



# David Styles

## Vegetation Surveys, Advice and Consulting

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Dear Luvanya

### ASSESSMENT OF VEGETATION WITHIN AND SURROUNDING THE FOOTPRINT OF A PROPOSED PEDESTRIAN BRIDGE AT BURBREEZE, TONGAAT

#### 1. Introduction

I have been asked by the Sivest Environmental Division on behalf of the eThekweni Municipality: Engineering Unit to present a report assessing vegetation within and next to the footprint of a proposed pedestrian bridge across a small river at Burbreeze, Tongaat. A single GPS position was provided for the crossing.

#### 2. Methodology

The proposed footprint was investigated on foot on 13 and 20 August 2014 according to a reconnaissance survey approach during which notes and photographs were taken. Although the survey took place in the winter, enough was still evident to form an opinion about the quality of the vegetation.

#### 3. National Vegetation Map

The site is situated within a vegetation type designated as KwaZulu-Natal Coastal Belt Grassland (Scott-Shaw & Escott 2011) corresponding with the KwaZulu-Natal Coastal Belt of Mucina & Rutherford (2006). According to Scott-Shaw & Escott (2011) it is Critically Endangered. It is a: "Long and in places broad coastal strip along the KwaZulu-Natal coast, from near Mtunzini in the north, via Durban to Margate and just short of Port Edward in the south. Altitude ranges from about 20–450 m."

It is described as comprising:

Highly dissected undulating coastal plains which presumably used to be covered to a great extent with various types of subtropical coastal forest (the remnants of one of which are described as ... Northern Coastal Forest). Some primary grassland dominated by *Themeda triandra* still occurs in hilly, high-rainfall areas where pressure from natural fire and grazing regimes prevailed. At present the KwaZulu-

Natal Coastal Belt is affected by an intricate mosaic of very extensive sugarcane fields, timber plantations and coastal holiday resorts, with interspersed secondary *Aristida* grasslands, thickets and patches of coastal thornveld.

Due to very extensive transformation of the vegetation of the KwaZulu-Natal Coastal Belt, it is difficult to know what much of its vegetation originally comprised. This is also an issue in proximity to the proposed bridge site, as there is extensive settlement, the woody vegetation is secondary or comprises alien species, and none of what was seen can be considered to be in natural state.

#### **4. Field observations**

The bridge crossing appears to be at the site of an existing informal crossing. The crossing is shown in Appendix 1. There is a well-used path from a more recent, low-cost housing development on the east side of a small river (Newtown) that takes pedestrian traffic into and through the longer established suburb of Sandfields. Pedestrians cross over the small river by walking on top of a pipeline, which appears to be a precarious undertaking, as well as via a point north of the crossing. The path seems to only serve residents of Newtown as all the pedestrians seen seemed to be from there.

There is a considerable amount of dumping of refuse on both sides of the river. A resident of a dwelling at Newtown, next to the river, was seen tipping refuse down the bank close to the crossing. There is also much general littering along the informal path all the way from the Newtown side through to a small park and playground on the Sandfields side of the river, where the path leads. The park now appears unused for this purpose as the swings have been removed or stolen from their support structure. Traffic through the park also does not create a comfortable or child-friendly ambience; the bridge is likely to increase this traffic. An issue noted with access over the river at this point is that there is a short cut through an open area between houses, which was alleged by a neighbour to be private property (indicated in Appendix 1). This access is shown at point A1 in Appendix 1. A fence has been erected to prevent this but it has been cut at the bottom and one pedestrian was seen passing through it. In order to prevent and not facilitate what may be trespass through private property, the proposed development may best then include a relatively indestructible feature such as a wall at the bottom of the affected property so ensure traffic is better guided towards the park, which is the other feasible access route into Sandfields. The crossing, as it is currently used and as proposed for the bridge is photographed in Appendix 3.

Vegetation seen falls into two categories – dryland and wetland vegetation. Very little plant biodiversity occurs at the site of the proposed crossing, and for this reason it is only possible to provide a limited list of species that occur. This list appears in Appendix 2.

##### **4.1 Dryland vegetation**

The dryland vegetation on both sides of the river is mainly comprised of alien species. *Eucalyptus grandis* (Saligna Gum) is the most common tree, followed by *Melia azedarach* (Syringa). There is a single indigenous *Syzygium cordatum* (Umdoni) tree on the Newtown side of the crossing, the position of which is shown in Appendix 1. This lone tree is also photographed in Appendix 3. A small number of other indigenous trees occur a further distance from the crossing where they are less likely to be impacted upon by construction. These include several more *Syzygium cordatum*, *Trema orientalis* (Pigeonwood) and *Trichilia*

*emetica* (Natal Mahogany) trees. All herbaceous growth is alien except for a handful of indigenous weeds of disturbance. These trees mentioned are not rare or Red Listed.

#### 4.2 Wetland vegetation

Only two indigenous wetland species occur close to the crossing. There are two patches of the reed *Phragmites mauritianus* which is mapped and shown as the polygon P1 in Appendix 1, which grows with the alien reed *Pennisetum purpureum* (Napier Fodder). *Phragmites mauritianus* is a more unusually encountered than *Phragmites australis* (Common Reed), but it is not rare. There are also a small number of *Cyperus dives* sedges, which are in poor condition. This is a species that is resistant to disturbance and is one of the last to disappear from wetlands. It also often proliferates in wetlands that have been disturbed and into which nutrients or wastewater have been introduced. A large area comprised of the alien reed *Pennisetum purpureum*, with secondary grassy growth and a small amount of *Phragmites mauritianus* just flanking the river is shown as polygon P2 in Appendix 1; this appears less at risk of impact by the proposed development. The floating alien aquatic *Pistea striatoides* is also common in the water of the river, covering a large part of the water surface in places.

No other mapping apart from the patch of *Phragmites mauritianus* and *Pennisetum purpureum* respectively is shown in Appendix 1, as there is no other discernable differentiation in the vegetation which is simply a mix of predominantly alien species, with a small number of indigenous species that are either common or ruderals (species highly tolerant of or which flourish under conditions of disturbance).

A complete list of plant species noted within a 50 metre proximity to the crossing is provided in Appendix 3.

#### 5. Rare and Red Listed species

No rare or Red Listed species as recorded in Raimondo et al (2009) occur at or in close proximity to either crossing.

#### 6. Impact assessment

Given the poor state of the vegetation evidenced by the number of alien species and the limited number of indigenous species that are then only more common plants, pioneers or weeds of disturbance, the construction of the bridge is not considered to have an important impact on flora. The construction and more importantly increased activity and disturbance around the crossing that is then enabled is likely to somewhat increase the amount of alien vegetation.

Impacts are assessed according to criteria required by Sivest as follows.

The proposed development will destroy, damage or alter some vegetation. Impacts will occur within and close to the footprint, but indirect and cumulative impacts will probably also occur in proximity, consisting of increased disturbance at the crossing, along access routes to it, and some further increase of alien vegetation.	
<b>EXTENT (GEOGRAPHICAL)</b>	
Site	Yes, particularly direct destruction and disturbance during construction.

Local / district	No
Province / region	No
International and international	No
<b>DURATION</b>	
Construction period / Short term	Yes, with most of the impact during the construction phase.
Medium term (up to 6 years after construction)	Yes, probably some small cumulative and indirect impacts a further distance from the site, including disturbance to vegetation and an increase in alien vegetation (in response to increased activity at the crossing), although there a considerable amount of alien vegetation is already present.
Long term (more than 6 years after construction)	Yes, as above.
<b>PROBABILITY</b>	
Definite	Direct impacts
Probable	Indirect and cumulative impacts
Possible	-
Unlikely	-
<b>REVERSIBILITY</b>	
Reversible	Some of the construction related impacts are reversible.
Irreversible	However, some of the indirect and cumulative impacts also likely irreversible but these will be very small (mainly increased disturbance, litter and some increased occurrence of alien vegetation as a result, with these features already much evident at this locality).
<b>IRREPLACEABLE LOSS OF RESOURCES</b>	
High	No
Medium	No
Low	No
No Loss	Yes
<b>CUMULATIVE EFFECTS</b>	
High	No
Medium	No
Low	These are small, as noted above.
<b>SIGNIFICANCE RATINGS</b>	
High	No
Medium	No
Low	Yes, mainly because the existing vegetation is degraded and without much conservation worth, as a result of which small to modest amount of further deterioration is not considered significant.

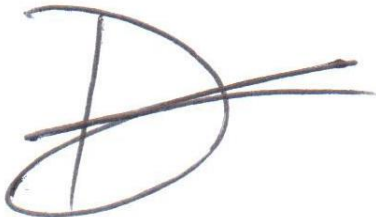
## 7. Mitigation

The main mitigation possibilities are as follows:

- Relocation of the *Phragmites mauritianus* reeds if in the construction footprint, to other suitable habitat along the river banks. This should preferably be on the western/Sandfields side of the river as vegetation on the banks is less transformed than on the eastern/Newtown side. This would need to be undertaken with due care by a horticulturist or other suitably qualified person, if this is to be successful.
- Destruction of alien plants during and post-construction would also be beneficial. If such mitigation was to be set in place it is also necessary to advise a radius around the proposed bridge around which this could occur. A distance of 30 metres each side of and back from the river banks would seem reasonable, but given that rivers are dynamic systems and there will be pedestrian movement in an area in which there is already much alien vegetation, invasion will readily resume if a control effort is not sustained.
- Finally, it will benefit the vegetation and the river if the refuse and litter that have been dumped is removed, including from the park through which pedestrians walk, but a long-term solution also requires a change mind-set from residents both the Newtown and Sandfields sides. Ideally a solution to the degradation seen will require involvement of either the municipality, or the communities, or both the municipality and the communities in a continuing effort to keep the river and its surrounds clean. If this could be achieved on a stipend basis, this could also create income for some residents of Newtown, in which there appears to be a high rate of unemployment.

Should you have any queries, please do not hesitate to contact me through details above.

Yours sincerely

A handwritten signature in dark ink, consisting of a large, stylized capital letter 'D' with a horizontal line extending to the right from its middle.

David Styles

## References

Mucina, L. & Rutherford, M. C. 2006. The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute, Pretoria.

Raimondo, D.; Von Staden, L.; Foden, W.; Victor, J.E.; Helme, N. A.; Turner, R. C.; Kamundi, D. A. & Manyama, P. A. (eds) 2009. Red list of South African plants. *Strelitzia* 25. South African National Biodiversity Institute, Pretoria.

APPENDIX 1: Vegetation map



## KEY TO APPENDIX 1

**Crossing** – The GPS point provided for the proposed bridge crossing. There appears already to be informal crossing of the small river at this point, by passage over a pipeline.

**A1** – Some of the current pedestrian traffic over the river appears to pass through here, which is alleged by a neighbor to be private property, which has a fence at the bottom that has been cut. This is likely to increase if the bridge is built, unless a relatively indestructible feature such as wall be built to prevent this.

**A2** – Most of the traffic proceeds over the river in this direction, towards a small park/playground that appears to have fallen into disuse, possibly partly because of the traffic that now occurs through it. This park is shown at point A3.

**S** – This is a lone indigenous trees, *Syzygium cordatum* (Umdoni) close to the crossing. A small number of other indigenous trees mentioned in the report are further away and are probably safe from construction. Almost all the other tree growth evident in the aerial photography comprises alien species, mainly *Eucalyptus grandis* (Saligna Gum) and to a lesser extent *Melia azedarach* (Syringa).

**P1** – Polygon containing two patches of the indigenous reed *Phragmites mauritianus*, some of the alien reed *Pennisetum purpureum* (Napier Fodder) and some other grassy growth.

**P2** – Polygon containing a large amount of the alien reed *Pennisetum purpureum*.



## APPENDIX 2: Species list

### APPENDIX 2.1: Alien invasive plants

Name	Plant form / description (H = Herb, Rd – Reed, S – Shrub, Sd = Sedge, T = Tree, V = Vine)
Acanthospermum sp.	H
Ageratum conyzoides	H
Annona sp. (Custard-apple)	T
Argemone mexicana	H
Bauhinia variegata	T
Bidens sp. (Blackjack)	H
Cajanus cajan (Split-pea)	S
Canna indica (Canna)	H
Cardiospermum grandiflorum (Balloon Vine)	V
Chromolaena odorata (Chromolaena)	S
Colocasia antiquorum	H
Eucalyptus grandis (Saligna Gum)	T
Ipomoea indica	V
Mangifera indica (Mango)	T
Musa sp. (Banana)	T
Pennisetum purpureum (Napier Fodder)	R
Persea americana (Avocado)	T
Physalis viscosa	H
Pistea striatoides	H
Ricinus communis (Castor-oil Bush)	S
Senecio madagascariensis	H
Solanum mauritianum (Bugweed)	T
Solanum nigrum	H
Sonchus sp.	H

Name	Plant form / description (H = Herb, Rd – Reed, S – Shrub, Sd = Sedge, T = Tree, V = Vine)
Cyperus dives	S
Hewittea malabarica	V
Lepidium africanum	H
Phragmites mauritianus	R
Rhynchosia caribaea	V
Syzygium cordatum (Umdoni)	T
Thunbergia alata	V
Trema orientalis (Pigeonwood)	T
Trichilia emetic (Natal Mahogany)	T
Withania somnifera	S / H

## APPENDIX 4: Photographs



**Top:** View of the crossing, together with the informal path that takes pedestrians over the small river. Trees in the vicinity are nearly all alien eucalypts.



**Middle:** Patch of the indigenous reed *Phragmites mauritianus*, with a few examples of the alien reed *Pennisetum purpureum* (Napier Fodder), nested in other grassy growth.



**Bottom:** View of the pipeline across the river, on which some pedestrians precariously cross, with another patch of *Phragmites mauritianus* to the left.



**Top:** View of into the river, with some *Phragmites mauritianus* reeds and large numbers of the alien floating aquatic *Pistia striatiodes* floating on the water.



**Middle:** Another view showing the dense infestation and disturbance on the river banks.



**Bottom:** A small number of *Cyperus dives* plants occur at or within 30 metres of the crossing, close to the river banks. Most are in poor condition or have been burned. This also shows some of the litter that is found on the banks.



**Top:** Wider view of the proposed crossing point and the current path.



**Left:** View of the pedestrian path looking towards the small park/playground which appears now in disuse, with litter and refuse in the foreground.