

Lichtenburg Solar Park & Power Line Corridor

RFI Assessment & Minimum Report

Project: BID March 2022

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1. Scope

Matrigenix (Pty) Ltd is proposing the establishment of a renewable energy generation facility (Photovoltaic Power Plant) with associated infrastructure and structures, and power line on Portion 25 of the Farm Houthaalboomen 31 IP and Portion 10 of the Farm Lichtenburg Town and Townlands 27 IP, Ditsobotla Local Municipality, Ngaka Modiri Molema District Municipality, North West province

The proposed renewable energy generation facility will be Photovoltaic (PV) Power Plant with a maximum generation capacity up to 120 MW, at the point of connection (Export Capacity) with the Eskom connection infrastructure.

The name of the facility will be **LICHTENBURG SOLAR PARK**.

Using the screening tool [9] generated report, the project for this area was identified as “RFI Combined sensitivity medium”, and the environmental assessment subsequently can be done in accordance with the Government gazetted requirements as referenced in [7] & [8].

2. Reference

- [1] Lichtenburg - BID March 2022.pdf
- [2] Lichtenburg solar park.kmz
- [3] Google earth with latest imagery 2020
- [4] No. 320 GOVERNMENT GAZETTE, 20 MARCH 2020 43110 (page 26)
- [5] Appendix 6 of the EIA Regulation
- [6] <https://screening.environment.gov.za/screeningtool>
- [7] ICASA - Independent Communications Authority of South Africa
- [8] Electronic Communications Act [No. 36 of 2005]
- [9] The Radio Frequency Spectrum Regulations, in terms of the Electronic Communications Act, Act No. 36 of 2005. Government Gazette No. 38641, Notice 279, 30 March 2015, Pretoria

3. Introduction

The report evaluates and assesses the possibility of the new solar power development site, together with its supporting infrastructure, having the potential of being generation sources of RF (radio frequency) interference signals thus effecting existing or new equipment and infrastructure in the surrounding.

Electromagnetic interference (EMI), also called radio-frequency interference (RFI) when in the radio frequency spectrum, is a disturbance generated by an external source that affects an electrical circuit by electromagnetic induction, electrostatic coupling, or conduction (reference Wikipedia)

Radio frequency interference, **RFI**, is any undesirable electrical energy with content within the frequency range dedicated to radio frequency transmission. **Conducted** RFI is most often found in the low frequency range of several kHz to 30MHz. **Radiated** RFI is most often found in the frequency range from 30MHz to 10GHz.

Radiated emissions are unintentional energy that escapes the equipment in the form of electric, magnetic, or electromagnetic fields. **Conducted emissions** are unintentional energy carried out of the equipment on the equipment's power cables or attached signal cables.

For the proposed renewable energy generation facilities (Photovoltaic Power Plants) with associated infrastructure and structures to be in a position to interfere with any electronic and telecommunication systems associated with a commercial business, airports, telecommunications and military installations, the installation must be located suitably close enough (or within an area considered as an affected area) to the above mentioned installations or have a conductive path into such an installation via cables, power lines and or other carrier devices or technology.

In this report the evaluation and assessment process followed will be to look at the layout of the site geographically. Determine what and where any existing infrastructure is located relative to the proposed site. Evaluate according to existing experience as to the scenarios that can pose a problem as well as the methods of limiting potential RF Interferences and the effects thereof.

4. Discussion

Figure 3 Layout of proposed site footprint with respect to Lichtenburg and local farm lands” & Figure 4 Lichtenburg Solar Park” indicates the proposed footprint and layout of the solar park and power lines relative to the surrounding area. This is described comprehensively in the BID document [1]

Also clearly indicated in Figure 1 Proposed site screening report” the site location relative to the various colour indications reflecting the sensitivity of the site to RF Interference (RFI). It shows that the total area is in the green sections except for the end of the power corridor indicating a low sensitivity impact for the solar park as identified by the screening tool but medium for the end of the power corridor. Note that this power corridor terminates into the power station infrastructure.

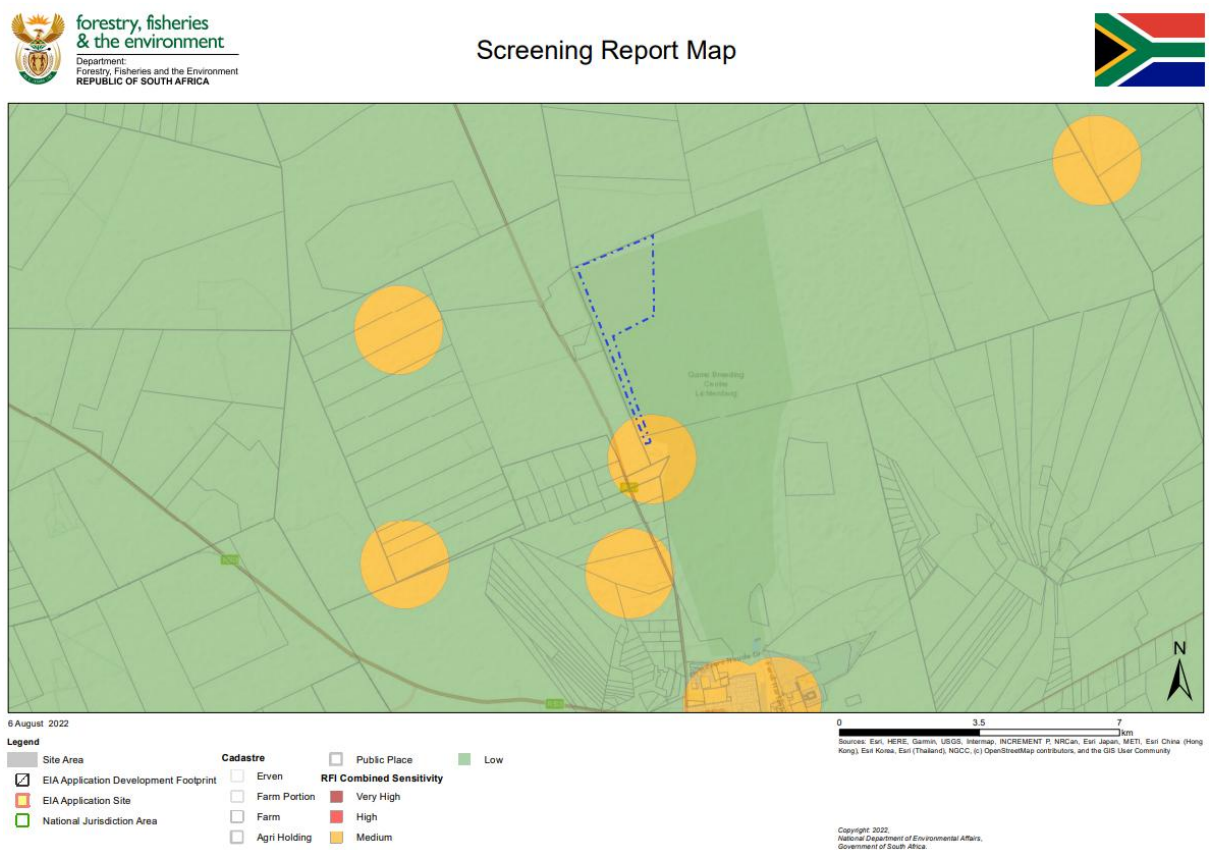


Figure 1 Proposed site screening report



Figure 2 Watershed Power Substation

With closer inspection of the site layout in Figure 3, it can be seen that the solar farm is located next to multiple farming areas and a local road (the R505). No radio or communication sensitive installations are identified here and with the assumption that all equipment used by this project will be subjected to the standard ICASA transmission/reception regulations, this project will not pose any risk as an RF Interference source to existing old and new equipment.

Figure 2 shows that the solar farm power corridor ends up in the Eskom sub-station. Similar equipment and power lines will enter and exit this substation as per the existing infrastructure and it can be deduced that there will be no additional interference as what is currently present at this sub-station.

With the same visual evaluation approach, it is clear that the solar farm sites are also located within rural and farming areas. There are indications that the solar park site is located east and south west of a few automated irrigation systems that are controlled by electric and electronic equipment. This equipment together with the solar park control, monitor and security facility will be able to co-exist if they adhere to all ICASA radiation and interference equipment regulations [7], [8] & [9]

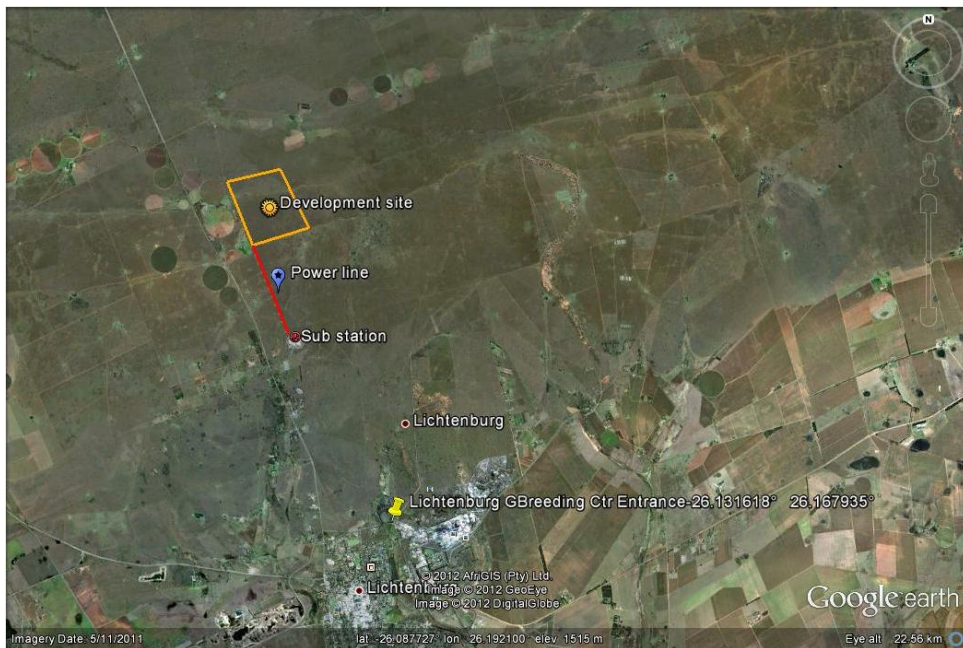


Figure 3 Layout of proposed site footprint with respect to Lichtenburg and local farm lands

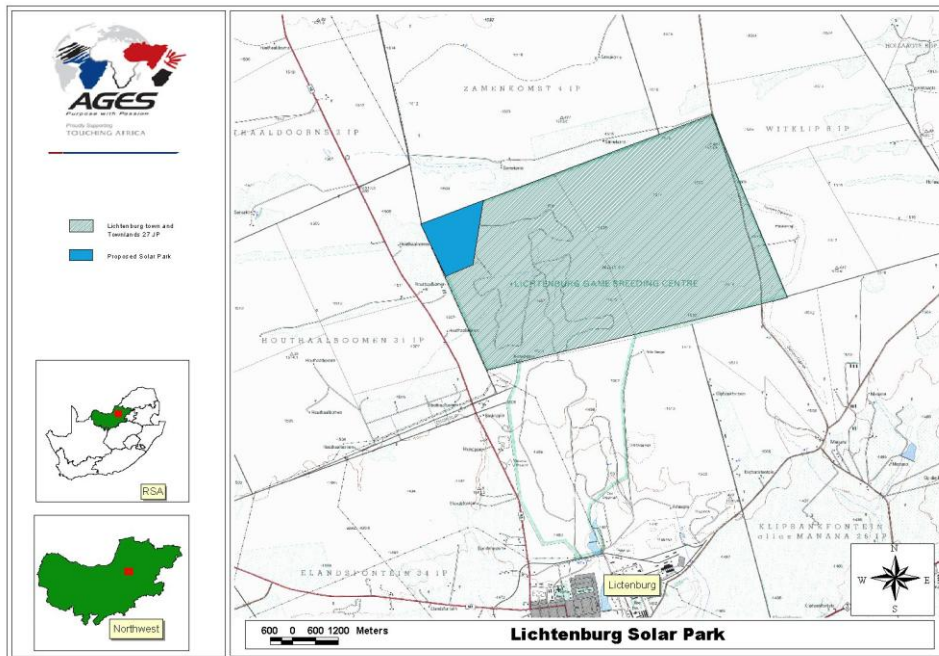


Figure 4 Lichtenburg Solar Park

Table 1 Identified possible interference sources and Risk assessment

The proposed development (the Photovoltaic (PV) Power Plants and connection infrastructure) consists of the installation of the following equipment:	
Description	RFI interference source probability
Photovoltaic modules (mono-crystalline, poly-crystalline, or bi-facial modules)	None
Mounting systems for the PV arrays (single-axis horizontal trackers or fixed structures) and related foundations	None
Internal cabling and string boxes	Could be susceptible to interference radiators
DC/AC inverters	Potential for sources of RFI transmissions
Medium voltage stations, hosting LV/MV power transformers	Potential for sources of Low frequency interference
Medium voltage receiving station(s)	Potential for sources of Low frequency interference
Workshops & warehouses	Potential transmission and reception of RFI signals
One on-site high-voltage substation with high-voltage power transformers, stepping up the voltage to 132kV and one high-voltage busbar with metering and protection devices	Potential for sources of Low frequency interference sources
One on-site switching station, with one high-voltage busbar with metering and protection devices	Potential for sources of Low frequency interference sources
One (1) 132 kV powerline, to the Eskom Watershed substation, located on the Remainder Portion of the farm Lichtenburg Town and Townlands 27 IP.	Potential for sources of Low frequency interference sources
Battery Energy Storage Systems (BESS), with a footprint up to 10 ha, next to the on-site high-voltage substation, within the PV plant footprint / fenced areas	Potential of variable frequency interference sources
Electrical system and UPS (Uninterruptible Power Supply) devices	Potential of variable frequency interference sources
Lighting system	None
Grounding system	None
Internal roads	None
Fencing of the site and alarm and video-surveillance system	Potential of variable frequency interference sources
Water access point, water supply pipelines, water treatment facilities	Potential of variable frequency interference sources
Sewage system	None unless remote monitoring and control
Interventions on the Eskom Watershed Substation	None

During the construction phase, the site may be provided with additional:	Could be potential of variable frequency interference sources but will be removed once construction has been completed
Water access point, water supply pipelines, water treatment facilities	
Prefabricated buildings	
Workshops & warehouses	
to be removed at the end of construction.	
The connection may also entail interventions on the Eskom grid, according to Eskom's connection requirements/solution.	Will be subject to all current regulations from ESKOM
Risk	Low
	Medium
	High

For **Error! Reference source not found.** the following observations are made:

Low to none (green) RFI concerned items that need no elaboration as to any corrective or special actions on the project. This statement is also subject to all Eskom installations done according to their approved practices and standards

All medium(yellow) items require special mention as any radio or communication used, including video, must be subjected to the ICASA [11] regulations with respect to frequency band used, radiation energy levels as well as spurious out of band transmissions.

No high (red) items are identified

5. Conclusion

In conclusion the following finding is made with respect to the RFI sensitivity of this project:

1. This assessment is applicable to the proposed development footprint as it is shown in this document. The power line corridors identified here is part of the solar park and has been evaluated as one
2. After evaluation and consideration of all activities identified, it is still considered to be classified as low sensitivity to RFI and the power line corridor classified as medium is only so because it ends up in a potential RFI active area (The Watershed power sub-station).
3. For the proposed development referred to in this report, there should be no unacceptable impact on existing and potential, future installations if all equipment to be used permanently or temporarily has acceptable EMI/RFI levels that have been subjected to the ICASA requirements. Refer to [7], [8] & [9]
4. No Cumulative RFI effects are expected at any of the adjacent sites and whether there is a single solar park or combined with the power line corridor the outcome will be the same.

Prepared by :



PF Smuts BEng (Hons)

Radar and RFI Specialist

I, Philip Francois Smuts, hereby declare that I am an independent specialist.



Date:

10 August 2022

6. Appendix

(Appendix 6 of the EIA Regulation Specialist reports - **Check list**)

#				Description	Comment
1		(1)		A specialist report prepared in terms of these Regulations must contain—	
			(a)	details of—	
			(i)	the specialist who prepared the report; and	Attached to report
			(ii)	the expertise of that specialist to compile a specialist report including a curriculum vitae;	Attached to report
			(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Attached to report
			(c)	an indication of the scope of, and the purpose for which, the report was prepared;	See chapter - 1. Scope
			(cA)	an indication of the quality and age of base data used for the specialist report;	Refer to [3]
			(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Refer to Chapter 5
			(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Not applicable
			(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Refer to - 3. Introduction
			(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	Refer to – 4 Discussion
			(g)	an identification of any areas to be avoided, including buffers;	None
			(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Refer to Fig 1,2,3 & 4
			(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Adherence to ICASA and ESKOM procedures and best practices
			(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Refer to – 5. Conclusion
			(k)	any mitigation measures for inclusion in the EMPr;	Refer to – 5. Conclusion
			(l)	any conditions for inclusion in the environmental authorisation;	None
			(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Refer to (i) above
			(n)	a reasoned opinion—	
			(i)	whether the proposed activity, activities or portions thereof should be authorised;	None
			(iA)	regarding the acceptability of the proposed activity or activities; and	None

			(ii)	if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	None
			(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	None
			(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	None
			(q)	any other information requested by the competent authority.	None