TERRESTRIAL BIODIVERSITY IMPACT ASSESSMENT

FOR

PROPOSED LOUWVILLE HOUSING ON ERVEN 7752 AND 1003 VREDENBURG

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PROJECT DETAILS

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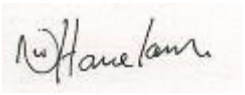
By Author	Director: Environmental Management; Principle EAP & Biodiversity Specialist	Nicolaas Hanekom		22 July 2019

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1. Introduction

Saldanha Bay Municipality proposes a housing development and associated infrastructure on erven 7752 and 1003 with a total development area of ±5.122 ha. The development proposes the following:

- ±154 residential erven (±120-160m^2);
- 3 open space erven (±1.1158ha) mainly along the southern border of the site which includes the concrete stormwater channel and its 1:100 year floodline area;
- Creche/church erf (±1989m^2);
- Road erf (±1.5539m^2); access roads to the development will be from Kootjieskloof street (250m from Maclon street) and Maclon street (127m from Kootjieskloof street); Proposed new roads situated in the 16m road reserves will be 5,0m wide, and new roads situated in the 10m road reserves will be 4,5m wide. The 5,0m wide roads will have kerbs installed on both sides, namely CK5 and MK10, while the 4,5m wide roads will have CK5 and edging (90mm).
- Internal Sewer main pipelines will be 160mm diameter uPVC Class 34, with a maximum capacity of 16 l/s; house connections will be 110mm diameter uPVC Pipes;
- Internal Water main pipelines will be 160mm/110mm diameter uPVC Class 12, with a maximum capacity of 17 l/s; house connections will be 25/20mm HDPe pipes;
- Internal underground stormwater pipelines will be 375mm/450mm diameter concrete pipes, with a maximum capacity of 150 l/s, the proposed stormwater system will drain to the existing stormwater concrete canal and connect to the existing canal at three points, the stormwater design will allow for the 1:2 and 1:50 year floods;
- Re-route 300mm diameter existing sewer main pipelines, with a maximum capacity of 100 l/s;
- All proposed infrastructure will connect to existing Municipal infrastructure;
- The 1:50 and 1:100 year floodline areas of the concrete stormwater channel running along the southern border of the site will be excluded as no-go/no-development area for the duration of the construction phase of the development unless activities relate to installation of service and road infrastructure or rehabilitation of disturbed area, and will eventually be fenced as a safety precaution with 2,4m high ClearVu fencing.

The consulting engineers (iX Engineers) provided Eco Impact with layout maps of the proposed housing development site and from these maps it was determined that an area of approximately 5.2ha had to be and was surveyed for this assessment on 4 October 2018.

The terrestrial biodiversity assessment was commissioned in order to help inform the development layout and environmental authorisation process for the proposed housing development as described above. The assessment is intended to provide baseline terrestrial biodiversity information that can be used to guide the planning and development process.

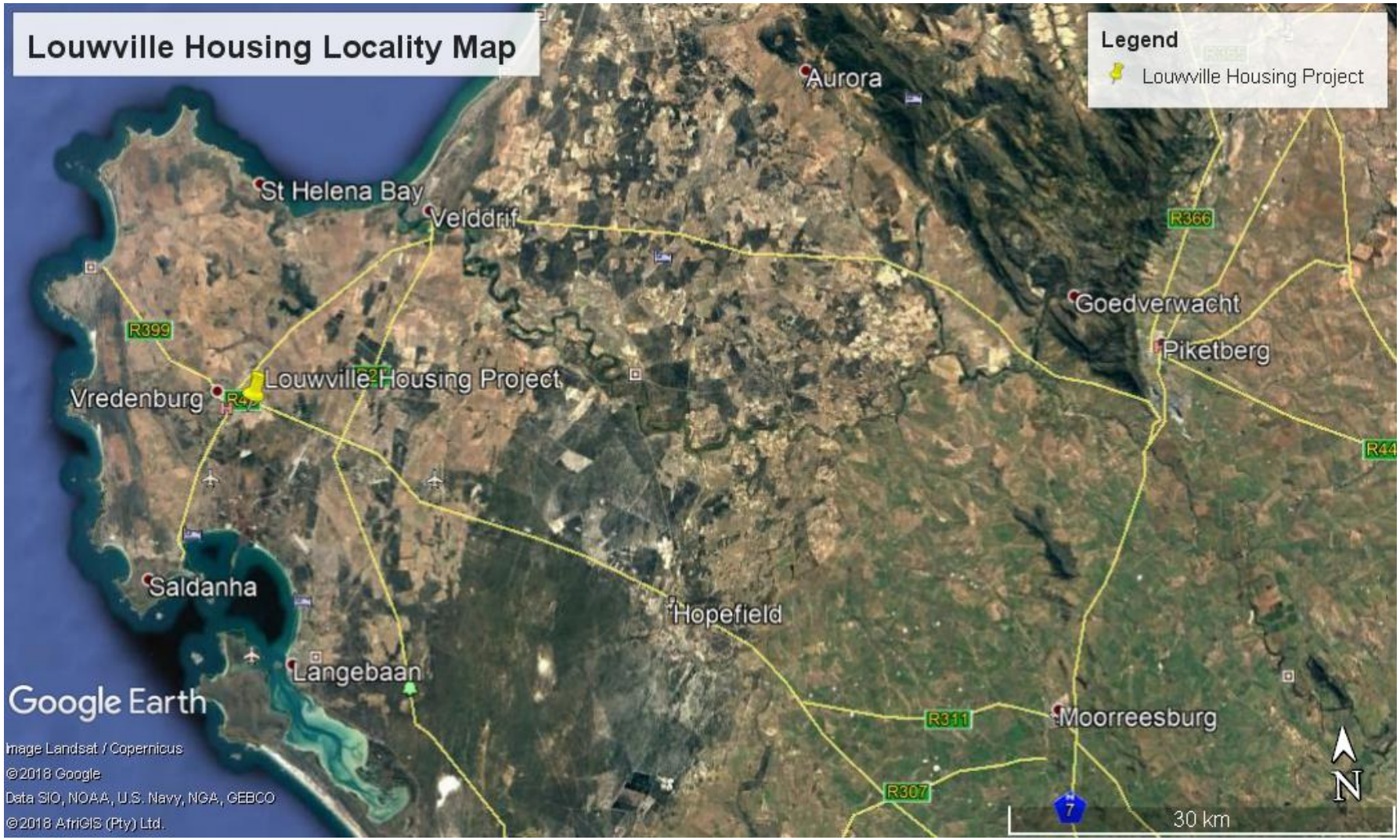

Figure 1.1: Proposed Louwville Housing locality map.

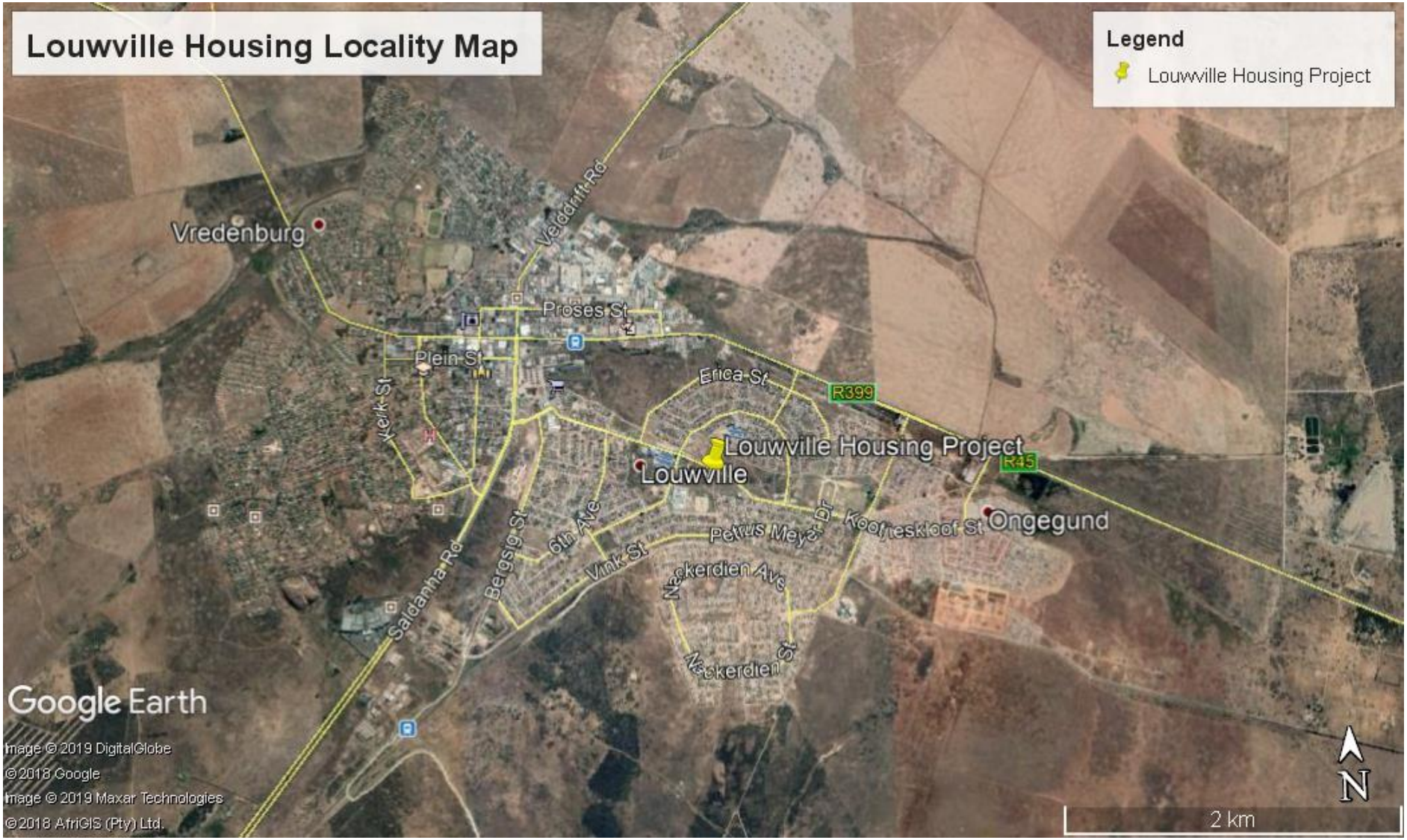

Figure 1.2 Proposed Louwville Housing locality map.

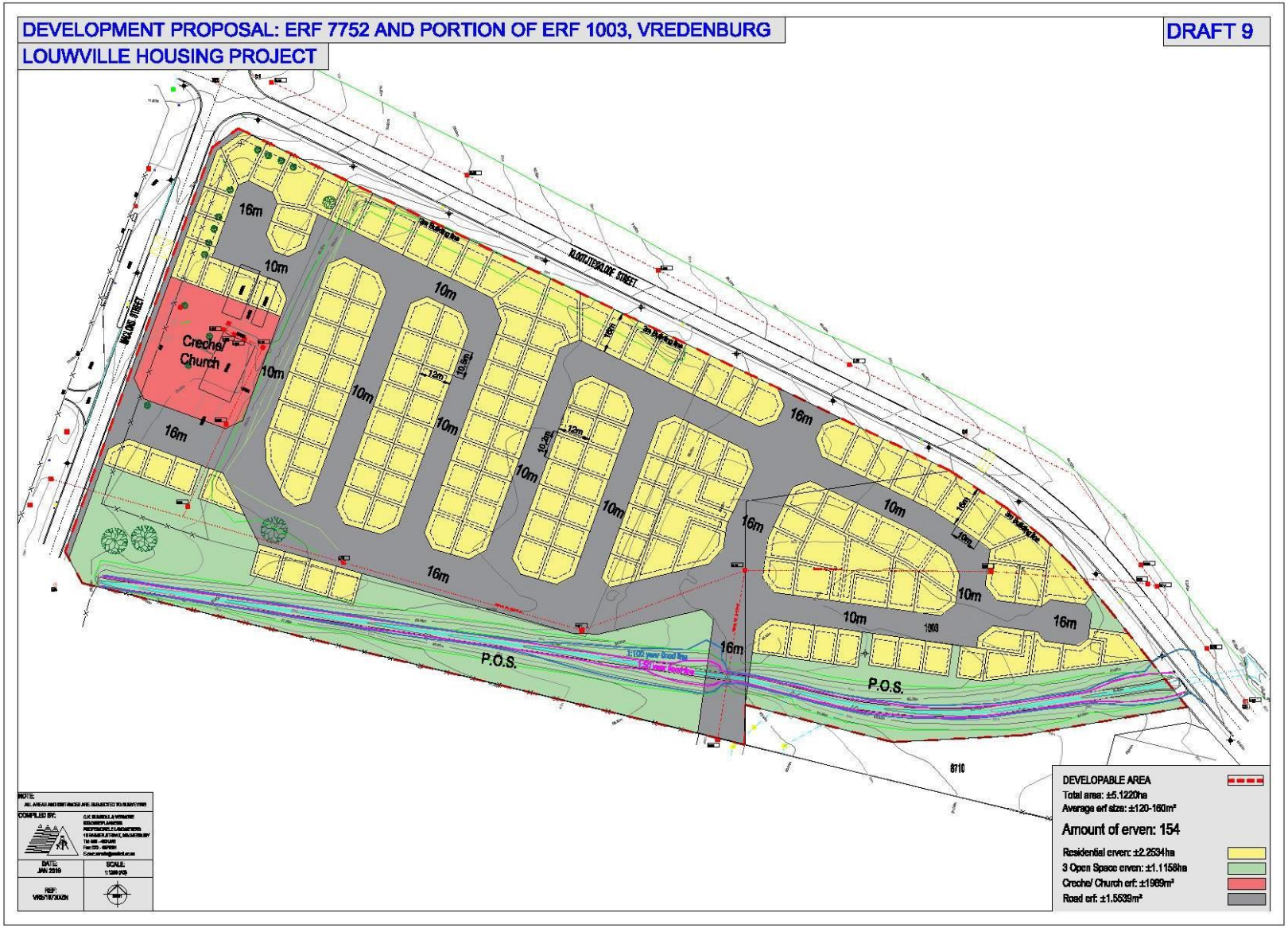

Figure 2: Proposed Louwville Housing Development Layout Map

2. Terms of Reference

The terms of Reference for this study were as follows:

- Undertake a site visit during the main flowering season to assess the vegetation in the study area.
- Provide a description of the vegetation and associated habitat in the study area and identify and locate any plant or fauna Species of Conservation Concern that are present, or likely to be present.
- Compile a botanical and habitat sensitivity map of the area, with accompanying explanation in the report. Refer to and take into account any CBA maps for the area.
- Identify likely terrestrial biodiversity impacts of the proposed development alternatives, and the No Go alternative, and assess their significance, using standard IA methodology.
- Provide recommendations for mitigation of any identified impacts, and for the construction and operational phases of the proposed project.
- Provide a professional opinion on whether the proposed development should be authorised, from a terrestrial biodiversity perspective.

3. Limitations, Assumptions and Methodology

The study area was visited on 4 October 2019. The site visit was therefore undertaken within what is normally considered the optimal peak spring flowering period in this primarily winter rainfall region and it was possible to identify main terrestrial indigenous vegetation species remaining on site. The overall confidence level in the accuracy of the botanical findings is high. Probably because the study area has not been burnt for several years and has been significantly disturbed due to urban development, there were very few annuals and no bulbs evident on site. The study area was walked and all fauna and flora were noted. Various photographs and plant specimens were taken.

Relevant references are noted in the text, and conclusions were drawn based on this documentation and professional experience in the area. Areas were measured using Google Earth Pro.

It is assumed that the study area is an accurate representation of the proposed development site (Refer to Figures 1.1 and 1.2) as provided by the engineers. For purposes of this assessment the No Go alternative is assumed to be a continuation of the status quo, which in this case is land occasionally used for recreational purposes as an informal sport field, existing creche and church erven and mainly vacant undeveloped land.

Although this study does not address wetland or freshwater issues at all, as this was not part of the terms of reference, it can be stated that no natural freshwater resources were observed on or within close proximity to the site that may potentially be impacted upon, only a man-made concrete stormwater channel is present along the southern border of the proposed development site, but as can be seen from the layout as proposed this has in any case been excluded from the proposed development area.

Conservation value and sensitivity of habitats are products of species diversity, plant community composition, rarity of habitat and vegetation type, degree and type of habitat degradation, rarity of species, ecological viability and connectivity, restorability, vulnerability to impacts, and reversibility of threats. Any areas with a good chance of supporting and maintaining viable populations of threatened or localised flora or fauna species are deemed to be of High sensitivity.

Medium sensitivity areas have been partly disturbed and typically support 10 - 30% of the original species diversity (prior to disturbance), may have limited numbers of a few plant Species of Conservation Concern, and have moderate rehabilitation potential.

Low sensitivity areas have been heavily disturbed, with changes to the soil structure and composition, and support less than 10% of the expected indigenous plant diversity, no plant Species of Conservation Concern, and rehabilitation potential is considered to be low, at least without substantial investments in time, materials and money.

Reference is made to the South African Vegetation Map (Mucina & Rutherford 2006 and 2012 updates), to the National Spatial Biodiversity Assessment (Rouget et al 2004), and to the National List of Threatened Ecosystems (DEA 2011). In addition, the Western Cape Biodiversity Spatial Plan (2017) was also referenced as well.

4. Description of the Study Area

4.1 Physical Characteristics of the Site and Surrounds

The propose development site of ±5.2ha is located within a medium dense developed urban setting. The housing project is proposed on erven 7752 and 1003, Louwville which is located on the corner of Maclon and Kootjieskloof Streets opposite the existing cemetery and Weston Secondary School within Louwville residential area. In terms of topography, the site is fairly flat lying with a slight slope down from the west towards the south-east. A portion of the development area has been used for informal recreational sports purposes, and there are existing creche and church erven and a number of established informal gravel vehicle and foot paths throughout the development site which serve as thoroughfare for the neighbouring residents. A concrete stormwater channel runs along the southern boundary of the development site.

The general geology of the area consists primarily of Tertiary Aged consolidated and unconsolidated limestone and lime rich sands (calcretes) overlain by sand and sandy soils. There are scattered outcrops of course grained porphyritic Vredenburg Granite (550-500 Ma) within the surrounding area, but these are not found within the site boundaries.

4.2 Vegetation at a Regional and National Context

The study area is part of the Fynbos biome, located within what is now known as the Core Region of the Greater Cape Floristic Region (GCFR; Manning & Goldblatt 2012). The GCFR is one of only six Floristic Regions in the world, and is the only one largely confined to a single country (the Succulent Karoo component extends into southern

Namibia). It is also by far the smallest floristic region, occupying only 0.2% of the world's land surface, and supporting about 11500 plant species, over half of all the plant species in South Africa (on 12% of the land area). At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Many of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the nationwide plant Red Listing project indicate that 67% of the threatened plant species in the country occur only in the southwestern Cape, and these total over 1800 species (Raimondo *et al* 2009)! It should thus be clear that the southwestern Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The study area lies within the West Strandveld bioregion (Mucina & Rutherford 2010). It is characterised by relatively high winter rainfall, low altitude and poor, sandy soils, with large urban area and high levels of alien invasive vegetation. Due to this combination of factors the loss of natural vegetation in this bioregion has been severe (>60 of original extent lost within the region), and the bioregion has a fairly high number of threatened plant species (Raimando et al 2009).

The proposed development site is mapped as being within an area supporting Saldanha Granite Strandveld. According to a recent analysis by CapeNature's conservation planner only 27.3% of this vegetation type is remaining. Therefore, Saldanha Granite Strandveld qualifies as an Endangered ecosystem and has very little formal protection. Approximately 2ha of the south and south-eastern section of the site has been mapped as terrestrial CBA. ESA and ESA2, this is due to the botanical sensitivity of the indigenous vegetation originally occurring within this area but also due to the importance of the concrete stormwater channel maintaining its hydrological connectivity and functioning.

See study area maps below and site photographs in report.

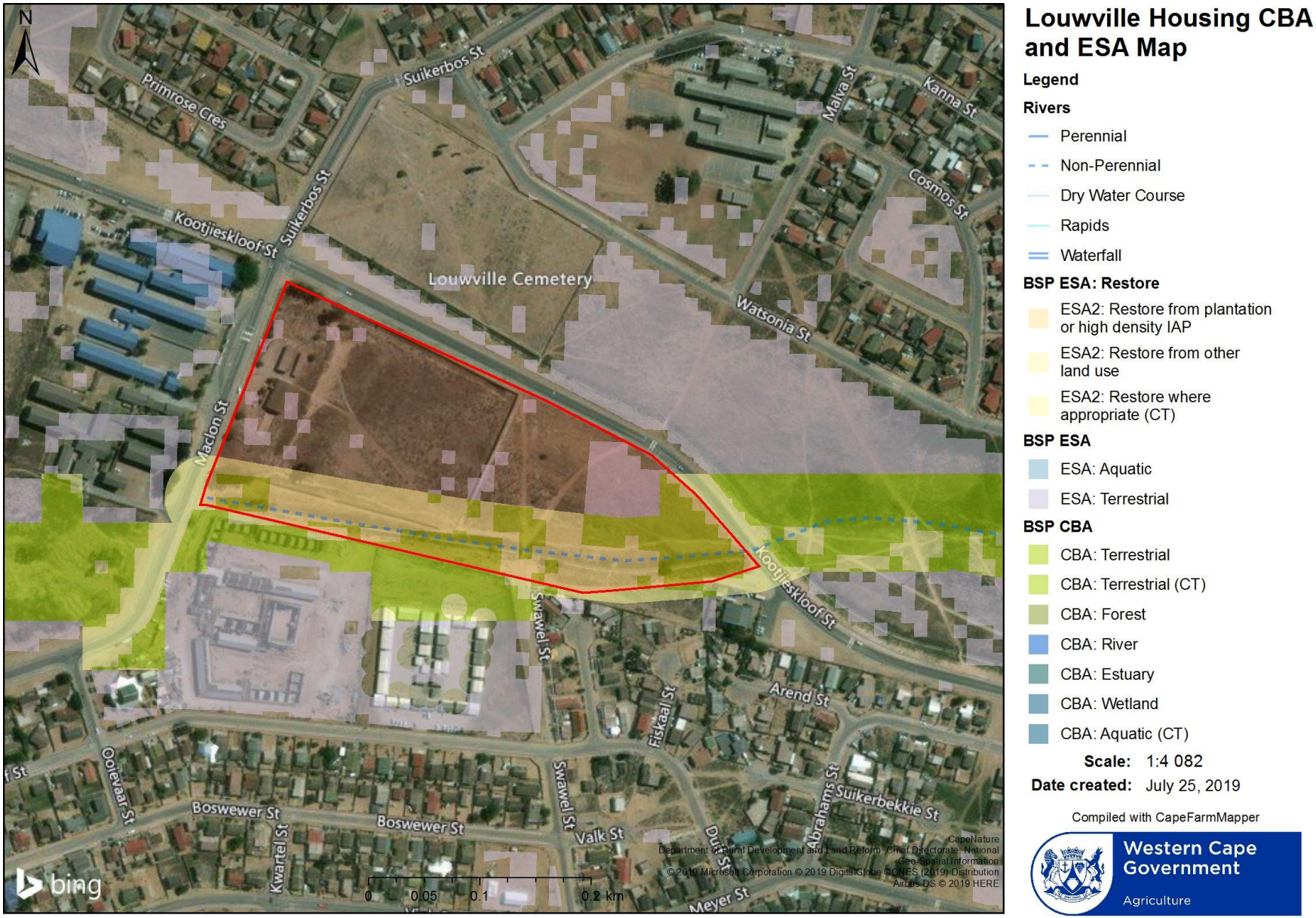

Figure 2: Extract of the Western Cape Biodiversity Spatial Planning map (2017), indicating proposed development area assessed and mapped CBAs and ESAs.

4.3 The Vegetation and Habitat on Site

The National Vegetation Map of South Africa (2012) identifies the remnants of natural vegetation occurring on the site and surrounds as Saldanha Granite Strandveld (*Endangered*) as part of the Fynbos biome.

Vegetation Type : Saldanha Granite Strandveld (FS 2)
Reference number: FS 2
Ecosystem threat status: Endangered (EN)
Listed under criterion: A1
Biome: Fynbos
Province: Western Cape
Municipalities:
Saldanha Bay LM
WCDMA01
Original area of ecosystem: 23 000 ha
Remaining natural area of ecosystem (%): 37%
Proportion of ecosystem protected: 10% of original area
***Known* of species of special concern:** 45 Red Data plant species (EX, EW, CR, EN & VU excl VU D2) and 15 endemic plant species

Geographical location:
On the West Coast, granite domes from Vredenburg to St Helena Bay and many points along the coast including Paternoster and Saldanha's North Head; also around Langebaan town and at Postberg on the Langebaan Peninsula.

Description:
Rounded forms of granite sheets and smooth forms at their feet dominate the landscapes of this ecosystem. Low to medium shrubland, containing some succulent elements, alternates with grassy and herb-rich spots supporting a rich geophyte flora. At least 15 endemic plant species and 45 Red Data List plant species occur in the ecosystem.

Notes:
Approximately 10% of the ecosystem is protected in the West Coast National Park, SAS Saldanha and Columbine Nature Reserves, and a small portion is found in private reserves such as West Point, Groot Paternoster and Swartriet.

Observations and Findings:
Essentially the whole study site can be considered transformed and significantly degraded due to previous and ongoing urban development and associated human activities.

The western half of the site was previously cleared for development of the creche and church erven as well as informal sport fields and is mainly covered with returning grass and weed species. Due to the significantly low plant diversity and limited indigenous vegetation species recorded on the eastern half of the site it is expected that this area was also previously cleared potentially for intended development. The only significant returning indigenous vegetation species recorded to occur in abundance on the site was *Oncosiphon suffruticosum* (Stinkkruid), which is also an indication of significantly

disturbed veld.

No species of conservation concern were recorded on the site and none is expected to occur in viable population numbers on the site or immediate surrounds given the previous disturbance and the current state of the area concerned. The whole site is dominated by weeds, grasses and annual herbaceous species i.e. Stinkkruid with various informal foot- and vehicle paths.

The site has no remaining natural vegetation in good condition (i.e. no viable populations of threatened or localised plant species). All ecological processes on the site have been significantly impacted by soil disturbance (excavations, site clearance, urban development etc.), inappropriate fire regimes, loss of pollinators and seed dispersers, alien-, weed- and garden plant invasion, habitat fragmentation due to urban development and the creation of the concrete storm water drainage line along the southern border. The heavily disturbed and isolated site also present a very difficult conservation and/or rehabilitation challenge, and formal conservation or rehabilitation of the site is therefore highly unlikely and not feasible.

It is expected that less than 2ha of indigenous vegetation species (mainly consisting of grass and herbaceous species associated with disturbed veld) will be cleared during the proposed development)

No indigenous fauna or avifauna species were recorded during the survey and due to the location of the site within an active urban setting as well as the significant transformed state of the natural habitat on site it is not expected that any indigenous fauna or avifauna of conservation concern inhabits this site and may only occasionally visit the site for short periods of time.

Refer to site photos below as was taken during the site survey:

Photo 1: Informal sport field area south of Klootjieskloof Street

Photo 2: Informal sport field area facing west towards the creche and church erven (standing in the western half of the site).

Photo 3: Informal sport field area facing west towards the creche and church erven (standing approximately in the middle of the site).

Photo 3: Eastern half of the site facing east (standing approximately in the middle of the site).

Photo 4: Eastern half of the site facing east south.

Photo 5: Concrete stormwater channel along southern border.

Photo 6: Concrete stormwater channel along southern border.

4.4 Terrestrial Biodiversity Sensitivity

As can be seen from Figure 2 in the report approximately 2ha of the south and south-eastern sections of the site is mapped as terrestrial Critical Biodiversity Area, Ecological Support Areas and Ecological Support Area 2 (Restore).

CBA Terrestrial - Areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure.
Objective - Maintain in a natural or near-natural state, with no further loss of natural habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land uses are appropriate.
Observations and Findings on Site – There are no natural habitat nor flora or fauna species of conservation concern remaining on site, only a concrete storm water channel along the southern border of the site. The stormwater channel and its associated 1:100-year floodline area has been excluded from the proposed development area therefore hydrological functioning of the channel will continue as is.

ESA Terrestrial - Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.
Objective - Maintain in a functional, near-natural state. Some habitat loss is acceptable, provided the underlying biodiversity objectives and ecological functioning are not compromised.
Observations and Findings on Site – There are no natural habitat nor flora or fauna

species of conservation concern remaining on site, only a concrete storm water channel along the southern border of the site. The stormwater channel and its associated 1:100-year floodline area has been excluded from the proposed development area therefore hydrological functioning of the channel will continue as is.

ESA 2 Restore from other land use - Areas that are not essential for meeting biodiversity targets, but that play an important role in supporting the functioning of PAs or CBAs, and are often vital for delivering ecosystem services.
Objective - Restore and/or manage to minimize impact on ecological processes and ecological infrastructure functioning, especially soil and water-related services, and to allow for faunal movement.
Observations and Findings on Site – There are no natural habitat nor flora or fauna species of conservation concern remaining on site, only a concrete storm water channel along the southern border of the site. The stormwater channel and its associated 1:100-year floodline area has been excluded from the proposed development area therefore hydrological functioning of the channel will continue as is.

The **site is considered to be of low terrestrial botanical/biodiversity sensitivity** and conservation value (see Figure 3 below) due to the following reasons:

- Significantly low indigenous plant species diversity remaining on site.
- No plant, fauna or avifauna species of conservation concern recorded on site.
- Previous site clearance and developments leading to habitat transformation and fragmentation.
- Ongoing human impacts due to the urban surroundings and developments i.e. school grounds, residential areas, cemetery, informal sport fields, church and creche erven.
- Low terrestrial ecological connectivity opportunities due to isolation of site inside urban developed area.
- Low conservation and/or rehabilitation potential due to transformed state, the location within the urban area, low ecological connectivity value and small size of the site.

It is however important to note that the hydrological functioning of the stormwater channel along the southern border is to be maintained due to the supporting role which it plays in replenishing water resources which in turn maintains ecological functioning of remaining undeveloped areas surrounding Louwville, therefore this area has been mapped as important to maintain current hydrological functioning. The concrete stormwater channel and its associated 1:100 year floodline area which includes most of the mapped CBA, ESA and ESA2 areas on site have been excluded from the proposed development area (accept for required services infrastructure i.e. the access road which will be along existing access road over the channel) to be maintained as Public Open Space and therefore hydrological functioning of the stormwater channel will be maintained.

Figure 3: Terrestrial biodiversity sensitivity map of the proposed Louwville housing development site.

5. Identification and Assessment of Potential Terrestrial Biodiversity Impacts

The biodiversity impacts will be both direct and indirect, although the latter (habitat fragmentation, loss of ecological connectivity) will be less significant for this project than the direct impacts. Construction phase impacts will be both permanent and long term.

In the case of this project the primary construction phase impact is loss of indigenous terrestrial vegetation species in a significantly transformed habitat within the development footprint. All development located within the proposed development footprint area will result in the permanent loss of that vegetation. It is assumed that the disturbance will be restricted to the footprint areas shown in Figure 2, and that is what is assessed here.

(See Appendix B attached for Impact Assessment Methodology used)

Construction Phase Terrestrial Biodiversity Impacts:

Nature of potential impact: Loss of and impacts on low sensitivity terrestrial indigenous vegetation
Discussion: The habitat loss is deemed to be permanent (>15 years). The original vegetation type occurring within the area is Saldanha Granite Strandveld listed as Endangered. However the site has no remaining natural vegetation in good condition (i.e. no viable populations of threatened or localised plant species). All ecological processes on the site have been significantly impacted by soil disturbance (excavations, site clearance, urban development etc.), inappropriate fire regimes, loss of pollinators and seed dispersers, alien-, weed- and garden plant invasion, habitat fragmentation due to urban development and the creation of the concrete storm water drainage line along the southern border. The heavily disturbed and isolated site also present a very difficult conservation and/or rehabilitation challenge, and formal conservation or rehabilitation of the site is therefore highly unlikely and not feasible. No loss of high sensitivity habitat or plant species of conservation concern will take place as a result of this proposed development; however habitat will be lost and therefore a medium impact on processes is expected to occur.
Cumulative impacts: Habitat fragmentation and loss of ecological connectivity.
Mitigation: • The southern concrete stormwater channel and its associated 1:100 year floodline area are to be demarcated as a “no-go” area for the duration of the construction phase of the development unless activities relate to installation of service and road infrastructure or rehabilitation of disturbed area. • No construction related disturbance should be allowed outside of the proposed development areas. This includes no dumping of fill, no roads, and all forms of temporary disturbance. • Implement site specific erosion and storm water runoff management measures to

prevent (or if prevention is not possible limit) any erosion from occurring on the development footprint area and surrounds.

Criteria	Without Mitigation	With Mitigation
Extent	2	1
Duration	5	5
Magnitude	4	4
Probability	5	5
Significance	55 - Medium	50 - Medium
Status	Medium Negative Significance without Mitigation	Medium Negative Significance with Mitigation
Reversibility	100% Reversible	100% Reversible
Irreplaceable loss of resources	2-Partial loss of resource will occur	2-Partial loss of resource will occur
Degree to which impact can be mitigated	2 – Cannot be completely mitigated	

Nature of potential impact:
Impact on terrestrial fauna and avifauna occurring on the site and surrounds

Discussion:
No loss of high sensitivity habitat or fauna or avifauna Species of Conservation Concern will take place as a result of this proposed development.

Cumulative impacts:
Habitat fragmentation and loss of ecological connectivity.

Loss of; and impacts on Low Sensitivity terrestrial fauna and avifauna habitat.

Which in turn will lead to potential displacement of fauna and avifauna species inhabiting/visiting the site.

No indigenous fauna or avifauna species were recorded during the survey and due to the location of the site within an active urban setting as well as the significant transformed state of the natural habitat on site it is not expected that any indigenous fauna or avifauna of conservation concern inhabits this site and may only occasionally visit the site for short periods of time.

Mitigation:
- The southern concrete stormwater channel and its associated 1:100 year floodline area are to be demarcated as a “no-go” area for the duration of the construction phase of the development unless activities relate to installation of service and road infrastructure or rehabilitation of disturbed area.
- No construction related disturbance should be allowed outside of the proposed development areas. This includes no dumping of fill, no roads, and all forms of

temporary disturbance.

- Implement site specific erosion and storm water runoff management measures to prevent (or if prevention is not possible limit) any erosion from occurring on the development footprint area and surrounds.

Criteria	Without Mitigation	With Mitigation
Extent	2	1
Duration	5	5
Magnitude	4	2
Probability	5	5
Significance	55 - Medium	40 – Low
Status	Medium Negative Significance without Mitigation	Low Negative Significance with Mitigation
Reversibility	100% Reversible	100% Reversible
Irreplaceable loss of resources	2-Partial loss of resource will occur	2-Partial loss of resource will occur
Degree to which impact can be mitigated	2 – Cannot be completely mitigated	

Nature of potential impact:
Impact on terrestrial Critical Biodiversity Areas and Ecological Support Areas

Discussion:
As can be seen from Figure 2 in the report approximately 2ha of the south and south-eastern sections of the site is mapped as terrestrial Critical Biodiversity Area, Ecological Support Areas and Ecological Support Area 2 (Restore).

There are no natural habitat nor flora or fauna species of conservation concern remaining on site, only a concrete storm water channel along the southern border of the site.

The hydrological functioning of the stormwater channel along the southern border is to be maintained due to the supporting role which it plays in replenishing water resources which in turn maintains ecological functioning of remaining undeveloped areas surrounding Louwville, therefore this area has been mapped as important to maintain current hydrological functioning. The concrete stormwater channel and its associated 1:100 year floodline area which includes most of the mapped CBA, ESA and ESA2 areas on site have been excluded from the proposed development area (accept for required services infrastructure i.e. the access road which will be along existing access road over the channel) to be maintained as Public Open Space and therefore hydrological functioning of the stormwater channel will be maintained

Cumulative impacts:
Habitat fragmentation and loss of ecological connectivity associated with mapped CBAs

and ESAs.

Mitigation:

- The southern concrete stormwater channel and its associated 1:100 year floodline area are to be demarcated as a “no-go” area for the duration of the construction phase of the development unless activities relate to installation of service and road infrastructure or rehabilitation of disturbed area.
- No construction related disturbance should be allowed outside of the proposed development areas. This includes no dumping of fill, no roads, and all forms of temporary disturbance.
- Implement site specific erosion and storm water runoff management measures to prevent (or if prevention is not possible limit) any erosion from occurring on the development footprint area and surrounds.

Criteria	**Without Mitigation**	**With Mitigation**
Extent	2	1
Duration	5	5
Magnitude	4	2
Probability	5	5
Significance	55 - Medium	40 – Low
Status	Medium Negative Significance without Mitigation	Low Negative Significance with Mitigation
Reversibility	100% Reversible	100% Reversible
Irreplaceable loss of resources	2-Partial loss of resource will occur	2-Partial loss of resource will occur
Degree to which impact can be mitigated	2 – Cannot be completely mitigated	

<u>Operational Phase Terrestrial Biodiversity Impacts:</u>

Nature of potential impact:
Potential erosion of the site and surrounds due to stormwater flow or flooding

Discussion:
Soil erosion which can occur due to overland storm water flow and flooding should heavy rains fall.

Cumulative impacts:
Exposing soil may lead to erosion of site and surrounds if not mitigated.

Mitigation:

- Disturbed and open space areas must be rehabilitated and planted with indigenous vegetation to promote rehabilitation.
- If erosion is detected implement erosion rectification and preventions measures as guided by an ECO
- Frequent (three monthly and/or after heavy rains) litter and debris removal from the

stormwater channels must be conducted to prevent potential flooding, erosion and improve water quality.

Criteria	Without Mitigation	With Mitigation
Extent	3	1
Duration	5	1
Magnitude	6	2
Probability	4	2
Significance	56 - Medium	8 - Low
Status	Medium Negative	Low Negative (Acceptable)
Reversibility	100%	100%
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	1 – Resource will not be lost
Degree to which impact can be mitigated	1 – Can be completely mitigated	

Nature of potential impact:
Impact on terrestrial Critical Biodiversity Areas and Ecological Support Areas

Discussion:
The hydrological functioning of the stormwater channel along the southern border is to be maintained due to the supporting role which it plays in replenishing water resources which in turn maintains ecological functioning of remaining undeveloped areas surrounding Louwville.

Cumulative impacts:
Habitat fragmentation and loss of ecological connectivity associated with mapped CBAs and ESAs.

Mitigation:

- Disturbed and open space areas must be rehabilitated and planted with indigenous vegetation to promote rehabilitation.
- If erosion is detected implement erosion rectification and preventions measures as guided by an ECO
- Frequent (three monthly and/or after heavy rains) litter and debris removal from the stormwater channels must be conducted to prevent potential flooding, erosion and improve water quality.

Criteria	Without Mitigation	With Mitigation
Extent	3	1
Duration	5	1
Magnitude	6	2
Probability	4	2
Significance	56 - Medium	8 - Low
Status	Medium Negative	Low Negative

		(Acceptable)
Reversibility	100%	100%
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	1 – Resource will not be lost
Degree to which impact can be mitigated	1 – Can be completely mitigated	

Decommissioning/Rehabilitation Phase:

Nature of potential impact: Potential erosion of the site and surrounds during rehabilitation phase
Discussion: Decommissioning (i.e. demolishing developed structures) could lead to soil erosion which can occur due to wind (wind erosion cause dust pollution); and due to overland storm water flow should heavy rains fall.
Cumulative impacts: Exposing soil may lead to erosion of site and surrounds if not mitigated.
Mitigation: • Decommissioned areas must be rehabilitated and planted with indigenous vegetation immediately after built structures have been removed. • Engineered contour structures reinstated and maintained. • Monitor rehabilitation of area on a 6 monthly basis until effective/successful rehabilitation has been obtained. • If erosion is detected implement erosion rectification and preventions measures as guided by an ECO

Criteria		
	Without Mitigation	**With Mitigation**
Extent	3	1
Duration	5	1
Magnitude	6	2
Probability	4	2
Significance	56 - Medium	8 - Low
Status	Medium Negative	Low Negative (Acceptable)
Reversibility	100%	100%
Irreplaceable loss of resources	2-Partial loss of resources but can be rehabilitated	1 – Resource will not be lost
Degree to which impact can be mitigated	1 – Can be completely mitigated	

No-Go Alternative

The status quo would appear to be ongoing active loss of habitat due to ongoing human activities associated within the urban setting of the site.

Given this variability it is thus difficult to generalise about the No Go impact, and to infer likely future impacts. On balance, assuming continuation of the status quo, it is likely that the No Go alternative will have a Neutral to Medium negative botanical impact.

6. Concluding Remarks and Recommendations

The vegetation and ecology within the study area has been heavily disturbed for a long time, and no significant patches of intact natural vegetation remain within the site or immediate surrounds. Terrestrial botanical diversity is very low to non existent.

Essentially the whole study site can be considered transformed and significantly degraded due to previous and ongoing urban development and associated human activities.

The original vegetation type occurring within the area is Saldanha Granite Strandveld listed as Endangered. However the site has no remaining natural vegetation in good condition (i.e. no viable populations of threatened or localised plant species). All ecological processes on the site have been significantly impacted by soil disturbance (excavations, site clearance, urban development etc.), inappropriate fire regimes, loss of pollinators and seed dispersers, alien-, weed- and garden plant invasion, habitat fragmentation due to urban development and the creation of the concrete storm water drainage line along the southern border. The heavily disturbed and isolated site also present a very difficult conservation and/or rehabilitation challenge, and formal conservation or rehabilitation of the site is therefore highly unlikely and not feasible.

It is expected that less than 2ha of indigenous vegetation species (mainly consisting of grass and herbaceous species associated with disturbed veld) will be cleared during the proposed development)

No indigenous fauna or avifauna species were recorded during the survey and due to the location of the site within an active urban setting as well as the significant transformed state of the natural habitat on site it is not expected that any indigenous fauna or avifauna of conservation concern inhabits this site and may only occasionally visit the site for short periods of time.

No specific botanical mitigation is required for this project, other than demarcating and restricting the proposed development from impacting negatively on the hydrological functioning of southern stormwater channel.

As can be seen from Figure 2 in the report approximately 2ha of the south and south-eastern sections of the site is mapped as terrestrial Critical Biodiversity Area, Ecological Support Areas and Ecological Support Area 2 (Restore).

There are no natural habitat nor flora or fauna species of conservation concern remaining on site, only a concrete storm water channel along the southern border of the site.

The hydrological functioning of the stormwater channel along the southern border is to be maintained due to the supporting role which it plays in replenishing water resources which in turn maintains ecological functioning of remaining undeveloped areas surrounding Louwville, therefore this area has been mapped as important to maintain current hydrological functioning. The concrete stormwater channel and its associated 1:100 year floodline area which includes most of the mapped CBA, ESA and ESA2 areas on site have been excluded from the proposed development area (accept for required services infrastructure i.e. the access road which will be along existing access road over the channel) to be maintained as Public Open Space and therefore hydrological functioning of the stormwater channel will be maintained.

Although development of the Low terrestrial botanical sensitivity area previous mapped as Endangered Saldanha Granite Strandveld has been rated as having a potential Medium negative significance at a regional scale if other factors such as ongoing human disturbances and urban development, alien plant encroachment, low ecological connectivity etc. are taken into consideration it is believed that the entire proposed development will have a Low negative significance on the terrestrial biodiversity features of the site and surrounds. If is therefore concluded that the proposed development could therefore be authorised without causing significant negative terrestrial biodiversity impacts.

Summary of recommendations as listed in the report and additional general impact mitigation measures to be implemented:

Planning considerations and constraints-

- The construction and final development footprints should be demarcated and all proposed activities should be restricted to the proposed development area and outside of any no-go areas identifeed.

Construction, Operational and Rehabilitation phases -

- The project implementation process should be subject to standard Environmental Management Programme (EMP) prescripts and conditions and only proceed under supervision of a competent and diligent Environmental Control Officer, both during the construction, operational and decommission/rehabilitation phases.
- Undertake development activities only in identified and specifically demarcated areas as proposed.
- The southern concrete stormwater channel and its associated 1:100 year floodline area are to be demarcated as a “no-go” area for the duration of the construction phase of the development unless activities relate to installation of service and road infrastructure or rehabilitation of disturbed area.

- No construction related disturbance should be allowed outside of the proposed development areas. This includes no dumping of fill, no roads, and all forms of temporary disturbance.
- Demarcate no-go areas before any land clearing occurs under the supervision of an ECO. Demarcation must be clearly visible and effective and no-go area must remain demarcated throughout construction phase.
- Personnel should be restricted to the construction camp site and immediate construction areas only.
- Remove and conserve topsoil layer and overburden material for rehabilitation after construction activities have ceased
- Implement site specific erosion and storm water runoff management measures as according to EMP requirements to prevent (or if prevention is not possible limit) any erosion from occurring on the development footprint area and surrounds.
- Proper waste bins to be provided during construction and operation and all waste to be regularly (at least once a week) removed to municipal landfill site.
- If any fuel or hazardous materials is spilled on site it must be treated as according to EMP requirements.
- The cement mixing area must be at least 32m away from the edge of the stormwater channel and is only to take place within demarcated cement mixing area that is impermeable and has a berm so that no cement mix runoff water escapes from cement mixing area.
- The landowner/s must adhere to his/her legal obligations to actively eradicate and manage alien vegetation infestations present on the applicable and surrounding properties.
- Monitor soil erosion on a regular basis and rehabilitate impacted areas as soon as possible under supervision of appointed ECO.
- Storm water discharge flow must be managed and restricted in such a manner that it does not cause erosion or flooding.
- Frequent (three monthly and/or after heavy rains) litter and debris removal from the stormwater channels must be conducted to prevent potential flooding, erosion and improve water quality.
- Only use topsoil as derived and conserved from the proposed development areas to be rehabilitated after development activities have ceased on the property.
- Only use vegetation indigenous to the area to rehabilitate impacted/decommissioned areas and implement ongoing monitoring of the rehabilitated areas until successful rehabilitation has taken place.
- After topsoil has been replaced ongoing monitoring and removal of alien vegetation regrowth must be conducted to ensure effective rehabilitation of indigenous vegetation.
- Decommissioned areas must be rehabilitated and planted with indigenous vegetation immediately after built structures have been removed.
- Engineered contour structures reinstated and maintained.
- Monitor rehabilitation of areas impacted outside of the proposed development areas or decommissioned areas on a 6 monthly basis until effective/successful rehabilitation has been obtained.
- If erosion is detected during or after rehabilitation implement erosion rectification

and preventions measures as guided by an ECO

Eco Impact is of the opinion, and based on the survey and desk study done, that the proposed development activities; if designed and implemented according to the recommendations as provided in this report, will not have an unacceptable significantly negative impact on the environmental aspects of the site and surrounds as assessed in this report.

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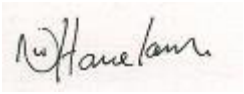
APPENDIX A: Declaration of Independence

THE INDEPENDENT PERSON WHO COMPILED OR REVIEWED 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 terms of regulation 71 of GN No. R. 543.

Eco Impact is independent and does not have an interest in the business nor receive any payment other than fair remuneration for services rendered as required in terms of regulations.



Pri.Sci.Nat (Ecological Science) 400274/11

Signature of the specialist:
Name of company: Eco Impact legal Consulting (Pty) Ltd
Date: 25 July 2019

Abbreviated CV:

Nicolaas Hanekom has 26 years' experience working as an ecologist for nature conservation organizations. He has extensive field experience and botanical knowledge, some knowledge of wetlands ecology, is knowledgeable of the region in which they are working and exercises sound and unbiased scientific and professional judgment. He is a qualified Environmental Assessment Practitioner and a registered Professional Natural Scientist (Ecologist) with the SACNASP who holds a M. Tech, Nature Conservation from the Cape Peninsula University of Technology. This master's thesis focussed on the impact of different land uses on the Phytodiversity ("Botany/ plants") of the West Coast Strandveld in and around Rocherpan Nature Reserve.

Hanekom further qualified in Environmental Management Systems ISO 14001:2004, at the Centre for Environmental Management, North-West University, as well as Environmental Management Systems ISO 14001:2004 Audit: Internal Auditors Course to ISO 19011:2011 level, from the Centre for Environmental Management, North-West University qualifying him to audit to ISO/SANS environmental compliance and EMS standards.

He has also completed the suite of Greener Governance courses with certificates in:

- An Overview of Environmental Management at the Local Government Level, Centre for Environmental Management, North-West University;
- Greener Governance for Local Authorities, Centre for Environmental Management, North-West University;
- Tools for Integrated Environmental Management and Governance, Centre for Environmental Management, North-West University.

Hanekom attended and obtained a certificate on Integrated Protected Area Planning at the Centre for Environmental Development, University of KwaZulu Natal and a certificate in Project Management (Theory and Practical), through CS Holdings. He has lectured in two subjects at the Cape Peninsula University of Technology. He has 14 years of environmental planning experience, working for Free State and Western Cape departments of environmental affairs, where he reviewed and commented on development (EIA) applications in the West Coast region.

Hanekom has been responsible for many environmental impact assessments and several EIA applications, waste license and atmospheric emission license applications as well as being involved in the implementation of several environmental management systems.

APPENDIX B: Impact Assessment Methodology

Below is the assessment methodology utilized in determining the significance of the potential mining impacts on the biophysical environment, and where applicable the possible alternatives. The methodology is broadly consistent with that described in the Department of Environmental Affairs' Guideline Document on the EIA Regulations (1998) and as provided by the Shangoni Management Services.

For each potential impact, the significance is determined by specified factors as in Table 1. Significance is described prior to mitigation as well as with the most effective mitigation measure(s) in place.

The mitigation described in the document represents the full range of plausible and pragmatic measures that must be implemented.

Despite the attempts at providing a completely objective and impartial assessment of the environmental implications of proposed activities, the specialist can never completely escape the subjectivity inherent in attempting to define significance.

Recognising this, potential subjectivity in the current process is addressed as follows:

- Be clear about the difficulty of being completely objective in the determination of significance;
- Develop an explicit methodology for assigning significance to impacts and outlining this methodology in detail. Having an explicit methodology not only forces the assessor to come to terms with the various facets contributing toward determination of significance, thereby avoiding arbitrary assignment, but also provides the reader of the report with a clear summary of how the assessor derived the assigned significance; and
- Wherever possible, differentiating between the likely significance of potential environmental impacts as experienced by the various affected parties.

Although these measures may not totally eliminate subjectivity, they do provide an explicit context within which to review the assessment of impacts.

Table 1: Assessment criteria for the evaluation of impacts

Criteria	**Description**		
Nature	a description of what causes the effect, what will be affected, and how it will be affected.		
	Type	**Score**	**Description**
Extent (E)	None (No)	1	Footprint
	Site (S)	2	On site or within 100 m of the site
	Local (L)	3	Within a 20 km radius of the centre of the site
	Regional (R)	4	Beyond a 20 km radius of the site
	National (Na)	5	Crossing provincial boundaries or on a national / land wide scale
Duration (D)	Short term (S)	1	0 – 1 years
	Short to medium (S-M)	2	2 – 5 years
	Medium term (M)	3	5 – 15 years
	Long term (L)	4	> 15 years
	Permanent(P)	5	Will not cease

Criteria	Description		
Magnitude (M)	Small (S)	0	will have no effect on the environment
	Minor (Mi)	2	will not result in an impact on processes
	Low (L)	4	will cause a slight impact on processes
	Moderate (Mo)	6	processes continuing but in a modified way
	High (H)	8	processes are altered to the extent that they temporarily cease
	Very high (VH)	10	results in complete destruction of patterns and permanent cessation of processes.
Probability (P) the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned	Very improbable (VP)	1	probably will not happen
	Improbable (I)	2	some possibility, but low likelihood
	Probable (P)	3	distinct possibility
	Highly probable (HP)	4	most likely
	Definite (D)	5	impact will occur regardless of any prevention measures
Significance (S)	Determined through a synthesis of the characteristics described above: **S = (E+D+M) x P** Significance can be assessed as low, medium or high		
Low: < 30 points:	The impact would not have a direct influence on the decision to develop in the area		
Medium: 30 – 60 points:	The impact could influence the decision to develop in the area unless it is effectively mitigated		
High: < 60 points:	The impact must have an influence on the decision process to develop in the area		
No significance	When no impact will occur or the impact will not affect the environment		
Status	Positive (+)		Negative (-)
The degree to which the impact can be reversed	Completely reversible (R)	90-100%	The impact can be mostly to completely reversed with the implementation of the correct mitigation and rehabilitation measures.
	Partly reversible (PR)	6-89%	The impact can be partly reversed providing that mitigation measures as stipulated in the EMP are implemented and rehabilitation measures are undertaken
	Irreversible (IR)	0-5%	The impact cannot be reversed, regardless of the mitigation or rehabilitation measures taking place
The degree to which the impact may cause irreplaceable loss of resources	Resource will not be lost (R)	1	The resource will not be lost or destroyed provided that mitigation and rehabilitation measures as stipulated in the EMP are implemented
	Resource may be partly destroyed (PR)	2	Partial loss or destruction of the resources will occur even though all management and mitigation measures as stipulated in the EMP are implemented
	Resource cannot be replaced (IR)	3	The resource cannot be replaced no matter which management or mitigation measures are implemented.
The degree to which the impact can be mitigated	Completely mitigatible (CM)	1	The impact can be completely mitigated providing that all management and mitigation measures as stipulated in the EMP are implemented
	Partly mitigatible (PM)	2	The impact cannot be completely mitigated even though all management and mitigation measures as stipulated in the EMP are implemented. Implementation of these measures will provide a measure of mitigatibility
	Un-mitigatible (UM)	3	The impact cannot be mitigated no matter which management or mitigation measures are implemented.