



F.E.N. Consulting

Applying science to the real world

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FRESHWATER SPECIALIST SITE WALK DOWN VERIFICATION AND IMPACT STATEMENT FOR THE PROPOSED 400 kV KUDU-ORANJEMUND OVERHEAD POWERLINE AS PART OF THE ENVIRONMENTAL AUTHORISATION AMENDMENT PROCESS, NEAR ALEXANDER BAY, NORTHERN CAPE PROVINCE

Freshwater Ecologist Network (FEN) Consulting (Pty) Ltd was appointed to conduct a specialist freshwater 'site walkdown' micro-sighting and provide a specialist impact statement based on the amended layout for the proposed 400 kV Kudu-Oranjemund overhead powerline (OHPL) (Figure A and B – Appendix 1). The outcome of this specialist statement letter will indicate if the nature or severity of impact has changed (based on the outcome of the existing freshwater specialist report compiled by BlueScience (2016)) to advise on the requirement of a Part 1 or Part 2 amendment as part of the Environmental Authorisation (EA) amendment process.

The OHPL to be amended will be routed from the Eskom Oranjemund substation, located approximately 12,5 km east of Alexander Bay and south of the South Africa/Namibia international border. The OHPL will cross the South Africa/Namibia border to the NamPower Kudu substation in Namibia (approximately 40 km north of the Oranjemund substation). The previous alignment for the OHPL has received environmental authorisation [Ref: 14/12/16/3/3/2/977], however, the technology suggested in the Environmental Impact Assessment (EIA) has been amended to more modern structures which have different dimensions to that in the EIA, specifically:

- Change of the OHPL support towers positioning;
- Number of OHPL support tower present: 8 (reduced from 20);
- Change in OHPL support tower height: 62 m (increase from 42 m);
- Combined OHPL support tower footprint: approximately 136m² (a reduction from 240 m²);
- Individual OHPL support tower footprints: 17 m² (increased from 12 m²); and
- Change from two lines to one line.

BlueScience undertook the freshwater ecological impact assessment as part of the EIA process in 2016¹. As such, FEN Consulting made use of the BlueScience (2016) freshwater ecological impact assessment report and undertook a site walk down² in August 2021, to identify any areas of potential concern, increased sensitivity including potential 'no-go' areas, ascertain the necessity for approvals and/or permits required and to determine whether the amended OHPL layout which is being proposed as part of the amendment (hereafter referred to as the "proposed OHPL") can be approved by the Department of Forestry, Fisheries and Environment (DFFE) or whether any changes are required to the proposed layout (due to presence of sensitive freshwater habitat / "no-go" areas and/ or any other special freshwater features). It is a further aim of this letter to ascertain whether the amended layout will result in additional potential impacts and whether there is a requirement for additional mitigation measures to be implemented by the proponent from a freshwater ecological perspective.

1. DESKTOP BACKGROUND OUTCOME

The outcome of the desktop background study is presented in Appendix A, which reports on the findings of the relevant and most updated national, provincial and municipal desktop datasets. The National Freshwater Ecosystem Priority Area (NFEPA) (2011) database and the National Biodiversity Assessment (NBA) (2018) desktop dataset identified the Orange River as the only watercourse to be traversed by the proposed OHPL (Figure C and D – Appendix 1). In the report of BlueScience (2016), the findings were the same as the databases, with only the Orange River identified to be traversed by the previous OHPL layout. FEN Consulting undertook a site assessment on the 4th of August 2021 to ground truth the desktop database findings as well as the BlueScience (2016) identified watercourse relative to the proposed OHPL.

2. SITE WALKDOWN OUTCOME

The proposed OHPL relative to the delineated and assessed BlueScience (2016) watercourse (Orange River) is presented in Figure 1. The table below presents a summary of the ecological assessment of the Orange River as per BlueScience (2016).

Table 1: Summary of the ecological assessment of the Orange River undertaken by BlueScience (2016)

Index for Habitat Integrity (IHI)	Ecological Importance and Sensitivity (EIS)
Category D (Largely modified)	High
The instream as well as the riparian vegetation of the Orange River at the OHPL crossing is in a largely modified condition, largely as a result of flow and water quality modification in the upstream catchment. There are also direct habitat impacts both upstream and downstream of the site that has resulted in some loss of indigenous riparian vegetation and the subsequent growth of invasive alien plants.	The Orange River is considered to be of a high ecological importance and sensitivity. This is due to the fact that it is directly upstream of the Orange River Mouth Ramsar site, and the aquatic habitat associated with the river is particularly important in providing refugia in an arid area. The river also provides habitat for a number of endemic and rare and endangered biota species.

¹ BlueScience. 2016. Aquatic ecological impact assessment for the proposed Eskom Kudu-Oranjemund Project. August 2016. Project number: P365-May16

² FEN Consulting only undertook a site walk down of the OHPL infrastructure located in South Africa surrounding the Eskom Oranjemund substation, as provided by the EAP.

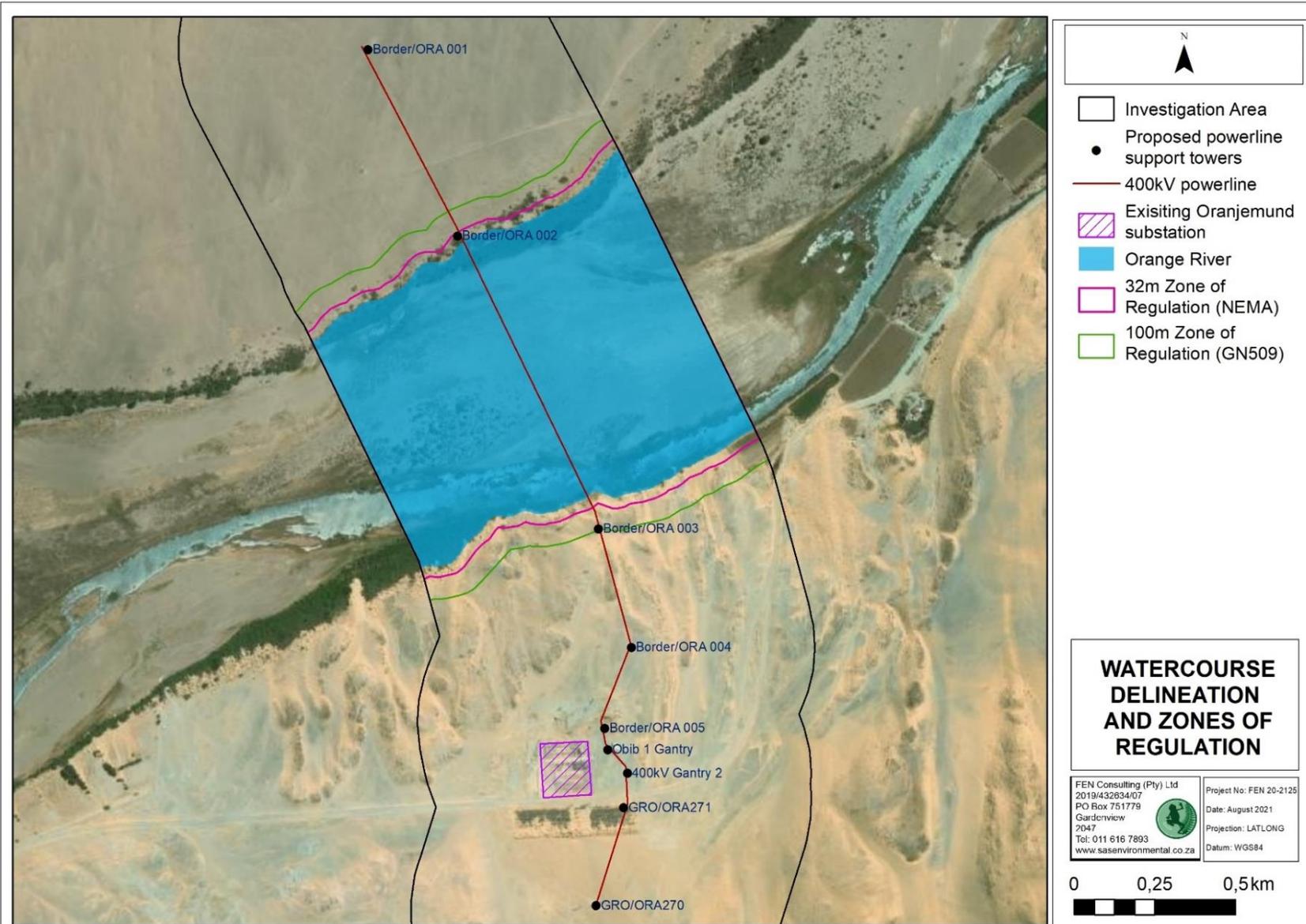


Figure 1: Map presenting the delineated extent of the Orange River relative to the proposed OHPL. The relevant regulated zones as it relates to the NEMA and the NWA are also presented (Refer to Section 3 for more detail). It should be noted that the proposed OHPL traverses the Orange River in the same portion as that assessed by BlueScience (2016).

Based on the outcome of the FEN Consulting site assessment, the ecological and site characteristics of the Orange River as described by BlueScience (2016) were confirmed to be accurate and representative of the current condition of the Orange River (Figure 2). The Orange River can be described as largely modified predominantly due to the loss of indigenous riparian vegetation and the subsequent invasion by alien vegetation such as *Eucalyptus camaldulensis*, *Prosopis glandulosa*, *Salix babylonica* and *Nicotiana glauca*, also noted by BlueScience (2016).



Figure 2: Photographs presenting an overview of the Orange River to be traversed by the proposed OHPL. (A) reach of the Orange River downstream of the proposed OHPL crossing. (B) Photograph taken at the proposed OHPL crossing point of the upstream reach of the Orange River. Note the steep embankment. (C) Red arrow depicts the locality of the Border/ORA 003 support tower relative to the Orange River delineated extent (blue dashed line) and an existing OHPL.

3. IMPACT STATEMENT

Based on the impact assessment undertaken by BlueScience (2016), should the proposed OHPL development (predominantly the support towers) be located outside of the delineated extent of the Orange River, with the implementation of the recommended mitigation measures, the impact significance is expected to be very low.

Considering the proposed OHPL layout relative to the delineated extent of the Orange River and the applicable legislative regulated zones (as it relates to the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the National Water Act, 1998 (Act No. 36 of 1998) (NWA)) (Figure 1); the proposed powerline support tower (Border/ORA 003) is located the closest to the Orange River, approximately 97 m from the delineated extent of the river and thus within the 100 m Zone of Regulation (ZoR) in accordance with the National Water Act, 1998 (Act No. 36 of 1998). Due to the distance this support tower is located from the Orange river, and provided the recommended mitigation measures as per BlueScience (2016) are implemented, it is the opinion of the freshwater specialist that the proposed OHPL layout will not pose a direct negative impact on the Orange River. The freshwater

specialist can also confirm that the nature and severity of impact as described in BlueScience (2016) remains the same and that a Part 1 amendment application can be followed from a freshwater ecological perspective. The recommended mitigation measures as per BlueScience (2016) are considered sufficient to maintain the determined impact significance, with specific mention of ensuring that the risk of erosion is reduced by contouring all service/access roads along any steep slopes and that runoff over exposed areas be mitigated to reduce the rate and volume of runoff.

We trust we have interpreted your requirements correctly. Please feel free to contact me if you have any queries in this regard.

Yours Faithfully,

Digital Documentation Not Signed for Security Purposes

Christel du Preez

Pr. Sci. Nat.

APPENDIX 1 – DESKTOP BACKGROUND INFORMATION

Table A: Desktop data (from desktop databases only) relating to the characteristics of the proposed OHPL and its associated investigation area.

Aquatic ecoregion and sub-regions in which the investigation area is located		Detail of the investigation area in terms of the National Freshwater Ecosystem Priority Area (NFEPA) (2011) database	
Ecoregion	Western Coastal Belt	FEPACODE	The proposed OHPL is located in a sub-quaternary catchment classified as a catchment most efficient for rehabilitating to an A or B condition to meet under achieved river type targets upstream management catchment which is required to be managed to prevent (FEPA CODE = 3).
Catchment	Orange		
Quaternary Catchment	D82L		
WMA	Lower orange		
subWMA	Orange		
Dominant characteristics of the Western Coastal Belt Ecoregion Level II (25.03) (Kleynhans et al., 2007)		NFEPA Wetlands (Figure C)	According to the NFEPA database (2011), a natural floodplain wetland associated with the Orange River is traversed by the proposed OHPL. This wetland is considered to be in a natural or good (WETCON = AB) ecological condition.
Level II Code	25.03	Wetland Vegetation Type	The proposed OHPL is located in the Southern Namib Desert (Dn) Wetland Vegetation type (least threatened). The threat status is provided by Mbona <i>et al.</i> (2015).
Dominant primary terrain morphology	Slightly Undulating Plains.		
Dominant primary vegetation types	Lowland Succulent Karoo, Upland Succulent Karoo, Strandveld Succulent Karoo.	NFEPA Rivers (Figure C)	As per the NFEPA database (2011), the Orange River is traversed by the proposed OHPL. The Orange River is considered to be in a moderately modified ecological condition (RIVCON = C) according to the NFEPA database (2011) and the PES 1999 dataset.
Altitude (m a.m.s.l)	0 - 300		
MAP (mm)	0 - 100		
The coefficient of Variation (% of MAP)	30 – 40		
Rainfall concentration index	55 - 65		
Importance of the investigation area according to the Critical Biodiversity Areas of the Northern Cape (2016)		According to the Critical Biodiversity Areas of the Northern Cape (2016), the proposed OHPL is located in an area classified as a Critical Biodiversity Area (CBAs) 1. CBAs are areas that must remain in good ecological condition in order to meet biodiversity targets for ecosystem types, species of special concern or ecological processes. CBA 1 areas that are considered to be irreplaceable or near irreplaceable for meeting biodiversity targets.	
Rainfall seasonality	Winter		
Mean annual temp. (°C)	16 - 20		
Winter temperature (July)	10 - 22		
Summer temperature (Feb)	14 - 30		
Median annual simulated runoff (mm)	<5		
National Web Based Environmental Screening Tool (2020): Aquatic Biodiversity sensitivity			
The screening tool is intended for pre-screening of sensitivities in the landscape to be assessed within the EIA process. This assists with implementing the migration hierarchy by allowing developers to adjust their proposed development footprint to avoid sensitive areas.		The portion of the Orange River to be traversed by the proposed OHPL are considered to be of very high aquatic biodiversity importance and due to the biodiversity importance classification as per the NCCBA (2016) dataset.	
National Biodiversity Assessment (2018): South African Inventory of Inland Aquatic Ecosystems (SAIIAE) (National Wetland Map 5 is included in the NBA) (Figure D)			
According to the NBA 2018: SAIIAE the Orange River will be traversed by the proposed OHPL; this corresponds with the river identified by the NFEPA Database. This river is considered to be in a moderately modified ecological condition (Class C). The Ecosystem Threat Status (ETS) of the river is Critical, and the ecosystem protection level (EPL) thereof is not protected.			

El = Ecological Importance; ES = Ecological Sensitivity; ESA = Ecological Support Area; EN = Endangered; m.a.m.s.l = Metres above mean sea level; MAP = Mean Annual Precipitation; NFEPA = National Freshwater Ecosystem Priority Area; OESA = Other Ecological Support Area; OHPL = Overhead Powerline; PES = Present Ecological State; WMA = Water Management Area

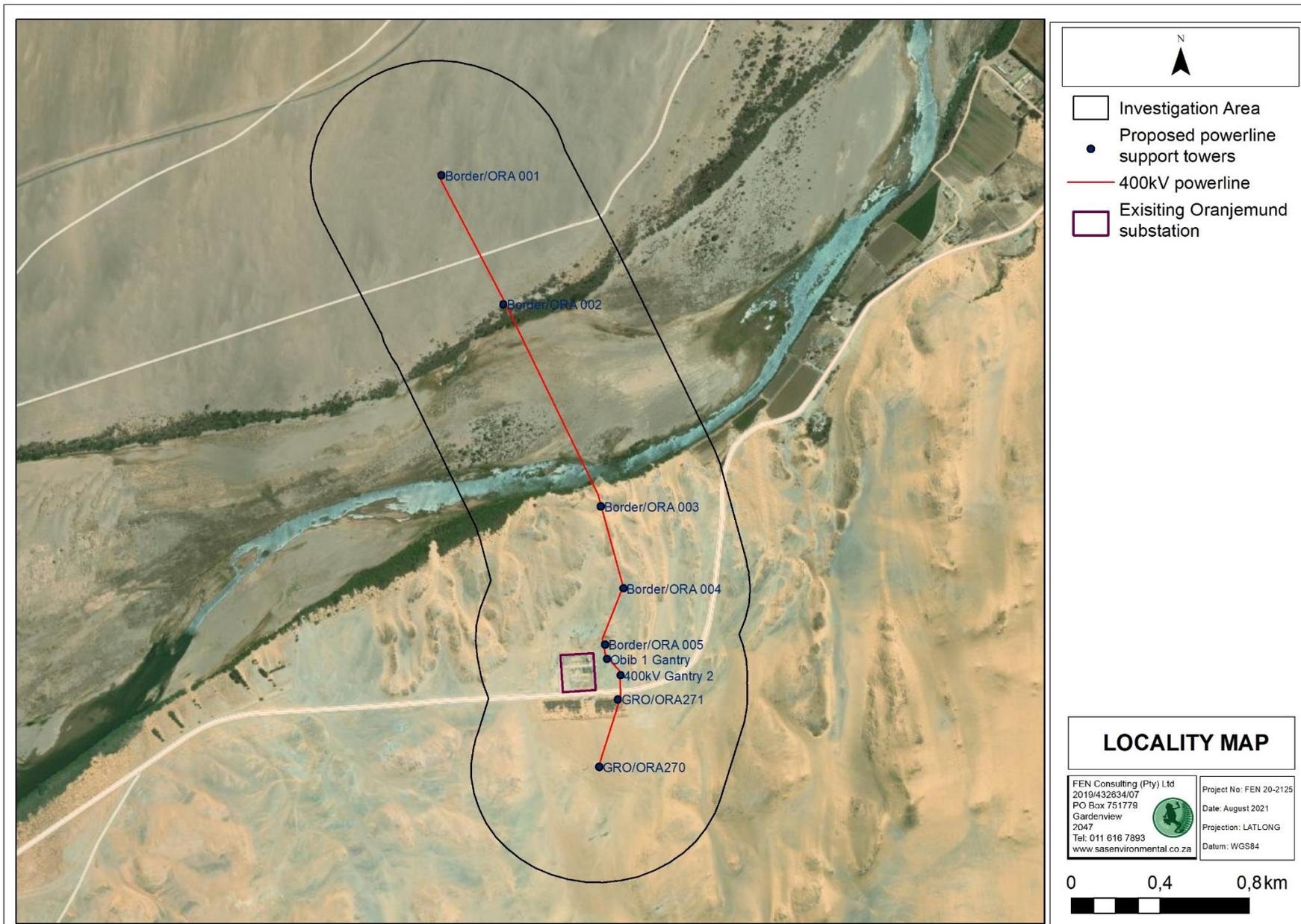


Figure A: Digital satellite image depicting the proposed OHPL and the associated investigation area in relation to its surroundings.

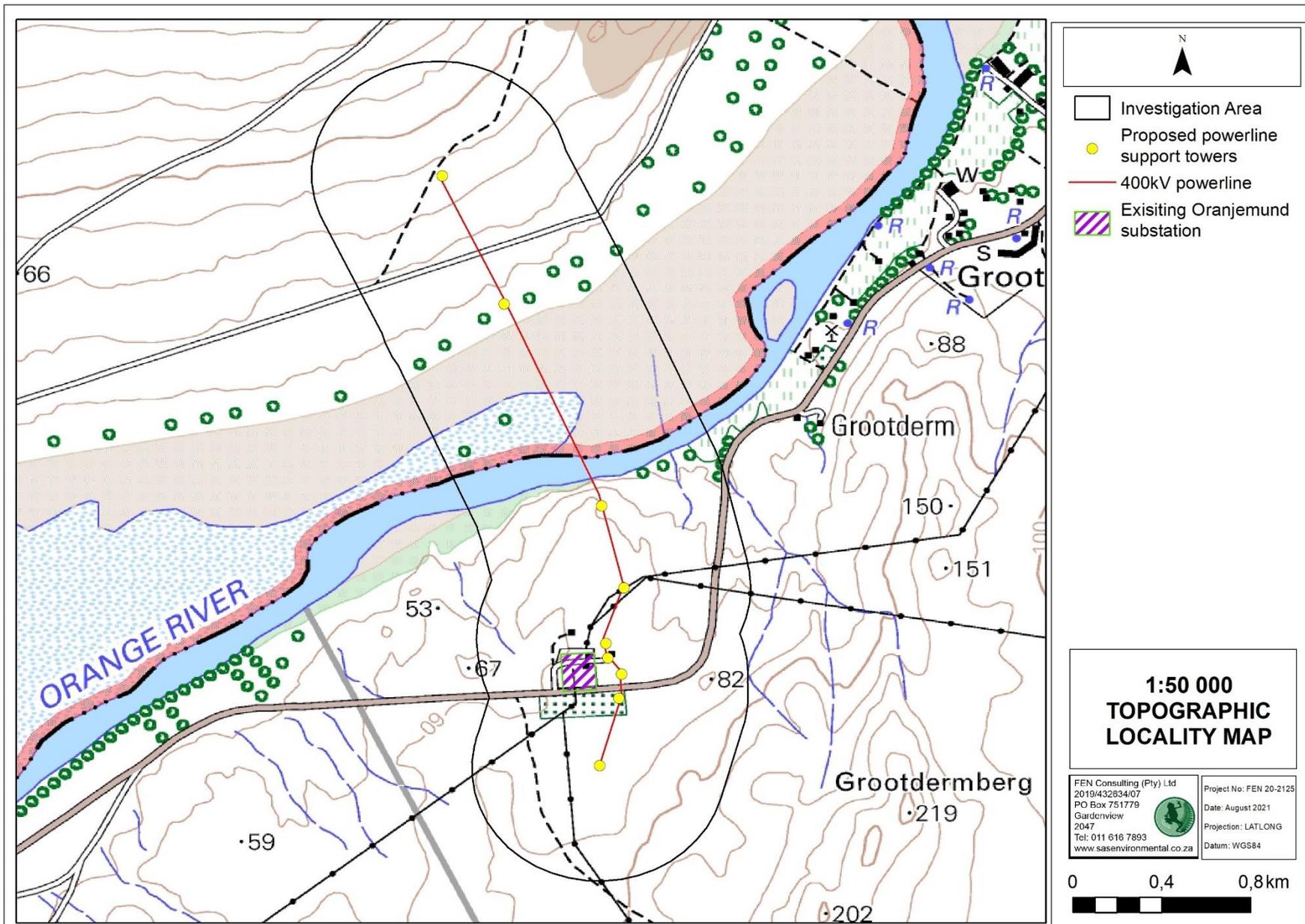


Figure B: Location of the proposed OHPL and the associated investigation area depicted on a 1:50 000 topographical map in relation to surrounding areas.

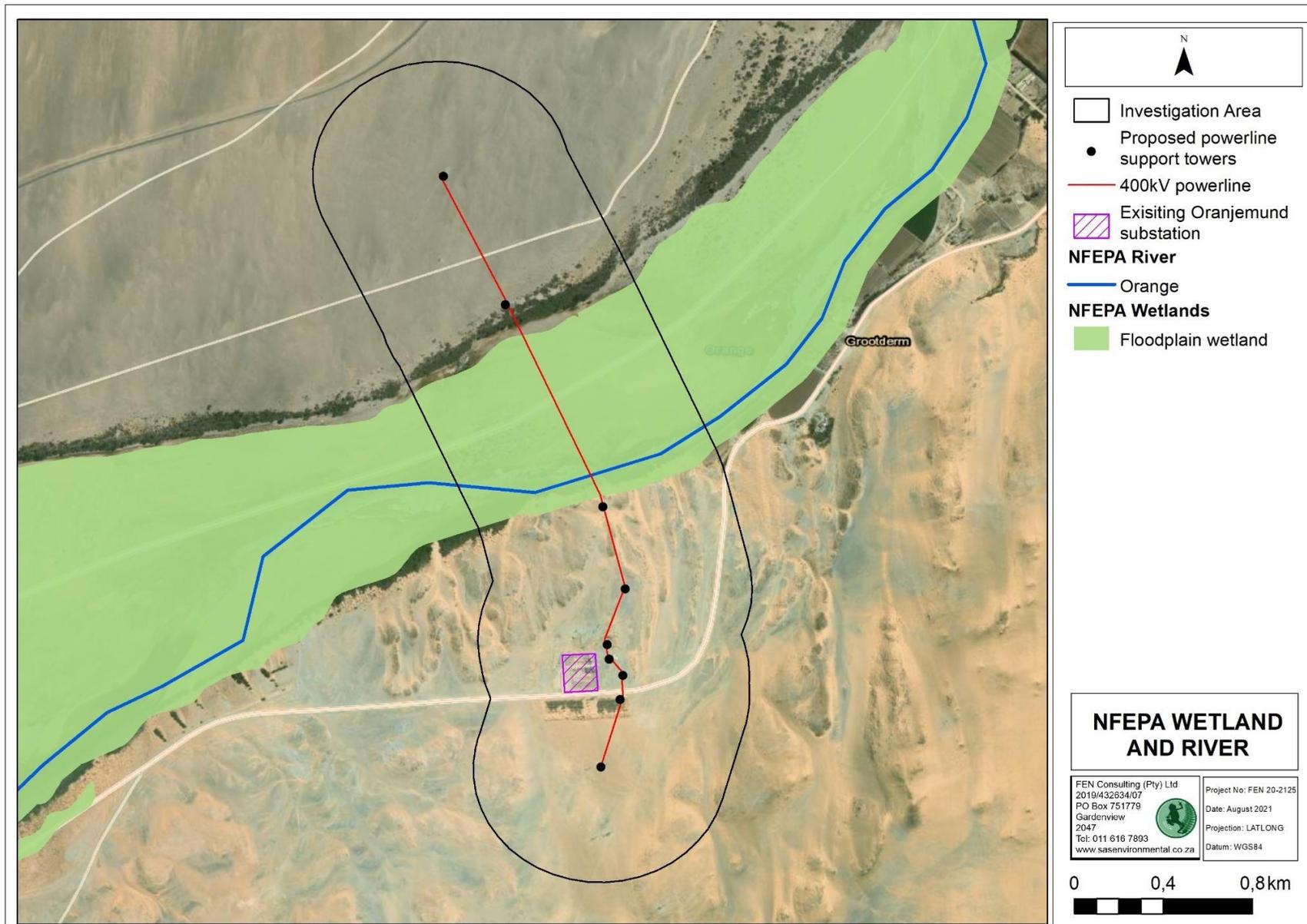


Figure C: NFEPA listed rivers and natural and artificial wetlands associated with the proposed OHPL and investigation area, according to the NFEPA database (2011).

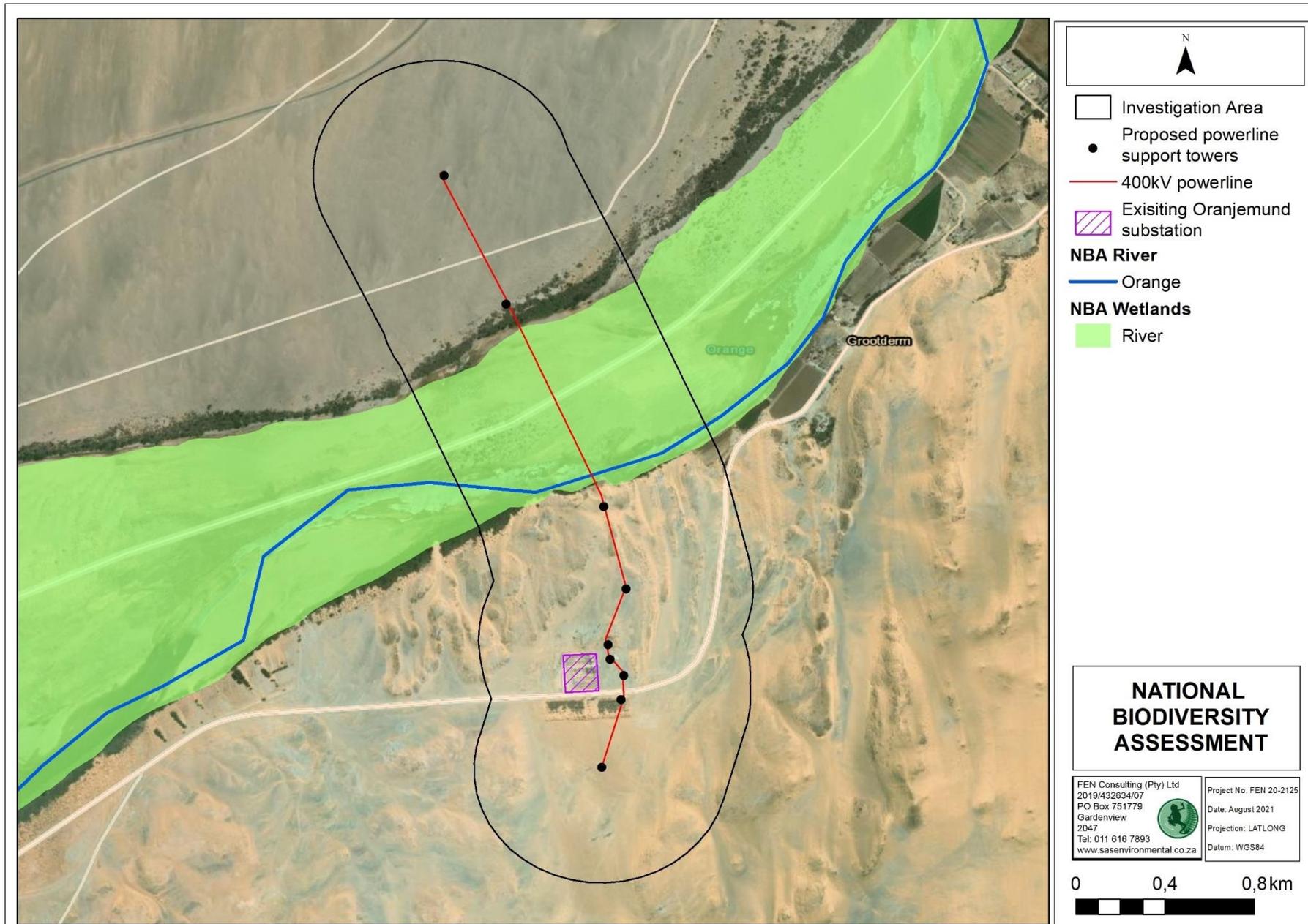


Figure D: NBA identified wetlands and rivers associated with the proposed OHPL and investigation area, according to the NBA database (2018).