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WETLAND ASSESSMENT

PROPOSED SALDANHA BAY NETWORK STRENGTHENING PROJECT WESTERN CAPE PROVINCE

SCOPING PHASE REPORT

JANUARY 2016

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Declaration

I, **Rowena Harrison,** declare that -

- I act as the independent specialist in this matter;
- I do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- I will 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 applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the National Environmental Management Act (Act 107 of 1998)(NEMA), regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the NEMA Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- As a registered member of the South African Council for Natural Scientific Professions in terms of the Natural Scientific Professions Act, 2003 (Act No. 27 of 2003), I will undertake my profession duties in accordance with the Code of Conduct of the Council, as well as any other societies of which I am a member; and
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority; all the particulars furnished by me in this report are true and correct.

Signature of the specialist:

Date:

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Executive summary

Afzelia Environmental Consultants (Pty) Ltd was appointed by Savannah Environmental (Pty) Ltd to undertake a wetland assessment for the proposed development of the Saldanha Bay Network Strengthening Project Western Cape Province. This report details the findings of a desktop assessment for the scoping phase. A more detailed field investigation will be conducted as part of the EIA phase of this assessment.

The main findings of this report have been summarised below:

i. The desktop wetland assessment identified two unchannelled valley bottom wetlands and six depressions wetlands within the study area
ii. A health assessment was conducted for these wetlands according to the WET-Health Level 1 (desktop) methods. The unchannelled valley bottom wetlands have been classified as a PES category D or largely modified and the depression wetlands as a PES category C.
iii. Modifications to the wetland systems are largely as a result of human disturbances including the operation of a phosphorus mine, agricultural activities and urban/ residential development within the catchment areas.
iv. Potential impacts of the proposed Saldanha Bay Network Strengthening Project are related to soil erosion, pollution of wetland systems, loss of hydrophilic vegetation and disturbance of wetland systems which leads to encroachment by alien invasive species.
v. Route Alternative 3 and Substation Site A are recommended as preferred at this stage with regards to minimising impacts on wetland systems. Accurate delineations, buffers and impacts will be further investigated during the EIA phase.

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1.1 Background to the assessment

Afzelia Environmental Consultants (Pty) Ltd was appointed by Savannah Environmental (Pty) Ltd to undertake a wetland assessment for the proposed development of the Saldanha Bay Network Strengthening Project Western Cape Province. This report details the findings of a desktop assessment for the scoping phase. A more detailed field investigation will be conducted as part of the EIA phase of this assessment.

The proposed activity involves:

- The construction of a new 400/132 kV Transmission Substation with a planned capacity of three 500 MVA transformers
- The construction of a new 132/66 kV Distribution Substation near the current Blouwater Substation in the Saldanha Bay area
- The construction of two 400kV Power lines from the Aurora Station to the new proposed Dx and Tx substations
- Replacement of two of the four existing 250 MVA transformers with two 500 MVA transformers as well as new 400/132 kV transformers
- Establishment of two 132 kV feeder bays at the Aurora Substation

1.2 Scope of work

The scope of work entailed the following:

- Provide a desktop assessment of the site for the presence of wetland systems and drainage/watercourse channels;
- Assess and describe the health of any wetland units identified through a level 1 (desktop) evaluation of indicators based on geomorphology, hydrology and vegetation as per the WET-Health methods;
- Identify sensitive and 'No-Go' areas (if applicable)
- Identify potential impacts and types of impacts that are most likely to occur
- Identify potential impacts that will be considered further in the EIA Phase relating to the wetland assessment.

2. METHODOLOGY

For the purpose of this assessment, wetlands are considered as those ecosystems defined by the National Water Act as:

> *"land which 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 land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."*

The desktop study involved the assessment of aerial photography, GIS databases including the NFEPA and South African National Wetland maps as well as literature reviews of the study site in order to determine the likelihood of wetland areas within the

study site. The following data sources and GIS information provided in Table 1 was utilised to inform the delineation.

Table 1: Information used to inform the desktop wetland assessment

DATA	USE	SOURCE
Latest and Historic Google Earth ™ imagery	Used to assist with identifying potential areas within the study boundary for the presence of wetland systems.	Google Earth PRO™ On-line
River line	Mapping of watercourses outside of the study site.	Surveyor General
National Wetland Classification System	Assistance with information collection about the site and surrounding areas.	SANBI
National Freshwater Ecosystem Priority Area maps and database	Information gathering regarding the presence of FEPA wetlands on the site and within surrounding areas.	Water Research Commission, Implementation Manual and Maps for FEPA area.

Once the wetlands have been identified their functionality was assessed using a Level 1 screening assessment for their functionality and health according to the Wet-Ecoservices (Kotze *et al*., 2009) and Wet-Health series (Macfarlane *et al*., 2009).

Potential Impacts to wetland resources were identified for both the construction and operational phases of the project. The following generic scope for assessing the significance of impacts that are related to the key issues raised in the scoping phase assessment were used to calculate the significance of identified impacts:

- The nature of the activity
- The extent of the activity
- The duration of the activity
- The magnitude of the impact
- The probability of the impact occurring

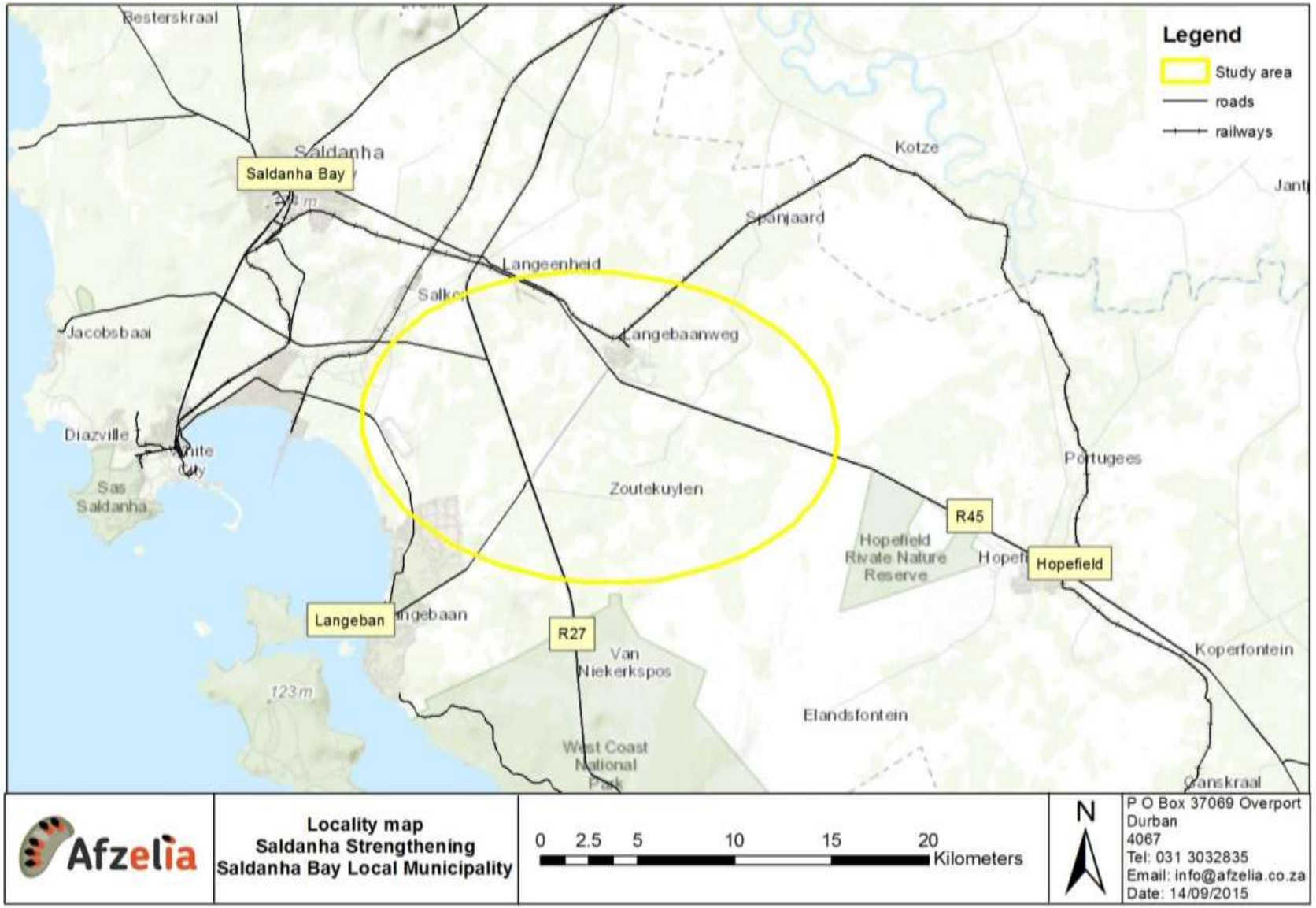


Figure 1: Locality Map of Saldanha Strengthening study area

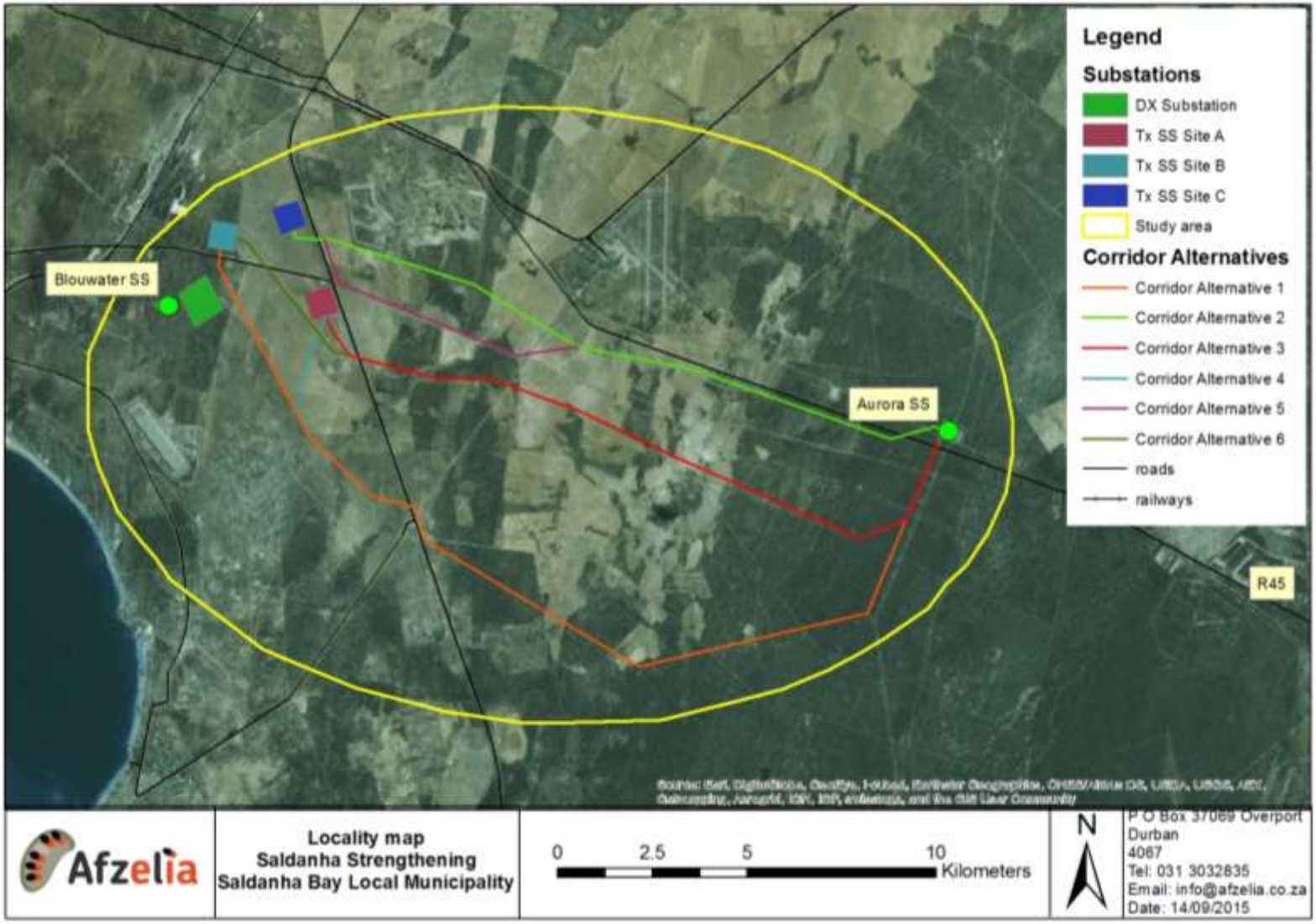


Figure 2: Site Description Map indicating proposed substation site alternatives and power line corridor alternatives

3. ENVIRONMENTAL BASELINE

3.1 Background information of the study area

3.1.1 Climate

The climate around Saldanha is characterised by winter rainfall with the lowest rainfall recorded in February (1mm) and the highest in June (49mm). The area experiences high air humidity and a low incidence of frost. Mean maximum and minimum temperatures for the area are approximately 25.1°C and approximately 8°C for January and July respectively (Mucina and Rutherford, 2007).

3.1.2 Vegetation

The study site falls into four different vegetation types, namely the Saldanha Flats Strandveld, which is the dominant vegetation type; the Saldanha Limestone Strandveld which is situated along the western edge of the site; the Saldanha Granite Strandveld located along the southern section of the site; and the Hopefield Sand Fynbos Vegetation along the northern boundary.

The Saldanha Flats Strandveld is situated in the Western Cape Province coastal flats from St Helena Bay to Saldanha and Langebaan. It consists of Sclerophyllous shrublands with a sparse emergent and moderately tall shrub layer with an open succulent shrub layer forming the undergrowth. The vegetation type is considered endangered with more than half transformed for cultivation, road building or by urban development (Mucina and Rutherford, 2006).

The different vegetation types are structurally very similar and all consist of low shrub land and fynbos with varying amounts of grass, succulents, forbs and geophytes depending on the aspect and landscape position. All vegetation types are considered endangered with land transformation as a result of cultivation, development of coastal settlements and roads (Mucina and Rutherford, 2006).

3.1.3 Geology

The study site is situated on calcareous sand over a limestone hardpan layer along an old marine terrace. The Sandveld Group overlies the Cape Granites as well as the Malmesbury Group metasediments into which the granites intrude (Mucina and Rutherford, 2006; AGIS[1])

3.1.4 Catchment characteristics

The study area is situated within the G10M quaternary catchment which is part of the Lower Berg Sub Water Management Area, and the Berg Water Management Area. The Berg water management area commands the south-western corner of South Africa. The Berg River is the only major river in the water management area, although there are several smaller rivers and streams draining to the ocean. Several large dams and

[1] Land type information was obtained from the Department of Agriculture's Global Information Service (AGIS) January 2014 – www.agis.agric.za

numerous farm dams regulate the surface runoff from the water management area (National Water Resource Strategy, 2004).

4. DESKTOP WETLAND DELINEATION

The FEPA wetlands layer as well as the examination of aerial photography was used to identify wetland areas that could potentially be affected by the proposed development. Examination of the National Freshwater Ecosystem Priority Areas (NFEPA) databases was undertaken for the proposed development. The NFEPA project aims to produce maps which provide strategic spatial priorities for conserving South Africa's freshwater ecosystems and supporting sustainable use of water resources. These strategic spatial priorities are known as Freshwater Ecosystem Priority Areas, or FEPAs. FEPAs are determined through a process of systematic biodiversity planning and involved collaboration of over 100 freshwater researchers and practitioners. They are identified based on a range of criteria dealing with the maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries (Macfarlane *et al*., 2009).

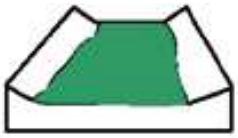
The examination of the FEPA GIS database showed that a number of Freshwater Ecosystem Priority Area wetlands are present in the study are (**Figure 3)**. The wetlands within the study are classified as:

- Two Unchannelled valley bottom wetlands
- Three Depressions

These wetlands have been classified as FEPA wetlands as a result of the largely natural condition with a wetland health condition of C (moderately modified). The FEPA wetlands within the study site are further considered to be within a sub-quaternary catchment that contains wetlands of exceptional biodiversity importance. However ground-truthing the existence and condition of FEPA wetlands is important to understand local conditions which have an impact on the wetland systems, their functional integrity and health.

Wetlands were delineated within the study area according to the FEPA map as well as the examination of the aerial photography of the site. Two unchannelled valley bottom wetlands and six depression wetlands were identified within the study site (**Figure 4 and 5**). A description of unchannelled valley bottom wetlands and depressions is given in **Table 2**.

Table 2: Wetland hydrogeomorphic (HGM) types (Kotze *et al*., 2008; Ollis, 2013)

HGM Unit	Description	Source of water maintaining the wetland[2]	
		Surface	Subsurface
Unchannelled Valley bottom 	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 also from adjacent slopes.	***	*/ ***
Depression 	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.	*/ ***	*/ ***

[2] Precipitation is an important water source and evapotranspiration an important output in all of the above settings

Water source:

* Contribution usually small

*** Contribution usually large

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

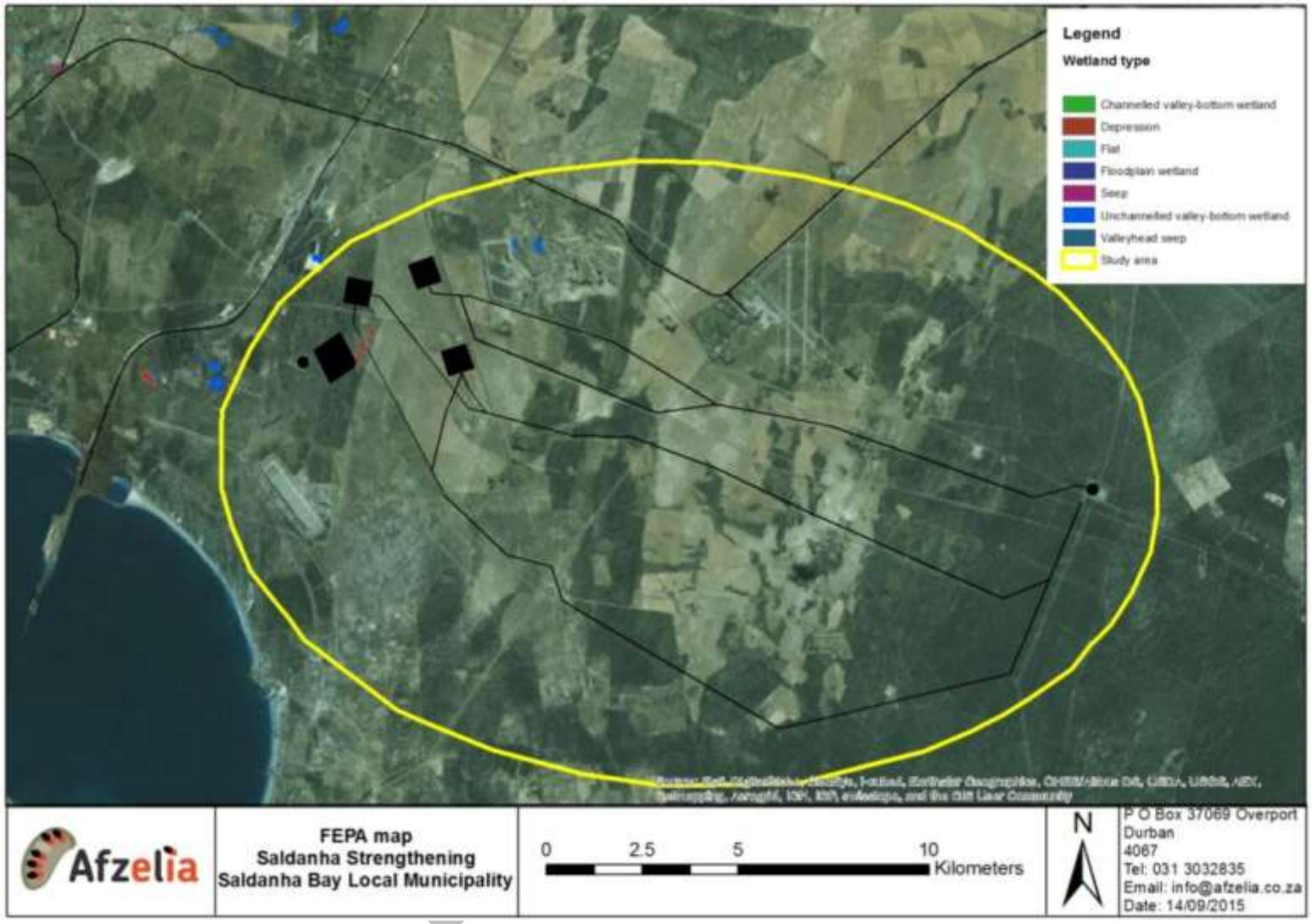


Figure 3: FEPA wetlands associated with the site

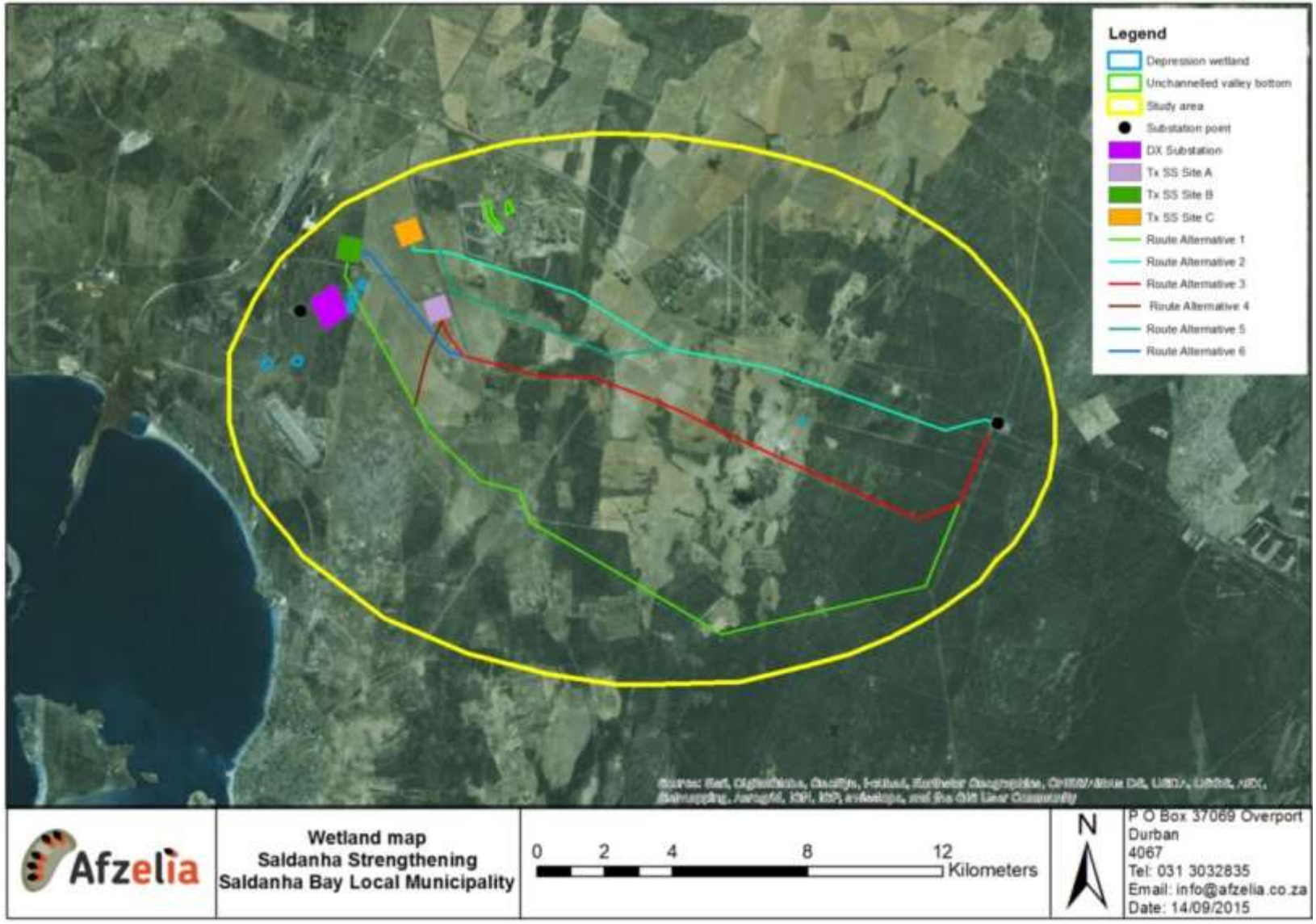


Figure 4: Desktop delineation of wetlands on site

5. WETLAND HEALTH ASSESSMENT

Wetlands within the study area serve to improve habitat within and potentially downstream of the study area through the provision of various ecosystem services. These ecosystem services relate to flood attenuation; streamflow regulation and water purification. They therefore affect the quantity and quality of water within a catchment (Mitsch and Gosselink, 1993). The importance of wetland conservation and sustainable management is directly related to the value of the functions provided by a wetland (Smathkin and Batchelor, 2005). These functions need to be assessed in order to make more informed decisions regarding management and rehabilitation of wetlands within a study site.

A wetland's ability to contribute to ecosystem services within the study area is dependent on the particular wetland's Present Ecological State (PES) in relation to a benchmark or reference condition. A Level 1 (desktop) Wetland Health assessment was conducted on the wetlands identified as per the procedures described in *'Wet-Health: A technique for rapidly assessing wetland health'* (MacFarlane *et al*., 2008). The Level 1 assessment involves screening the wetlands using a desktop evaluation to establish whether they are likely to be contributing to ecosystems services within the study area based on their health status. This document assesses the health of a wetland through evaluation of three main factors -

- ***Hydrology:*** *defined as the distribution and movement of water through a wetland and its soils.*
- ***Geomorphology:*** *defined as the distribution and retention patterns of sediment within the wetland.*
- ***Vegetation:*** *defined as the vegetation structural and compositional state.*

The WET-Health tool evaluates the extent to which anthropogenic changes have impacted upon wetland functioning or condition through assessment of the above-mentioned three factors. Scores range from 0 indicating no impact to a maximum of 10 which would imply that impacts had completely destroyed the functioning of a particular component of the wetland. Impact scores obtained for each of the modules reflect the degree of change from natural reference conditions (**Table 3**).

Table 3: Guideline for interpreting the magnitude of impacts on wetland integrity

IMPACT CATEGORY	DESCRIPTION	RANGE
None	No discernible modification or the modification is such that it has no impact on wetland integrity.	0 – 0.9
Small	Although identifiable, the impact of this modification on wetland integrity is small.	1 – 1.9
Moderate	The impact of this modification on wetland integrity is clearly identifiable, but limited.	2 – 3.9

Large	The modification has a clearly detrimental impact on wetland integrity. Approximately 50% of wetland integrity has been lost.	4 – 5.9
Serious	The modification has a clearly adverse effect on this component of habitat integrity. Well in excess of 50% of the wetland integrity has been lost.	6 – 7.9
Critical	The modification is present in such a way that the ecosystem processes of this component of wetland health are totally / almost totally destroyed.	8 – 10

The PES categories are divided into six units (A-F) based on a gradient from "unmodified/natural" (Category A) to "severe/complete deviation from natural" (Category F) as depicted in **Table 4**.

Table 4: Health categories used by WET-Health for describing the integrity of wetlands

DESCRIPTION	IMPACT SCORE	HEALTH CATEGORY
Unmodified, natural.	0 – 1.0	A
Largely natural with few modifications. A slight change in ecosystem processes is discernible and a small loss of natural habitats and biota may have taken place.	1.1 - 2.0	B
Moderately modified. A moderate change in ecosystem processes and loss of natural habitats has taken place but the natural habitat remains predominantly intact	2.1 - 4.0	C
Largely modified. A large change in ecosystem processes and loss of natural habitat and biota and has occurred.	4.1 - 6.0	D
The change in ecosystem processes and loss of natural habitat and biota is great but some remaining natural habitat features are still recognizable.	6.1 - 8.0	E
Modifications have reached a critical level and the ecosystem processes have been modified completely with an almost complete loss of natural habitat and biota.	8.1 - 10.0	F

Since hydrology, geomorphology and vegetation are interlinked their scores are aggregated to obtain an overall PES health score using the following formula (MacFarlane *et al*., 2008):

Health = ((Hydrology score) x3 + (Geomorphology score) x2 + (Vegetation score) x2)) ÷ 7

This gives a score ranging from 0 (pristine) to 10 (critically impacted in all respects). Hydrology is weighted by a factor of 3 since it is considered to have the greatest contribution to wetland health.

Due to differences in the pattern of water flow through different hydro-geomorphic (HGM) type, the tool requires that the wetland is divided into distinct HGM units at the outset. Ecosystem services for each HGM unit are then assessed separately.

As this is a screening assessment the unchannelled valley bottom wetlands identified at the site were assessed as a single unit with the depression wetlands assessed as another unit.

5.1 Unchannelled valley bottom wetlands

Despite the FEPA category of these wetlands (PES Category C; moderately modified) the scores obtained through the Level 1 Wet-Health assessment has found the unchannelled valley bottom wetlands to be generally a PES Category D (**Table 5**), associated with largely modified system. Modifications to the unchannelled valley bottom wetlands are predominantly as a result of a phosphorus mine which has been identified adjacent to the wetland areas. Mining activities generally lead to a decline in wetland health due to soil erosion, desiccation of soils and removal of hydrophytic vegetation through the operations of the mine. This will need to be investigated further and confirmed during the EIA phase of the assessment.

Table 5: Summary of general PES score for the unchannelled valley bottom wetlands

Hydrology	Geomorphology	Vegetation	Present Ecological Score (Category)
3.5	4.6	4.2	D (4.01)

5.2 Depression wetlands

All depression wetlands were also generally assessed in terms of their health and found to be a PES Category C (**Table 6**), associated with a moderately modified system. Modifications to the systems stem primarily from agricultural activities including grazing and cultivation. Agricultural activities generally lead to the removal of hydrophytic vegetation. Cultivation causes soil mixing which can cause desiccation of the soil changing the hydrology of the pan systems.

Table 6: Summary of PES score

Hydrology	Geomorphology	Vegetation	Present Ecological Score (Category)
3.0	3.2	3.6	C (3.22)

6. PRELIMINARY SENSITIVITY ASSESSMENT

The preliminary sensitivity assessment identifies those parts of the study area that have high conservation value or that may be sensitive to disturbance (**Figure 5**). The information provided in the preceding sections was used to compile a map of sensitive areas. Broad scale mapping was used to provide information on the location of sensitive features. There are a number of features that need to be taken into account in order to evaluate sensitivity in the study area. These include the following:

1. National wetland planning including the South African National Biodiversity Institute GIS databases (such as the NFEPA and National Wetlands Layers);
2. Potential occurrence of wetland systems based on the examination of aerial imagery for wetland systems.

These factors have all been taken into account in evaluating sensitivity within the study area. It must be emphasized that this is a preliminary sensitivity map (Figure 5), based on broad information via a desktop assessment. It is therefore vitally important to establish, during the EIA phase, which areas constitute wetland areas and are therefore considered sensitive on the basis of various factors as mentioned above.

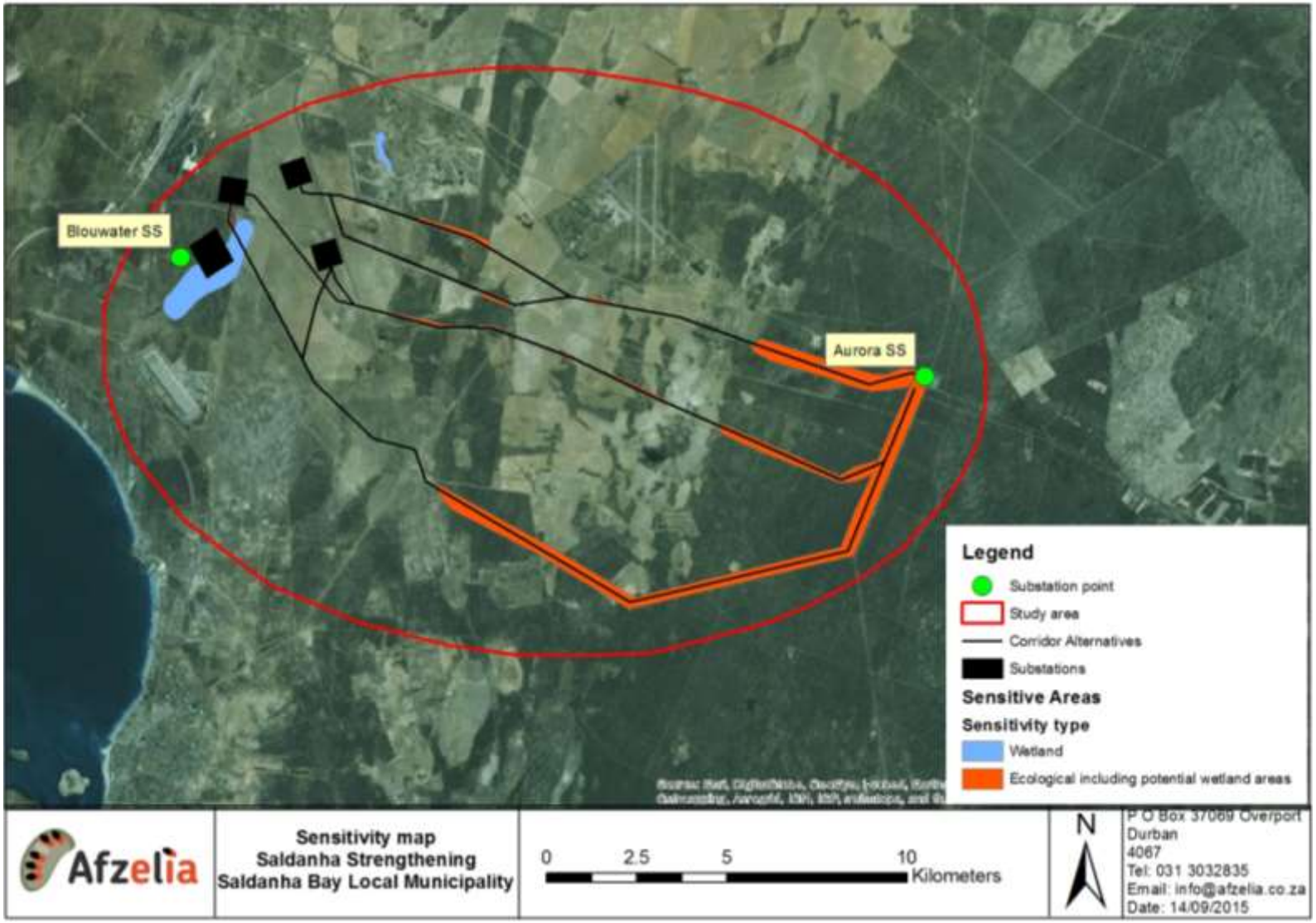


Figure 5: Sensitivity map showing preliminary areas that will be assessed in detail

7. IMPACT ASSESSMENT

Any development activity in a natural system will have an impact on the surrounding environment, usually in a negative way. The purpose of this phase of the study was to identify generic potential impacts that may be caused by the proposed activity and assess the likely significance of the potential impacts. These impacts relate to:

- Construction related impacts causing soil erosion, sedimentation of wetlands and general degradation of wetland functionality and health;
- Impacts associated with the loss of hydrophilic vegetation if wetland systems are impacted on by the powerlines, or occur within construction areas;
- Pollution impacts as a result of construction activities;
- Spread of alien invasive species into disturbed areas.

Most of these impacts are primarily relevant to the construction phase and will be reduced significantly during the operational phase. The potential impacts are described in more detail below.

7.1 Significance of identified impacts

Significance scoring assesses and predicts the significance of environmental impacts through evaluation of the following factors; probability of the impact; duration of the impact; extent of the impact; and magnitude of the impact. The significance of environmental impacts is then assessed taking into account any proposed mitigations. The significance of the impact "without mitigation" is the prime determinant of the nature and degree of mitigation required[3]. Each of the above impact factors have been used to assess each potential impact using ranking scales (**Table 7**).

Unknown parameters are given the highest score (5) as significance scoring follows the Precautionary Principle. The Precautionary Principle is based on the following statement: *When the information available to an evaluator is uncertain as to whether or not the impact of a proposed development on the environment will be adverse, the evaluator must accept as a matter of precaution, that the impact will be detrimental. It is a test to determine the acceptability of a proposed development. It enables the evaluator to determine whether enough information is available to ensure that a reliable decision can be made.*

[3] Impact scores given "with mitigation" are based on the assumption that the mitigation measures recommended in this assessment are implemented correctly and rehabilitation of the site is undertaken. Failure to implement mitigation measures during and after construction will keep the impact at an unacceptably high level.

Table 7: Significance scoring used for each potential impact

Probability	***Duration***
1 - very improbable 2 - improbable 3 - probable 4 - highly probable 5 - definite	1 - very short duration (0-1years) 2- short duration (2-5 years) 3 - medium term (5-15 years) 4 - long term (>15 years) 5 - permanent/unknown
Extent	***Magnitude***
1 - limited to the site 2 - limited to the local area 3 - limited to the region 4 - national 5 - international	2 – minor 4 – low 6 – moderate 8 – high 10 – very high

Significance Points = (Magnitude + Duration + Extent) x Probability. The maximum value is 100 Significance Points.
Potential Environmental Impacts are rated as high, moderate or low significance as per the following:
<30 significance points = Low environmental significance
31-59 significance points = Moderate environmental significance
>60 significance points = High environmental significance

The findings of this report and identification of potential impacts are based on preliminary desktop work. The specification of the duration, probability and reversibility of the impacts will be subject to change prior to a detailed site inspection. The significance of impacts stated below were calculated using prior knowledge of similar developments coupled with the desktop work detailed in this report. Furthermore, the precautionary principle will be applied with respect to impacts where there is uncertainty.

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Construction and Operational phase			
Soil Erosion, sedimentation, disturbance and degradation of wetland areas	Construction activities (i.e. excavations and vegetation clearing and bringing fill/bedding material to site, depositing such material,) expose soil to environmental factors including rainfall and wind which leads to the removal of topsoil resulting in soil erosion. This is particularly so for the construction of the substations as well as any access roads, and pylons associated with the power lines that may be adjacent to or through wetland areas. Sedimentation of deposited soil as a result of erosion poses a risk to the geomorphological/functional integrity of the wetland systems. Disturbance to the soils and vegetation associated with the wetlands leads to changes in the hydrological and geomorphologic integrity of these systems. This will need to be investigated in the EIA phase of the assessment. Compaction of soil will occur in the work area which will experience heavy vehicle traffic during construction. This will increase the soil bulk density, reduce the porosity and the hydraulic conductivity, impeding hydrological flow and leading to wetland degradation. Residual impacts of the proposed activity relate to improperly maintained roads to service the new substations and power lines which may result in secondary impacts on any wetlands within the vicinity of the construction areas. Mitigation measures which will be detailed in the EIA phase must limit the significance of these impacts on the functionality of the wetlands	Local	Pans along Route Alternative 1 and adjacent to the DX Substation

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Construction and Operational phase			

Impacts associated with soil erosion

Impact	Probability		Duration		Extent		Magnitude		Significance scoring without mitigation	Significance scoring with mitigation
	Without	With	Without	With	Without	With	Without	With		
Construction Phase										
Soil erosion and sedimentation	5	4	2	2	2	1	8	6	60 (high)	36 (moderate)
Operational Phase										
Degradation of wetland areas	5	5	4	4	1	1	6	4	55 (moderate)	45 (high)

Reduction in hydrophilic vegetation	The removal of existing wetland vegetation for the powerline servitude will have negative impacts on the functionality of the vegetation community within this area. The disturbance will make the wetlands more prone to encroachment by alien invasive species. If this occurs, then potentially re-establishment and re-development of former indigenous vegetation communities may either be hindered or may not occur, resulting in changes to the ecological structure and species composition of the wetland area along the route.	Site	Pans along Route Alternative 1 and adjacent to the DX Substation

Issue	Nature of Impact								Extent of Impact	No-Go Areas
Construction and Operational phase										
Impacts associated with reduction in hydrophilic vegetation										
Impact	Probability		Duration		Extent		Magnitude		Significance scoring without mitigation	Significance scoring with mitigation
	Without	With	Without	With	Without	With	Without	With		
Construction Phase										
Reduction in hydrophilic vegetation	5	3	2	2	1	1	6	4	45 (moderate)	21 (low)
Operational Phase										
Reduction in hydrophilic vegetation	5	5	4	4	1	1	4	2	45 (moderate)	35 (moderate)
Pollution of water resources and soil	Mismanagement of waste and pollutants like hydrocarbons, construction waste and other hazardous chemicals will result in these substances entering and polluting sensitive natural environments either directly through surface runoff during rainfall events, or indirectly through subsurface water movement. An increase in pollutants will lead to a decline in the water quality of the wetlands affecting their ability to act as ecological corridors in the larger landscape.								Local	Pans along Route Alternative 1 and adjacent to the DX Substation

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Construction and Operational phase			

Impacts associated with Pollution of water resources and soil

Impact	Probability		Duration		Extent		Magnitude		Significance scoring without mitigation	Significance scoring with mitigation
	Without	With	Without	With	Without	With	Without	With		
Construction Phase										
Pollution of water resources and soil	5	5	2	2	2	1	8	6	60 (high)	45 (moderate)
Operational Phase										
Pollution of water resources and soil	5	5	4	4	2	1	6	4	60 (high)	45 (moderate)

Alien invasive species	Alien invasive species will quickly encroach into disturbed areas. Alien species generally out-compete indigenous species for water, light, space and nutrients as they are adaptable to changing conditions and easily invade a wide range of ecological niches (Bromilow, 2010). Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and "quality" of species), change nutrient cycling and	Local	Pans along Route Alternative 1 and adjacent to the DX

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Construction and Operational phase			
	productivity, and modify food webs (Zedler, 2004). Such changes on the ecology of the wetland will have a detrimental impact on its ability to maintain both floral and faunal biodiversity.		Substation

Impacts associated with alien invasive species encroachment

Impact	Probability		Duration		Extent		Magnitude		Significance scoring without mitigation	Significance scoring with mitigation
	Without	With	Without	With	Without	With	Without	With		
Construction Phase										
Impacts associated with alien invasive species	5	4	2	2	2	1	8	6	60 (high)	36 (moderate)
Operational Phase										
Impacts associated with alien invasive species	5	5	4	4	2	1	6	4	60 (high)	45 (moderate)

Recommendations for further study

The terms of reference for the wetland assessment for the EIA phase will include:

Issue	Nature of Impact	Extent of Impact	No-Go Areas
Construction and Operational phase			
• Accurately delineate the outer wetland boundary and various wetness zones (i.e.: permanent, seasonal temporary wetness zones) within the study area according to methods contained in 'A Practical Field Procedure for Identification and Delineation of Wetland and Riparian Areas' (DWAF, 2005); • Assess and describe the health of any wetland units identified, through evaluation of indicators based on geomorphology, hydrology and vegetation as per the WET-Health methods. A Level 2 assessment using an in-field assessment will be conducted to verify the scores obtained in this Scoping Phase report. • Assess and describe the Ecological Importance and Sensitivity of any wetlands identified on site, based on the presence of red data species; variety of habitats for faunal diversity; the health of the wetland and ecosystem benefits the wetland provides as per the Health Index of Habitat Integrity (DWAF, 2007); • Determine appropriate set-back buffers for all wetlands delineated within the study boundary; • Identify current and future sources of impacts associated with the proposed project, during both construction and operational phases; • Assess and evaluate identified potential impacts. Impacts will be assessed both pre- and post- implementation of mitigating measures; and • Propose and explain mitigation measures for unavoidable impacts. This will need to be incorporated into the Environmental Management Programme (EMPr).		

8. RECOMMENDATIONS

The desktop wetland delineation has shown that a number of pans occur within the vicinity of Corridor Alternative 1 (orange powerline in Figure 2), as well as adjacent to the DX substation. In light of this, it is recommended that Corridor Alternative 3 (red powerline in Figure 2) and Substation Site A be the recommended option with regards to minimising the impact on wetland systems. Corridor Alternative 5 and Substation Site C (purple powerline in Figure 2) or Corridor Alternative 6 and Substation Site B (dark green powerline in Figure 2) have also been identified as potential suitable corridors, which will need to be investigated further and confirmed during the EIA phase.

9. CONCLUSIONS

The desktop assessment of the study area identified two unchannelled valley bottom wetlands and six depression wetlands. A health assessment was conducted for these wetlands according to the WET-Health Level 1 (desktop) methods. The unchannelled valley bottom wetlands have been classified as a PES category D or largely modified and the depression wetlands as a PES category C, moderately modified. Modifications to the wetland systems are largely as a result of human disturbances including the operation of a phosphorus mine, agricultural activities and urban/ residential development within the catchment areas.

Impacts of the proposed Saldanha Bay Network Strengthening Project are related to soil erosion, pollution of wetland systems, loss of hydrophilic vegetation and disturbance of wetland systems which leads to encroachment by alien invasive species.

Accurate delineations, buffers and impacts will be further investigated during the EIA phase

Route Alternative 3 and Substation Site A is the recommended route with regards to minimising impacts on wetland systems.

10. REFERENCES

DWAF (Department of Water affairs and Forestry). 2005. A practical field procedure for identification and delineation of wetland and riparian areas. Edition 1, September 2005. DWAF, Pretoria.

Kotze, D.M., Marneweck, G., Batchelor, A., Lindley, D., & Collins, N., 2008. WET-EcoServices. A technique for rapidly assessing ecosystem services supplied by wetlands. WRC Report No TT 339/08, Water Research Commission, Pretoria.

Macfarlane, D.M., Kotze, D.C., Ellery, W.N., Walters, D., Koopman, V., Goodman, P. & Goge, C. 2007. WET-Health: A technique for rapidly assessing wetland health. WRC Report No TT 340/08, Water Research Commission, Pretoria.

Macfarlane, D.M., Bredin, I.P., Adams, J.B., Zungu, M.M., Bate, G.C. and Dickens, C.W.S. 2014. *Preliminary guideline for the determination of buffer zones for rivers, wetlands and estuaries. Final Consolidated Report.* WRC Report No TT 610/14, Water Research Commission, Pretoria.

Mitsch, W.J & Gosselink, J.G. 1993. The Values of Wetlands: Landscapes and Institutional Perspectives. School of Natural Resources, Ohio

Mucina, L., Rutherford, M.C. & Powrie, L.W. (eds) 2007. Vegetation Map of South Africa, Lesotho and Swaziland, edn 2, 1:1 000 000 scale sheet maps. South African National Biodiversity Institute, Pretoria. ISBN 978-1-919976-42-6.

Ollis, D.J., Snaddon, K., Job N.M., & Mbona, N. 2013. Classification Systems for Wetlands and other Aquatic Ecosystems in South Africa. User Manual: Inland Systems. SANBI Biodiversity Series 22. South African National Biodiversity Institute, Pretoria.

SANBI. 2009. Further Development of a Proposed National Wetland Classification System for South Africa. Primary Project Report. Prepared by the Freshwater Consulting Group (FCG) for the South African National Biodiversity Institute (SANBI).

Smathkin, V.U. & Batchelor, A.L. 2005. Evaluating wetland flow regulation functions using discharge time series. Hydrological Processes 19: 1293-1300

Soil Classification Working Group, 1991. Soil Classification: A Taxonomic System for South Africa. Department of Agriculture.