# BIODIVERSITY BASELINE &

# FRESHWATER ECOLOGICAL IMPACT ASSESSMENT

## *PROPOSED EXTENSION OF SAXDOWNS ROAD, KUILS RIVER*


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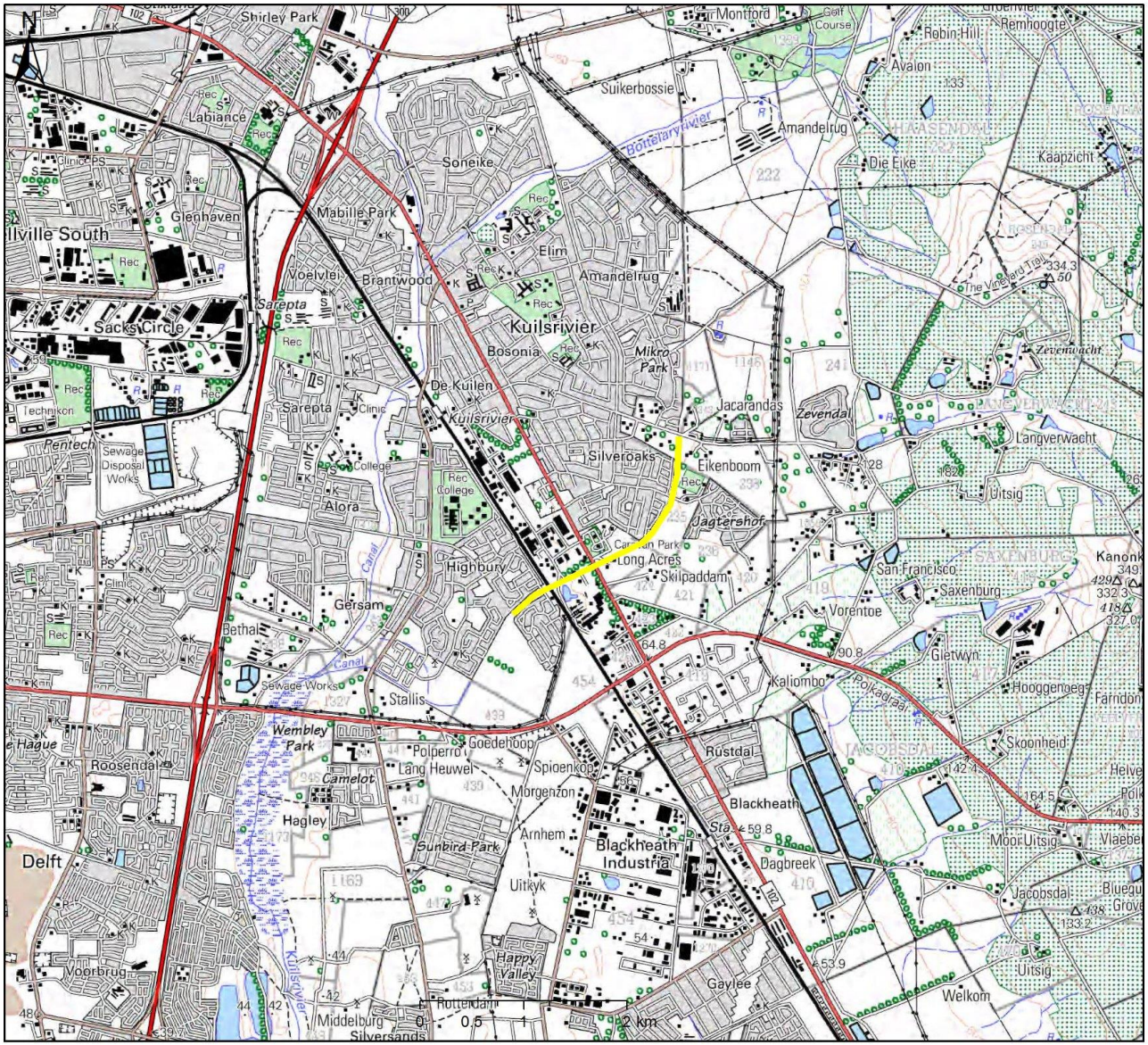
## 1. INTRODUCTION AND BACKGROUND

Eco Impact Legal Consulting (Pty) Ltd (Eco Impact) is appointed by the City of Cape Town to assess the biodiversity and freshwater ecosystems impacts of the proposed construction of Saxdowns Road.

Currently Saxdowns Road runs through Kuils River from the M23 (Bottelary Road) until Langverwacht Road. Saxdowns Road is to be extended further south-southwest towards the M12, from Langverwacht Road south-southwest through Jagtershof, crossing the R102 (Van Riebeeck Road) and ending in Highbury next to Zirconia Crescent where it will eventually connect with the future planned Belhar Main Road.




# 1:50000 Topographical Map of Saxdowns Rd

**Scale:** 1:50 000

**Date created:** February 20, 2018

Western Cape Government
Agriculture

**Figure 1:** The 1 in 50 000 topographical map for the study area. Study area Indicated by yellow line**.**

## 2. METHODOLOGY, ASSUMPTIONS AND LIMITATIONS OF THE STUDY

Input into this report was informed by a combination of desktop assessments of existing biodiversity and freshwater ecosystem information for the study area and catchment, as well as by a more detailed assessment of the freshwater features at the site.

The site was visited in September 2017. During the field visit, the characterisation and integrity assessments of the ecological features were undertaken. Mapping of the features was undertaken using Google Maps with GPS tracker. The features were mapped while doing the field survey. The SANBI Biodiversity GIS website was also consulted to identify any constraints in terms of fine-scale biodiversity conservation mapping as well as possible freshwater features mapped in the Freshwater Ecosystem Priority Areas maps. This information/data was used to inform the resource protection related recommendations.

The basic terms of reference (TOR) for this study were the Cape Nature recommended TOR for biodiversity specialists, and are as follows:

- Produce a baseline analysis of the botanical attributes of the study area as a whole.
- This report should clearly indicate any constraints that would need to be taken into account in considering the development proposals further.
- The baseline report must include a map of the identified sensitive areas as well as indications of important constraints on the property. It must also:
- Describe the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering viability etc.

In terms of biodiversity pattern, identify or describe:

*Community and ecosystem level*

- The main vegetation type, its aerial extent and interaction with neighbouring types, soil or topography;
- The types of plant communities that occur in the vicinity of the site
- Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment, etc.*)

*Species level*

- Red Data Book species of conservation concern (RDBSCC) - (provide location)
- The viability of and estimated population size of the RDBSCC that are present (include degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High = 70-100% confident, Medium 40-70% confident, Low 0-40% confident)
- The likelihood of other RDBSCC species occurring within the vicinity (include degree of confidence)

*Other pattern issues*

Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.

- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying
- The condition of the site in terms of current or previous land uses

In terms of biodiversity process, identify or describe:

- The key ecological “drivers” of ecosystems on the site and in the vicinity, such as fire.

- Any mapped spatial component of an ecological process that may occur at the site or in the vicinity i.e. watercourses, biome boundaries, migration routes etc.
- Any possible changes in key processes e.g. increase fire frequency or drainage/artificial recharge of aquatic systems.

- Describe what is the significance of the potential impact of the proposed project – with and without mitigation – on biodiversity pattern and process at the site, landscape, and regional scales.

- Recommend actions that should be taken to prevent or mitigate impacts. Indicated how these should be scheduled to ensure long-term protection, management and restoration of affected ecosystems and biodiversity.

- Indicate limitations and assumptions, particularly in relation to seasonality.

Limitations and uncertainties often exist within the various techniques adopted to assess the condition of ecosystems. The following techniques and methodologies were utilized to undertake this study:

- The ecological importance and sensitivity assessment was conducted according to the guidelines as developed by DWAF (1999).
- Recommendations are made with respect to the adoption of buffer zones within the development site, based on the wetlands functioning and site characteristics.

The level of aquatic assessment undertaken was considered to be adequate for this study.

## 3. DESCRIPTION OF THE ECOLOGICAL FEATURES AND THE WIDER STUDY AREA

The natural vegetation originally occurring within the study area would have under unmodified circumstances been Critically Endangered - Cape Flats Sand Fynbos.

The site is located within the G22E quaternary catchment. The primary aquatic feature on the site is the wetlands. The study area lies within the Kuils-Eerste River sub-catchment of the Berg Water Management Area and within the City of Cape Town boundaries in the Western Cape Province.

The terrestrial and aquatics habitats within the proposed development site and surrounds have however been significant degraded and transformed due to previous and ongoing urban developments of the Kuils River urban area.

### 3.1. SITE CHARACTERISATION

At least six wetlands were identified on and within 100m of the proposed development site during the field survey. Wetlands 2 (± 0.4ha) and 4 (± 0.5ha) will be partially impacted upon during the construction of the road. The remaining wetlands are located outside of the proposed development footprint and most of these wetlands are typified by bulrushes *Typha capensis*. Although the wetlands may have been part of a larger wetland area in the past the depressions within which the wetlands now occurs appears to have been specifically created or transformed to deal with the storm water of the site and surrounds.

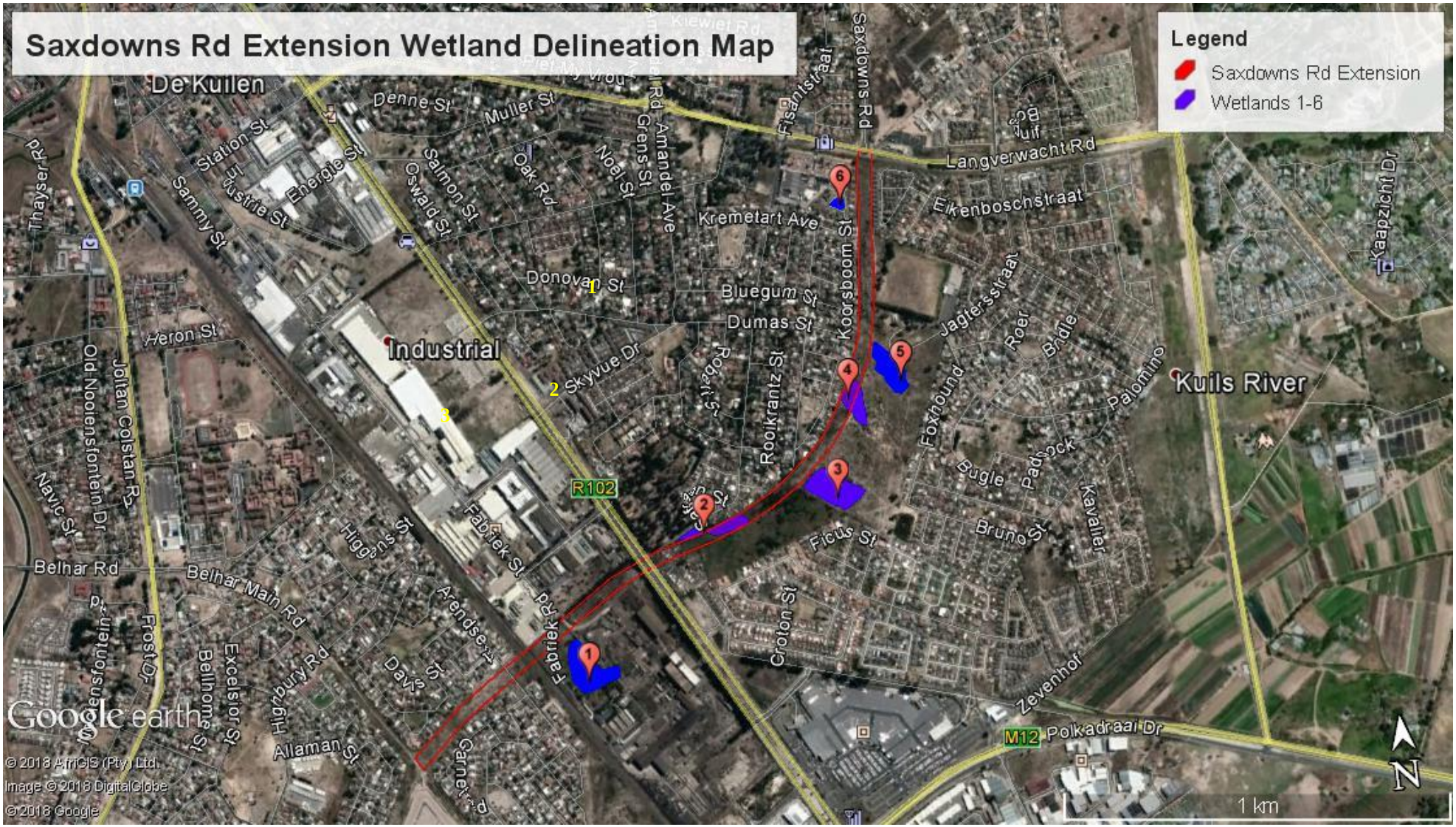



**Figure 2:** Remaining wetlands identified on the proposed development site and surrounds

## 3.2. DESCRIPTION OF THE STUDY AREA

The district is characterised by flat plains typical of the Cape Flats, which cover most of the Tygerberg district. The most significant topographical feature in the district is the Tygerberg Mountain, which runs in a north-south direction. The highest point of the Tygerberg is 398m above sea level, just east of Plattekloof. A few of the foothills of the Durbanville hills penetrate into the north-eastern extreme of the district. The affected property lies within the urban area of Kuils River and is surrounded by flat residential and commercial / industrial built up area.

The Kuils River and its tributaries area receive most of its rainfall during winter with a Mediterranean climate. This catchment is drier than that of the Eerste River and the mean annual precipitation ranges from 800mm in the eastern hills to about 500mm near the coast. About 80 % of the rain falls in a series of winter downpours, which bring the river down in spate. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures range from 19°C in July to 29°C in February. The region is the coldest during July when the mercury drops to 7°C on average during the night.

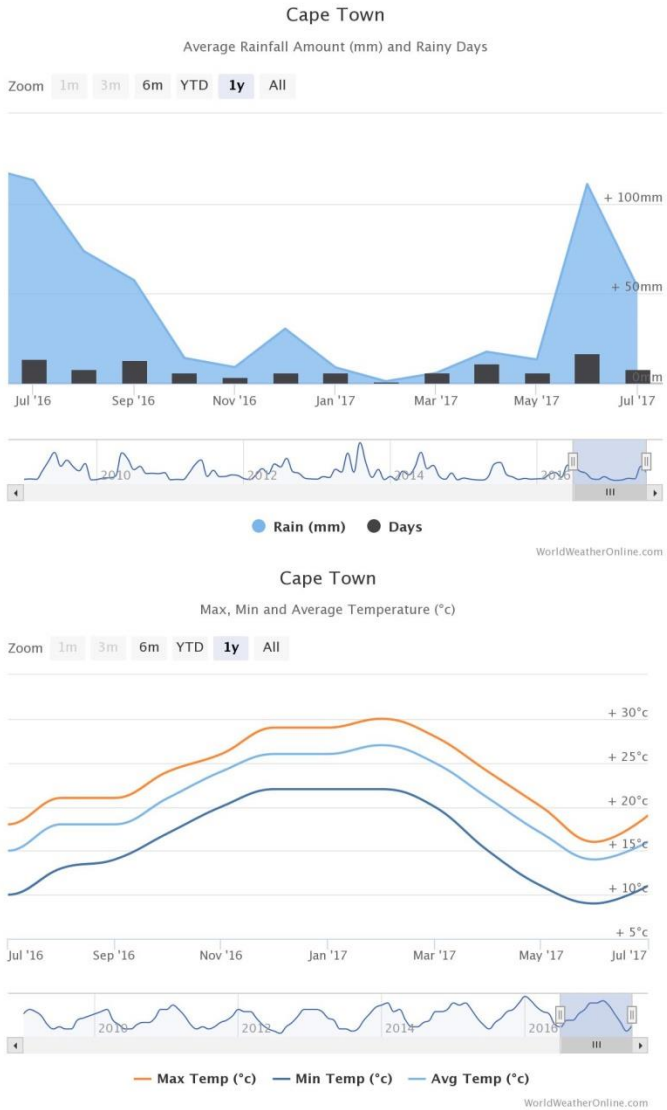



**Figure 3:** Climate graphs for the area (Worldweatheronline, 2017)

The underlying rock formations of an area comprise the foundation of its physical environment. The geology of an area is shaped by hydrological and weathering processes, which create the topography of the area. The underlying geology also gives rise to various soil types, which influence the indigenous fauna and flora of an area, as well as human agricultural practices. The geology of the site is characterised by the **Sandveld Group**

**Sands**, characteristic of the Cape Flats area, which cover the remainder of the Tygerberg district.

The **Sandveld Group** is mainly represented by the Springfontyn Formation, which was developed through the deposition of windblown sand (an aeolian deposit), consisting of reddish to grey, unconsolidated quartzite aeolian sand and is most common in the northern and central portion of the Tygerberg district, from Milnerton to Langa and Bellville (UCT Department of Geological Sciences). The south-eastern portion of the Tygerberg district, including Cape Town International Airport and Delft, is overlain with semi-consolidated aeolian sands of the Witzand Formation.

Soils underlying the site can be categorized as imperfectly drained sandy soils which consist largely of soils with a sandy texture, leached and with subsurface accumulation of organic matter and aluminium, with or without iron oxides, either deep or on hard or weathering rock.

The indigenous vegetation originally occuring in the study area would have been Cape Flats Sand Fynbos. It is characterised by typical fynbos families such as proteas, ericas, restios (reeds), buchu and geophytes (bulbs). Its composition vegetation usually consists of dense, moderately tall shrubland, interspersed with restios. Cape Flats Sand Fynbos is exceptionally high in species diversity and has a high number of Vulnerable, Endangered and Critically Endangered species. Five of its plant species have become extinct. Cape Flats Sand Fynbos is listed as Critically Endangered and more than 85% of this vegetation type within the City has been transformed. Many of the remaining patches are small pockets surrounded by urban areas. The vegetation as surveyed on the site and surrounds is however in a seriously modified state, with none of these species of conservation concern remaining on site.

## 3.3 TERRESTRIAL ECOSYSTEM IMPACT ASSESSMENT

As previously mentioned the natural habitat on site has been completely transformed and isolated due to urban development.

The site is completely encroached and dominated by alien trees (i.e. *Acacia saligna*), weeds and grass species with the only indigenous terrestrial vegetation species recorded on the proposed development site being scattered *Carpobrotus edulis*, restios and common white and yellow *Arctotis sp*. It is estimated that the proposed road development will lead to the clearance of less than 0.5ha of indigenous vegetation species and none of which are of conservation concern.

No terrestrial avifauna of fauna species of conservation concern were recorded on site at the time of the survey and none are expected to breed here.

No terrestrial Critical Biodiversity or Ecological Support Areas have been mapped on the site or nearby surrounds in the City of Cape Town Biodiversity Network (2017).

The site is isolated, surrounded by urban development, small in overall size and therefore has a very low ecological connectivity value and low rehabilitation potential.

Taking into account all of the above mentioned factors a **Low Terrestrial Botanical Sensitivity and Conservation Value is allocated to the site and surrounds**, and the **overall potential negative impact significance of the proposed development on the terrestrial habitat of the site and surrounds will therefore be of low negative significance**.

See below photos of the proposed development site and surrounds.

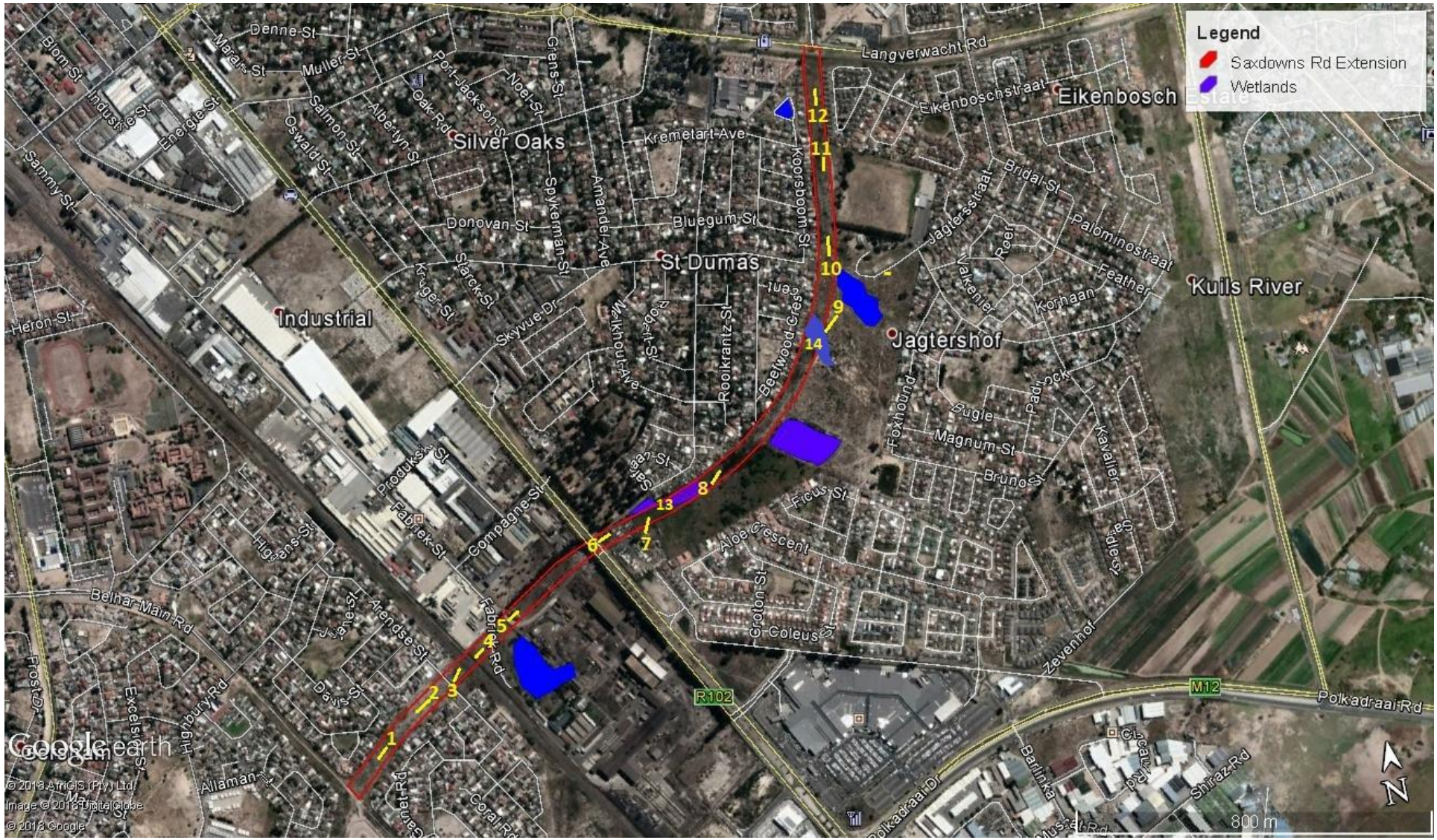



**Figure 4:** Site photos map

**Photo 1**: Start of new road at location where it will eventually connect with Belhar Main Rd.

**Photo 2**: Proposed development site.

**Photo 3**: Proposed development site, where the new road will go over the railway line.

**Photo 4**: Proposed development site, where the new road will go over the railway line at the Cisco industrial property.

**Photo 5**: Proposed development site at the Cisco industrial property.

**Photo 6**: Proposed development site, next to the scrap yard.

**Photo 7**: Proposed development site, next to the scrap yard.

**Photo 8**: Proposed development site.

**Photo 9:** Proposed development site with seasonal wetland that will be partially filled during the proposed development.

**Photo 10:** Proposed development site next to school grounds.

**Photo 11:** Proposed development site next to school grounds.

**Photo 12:** End of proposed new road development site where it will connect with Langverwacht Rd.

## 3.4 AQUATIC ECOSYSTEM IMPACT ASSESSMENT

Wetlands as defined by the National Water Act (Act 36 of 1998) "*are a portion of land that is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which under normal circumstances supports or would support vegetation typically adapted to life in saturated soil*." Wetland delineation relates to the determination and marking of the boundary of a wetland to the outer edge of the temporary zone of wetness.

The wetland assessment consisted of the following wetland assessment components: Wetland delineation; Wetland classification; Wetland integrity; Wetland ecological importance and sensitivity; and Ecosystem services supplied by the wetland.

Only the wetlands that will be impacted upon/filled during the proposed development have been assessed in this report.

### 3.4.1 WETLAND DELINEATION

The wetland delineation process uses four wetland indicators to provide an estimate of the extent of a wetland. They are: landscape position (must be flat or depressed), vegetation

(must be hydrophilic), soil form (must compliment an existing wetland type) and soil wetness (water table must be within 50 cm of profile).

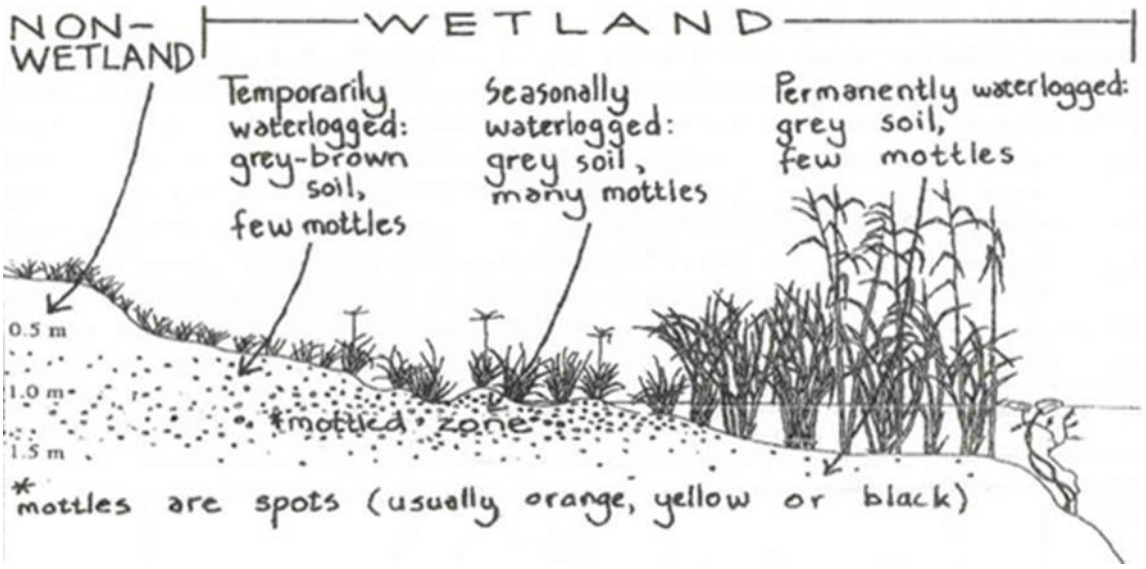



**Figure 5:** Wetland illustration

**Table 1:** Soil and vegetation characteristics used in the delineation of wetlands and the determination of wetland zonation (Relevant characteristics highlighted in green) (after Kotze et al., 1996).

| Soil Wetness Zone | | | | |
|---|---|---|---|---|
| Soil Depth | Non-Wetland | Temporary | Seasonal | Permanent / Semi Permanent |
| 0-10 cm | Matrix usually brown/ red (chroma >1) | Matrix brown to greyish brown (chroma 0-3, usually 1 or 2) | Matrix brownish grey to grey (chroma 0-2) | Matrix grey (chroma 0-1) |
| | No / very few mottles | Few/no mottles | Many mottles | Few / no mottles |
| | Nonsulphidic | Nonsulphidic | Sometimes sulphidic | Often sulphidic |
| 30-40 cm | Matrix usually brown (chroma >2) | Matrix greyish brown (chroma 0-2, usually 1) | Matrix brownish grey to grey (chroma 0-1) | Matrix grey (chroma 0-1) |
| | No/few mottles | Few/many mottles Nonsulphidic Predominantly grass species; mixture of species which occur extensively in non- wetland areas, and hydrophytic plant species which are restricted largely to wetland areas | Many mottles Sometimes sulphidic Hydrophytic sedge and grass species which are restricted to wetland areas, usually <1m tall. | No/few mottles |
| | Nonsulphidic | | | Often sulphidic |
| Vegetation | Dominated by plant species which occur extensively in non- wetland areas; hydrophytic species may be present in very low abundance | | | Dominated by: (1) emergent plants, including reeds (*Phragmites australis*), sedges and bulrushes (*Typha capensis*), usually >1m tall (marsh); or (2) floating or submerged aquatic plants. |

Wetland 2 is a reasonably large isolated depression wetland which occurs partially inside the

central-southern half of the development site and is typified by bulrushes *Typha capensis*. The depression appears to have been specifically created to deal with the storm water that passes through the site and from the adjacent residential areas and infrastructure. It is important to note that this wetland was identified in the City of Cape Town Biodiversity Network (2017) as originally a part of a much bigger wetland. The original wetland identified in the City of Cape Town 2017 study is much bigger and situated more to the west as identified during this field survey which supports the theory that this part of the wetland has been specifically modified and created to deal with the storm water. Other on site surface topographical features such as the shaped berms also supports this theory.

**Photo 13.1:** A section of wetland 2 which will be partially filled and developed upon.

**Photo 13.2:** A section of wetland 2 which is proposed to be completely filled and development upon.

Wetland 4 exists partially within the proposed development area in the northern half of the site. The vegetation (restios) is more indicative of seasonally wet sandy soils and not necessarily being inundated. The area is severely fragmented by paths running through the centre of the wetland area, as well as invasive alien Port Jackson (*Acacia saligna)* willows and exotic grasses.

**Photo 14.1:** View of Wetland 4 that will be partially filled and impacted upon.

**Photo 14.2:** Close-up view of Wetland 4.

**Photo 14.3:** Soil profile of Wetland 4.

## 3.4.2 WETLAND CLASSIFICATION

The classification of the wetlands in the study area was based on the WET-EcoServices technique (Kotze et al, 2005). The WET-EcoServices technique identifies main types of wetland based on hydro-geomorphic characteristics (Table 13). According to hydro-geomorphic characteristics, the wetland feature within the study area can be classified as follows:

**Table 2:** Classification of wetland areas within study area

| | |
|---|---|
| **Name** | Wetland 2 - (0.4ha in total) |

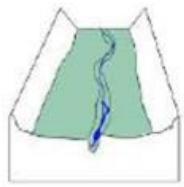
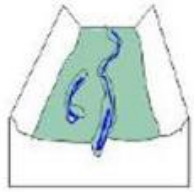
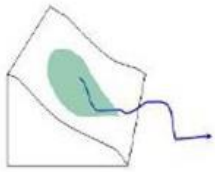
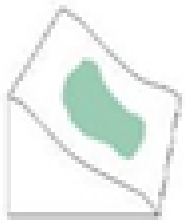
| | |
|---|---|
| **Impacted Area** | Approximately 0.3 ha |
| **System** | Inland |
| **Ecoregion** | South Western Coastal Belt |
| **Landscape setting** | Lower Foothills |
| **Hydrogeomorphic Type** | Depression |
| **Longitudinal zonation** | Lower foothills |
| **Drainage** | Surface and low water table. |
| **Seasonality** | Seasonal |
| **Anthropogenic influence** | Wetland 2 is a reasonably large isolated depression wetland which occurs partially inside the central-southern half of the development site and is typified by bulrushes *Typha capensis*. The depression appears to have been specifically created to deal with the storm water that passes through the site and from the adjacent residential areas and infrastructure. It is important to note that this wetland was identified in the City of Cape Town Biodiversity Network (2017) as originally a part of a much bigger wetland. The original wetland identified in the City of Cape Town 2017 study is much bigger and situated more to the southeast as identified during this field survey which supports the theory that this part of the wetland has been specifically modified and created to deal with the storm water. Other on site surface topographical features such as the shaped berms also supports this theory. |
| **Vegetation** | Cape Flats Sand Fynbos |
| **Substrate** | Grey, regic sands |
| **Salinity** | Fresh |

**Table 3:** Classification of wetland areas within study area

| | |
|---|---|
| **Name** | Wetland 4 (0.5ha in total) |
| **Impacted Area** | Approximately 0.3ha |
| **System** | Inland |
| **Ecoregion** | South Western Coastal Belt |
| **Landscape setting** | Lower Foothills |
| **Hydrogeomorphic Type** | Depression |
| **Longitudinal zonation** | Lower foothills |
| **Drainage** | Surface and low water table. |
| **Seasonality** | Seasonal |
| **Anthropogenic influence** | Wetland 4 exists partially within the proposed development area in the northern half of the site. The vegetation (restios) is more indicative of seasonally wet sandy soils and not necessarily being inundated. The area is severely fragmented by paths running through the centre of the wetland area, as well as invasive alien Port Jackson (*Acacia saligna)* willows and exotic grasses. |
| **Vegetation** | Cape Flats Sand Fynbos |
| **Substrate** | Grey, regic sands |
| **Salinity** | Fresh |

**Table 4:** Wetland hydro-geomorphic types typically supporting inland wetlands in South Africa

| **Hydro-geomorphic types** | **Description** | **Source of water maintaining wetland** [1] | |
|---|---|---|---|
| | | **Surface** | **Sub-surface** |
| Floodplain | Valley bottom areas with a well-defined stream channel gently sloped and | *** | * |

| | | | |
|---|---|---|---|
|  | characterized by floodplain features and the alluvial transport and deposition of sediment, usually leading to a net accumulation of sediment. Water inputs from main channel and from adjacent slopes. | | |
| Valley bottom with a channel  | Valley bottom areas with a well-defined stream channel but lacking characteristic floodplain features. May be gently sloped and characterized by the net accumulation of alluvial deposits or may have steeper slopes and be characterized by the net loss of sediment. Water inputs from main channel and from adjacent slopes. | *** | */ *** |
| Valley bottom without a channel  | Valley bottom areas with no clearly defined stream channel usually gently sloped and characterized by alluvial sediment deposition, generally leading to a net accumulation of sediment. Water inputs mainly from channel entering the wetland and from adjacent slopes. | *** | */ *** |
| Hillslope seepage linked to stream channel  | Slopes on hillsides, characterized by the colluvial movement of materials. Water inputs are mainly from sub-surface flow and outflow is usually via a well-defined stream channel connecting the area directly to a stream channel. | * | *** |
| Isolated Hillslope seepage  | Slopes on hillsides, which are characterized by the colluvial (transported by gravity) movement of materials. Water inputs mainly from sub-surface flow and outflow either very limited or through diffuse sub-surface and/or surface flow but with no direct surface water connection to a stream channel. | * | *** |
| Depression (includes Pans)  | A basin shaped area with a closed elevation contour that allows for the accumulation of surface water (i.e. it is inward draining). It may also receive sub-surface water. An outlet is usually absent, and therefore this type is usually isolated from the stream channel network. | */ *** | */ *** |

[1] Precipitation is an important water source and evapotranspiration is important.

Water source: * Contribution usually small

*** Contribution usually large

*/ *** Contribution may be small or important depending on the local circumstances

## 3.4.3 WETLAND INTEGRITY

The Present Ecological Status (PES) Method (DWAF 2005) was used to establish the integrity of the wetland and was based on the modified Habitat Integrity approach developed by Kleynhans (DWAF, 1999; Dickens *et al*, 2003). Table 5 shows the criteria and results from the assessment of the habitat integrity of the wetland. These criteria were selected based on the assumption that anthropogenic modification of the criteria and attributes listed under each selected criterion can generally be regarded as the primary causes of the ecological integrity of a wetland.

**Table 5:** Habitat integrity assessment criteria for palustrine wetlands (Dickens *et al*, 2003)

| **Criteria/Attributes** | **Relevance** |
|---|---|
| **Hydrologic** | |
| Flow Modification | Consequence of abstraction, regulation by impoundments or increased runoff from human settlements or agricultural land. Changes in flow regime (timing, duration, frequency), volumes, velocity which affect inundation of wetland habitats resulting in floralistic changes or incorrect cues to biota. Abstraction of groundwater flows to the wetland. |
| Permanent Inundation | Consequence of impoundment resulting in destruction of natural wetland habitat and cues for wetland biota. |
| **Water Quality** | |
| Water Quality Modification | From point or diffuse sources. Measure directly by laboratory analysis or assessed indirectly from upstream agricultural activities, human settlements and industrial activities. Aggravated by volumetric decrease in flow delivered to the wetland. |
| Sediment Load Modification | Reduction due to entrapment by impoundments or increase due to land use practices such as overgrazing. Cause of unnatural rate of erosion, accretion or infilling of wetlands. |
| **Hydraulic/Geomorphic** | |
| Canalisation | Results in desiccation or changes to inundation patterns of wetland and thus changes in habitats. River diversions or drainage. |
| Topographic Alteration | Consequence of infilling, ploughing, dykes, trampling, bridges, roads, railway lines and other substrate disruptive activities that reduce or change wetland habitat directly. |
| **Biota** | |
| Terrestrial Encroachment | Desiccation of wetland and encroachment of terrestrial plant species due to changes in hydrology or geomorphology. Change from wetland to terrestrial habitat and loss of wetland functions. |
| Indigenous Veg Removal | Destruction of habitat through farming activities, grazing or firewood collection affecting wildlife habitat and flow attenuation functions, organic matter inputs and increases potential for erosion. |
| Invasive Plant Encroachment | Affects habitat characteristics through changes in community structure and water quality changes (oxygen reduction and shading). |
| Alien Fauna | Presence of alien fauna affecting faunal community structure. |
| Over utilisation | Overgrazing, over fishing, etc. |

**Table 6:** Wetland habitat integrity assessment (score of 0=critically modified to 5=unmodified)

| **Criteria & Attributes** | **Wetland 2** |
|---|---|
| **Hydrologic** | |
| Flow Modification | 2 |
| Permanent Inundation | 2 |
| **Water Quality** | |
| Water Quality Modification | 2.5 |
| Sediment Load Modification | 2 |
| **Hydraulic/Geomorphic** | |
| Canalisation | 1.5 |
| Topographic Alteration | 2.5 |

| **Biota** | |
|---|---|
| Terrestrial Encroachment | 2 |
| Indigenous Vegetation Removal | 3 |
| Invasive Plant Encroachment | 3 |
| Alien Fauna | 4.5 |
| Over utilisation of Biota | 4.5 |
| **Total Mean** | **2.6** |
| **Category** | **D– Largely modified** |

**Table 7:** Wetland habitat integrity assessment (score of 0=critically modified to 5=unmodified)

| **Criteria & Attributes** | **Wetland 4** |
|---|---|
| **Hydrologic** | |
| Flow Modification | 0 |
| Permanent Inundation | 2 |
| **Water Quality** | |
| Water Quality Modification | 2.5 |
| Sediment Load Modification | 2 |
| **Hydraulic/Geomorphic** | |
| Canalisation | 1.5 |
| Topographic Alteration | 1 |
| **Biota** | |
| Terrestrial Encroachment | 1 |
| Indigenous Vegetation Removal | 2 |
| Invasive Plant Encroachment | 2 |
| Alien Fauna | 4.5 |
| Over utilisation of Biota | 4.5 |
| **Total Mean** | **2.0** |
| **Category** | **D– Largely modified** |

**Table 8: Relation between scores given and ecological categories Scoring**

| **Guidelines Per Attribute*** | **Interpretation of Mean* of Scores for all Attributes: Rating of Present Ecological Status Category (PESC)** |
|---|---|
| Natural, unmodified - score=5. | Within general acceptable range<br>CATEGORY A<br>>4; Unmodified, or approximates natural condition. |
| Largely natural - score=4. | CATEGORY B<br>>3 and <4; Largely natural with few modifications, but with some loss of natural habitats. |
| Moderately modified- score=3. | CATEGORY C<br>>2 and <3; moderately modified, but with some loss of natural habitats. |
| Largely modified - score=2. | CATEGORY D<br><2; largely modified. A large loss of natural habitats and basic ecosystem functions has occurred. |
| | OUTSIDE GENERALLY ACCEPTABLE RANGE |
| Seriously modified - rating=1. | CATEGORY E<br>>0 and <2; seriously modified. The losses of natural habitats and basic ecosystem functions are extensive. |
| Critically modified - rating=0. | CLASS F<br>0; critically modified. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat. |

The WET-Health method was also then used to determine the Present Ecological Status (PES) scores for the hydrology, geomorphology, water quality and vegetation of the wetland and generate an overall PES and ecological category for the wetland (Table 9). While the

WET-Health documentation explicitly discourages aggregation of the scores for the three components (hydrology, geomorphology and vegetation), a procedure is provided whereby the results can be integrated into a single score that can be used to categorise the overall present ecological condition of a wetland. The formula used is: Overall Health = ((Hydrology score) x3 + (Geomorphology score) x2 + (Vegetation score) x2)) ÷ 7, but users can adjust these default weightings for the three components if they consider this to be necessary, provided written justification for such an adjustment is given.

**Table 9:** WET-Health assessment of the present ecological status of the wetlands

| **Wetland** | **Wetland 2** | |
|---|---|---|
| **Components** | **PES% Score** | **Eco Category** |
| **Hydrology PES** | 30 % | **E** |
| **Geomorphology PES** | 71 % | **C** |
| **Water quality PES** | - | **-** |
| **Vegetation PES** | 71 % | **E** |
| **Overall Wetland PES** | 53 % | **D** |

**Table 10:** WET-Health assessment of the present ecological status of the wetlands

| **Wetland** | **Wetland 4** | |
|---|---|---|
| **Components** | **PES% Score** | **Eco Category** |
| **Hydrology PES** | 30 % | **E** |
| **Geomorphology PES** | 30 % | **E** |
| **Water quality PES** | - | **-** |
| **Vegetation PES** | 51 % | **D** |
| **Overall Wetland PES** | 36 % | **E** |

From Table 9 to Table 10 it can be seen that the habitat integrity of all the wetlands to be impacted upon are considered to be largely modified. The most significant impacts that occurred on the wetland areas are the direct habitat loss and transformation due to surrounding and onsite land use/development activities.

### 3.4.4 ECOSYSTEM SERVICES SUPPLIED BY THE WETLANDS

The assessment of the ecosystem services supplied by the wetland was conducted according to the guidelines as described by Kotze *et* al (2004). An assessment was undertaken that examines and rates the services listed in Table 11. The characteristics were scored according to the general levels of services provided.

The wetland areas offer moderate services in terms of trapping and or removing phosphate, nitrate and toxicants. It also offers moderate services in terms of controlling erosion and attenuating floods. There are no critically important aquatic ecosystems downstream of the site.

**Table 11: Goods and services assessment results for the wetland in the study site (high=4; low=0)**

| **Goods and services** | **Wetland 2** | **Goods and services** | **Wetland 2** |
|---|---|---|---|
| Flood attenuation | 3 | Maintenance of biodiversity | 1.4 |
| Stream flow regulation | 3 | Water supply for human use | 0 |
| Sediment trapping | 3 | Natural resources | 0 |
| Phosphate trapping | 2.2 | Cultivated foods | 0 |
| Nitrate removal | 1.6 | Cultural significance | 0 |
| Toxicant removal | 2.6 | Tourism and recreation | 0.4 |
| Erosion control | 1.1 | Education and | 1.5 |

| | | | |
|---|---|---|---|
| | | research | |
| Carbon storage | 2.3 | | |

**Table 12: Goods and services assessment results for the wetland in the study site (high=4; low=0)**

| Goods and services | Wetland 4 | Goods and services | Wetland 4 |
|---|---|---|---|
| Flood attenuation | 1.1 | Maintenance of biodiversity | 1.4 |
| Stream flow regulation | 1.1 | Water supply for human use | 0 |
| Sediment trapping | 1.1 | Natural resources | 0 |
| Phosphate trapping | 2.2 | Cultivated foods | 0 |
| Nitrate removal | 1.6 | Cultural significance | 0 |
| Toxicant removal | 2.6 | Tourism and recreation | 0.4 |
| Erosion control | 1.1 | Education and research | 1.5 |
| Carbon storage | 2.3 | | |

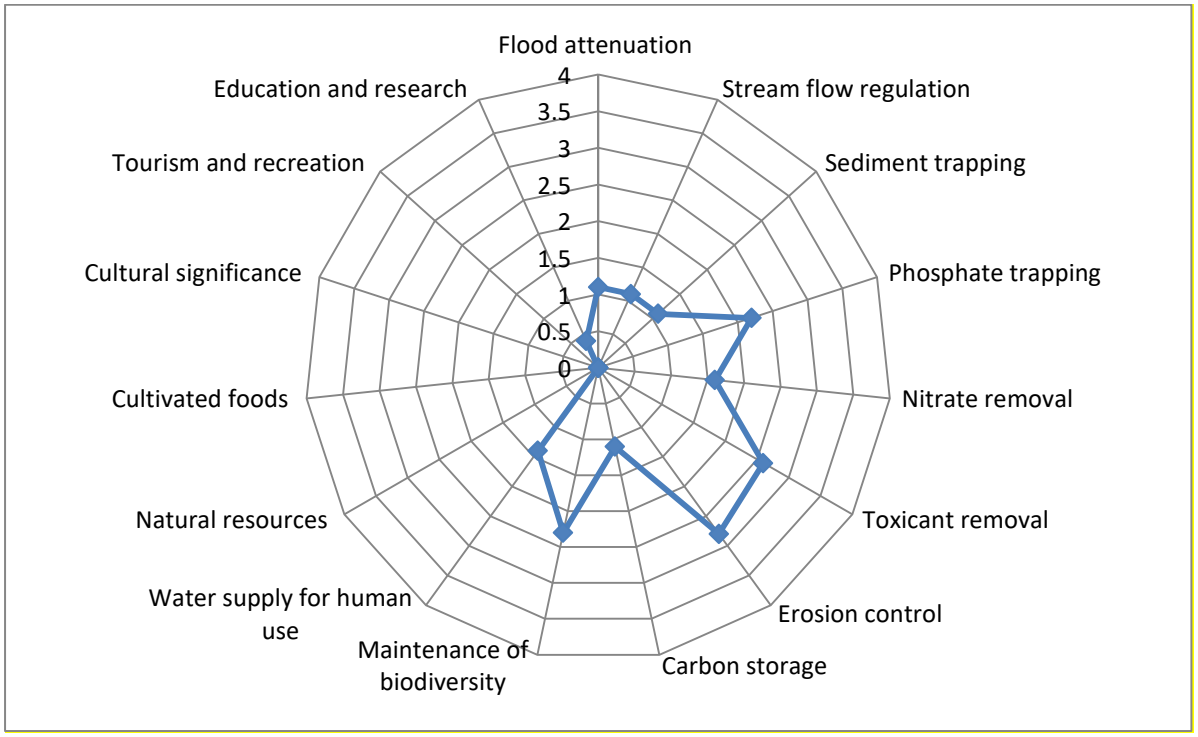



**Figure 6:** Ecosystem services provided by the wetland 1

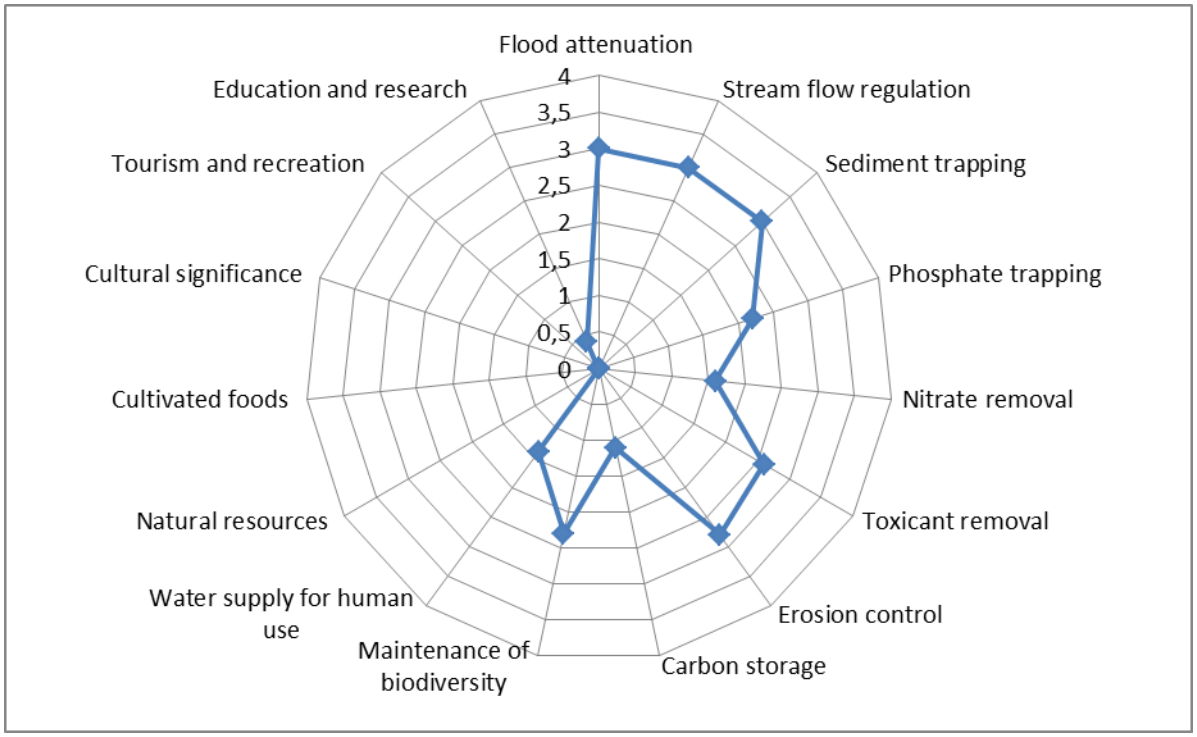



**Figure 7:** Ecosystem services provided by the wetland 3

### 3.4.5 ECOLOGICAL IMPORTANCE AND SENSITIVITY (EIS)

The EIS Assessment for the wetland area utilises the same methodology as that for rivers and is described in this report. The results from the wetland assessments are provided in Table 13 – 14 below.

**Table 13:** Results of the EIS assessment for the wetland area Biotic

| **Determinants** | **Wetland 2** |
|---|---|
| Rare and endangered biota | 0.5 |
| Unique biota | 1 |
| Intolerant biota | 1 |
| Species/taxon richness | 1 |
| **Aquatic Habitat Determinants** | |
| Diversity of aquatic habitat types or features | 1.5 |
| Refuge value of habitat type | 2 |
| Sensitivity of habitat to flow changes | 2 |
| Sensitivity of flow related water quality changes | 2 |
| Migration route/corridor for instream and riparian biota | 3 |
| National parks, wilderness areas, Nature Reserves, Natural Heritage sites, Natural areas, PNEs | 0 |
| **EIS CATEGORY** | **Moderate** |

**Table 14:** Results of the EIS assessment for the wetland area Biotic

| **Determinants** | **Wetland 4** |
|---|---|
| Rare and endangered biota | 0.5 |
| Unique biota | 1 |
| Intolerant biota | 1 |
| Species/taxon richness | 1 |
| **Aquatic Habitat Determinants** | |
| Diversity of aquatic habitat types or features | 0.5 |
| Refuge value of habitat type | 1 |

| | |
|---|---|
| Sensitivity of habitat to flow changes | 2 |
| Sensitivity of flow related water quality changes | 2 |
| Migration route/corridor for instream and riparian biota | 1 |
| National parks, wilderness areas, Nature Reserves, Natural Heritage sites, Natural areas, PNEs | 0 |
| **EIS CATEGORY** | **Low** |

From an ecological perspective, wetland 4 is of a low and wetland 2 of a moderate ecological sensitivity and importance. They provide a refuge for some indigenous species and water attenuation functions. Furthermore, as they are the interface between the terrestrial and aquatic environments, they have higher species diversity than the surrounding terrestrial, which has been extensively altered.

## 3.5. BIODIVERSITY CONSERVATION VALUE

There are two conservation mapping initiatives of relevance to the project; the Freshwater Ecosystem Priority Areas (FEPA) map which is available for the entire South Africa and the City of Cape Town Biodiversity Network Map. FEPAs are strategic spatial priorities for conserving freshwater ecosystems and associated biodiversity that were determined through a process of systematic biodiversity planning and were identified using a range of criteria for serving ecosystems and associated biodiversity of rivers, wetlands and estuaries. These rivers should be kept in their current condition, should not be degraded any further than its current moderately modified condition and it should be considered for rehabilitation. There are no FEPA wetlands mapped on the proposed development area.

The proposed road alignment will impact on two wetlands (Wetlands 2 and 4). Wetland 2 were originally mapped as a much larger wetland areas more to the southeast as part of a wetland Critical Ecological Support Area in the City of Cape Town Biodiversity Network (2017), and wetland 4 was also mapped as a wetland CESA. The identified wetlands that will be impacted upon are all classified as natural and semi-natural wetlands, without a channelled outflow and vegetated. The mapping confidence for these wetlands is however indicated as Low Confidence and from the assessment conducted it is clear that the mapping was not groundtruthed.


**Figure 8:** FEPA MAP

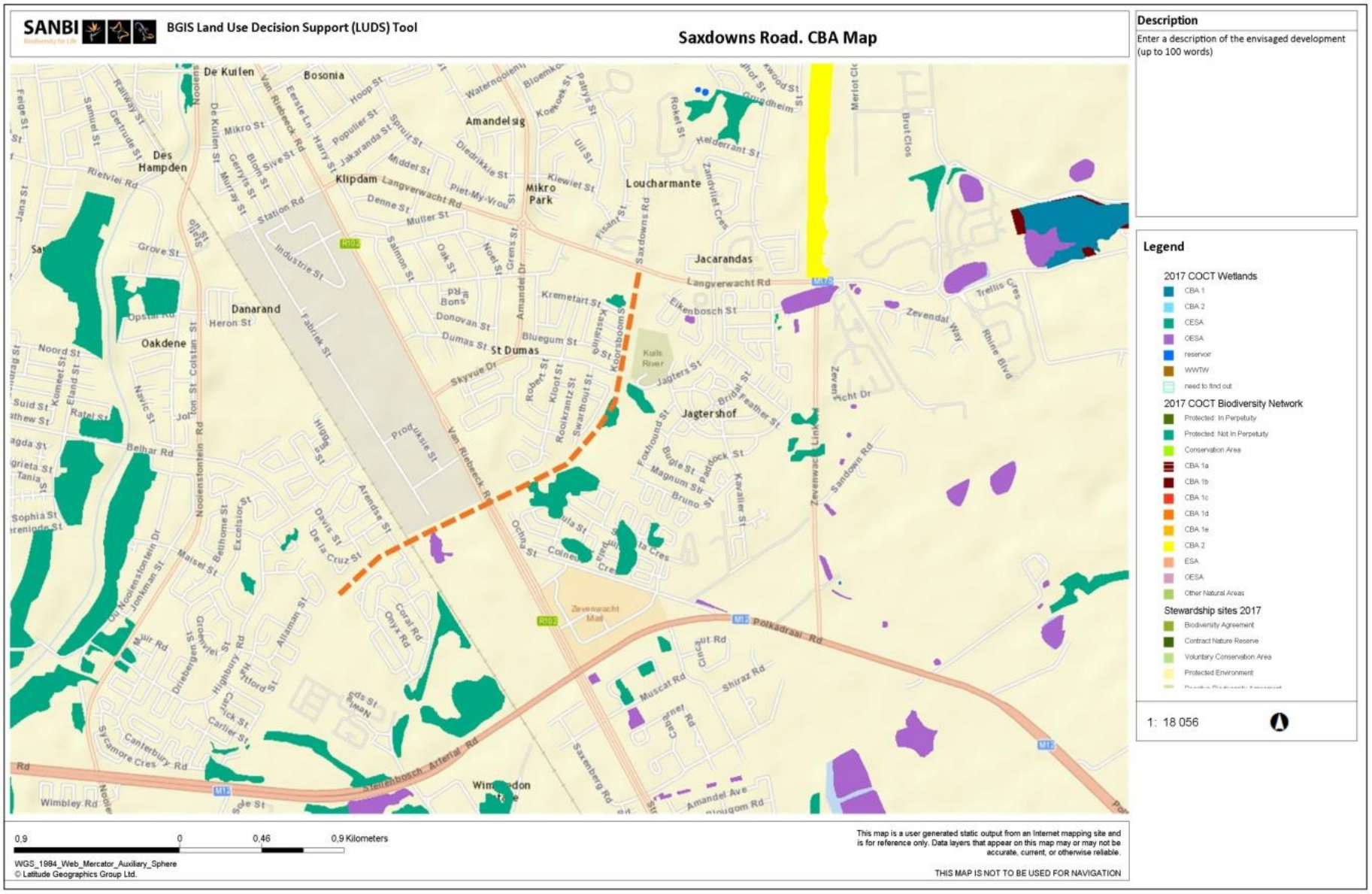



**Figure 9:** City of Cape Town 2017 Biodiversity map

## 4. IMPACT ASSESSMENT OF THE ACTIVITIES

### POTENTIAL IMPACTS ON TERRESTRIAL HABITAT

The site is completely encroached and dominated by alien trees (i.e. *Acacia saligna*), weeds and grass species with the only indigenous terrestrial vegetation species recorded on the proposed development site being scattered *Carpobrotus edulis*, restios and common white and yellow *Arctotis sp*. It is estimated that the proposed road development will lead to the clearance of less than 0.5ha of indigenous vegetation species and none of which are of conservation concern.

No terrestrial avifauna of fauna species of conservation concern were recorded on site at the time of the survey and none are expected to breed here.

No terrestrial Critical Biodiversity or Ecological Support Areas have been mapped on the site or nearby surrounds in the City of Cape Town Biodiversity Network (2017).

The site is isolated, surrounded by urban development, small in overall size and therefore has a very low ecological connectivity value and low rehabilitation potential.

Taking into account all of the above mentioned factors a **Low Terrestrial Botanical Sensitivity and Conservation Value is allocated to the site and surrounds**, and the **overall potential negative impact significance of the proposed development on the terrestrial habitat of the site and surrounds will therefore be of low negative significance**.

***Proposed Mitigation Measures during Construction. Operational and Decommissioning Phases:***

- The construction disturbance zone must be limited to the proposed development footprint area only and must be demarcated before the construction starts and remain demarcated throughout the construction phase.
- Any areas impacted upon outside of the proposed development area must be rehabilitated with locally indigenous terrestrial and/or aquatic vegetation under the supervision of a qualified specialist depending on what type of habitat was impacted upon.

### POTENTIAL IMPACTS ON WETLANDS

Construction of Saxdowns Road would have the following definite, permanent and irreversible impact on the identified aquatic ecosystems.

The project layout would result in infilling of portions of wetlands 2 and 4 as identified and accounting for permanent encroachment into an area of approximately 0.6ha (0.3ha respectively for each wetland area).

The affected portions of the wetlands would be permanently destroyed. The ecological significance of this loss is considered of **low negative significance** – a rating that takes account of the existing level of degradation and fragmentation of the system, but also of the rapid rate of degradation of the identified wetlands.

The following impacts are likely to occur within the wetland depressions in the area:

- Degradation as a result of compaction, excavation, passage of vehicles over wetland areas.
- Dumping of construction waste (old tar, paving, rubble) in wetland area.
- Visual degradation associated with litter (e.g. cement bags, litter from workers).
- Permanent destruction of soil function as a result of spillage of oils, fuels other contaminants from refuelling areas.
- Permanent loss of existing wetland habitat due to proposed road developments.

***Proposed Mitigation Measures during Construction. Operational and Decommissioning Phases:***

- Wetland 2 depression appears to have been specifically created to deal with the storm water that passes through the site. Due to the large extent of this wetland area (approximately 0.4ha), it is recommended that this wetland be recreated as a wetland offset southeast of the road. This proposed area to the southeast covers a portion of the original wetland identified in the 2017 City of Cape Town Biodiversity Network and the creating and rehabilitation of this area will be an important storm water attenuation/retention facility. This feature could also be improved on through the removal of invasive alien plants and a freshwater specialist input during the design and construction of the lost storm water detention facilities and thus considered as a trade-off for the loss of the previous two wetland areas.
- Wetland 4 vegetation (restios) is shallow with fewer inundations and more indicative of seasonally wet sandy soils and not necessarily being inundated, although the area has been severely fragmented by paths running through the centre of the wetland area, as well as invasive alien Port Jackson (*Acacia saligna)* willows and exotic grasses which has led to further fragmentation. It is expected that this wetland area could thus be filled and developed on with a low negative significance impact.
- The disturbance zone must be kept to a maximum of 10m beyond the edge of the new road – this must be fenced off/demarcated along the full wetland width, using wire fencing and shade cloth and access by personal and machinery beyond the demarcation may not take place, other than for purposes of daily litter collection which must take place on foot.
- Litter must be collected from the abutting wetlands on a daily basis and by foot. All litter must be stored in suitable containers and disposed of at a licensed landfill site on at least a weekly basis.
- No vehicles may be refuelled within 30m of the mapped wetland edges, and any refuelling areas must be appropriately bunded.
- Site camps and areas for the storage of construction equipment and / or waste may not be located within 30m of the edge of any demarcated wetland.
- Construction that requires infilling of a wetland must take place from the terrestrial edge, and not from the wetland edge, to minimise unnecessary damage;
- At the end of construction, allowance must be made for landscaping the area of disturbed wetland abutting the construction area plus a 10m setback area.

## 5. CUMULATIVE IMPACTS

Cumulatively, the potential impact of the activities to be undertaken will be of a low significance and will be mitigated by providing wetland offset areas and short term rehabilitation of the disturbed areas and longer term monitoring and control of the growth of alien invasive plants.

## 6. CONCLUDING REMARKS

In terms of potential negative impacts on the terrestrial habitat found on the site and surrounds no significant remnants or individual species of indigenous fauna, avifauna and flora remains and therefore the proposed development is not expected to have any significant negative impacts on terrestrial habitat features of the site and surrounds.

In terms of potential negative impacts on the freshwater/aquatic habitats found on the site and surrounds it is clear that the route will definitely impact, on a permanent basis, on portions of wetlands found on the proposed development site and surrounds. The former impacts are not mitigable and this report has recommended offset mitigation to account for wetland loss. A no-development alternative is not considered a necessary or useful recommendation to avoid these impacts, taking into account the level of degradation and fragmentation of the affected wetlands, as well as the opportunity for offset mitigation to create a better quality of habitat than that lost.

Wetland 2 depression appears to have been specifically created to deal with the storm water that passes through the site. It is therefore recommended that this wetland be recreated as a wetland offset southeast of the proposed road. This proposed area to the southeast covers a portion of the original wetland identified in the 2017 City of Cape Town Biodiversity Network and the creating and rehabilitation of this area will be an important storm water attenuation/retention facility. This feature could also be improved on through the removal of invasive alien plants and a freshwater specialist input during the design and construction of the lost storm water detention facilities and thus considered as a trade-off for the loss of the previous two wetland areas.

Wetland 4 vegetation (restios) is more indicative of seasonally wet sandy soils and not necessarily being inundated. The area is severely fragmented by paths running through the centre of the wetland area, as well as invasive alien Port Jackson (*Acacia saligna)* willows and exotic grasses. This wetland area could thus be filled and developed on with a low significance impact.

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## APPENDIX A: ABBREVIATED CURRICULUM VITAE AND DECLARATION OF INDEPENDENCE OF FRESHWATER SPECIALIST

## BACKGROUND AND QUALIFICATIONS OF SPECIALIST CONSULTANT

Full Name: Nicolaas Hanekom
Year of Birth: 1967
Nationality: South African
Profession: Environmental Scientist and Environmental Assessment Practitioner
Years in Profession: Since 1989

This Freshwater Impact Assessment was conducted by Nicolaas Hanekom who has 26 years' experience working as an ecologist in the field of nature conservation. He has extensive field experience, knowledge of freshwater ecology, knows the region in which he is working and exercises sound and unbiased scientific and professional judgment. He has received training on the basics of freshwater ecosystems impact assessment during his career in nature conservation. He is a qualified Environmental Assessment Practitioner who holds a M. Tech, Nature Conservation from the Cape Peninsula University of Technology and a registered Professional Natural Scientist (Ecologist) with the South African Council for Natural Scientific Professions ("SACNASP").

Summary of Experience:

- Assistance Reserve Manage at Gariep Dam Nature Reserve (1993-1998)
- Reserve Manager, Conservation Services Manager for Western Cape Nature Conservation Board (1998-2001)
- Part time external Lecturer at Cape Peninsula University of Technology (2003-2005)
- Director: Environmental Management at Cape Lowlands Environmental Services (2006-2010)
- Environmental Impact Assessment Practitioner at Eco Impact (Pty) Ltd (2010 to date)
- Safety Health & Environmental System consulting

Mr Hanekom meets the legal requirements to act as a specialist on this project in terms of Regulation 13 of the Environmental Impact Assessment Regulations, 2014 that took effect on 8 December 2014, which regulates the general requirements for Environmental Assessment Practitioners ("EAP"s) and specialists. The regulation states that:

An EAP and a specialist, appointed in terms of regulation 12(1) or 12(2), must –

(1)(a) be independent;
(b) have expertise in conducting environmental impact assessments or undertaking specialist work as required, including knowledge of the Act, these Regulations and any guidelines that have relevance to the proposed activity;
(c) ensure compliance with these Regulations;
(d) perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the application;
(e) take into account, to the extent possible, the matters referred to in regulation 18 when preparing the application and any report, plan or document relating to the application; and
(f) disclose to the proponent or applicant, registered interested and affected parties and the competent authority all material information in the possession of the EAP and, where applicable, the specialist, that reasonably has or may have the potential of influencing-
(i) any decision to be taken with respect to the application by the competent authority in terms of these Regulations; or
(ii) the objectivity of any report, plan or document to be prepared by the EAP or specialist, in terms of these Regulations for submission to the competent authority; unless access to that information is protected by law, in which case it must be indicated that such protected information exists and is only provided to the competent authority.

(2) In the event where the EAP or specialist does not comply with sub regulation (1) (a), the proponent or applicant must, prior to conducting public participation as contemplated in chapter 5 of these Regulations, appoint another EAP or specialist to externally review all work undertaken by the EAP or specialist, at the applicant's cost.

**THE INDEPENDENT PERSON WHO COMPILED A SPECIALIST REPORT OR UNDERTOOK A SPECIALIST PROCESS**

I Nicolaas Willem Hanekom, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- have ensured that the names of all interested and affected parties that participated in terms of the specialist input/study were recorded in the register of interested and affected parties who participated in the public participation process;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of NEMA, the Environmental Impact Assessment Regulations, 2014.

Signature of the specialist

**Eco Impact Legal Consulting (Pty) Ltd**
Name of company

**22 September 2017**
Date