burrows

5.4 Indigenous fauna

Southern Double-collared Sunbirds (*Cinnyris chalybeus*) and Cape Weavers (*Ploceus capensis*) were conspicuous on Site, especially in the north-western portion of the Site in the vicinity of the stormwater containment pool. Cape Weavers use *A. saligna* plants for nest-building, surrounding this pool (obs., this study).

While there is evidence that disturbed margins (e.g. roads) bordering stands of bird-pollinated plants result in lowered pollination visitation rates (Geerts and Pauw, 2010), there is also striking recent anecdotal evidence of mass visitation by a variety of bird species to an urban Moorreesburg property where multiple planted *Aloe* species occur. Moorreesburg is entirely surrounded by wheat field monoculture (Dr. Phoebe Barnard and Anina Heysteck, pers. com. 2012).

Thus corridors or "islands" of indigenous vegetation, however discrete, can provide important ecosystem services for especially birds, especially given the pace of habitat destruction in the SW Cape lowlands, as well as climate change which impacts bird migrations, e.g. Southern Double-collared Sunbirds have been recorded up to 34km distant from ringing sites (Hockey et al, 2005).

Bathyergus suillus (Cape dune mole-rat) are especially active on the "plateau" (see section 4.2), and along the north-eastern boundary of the Site.

5.5 Alien fauna

Guinea Fowl are common on Site. These birds were introduced to South Africa circa 19th century. (Hockey et al, 2005; Dr. P Barnard, pers. com. 2012).

6. Impact regime

6.1 Past

As highlighted by this report, the Site is entirely transformed, excepting the small, degraded, remnant vegetation *CFSF* community in the north-eastern corner of the Site (five indigenous plant species).

While the precise development history of the Site is unknown to the consultant, it is probable that the Site has experienced repeated disturbance and thus cumulative impacts over the past 120 years (Raimondo et al., 2009), culminating in irreversible habitat destruction associated with landfill operations and then light industrial development over the past decade (see Appendix 3).

It is the consultant's opinion, on the basis of survey and observed remaining indigenous species, that a degraded, although intact, *CFSF* vegetation community would have existed at the Site at the onset of landfill operations.

6.2 Present

6.2.1. Alien vegetation

The Site is currently heavily infested by *A. saligna* and to a lesser extent, *Eucalyptus*. Within the context of the Site, negative social impacts of alien infestation include:

- A fire-hazard to surrounding businesses and property
- Fostering of criminal activities (concealment): "Bush of Evil"!
- Vagrancy (concealment)
- Illegal tipping (concealment)

Negative environmental impacts of alien infestation include:

- Vigorously-growing *A. saligna* and *P. clandestinum* potentially out-compete remaining indigenous flora, resulting in a high negative cumulative impact upon both *CFSF* and *L. explanatus* (EN).
- In the case of uncontrolled fire (likely, given the Sites' current condition), what little indigenous seed-bank remained would likely be killed due to excessive heat generated by a large alien fuel load.

6.2.2. Illegal tipping

- Conspicuous illegal tipping of apparently commercial waste is present at co-ordinates -33.873885° x 18.702322° on the north-eastern boundary of the Site.

7. Water catchment and containment

A narrow strip running from the north-western to north-eastern corner of the Site serves as water catchment and containment (±300m long x 35m wide; approximate corner co-ordinates are -33.874521° x 18.698819°; -33.874738° x 18.698936°; -33.872957° x 18.701476°; -33.873208° x 18.701704°). Run-off into the containment area is facilitated by large culverts (Figure 13), visible in Google Earth imagery (cover page; Figure 15).

Figure 13: Cement and Tire culverts

Figure 14: Water containment pool with *Typha capensis*

Despite the transformed, degraded nature of the Site, the above-mentioned northern strip provides refuge for Southern Double-collared Sunbirds and Cape Weavers, largely due to an artificially

created, near-perennial water body in the north-western corner. This pool contains runoff that would otherwise inundate surrounding light industrial businesses during heavy rainfall events. Evidence of seasonal standing water was found in the south-western corner of the site (-33.876105 x 18.699796), although this area appears not to have been developed specifically as water catchment or containment.

Figure 15: Google Earth image with existing water catchment area (red), containment pool (blue) and remnant *CFSF* vegetation community (green). Note: *Acacia saligna* cover is currently more extensive than in this 2011 Google Earth image

8. General condition of the Site: summary

The majority of the Site currently forms sterile landfill infested primarily with *A. saligna*. The only original, intact, quartzitic surface sand on Site occurs in the north-eastern corner and in a small adjacent strip along the north-eastern boundary.

The extreme north-eastern corner of the Site contains the only indigenous vegetation remnant on Site, albeit composed of only five species (approximate co-ordinates are -33.873170° x 18.701018°; -33.873400° x 18.701325°; -33.872957° x 18.701476°; -33.873208° x 18.701704°).

One of these five plant species is classified as Endangered (EN) on the Red List of South African Plants (Raimondo et al., 2009): *Lampranthus explanatus* (Mesembryanthemaceae). A further three indigenous plant species occur on Site outside of the north-eastern corner.

The entire northern boundary forms a water catchment and containment area (see Section 7), necessary in the context of the topography of the Site, i.e. a moderately steep landfill hill, sloping down towards the northwest. The water containment pool supports indigenous avifauna, despite the degraded nature of the Site.

9. Assessment of botanical impacts

The context of botanical threat assessment at the Everite Site addresses loss of approximately 1ha of degraded, critically endangered *Cape Flats Sand Fynbos* containing five indigenous plant species, including one endangered species, *Lampranthus explanatus* (EN). All assessments are as per Figure 15 polygons (pg. 16).

Table 1 represents an impact assessment matrix for development and no-go options, with and without restoration, maintenance, or relocation mitigations. Explanations of threat assessment criteria are included in Appendix 8.

Alternative	Action	Impact	Extent of impact	Duration of impact	Intensity of impact	Consequence score	Probability of occurrence	Status of impact	Significance of impact	Confidence
Development Alternative 1	Site capping except for red polygon, without mitigation	Loss of *CFSF* + EN species	L	H	H-	7	H	Negative	H	High
Development Alternative 1.1	Site capping except for red polygon, with mitigation	Restoration and maintenance of *CFSF* + conservation of EN species	L+	H	L+	3	L	Positive	L+	Medium to High
Development Alternative 2	Site capping except for blue polygon, without mitigation	Loss of *CFSF* + EN species	L	H	H-	7	H	Negative	H	High
Development Alternative 2.1	Site capping except for blue polygon, with mitigation	Loss of *CFSF* + relocation of EN species	L	H	M-	6	H	Negative	M	High
No-go Alternative 3	No Site capping or development, without mitigation	Loss of *CFSF* + EN species	L	H	M-	6	H	Negative	M	High
No-go Alternative 3.1	No Site capping or development, with mitigation	Restoration and maintenance of *CFSF* within red polygon, clearing of alien vegetation elsewhere	L	H	L+	4	L	Positive	L+	Medium to High

Table 1. Impact assessment matrix for development and no-go options at the Everite Site, Brackenfell, with and without relocation and maintenance mitigations.

9.1. Development Alternative 1

Development Alternative 1 would involve capping of the site, except in the red polygon (Figure 15), coupled with light industrial development of the remainder of the Site. No mitigations would be performed.

The extent of impact would be indirect, negative and localized (±1ha). The duration of impacts to the *CFSF* remnant would be high, i.e. permanent and irreversible. The projected consequence score of 7 reflects a high significance of impact. The probability of biodiversity loss given development without mitigation, would be high (definite), and the status of the impact would be negative.

The significance of Alternative 1 impacts would be high, i.e. loss of critically endangered *CFSF* and one endangered plant species, conforming to predicted extinction of *L. explanatus* in the wild by 2020 (Raimondo et al., 2009; see 5.2.). Confidence in assessment and prediction is high.

9.2. Development Alternative 1.1

Development Alternative 1.1 would involve capping of the site, except in the red polygon (Figure 15), coupled with light industrial development of the remainder of the Site. Restoration and conservation mitigations would be performed.

The extent of impact would be direct, positive and localized (±1ha). The duration of the mitigations would be labour intensive and would have to be applied indefinitely, as the Site has no ecological connectivity. The intensity of the mitigations would represent a minor contribution to conservation goals for *CFSF*. The projected consequence score of 4 reflects the minor significance of mitigations. The probability of mitigations having a minor but positive impact is low. The status of mitigations would be positive, although their significance would be offset by the small size of the *CFSF* remnant and low numbers of indigenous plant species, including the one EN species.

9.3. Development Alternative 2

Development Alternative 2 would involve capping of the site excepting for the blue polygon (Figure 15). No restoration or relocation mitigations would be performed.

The extent of impact would be direct, negative and localized (±1ha). The duration of impacts to the *CFSF* remnant would be high, i.e. permanent and irreversible. The intensity of the impact would be high. The projected consequence score of 7 reflects a high significance of impact. The probability of the impacts occurring given development is high (definite), and the status of the impact would be negative.

The significance of Alternative 2 impacts, without mitigation, would be high, i.e. loss of critically endangered *CFSF* habitat, as well as one endangered plant species, conforming to predicted extinction of *L. explanatus* in the wild by 2020 (Raimondo et al., 2009; see 5.2.). Confidence in assessment and prediction is high.

9.4. Development Alternative 2.1

Development Alternative 2.1 would involve capping of the site excepting for the blue polygon (Figure 15), with mitigation to relocate plants of *L. explanatus* (EN) to nearby Bracken Nature Reserve.

The extent of impact would be direct, negative and localized (±1ha). The duration of impacts to the *CFSF* remnant would be permanent and irreversible. Relocation of the one endangered species would be initially labour-intensive, and relocated plants would require initial care after re-establishment. The intensity of the impact would be high. The projected consequence score of 6 reflects a moderate significance of impact. Under this scenario probability of the impact occurring would be high (definite), and although the status of the impact is negative, the relocation-mitigation offsets the consequence score by 1 point compared to Development Alternative 2.

The significance of Alternative 2.1 impacts, relocation-mitigation considered, would be moderate, i.e. loss of critically endangered *CFSF* habitat, although the one endangered plant species from the Site would be relocated. Confidence in assessment and prediction is high.

9.5. No-go Alternative 3

No-go Alternative 3 would involve no capping or light industrial development of the Site. No restoration or relocation mitigations would be performed.

The extent of impact would be indirect, negative and localized (±1ha). The duration of impacts to the *CFSF* remnant would be high, i.e. permanent and irreversible over time, due to absence of mitigation, i.e. restoration, maintenance, or relocation. The intensity of the impact would be moderate, i.e. continual decline of habitat and plant species over time. The projected consequence score of 6 reflects a moderate significance of impact.

Under this scenario probability of the impact occurring, i.e. loss of critically endangered *CFSF* habitat and one endangered plant species, would be high (definite) over time, and the status of the impact would be negative. Confidence in assessment and prediction is high.

9.6. No-go Alternative 3.1

This non-development alternative would involve no capping or light industrial development of the Site. Restoration and relocation mitigations would be performed.

The extent of impact would be direct, positive and localized (±1ha) but is considered a low negative score as surrounding alien vegetation occurring on transformed soils would continually encroach upon the mitigated area. The duration of the mitigations would be labour intensive and would have to be applied indefinitely, as the Site has no ecological connectivity. The intensity of the mitigations would represent a minor contribution to conservation goals for *CFSF*. The projected consequence score of 4 reflects the minor significance of positive mitigations. The probability of mitigations having a minor but positive impact is low. The status of mitigations would be positive, although their significance would be offset by the small size of the *CFSF* remnant and low numbers of indigenous plant species, including the one EN species. Confidence in assessment and prediction is medium to high.

10. Recommendations

1. From a botanical perspective the area outside of the red and green polygons is suitable for light industrial development and mixed land use.

2. If development proceeds within the green polygon, mandatory relocation of *L. explanatus* (EN) to Bracken Nature Reserve is advised. In this case, restoration and maintenance of the blue polygon is suggested.

3. If development proceeds in the green polygon, decommissioning (capping) and development of the greater Site should not encroach upon the area contained within the blue polygon.

4. Before Site decommissioning and/or development, the area/s demarcated by the red and/or green polygons should be buffered by 15m along the length of their respective southern boundaries.

5. All alien vegetation and existing surface rubble and tipped rubbish should be cleared from the red, blue and/or red polygon areas.

6. Appropriate *CFSF* wetland species for re-establishment around the water containment pool include *Salix mucronata* (Salicaceae, "Cape Willow") to accommodate Cape Weavers; and Restionaceae species such as *Elegia nuda* and *Elegia recta*. The 15m buffer-zone can be planted with Erica *mammosa* (present at Kenilworth Racecourse and Northpine) to cater for Southern Double-collared Sunbirds; *Willdenowia incurvata* (Restionaceae) and *Metalasia muricata* (Asteraceae, "Blombos") to accommodate wind and insect pollen vectors.

7. Given a relocation imperative for *L. explanatus*, immediate re-establishment of plants at Bracken nature Reserve should be supervised by an authorised representative of that nature reserve, bearing in mind that rescued plants need to be planted in loose quartzitic sand – the habitat of the species.

11. Conclusion

The results of impact assessment show that Development Alternative 1.1 is most desirable from a botanical perspective.

While No-go Alternative 3.1 offers the second least destructive alternative to the *CFSF* remnant, the assessed consequence score needs to be weighed against factors such as labour-intensive restoration and ongoing maintenance, given the degraded nature of the remnant, low species-count, and low numbers of those species.

While Development Alternative 2.1 would result in destruction of the small *CFSF* remnant, this alternative offers the highest survival-probability for *L. explanatus* plants, i.e. relocation to a nearby, managed nature reserve. This mitigation should be viewed in the light of the high cost of restoration and maintenance of a degraded remnant containing low numbers (<100 total) of only five indigenous plant species.

While the *CFSF* elements and water catchment within the Everite Site have no ecological connectivity, it is considered that green corridors, free of alien vegetation, have an intrinsic human and biodiversity value; function as crucial water catchment and containment; and can in some cases provide ongoing refuge for indigenous life forms such as birds and hardier indigenous plants.

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Appendix: 1

Curriculum Vitae: Ross C. Turner

Qualifications

- Bachelor of Social Science, University of Cape Town: 1989-1991. Majors: Psychology, Comparative Religion
- Master of Science, University of KwaZulu-Natal: 2010-2012.

Relevant Experience (selection)

- *Ericaceae* apprenticeship under Dr. Ted Oliver & Inge Oliver, Compton Herbarium, 2000-2004.
- More than 15 years' extensive field experience in the mountains of the CFR and southern Africa
- Botanical Consultant, performing the botanical component of EIA processes, throughout the CFR, since January 2005.

- Approximately 2300+ plant collections, housed primarily in Compton Herbarium (NBG), Bolus Herbarium (BOL), and *Herbarium Turneri* (HT).
- EDDA – The Erica Distribution Database, containing more than 35 000 plant records: 2004 ongoing.
- Specialist Botanical Consultant to CREW (Custodians of Rare and Endangered Wildflowers, SANBI), as well as voluntary participant in CREW Community Projects; 2004-2010.
- "*Kenilworth Racecourse Rare Species Atlas*": A database survey prepared for CREW (SANBI): Survey performed in March / April 2005, prior to controlled burning of Kenilworth Racecourse on 29-03-2005.
- IUCN Red Data List Officer from June 2006 to April 2007; contract work for SANBI.
- Fieldwork Consultant / specialist botanist for BIOTA Cape of Good Hope Observatory, Olifantsbos, January 2008.
- Fieldwork consultant / specialist botanist for resurvey of Hugh Taylor's Cape of Good Hope permanent vegetation study plots; a collaborative study between UCT and the University of Connecticut, USA; 2010-2011

Popular Articles

Turner RC. 2006. The Golden Oval: a conspectus of pre and post burn survey at Kenilworth Racecourse. *Veld & Flora*, September 2006.

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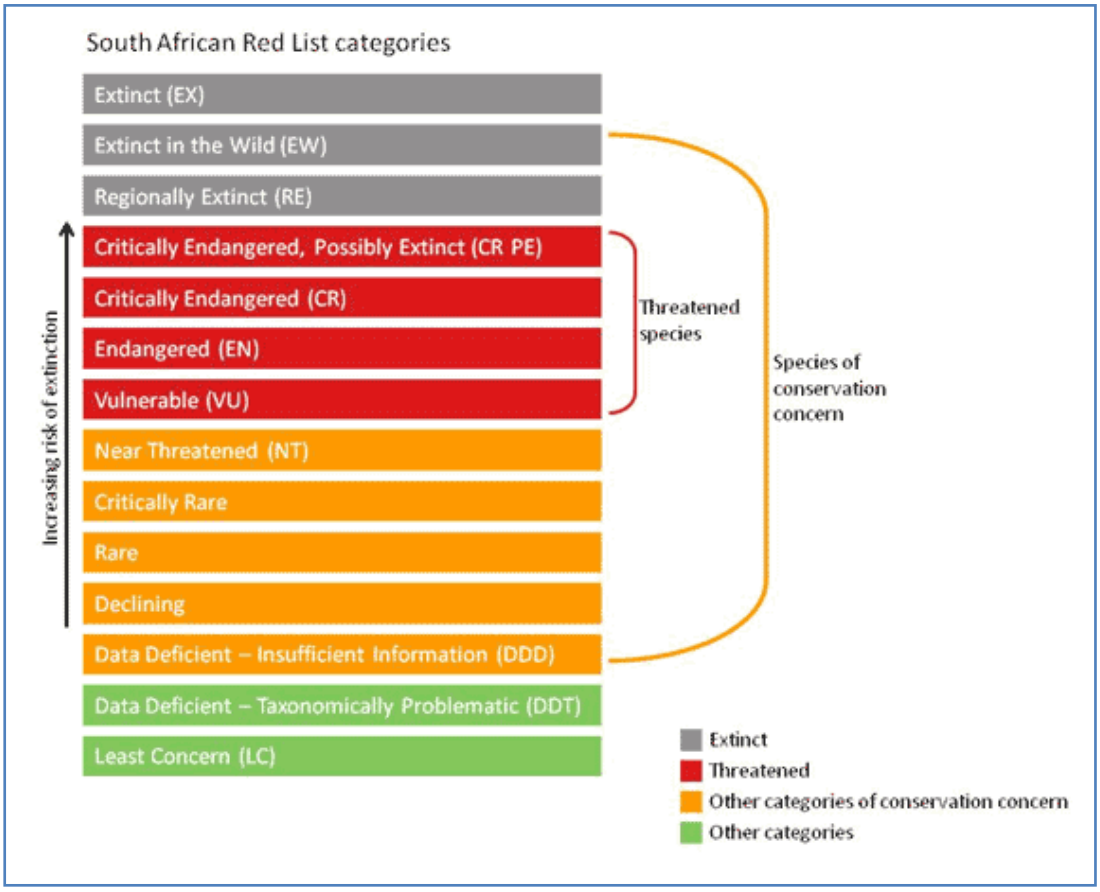
Appendix 2. Explanation of IUCN Threatened species and species of conservation concern



Appendix 3. Google Earth Everite Site impact timeline: 2004-2011

August 2004

July 2005

June 2007

August 2008

October 2009

November 2010

September 2011

December 2011 (Current Google Earth image)

Appendix 4. Everite and Northpine Localities with GIS, especially for *Lampranthus explanatus* (EN), showing reduction in area of occupancy of the Northpine *CFSF* vegetation remnant from 2005-2011

September 2005

December 2011

Appendix 5. Indigenous plant species recorded within the Everite Site

	Family	Genus	Species
1	Anacardiaceae	Rhus	laevigata
2	Asteraceae	Senecio	halimifolius
3	Mesembryanthemaceae	Carpobrotus	edulis
4	Mesembryanthemaceae	Conicosia	pugioniformis
5	Mesembryanthemaceae	Lampranthus	explanatus
6	Rhamnaceae	Phylica	ericoides
7	Rosaceae	Cliffortia	polygonifolia

Appendix 6. Alien plant species recorded within the Everite Site

	Family	Genus	Species
1	Asteraceae	Taraxacum	officionale
2	Euphorbiaceae	Ricinus	communis
3	Fabaceae	Acacia	saligna
4	Meliaceae	Melia	azedarach
5	Myrtaceae	Eucalyptus	sp.
6	Myrtaceae	Eucalyptus	sp.
7	Orobanchaceae	Orobanche	ramosa
8	Pinaceae	Pinus	sp.
9	Poaceae	Cynodon	dactylon
10	Poaceae	Pennisetum	clandestinum
11	Typhaceae	Typha	capensis

Appendix 7. GEOSURE (Pty) Ltd geological survey map and findings

8 SUMMARY OF FINDINGS AND RECOMMENDED WAY FORWARD

Key findings and recommendations from this detailed geotechnical assessment are as follows:

- The 10 ha asbestos waste consolidation site at the old Everite Brackenfell site currently forms 'sterilised' land;
- The conditions on site are not perfect in that the capping material installed in the early 2000 has been compromised by considerable mole activity, which has brought asbestos wastes to surface.
- Although the site is vegetated with kikuyu and alien Port Jacksons and Rooikrans, this does limit the air-borne dispersion of asbestos wastes. However, the vegetation is prone to fire in the dry summer months and thus the limitations on exposure are compromised.
- Air monitoring has shown that currently no exposure risks exist.
- The site will require in the near future considerable re-engineering and capping to secure it properly into the long term. This is a fairly complex task and it is estimated will cost in excess of R 10 million.
- There will be a need for long-term annual management and maintenance on the site.
- Some form of permanent hard-standing is seen as a suitable option to secure the site into the long-term.
- Detailed geotechnical assessment has ascertained that parts of the site are (very) compromised in terms of founding conditions and would be difficult, if not extremely expensive to develop for light industrial uses, ie buildings.
- Differential settlement and unsuitable founding conditions are exist in these areas.
- There are however parts of the site where development of light industrial type units is possible and where 'limited industrial' use could occur, such as mini-storage units or vehicle parking.
- Consequently, a mixed landuse on part of this site is possible, with the profits obtained from such being used to off-set the cost of the development of these areas and the need to secure the remaining 'unusable' parts of the site.
- Health and safety issues are manageable for the envisaged re-engineering and it will be necessary to follow the advice of a suitably experienced accredited asbestos inspection authority in this regard. Health and safety issues that require attention are as follows:
  - Ensure that all contractors required to perform work (excavation work excluded) at the site be informed about the potential asbestos exposure risk and the requirement to wear at minimum suitable and approved respirators (i.e. type FFP2) when engaging in the required work.
  - If future development of the site should proof not to be an option, consideration must then be given to clear the existing vegetation and then covering and hard surfacing the site so as to stop mole activity from exposing subsurface asbestos. This will make a major contribution in stopping the further exposure and contamination risk posed by exposed asbestos.
  - In the interim, and with intervals not exceeding 12 months, background airborne asbestos monitoring should be implemented and performed under various wind conditions to establish whether unacceptable asbestos fibre distribution does not occur. This is prudent due to the slow deterioration of friable asbestos sludge with time.
- The excavation and handling of asbestos wastes requires special attention to manage the health and safety issues, and thus it will be necessary to include the services of a suitable experience contaminant hydrogeologist in the design and project execution phases. There are many 'tricks and traps' to work

of this nature that will govern the success of compliance to health and safety needs and the success of the engineering works.

- It will be necessary to bring into the team a suitably experienced environmental assessment practitioner to undertake the EIA aspects in early 2012. We have recommended Chand Environmental for this as they have had experience with a previous asbestos remedial project and compiling the necessary Background Information Documents.
- It will be necessary to bring into the project team the services of a specialist civils engineer to undertake the design and contracts management aspects of the work. We have recommended Mr Andre Jordaan from Kantey & Templer and preliminary discussions have been had with him.
- Urban Dynamics Western Cape is already assisting with the town planning aspects and it will be necessary to retain their services to take the project forward.
- A key issue is to first obtain the opinions of the local regulatory authorities regarding the proposed securing and development of the site. They include the City of Cape Town, provincial Government – Department of Environmental Affairs and Development Planning (DEA&DP), Department of Labour, Department of Water Affairs. The DEA&DP will need to refer the situation and proposals to their National office in Pretoria as it is a hazardous waste issue – all hazardous issues are dealt by the National office. To this end, a feedback workshop has been arranged for the 23rd November 2011, to be held at the Kraaifontein Municipal offices (09h00 to 12h00).
- Public participation and input will be required should the decision be taken to proceed with the development. It is envisaged that this will be covered by the EIA process mentioned above.

In final conclusion, we thank you for appointing the MEGAteam to undertake this work and trust that it has been done to your satisfaction.

Yours faithfully

Ritchie Morris Pr Sci Nat (86/90)
Environmental hydrogeologist

Morris Environmental & Groundwater Alliances

Deven Naidoo Pr Sci Nat
Engineering Geologist

GEOSURE (Pty) Ltd

Pierre Wepener (NHDPH)
Cert. Occ. Hyg. (BIOH) & (SAIOH)

industricon

MEGA PARTNERSHIPS

Appendix 8. Impact assessment methodology

8.1. Extent of impact (spatial scale)

Ranking criteria

L	M	H
Impact is localized within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

Taken into consideration:

- Access to resources; amenity
- Threats to lifestyles, traditions and values
- Cumulative impacts, including possible changes to land uses at and around the site.

8.2. Duration of impact

Ranking criteria

L	M	H
Quickly reversible, less than project life, short term (0-5 years)	Reversible over time; medium term to life of project (5-15 years)	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

Taken into consideration the social and economical cost – benefit (e.g. long or short term costs/benefits)

8.3. Intensity of the impact

Type of Criteria	Negative			Positive		
	H-	M-	L-	L+	M+	H+
Qualitative	Substantial deterioration, death, illness or injury, loss of habitat/diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat/biodiversity/resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be	Measurable deterioration Recommended level will occasionally	No measurable change; Recommended level will	No measurable change; Within or better than	Measurable improvement	Measurable improvement

	violated (e.g. pollution)	be violated	never be violated	recommended level.		
Community response	Vigorous	Widespread complaints	Sporadic complaints	No observed reaction	Some support	Favourable publicity

8.4. Probability of occurrence of impact

Ranking criteria

L	M	H
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

8.5. Status of the impact

Describe whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, use the opposite, positive descriptions for criteria.

Based on a synthesis of the information contained in (a) to (e) above, the specialist will be required to assess the significance of potential impacts in terms of the following criteria:

8.6. Method used to determine the Consequence Score: L+ = 0; L = 1; M = 2; H = 3.

Combined Score (Duration + Extent + Intensity)	0 – 2	3 – 4	5	6	7	8 – 9
Consequence Rating	Not significant	Very low	Low	Medium	High	Very high

Positive impacts would be ranked in the same way as negative impacts, but result in high, medium or low positive consequence.

8.7 Significance of the impact

The significance of impacts to be assessed both with prescribed mitigation actions. The significance of the identified impacts on components of the affected environment to be determined as Probability X Consequence:

Significance				
Probability	H	Medium		High
	M			
	L	Low		Medium
		L	M	H
		Consequence		

8.8 Degree of confidence in predictions:

State the degree of confidence in the predictions, based on the availability of information and specialist knowledge. Ranking L, M, H as per 8.4.

DECLARATION OF THE SPECIALIST

Note: Duplicate this section where there is more than one specialist.

I Ross Turner, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that:

- In terms of the general requirement to be independent:
  - other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity; or

  - am not independent, but another specialist (the "Review Specialist") that meets the general requirements set out in Regulation 13 of the NEMA EIA Regulations has been appointed to review my work (Note: a declaration by the review specialist must be submitted);

- In terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;

- I have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any Report, plan or document prepared or to be prepared as part of the application; and

- I am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations.

14 September 2021

Signature of the Specialist: Date:

Ross Turner Botanical Surveys

Name of company (if applicable):