

Idas Valley, Stellenbosch Erf 10866

Wetland Assessment

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Background

The Stellenbosch Municipality plans to construct a housing development on Erf 10866 and the adjacent Erf 11008. In order to fulfil the legal requirements, the firm Eco Impact was appointed to conduct the usual environmental surveys. The overall outcome of the survey indicated that the site was degraded with little worth conserving and that the housing project could go ahead. Subsequently Cape Nature officials visited the site and found “sedges”, which they construed to be indicative of the presence of a wetland. Hence they asked for an independent review of the Eco Impact assessment. WATSAN Africa was appointed to conduct the review.

This review sharply focusses on the presence or absence of a wetland of the two erf's. If indeed such a wetland is present, its condition should be assessed in order to assist a decision by the authorities to approve or disapprove the envisaged development.

The Eco Impact report adequately describes the area, its general and specific characteristics and therefore it will not be repeated here. This re-assessment should be read in conjunction with the original report.

A site visit was conducted on 14 August 2015.

Vegetation Indicator

The following plants were recorded on the property:

Oxalis at least 2 species
Cotula turbinata flowering
Chasmanthe floribunda
Babiana sp. non-flowering (scarce)
Leonotis leonurus Wildedagga
Pennisetum macrourum (river bed grass, Figure 1)
Pennisetum clandestinum (kikiyu lawn grass)
Zantedeschia aethiopica (Arum lily)
Geophytes too early in the season to identify.
Acacia saligna Port Jackson willow
Eucalyptus spp. Various sorts of blue gum trees
Populus sp. A poplar bush in the stream bed.
Pinus spp. Pine trees
Quercus sp. Oak tree
Lupine cultivars

The river bed grass is listed as an “obligatory wetland” species (DWAF, 2005) and is probably the plant that was taken for “sedge” during the Cape Nature site visit. Nevertheless, the presence of this plant is indeed indicative of a wetland. The grass was present in concentrated patches over quite a substantial area.

The arum lilies were small and only just emerging from the ground. They were widespread. It seemed that the usual annual growth and flowering season started very late because of the late rains. Even the *Oxalis*, which are usually the first to flower, only showed a couple of buds.

The site was dominated by a dense eruption of lupines. This leaves the impression that in the past the site was ploughed over and lupines were commercially grown for animal fodder, as is common in the area. The lupines seem to be naturalised since agriculture was abandoned.



Figure 1. River Bed Grass

River Bed Grass

The wetland at Erf 10866 was delineated according to the presence of river bed grass *Pennisetum macrourum*. This plant was classified as an obligatory wetland species (DWAF, 2005).

However, Sieben *et al* (2014) did ground-breaking work with regard to the classification of wetlands and wetland indicator species. According to this the scleretophyllous wetlands of the Cape low lands are species poor and often dominated by one indicator species only. In the case of Erf 10866 it is river bed grass.

On p. 21 of their analysis Sieben *et al* stated that *Pennisetum macrourum* “ did not come out as an indicator species”.

If the decision-making authorities agree that river bed grass does not serve as an indicator species, then the delineation of a wetland of Erf 10866 falls away. In this case the development could go ahead without any restriction.

I agree that river bed grass indicate the very dry end of the spectrum of wetlands and that the presence of more wetland indicator species would qualify Erf 10866 as a wetland worth saving.

Terrain Indicator

The site is a valley floor surrounded by mountains. The high mountains receive more than a metre of annual rain that readily penetrates the sandstone and granite. This groundwater can decant in the valley floors and then form seeps and wetlands, such as the one at Erf 10866, apart from the rainfall.

Erf 10866 is gently sloped, despite of being located in the foothills of the mountains. This slope is conducive for the formation of wetlands.

Originally the wetland could have been classified as a valley bottom without a channel or perhaps a valley bottom with a shallow channel connection to the adjacent stream, according to the classification system of Kotze *et al* (2005).

Currently a very deeply eroded channel (Figure 2) cuts through the area and probably drains surface and even groundwater much faster than during the time prior to human impact, preventing the maintenance of obvious wetland conditions.



Figure 2. The Trench

Soil Wetness Indicator

The soil was sandy. The stream alongside the site was deeply incised, up to 4 meters, and the substrate seemed to be sand all the way down to the bottom of the stream. This is a light brown, slightly yellow or then light coloured sand.

There was lots of mole activity, with mole heaps everywhere. The sand out of the mole burrows seemed to be light brown to yellowish, with no grey.

Only among the river bed grass the soil was cracked, like in a dried out wetland. This was rather surprising as it was late in the rainy season and it was to be expected that the soil was waterlogged with no cracks.

With such a deep incision along the site, it can be expected that ground water would decant into the ditch and that this could contribute to the dryness of the site.

Soil Profile Indicator

According to the geotechnical survey by Core Geotechnical Services during June 2014 the southern and central parts of the site showed signs of 'gleying' (terminology according to DWAF 2005) that could be indicative of hydromorphic soils. This refers to the blotches and streakiness that develop in soils that are subject to periodic waterlogging followed by drying out. This is recognised as a definite sign of the presence of a temporary wetland. Gleying was noted from a depth below the surface of 0.8 metre and deeper (perhaps too deep for the moles to reach).

The report states: "Regionally, the area is underlain from surface by Recent unconsolidated sandy and gravelly deposits of colluvial (transported) origin. Weathered residual granites of the Cape Granite Suite underlie the transported soils.

“From ground surface, soils consist of transported clayey sands, silty sands and clayey silts between 0.6 m to 1.3 m thick. The colluvial soils are underlain by residual granites, consisting of clayey sand that is intersected below approximately 1.3 m across the site.

A perched water table is expected to develop within 0.5 m of ground surface in the lower lying, flatter areas towards the south. Ponding of water on surface may also occur in areas close to the wetland located in the central northern part side of the site. The groundwater relies mainly on recharge from direct infiltration of rainfall, as well as from up-slope recharge of the groundwater via horizontal flow in the transported soils.”

However, even though the geotechnical survey was conducted during the rainy season, no ponding was noted. This corresponds to the findings of the recent site visit, a year later. Seemingly the ditch alongside the site contributes to its drainage. What once was a functional temporary wetland now are well drained soils with a significantly dropped water table. Only in one of the 7 holes that were dug for the survey yielded water. The others were all dry.

Classification of the Wetland

The wetland on Erf 10866 can be considered to be at most a “temporary” wetland (terminology DWAF, 2005) and then only in the area where the river bed grass occurs.

I am tempted to name it a seasonal wetland, as it is probably bone dry during summer, with the river bed grass dried out, only to sprout at the beginning of the following rainy season.

The rest of the area, in the absence of any convincing indicators, can hardly be classified as wetland. This then would be dry, or non-wetland (DWAF, 2005).

The presence of river bed grass facilitates the delineation of the wetland.

Wetland Integrity

Table 1. Wetland Habitat Integrity (After Kleynhans, 1999)

Attribute	Score
Hydrology	
Flow modification	4
Inundation	4
Water Quality	
Water quality modification	2
Sediment load modification	2
Hydrology / Geomorphology	
Canalization	5
Topographic Alteration	4
Biology	
Terrestrial encroachment	2
Removal of vegetation	5
Alien fauna	1
Over-utilisation of biological resources	5
Mean	3.6
Category	Modified

0-1.0	Pristine
0.1-2	Near-pristine
2.1-3	Moderately impacted
3.1-4	Modified
4.1-5	Critically modified

The final score of the evaluation very much depends on the starting point. During historical times, prior to the onset of human impact, the site was probably densely overgrown with Cape Fynbos. If this scenario is to be the starting point, then obviously it is critically modified.

If the starting point is considered to be a patch of river bed grass as it is today, perhaps somewhat smaller in area, a final assessment of modified could be conceived.

However, the initial point was never recorded, so we will probably never know. Chances are that the fynbos scenario was the more likely one.

The scores are purely the represent the insight and experience of the evaluator. The scoring system provides a framework for talking points, should other professionals in the field would want to field their opinions.

Wetland Services

Table 2. Wetland Goods and Services

Goods & Services	Score
Flood attenuation	2
Stream flow regulation	1
Sediment trapping	2
Phosphate trapping	2
Nitrate removal	2
Toxicant removal	1
Erosion control	2
Carbon storage	2
Biodiversity maintenance	3
Water supply for human use	1
Natural resources	2
Cultivated food	4
Cultural significance	1
Tourism and recreation	4
Education and research	2

0	Low
5	High

The goods and services delivered by the environment, in this case the Erf 100866 wetland, is a Resource Economics concept as adapted by Kotze *et al* (2005).

The value for tourism stands out because it is located in the most picturesque area of Stellenbosch with its mountains and vineyards. The lupines serve as fodder for livestock, hence the higher score. Stellenbosch has much cultural value, but the erfs on the verge of Idas Valley probably does not share the same attribute.

The diagram (Figure 2) is an accepted manner to visually illustrate the resource economical footprint the wetland.

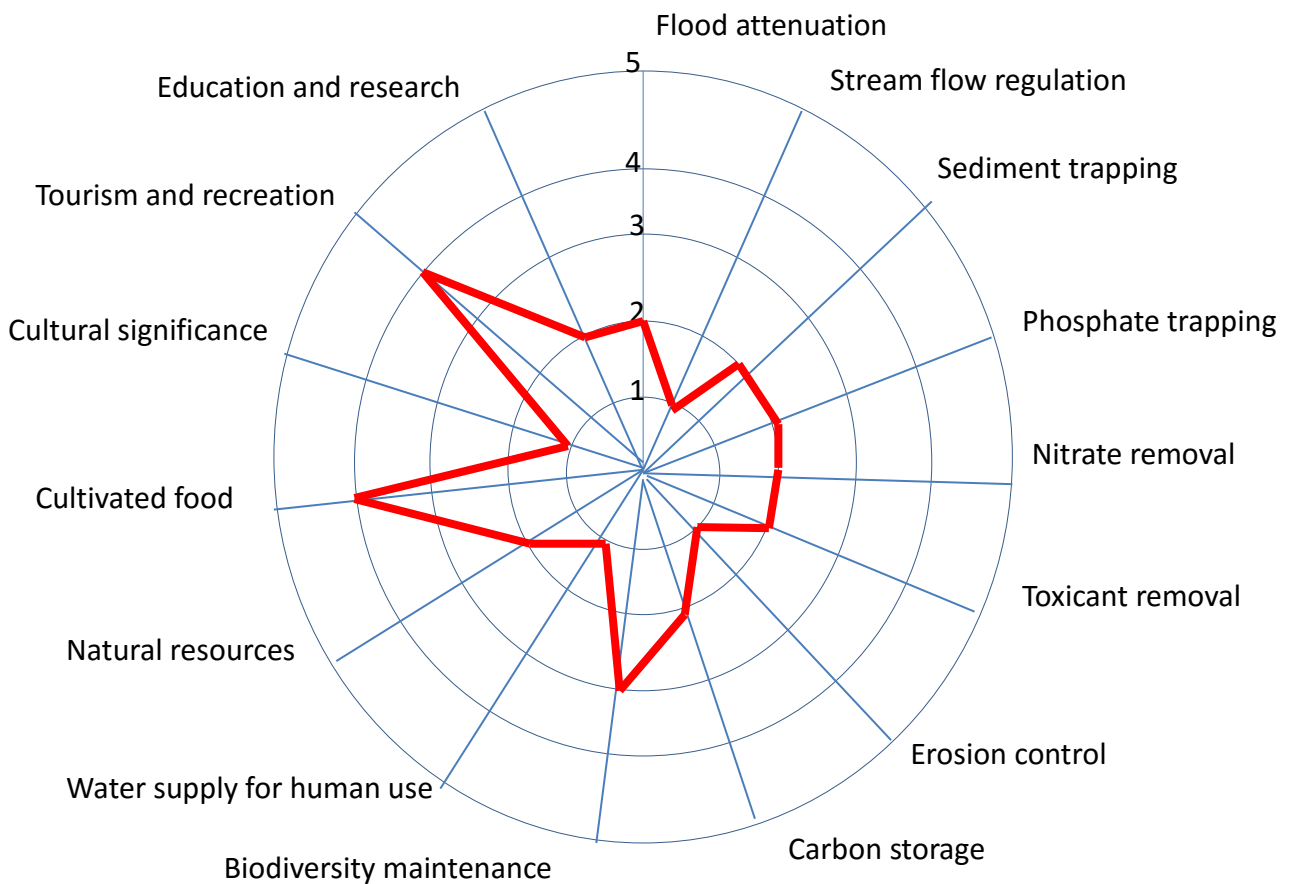


Figure 1. Diagrammatic representation of the Erf 100866 wetland goods and services

Conclusions

Most environmental practitioners' reaction on being confronted with the prospect of yet another development in a wetland is one of resistance, as the gross demise of wetlands on a global scale is widely condemned. The one at Erf 100866 Idas Valley elicit the same reaction.

Nevertheless, although it is uncertain what the historic status of the wetland was, it was probably much bigger than at present and was covered with a dense stance of fynbos. Currently it shows signs of dehydration, significant retraction and has probably lost most of its ecological functionality.

Because the only indicator species that occur on the grounds in significant numbers is river bed grass, which prominent wetland authorities do not recognize as a valid indicator species. If the decision-making authorities concede, no restrictions on the

development of Erf 10866 should be applied. I agree that the presence of only river bed grass and no other indicator species should disqualify an area as a valid wetland.

Should the authorities decide to approve the development of housing on the property, whatever little wetland function that is left, would be lost. It is doubtful if any mitigation would retrieve its function.

On the other hand, should the authorities decide not to allow any development, it seems probable that the current wetland function, little as it may be, would gradually be lost anyway, as the current process of dehydration would persist.

If the wetland's further destruction is to be reversed and should the authorities decide to restore the wetland, it stands to reason that the adjacent trench requires to be filled in. In this event an active, long term rehabilitation process is called for, including the re-establishment of a percentage of the original vegetation. This might prove tedious, expensive and an option not feasible to the municipality.

Finally, should the project go ahead, the authorities are free to call for an offset, in which event the municipality and its agents are to follow due procedure, as set out in various central and provincial government policy documents. This is a distinct option, but another project altogether, with its own terms of reference and time frame.

Literature

Anonymous. Not dated, probably 2005. *A practical field procedure for identification and delineation of wetlands and riparian areas*. Department of Water Affairs and Forestry, Pretoria.

Donovan Kotze, D., G. Marnewecke, A. Batchelor, D. Lindley & N. Collins. 2005. *A technique for rapidly assessing ecosystem services supplied by wetlands*. Water Research Commission, Pretoria.

Hanekom, N. 2015. *DWS (DW781) Freshwater Ecological Information Proposed Housing Project on Erven 0866 and 11008 Idas Valley, Stellenbosch*. Eco Impact, Malmesbury.

Kleynhans, C.J. 1999. *Assessment of Ecological Importance and Sensitivity*. Department of Water Affairs and Forestry. Pretoria.

Sieben, E.J.J., H. Mtshali & M. Janks. 2014. *Classification and Analysis of Wetland Vegetation Types for Conservation, Planning and Monitoring*. Water Research Commission. Pretoria.

Yates, J. & M. Jones. 2014. *Geotechnical Site Investigation for Erven 10866-11008 Idas Valley Stellenbosch*. Core Geotechnical Consultants, Cape Town.

Wetland Delineation

The wetland can be demarcated according to the presence of the river bed grass, which is clearly visible on a Google Earth image. A 5 to 10 meter buffer zone is shown in the Figure below. The wetland is marked in the north eastern corner of the site.



Figure 1. Erf 100866 wetland delineation