

The status, occurrence and distribution of the Red Listed plant species *Cineraria longipes* S. Moore, in the area likely to be affected by the construction of the proposed 210 mL reservoir, Meredale (DEA Ref No. 14/12/16/3/3/1/1632)

Report prepared for the Klipriviersberg Sustainability Association, an Interested and Affected party in the proposed Meredale Reservoir project



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A Pro Bono project in the interest of Environmental Sustainability in South Africa

TERMS OF REFERENCE

I made an offer to KlipSA to do a survey to establish the extent of occurrence and possible impacts of the proposed Meredale 210ML reservoir construction on the Red Listed plant species *Cineraria longipes* on a *Pro Bono* basis. This is in order to provide supporting evidence for the appeal against the positive Record of Decision granted to the project proponent.

THE STUDY AREA

The locality description of the proposed Meredale reservoir as set out in the Basic Assessment report (Asande Projects, 2017), does not stipulate which farm portions are likely to be impacted by the proposed development. From Appendix C of the BAR (Asande Projects, 2017), at least nine farm portions are crossed by the access road, the proposed reservoir is situated on one farm portion and the proposed over flow pipeline straddles the boundary between two farm portions.

The enclosed existing reservoirs could not be accessed and is therefore excluded from the current survey.

The portion of the study area investigated is situated around the various proposed development components: (Figure 1).

- The proposed reservoir site is situated west of and adjacent to the existing two reservoirs. It comprises approximately two hectares.
- The overflow pipeline will be linked to the proposed reservoir and run south for approximately 710m. The proposed pipeline servitude is 20m wide, giving a surface area of approximately 1.4 hectares.

*Note that my overflow pipeline survey area was based on the draft BAR (Asande Projects, 2016) maps and not the Appendix C (Facility illustration). The draft BAR maps are incorrect both in alignment and length of the pipeline, .i.e. the BAR maps show an approximately 300m pipeline (Asande Projects, 2016). Due to time constraints it has not been possible to visit the site again to survey the full 710m proposed overflow pipe along the correct pipeline alignment.

- The access road of approximately 2150 meters runs from the end of the AfriSam access road in the east to the base of the proposed reservoir. It comprises approximately 3.23 hectares with a servitude width of 15m.

*Some confusion exist with regards the route alignment of the access road. The draft BAR (Asande Projects, 2016) predominantly show the access route aligned through the existing enclosed reservoir area, whilst some of the maps in the final BAR (Asande Projects, 2017) show the access road alternately through the existing reservoirs or aligned south of the existing reservoirs. The latter was used as the actual proposed service road.

- Contractors camp, approximately 0.6 hectares. This facility was not considered in the BAR (Asande Projects, 2016), but is included as part of this survey. The proposed contractor’s camp is indicated on the Appendix C (Facility illustration).map (Asande Projects, 2016).

Several outlet pipelines were included in the site facility illustration of the BAR (appendix C, Asande Projects (2017). These outlet pipelines do not form part of the impact description of the BAR and was therefore not considered in this report.

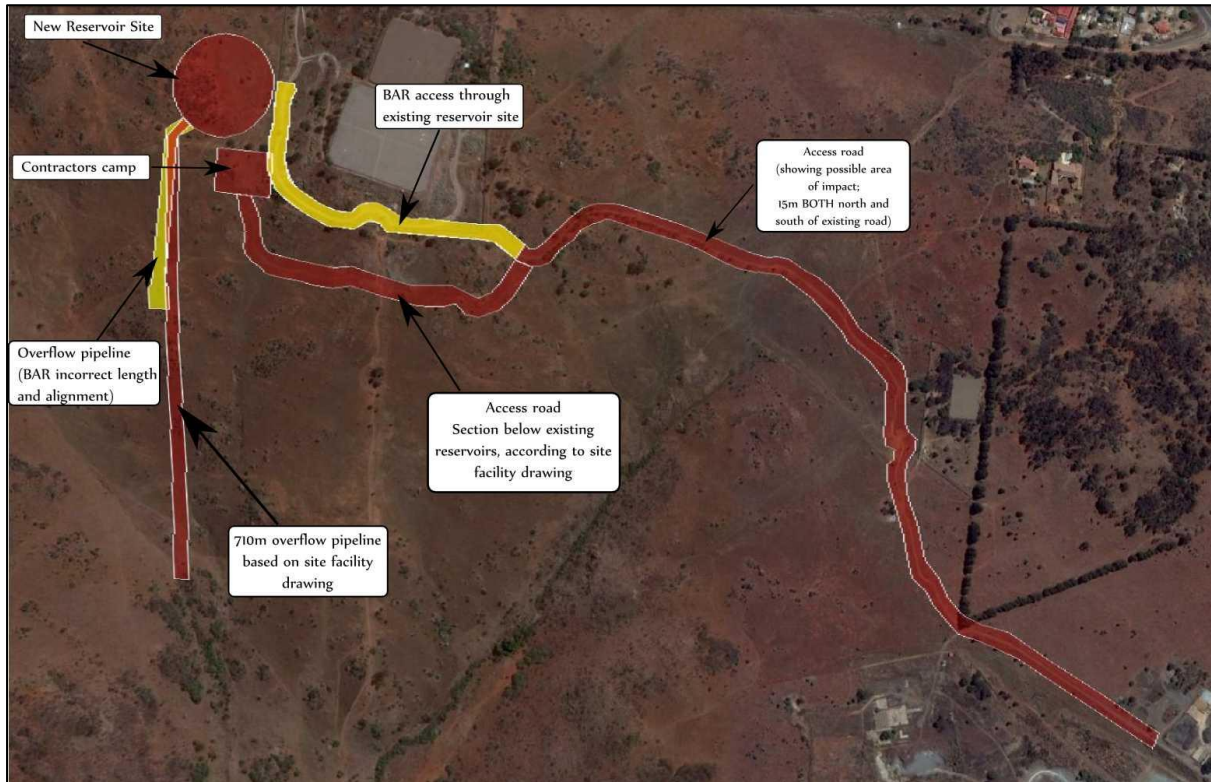


Figure 1: Infrastructure components of the proposed Meredale Reservoir, based on the BAR report and Appendices and the site facility drawings Appendix C, BAR (Asande Projects, 2016, 2017)

METHODS

The two site visits were restricted to the accessible areas and the perceived area of possible impact; as described above, the area of impact extends beyond the boundaries as indicated by the majority of the BAR maps (Asande Projects, 2016, 2017). Due to time constraints imposed by the 20 day appeal period, this oversight could unfortunately not be rectified.

Search for *Cineraria longipes* and its occurrence on site

C. longipes flowers in autumn (March – May). As this species occupies a very distinctive micro-habitat, it is however relatively easy to determine its presence/absence on site, even when not in flower.

There was a relatively high possibility of occurrence of *C. longipes* on site, as habitat conditions are suitable and known populations have been recorded to the north west and south east of the site.

I established the presence of *C. longipes* on site during a brief (half hour) site visit on the 24th of February 2017. My two subsequent site visits (20 March and 27 March 2017) was to determine the extent of occurrence of the *C. longipes* sub-population on site. An approximation of the area searched is shown in Figure 2.

The methodologies followed was to restrict the search to areas of suitable broad scale habitat requirements (undisturbed grassland on south and west facing slopes) and prime micro-habitats (i.e. in the shelter of rocks on the southern and western sides of the rocks, not substantially shaded by thickets and bush clumps). I've previously observed *C. longipes* outside the confines of the prime habitat as described above, but restricted the search to these habitats due to time constraints. The search was further limited to the areas that could be impacted by the proposed development and an area of up to 200m from these points (see limitations as described above); this includes the areas downslope of the proposed reservoir, downslope of the proposed access road and around the proposed overflow pipeline.

*Please note that the fenced-in existing reservoir area could not be accessed and the occurrence of *C. longipes* in this area could therefore not be determined.

The locality of each *C. longipes* plant or clump of plants found was recorded using a handheld Garmin eTrex 10 GPS device – see Table 1 and Figure 3. Many of these plants were also photographed.



Figure 2: Approximate area visited during two site visits

CINERARIA LONGIPES

Red List status and populations

Cineraria longipes S.Moore, is a Witwatersrand and hence Gauteng Endemic plant. Its Red List status is Vulnerable D2 according to the last assessment done in 2005 (M.F. Pfab & J.E. Victor (2005)) and published on the website <http://www.easybib.com/reference/guide/apa/website>. According to the 2003 IUCN online listing (<http://www.iucnredlist.org/details/39588/0>) it was only known from the following localities (the species is presumed extinct at 3 other localities):

- Rietvlei (50-100 mature individuals)
- Mondeor (55 to 85 mature individuals).
- Suikerbosrand Nature Reserve (82 to 200 mature individuals)
- Naturena (200 to 300 mature individuals)
- Eikenhof/Afrisam Quarry (80 to 150 mature individuals)
- Opposite Eikenhof quarry (8 to 15 mature individuals)
- Klipriviersberg Nature Reserve (25 to 50 mature individuals)

I was responsible for the discovery of the Rietvlei, Naturena and opposite Eikenhof quarry sub-populations.



Figure 3: Distribution map for *Cineraria longipes* populations
(copied from <http://redlist.sanbi.org/species.php?species=3154-39>)

Habitat

According to M.F. Pfab & J.E. Victor (2005) the species occurs in “Grassland, amongst rocks and along seepage lines, exclusively on basalt koppies on south-facing slopes”.

From personal observations I would conclude that prime habitat for this also includes facing slopes, but only in grassland amongst rocks. An important personal habitat observation is that the species does not occupy the areas amongst rocks where there has been any disturbance to the soils, as it is seemingly unable to compete with secondary succession weedy species and increaser species such as *Hyparrhenia hirta* (Highveld thatching grass). It is also unlikely to occur in otherwise suitable grassland amongst rock, if the rocky sections has been colonised by tree thickets, as is often the case in the area; an exception to this is *Cussonia paniculata*, which does not cast a significant shadow.

Threats

The most significant threats to this species is habitat loss and alien invasive species (M.F. Pfab & J.E. Victor (2005)).

Soil and vegetation disturbance related to human activities, e.g. roads (including dirt roads and tracks) and the associated invasion by weedy and alien invasive species also appears to pose a significant risk to this plant. Poor veld management practises such as over-grazing and incorrect veld burning practises might also increase the incidence of invasion by weedy species, by alien invasive species and bush encroachment, all of which poses a threat to *C. longipes* (personal observations).

RESULTS




During the 20 and 27 March surveys 69 *C. longipes* plants/plant clusters were recorded. These occurred in an east west band across the entire site, with the exemption of the far eastern portion of the site (east of the gully) on the east facing slopes (See Table 1 and 2, and Figure 4).

Table 1: GPS localities for *Cineraria longipes* on site

Locality number	GPS locality	Locality Number	GPS locality
130	26°17'3.08"S 27°58'46.88"E	171	26°17'5.46"S 27°58'27.77"E
131	26°17'3.26"S 27°58'47.17"E	172	26°17'2.54"S 27°58'28.81"E
132	26°17'3.23"S 27°58'47.03"E	173	26°17'2.29"S 27°58'28.06"E
133	26°17'3.19"S 27°58'47.10"E	174	26°17'2.18"S 27°58'24.89"E
134	26°17'3.01"S 27°58'46.74"E	175	26°17'2.15"S 27°58'24.71"E
135	26°17'3.08"S 27°58'46.45"E	176	26°17'2.62"S 27°58'24.06"E
136	26°17'3.08"S 27°58'46.45"E	177	26°17'2.18"S 27°58'21.65"E
137	26°17'3.12"S 27°58'46.70"E	178	26°17'1.46"S 27°58'22.30"E
138	26°17'2.90"S 27°58'46.81"E	179	26°17'1.10"S 27°58'21.36"E
139	26°17'3.12"S 27°58'46.56"E	181	26°17'0.89"S 27°58'21.00"E
140	26°17'3.55"S 27°58'46.24"E	182	26°17'2.72"S 27°58'20.28"E
141	26°17'3.66"S 27°58'46.13"E	185	26°16'58.66"S 27°58'11.14"E
144	26°17'5.24"S 27°58'46.60"E	186	26°16'59.70"S 27°58'13.69"E
145	26°17'5.24"S 27°58'46.78"E	187	26°16'58.94"S 27°58'14.38"E

146	26°17'5.46"S 27°58'46.78"E	188	26°16'58.91"S 27°58'14.41"E
147	26°17'5.39"S 27°58'46.52"E	189	26°16'57.54"S 27°58'15.96"E
148	26°17'5.53"S 27°58'46.45"E	190	26°16'59.56"S 27°58'18.01"E
149	26°17'6.50"S 27°58'47.24"E	191	26°17'0.56"S 27°58'19.16"E
150	26°17'6.43"S 27°58'47.28"E	192	26°17'3.84"S 27°58'21.83"E
151	26°17'6.40"S 27°58'48.40"E	196	26°17'7.37"S 27°58'35.00"E
152	26°17'6.25"S 27°58'48.58"E	197	26°17'6.61"S 27°58'31.51"E
153	26°17'6.76"S 27°58'48.61"E	198	26°17'6.11"S 27°58'33.53"E
156	26°17'7.33"S 27°58'43.39"E	200	26°17'4.67"S 27°58'34.79"E
157	26°17'3.88"S 27°58'42.82"E	201	26°17'2.98"S 27°58'33.74"E
158	26°17'3.37"S 27°58'42.06"E	203	26°17'6.29"S 27°58'32.12"E
159	26°17'3.19"S 27°58'41.95"E	205	26°16'59.81"S 27°58'17.83"E
162	26°17'6.76"S 27°58'33.78"E	206	26°16'59.84"S 27°58'18.16"E
163	26°17'6.76"S 27°58'33.89"E	208	26°17'4.16"S 27°58'14.52"E
164	26°17'7.19"S 27°58'33.71"E	209	26°17'4.02"S 27°58'14.38"E
165	26°17'7.26"S 27°58'33.74"E	212	26°17'0.82"S 27°58'19.70"E
166	26°17'6.43"S 27°58'31.87"E	225	26°17'2.18"S 27°58'24.92"E
167	26°17'6.61"S 27°58'31.51"E	226	26°17'2.80"S 27°58'25.32"E
168	26°17'5.93"S 27°58'29.93"E	227	26°17'2.80"S 27°58'26.33"E
169	26°17'5.42"S 27°58'29.53"E	228	26°17'2.69"S 27°58'26.51"E
170	26°17'6.11"S 27°58'28.63"E		

Table 2: Photographs of 43 of the *Cineraria longipes* plant/plant clusters recorded on site (High resolution digital images can be made available on request).

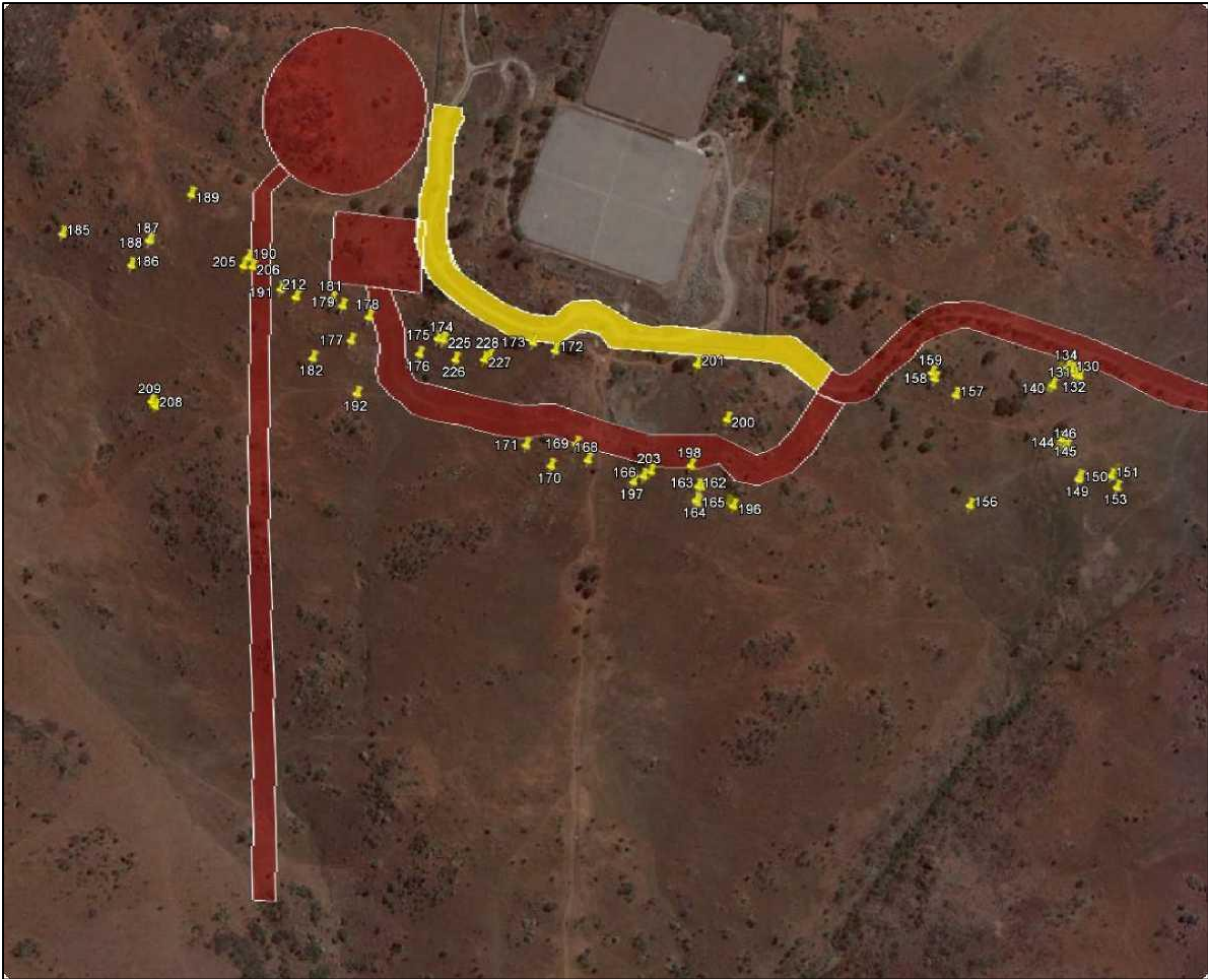


Figure 4: On-site occurrence of *Cineraria longipes* in relation to proposed development areas

DISCUSSION AND CONCLUSIONS

A large population of *C. longipes* has been recorded on site with 69 plants/plant clusters identified. This gives an indication of the local distribution of this species, but should not be regarded as definitive or comprehensive, as the survey was not a systematic search and a large portion of the sub-population was likely not found. Higher densities of this plant are likely and it is furthermore probable that its distribution continues along the lower slopes further south as well as west along the ridgeline.

It is highly likely that the Meredale sub-population of *C. longipes* has been impacted by prior disturbance and habitat modification activities during the construction and operation of:

- the of the first two reservoirs
- access roads and tracks
- the reservoir pipelines
- the overflow from the overflow pipeline from the first two reservoirs

- dumping of building rubble related to construction and operational activities around the first two reservoirs.

Secondary impacts related to the above mentioned activities include the spread of weedy species and significantly, the spread of Alien invasive species, both of which pose a threat to *C. longipes* on site.

Due to the high likelihood of severe impact on *C. longipes* it would be advisable to relook at the operational and construction procedures and designs of the proposed project. The GDARD guidelines for buffer zones around Red Listed species allow for a 200m buffer within the Urban edge and a 600m buffer outside the urban edge for Gauteng endemic species (GDARD, 2014). The draft BAR checklist under point 10-2b (Activity motivation, Urban edge), (Asande 2016), state that the proposed development falls within the urban edge. The final BAR (Asande Projects, 2017) correctly indicated the study area as falling outside the urban edge, as verified by the City of Johannesburg's online GIS map resources shows the proposed development outside the Urban Edge. Nearly all of the facilities (both temporary and permanent) fall well within a 200m exclusion buffer zone (see figure 5), and all of the facility will fall within the 600m buffer zone, which argues significant direct impacts and numerous indirect impacts associated with the edge effect and secondary disturbances.

Unmitigated, the expected impacted on the conservation status of *C. longipes* is significant. The Meredale sub-population is one of three sub-populations west of the R82. These three sub-populations comprise and the western most extent of the known distribution of this species. The sub-population at the AfriSam quarry is under threat from mining activities and the sub-population in Naturena occupies a relatively small and very isolated site.

POSSIBLE CONSTRUCTION IMPACTS ON THE MEREDALE *CINERARIA LONGIPES* POPULATION

Four areas of construction are contemplated for the proposed Meredale Reservoir site

- 1) The footprint area of the proposed reservoir.
- 2) The widening of the access road to 15m
- 3) The overflow pipeline and downstream habitat disturbance.
- 4) The contractor's camp.

The expected impacts on the Meredale *C. longipes* sub-population would likely include the direct loss of plants during the construction phase, the loss of habitat, habitat modification, habitat fragmentation, changes in drainage, soil moisture patterns and rainfall run-off patterns, increase in areas of disturbance and increase in competing alien invasive species.

All four construction activities listed above will likely have an impact on this species. Of greatest concern is however the access road and the overflow pipeline that runs directly through the area of occupancy of this sub-population. All four the construction activities also fall well within the recommended buffer zone of this sub-population of *C. longipes*; the extent of the buffer zone has not been verified as there is confusion around where the Johannesburg urban edge is located; a

200m buffer zone will apply inside the urban edge and a 600m buffer zone will apply outside the urban edge. .

The southern section of the site has not been accessed and it is likely that more *C. longipes* occurs within the vicinity of the overflow pipeline.



Figure 5: *C. longipes* population on-site with a 200m buffer zone indicated in blue, relative to the proposed infrastructure layout for the development. The correct application and use of a 600m buffer zone will extend the buffer zone to cover the entire project footprint.

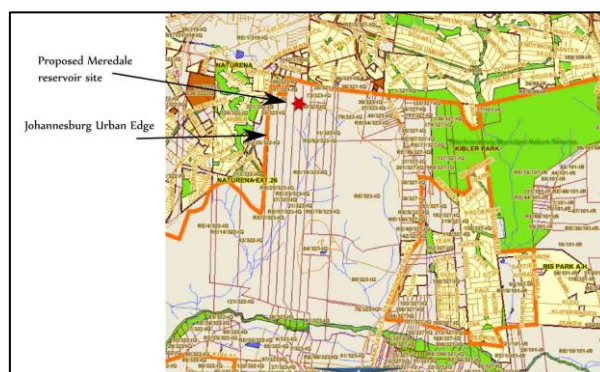


Figure 6: Johannesburg Urban Edge, indicating the study site outside the urban edge boundary (City of Johannesburg online GIS database).

MITIGATION OPTIONS

If unmitigated the proposed development will have a severe impact on the long term survival of the Meredale sub-population of *C. longipes*. It is debatable whether the impact of the proposed development can be mitigated adequately to reduce the anticipated long term impacts on this species, without significant project layout and infrastructure re-design. The no-go options should be considered if the impacts cannot be sufficiently mitigated.

The following recommendations should be considered:

- The exact extent of the sub-population of *C. longipes* on site should be determined by systematically searching for it. These localities need to be visually marked to prevent accidental disturbance to the plants and areas directly surrounding these plants. The southern extent of the *C. longipes* sub-population has not been determined and should be done prior to the finalisation of the project planning.
- Consideration should be given to alternate access routes to avoid direct and indirect impacts on this species.
- If alternate access routes are not viable, re-routing of the current access route to allow for at least a 50m buffer zone between the road and any individual *C. longipes* plants should be considered.
- Re-routing the section of road below and outside the existing fenced-off reservoir section to the existing roads within the fenced off reservoir section.
- Reduce the width of the access road to the minimum required width; consider single vehicle road sections interspersed with double lane sections for passing. On-site vehicle traffic control would be required.
- Reduce the 'edge effect' and spoil/construction material spillage outside the designate construction footprint area.
- Selecting an alternate alignment for the overflow pipeline, possibly directing it to the north of the reservoir.
- A comprehensive rehabilitation plan should be put in place, including topsoil salvage and storage, plant rescue for replanting and soil restoration to prevent the formation of weed corridors.
- Comprehensive long term alien invasive control, including the control of seed source plants that are already established on site and in the surrounding areas.
- Strict control on the movement of construction vehicles on site, by temporary fencing of servitudes and road reserves and the contractor's camp.
- The construction and excavation activities are likely to produce rock spoil (as can be seen in the areas surrounding the existing two reservoirs). The rock spoil should be removed off-site and temporary on-site storage should be restricted to the footprint area of the development.

REFERENCES

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