HARMONY CENTRAL PLANT 14 MW SOLAR PHOTOVOLTAIC (PV) FACILITY, FREE STATE PROVINCE

Basic Assessment Report

September 2022

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Prepared for:

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destea
department of
economic, small business development,
tourism and environmental affairs
FREE STATE PROVINCE

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2014, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2014 as amended and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.
2. This report format is current as of **13 February 2020**. It is the responsibility of the applicant to ascertain whether subsequent versions of the form have been published or produced by the competent authority
3. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.
4. Where applicable **tick** the boxes that are applicable in the report.
5. An incomplete report may be returned to the applicant for revision.
6. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.
7. This report must be handed in at offices of the relevant competent authority as determined by each authority.
8. No faxed or e-mailed reports will be accepted.
9. The signature of the EAP on the report must be an original signature.
10. The report must be compiled by an independent environmental assessment practitioner.
11. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.
12. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.
13. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.
14. Two (2) colour hard copies and one (1) electronic copy of the report must be submitted to the competent authority.
15. Shape files (.shp) for maps must be included in the electronic copy of the report submitted to the competent authority.

PROJECT DETAILS

Reference No.	:	TBC
Title	:	Basic Assessment Process Basic Assessment Report: Development of the 14MW Harmony Central Plant Solar Photovoltaic (PV) Facility, Free State Province
Authors	:	Savannah Environmental Chantelle Geyer Ansoné Esterhuizen Karen Jodas
Specialists	:	DPR Ecologists & Environmental Services CTS Heritage Pachnoda Consulting ECO-Thunder
Applicant	:	Harmony Gold Mining Company (Pty) Ltd
Report Status	:	Basic Assessment Report for Public Review
Date	:	September 2022

When used as a reference this report should be cited as: Savannah Environmental (2022). Basic Assessment Report: 14MW Harmony Central Plant Solar Photovoltaic (PV) Facility, Free State Province

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SUMMARY AND OVERVIEW OF THE PROJECT

Harmony Gold Mining Company (Pty) Ltd is looking to supplement its energy supply by implementing Photovoltaic (PV) generation, aiding their transition to a more sustainable and environmentally friendly energy mix.

The development of a solar photovoltaic (PV) facility with a generating capacity of 14MW is proposed East of the Harmony Gold Central Plant operations, approximately ~6km north east of the town of Virginia, and ~11km south east of the town of Welkom within the Matjhabeng Local Municipality and within the Lejweleputswa District Municipality, Free State Province. The PV facility is located on Portion 12 of the farm Saaiplaas 771 and Portion 1 of the Farm Rustgevonden 564 and is owned by the Mine.

The solar PV development will be known as Harmony Central Plant Solar PV Facility. The preferred site for the project is on properties which are privately owned by the Mine and are available for the proposed project and is therefore deemed technically feasible by the project developer for such development to take place. A project site considered to be technically suitable for the development of the solar PV facility, with a site extent of approximately 210 hectares, was identified.

A development area of ~80ha was demarcated within this project site and allows an adequate footprint (28ha) for the installation of a solar PV facility with a contracted capacity of up to 14MW, while allowing for the avoidance of environmental site sensitivities.

The full extent of the project site is to be evaluated in the Basic Assessment process to identify sensitivities. Site-specific studies and assessments have delineated areas of potential sensitivity within the development area (refer to **Figure B**). These have been avoided by the appropriate placement of infrastructure within the development footprint (refer to **Figure C**).

The infrastructure associated with the 14MW solar PV facility will include:

- modules and mounting structures.
- Inverters and transformers a SCADA room, and maintenance room.
- Cabling between the project components, to be laid underground where practical.
- Access roads, internal roads and fencing around the development area.
- Temporary and permanent laydown areas.
- Grid connection infrastructure including an on-site facility substation and a switching substation to be connected to the existing Harmony North Substation via an overhead power line (located in the southern corner of the site).

The site is accessible via the R73, which lays directly adjacent to the proposed site.

As of 2019,the Industrial sector was the leading electricity consumer in South Africa, with up to 56 percent of the total consumption (Ratshomo 2019).Mining and quarrying accounted for 10% of the industrial consumption (Chamber of Mines of South Africa, 2017).The successful development of the renewable energy project will enable Harmony Gold to make a valuable and meaningful contribution towards growing the green economy within the Free State Province and South Africa. This will assist the Free State in creating green jobs and reducing Green House Gas emissions, while reducing the energy demand on the Eskom national grid.

The full extent of the project site was considered through the Assessment phase by the independent specialists and the EAP. On-site sensitivities were identified through the review of existing information, desk-top evaluations, and field surveys. A development footprint for the PV facility within the project site was proposed by the developer through consideration of the sensitive environmental features and areas identified through the EIA process.

The development of Harmony Central Solar PV Facility will comprise the following phases:

- ***Pre-Construction and Construction*** – will include pre-construction surveys; site preparation; establishment of access roads, laydown areas, and facility infrastructure (including PV panels, facility substation and O&M Hub); construction of foundations involving excavations; the transportation of components/construction equipment to site, manoeuvring and operating vehicles for unloading and installation of equipment; laying cabling; and commissioning of new equipment and site rehabilitation.
- ***Operation*** – will include the operation of the PV facility and the generation of electricity, which will be fed into the mines substation via the facility on-site substation and an overhead power line. The operation phase is expected to be approximately 20 years (with maintenance).
- ***Decommissioning*** – depending on the economic viability of the PV facility, the length of the operation phase may be extended beyond a 20-year period. At the end of the project's life, decommissioning will include site preparation, disassembling of the components of the PV facility, clearance of the relevant infrastructure at the site and appropriate disposal thereof, and rehabilitation. Note that impacts associated with decommissioning are expected to be similar to those associated with construction activities. Therefore, these impacts are not considered separately within this chapter.

Environmental impacts associated with construction and decommissioning activities may include, among others, threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna, avifauna and flora, impacts to sites of heritage value, soil contamination, erosion and loss of agricultural land, nuisance from the movement of vehicles transporting equipment and materials, and loss of income from agricultural land .

Environmental impacts associated with the operation phase includes soil contamination, erosion and potential invasion by alien and invasive plant species. Other impacts include visual impacts and night time lighting impacts.

Quantification of Areas of Disturbance on the Site

Site-specific impacts associated with the construction and operation of Harmony Central Plant Solar PV facility relate to the direct loss of vegetation and species of special concern, disturbance of animals (including avifauna) and loss of habitat and impacts to soils. In order to assess the impacts associated, it is necessary to understand the extent of the affected area.

- The development area being assessed for Harmony Central Plant Solar PV facility is approximately 80ha in extent, of which the proposed infrastructure will occupy an area of approximately 28ha. This area includes infrastructure such as PV modules and mounting structures, Inverters and transformers, temporary and permanent laydown area, site offices and maintenance buildings, including workshop areas for maintenance and storage and site and internal access roads.
- The grid connection solution includes additional infrastructure, including a grid line servitude on-site substation (footprint area up to 2ha in extent) and Eskom switching station (footprint area up to 2ha in extent).

Terrestrial and Freshwater Impacts

The area has a long history of transformation by mining, agriculture and urban expansion and the cumulative impact that this has had is extensive. Therefore, should the proposed development further encroach into natural areas it will have a high cumulative impact. However, since transformation is already so extensive the proposed development has the opportunity to make use of these transformed areas and should the development be able to remain within these transformed areas should therefore not contribute significantly toward the cumulative impacts in this area.

The most significant impact on mammals anticipated on the site itself is primarily concerned with the loss and fragmentation of available habitat. Transformation of the natural vegetation on the site will result in a decrease in the population size as available habitat decreases. Since the area is already largely transformed, the mammal population will already be heavily modified and the impact caused by the proposed development should be fairly low. Additional measures which will further mitigate these impacts include the exclusion of remnants of natural grassland and the exclusion of natural wetland areas in the southern portion of the site. Construction itself may also affect the mammal population and care should therefore be taken to ensure none of the faunal species on site is harmed. The hunting, capturing or harming in any way of mammals on the site should not be allowed. Voids and excavations may also act as pitfall traps to fauna and these should continuously be monitored and any trapped fauna removed and released in adjacent natural areas.

The impact significance has been determined and should development take place without mitigation it is anticipated that several moderate-high to high impacts will occur. The impact on remaining natural patches of grassland as well as the wetland systems in the southern portion of the site will especially be heavily affected. However, should adequate mitigation be implemented as described these can all be reduced to moderate and low-moderate impacts. This is however subject to the development footprint being retained within areas of low sensitivity and avoiding any patches of remaining natural grassland as well as the wetland systems on the site

Should development of the solar facility be able remain within transformed areas, this will greatly decrease the anticipated impacts. However, should the development encroach into adjacent remnant patches of natural grassland this will entail a high impact. Being a mining area, this results in transformation and degradation of large portions of land. The cumulative impact of development and mining in this area is therefore high. The proposed solar development should therefore first consider the development of areas considered as already transformed and of low sensitivity. These include the old ploughed fields and areas which previously consisted of buildings and structures. Only if no remaining options remain should the development consider encroaching into remaining natural areas. However, in this instance it will result in high impacts. Likewise the remaining natural wetland areas in the southern portion of the site will also have a high level of sensitivity and should be avoided by development but will be discussed in greater detail in the wetland assessment section of the report.

Due to the largely transformed nature of the development area, no protected or endangered plant species were noted. Although the possibility remains that may be present in those patches of remaining natural grassland, the likelihood is considered fairly low. The area does however contain quite a substantial infestation of invasive trees, and this will pose a risk of spreading into surrounding natural areas, especially as construction of the solar development will increase disturbance in the area (**Appendix B**). The proposed

development will also have to implement a comprehensive monitoring and eradication programme to ensure that invasive plant species are removed from the area and prevented from re-establishing.
Given the largely transformed condition of the site no protected or endangered plant species were noted. Although the possibility remains that may be present in those patches of remaining natural grassland, the likelihood is considered fairly low. The anticipated impact on the loss of protected or endangered plant species is therefore fairly low.

Avifauna Impacts

Five avifaunal habitat types were identified on the study site and surroundings, ranging from untransformed and secondary grassland, bush clump mosaics to transformed and landscape/manicured areas. The study site was also surrounded by a number of pans, which provided habitat for a high diversity of waterbird taxa. Approximately 152 bird species are expected to occur in the wider study area, of which 85 species were observed in the study area (during two surveys). The expected richness included five threatened or near threatened species, 14 southern African endemics and 14 near-endemic species. The vulnerable Lanner Falcon (*Falco biarmicus*) was observed on the study site (during a fly-over). Eleven southern African endemics and 11 near-endemic species were confirmed on the study site.

An evaluation of potential and likely impacts on the avifauna revealed that the impact significance was moderate to low after mitigation (depending on the type of impact). However, the risk for certain waterbirds (including flamingo taxa) colliding with the PV infrastructure remained eminent due to the presence of inundated pans in the study area. Post-construction monitoring was recommended along with the installation of appropriate bird diverters to minimise the potential risk of collision trauma in birds.

No fatal-flaws were identified during the assessment, although it was strongly recommended that the proposed mitigation measures and monitoring protocols (e.g. post construction monitoring) be implemented during the construction and operational phase of the project.

Soils and Agricultural Impacts

The soil and agricultural properties and sensitivities of the proposed Harmony Central solar PV facility development was the subject of the Agricultural Agro-Ecosystem Assessment conducted. The study found that the area consists of two different natural soil forms, i.e. Avalon and Bainsvlei, ranging from 0.3m to 0.9m in effective soil depth. The areas with existing soil disturbance, are classified as Technosols.

The largest portion of the development area has land with Moderate (Class 08) land capability that is suitable for dryland crop production. Small areas scattered in between has lower land capability (Class 06 and 07 – Low-Moderate) and higher land capability (Class 09 – High-Moderate). The sensitivity rating of the site was also based on the soil classification of the site as well as the current land use. Approximately 166.3 ha has Medium agricultural sensitivity and 44.4ha has Low sensitivity. The entire development footprint falls on land with Medium sensitivity. The proposed development footprint exceed the allowable limit with 29.4ha for the areas with Medium sensitivity.

It is anticipated that the construction and operation of the Harmony Central solar PV facility will have impacts that range from medium to low. Through the consistent implementation of the recommendation mitigation measures, most of impacts can all be reduced to low. Since the area around the development footprint will be fenced off, it is not anticipated that the impact on livestock grazing can be mitigated as this area will now be excluded from livestock farming.

Considering that the infrastructure components, including the proposed substation, will be placed in close proximity to each other, I confirm that as far as I know, all reasonable measures have been taken to avoid or minimize fragmentation and disturbance of agricultural activities, provided that the mitigation measures provided in this report are implemented.

It is the opinion of the specialist that even though the development footprint includes areas with Medium agricultural sensitivity that exceeds the allowable development limits, this application be considered favourably. The area has not been used for crop production since 2014 (according to the land owner) and aerial imagery has confirmed that the area has not been from 2010 onwards. The development is currently used for cattle grazing by the local community and this activity can supplement the income of one to two people's families.

However, the project is considered acceptable permitting that the mitigation measures stipulated in this report are followed to prevent soil erosion and soil pollution and to minimise impacts on the veld quality of the farm portions that will be affected. The project infrastructure should also remain within the proposed footprint boundaries that will be fenced off.

Archaeology and Palaeontological Impacts

The areas surveyed as part of this assessment have been transformed through agricultural interventions and/or mining activity. No archaeological resources of scientific cultural value were identified within the area proposed for the Central PV Facility and its grid connection and as such, no impact to significant archaeological heritage resources is anticipated.
Furthermore, no impacts to significant palaeontological heritage is anticipated on condition that the attached. Chance Fossil Finds Process is implemented and no impacts to the cultural landscape are anticipated.

There is no objection to the development of the proposed project, on condition that:
- The Chance Fossil Finds Procedure must be implemented for the duration of construction activities.
- Should any previously unrecorded archaeological or palaeontological resources or possible burials be identified during the course of construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward

Visual Impacts

Overall, the post mitigation significance of the visual impacts is expected to range from moderate to low. An additional mitigating factor for the proposed PV facility is the fact that it utilises a renewable source of energy (considered as an international priority) to generate electricity and is therefore generally perceived in a more favourable light. The PV Facility does not emit any harmful by-products or pollutants and is therefore not negatively associated with possible health risks to observers.

A number of mitigation measures have been proposed to reduce the significance of anticipated visual impacts. Regardless of whether or not mitigation measures will reduce the significance of the anticipated visual impacts, they are considered to be good practice and should all be implemented and maintained throughout the construction, operation and decommissioning phases of the proposed facility.

If mitigation is undertaken as recommended, it is concluded that the significance of most of the anticipated visual impacts will remain at or be managed to acceptable levels. As such, the PV facility and associated infrastructure would be considered to be acceptable from a visual impact perspective and can therefore be authorised.

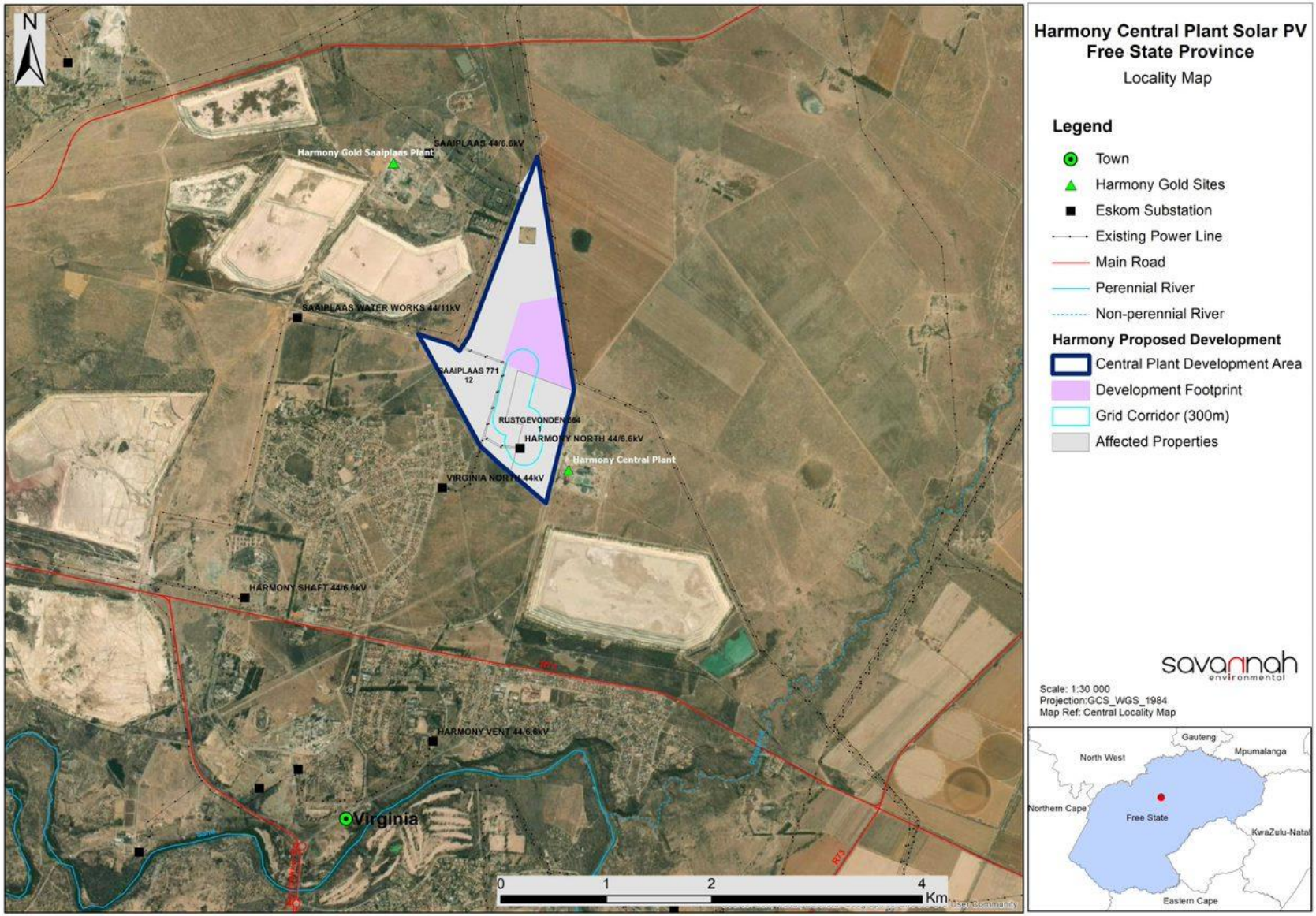

Figure A: Locality map showing the location of the project site proposed for the development of the Harmony Central Plant Solar PV Facility

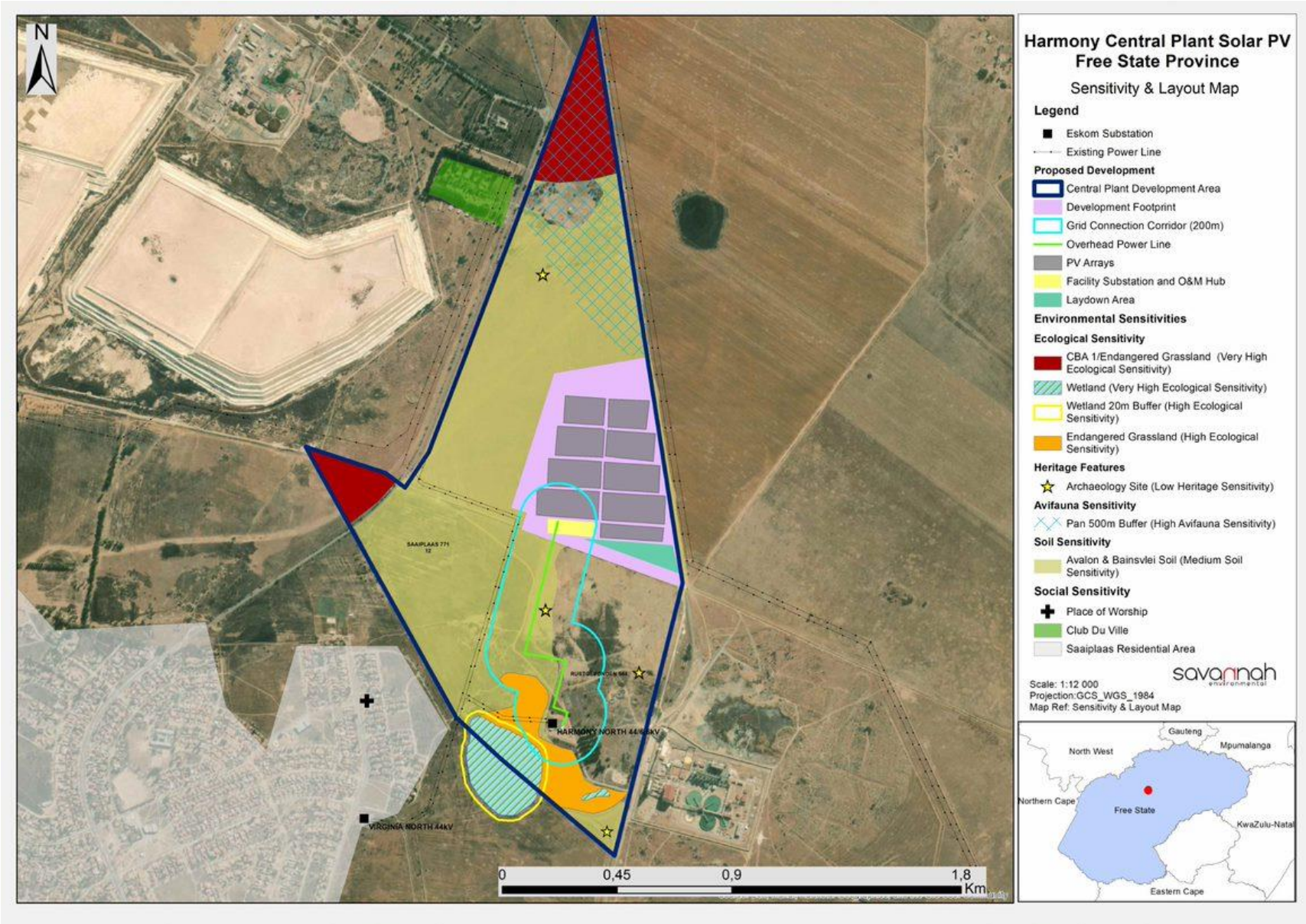

Figure B: Environmental sensitivity map overlain with the development area and grid connection corridor for the Harmony Central Plant Solar PV Facility

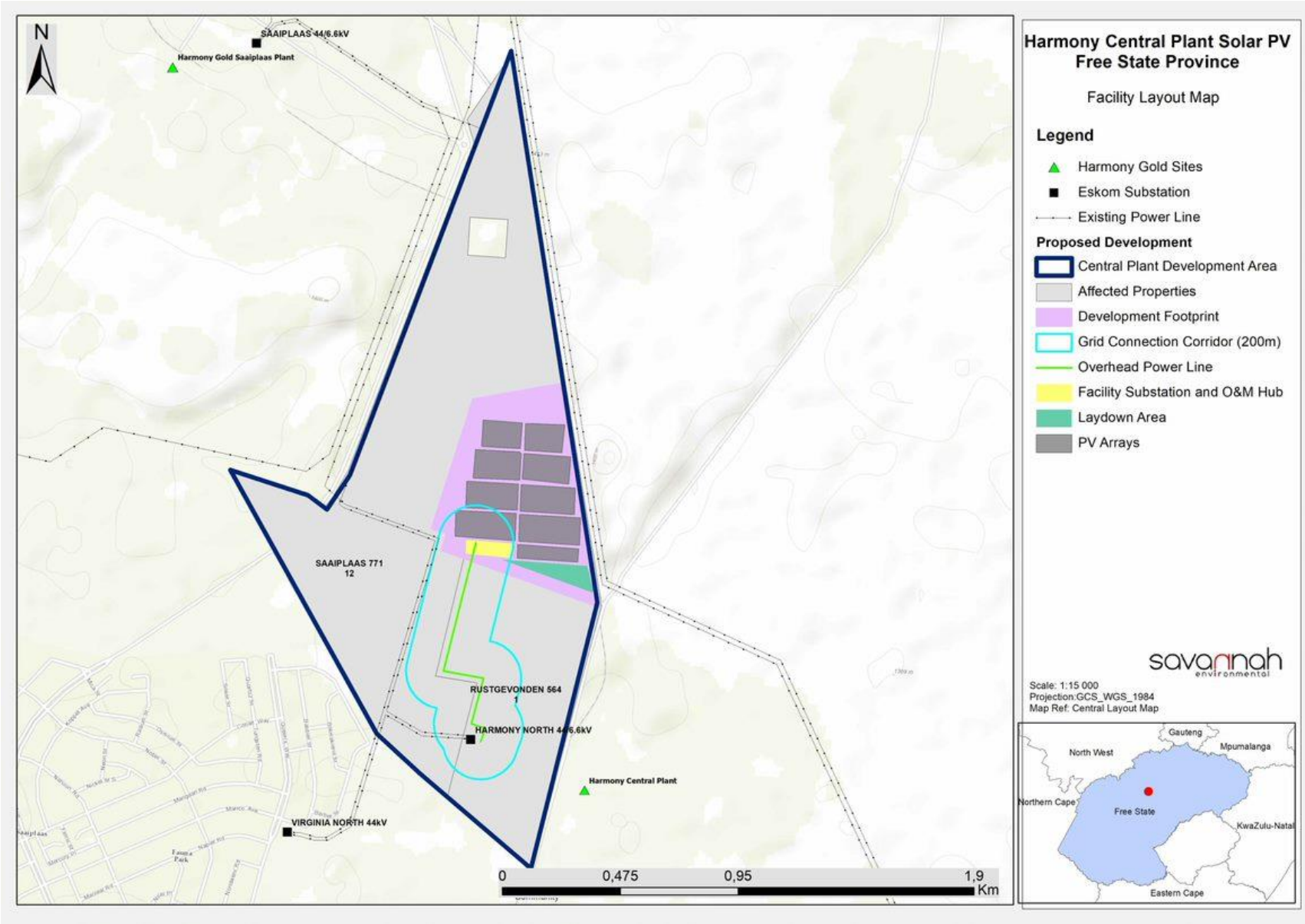

Figure C: Facility layout for the Harmony Central Plant Solar PV Facility

DEFINITIONS AND TERMINOLOGY

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Assessment: The process of collecting, organising, analysing, interpreting, and communicating information which is relevant.

Biodiversity: The variables among living organisms from all sources, including, terrestrial, marine, and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Commissioning: Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the wind turbine are installed.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g., discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Development area: The development area is that identified area (located within the project site) where the Harmony Central Plant Solar PV Facility is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints, and has been assessed within this BA Report and by the respective specialists. The development area is up to ~80ha in extent.

Development footprint: The development footprint is the defined area where the PV panel array and other associated infrastructure for the Harmony Central Plant Solar PV Facility is planned to be constructed. This is the anticipated actual footprint of the facility, and the area which would be disturbed. The exact size of the footprint is to be determined however, following initial layout optimisation, the footprint is up to ~28ha.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g., noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Emergency: An undesired/ unplanned event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

i. The land, water and atmosphere of the earth.
ii. Micro-organisms, plant and animal life.
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Authorisation (EA): means the authorisation issued by a competent authority (Free State Department of Economic, Small Business Development, Tourism & Environmental Affairs (FSDESTEA)) of a listed activity or specified activity in terms of the National Environmental Management Act (No 107 of 1998) (NEMA) and the EIA Regulations promulgated under the NEMA.

Environmental Assessment Practitioner (EAP): An individual responsible for the planning, management and coordinating of EMPRs plan or any other appropriate environmental instruments introduced by legislation.

Environmental Control Officer (ECO): An individual appointed by the Owner prior to the commencement of any authorised activities, responsible for monitoring, reviewing, and verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and conditions of the EA.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment

Environmental Management Programme (EMPr): An operational plan that organises and co-ordinates mitigation, rehabilitation, and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Habitat: The place in which a species or ecological community occurs naturally.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical, or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Indigenous Vegetation: Defined in NEMA as: vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien plant infestation OR Land where the topsoil has not been lawfully disturbed during the preceding ten years.

Incident: An unplanned occurrence that has caused, or has the potential to cause, environmental damage.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g., the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place because of the activity.

Interested and affected party (I&AP): Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Method statement: A written submission to the ECO and the site manager (or engineer) by the EPC Contractor in collaboration with his/her EO.

No-go areas: Areas of environmental sensitivity that should not be impacted on or utilised during the development of a project as identified in any environmental reports.

Photovoltaic effect: Electricity can be generated using photovoltaic panels (semiconductors), which are comprised of individual photovoltaic cells that absorb solar energy to produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the Photovoltaic Effect.

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust, or heat emitted from any activity, including the storage or treatment or waste or substances.

Pre-construction: The period prior to the commencement of construction, this may include activities which do not require Environmental Authorisation (e.g., geotechnical surveys).

Project site: The project site is that identified area within which the development area and development footprint are located. It is the broader geographic area assessed as part of the BA process, within which direct effects of the proposed project may occur. The project site is ~210ha in extent.

Project description: A description of the proposed project that includes technical details of the siting, operation

Residual impacts: Predicted effects of a project on the environment after proposed mitigation measures have been adopted; in other words, the predicted actual effects of the project.

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment

DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326), the applicant has appointed Savannah Environmental (Pty) Ltd as the independent environmental consultant responsible for managing the Application for EA and supporting Scoping and Environmental Impact Assessment (S&EIA) process; inclusive of comprehensive, independent specialist studies. The application for EA and Basic Assessment process will be managed in accordance with the requirements of NEMA, the 2014 EIA Regulations (GNR 326), and all other relevant applicable legislation.

Neither Savannah Environmental nor any of its specialists are subsidiaries or are affiliated to the applicant. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed facility. Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned) and is rated as a Level 2 Broad-based Black Economic Empowerment (B-BBEE) Contributor. Savannah Environmental's team have been actively involved in undertaking environmental studies since 2006, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development.

The Savannah Environmental team for this project includes:

- **Chantelle Geyer** was the junior EAP on this project and the GIS Practitioner, she holds a BSc degree in Environmental Science, and a BSc Honours degree in Environmental Geology degree from the North-West University in Potchefstroom, South Africa. She is a Junior Environmental Consultant and specialises in basic assessments, environmental impact assessments, GIS-mapping, public participation administration, and environmental management programmes.
- **Ansoné Esterhuizen**, is the registered EAP (2020/291) with the Environmental Assessment Practitioners Association of South Africa. She holds a Bachelor of Arts in Environmental Management and is currently completing her BSc Honours in Environmental Management. She has over 4 years of experience in conducting Environmental Impacts Assessments, public participation, and Environmental Management Programme for a wide range of projects including renewable energy projects
- **Karen Jodas** is Director at Savannah Environmental (Pty) Ltd and the project manager for the Harmony Gold projects, she holds a Master of Science Degree and is registered as a Professional Natural Scientist (400106/99) with the South African Council for Natural Scientific Professions (SACNASP). She has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through her involvement in related EIA processes over the past 25 years. She has successfully managed and undertaken EIA processes for infrastructure development projects throughout South Africa.
- **Nicolene Venter,** is a Board Member of IAPSA (International Association for Public Participation South Africa). She holds a Higher Secretarial Diploma and has over 21 years of experience in public participation, stakeholder engagement, awareness creation processes and facilitation of various meetings (focus group, public meetings, workshops, etc.). She is responsible for project management of public participation processes for a wide range of environmental projects across South Africa and neighbouring countries.

Curricula vitae (CVs) detailing Savannah Environmental team's expertise and relevant experience are provided in **Appendix G1**.

BASIC ASSESSMENT REPORT FOR REVIEW

This Basic Assessment Report has been prepared by Savannah Environmental to assess the potential environmental impacts associated with the project. This process is being undertaken in support of an application for EA from the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA) in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA).

The 30-day period for review is from 02 September 2022 to 03 October 2022. The report is available for public review at (http://www.savannahsa.com/public-documents/energy-generation/). All comments received and recorded during the 30-day review and comment period will been included, considered, and addressed within the final BA Report to be submitted to the Competent Authority for consideration.

Comments should be submitted in writing on or before 03 October 2022 to the contact person below.

Please submit your comments by **03 October 2022** to:
Nicolene Venter of **Savannah Environmental** PO Box 148, Sunninghill, 2157 Tel: 011-656-3237 Mobile: 060 978 8396 Fax: 086-684-0547 Email: publicprocess@savannahsa.com

Comments can be made as written submission via fax, post, or email.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section? YES **NO**

If **YES**, please complete the form entitled "Details of specialist and declaration of interest" for the specialist appointed and attach in Appendix I.

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Based on: Normal

1. PROJECT DESCRIPTION

a) Describe the project associated with the listed activities applied for

Harmony Gold Mining Company (Pty) Ltd (a subsidiary of Harmony Gold Mining Company Ltd) is looking to supplement its energy supply by implementing Photovoltaic (PV) generation, aiding their transition to a more sustainable and environmentally friendly energy mix.

The development of a solar photovoltaic (PV) facility with a generating capacity of 14MW is proposed on a site located east of the Harmony Gold Central Plant operations, approximately ~6km north east of the town of Virginia, and ~11km south east of the town of Welkom within the Matjhabeng Local Municipality and within the Lejweleputswa District Municipality, Free State Province. The PV facility is located on Portion 12 of the farm Saaiplaas 771 and Portion 1 of the Farm Rustgevonden 564 which are owned by the Mine.

The solar PV development will be known as Harmony Central Plant Solar PV Facility. The preferred site for the project is on properties which are owned by the Mine and are available for the proposed project. A project site[1] considered to be technically suitable for the development of the solar PV facility, with a site extent of approximately 210 hectares, was identified. A development area[2] of ~80ha was demarcated within this project site, and allows an adequate footprint[3] for the installation of a solar PV facility with a contracted capacity of up to 14MW, while allowing for the avoidance of environmental site sensitivities.

The full extent of the project site is evaluated in the Basic Assessment process to identify sensitivities. Site-specific studies and assessments have delineated areas of potential sensitivity within the development area (refer to **Figure 1**). These have been avoided by the appropriate placement of infrastructure within the development footprint (refer to **Figure C**).

The infrastructure associated with the 14MW solar PV facility will include:

- modules and mounting structures.

[1] The project site is that identified area within which the development area and development footprint are located. It is the broader geographic area assessed as part of the BA process, within which direct effects of the proposed project may occur. The project site is ~210ha in extent.
[2] The development area is that identified area where the 14MW PV facility is planned to be located. This area has been selected as a practicable option for the facility, considering technical preference and constraints. The development area is ~80ha in extent.
[3] The development footprint is the defined area (located within the development area) where the PV panel array and other associated infrastructure for the Harmony Central Plant Solar PV facility is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

- Inverters and transformers a SCADA room, and maintenance room.
- Cabling between the project components, to be laid underground where practical.
- Access roads, internal roads and fencing around the development area.
- Temporary and permanent laydown areas.
- Grid connection infrastructure including an on-site facility substation and a switching substation to be connected to the existing Harmony North Substation via an overhead power line (located in the southern corner of the site).

The site is accessible via the R73, which is located directly adjacent to the south of the proposed site.

As of 2019,the Industrial sector was the leading electricity consumer in South Africa, with up to 56 percent of the total consumption (Ratshomo 2019).Mining and quarrying accounted for 10% of the industrial consumption (Chamber of Mines of South Africa, 2017).The successful development of the renewable energy project will enable Harmony Gold to make a valuable and meaningful contribution towards growing the green economy within the Free State Province and South Africa. This will assist the Free State in creating green jobs and reducing Green House Gas emissions, while reducing the energy demand on the Eskom national grid.

Table 1 below provides the details of the project, including the main infrastructure components and services that will be required during the project life cycle.

Table 1: Details of the proposed Harmony Central Plant Solar PV Facility and associated infrastructure

Component	Description / Dimensions
District Municipality	Lejweleputswa District Municipality
Local Municipality	Matjhabeng Local Municipality
Ward Number (s)	Ward 8
Nearest town(s)	Virginia
Farm name(s) and number(s) of properties affected by the Solar Facility	» Portion 1 of the Farm Rustgevonden 564 (F03500000000056400000).
Portion number(s) of properties affected by the Solar Facility	» Portion 12 of the Farm Saaiplaas 771 (F03500000000077100012).
SG 21 Digit Code (s)	
Current zoning	Mining
Site Coordinates (centre of development area)	28° 2'56.76"S, 26°52'57.61"E
Total extent of the Affected Properties, also referred to as the study area	~210ha
Total extent of the Development area	Up to ~80ha
Total extent of the Development footprint	Up to ~28ha
Contracted capacity of the facility	Up to 14MW
PV panels	Height: up to 6m from ground level (installed).
	»
On-site Facility Substation	» Located within the development footprint. » Approximately 200m² in extent. » The substation will connect to the existing Harmony North (substation via a new overhead power line.

Access gravel roads and internal roads	» Access to the proposed development area is provided by a secondary road that traverses from the R73 Road (at the Central Plant's west gate) to the Harmony Central Plant Solar PV. » A main gravel access road up to 8m in width and 200m in length will be constructed to provide direct access to the development area. » A network of 6m wide (with a total length of 200m) gravel internal access roads will be constructed to provide access to the various components of the facility.
Laydown area	» Up to 10 000m².
O&M building	» Up to 200m².
Services required	» *Auxiliary Electricity* – electricity will either be sourced from Harmony Central Plant or directly from Eskom. » *Water Supply* - water will be sourced from the Harmony Central Plant / procured from the Matjhabeng Local Municipality, or through a Contractor upon reaching a Service Level Agreement. » *Waste Collection / Removal* - only refuse disposal will be required. Refuse will be collected by the municipality or by a Contractor and be disposed of at a licensed waste disposal facility. » *Sanitation* - No effluent will be generated by the project, except for normal sewage due to the presence of construction and O&M personnel on-site (during the construction and operations phase). The sewage will be collected and treated in accordance with the legislative framework using a septic or conservancy tank. Should the Matjhabeng Local Municipality not permit the use of the conservancy / septic tank, the sewage will be kept in the conservancy tank and be collected by a Contractor with a honey-sucker truck. The Matjhabeng Local Municipality will be engaged before Financial Close to determine if they have the capacity to render the above-mentioned services. If not, the applicant will go out to tender to obtain these services.

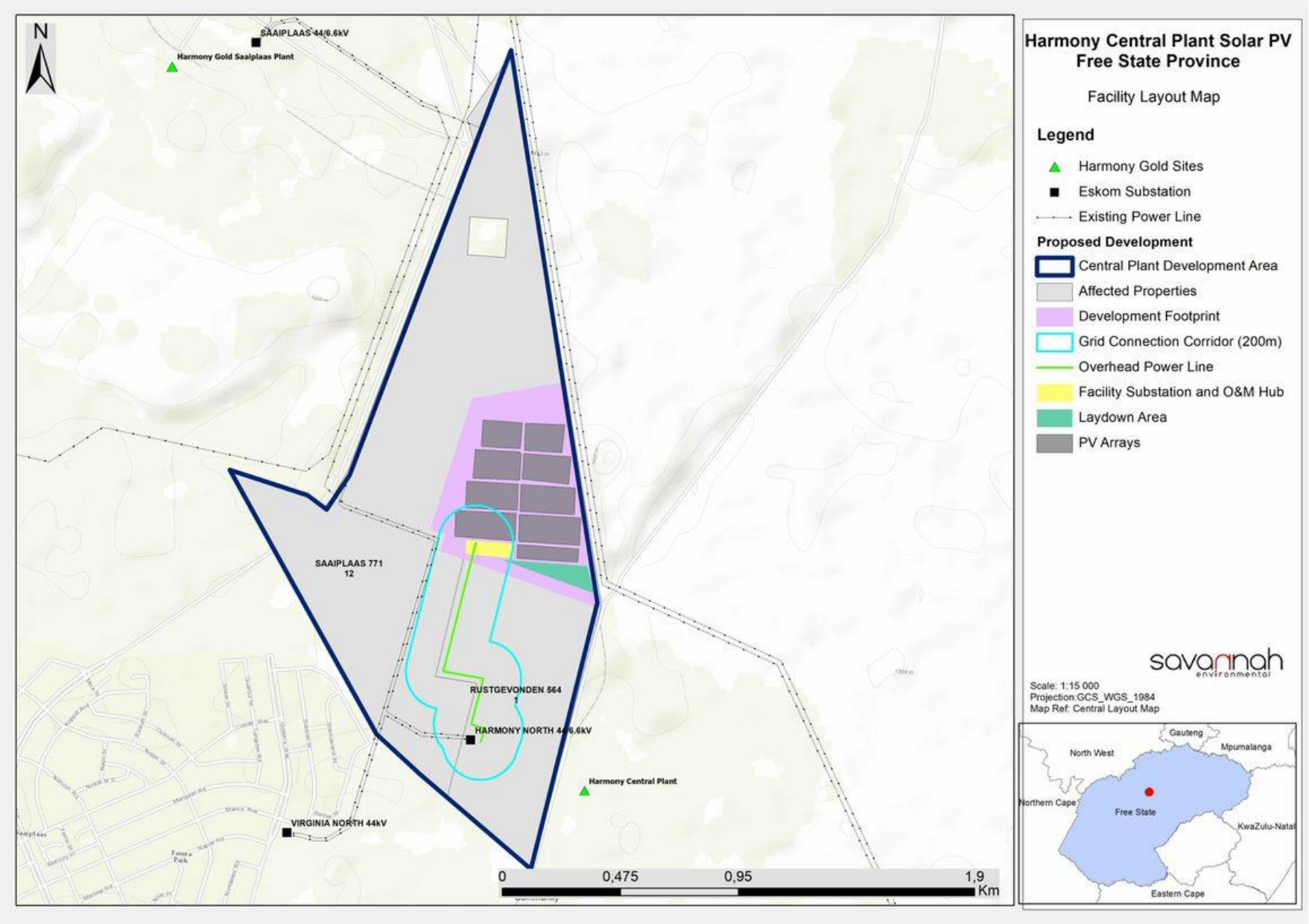


Figure 1: Locality map illustrating the location of the development area under investigation for the development of the 14MW Harmony Central Plant Solar PV Facility

b) Provide a detailed description of the listed activities associated with the project as applied for

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended	Describe the portion of the proposed project to which the applicable listed activity relates.
1(ii)	The development of facilities or infrastructure for the generation of electricity from a renewable resource where – (ii) the output is more than 10 megawatts but less than 20 megawatts	***The project comprises a renewable energy generation facility, which will utilise solar power technology and will have a contracted capacity of up to 14MW.***
11 (i)	The development of facilities or infrastructure for the transmission and distribution of electricity – (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275kV or more.	***Electrical infrastructure is required to connect the PV facility to the existing Harmony North Substation and will consist of an on-site substation and an overhead power line of more than 33kV and less than 275kV. The site falls outside an urban area.*** ***The site falls outside an urban area.***
12(ii)(a)(c)	The development of – (ii) infrastructure or structures with a physical footprint of 100 square meters or more, where such development occurs – (a) within a watercourse; or (c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse.	***Wetlands have been identified within the development area . The construction of the PV facility and associated infrastructure will require the establishment of infrastructure within a physical footprint is within a watercourse or within 32 metres of a watercourse identified within the project area.***
14	The development and related operation of facilities and infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.	***The development of the project will require the construction and operation of facilities and infrastructure for the storage and handling of a dangerous good (combustible and flammable liquids, such as oils, lubricants, solvents) associated with the on-site substation where such storage will occur inside containers with a combined capacity exceeding 80 cubic meters but not exceeding 500 cubic meters.***
Listing Notice 1 (GNR 327) 08 December 2014 (as amended)	19 (ii)	The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10 cubic meters from a (i)watercourse. ***Some parts of the development area are located within watercourses and will***

		require the removal of approximately 10 cubic metres of soil and rock from the watercourses during the construction phase.
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.	***The clearance of an area >1ha but less than 20ha of indigenous vegetation will be required for the development of the PV facility and associated infrastructure.*** ***Although the area falls within the Vaal Vet Laagte, which tends to be a protected vegetation, the ecological studies have concluded that the area has been largely transformed and as a result little to no indigenous vegetation remain on site.*** ***The project would therefore result in the clearance of indigenous vegetation within an area of 1 hectare or more, but less than 20 hectares, for the development of infrastructure.***
Activity No(s):	**Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended**	**Describe the portion of the proposed project to which the applicable listed activity relates.**
4(b)(i) (gg)	The development of a road wider than 4 metres with a reserve of less than 13.5 metres. b. Free State i. Outside urban areas: (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve, excluding disturbed areas.	***The development of Harmony Central Plant Solar PV Facility will require the construction of a main gravel access road and internal gravel roads. The site is located in the Free State Province outside of an urban area and is located less than 5km from the Thabong Game Ranch, which classified as Nature reserve in the South African Protected Areas Dataset (SAPAD).*** ***A CBA1 area overlaps with the northern and western points of the property.***
10(b)(i) (gg)(hh)	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. b. Free State i. Outside urban areas: (gg) Areas within 10 kilometres from national parks or would heritage sites or 5 kilometres from any other protected area identified in	***The development of the project will require the construction and operation of facilities and infrastructure for the storage and handling of a dangerous good (combustible and flammable liquids, such as oils, lubricants, solvents) associated with the on-site substation where such storage will occur inside containers with a combined capacity exceeding 30 cubic meters.*** ***The site is located in the Free State Province, outside an urban area, and***

	terms of NEMPAA or from the core areas of a biosphere reserve; or (hh) Areas within a watercourse or wetlands; or within 100 metres from the edge of a watercourse or wetland.	***within 5km of the Thabong Game Ranch, which classified as Nature reserve in the South African Protected Areas Dataset (SAPAD).*** ***A CBA1 area overlaps with the northern and western points of the property***
12 (b) (i)	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. b. Free State i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;	***An area in excess of 300m² of indigenous vegetation would be required to be cleared. A CBA1 area overlaps with the northern and western points of the property.***
14(ii)((a)(c)(b)(i) (hh)	The development of – (ii) infrastructure or structures with a physical footprint of 10 square meters or more, where such development occurs – (a) within a watercourse; or (c) if no development setback exists, within 32 meters of a watercourse, measured from the edge of a watercourse. b. Free State i. Outside urban areas: (hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere or reserve.	**The development of the Harmony Central Plant Solar PV Facility will require the establishment of infrastructure (including a power line, and internal access roads) with a physical footprint exceeding 10m² within 32m of a watercourse.** **The site is located in the Free State Province, outside an urban area and within 5km of the Thabong Game Ranch, which is classified as a Nature reserve in the South African Protected Areas Dataset (SAPAD**). ***A CBA1 area overlaps with the northern and western points of the property***

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

(a) the property on which or location where it is proposed to undertake the activity.
(b) the type of activity to be undertaken.
(c) the design or layout of the activity.
(d) the technology to be used in the activity.
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application as required by Appendix 1 (3)(h) of GN 326, Regulation 2014 as amended. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity (NOT PROJECT) could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes, etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

The identification of alternatives should be in line with the Integrated Environmental Assessment Guideline Series 11, published by the DEA in 2004. Should the alternatives include different locations and lay-outs, the co-ordinates of the different alternatives must be provided. The co-ordinates should be in degrees, minutes and seconds. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

a) Site alternatives

the property on which or location where it is proposed to undertake the activity

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
The placement of a Solar PV Facility is dependent on several factors, including land suitability; climatic conditions (solar irradiation levels); topography; location of the study area; availability of grid connection infrastructure; extent of the study area; latitude of the site; and the need and desirability of the project. From a regional site selection perspective, the Free State region is considered to be favourable for the development of a Solar PV Facility as it is ranked number 3 amongst South Africa's provinces in terms of its estimated solar power generation potential. From a local level perspective, the project site has specifically been identified by Harmony Gold Mining (Pty) Ltd as	28° 2'56.76"S	26°52'57.61"E

being highly desirable for the development of a Solar PV Facility based on the following characteristics: » **Solar resource:** The economic viability of a Solar PV Facility is directly dependent on the annual direct solar irradiation values of the area within which it will operate. The Global Horizontal Irradiation (GHI) for the study area is in the region of approximately 1900 - 2050 kWh/m^2/annum. This is considered feasible for the development of a Solar PV Facility. Based on the solar resource available, no alternative locations are considered. » **Topography:** The topography of the study area is described as slightly undulating plains with an even (flat) slopes. The proposed development site itself is located at an average elevation of 1 470m above sea level and has an even slope to the north. The majority of the development area is characterised by a slope percentage between 0 and 5%, with some smaller patches within the project area characterised by a slope percentage up to 30%. The flat topography of the project area is considered beneficial in terms of the construction activities that will be required. Based on the suitable and preferable topography, no location alternatives are considered for the development. » **Site extent:** The project site (i.e., the affected properties) is up to ~210ha in extent, which is sufficient for the installation of a facility with a contracted capacity of up to 14MW and allowing for avoidance of environmental site sensitivities. The development area and footprint are up to ~80 ha and 28ha in extent, respectively. The project site is sufficient for the proposed project and therefore eliminates the need to consider alternative locations. » **Site access:** Access to the proposed development area is provided by a secondary road that traverses from the R73 to the Harmony Central Plant. A network of internal access roads will be constructed to provide access to the various components of the facility. Sufficient access is therefore available for the delivery of equipment and project components during construction and to access the site during operation. Based on the sufficient access available for the project, no alternative locations are considered. » **Land suitability:** Land use activities within the broader region are predominantly described as cattle farming, with the mining activities and the Harmony Central Plant prominently		

visible within the study area. The proposed project will not conflict with the current land use or any future mine expansions. Sites that facilitate easy construction conditions (i.e., relatively flat topography, lack of major rock outcrops etc.) are favoured during the site selection process for a Solar PV Facility, and the proposed project area fits this criterion. » **Geographic location:** The development area is close to the Harmony Central Plant, one of Harmony Gold's operations. There is no evidence of livestock or game farming, nor recent rainfed crop production within the development area. The project area compliments the proposed land use by repurposing undeveloped land with economically viable land use. » **Latitude of the site:** At higher latitudes, the angle of irradiation is smaller, causing energy to be spread over a large area of the surface, resulting in cooler temperatures. At lower latitudes (i.e., between 20° and 30°), the sun is higher in the sky, causing energy to be spread over a small area of the surface, resulting in warmer temperatures. The project site is located at a latitude of 28° 2'56.76"S, 26°52'57.61"E which means that it receives high amounts of solar energy, making it suitable for the development of a Solar PV Energy Facility. » **Access to the Electricity Grid –** A key factor in the siting of any power generation project is the availability of a viable grid connection. Following confirmation of sufficient available land for the development of the Solar PV Facility, the developer considered the possible grid connection points to evacuate the generated power from the PV facility to Harmony Central Plant. » **Environmental screening and consideration of sensitive environmental features:** Following the confirmation of the project site as being technically feasible for the development of a Solar PV Facility, specialist investigations of the development area were undertaken, during which sensitive features were identified. The sensitivity spatial data compiled by the specialist team for the development area and the broader area was provided to Harmony Gold prior to the lodging of the application for the EA. Through the integration of the specialist sensitivity data obtained, Harmony Gold developed a layout that avoids areas and features of high environmental sensitivity.		

As the overall purpose of the facility is to generate power for use Harmony Central Plant, Harmony Gold has identified Portion 1 of the Farm Rustgevonden 564 and Portion 12 of the Farm Saaiplaas 771 as the most feasible option for the development of the facility. This decision was based on land availability for the development of a Solar PV Facility; the proximity to Harmony Gold's Central Plant operations (the exclusive offtake of the generated power); and the distance from a viable grid connection point. Based on the above site-specific attributes and considerations, the development area was identified by Harmony Gold as being the most technically feasible and viable site within the broader area for further investigation in support of an application for EA.		
Alternative 2		
Taking into consideration the solar resource, grid access, land suitability, landowner support, access to road infrastructure, the current land use of the project site and development area, the Harmony Central Plant Solar PV Facility project site was identified by the developer as being the most technically feasible and viable project site within the broader area for further investigation in support of an application for authorisation. As a result, no property alternatives are proposed as part of this Basic Assessment process.	Lat (DDMMSS)	Long (DDMMSS)
Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)

b) The type of activity to be undertaken.

In the case of linear activities:

Alternative:	**Latitude (S):**	**Longitude (E):**
Alternative S1 (preferred)		
• Starting point of the activity	28° 3'3.74"S	26°52'51.32"E
• Middle/Additional point of the activity	28° 3'21.16"S	26°52'53.72"E
• End point of the activity	28° 3'29.40"S	26°52'53.83"E
Alternative S2 (if any)		
• Starting point of the activity		
• Middle/Additional point of the activity		
• End point of the activity		
Alternative S3 (if any)		
• Starting point of the activity		
• Middle/Additional point of the activity		
• End point of the activity		

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment.

In the case of an area being under application, please provide the co-ordinates of the corners of the site as indicated on the lay-out map provided in Appendix A of this form.

The Grid connection proposed for the site was determined the most feasible based on the environmental sensitivities and the proximity to the Harmony North Substation.

The Grid connection infrastructure including an on-site facility substation and a switching substation to be connected to the existing Harmony North Substation via a approximately 2km overhead power line (located in the southern corner of the site). The overhead powerline is being assessed within a 200m wide corridor.

c) Lay-out alternatives

Alternative 1 (preferred alternative)		
Description	Lat (DDMMSS)	Long (DDMMSS)
The full extent of the affected properties (i.e., Portion 1 of the Farm Rustgevonden 564 and Portion 12 of the Farm Saaiplaas 771) is ~ 210ha in extent, which is sufficient for the installation of a Solar PV Facility with a contracted capacity of 14MW, while allowing for the avoidance of environmental site sensitivities. A development footprint of ~28ha has been identified within the affected properties, within which the solar PV facility and its associated infrastructure will be located. The location of the development footprint was informed by the findings of the specialist investigations undertaken during the BA process. Areas to be avoided by the project were identified, specifically relating to ecological, heritage and/or aquatic features. The identified sensitivities were utilised as a tool by Harmony Gold, to identify and locate the development footprint within the project site and development area. This was undertaken with the aim of avoiding possible sensitive areas within the development footprint as far as possible, to limit impacts associated with the project. The environmental sensitivity identification process has informed the layout design for the PV facility, avoiding sensitive areas as far as possible, and thereby ensuring that the layout plan taken forward for consideration during the EIA Phase is the most optimal from an environmental perspective. No layout alternatives are therefore considered further in this BA.	N/A	N/A
Alternative 2		
Description	Lat (DDMMSS)	Long (DDMMSS)

Alternative 3		
Description	Lat (DDMMSS)	Long (DDMMSS)
[redacted]		

d) Technology alternatives

Alternative 1 (preferred alternative)
Since the development area is unsuitable for wind generation, solar energy has been identified by Harmony Gold as the preferred technology for implementation within the development area. Few technology options are available for solar facilities, and the use of those that are considered are usually differentiated by weather and temperature conditions that prevail in the area, so that optimality is obtained by the final site selection. Solar energy is considered the most suitable renewable energy technology for this area, based on-site location, ambient conditions and energy resource availability. Solar PV was therefore determined as the most suitable option for further assessment, and no other technology alternatives are being assessed for the project. Several solar PV technology alternatives are available, including *inter alia*: » Bifacial PV panels. » Monofacial PV panels. » Fixed mounted PV systems (static / fixed-tilt panels). » Single-axis tracking or double-axis tracking systems (with solar panels that rotate around a defined axis to follow the sun's movement). » Monocrystalline modules, polycrystalline modules or thin film modules. The primary difference between PV technologies available relate to the extent and height of the facility; however, the potential for environmental impacts remains similar in magnitude. Fixed mounted PV systems can occupy a smaller extent and have a lower height when compared to tracking PV systems, which require both a larger extent of land, and are taller in height. However, both options are considered acceptable for implementation from an environmental perspective. Bifacial solar PV panels offer many advantages over Monofacial PV panels, as power can be produced on both sides of the module, increasing total energy generation. Monocrystalline polycrystalline or thin film modules differ mainly in their cost and efficiency values, but do not represent a fundamentally different panel design type from an environmental perspective. The preference will, therefore, be determined on technical considerations and the site conditions. The PV panels are designed to operate continuously for more than 30 years, mostly unattended and with low maintenance. The impacts associated with the construction, operation, and decommissioning of the facility are anticipated to be the same irrespective of the PV panel selected for implementation. The preferred technology option will be informed by efficiency as well as environmental impact and constraints (such as sensitive biophysical features). The PV panels proposed, will comprise solar panels which once installed, will stand less than 5m above ground level.
Alternative 2
[redacted]
Alternative 3
[redacted]

e) other alternatives (e.g., scheduling, demand, input, scale and design alternatives)

Alternative 1 (preferred alternative)
No alternative is applicable
Alternative 2
[redacted]
Alternative 3
[redacted]

f) No-go alternative

The 'do-nothing' alternative is the option of not constructing the Harmony Central Solar PV facility at the identified site in the Free State.

Should this alternative be selected, there would be no environmental impacts or benefits as a result of construction and operation activities associated with the solar PV facility for the Harmony Central Mine.

The 'do-nothing' alternative will therefore likely result in minimising the cumulative impact on the land, although the current land use activities on the project site (mining and agriculture) will continue. The socio-economic benefits associated with the implementation of the project would not be realised.

This alternative is assessed in detail in **Section D (2).**

g) Conclusion

Before the initiation of the project for Harmony Central Plant a pre-feasibility study was done to determine the high-level environmental sensitivities. An area of approximately 500ha was evaluated around the Harmony central Mine, from this a feasible project site of 210ha was determined for evaluation by specialists.

The specialist assessments highlighted and ground truthed environmental sensitivities within the project site and a development area of approximately 80ha was put forward to the developer for the location and design of a project development footprint. The development of the Harmony Central Plant Solar PV Facility with a capacity of up to 14MW would require the clearance of up to 28ha for the placement of the solar PV panel array and associated infrastructure, it was however established that the majority of the development footprint area (28ha) is located in an area with previously disturbed vegetation[4].

The ecological assessment found that although there may be smaller areas classified as indigenous vegetation[5] to some extent within the development area, however the development of the project would only result in the clearance of indigenous vegetation within an area of 1 hectare or more, but

[4] Ploughing of land, bulldozing of an area, eradication or removal of vegetation cover with chemicals, amongst others, constitutes clearance of vegetation, provided that this will result in the vegetation being eliminated, removed or eradicated.
[5] Defined in NEMA as: vegetation consisting of indigenous plant species occurring naturally in an area, regardless of the level of alien plant infestation OR Land where the topsoil has not been lawfully disturbed during the preceding ten years.

less than 20 hectares, for the development of infrastructure, this is attributed to the fact that the site has been heavily disturbed within the last 10 years.

The Applicant considers the preferred development area within the study area as being highly favourable and suitable for the establishment of a solar PV facility. The PV facility will be located within close proximity of the Harmony Central Mine. By utilising an already disturbed area, this would mean minimising the potential for cumulative environmental impacts. Furthermore, with the site being near the existing Mine Substation, this ensures that the power line will be relatively short, saving on costs and further reducing cumulative environmental impacts associated with power line infrastructure. The characteristics considered were identified by the developer as the main aspects that play a role in the opportunities and limitations for the development of a Solar PV facility.

Paragraphs 3 – 13 below should be completed for each alternative.

3. PHYSICAL SIZE OF THE ACTIVITY

a) Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative:	**Size of the activity:**
Alternative A1[6] (preferred activity alternative)	28ha – development footprint area for the PV facility
Alternative A2 (if any)	
Alternative A3 (if any)	

or, for linear activities:

Alternative:	**Length of the activity:**
Alternative A1 (preferred activity alternative)	~up to 1km – length of the grid line (linear component)
Alternative A2 (if any)	
Alternative A3 (if any)	

b) Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	**Size of the site/servitude:**
Alternative A1 (preferred activity alternative)	
Alternative A2 (if any)	
Alternative A3 (if any)	

[6] "Alternative A.." refer to activity, process, technology or other alternatives.

4. SITE ACCESS

Does ready access to the site exist? **[Access to the proposed development area is provided by a secondary road]**	[redacted] **NO**
If NO, what is the distance over which a new access road will be built	200m

Describe the type of access road planned:

The proposed PV facility site is accessible from both the M3 and the R730 via secondary roads. A main gravel access road will be constructed to provide direct access to the development. In addition, a network of internal access roads will be constructed to provide access to the various components of the facility.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

1. LOCALITY MAP

An A3 locality map must be attached to the back of this document, as **Appendix A**. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g., 1:250 000 can be used. The scale must be indicated on the map.). The map must indicate the following:

- an accurate indication of the project site position as well as the positions of the alternative sites, if any.
- indication of all the alternatives identified.
- closest town (s;)
- road access from all major roads in the area.
- road names or numbers of all major roads as well as the roads that provide access to the site(s).
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow.
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

A locality map has been included as part of this report as **Appendix A1**.

2. LAYOUT/ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as **Appendix A** to this document.

The site or route plans must indicate the following:

» the property boundaries and numbers of all the properties within 50 metres of the site.
» the current land use as well as the land use zoning of the site.
» the current land use as well as the land use zoning each of the properties adjoining the site or sites.
» the exact position of each listed activity applied for (including alternatives).
» servitude(s) indicating the purpose of the servitude.
» a legend; and
» a north arrow.

A layout plan has been included as part of this report within **Appendix A3**.

3. SENSITIVITY MAP

The layout/route plan as indicated above must be overlain with a sensitivity map that indicates all the sensitive areas associated with the site, including, but not limited to:

» watercourses.
» the 1:100-year flood line (where available or where it is required by DWS).
» ridges.
» cultural and historical features.
» areas with indigenous vegetation (even if it is degraded or infested with alien species); and
» critical biodiversity areas.

The sensitivity map must also cover areas within 100m of the site and must be attached in **Appendix A.**

A map of the layout overlain with the environmental sensitivities has been included as part of this report within **Appendix A4**.

5. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under **Appendix B** to this report**.** It must be supplemented with additional photographs of relevant features on the site, if applicable.

Refer to **Appendix B** for the site photographs.

6. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of at least 1:200 as **Appendix C** for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

A facility illustration has been included as part of this report within **Appendix C**.

7. ACTIVITY MOTIVATION

Motivate and explain the need and desirability of the activity (including demand for the activity):

1. Is the activity permitted in terms of the property's existing land use rights?		**NO**	Please explain
The proposed project is located adjacent to the Harmony Central Plant (owned and operated by Harmony Gold) and is proposed to be developed on properties owned by both Harmony Gold Mining Company (Pty) Ltd and Lozitone Pty Ltd[7]. The proposed site is currently zoned as mining. Therefore, the site will be required to be rezoned to 'special use' as required by the municipality.			
2. Will the activity be in line with the following?			
(a) Provincial Spatial Development Framework (PSDF)	**YES**		Please explain
The Free State PSDF is a provincial spatial and strategic planning policy that responds to and complies with, in particular, the National Development Plan (NDP) Vision 2030 and the National Spatial Development Perspective (NSDP). This framework promotes a developmental state in accordance with the principles of global sustainability as is stated by, among others, the South African Constitution and the enabling legislation. The FS PSDF is based on six growth and development pillars, each of which has its own set of drivers with long-term programmes. Pillar 1 highlights the job creation, economic and sustainable growth by expanding and maintaining basic road infrastructures and through the implementation of alternative electricity infrastructure. The proposed project will create temporary employment opportunities during the construction phase, and no permanent employment opportunities during the operational phase. The proposed project is a renewable energy facility that will provide power to Harmony Central Plant operations, resulting in a reduction of pressure from Harmony Gold Mining's operations on the Eskom national grid. Therefore, the proposed project is in line with the Free State PSDF.			
(b) Urban edge / Edge of Built environment for the area	**YES**	NO	Please explain
The proposed project site is located just outside the urban areas ~7km north east from Virginia, and ~2km east of the Saaiplaas Suburb. The site falls outside the urban edge and is adjacent to the Harmony Central Plant mining boundary.			

[7] A subsiditory of Harmony Gold Mining (Pty) Ltd

(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g., would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	**YES**		Please explain

The project will create direct job opportunities that will stimulate the local economy and produce power through harnessing the solar resource from the project site and is therefore considered an example of sustainable development. As such, the project aligns with the vision of the Matjhabeng Local Municipality: "*By being a benchmark developmental municipality in service delivery excellence*" and with the mission**:**

» "By being a united, non-racial, non-sexist, transparent, responsible municipality"
» "By providing municipal services in an economic, efficient and effective way"
» "By promoting a self-reliant community through the promotion of a culture of entrepreneurship"
» "By creating a conducive environment for growth and development"

The project will therefore not compromise the integrity of the IDP.

Chapter 7 of the municipality's IDF the provision of energy (Electricity), states that South Africa is faced with having to save energy through energy reduction campaigns (Demand Side Management Renewable Energy and Energy Efficiency). Through this programme, carbon emission reduction and climate change mitigation have become the municipality's local priorities, and therefore Matjhabeng is striving to become a leader in the field of climate change mitigation, the reduction of harmful greenhouse gases, and the identification and implementation of alternative sources for Energy. Renewable energy, proper energy-efficient measures, and the successful institutionalisation of climate change mitigation in all spheres of business form part of this commitment.

The Municipality's vision and mission are translated into the following five municipal key performance areas:

- KPA1: Good governance
- KPA 2: Basic Service delivery
- KPA 3: Inclusive economic development and job creation
- KPA 4: Institutional transformation
- KPA 5: Financial sustainability and viability

The Matjhabeng Local Municipality recognizes the need to meet the energy requirements of its residents in a dynamic changing sector. The LM understands the benefits of renewable energy development as playing the following factors to the region:

- Savings on the current and already substantial Eskom Bill as the Project's tariff is lower than the Eskom tariff and the escalation rate is fixed per year at its applicable CPI rates during the life cycle of the Project.
- Potential to attract foreign investments and subsequently achieve economic growth.
- Additional revenue stream due to the innervational technology, which has the potential to enable the selling of excess power to Eskom or another off-taker.
- Refinancing the current Eskom debt for immediate relief.
- Financial investment into the municipality jurisdiction that will boost the economic cycle of the community.
- New upcoming industrialization activity attraction.
- Job creation, skills development and Small Medium Micro Enterprises (SMME) development; and
- Transforming the energy sector in SA and Africa as per its current timeline.

For the mining sector the major challenges include the over-dependence of the local economies on mining. Linked to these key sectors is the need to consider youth development. The key issues pertaining to both the province and the MLM include:

- African youths are the majority in the Free State, and they are also the most disadvantaged. Consequently, all attempts at intervening on behalf of youths should mainly target the African youth.
- There is an inherent lack of skills particularly amongst the African and Coloured youths, which leads to high unemployment amongst these groups.
- Youths are both perpetrators and victims of wrong social behaviours. They are at risk of being exposed to risky sexual behaviour, HIV & AIDS, and being head of a household.

(d) Approved Structure Plan of the Municipality	**YES**		Please explain

There are several renewable energy projects that are proposed in the Matjhabeng Local Municipality under the Department of Mineral Resources and Energy (DMRE's) Renewable Energy Independent Power Producers Procurement Programme (REIPPPP). However, the proposed Harmony Central Plant Solar PV Facility will not be bid under the REIPPP Programme as it is the developer's intention to supply the generated power to Harmony Central Plant as a way of reducing total carbon emissions and diversifying the electricity supply to its Harmony Central Plant's operations. The municipality will need to confirm whether the existing municipal infrastructure available will have the capacity for the proposed project, including the capacity for the handling of waste in the associated waste landfill.

(e) An Environmental Management Framework (EMF) adopted by the Department (e.g., Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)		**NO**	Please explain

The Matjhabeng Local Municipality does not have an EMF as a development guiding tool in its jurisdiction.

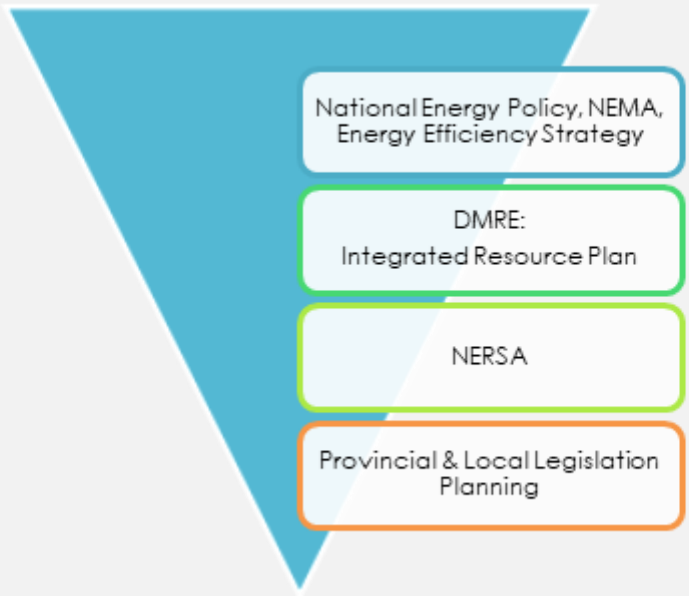
(f) Any other Plans (e.g., Guide Plan)		**NO**	Please explain

N/A

3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e., is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	**YES**		Please explain

The main purpose of the development is to generate electricity from a renewable resource, which will be supplied to Harmony Central Plant's operations. The project is not specifically considered within the approved municipal SDF. However, the municipality identified basic service delivery such as electricity, job creation and economic growth as priorities within the SDF and IDP both locally and within the district municipality. The proposed development will assist in achieving these objectives.

4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g., development is a national priority, but within a specific local context it could be inappropriate.)	**YES**		Please explain
The proposed development will benefit the local community through job creation, skills development opportunities, and training which will, in turn, assist in reducing the poverty levels that the area is currently facing, and indirectly strengthen the electricity supply for the area. The solar facility will generate power for the Mine's own use, reducing the Mine's reliance on the Eskom power supply/network. The project will also assist the government in achieving the goal of adding new capacity from renewable energy as part of the electricity generation technology mix by 2030. In addition, the project will assist in the reduction of the need to mine non-renewable resources such as coal for conventional power generation.			
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater to the development? (Confirmation by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)	**YES**		Please explain
The Matjhabeng Local Municipality will be engaged prior to commencement of the development.			
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)? (Comment by the relevant Municipality in this regard must be attached to the final Basic Assessment Report as Appendix I.)		**NO**	Please explain
The proposed project is to be developed by a private developer (i.e., Harmony Gold) and not the municipality. It, therefore, does not fall within, nor does it have any implications for the infrastructure planning of the municipality.			
7. Is this project part of a national programme to address an issue of national concern or importance?	**YES**		Please explain
The need to expand electricity generation capacity in South Africa is based on national policy and informed by on-going strategic planning undertaken by the Department of Mineral Resources and Energy (DMRE). The hierarchy of policy and planning documentation that support the development of renewable energy projects such as a solar energy facility is illustrated below.			



The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. As solar energy developments are a multi-sectoral issue (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process of a solar energy project and the related statutory environmental assessment process.

The energy action plan announced by Ramaphosa on 25 July 2022 is multi-faceted. It is aimed at ensuring energy security in South Africa by making improvements to Eskom, the country's state-owned public utility, curbing loadshedding and transforming the energy framework. A role is envisaged for South Africans to be part of the solution.

In the plan the following aims were set out

- *A complete scrapping of licensing requirements for private energy projects* that feed into the electricity grid. Until August 2021, all energy generation facilities of more than 1MW required a licence. Then, the cap was lifted to 100MW – which led to more than 80 private sector electricity projects with a combined planned capacity of over 6 000MW.
- Over the next three months, *Eskom will start to buy electricity from existing independent power producers*.
- *Eskom will import power from Botswana and Zambia*, which have more electricity capacity than they require.
- Government departments will now take a "*pragmatic approach" to the requirements to use locally manufactured inputs* for green energy projects.
- The amount of new generation capacity procured through *Bid Window 6 for wind and solar power will be doubled from 2 600 MW to 5 200 MW*. Further bid windows will be released "on an expedited basis".
- *Special legislation will be tabled* in Parliament soon to address the legal and regulatory obstacles to new generation capacity "for a limited period". Ramaphosa says it currently takes almost 1 000

days to get a project from design to operation due to all the necessary regulatory approvals and red tape.

- *Eskom has been given the go-ahead to increase its budget* over the next 12 months for critical maintenance.
- Businesses and households will be encouraged to install rooftop solar and to connect this to grid.
- To incentivise greater uptake of rooftop solar, Eskom will develop rules and a pricing structure – known as a feed-in tariff – for all commercial and residential installations on its network.
- Eskom will be constructing its first solar and battery storage projects at Komati, Majuba, Lethabo and several other power stations. These will result in over 500MW being added to the system.
- A National Energy Crisis Committee, which is chaired by the director-general in the Presidency has been established and brings together all the departments and entities involved in the provision of electricity. Ramaphosa said the ministers on the committee will report to him directly on a regular basis.

Harmony Central Plant Solar PV Facility is proposed in specific response to the requirement for diversification of the country's energy mix to include renewable energy such as solar PV as detailed in the IRP 2019.

The above-mentioned energy plans have been extensively researched and are updated on an on-going basis to take into consideration changing scenarios, new information, developments in new technologies, and to reflect updated demands and requirements for energy production within the South African context. These plans form the basis of South Africa's energy generation sector and dictate national priorities for energy production.

Within a policy framework, the development of renewable energy in South Africa is supported by the White Paper on Renewable Energy (November 2003). In order to meet the long-term goal of sustainable renewable energy industry, a goal of 17.8GW of renewables by 2030 has been set by the DMRE within the Integrated Resource Plan (IRP) 2019. This energy will be produced mainly from wind, solar, biomass, and small-scale hydro (with wind and solar comprising the bulk of the power generation capacity). This amounts to ~42% of all new power generation being derived from renewable energy forms by 2030. This is however dependent on the assumed learning rates and associated cost reductions for renewable options.

Power generated at the proposed Harmony Central Plant Solar PV Facility will be evacuated to Harmony Central Plant's operations. This will reduce Harmony Central Plant's direct dependency on the supply of energy from the national grid.

8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	**YES**		Please explain

The site for the development of the Harmony Central Plant Solar PV Facility is situated on land owned by Harmony Gold and Lozitone Pty Ltd, the exclusive offtake of the power to be generated by the facility. The location of the facility includes benefits such as that the Harmony Central Mine is situated in close proximity to the project site, and that the point of connection, i.e., the Harmony North (6.6/44kV) substation, is within 1km, shortening the length of the distribution line needed.

9. Is the development the best practicable environmental option for this land/site?	**YES**		Please explain
Sections of the proposed site have been transformed and altered through historical anthropogenic activities as there were houses on the site that were demolished by Harmony Gold due to the geotechnical risks associated with the site. This facility will be contributing to a positive and sustainable function for the site in the long-term, as it will no longer be available for mining activities as well as for other transformation activities taking place on-site as fencing will be placed around the facility, decreasing accessibility. The PV facility will also reduce the Harmony Central Plant's dependency on non-renewable power sources for the operation of the Harmony Central Plant's operations, as well as produce "clean" energy that will not have a detrimental effect on the broader environment.			
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	**YES**		Please explain
The negative impacts associated with the proposed activity include localised impacts on vegetation, soils, and land use and are expected to be limited to the development footprint and are not considered to be of high significance (refer to **Section D**). All impacts can be managed and mitigated to acceptable levels, as outlined in the Environmental Management Programme. Sections of the proposed site have been transformed and altered through historical anthropogenic activities as there were houses on the site that were demolished by Harmony Gold due to the geotechnical risks associated with the site. This facility will be contributing to a positive and sustainable function for the site in the long-term, as it will no longer be available for mining activities as well as for other transformation activities taking place on-site as fencing will be placed around the facility, decreasing accessibility. The PV facility will also reduce the Harmony Central Plant's dependency on non-renewable power sources for the operation of Harmony Central Plant's operations, as well as produce "clean" energy that will not have a detrimental effect on the broader environment. Positive impacts associated with the facility include i) the diversifying of the power use for Harmony Central Plant's operations ii) generation of electricity from a renewable resource also reduces reliance (although limited) on conventional power sources; iii) local economic upliftment and minimal job creation iv) and the reduction of Harmony Central Plant's carbon footprint. These positive impacts will extend beyond the boundary of the site and are expected to outweigh the negative impacts.			
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?		**NO**	Please explain
Several solar PV facilities have been authorised within the area. However, mining is the predominant land use within the area, most of the towns and residential areas surrounding the development are focused on mining related activities. Although the Welkom area has adequate solar resources and available land for further expansion of solar PV developments, it is highly unlikely that the focus will shift from mining on a large scale in such a way that a precedent would be set.			
12. Will any person's rights be negatively affected by the proposed activity/ies?		**NO**	Please explain
The proposed project will take place on mine owned land immediately adjacent to Harmony Gold's Harmony Central Plant. The two affected properties are owned by Harmony Gold Mining Company (Pty) Ltd and Lozitone Pty Ltd. Harmony Central Plant is intended to be the exclusive user/off taker of the power			

to be generated. No infrastructure will extend beyond the boundaries of the two affected properties. Therefore, no rights of any person will be negatively affected.			
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	**YES**		Please explain
The project site is located outside the urban edge, close to the urban areas of Virginia and Saaiplaas (~7m southwest and ~2 km west, respectively). Therefore, the proposed project will not compromise the urban edge as defined by the local municipality.			
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?		**NO**	Please explain
The project will not be registered as a SIP.			
15. What will the benefits be to society in general and to the local communities?			Please explain
Job opportunities, although limited, will be created during the construction and operation of the proposed facility. In addition, local and regional economic benefits would be realised through the additional revenue generated as a result of the proposed project (through direct and indirect job opportunities, local spend, local procurement, etc.). The primary benefit to society, in general, will be a reduction in the use of non-renewable resources for the generation of power, contributing to a sustainable environment and development. The solar facility will generate power for the Mine's own use, reducing the Mine's reliance on the Eskom power supply/network. The project will also assist the government in achieving the goal of adding new capacity from renewable energy as part of the electricity generation technology mix by 2030. In addition, the project will assist in the reduction of the need to mine non-renewable resources such as coal for conventional power generation.			
16. Any other need and desirability considerations related to the proposed activity?			Please explain
The uptake of renewable energy sources in the mining sector has been a slow-moving transition – which can largely be attributed to the cost involved in establishing a solar/wind power plant, the added costs associated with storing that energy, regulatory challenges, and a limited track record in the industry. Pressure from government and investors to improve environmental footprints by reducing carbon emissions is now one of the top five agenda items in business development, and incorporating renewable energy is an easy way to achieve this. In August 2021 with the aim to bolster energy security, President Cyril Ramaphosa announced that the licence threshold for independent power producers would be lifted from 1 MW to 100 MW, opening the door for companies to build their own generation facilities without the need to obtain a generation license from the National Energy Regulator of South Africa (NERSA). Reliable and cost-effective energy, sourced and generated through private or internal arrangements eliminates the possibility of unexpected power outages and unreliable grid power from government-owned entities such as Eskom. The additional energy supply helps reduce the burden on such entities and reduces the need for energy management alternatives such as load shedding.			

In terms of value creation through sustainability it is estimated that the Harmony Gold suite of solar PV projects (of which the Harmony Central Plant Solar PV Facility is one) will offset the liabilities of anticipated costs pending Scope 2 carbon taxes, against the backdrop of deregulation of the energy sector in South Africa, represents a big step forward for mining and private power industries in South Africa.

The construction of the solar energy plants will be a watershed moment for Harmony, as not only will these transactions help deliver on the Mine's environmental and social obligations and undertakings, but they will also de-risk the business and deliver many socio-economic benefits, including ensuring that investors and other stakeholders continue to derive value and positive returns in a global climate of energy uncertainty.

It is anticipated that this emission profile will decline over time, in line with Harmony Gold production profile, as well as when the renewable energy mix increases in the national electricity grid. However, a number of active decarbonisation measures are currently under way ahead of that amelioration.

Owing to the emissions profile, one of the strongest levers that the Company can pull is the deployment of renewable energy, with three upcoming solar photovoltaic (PV) projects (of which Harmony Central Plant Solar PV forms part) and wind energy projects to enable rapid decarbonisation of these particular operations.

Phase 3 targets are also being set for those emissions that occur through the third-party processing of the company's concentrate, where electricity will continue to remain the focus of this operation owing to its emissions predominance.

The placement of a PV facility is strongly dependent on several factors including climatic conditions (solar resource), topography, the location of the site, land availability and suitability, the extent of the site and the need and desirability for the project. From a local level perspective, the project site and development area have specifically been identified by the proponent as being highly desirable from a technical perspective for the development of a PV facility due to the following site characteristics:

- Proximity to the Harmony Central Plant Mine: The development area is located in close proximity to the Harmony Central Mine, which will be the exclusive user of the generated power and is therefore preferred for development of the proposed PV Facility. Furthermore, there are existing available infrastructure that are considered as possiblly forming part of the grid connection points in order to be able to evacuate the generated power from the PV facility to the Harmony Central Mine.

- Land suitability and land use activities – The properties included in the project site were identified considering the feasible solar resource and are deemed technically feasible by the project developer for such development to take place. The project site is currently owned by the Harmony Gold and has an extent of 80 ha, which was considered by the developer as sufficient for the development of a 14MW Solar PV facility. An exact development footprint within the development area for the placement of infrastructure was identified in the impact phase of the basic assessment.

The broader project site is currently used for activities associated with mining and agricultural activities (grazing). The area identified for the PV facility although on mining land will not impact on the mining activities. The development of the solar PV facility on this property will ensure the continuation of an economically viable land use and will support the long-term operation of the mine. Sites that facilitate easy construction conditions (i.e., relatively flat topography, lack of major rock outcrops etc.) are favoured during the site selection process for a solar PV facility, and the proposed development area fits this criterion.

- Proximity to Towns with a Need for Socio-Economic Upliftment: The proposed project is located near the towns of Welkom and Virginia in the Free State. As per the Integrated Development Planning, these districts still experience high levels of unemployment, poverty, and inequality mainly amongst the youth, women, and people with disabilities. With the development of The Harmony Central Plant Solar PV Facility, secondary social benefits can be expected in terms of additional spend in the nearby towns due to the increased demand for goods and services. Considering the above, it is clear that a need for employment opportunities and skills development is present within the area.

Taking into consideration the solar resource, proximity to the mine, land availability and suitability, geographical and topographical location, access to road infrastructure and proximity to towns with a need for socio-economic upliftment, the development of the Harmony Central Plant Solar PV Facility within the proposed project site is considered to be desirable.

17. How does the project fit into the National Development Plan for 2030?	Please explain

By 2030, South Africa aims to reduce carbon emissions, promote economic development and increase the Gross Domestic Product (GDP). This project will fit into this vision since it aims to contribute towards electricity supply through renewable energy sources. This Solar PV Energy Facility with which the activities are associated will assist in reducing the country's carbon footprint, as it will be generating renewable energy, and will facilitate the infrastructure growth in the area through employment and increasing infrastructure.

18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.

The general objectives of Integrated Environmental Management have been taken into account for this BA Report by means of identifying, predicting, and evaluating the actual and potential impacts on the environment, socio-economic conditions, and cultural heritage component. The risks, consequences, alternatives as well as options for mitigation of activities have also been considered with a view to minimise negative impacts, maximise benefits and promote compliance with the principles of environmental management.

19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

The principle of environmental management as set out in section 2 of NEMA states that:

» Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
» Development must be sustainable socially (people), environmentally (planet) and economically (prosperity).

» Sustainable development requires the consideration of all the relevant factors.

From a project perspective, the development can be considered sustainable as it makes use of a renewable energy resource, does not result in any significant impacts during its construction, and does not emit any pollution during the operational phase.

These principles of sustainable development are further taken into account by including measures within the Environmental Management Programme (EMPr) to mitigate impacts that may occur, thereby further reducing the environmental impacts. The EMPr provides mitigation measures in terms of disturbance to vegetation, loss of wetlands and land capability, pollution and degradation to the environment, waste and stormwater management.

8. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
National Legislation			
Constitution of the Republic of South Africa (No. 108 of 1996)	In terms of Section 24, the State has an obligation to give effect to the environmental right. The environmental right states that: "*Everyone has the right –* » *To an environment that is not harmful to their health or well-being, and* » *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:* * *Prevent pollution and ecological degradation,* * *Promote conservation, and* *Secure ecologically sustainable development and use of natural resources, while promoting justifiable economic and social development*."	Applicable to all authorities	The Constitution has no permitting requirements. The application of the Environmental Right however implies that environmental impacts associated with proposed developments are considered separately and cumulatively. It is also important to note that the "right to an environment clause" includes the notion that justifiable economic and social development should be promoted, through using natural resources and ecologically sustainable development.
National Environmental Management Act (Act No 107 of 1998)	In terms of the Duty of Care Provision in section 28(1), Harmony Gold must ensure that reasonable measures are taken throughout the lifecycle of this project, to ensure that any pollution or degradation of the environment associated with it is avoided, stopped or minimised.	Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (FSDESTEA) – competent authority	The listed activities triggered by the Solar PV Facility have been identified and assessed as part of the BA process currently underway for the project.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	In terms of NEMA, it is the legal duty of a project proponent to consider a project holistically, and the cumulative effect of a variety of impacts. Considering the capacity of the proposed solar PV facility (i.e., contracted capacity of 14MW) and the triggering of Activity 1 of Listing Notice 1 (GN R.983), a Basic Assessment process is required in support of the application for EA.		
National Environmental Management Act (Act No 107 of 1998)	In terms of the "Duty of Care and Remediation of Environmental Damage" provision in Section 28(1) of NEMA, every person who causes, has caused or may cause significant pollution or environmental degradation must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment. Under NEMA, it is the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	FSDESTEA	While no permitting or licensing requirements arise directly by virtue of the proposed project through this section, it finds application through the consideration of potential cumulative, direct, and indirect impacts. It will continue to apply throughout the lifecycle of the project.
Environment Conservation Act (Act No 73 of 1989) (ECA)	The Noise Control Regulations in terms of Section 25 of the ECA are applicable for noise control in the Free State Province.	FSDESTEA	Noise impacts are expected to be associated with the project's construction phase. Considering the project area's location in relation to residential areas and provided that appropriate mitigation measures are implemented, construction noise is

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
			unlikely to present a significant intrusion to the local community. There is therefore no requirement for a noise permit in terms of this legislation.
National Water Act (Act No 36 of 1998)	A water use listed under Section 21 of the NWA must be licensed with the Regional DHSWS, unless it is listed in Schedule 1 of the NWA (i.e., is an existing lawful use); is permissible under a General Authorisation (GA); or if a responsible authority waives the need for a water use licence (WUL). Water use is defined broadly and includes consumptive and non-consumptive water uses; taking and storing water; activities which reduce stream flow; waste discharges and disposals; controlled activities (activities which impact detrimentally on a water resource); altering a watercourse; removing water found underground for certain purposes; and recreation. Consumptive water uses may include taking water from a water resource (Section 21(a)) and storing water (Section 21(b)). Non-consumptive water uses may include impeding or diverting of flow in a watercourse (Section 21(c)); and altering of bed, banks or characteristics of a watercourse (Section 21(i)).	Regional Department of Water and Sanitation	A WUL or GA is required to be obtained if water resources are impacted (either directly or indirectly). The development area is located within the 500m regulated area of wetland features. A General Authorisation for the project will therefore need to be registered with the DWS for water uses 21(c)&21(i);
National Water Act (Act No 36 of 1998) (NWA)	In terms of Section 19, Harmony Gold must ensure that reasonable measures are taken throughout the project's lifecycle to prevent	Regional DHSWS	This section will apply with respect to the potential impact on the wetland features located within the 500m regulated area of the development area,

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	and remedy pollution to water resources from occurring, continuing, or recurring.		primarily during the construction phase (i.e., pollution from construction vehicles).
Minerals and Petroleum Resources Development Act (Act No 28 of 2002) (MPRDA)	In accordance with the MPRDA, a mining right permit is required where a mineral in question is to be mined, including the mining of materials from a borrow pit.	Department of Mineral Resources and Energy (DMRE)	Any person who wishes to apply for a mining permit in accordance with Section 27(6) must simultaneously apply for an Environmental Authorisation in terms of NEMA. No borrow pits are expected to be required for the construction of the project, and as a result a mining permit or EA in this regard is not required to be obtained.
	Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.		In terms of Section 53 of the MPRDA, approval is required from the Minister of Mineral Resources and Energy to ensure that the proposed development does not sterilise a mineral resource that might occur on site.
National Environmental Management: Air Quality Act (Act No 39 of 2004) (NEM: AQA)	The National Dust Control Regulations (GNR 827), published under Section 32 of NEM: AQA, prescribe the general measures for dust control in all areas, and a standard for acceptable dust fall rates in residential and non-residential areas. In accordance with these Regulations any person who conducts any activity in such a way as to give rise to dust in quantities and concentrations that may exceed the dust fall standard set out in Regulation 3 must, upon receipt of a notice from the air quality officer, implement a dust fall monitoring programme. Any person who has exceeded the dust fall standard must, within three months after submission of the dust fall monitoring report,	FSDESTEA Lejweleputswa District Municipality	If the project results in the generation of excessive levels of dust, a dust fall monitoring programme would be required for the project. Dust fall monitoring results from the dust fall monitoring programme would then need to be included in a dust monitoring report, and a dust management plan would need to be developed.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	develop and submit a dust management plan to the air quality officer for approval.		
National Heritage Resources Act (Act No 25 of 1999) (NHRA)	Relevant sections include- Section 7 stipulates assessment criteria and categories of heritage resources according to their significance. Section 35 of the NHRA provides for the protection of all archaeological and palaeontological sites, and meteorites. Section 36 provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority. Section 38(1) lists activities which require developers or any person who intends to undertake a listed activity to obtain consent from the responsible heritage resources authority through the procedure set out in section 38. This is not required where a basic assessment is undertaken under NEMA, including a HIA, and SAHRA's requirements are considered the competent authority when granting the EA. Section 44 requires the compilation of a Conservation Management Plan and a permit from SAHRA for the presentation of archaeological sites as part of public enjoyment, education, research, tourism attraction.	South African Heritage Resources Agency (SAHRA) Free State Heritage Resources Authority	A Heritage Impact Assessment (including palaeontology) was undertaken for the project as per the requirements of Section 38 of the NHRA (refer to **Appendix D4**). During the field survey, no heritage and archaeological resources of significance were identified within the development footprint. No sensitivity exclusions from a palaeontological perspective. The site visit confirmed that there were no fossils visible on the site and along the route for the grid connection. Should a heritage resource be impacted upon, a permit may be required from SAHRA or Free State Heritage Resources Authority, in accordance with of Section 48 of the NHRA, and the SAHRA Permit Regulations (GN R668).

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
National Environmental Management: Biodiversity Act (Act No 10 of 2004) (NEM:BA)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in a listed ecosystem as a threatening process. Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable, and protected species (GNR 151), as amended in 2020 (GN627). » TOPS Regulations (GNR 152). NEM:BA provides for listing threatened or protected ecosystems in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process, including the: purpose and rationale for listing ecosystems; criteria used to identify listed ecosystems; implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 1002, 9 December 2011, GG 34809.	DFFE and FSDESTEA	Under NEM:BA, a permit would be required for any activity that is of a nature that may negatively impact on the survival of a listed protected species. A Terrestrial Ecology and Wetland Impact Assessment has been undertaken as part of the BA process (refer to **Appendix D1**). No protected species which require a permit under NEM:BA were identified within the development area.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	Chapter 5 of NEM:BA pertains to alien and invasive species, and states that a person may not carry out a restricted activity involving a specimen of an AIP without a permit issued in terms of Chapter 7 of NEM:BA; and that a permit may only be issued after a prescribed assessment of risks and potential impacts on biodiversity is carried out. Applicable, and exempted AIP are contained within the Alien and Invasive Species List 2020, GNR 1003 of Government Gazette No. 43726.	DFFE and FSDESTEA	A Terrestrial Ecology and Wetland Impact Assessment (refer to **Appendix D1**) was undertaken as part of the BA process to identify any alien invasive plants present on site.
Conservation of Agricultural Resources Act (Act No 43 of 1983) (CARA) and Regulations (GN R1048) (CARA Regulations)	Section 5 of CARA provides for the prohibition of the spreading of weeds. Relevant sections include: Regulation 15 provides for the classification of categories of weeds and invader plants, and restrictions in terms of where these species may occur. Regulation 15E provides requirements and methods to implement control measures for different categories of AIPs.	Department of Agriculture, Land Reform and Rural Development (DALRD)	CARA will apply throughout the project's lifecycle. In this regard, soil erosion prevention and soil conservation strategies need to be developed and implemented. In addition, a weed control and management plan must be implemented. In terms of Regulation 15E, where Category 1, 2 or 3 plants occur a land user is required to control them by means of one or more of the following methods: » Uprooting, felling, cutting or burning. » Treatment with a weed killer that is registered for use in connection with such plants, in accordance with the directions for the use of such a weed killer. » Biological control, carried out in accordance with the stipulations of the Agricultural Pests Act (No. 36 of 1983), the ECA and any other applicable legislation. » Any other method of treatment recognised by the executive officer that has as its object the

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
			control of plants concerned, subject to the provisions of sub-regulation 4. » A combination of one or more of the methods prescribed, save that biological control reserves and areas where biological control agents are effective shall not be disturbed by other control methods if the agents are destroyed or become ineffective.
National Forests Act (Act No. 84 of 1998) (NFA)	According to the NFA, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the NFA was published in GNR 536. The prohibitions provide that "*no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister*".	DFFE	A permit would need to be obtained for any protected trees that are affected by the project. The Terrestrial Ecology and Wetland Impact Assessment included a site visit which allowed for the identification of protected trees that may require a license in terms of the NFA within the project area (refer to **Appendix D1**). The Terrestrial Ecology and Wetland Impact Assessment (**Appendix D1**) identified no protected trees that may require a license in terms of the NFA within the development area.
National Veld and Forest Fire Act (Act 101 of 1998) (NVFFA)	Chapter 4 places a duty on owners to prepare and maintain firebreaks; the procedure in this regard; and the role of adjoining owners and the fire protection association. The applicant must ensure that: firebreaks are wide and long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land; it does not cause soil erosion; and it is reasonably free of inflammable material capable of carrying a veldfire across it.	DFFE	Whilst the NVFFA has no permitting or licensing requirements, it will be applicable during the construction and operation of the project for the preparation and maintenance of firebreaks; and provision of appropriate equipment and trained personnel for firefighting purposes.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	Chapter 5 places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn, or from whose land it may spread, must have such equipment; protective clothing; and trained personnel for extinguishing fires. Such owners must ensure that in their absence responsible persons are present on or near their land who, in the event of fire, will extinguish it, or assist in doing so, and take all reasonable steps to alert adjoining landowners and the relevant fire protection association, if any.		
Hazardous Substances Act (Act No 15 of 1973)	This Act regulates the control of: (i) substances that may cause injury, ill health, or death (due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances); and (ii) certain electronic products. It provides for the: rating of such substances or products by the degree of danger; and prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » *Group I and II:* Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be	Department of Health	It is necessary to identify and list all Group I, II, III, and IV hazardous substances that may be on the project area and in what operational context they are used, stored or handled. If applicable, a licence would be required to be obtained from the Department of Health.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	declared as Group I or Group II substance. » Group IV: any electronic product, and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate licence being in force.		
National Environmental Management: Waste Act, 2008 (Act No 59 of 2008) (NEMWA)	The Minister may by notice in the *Gazette* publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » adding other waste management activities to the list. » removing waste management activities from the list; and » making other changes to the particulars on the list. In terms of the Regulations published in terms of NEMWA (GN 921), a basic assessment or EIA is required to be undertaken for identified listed waste management activities. Any person who stores waste must at least take steps, unless otherwise provided by this NEMWA, to ensure that: » the containers in which any waste is stored are intact and not corroded or in any other	DFFE (hazardous waste) FSDESTEA (general waste)	No waste listed activities are triggered by proposed project, therefore, no Waste Management Licence is required to be obtained. General and hazardous waste handling, storage and disposal will be required during construction and operation. The National Norms and Standards for the Storage of Waste (GNR 926), published under Section 7(1)(c) of NEM: WA, will need to be considered in this regard.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	way rendered unlit for the safe storage of waste. » adequate measures are taken to prevent accidental spillage or leaking. » the waste cannot be blown away. » nuisances, such as odour, visual impacts and breeding of vectors, do not arise; and » environmental pollution and harm to health are prevented.		
National Road Traffic Act (Act No 93 of 1996) (NRTA)	The technical recommendations for highways (TRH 11): "*Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads*" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads; and the prescribed procedures in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits	South African National Roads Agency Limited (national roads) Free State Department of Roads and Transport	An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits for vehicles carrying abnormally heavy or abnormally dimensioned loads; and transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the on-site substation components may not meet specified dimensional limitations (height and width).

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	for all other exemptions from the requirements of the NRTA and its relevant Regulations.		
Astronomy Geographic Advantage Act (Act No. 21 of 2007) (AGA)	The AGA provides for: the preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy; intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas; and matters connected thereto. Chapter 2 of the AGA allows for the declaration of astronomy advantage areas. Chapter 3 pertains to the management and control of astronomy advantage areas, which includes the following: » Restrictions on use of radio frequency spectrum in astronomy advantage areas. » Declared activities in core or central astronomy advantage area. » Identified activities in coordinated astronomy advantage area; and » Authorisation to undertake identified activities.	Department of Science and Technology	The project site is located within the Free State Province and well outside of areas considered as nationally significant astronomy advantage areas. Therefore, the requirements of AGA are not considered applicable.
Aviation Act (Act No 74 of 1962) 13th amendment of the Civil Aviation Regulations (CARS) 1997	Any communications structure, building or other structure, whether temporary or permanent, which has the potential to endanger aviation in navigable airspace or interfere with the operation of navigation or surveillance systems or Instrument Landing Systems, including meteorological systems for aeronautical purposes, is considered an obstacle and must be submitted to the	South African Civil Aviation Authority (CAA)	This Act will find application during the operation phase of the project. Appropriate marking of project infrastructure >45m above ground level is required to meet the specifications. as detailed in the CAR Regulations Part 139.01.33. An obstacle approval (or confirmation that no approval is required) would be obtained from the South African CAA.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
	Commissioner for Civil Aviation for evaluation (refer SA-CAR Part 139.01.33). The following structures require markings: » Any structure exceeding 45m above ground level or structures where the top of the structure exceeds 150m above the mean ground level, the mean ground level considered to be the lowest point in a 3km radius around such structure. » Structures lower than 45m, which are considered as a danger to aviation shall be marked as such when specified. » Overhead wires, cables etc., crossing a river, valley or major roads shall be marked; and, in addition, their supporting towers marked and lighted if an aeronautical study indicates it could constitute a hazard to aircraft.		
Provincial Legislation			
Free State Nature Conservation Ordinance 8 of 1969	Lists plant and animal species as protected	FSDESTEA	A Terrestrial Ecology and Wetland Impact Assessment has been undertaken as part of the BA process (refer to **Appendix D1**). No protected flora and fauna species which require a permit under the Free State Nature Conservation Ordinance were identified within the development area.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
Free State Provincial Growth and Development Strategy (FSGDS), Revised October 2013		FSDESTEA	The revised FSGDS refers to specific imperatives which sets the tone and pace for shared growth and development in the province. These include: • The need to effectively use scarce resources within the province, while addressing the real causes of development challenges. • The need to accelerate service delivery based on a common provincial development agenda as the basis for provincial strategic direction. • The need to identify investment opportunities and provide an environment of certainty critical for private-sector investment. • The need to promote intergovernmental coordination between the three spheres of government. • The need to facilitate facilitates the implementation of the People's Contract within the Province. • The need to provide a common vision as the basis for common action amongst all stakeholders, both inside and outside government.

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
			• The need to provide a framework for budgets, implementation, performance management and spatial development. The development of the solar PV Facility will assist with the need to effectively use scarce resources and the need to identify investment opportunities, including private sector-investment. The development of a solar facility reduces the need to make use of non-renewable resources for the generation of electricity and opens up the province to further future solar energy development.
Free State Provincial Spatial Development Framework (PSDF) 2013 - Executive Summary (Inception Report)			The Free State Provincial Growth and Development Strategy states that sustainable economic development is the only effective means by which the most significant challenge of the Free State, namely poverty, can be addressed. The PSDF gives practical effect to sustainable development, which is defined as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The PSDF is prepared in accordance with bioregional planning principles that were adapted to suit the site-specific requirements of the Free State. It incorporates and complies with the relevant protocols, conventions, agreements,

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
			legislation and policy at all applicable levels of planning, ranging from the international to the local. The Harmony Central Plant Solar PV Facility will contribute to sustainable and economic development goals of the Free State PSDF, once completed and formally adopted
Free State Green Economy Strategy (2014)		FS DESTEA	This Green Economy Strategy for Free State Province (FSGES) was developed in alignment with the national green economy strategy elaborated in the National Green Economy Framework and Green Economy Accord, as well the Free State Provincial Growth and Development Strategy. The development process was spearheaded by the Department of Economic Development, Tourism and Environmental Affairs (DETEA). The objective was to develop a green economy strategy to assist the province to, amongst others, improve environmental quality and economic growth, and to develop green industries and energy efficiency within the Province. The Harmony Central Plant Solar PV Facility will contribute to the aim of energy efficiency and green industry while promoting economic growth and is therefore consistent with this strategy.
Free State Investment Prospectus (2019)		DESTEA	Opportunity of the development of renewable energy is considered in the key sectors overview. The prospectus states that opportunities are opening up in the province for the energy sector, including renewable energy. Rezoning for the

Legislation	Applicable Requirements	Administering Authority	Compliance Requirements
			development of multiple solar energy facilities has already been undertaken in the province. Considering the future opportunities available for the development of renewable energy facilities (including solar PV facilities) the development of the Harmony Central Plant Solar PV Facility is considered to be in-line with the Investment Prospectus of the Province

9. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	**YES**
If YES, what estimated quantity will be produced per month?	Not determined at this stage.

How will the construction solid waste be disposed of (describe)?

The solid waste generated during construction will mainly be construction material, excavated substrate, and domestic solid waste. Cardboard waste will be produced from panel packaging and compacted on site prior to removal. Other wastes will include rubber caps on panel edges, wooden pallets, and plastic wrapping (all related to the panel packaging). There may also be some broken panels, which must be removed as per the latest regulations regarding producer responsibilities to minimise waste. Waste will be disposed of in either waste skips and/or scavenger-proof recycling bins (where possible) and temporarily placed in a central location for removal by an appropriate contractor. Where possible, waste will be recycled. Non-recyclable solid construction waste will be temporarily held in skips or other appropriate waste containers, to be disposed of at an appropriately licensed landfill site. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility.

Where will the construction solid waste be disposed of (describe)?

Recyclable waste will be recycled through accredited recycling companies and non-recyclable solid construction waste will be disposed at a registered municipal solid waste disposal site.

Will the activity produce solid waste during its operational phase?	**YES**
If **YES**, what estimated quantity will be produced per month?	Not determined at this stage.

How will the solid waste be disposed of (describe)?

The operation of the PV facility will result in the generation of general solid waste, such as damaged or broken panels; general waste from the offices; and oils from the on-site substation. The general solid waste generated during the operational phase will be temporarily stored in either waste skips and/or scavenger proof recycling bins (where possible), for removal by an appropriate contractor and subsequent disposal at an appropriately licensed landfill site. Where possible, waste will be recycled. Hazardous waste produced during the operational phase will be appropriately stored in bunded areas for removal by an appropriate contractor and subsequent disposal at a registered hazardous waste disposal facility.

If the solid waste will be disposed of into a municipal waste stream, indicate which registered landfill site will be used.

This has not been determined at this stage. The Matjhabeng Local Municipality will be engaged prior to Financial Close to determine if any their registered landfill sites have the capacity to accept waste generated by the project.

Where will the solid waste be disposed of if it does not feed into a municipal waste stream (describe)?

All solid waste generated during the operational phase will be fed into a municipal waste stream. Should the municipal landfill sites not have capacity to accept solid waste generated during the operational phase, other options will be explored by the operator.

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the NEM: WA?	**NO**

If **YES**, inform the competent authority and request a change to an application for scoping and EIA. An application for a waste permit in terms of the NEM: WA must also be submitted with this application.

Is the activity that is being applied for a solid waste handling or treatment facility?	**NO**

If **YES**, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA. An application for a waste permit in terms of the NEM: WA must also be submitted with this application.

b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES / **NO**
If **YES**, what estimated quantity will be produced per month?	m^3
Will the activity produce any effluent that will be treated and/or disposed of onsite?	**NO**

*If **YES**, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.*

Will the activity produce effluent that will be treated and/or disposed of at another facility?	**NO**

If **YES**, provide the particulars of the facility:

Facility name:
Contact person:
Postal address:
Postal code:
Telephone: **Cell:**
E-mail: **Fax:**

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

- During the construction phase, measures may be put in place to separate clean and dirty water.
- Sewage will be handled/managed by establishing portable ablution facilities. The sewage will be collected and treated in accordance with the legislative framework using a septic or conservancy tank.
- Water used within the construction process, if tested and found to be within the required limits, may be used for dust suppression.

c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere other that exhaust emissions and dust associated with construction phase activities?	**NO**
If **YES**, is it controlled by any legislation of any sphere of government?	

If **YES**, the applicant must consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If NO, describe the emissions in terms of type and concentration:

Solar energy installations operate by converting solar energy into electricity. This is characterised as a non-consumptive use of a natural resource and consumes no fuel for its continuing operation. Solar PV facilities produce an insignificant quantity of greenhouse gasses over their lifecycle. During the construction phase, minor dust impacts and exhaust emissions may occur; however, acceptable limits will not be exceeded. The operational phase of a solar PV facility does not produce carbon dioxide, sulphur dioxide, mercury, particulates, or any other type of pollution.

d) Waste permit

Will any aspect of the activity produce waste that will require a waste permit in terms of the NEM: WA?	**NO**

If **YES**, please submit evidence that an application for a waste permit has been submitted to the competent authority

e) Generation of noise

Will the activity generate noise?	**NO**
If **YES**, is it controlled by any legislation of any sphere of government?	

Describe the noise in terms of type and level:

Minimal noise will occur during the construction phase due to vehicle movement; the presence of construction workers on site; and machinery operation. This is not regarded as a significant noise source/impact and will not constitute a "disturbing noise". No noise will be generated during the operation phase.

10. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es):

Municipal	Water board	Groundwater	River, stream, dam or lake	**Other**	The activity will not use water

Water will be sourced from the Central Plant Mine

If water is to be extracted from groundwater, river, stream, dam, lake, or any other natural feature, please indicate the volume that will be extracted per month:	**N/A**
Does the activity require a water use authorisation (general authorisation or water use license) from the Department of Water Affairs?	**YES**

If **YES**, please provide proof that the application has been submitted to the Department of Water Affairs.

A General Authorization will be required. The application process will be completed once a positive EA is received from the Competent Authority.

11. ENERGY EFFICIENCY

Describe the design measures, if any, which have been taken to ensure that the activity is energy efficient:

The activity is in itself an activity that is proposed to generate electricity from a cleaner alternative energy source (i.e., solar radiation).

Describe how alternative energy sources have been taken into account or been built into the design of the activity if any:

The purpose of a Solar PV Energy Facility is to utilise a renewable energy source (i.e., solar radiation) for electricity production. Therefore, it is not required to consider any additional alternative energy sources.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area, which is covered by each copy No. on the Site Plan.

Section B Copy No. (e.g. A):	

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? **YES**

If **YES**, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed and attach it in Appendix I. All specialist reports must be contained in Appendix D.

Property description/physical address:

Province	Free State Province
District Municipality	Lejweleputswa District Municipality
Local Municipality	Matjhabeng Local Municipality
Nearest town(s)	Virginia (~7km)
Ward Number(s)	8
Farm name and number	Portion 1 of the Farm Rustgevonden 564 Portion 12 of the Farm Saaiplaas 771
Portion number	Portion 1 of the Farm Rustgevonden 564 Portion 12 of the Farm Saaiplaas 771
SG Code	» Portion 1 of the Farm Rustgevonden 564 (F03500000000056400000). » Portion 12 of the Farm Saaiplaas 771 (F03500000000077100012).

Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application including the same information as indicated above.

Current land-use zoning as per local municipality IDP/records:

The project site is currently zoned for mining.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required? **YES**

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1:

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline		2.4 Closed valley		**2.7 Undulating plain / low hills**	**X**
2.2 Plateau		2.5 Open valley		2.8 Dune	
2.3 Side slope of hill/mountain		**2.6 Plain**	**x**	2.9 Seafront	
2.10 At sea					

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following?

	Alternative S1:		**Alternative S2 (if any):**		**Alternative S3 (if any):**	
Shallow water table (less than 1.5m deep)	YES	**NO**	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	**NO**	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)		**NO**	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	**NO**	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	YES	**NO**	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)		**NO**	YES	NO	YES	NO
Any other unstable soil or geological feature		**NO**	YES	NO	YES	NO
An area sensitive to erosion		**NO**	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the

completion of this section[89]. Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted.

4. GROUNDCOVER

Indicate the types of groundcover present on the site. The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	Natural veld with scattered aliens[E]	**Natural veld with heavy alien infestation[E]**	**Veld dominated by alien species[E]**	Gardens
Sport field	**Cultivated land**	Paved surface	Building or other structure	**Bare soil**

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise. An ecologist has been appointed to determine the ground cover for the site, please see **appendix D1**

5. SURFACE WATER

Indicate the surface water present on and or adjacent to the site and alternative sites?

Perennial River		**NO**	UNSURE
Non-Perennial River		**NO**	UNSURE
Permanent Wetland	YES	**NO**	UNSURE
Seasonal Wetland		**NO**	UNSURE
Artificial Wetland	**YES**		UNSURE
Estuarine / Lagoonal wetland		**NO**	UNSURE

If any of the boxes marked **YES** or UNSURE is ticked, please provide a description of the relevant watercourse.

The surface water features of the development area are dominated by a large seepage system in the southern portion of the site. A smaller seepage area is also located to the east of this system and though heavily modified, is considered a natural wetland area. A few shallow excavations as well as surface obstructions (berms, roads and ditches) also promote the accumulation of surface water and consequent formation of artificial wetland areas.

[8] Please see appendix D2 for soils report
[9] A soil specialis has been appointed to conduct soil samples on which this section is based

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

The primary land uses for the broader area surrounding the project site are illustrated in Figure 2 below.

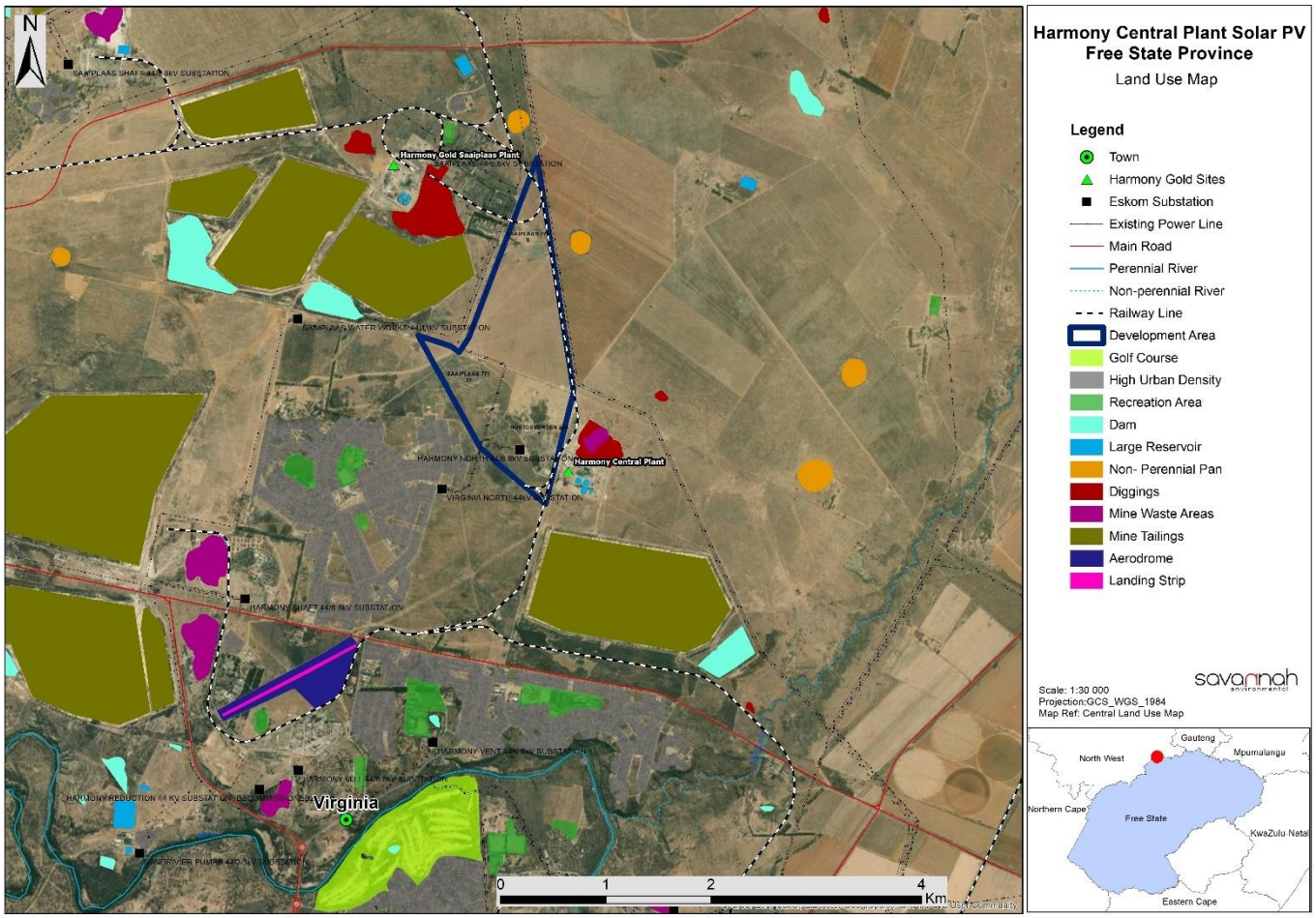


Figure 2: Map showing the land use character of the surrounding area (refer to **Appendix A**

Natural area	**Dam or reservoir**	Polo fields
Low density residential	Hospital/medical centre	Filling station [H]
Medium density residential	School	Landfill or waste treatment site
High density residential	Tertiary education facility	Plantation
Informal residential[A]	Church	**Agriculture**
Retail commercial & warehousing	Old age home	**River, stream or wetland**
Light industrial	Sewage treatment plant[A]	Nature conservation area
Medium industrial [AN]	Train station or shunting yard [N]	Mountain, koppie or ridge
Heavy industrial [AN]	**Railway line**	Museum
Power station	Major road (4 lanes or more) [N]	Historical building
Office/consulting room	**Airport [N]**	**Protected Area**

Military or police base/station/compound	**Harbour**	**Graveyard**
Spoil heap or slimes dam	**Sport facilities**	**Archaeological site**
Quarry, sand or borrow pit	**Golf course**	**Other land uses (describe) – Mining**

If any of the boxes marked with an "N "are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

[redacted]

If any of the boxes marked with an "An" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

[redacted]

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity? Specify and explain:

[redacted]

Does the proposed site (including any alternative sites) fall within any of the following:

Critical Biodiversity Area (as per provincial conservation plan)	**YES**	**NO**
Core area of a protected area?	[redacted]	**NO**
Buffer area of a protected area?	[redacted]	**NO**
Planned expansion area of an existing protected area?	[redacted]	**NO**
Existing offset area associated with a previous Environmental Authorisation?	[redacted]	**NO**
Buffer area of the SKA?	[redacted]	**NO**

If the answer to any of these questions was YES, a map indicating the affected area must be included in **Appendix A.**

A map which indicates the extent of the project site which falls within a CBA is included below as Figure 3, and included in **Appendix A**. While the development area has a minimal overlap with CBA areas, these are completely avoided by the planned development footprint (avoidance mitigation), and these areas are not impacted by the planned development.

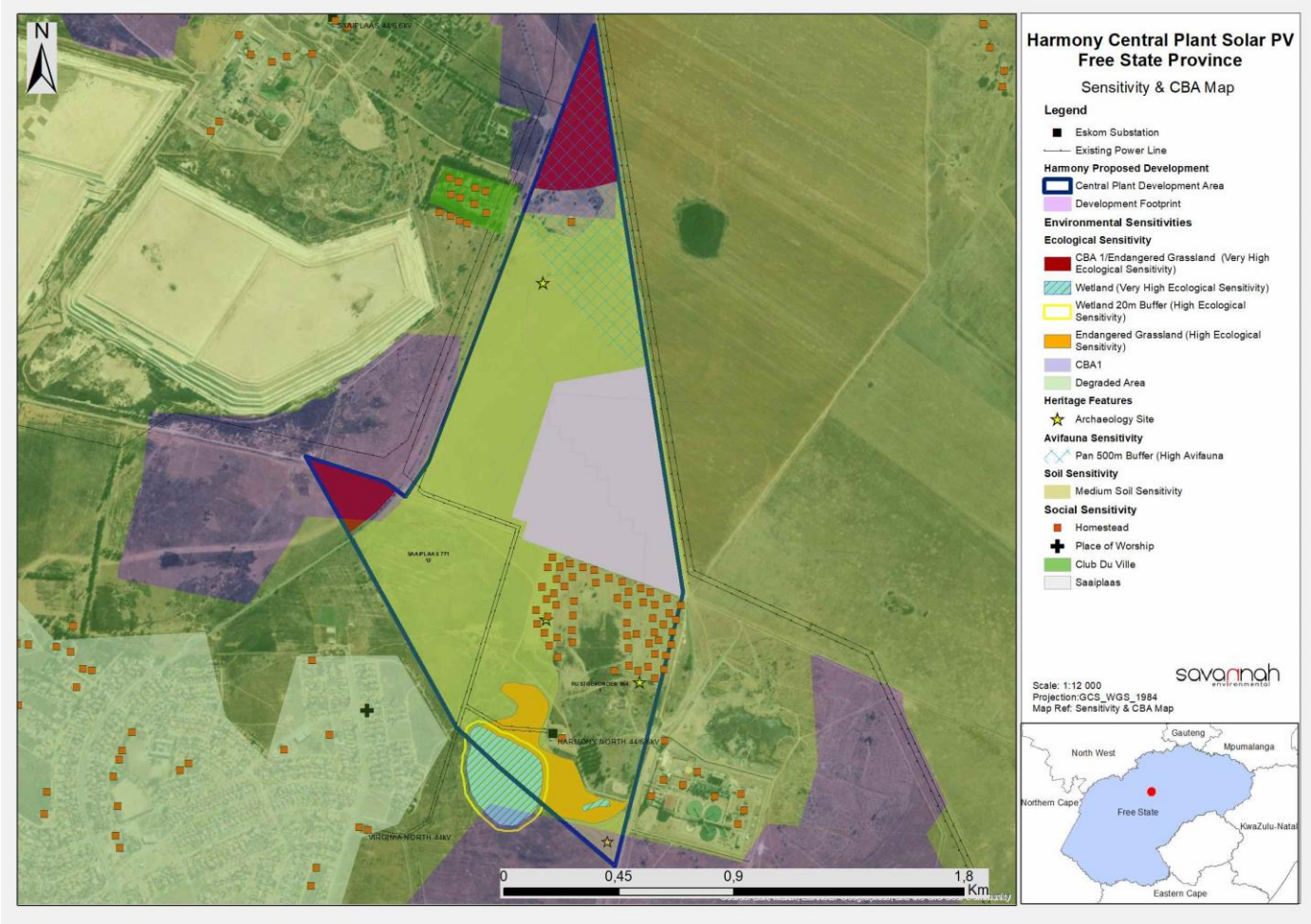


Figure 3: CBA area surrounding the proposed development area of the Harmony Central Mine

7. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or paleontological sites, on or close (within 20m) to the site? If **YES**, explain:	**YES**	NO
	Uncertain	

There are four archaeological sites present within the Central plant PV development area. The documented archaeology at the Harmony Gold Central Plant is classified as scientifically low significance. No archaeological resources of scientific cultural value were identified within the development footprint area proposed for the PV Facility and its grid connection and as such, no impact to significant archaeological heritage resources is anticipated.

If uncertain, conduct a specialist investigation by a recognised specialist in the field (archaeology or palaeontology) to establish whether there is such a feature(s) present on or close to the site. Briefly explain the findings of the specialist:

Briefly explain the findings of	A Heritage Impact Assessment (refer to **Appendix D3**) was undertaken for the proposed project. A Heritage Impact Assessment is required in terms of Section 38(8) of the NNHRA. The findings of the assessment are described below:

the specialist:

Heritage Resources identified

No heritage resources of archaeological or palaeontological significance were identified within the development area for the Harmony Central Plant Solar PV Facility. The proposed development footprint has been disturbed by various mining and agricultural activities.

There are four archaeological sites present within the Central plant PV development area. The documented archaeology at the Harmony Gold Central Plant is classified as scientifically low significance. No archaeological resources of scientific cultural value were identified within the development footprint area proposed for the PV Facility and its grid connection and as such, no impact to significant archaeological heritage resources is anticipated. The location of the four sites are indicated in Figure 4

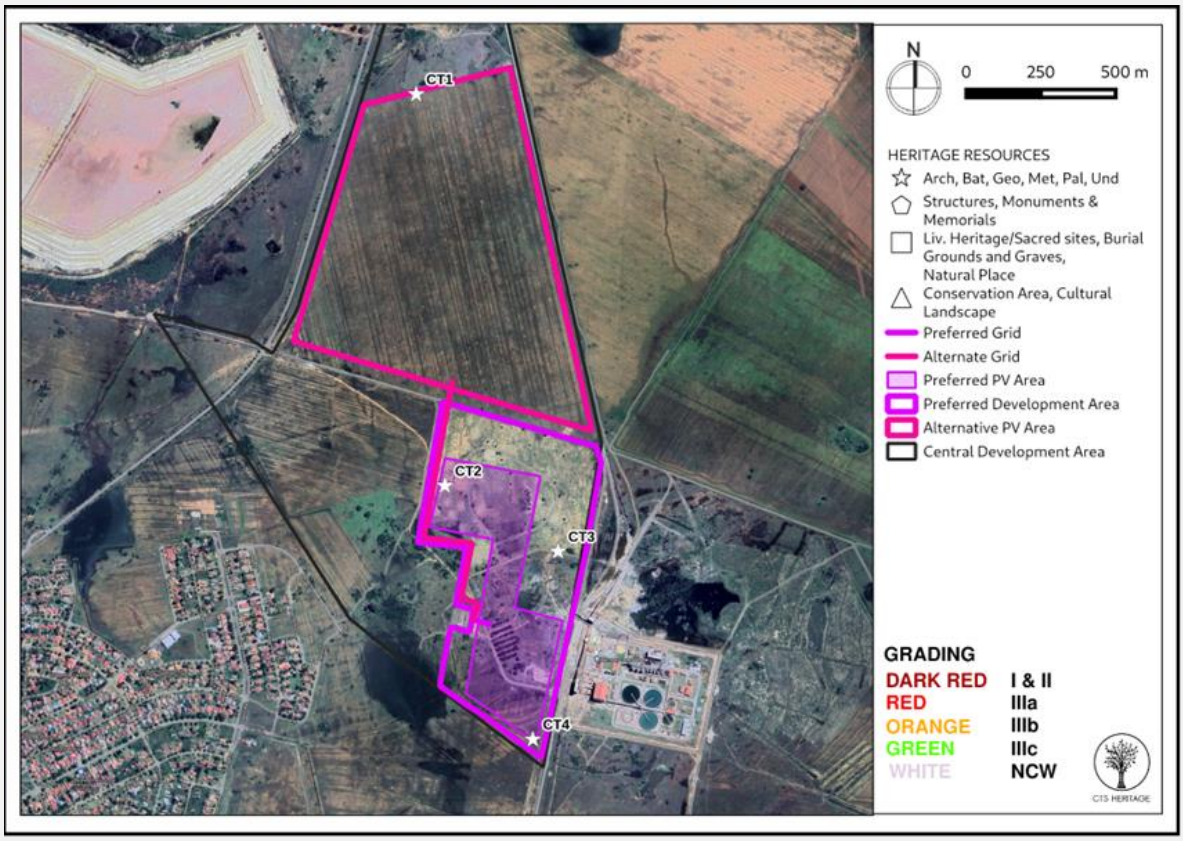


Figure 4: Location of archaeological sites identified

Palaeontology

According to the SAHRIS Palaeosensitivity Map (**Figure 5**), the area proposed for development is underlain by sediments of moderate palaeontological sensitivity consisting of the caenozoic regolith. Quaternary sands present is this area does not preserve fossils because they are transported and porous. The site visit confirmed that there were no fossils visible on in the development area.

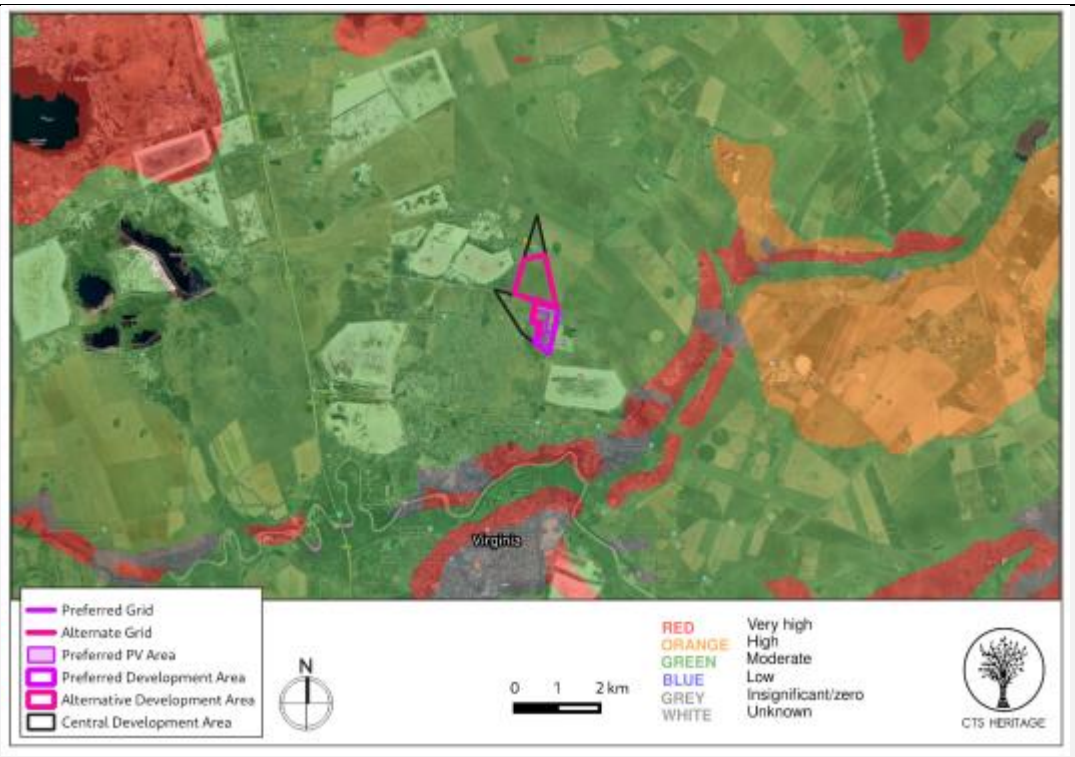


Figure 5: Palaeontological sensitivity of the area

Briefly explain the findings of the specialist:

Cultural Landscape and the Built Environment

The area proposed for development has been extensively previously disturbed through agriculture and mining infrastructure (Harmony Central Plant Solar PV Facility is proposed to be located adjacent to the Harmony Central Plant).

The installation of a Solar PV Energy Facility is therefore in keeping with the broader development character of the immediate surroundings which lie on the peri-urban edge of Virginia and the Harmony Central Plant to the east. The presence of small nodules of artefact-quality chert rocks, homogenous quartzites as well as high-quality riverine Hornfels and Quartz in the project areas in addition to relatively abundant standing water, and significant historical structures are located within 10km of the development area; however, none, of these heritage resources are anticipated to be impacted directly or indirectly by the proposed development.

Potential Impacts

All of the areas surveyed as part of this assessment have been transformed through agricultural interventions and/or mining activity. No archaeological resources of scientific cultural value were identified within the area proposed for the Central PV Facility and its grid connection and as such, no impact to significant archaeological heritage resources is anticipated. Furthermore, no impacts to significant palaeontological heritage is anticipated on condition that the attached. Chance Fossil Finds Process is implemented and no impacts to the cultural landscape are anticipated. A detailed impact on the Heritage resources is described in detail in **section D.**

Will any building or structure older than 60 years be affected in any way?	YES / **NO**
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	YES / **NO**

If **YES**, please provide proof that this permit application has been submitted to SAHRA or the relevant provincial authority.

8. SOCIO-ECONOMIC CHARACTER

a) Local Municipality

Please provide details on the socio-economic character of the local municipality in which the proposed site(s) are situated.

Level of unemployment:

Employment within Lejweleputswa decreased annually at an average rate of -1.63% from 2009 to 2019. In Lejweleputswa District Municipality the economic sectors that recorded the largest number of employments in 2019 was the trade sector with a total of 28 400 employed people or 34.8.0% of total employment in the district municipality.

Lejweleputswa has one of the highest rates of unemployment in the Free State province. When comparing unemployment rates among municipalities within Lejweleputswa District Municipality, the Matjhabeng Local Municipality (MLM) has an official unemployment rate of 34%.

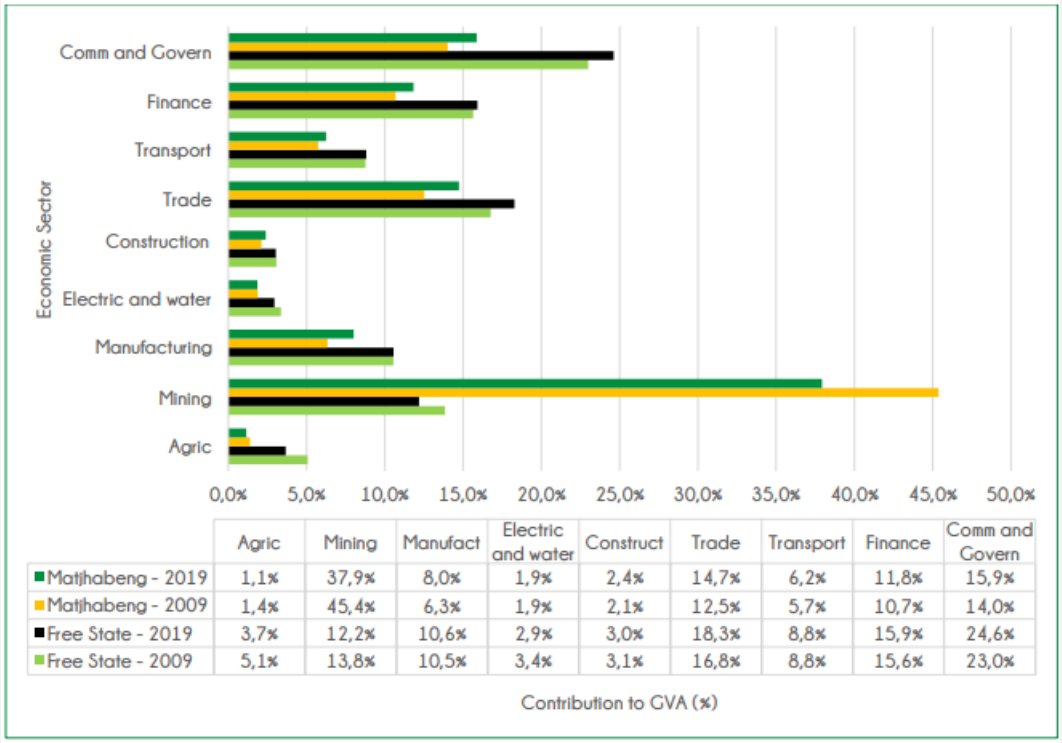
Unemployment in the MLM is similar to the average or the Lejweleputswa DM (35%) and the Free State (35%), and lower than the national rate, with an approximate 10% increase over the past ten years. This implies that although job creation is a top priority for the MLM, the unemployment situation is severe, as in other areas of the Province. The MLM has approximately 97 276 non-economically active people, almost 10 000 more than in 2009, including students, mothers, discouraged workers and others not currently looking for employment.

Economic profile of local municipality:

The economy of Lejweleputswa DM thrives on mining and farming. The district is rich in gold deposits and lies at the heart of the province's goldfields. In terms of farming, the district is a major producer of maize and sunflower. Mining and farming are the primary sectors of the economy in the district.

The Matjhabeng LM is the largest municipality in the district and it contains most of the mining activities, especially gold mining. Recently the mining sector has been on a downward trend because of closures of many of the shafts due to high costs of production among others and the need for deep mining.

The recent decline in world commodity prices, has aggravated the situation in general with many businesses that were traditionally dependent on the mining sector have either closed down or are in the process of closing down. Other municipalities primary sector relies heavily on agriculture.



	Agric	Mining	Manufact	Electric and water	Construct	Trade	Transport	Finance	Comm and Govern
Matjhabeng - 2019	1,1%	37,9%	8,0%	1,9%	2,4%	14,7%	6,2%	11,8%	15,9%
Matjhabeng - 2009	1,4%	45,4%	6,3%	1,9%	2,1%	12,5%	5,7%	10,7%	14,0%
Free State - 2019	3,7%	12,2%	10,6%	2,9%	3,0%	18,3%	8,8%	15,9%	24,6%
Free State - 2009	5,1%	13,8%	10,5%	3,4%	3,1%	16,8%	8,8%	15,6%	23,0%

Figure 6: Contribution of the municipality to the GVA

The data presented in the table below have been derived from the 2011 Census, Lejweleputswa District Municipality Integrated Development Plan (IDP) 2020/2021, Free State Provincial Growth and Development Strategy (FSPGDS) (2030), and the Matjhabeng Local Municipality Integrated Development Plan (IDP) (2020-2021).

Table 1: Baseline description of the socio-economic characteristics of the area within which the Harmony Central Plant Solar PV Facility is proposed

Population characteristics
» Matjhabeng Local Municipality has a population of 406461, where Lejweleputswa District Municipality has 627626.
» The majority of the local population belong to the Black African group and the most spoken language is Sotho.
» 69.4% of the Matjhabeng Local Municipality population comprise the Economically Active Population (EAP); this implies that there is a larger human resource base for development projects to involve the local population. The dependency ration is high at 30.6% of the Matjhabeng Local Municipality population (that is almost a third of the local population) which puts pressure on the EAP and local municipalities.
» The male population is slightly more prominent in the Matjhabeng Local Municipality; linked to the industrial character of the area.
» The skills profile of the area indicates that the availability of local labour for the proposed project is largely limited to low-skilled construction workers and a small number of skilled workers.
» There is a high unemployment rate in the Matjhabeng Local Municipality (20.3%) with a large economically active population seeking employment opportunities. Local workers should be utilised as much as possible for the proposed development in order to alleviate local unemployment.

- The continuous increase in the number of formal households in the local area will have an upward impact on electricity demand, thus requiring greater electrical capacity.
- Higher unemployment and lower income levels in the study area demonstrate the need for job creation.
- The high demand for employment can be addressed (although marginally) through direct job creation during the construction and operation phase of the proposed development.

Economic and household characteristics

- Access to basic services is generally greater in the Matjhabeng Local Municipality than at provincial level demonstrating that service delivery is generally more accessible.
- The shift of the economy from a primary to a tertiary economy is resulting in a large number of job losses and the mining sector is identified as suffering the largest loses. Metsimaholo has been earmarked as a development nodal point for the coming 20 years, which is line with the proposed development.
- For households headed by children under 18 years, there is 167 households, which is about one-fifth of the figure in Lejweleputswa (751).
- 15% child-headed households are informal dwellings (shack), which is about three-fifths of the rate in Lejweleputswa (24.1%)
- 58.7% child-headed households have women as their head, which is about 1.3 times the rate in Lejweleputswa (45.27%).
- Annual household income is R7200, which is more than double the amount in Lejweleputswa (R2 400).

Services

- There are 59 115 households in the municipality, which is about one-third of the figure in Lejweleputswa (172,370).
- About 12.2% households are informal dwellings.
- 96.9% are getting water from regional or local service providers, which is a little higher than the rate in Lejweleputswa (93.29%).
- 12.6% have no access to electricity, which is about double the rate in Lejweleputswa (6.48%).
- 74.9% have access to flush or chemical toilets, which is about 90 percent of the rate in Lejweleputswa (82.55%).
- 80.1% are getting refuse disposal from a local authority, private company or community members, which is about 90% of the rate in Lejweleputswa (86.5%).

Level of education:

The skills level within a study area is best illustrated in comparison to the wider region, which competes for investment and skilled workers. Table 7 compares the highest level of education of residents in the MLM to those in the wider regions in 2019. MLM has the lowest proportion of residents with no schooling in the study region. Although the residents with grade 12 is low, it is consistent with that of the wider region. These figures indicate that the Free State, as a whole, should pay more attention to the education of scholars as economic development and industrialization depends on the skill levels and education of the workforce.

Education characteristics

- 72.4% of the population in the Matjhabeng Local Municipality has completed Grade 9 or higher, which is a little higher than the rate in Lejweleputswa (68.39%).
- There are presently a total of 275 educational facilities in Matjhabeng Local Municipality
- 42.4% have completed matric or higher which is about 10% percent higher than the rate in Lejweleputswa (38.86%)

b) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R Not determined at this stage	
What is the expected yearly income that will be generated by or as a result of the activity?	N/A	
Will the activity contribute to service infrastructure?	**YES**	NO
Is the activity a public amenity?		**NO**
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	Construction Team and security of up to 50 people	
What is the expected value of the employment opportunities during the development and construction phase?	Not determined at this stage, will be finalized at procurement	
What percentage of this will accrue to previously disadvantaged individuals?	10%	
How many permanent new employment opportunities will be created during the operational phase of the activity?	Four	
What is the expected current value of the employment opportunities during the first 10 years?	Not determined at this stage, will be finalized at procurement	
What percentage of this will accrue to previously disadvantaged individuals?	10%	

9. BIODIVERSITY

Please note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed activity/ies. To assist with the identification of the biodiversity occurring on site and the ecosystem status consult http://bgis.sanbi.org or BGIShelp@sanbi.org. Information is also available on compact disc (cd) from the Biodiversity-GIS Unit, Ph (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) and must be provided as an overlay map to the property/site plan as Appendix D to this report.

A map which indicates the mapped biodiversity and ecological habitats and features on the site is included below as Figure 7, and included in **Appendix A**. The extent of the project site which falls within a CBA is also indicated. While the development area has a minimal overlap with CBA areas, these are completely avoided by the planned development footprint (avoidance mitigation), and these areas are not impacted by the planned development.

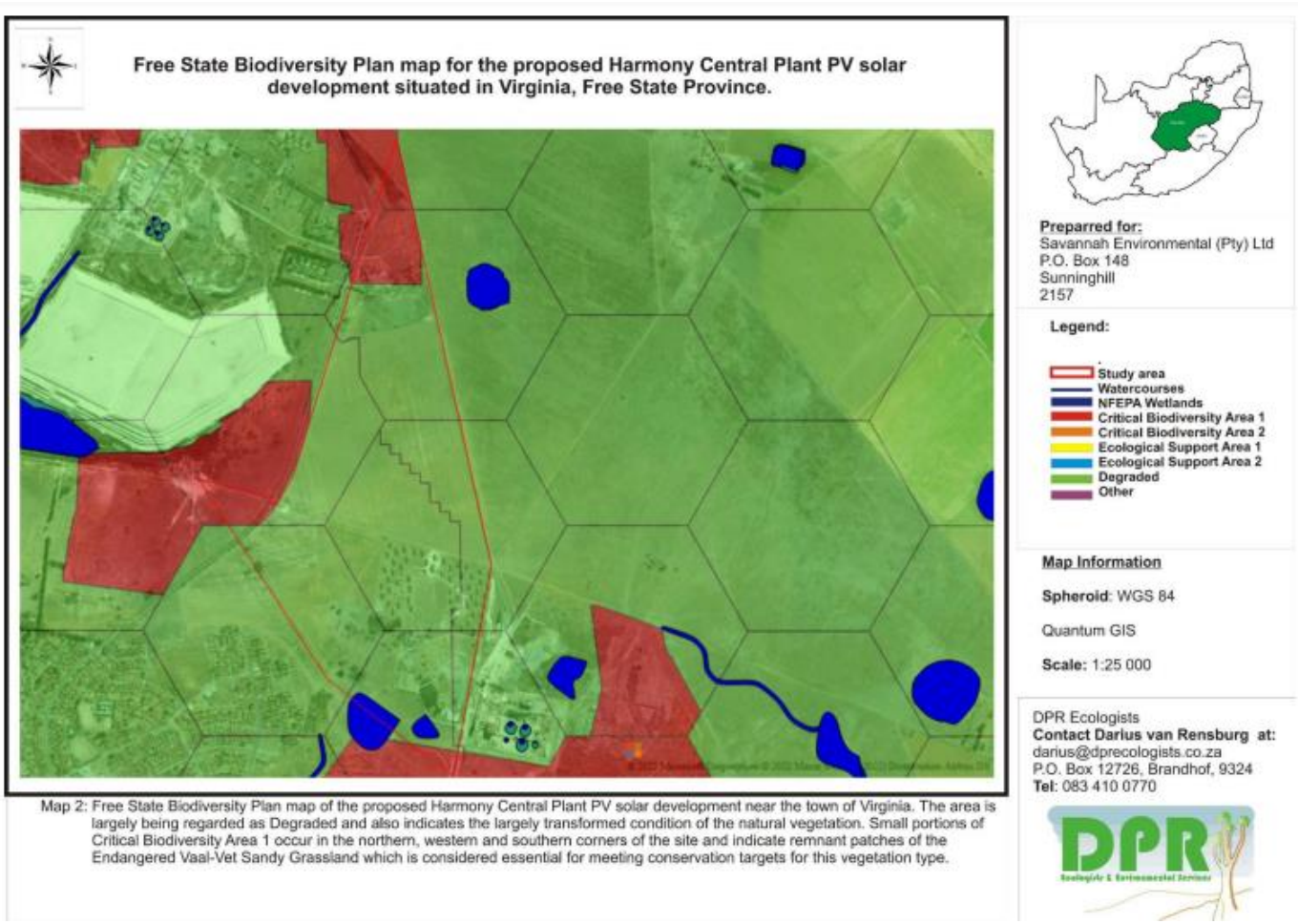


Figure 7: Habitats identified within the development area

a) Indicate the applicable biodiversity planning categories of all areas on site and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category)

While the development area has a minimal overlap with CBA areas, these are completely avoided by the planned development footprint (avoidance mitigation), and these areas are not impacted by the planned development (refer Figure 7 above). The categorisation below is for the planned development Footprint of the facility only (which avoids all CBA areas).

Systematic Biodiversity Planning Category				**If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan**
Critical Biodiversity Area (CBA)	Ecological Support Area (ESA)	Other Natural Area (ONA)	**No Natural Area Remaining (NNR)**	N/A

b) Indicate and describe the habitat condition on site

Habitat Condition	Percentage of habitat condition class (adding up to 100%)	Description and additional Comments and Observations (including additional insight into condition, e.g. poor land management practises, presence of quarries, grazing, harvesting regimes etc).
Natural	10%	Natural areas which have not been directly impacted by anthropogenic activities occur on site. These natural areas are the natural wetland features and drainage features identified within the development area and grid connection corridor. This habitat needs to be protected and improved due to the role of this habitat as a water resource.
Near Natural (includes areas with low to moderate level of alien invasive plants)	10%	The degraded grassland habitat unit is regarded as semi-natural grassland, but disturbed due to mining, agricultural activities and also human infringement in areas close to roads. Generally, this habitat unit has low ecological function attributed to floral communities, including the protected species.
Degraded (includes areas heavily invaded by alien plants)	40%	The disturbed grassland habitat unit comprises areas where the grassland has been altered due to historic and/or current human activity as well as livestock pressure. This habitat is not entirely transformed but is in a constant modified state as it cannot recover to a more natural state due to ongoing disturbances and pressures imposed from the surrounding transformed areas and the current land use. This area is considered to have a low sensitivity due to the fact that it may be used as a movement corridor and in many cases forms a barrier between the more natural grassland and the transformed areas.
Transformed (includes cultivation, dams, urban, plantation, roads, etc)	40%	The transformed areas are the areas which have little to no natural areas left due to being transformed by the informal housing, roads, mining practise and other infrastructure such as powerlines. Indirect impacts arise from the extensive anthropogenic presence from the current and historic land use. This habitat contributed to the high amount of alien vegetation recorded within the development area and grid connection corridor.

c) Complete the table to indicate:

(i) the type of vegetation, including its ecosystem status, present on the site; and

(ii) whether an aquatic ecosystem is present on site.

<table>
<tr><td colspan="2">Terrestrial Ecosystems
The site falls within the Vaal-Vet Sandy Grassland vegetation type <u>(This vegetation type is limited within the development area)</u></td><td colspan="7">Aquatic Ecosystems</td></tr>
<tr><td rowspan="2">Ecosystem threat status as per the National Environmental Management: Biodiversity Act (Act No. 10 of 2004)</td><td rowspan="2">Critical
Endangered
Vulnerable
Least Threatened</td><td colspan="3" rowspan="2">Wetland (including rivers, depressions, channelled and Unchanneled wetlands, flats, seeps pans, and artificial wetlands)</td><td colspan="2" rowspan="2">Estuary</td><td colspan="2" rowspan="2">Coastline</td></tr>
<tr></tr>
<tr><td>YES</td><td>NO</td><td>UNSURE</td><td>YES</td><td>NO</td><td>YES</td><td>NO</td></tr>
</table>

The site falls within the Vaal-Vet Sandy Grassland vegetation type. However, this vegetation type is limited within the development area.

A wetland feature is located on the southern boundary of the development area, but the feature plus the recommended buffer is avoided by the planned development footprint.

These are discussed in further detail in the section below (also refer to Figure 8).

d) Please provide a description of the vegetation type and/or aquatic ecosystem present on site, including any important biodiversity features/information identified on site (e.g. threatened species and special habitats)

<u>Vegetation Type</u>

The development area falls within the Vaal-Vet Sandy Grassland vegetation type (refer to **Figure 8**).

According to Mucina & Rutherford (2006) the area consists of Vaal-Vet Sandy Grassland (Gh10) This vegetation type is currently listed as Endangered (EN) under the National List of Threatened Ecosystems (Notice 1477 of 2009) (National Environmental Management Biodiversity Act, 2004). Any remaining patches of natural grassland would therefore be regarded as being of very high conservation value.

The vegetation type is currently heavily affected by extensive transformation by agriculture, urban expansion and mining operations. The Free State Province Biodiversity Management Plan (2015) has been published and has identified areas which are essential to meeting conservation targets for specific vegetation types, i.e. Critical Biodiversity Areas.

The development area is identified as a degraded area which has been previously transformed, the majority of the site was previous ploughing as well accommodating various mining structures and infrastructure. These areas would also largely be of low conservation value.

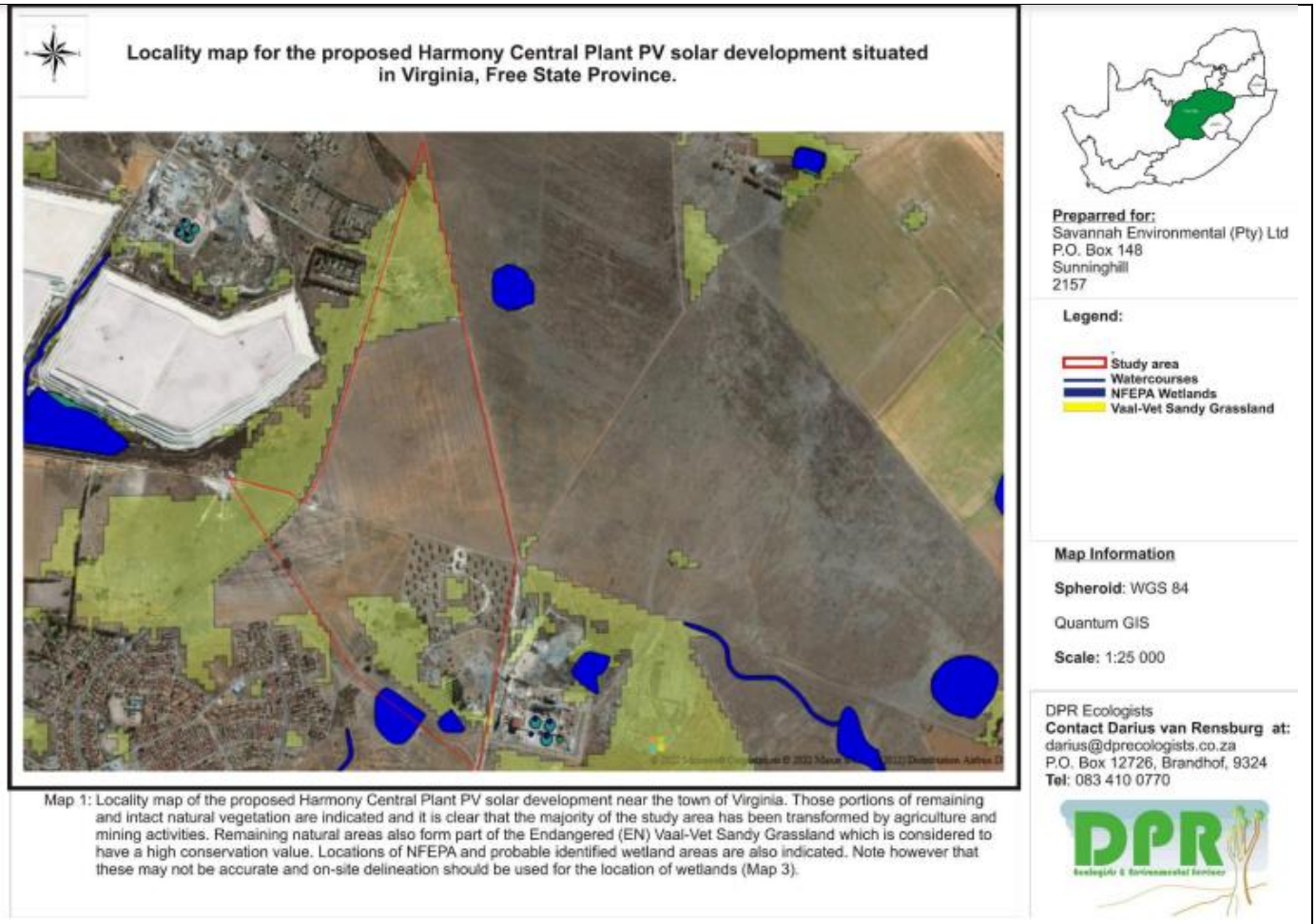


Figure 8: Map illustrating the vegetation type associated with the development area

A few small patches on the project site are however listed as Critical Biodiversity Area 1 (CBA 1) as these represent remnant patches of the threatened Vaal-Vet Sandy Grassland. These areas remain essential to maintaining the conservation targets for this vegetation type and they should all be regarded as having a very high conservation value. These areas regarded as CBA 1 have been completely excluded from the development and any associated activities.

Ploughed Plains (Grass layer dominated by pioneer species)

The vegetation composition in these areas also confirm that the natural vegetation type has been completely transformed in these areas.

The grass layer is dominated by pioneer grasses and herbs while exotic weeds are also common.

- **Pioneer grasses** common in transformed areas: *Chloris virgata, Aristida congesta, Cynodon dactylon, Aristida bipartita, Hyparrhenia hirta* and *Cymbopogon pospischillii*.
- **Herbaceous layer:** *Solanum incanum, Salvia verbenaca, Berkheya onopordifolia, Arctotis venusta, Conyza podocephala* and *Gomphocarpus fruticosus*.
- **Dwarf shrub**, *Stoebe plumosus* is also a reliable indicator of degraded grassland and is common in this area.
- **Exotic weeds** include: *Alternanthera pungens, Datura ferox, Emex australis* and *Schinus molle*.
- Species being associated with the natural vegetation type is almost completely absent and include **rare specimens** of *Lotononis listii* and *Delosperma cooperi*.

From the vegetation description of these previously ploughed areas, they are clearly transformed from the natural vegetation type and can no longer be regarded as representative of the Vaal-Vet Sandy Grassland vegetation type. These areas are also utilised as communal grazing and is affected by fairly high levels of overgrazing by livestock. Given

that the soil profile had also been transformed by previous ploughing it is highly unlikely that they would ever be able to re-attain a similar composition to the natural vegetation type. They are consequently regarded as having a low conservation value and would be ideal for the proposed development

Patches of remaining natural grassland (consisting of sandy soils)

These patches are all fairly small, they are in varying degrees of disturbance though still retain sufficiently representative vegetation to be regarded as part of the natural vegetation type in this area. This vegetation type, Vaal-Vet Sandy Grassland is also an Endangered ecosystem and therefore any remaining patches would be regarded as having a high conservation value. Though not in a particularly good condition, these patches are still dominated by a variety of climax grasses, dwarf shrubs and herbs while exotic weeds are also common and are indicative of significant disturbance.

- **The grass layer** is dominated by climax grasses though pioneer species are also abundant indicating a natural grass layer but with significant disturbance.
  - **Climax grasses** include *Themeda triandra, Digitaria eriantha, Eragrostis obtusa and Eragrostis* superba
  - **Pioneer species** include *Pogonarthria squarrosa, Eragrostis gummiflua and Trichoneura grandiglumis.*
- **Dwarf shrubs and herbs** include *Nolletia ciliaris, Berkheya macrocephala, Rosenia humilis, Sebaea exigua, Pentzia incana, Dicoma macrocephala, Nenax microphylla, Crabbea acaulis and Pollichia campestris*.
- **Pioneer *herb***, *Nidorella resedifolia* is also abundant and is an indicator of disturbance.
- **Geophytic plants:** *Colchicum longipes and Massonia jasminiflora*. These are both characteristic of the natural vegetation type in this area.
- **Exotic weeds** such as *Opuntia humifusa, Tagetes minuta, Bidens bipinnata* and *Conyza bonariensis.*

No protected or endangered species could be identified in these areas though it remains possible that some may be present. These patches should therefore be avoided by the development.

Conclusion

From the description of the area given above it is clear that the majority of the site has been transformed by agricultural and mining operations. The natural vegetation type in this area, Vaal-Vet Sandy Grassland is also currently under severe transformation pressure. Consequently, any remaining natural patches would therefore be regarded as having a very high conservation value. These patches have also been listed as Critical Biodiversity Area 1 (CBA 1), which confirms this sensitivity rating. These areas should therefore be avoided by development (application of the avoidance mitigation). The borders of these natural areas have also been refined by the current site survey and it is evident how the area has progressively been transformed.

Wetland Ecology

The large main seepage wetland system has been identified as the main wetland system on the site and is providing several essential functions considered to be highly sensitive and of high conservation value. The wetland has therefore be completely excluded from the development footprint and the 20-meter buffer zone as suggested for the development area has been maintained and avoided around the edge of the wetland.

As long as this is implemented successfully, the anticipated risk to the wetland should remain low. The smaller seepage wetland approximately 200m to the east of the main wetland is quite heavily modified but still functions in terms of the surface water drainage of the area. It also forms part of an area of remaining natural vegetation which also contributes to its conservation value. Any impacts that the development will have on this smaller wetland would inevitably also affect the larger wetland system. The development has therefore excluded this wetland area from development footprint.

The impact significance has been determined and should development take place without mitigation it is anticipated that several moderate-high to high impacts will occur. The impact on remaining natural patches of grassland as well as the wetland systems in the southern portion of the site will especially be heavily affected. However, should adequate mitigation be implemented as described these can all be reduced to moderate and low-moderate impacts.

Figure 9: A large wetland area occurs in the south of the site which is dominated by wetland grasses.

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT AND NOTICE

Publication name	Volksblad E-Publication	
Date published	02 September 2022	
Site notice positions	**Latitude**	**Longitude**
	28° 2'44.91"S	26°53'3.12"E
	28° 2'59.72"S	26°52'30.81"E
Date placed	18 August 2022	

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

(a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and a format as may be determined by the department) at a place conspicuous to the public at the boundary or on the fence of—

(i) the site where the activity to which the application relates is or is to be undertaken; and

(ii) any alternative site mentioned in the application.

Include proof of the placement of the relevant advertisements and notices in **Appendix E2**.

Three site notices were placed at the development site on 18 August 2022. Please refer to **Appendix E2** for proof of placement of the site and process notices.

One newspaper advertisement (in English) was published in the Volksblad E-Publication on 02 September 2022. Please refer to **Appendix E2** for the advertisement text. Proof of the media advertisement will be included in the final BA Report.

(b) giving written notice to—

(i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;

(ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;

(iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;

(iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;

(v) the municipality which has jurisdiction in the area;

(vi) any organ of state having jurisdiction in respect of any aspect of the activity; and

(vii) any other party as required by the department.

Notification letters, inclusive of a Background Information Document (BID), announcing the commencement of the BA process being undertaken and how I&APs can become involved in the BA

process were distributed via e-mail to pre-identified Interested and Affected Parties (I&APs) and key stakeholders on 01 September 2022. The notification letter announced the availability of the BA Report and EMPr for a 30-day review and comment period. Please refer to **Appendix E4** and **E5** for proof of distribution of the notification letters.

(c) placing an advertisement in—
  (i) one local newspaper; or
  (ii) any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations.

(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in subregulation 54(c)(ii).

An English advertisement announcing the commencement of the BA process and the availability of the BA Report and EMPr for a 30-day review and comment period was placed in the Volksblad E-Publication on 02 September 2022. Please refer to **Appendix E2** for the media advertisement text. Proof of placement will be included in the final BA Report.

(e) using reasonable alternative methods, as agreed to by the department, in those instances where a person is desiring of but unable to participate in the process due to—
  (i) illiteracy;
  (ii) disability; or
  (iii) any other disadvantage.

Alternative means of undertaking consultation have been designed and implemented by Savannah Environmental to ensure that I&APs, including persons desire to participate but unable to do so due to limitations as per the EIA Regulations, 2014, as amended, are afforded sufficient opportunity to access project information and raise comments on the project through an interactive web-based platform (i.e. online stakeholder engagement platform) readily available and accessible to any person registering their interest in the project. It ensures that the public participation process is undertaken in line with Regulations 41 to 44 of the EIA Regulations, 2014, as amended. Consultation with the Ward Councillor and the Ward Committee members will take place to ensure that project related information reach those persons with limitations are informed of the proposed development.

The online stakeholder engagement platform implemented by Savannah Environmental for the project allows the EAP to visually present details regarding the project and consultation documentation, including project maps and plans, and background information documents. It also contains the BA Report and Appendices available for review. The use of an online tool enables stakeholders and I&APs to explore the project-specific content in their own time, whilst still participating in a meaningful way in the consultation process.

Virtual Focus Group Meetings with the relevant stakeholder groups (i.e., landowners, authorities, and stakeholders (including Organs of State, local municipality and official representatives of community-based organisations)) will be held during the 30-day public review and comment period due the details of which are provided below:

- **6 September:** Focus Group Meeting with Lehweleputswa District Municipality and Matjihabeng Local Municipality Officials; and
- **14 September:** Key Stakeholders Workshop with National, Provincial and Local Authorities and Key Stakeholders i.e. Telkom, Eskom, South Africa Civil Aviation Authority, Representatives of Organisations i.e. Ratepayers Association

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

(a) indicate the details of the application which is subjected to public participation; and
(b) state—
  (i) that the application has been submitted to the department in terms of these Regulations, as the case may be;
  (ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;
  (iii) the nature and location of the activity to which the application relates;
  (iv) where further information on the application or activity can be obtained; and
  (v) the manner in which and the person to whom representations in respect of the application may be made.

The content included in the media advertisement and site notices compiles with the requirements of Regulation 41. (2)(a)(i) and (ii),Harmony Gold Mining (Pty) Ltd. Copies of the text as used for these notices are included in **Appendix E2**

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the department in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any Gazette that is published specifically for the purpose of providing notice to the public of applications made in terms of these Regulations.

Advertisements and notices must make provision for all alternatives.

The media advertisement was placed in the Volksblad E-Publication, which is a localand regional newspaper, and is widely distributed and read on their online platform by the public. A description was given of the proposed project; affected properties; and the BA and public participation process being undertaken.

4. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later stage that should have been addressed may cause the department to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

The sharing of information forms the basis of the public participation process and offers the opportunity for I&APs to become actively involved in the BA process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective and transparent manner. The public participation process affords I&APs opportunities to provide input into and receive information regarding the BA process in the following ways:

» provide an opportunity to submit comments regarding the project;
» assist in identifying reasonable and feasible alternatives, where required;
» identify issues of concern and suggestions for enhanced environmental assessment;
» contribute relevant local information and knowledge to the environmental assessment;
» allow registered I&APs to verify that their comments have been recorded, considered, and addressed, where applicable, in the environmental investigations;
» foster trust and co-operation;
» generate a sense of joint responsibility and ownership of the environment;
» comment on the findings of the environmental results as documented in the BA Report; and
» Identify issues of concern and suggestions for enhanced benefits.

The public consultation process has included the following to date:

- distribution of a notification letter with the BID to pre-identified I&APs; and
- placement of site notices

The public participation process has considered the nature and extent of the project to determine the most appropriate stakeholders are provided adequate opportunity to engagement and comment on the project. Focus Group Meetings with the relevant stakeholder groups (i.e., landowners and authorities (i.e., Organs of State, district & local authorities), and a Key Stakeholders Workshop with key stakeholders i.e., Eskom, Telkom, etc, and official elected representatives of community-based organisations)) are to be held during the 30-day public relyview and comment period.

In addition, all stakeholders will have access to all project documentation online on the Savannah Environmental stakeholder engagement platform. Access to the project documentation is unrestricted and easy to download. In the written notifications in which the BA and public participation process have been announced, including the media advertisement, I&APs has been made aware of the "*please call me*" that is available to those I&APs with limited data. The public participation team will attend to these messages received and determine the best way of communication with the I&AP.

Provide details of the measures taken to include all potential I&APs as required by Regulation 41(2)(e) and 41(6) of GN 326.

In terms of Regulation 41(2)(e) consultation with the Ward Councillor, the Ward Committee members and the officially elected representatives from organisations such as ratepayers associations and acknowledged community based organisation/s will take place to ensure that project related information reach those persons with limitations are informed of the proposed development.

In terms of Regulation 41(6) site notices were placed as the proposed development site, media advertisement placed in the local and regional newspaper and the BID distributed those pre-identified I&APs and in which it was requested that should they know of any other person/s that need to be informed of the proposed development to provide Savannah Environmental with their contact details, after which the public participation team will be in contact with that person/s and ensure that they are informed of the proposed development and provide them with the public documents available.

Key stakeholders (other than organs of state) identified in terms of Regulation 41(2)(b) of GN 326

Title, Name and Surname	Affiliation/ key stakeholder status	Contact details (tel number or e-mail address)
Samantha Ralston	BirdLife South Africa	The contact details of the key stakeholders have been excluded as per the requirements of the POPI Act.
Serame Motlhake	Sentech Ltd	
Zamikhaya Magogotya	South African Weather Services	
Simphiwe Masilela	Air Traffic and Navigation Services (ATNS)	
Selaelo Matlhane	South African Radio Astronomy Observatory (SARAO)	
Lizelle Stroh	South African Civil Aviation Authority	

Refer to the database attached within **Appendix E1** of the BA Report.

Include proof that the key stakeholder received written notification of the proposed activities. This proof may include any of the following:

(a) e-mail delivery reports;
(b) registered mail receipts;
(c) courier waybills;
(d) signed acknowledgements of receipt; and/or
(e) or any other proof as agreed upon by the competent authority.

Proof that the key stakeholders registered on the project database have received written notification of the proposed activities in included in **Appendix E4** of the BA Report. This proof includes the following:

(a) e-mail delivery reports;
(b) courier waybills – should hard copies be requested by an Organ of State or key stakeholder; and
(c) signed acknowledgements of e-mail receipt should the function be selected by the recipient..

5. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

To date no issues have been raised by stakeholders and/or I&APs. Any and all comments received during the 30-day review period of the BA Report will be included in **Appendix C6** of the Final BA which will be submitted to DESTEA.

6. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments received from I&APs and respond to each comment before the Draft BAR is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to the Final BAR as Appendix E8.

A Comments and Responses Report which includes comments received following the announcement of the BA process and during the 30-day review and comment period of the BA Report will be prepared and included as **Appendix C8** in the final BA report.

7. AUTHORITY PARTICIPATION

Please note that a complete list of all organs of state and or any other applicable authority with their contact details must be appended to the basic assessment report.

All Organs of State and/or any other applicable authorities, including their contact details, have been included in the I&AP database (refer to **Appendix C1**)

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input[10]. Authorities and Organs of State identified as key stakeholders include:

Authority/Organ of State	**Contact person**
Department of Forestry, Fisheries and the Environment: Biodiversity Conservation	Seoka Lekota
Department of Water and Sanitation: Free State Province	Ntili
Department of Agriculture and Rural Development	Nozizwe Makgalemele
Department of Mineral Resources and Energy	Mthetheleli Maphinda
Free State Provincial Heritage Resources Agency	Ntando Mbatha
SAHRA	Natasha Higgit
Free State Department of Economic Small Business Development, Tourism and Environment	Grace Mkhosana
Free State Department of Agriculture and Rural Development	Thabita Mokone
SANRAL: Western Region	Nxobile Mabaso
Eskom Holdings SOC Ltd	John Geeringh

Refer to the database attached within **Appendix C1**.

Include proof that the Authorities and Organs of State received written notification of the proposed activities as appendix C4 and C5.

[10] Contact details of the relevant authorities have been excluded as per the requirements of the POPI Act.

Proof that the Authorities and Organs of State received written notification of the proposed project has been included in **Appendix C4**. Appendix C5 includes the proof of written notifications to I&APs and landowners.

In the case of renewable energy projects, Eskom and the SKA Project Office must be included in the list of Organs of State.

Proof that the Eskom received written notification of the proposed project has been included in **Appendix C4**.

8. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for any activities (linear or other) where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority.

Proof of any such agreement must be provided, where applicable. Application for any deviation from the regulations relating to the public participation process must be submitted prior to the commencement of the public participation process.

A list of pre-registered I&APs must be included as **Appendix C1**.

A list of registered I&APs has been included as **Appendix C1.**

Copies of any correspondence and minutes of any meetings held must be included in Appendix E6.

Copies of correspondence with Organs of State and Key Stakeholders will be included in the final BA Report as **Appendix C4** and correspondence with I&APs will be included in **Appendix C5**. Copies of minutes of meetings held during the 30-day review and comment period will be included as **Appendix C7** to the final BA Report.

Has any comment been received from stakeholders?	YES	**NO**

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

Not applicable at this stage of the application / process.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014 as amended and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

Provide a summary and anticipated significance of the potential direct, indirect and cumulative impacts that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed. This impact assessment must be applied to all the identified alternatives to the activities identified in Section A(2) of this report.

1.1 Outcomes of the Department of Forestry, Fisheries and the Environment (DFFE) Web-Based Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16(1)(b)(v) of the 2014 EIA Regulations (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of applications in terms of Regulations 19 and 21 of the EIA Regulations.

The requirement for the submission of a Screening Report (**Appendix G2**) for the project is applicable as it triggers Regulation 19 of the EIA Regulations, 2014 (as amended). **Table 2** provides a summary of the specialist assessments identified in terms of the screening tool and responses to each assessment from the project team, considering the project area under consideration.

Table 2: Sensitivity ratings from the DFFE's web-based online Screening Tool associated with the development of the Solar PV Energy Facility and associated infrastructure.

Specialist Assessment	Sensitivity Rating as per the Screening Tool (relating to the need for the study)	Project Team Response
Agricultural Impact Assessment	High Sensitivity	This specialist study is included in this Basic Assessment Report as **Appendix D2**. Based on the outcome of the desktop analysis of available data as well as the data obtained during the site visit, it has been concluded that the entire development area haS medium to low sensitivity to the development from the perspective of soil and agricultural potential conservation.

Landscape/Visual Impact Assessment	Very High Sensitivity	A Visual impact assessment is included as Appendix D4 in this Basic assessment Report. Some components of the PV Facility and associated infrastructure may be visible but does not necessarily imply a high visual impact. Sensitive visual receptors within (but not restricted to) a 3km buffer zone from the facility have been identified, and is assessed to have a medium to low significance.
Archaeological and Cultural Heritage Impact Assessment	Low Sensitivity	A Heritage impact assessment (which covers both archaeological, palaeontology and cultural aspects of the project site) is included in this Report as Appendix D3. No resources of significance have been noted and no additional measures are recommended.
Palaeontology Impact Assessment	Very High Sensitivity	
Terrestrial Biodiversity Impact Assessment	Very high Sensitivity	An Ecological impact assessment (including flora and fauna) has been undertaken for the PV facility and is included as Appendix D1 of the Basic assessment Report. Based on the outcomes of the desktop study, available data and field work done, it has been indicated that the development area has some potential areas of significance however the development footprint falls within the areas identified as Low to Medium Sensitivity.
Aquatic Biodiversity Impact Assessment	Very high Sensitivity	An Ecological impact assessment (including freshwater) has been undertaken for the PV facility and is included as Appendix D1 of the Basic Assessment Report. Wetlands or watercourse features are located within the project site. However, the development footprint avoids both the wetlands, watercourses and the 500m regulated areas. Parts of the gridline corridor falls within a 500m regulated area adjacent to existing linear Eskom development
Civil Aviation Assessment	Medium Sensitivity	A small local air field is located approximately 6km from the proposed development. No predicted impacts are anticipated in this regard, however if applicable the Civil Aviation Authority (CAA) and Air Traffic Navigation Services (ATNS) will be consulted to obtain inputs.
Defence Assessment	Low Sensitivity	A defence or military base is not located within close proximity to the PV facility.
RFI Assessment	Low Sensitivity	The project site under consideration for the development of the Harmony Central plant is located within an area that as classified as having low sensitivity for telecommunication. Telkom will however be consulted to provide written comment on the proposed development.
Plant Species Assessment	Low Sensitivity	

Animal Species Assessment	High Sensitivity	An Ecological Impact assessment (including flora and fauna) has been undertaken for the PV facility and is included as Appendix D1 of the Basic Assessment Report.
Avian theme	Low Sensitivity	An Avifaunal Impact Assessment has been undertaken and is included in the Basic Assessment Report as Appendix D6. Some areas of high sensitivities have been identified within the project site, however the solar PV facility avoids all high sensitivities within the development footprint.

1.2 Assessment of Impacts Identified through the BA Process (Direct and Indirect)

Impacts that required investigation during the BA process and the specialist consultants involved in the assessment of these impacts are indicated in **Table 3** below.

A complete impact assessment in terms of Regulation 19(3) of GN 326 must be included as **Appendix F**.

Table 3: Specialist studies undertaken as part of the BA process

Company	Specialist Area of Expertise	Specialist Name	Appendix
DPR	Ecology and Wetlands	Darius Van Rensburg	Appendix D1
Pachnoda Consulting	Avifauna	Lukas Niemand	Appendix D2
Terra Africa Environmental Consultants	Soils and Agricultural Potential	Marinè Pienaar	Appendix D3
Eco Thunder Consulting	Visual	Marti Le Roux	
CTS Heritage	Heritage and Palaeontology	Jenna Lavin	Appendix D4
Eco Thunder Consulting	Social environment	Brogan Geldenhuys	Appendix D5

Specialist studies considered direct and indirect environmental impacts associated with the development of all components of the facility. Identified impacts are assessed in terms of the following criteria:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected.
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. a score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high).
- The **duration**, wherein it is indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1.
  - The lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2.
  - Medium-term (5–15 years) – assigned a score of 3.
  - Long-term (> 15 years) - assigned a score of 4.
  - Permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment.

- 2 is minor and will not result in an impact on processes.
- 4 is low and will cause a slight impact on processes.
- 6 is moderate and will result in processes continuing but in a modified way.
- 8 is high (processes are altered to the extent that they temporarily cease).
- 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

» The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
- 1–5, where 1 is very improbable (probably will not happen).
- 2 is improbable (some possibility, but low likelihood.)
- 3 is probable (distinct possibility).
- 4 is highly probable (most likely).
- 5 is definite (impact will occur regardless of any prevention measures).

» The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
» The **status**, which is described as either positive, negative or neutral.
» The degree to which the impact can be reversed.
» The degree to which the impact may cause irreplaceable loss of resources.
» The degree to which the impact can be mitigated.

The **significance** is determined by combining the criteria in the following formula:

S = (E+D+M) P; where
S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

» **< 30 points:** Low (i.e. where this impact would not have a direct influence on the decision to develop in the area).
» **30-60 points:** Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated).
» **60 points:** High (i.e. where the impact must have an influence on the decision process to develop in the area).

As Harmony Gold Mining Company has the responsibility to avoid or minimise impacts and plan for their management (in terms of the requirements of NEMA and the 2014 EIA Regulations (GNR 326)), the mitigation of significant impacts is discussed. Assessment of impacts with mitigation is made, to demonstrate the effectiveness of the proposed mitigation measures. An EMPr that includes all the mitigation measures recommended by the specialists for the management of significant impacts is included as **Appendix F** to this BA Report.

1.3 Assessment of Cumulative Impacts

The project may have effects (positive and negative) on natural resources; the social environment; and on the people living in the project area.

Specialist studies also considered cumulative impacts associated with similar developments within a 30km radius of the proposed project. The purpose of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact). In this regard, specialist studies considered whether the construction of the project will result in:

- Unacceptable risk to environmental sensitivities
- Unacceptable loss. Of environmental features
- Complete or whole-scale changes to the environment or sense of place.
- Unacceptable increase in impact.
- A conclusion regarding whether the project will result in any unacceptable loss or impact considering all the projects proposed in the area is included in the respective specialist reports.

The impacts as well as a brief overview of the cumulative impacts are assessed for each of the identified sensitivities in the below tables. In addition, a detailed cumulative assessment has been assessed in **Appendix F.** This assessment is based on information currently available and considers impacts from similar solar power generation developments in the vicinity of the proposed project. The following potential cumulative impacts are considered on:

- Terrestrial Ecology (including fauna and flora)
- Freshwater resources (i.e., wetlands and drainage features)
- Avifauna
- Soil, land capability and agricultural potential
- Heritage resources (including archaeology and palaeontology)
- Visual impacts
- Social impacts

Figure 10 indicates the location of the project in relation to all known solar power generation developments located within a radius of 30km. These developments were identified using DFFE database which list all renewable projects which currently have environmental authorization, and information available in the public domain at the time of this assessment.

It should be noted that not all the solar facilities presently under consideration by various developers will be built for operation. Not all proposed developments will be granted all relevant permits by the relevant authorities (DFFE, DMRE, NERSA) due to the following reasons:

- There may be limitations to the capacity of the existing or future Eskom grid.
- Not all applications will receive a positive EA.
- Where projects are to be developed as part of the national energy mix, stringent requirements must be met by applicants in terms of the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme and a highly competitive process that only selects the most competitive projects.
- Not all proposed PV facilities will be able to reduce the associated negative impacts to acceptable levels or mitigate the impacts to acceptable levels (fatally flawed).

- Not all proposed facilities will eventually be granted a generation license by NERSA and/or sign a Power Purchase Agreement.
- Not all developers will be successful in securing financial support to advance their projects further.

It may be important to note that the site is located within an area that has been disturbed by numerous mining and industrial activities, as well as residential areas. As such, it is not anticipated that the proposed PV development will have a negative cumulative impact on the broader landscape which is already dominated by mining infrastructure and agriculture. In terms of renewable development activities which can have an industrial feel, it is recommended that such infrastructure be grouped or clustered to avoid sprawl across natural landscapes.

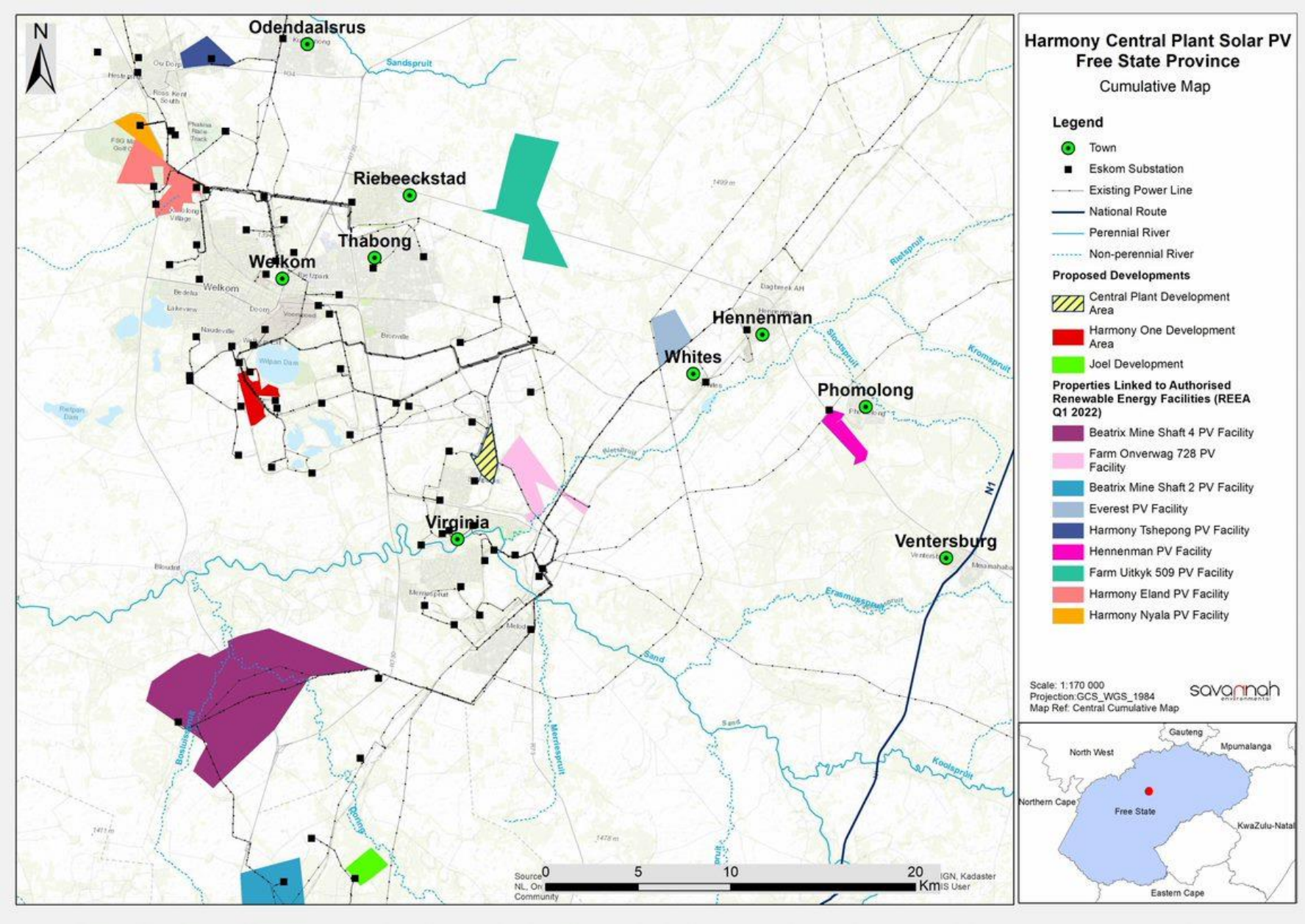


Figure 10: Cumulative map indicating the location of one other solar energy development within 30km of the development area

1.4. Assessment of Impacts on Terrestrial Ecology (Direct, Indirect and Cumulative)

Potential impacts on biodiversity resulting from the project would stem from a variety of different activities and risk factors associated with the project pre-construction, construction and operation phases. Potential impacts; their relative significance; and the recommended mitigation measures are summarised below (refer to the Specialist report: **Appendix D1** or the full impact assessments in **Appendix** F for more details).

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
Alternative 1 (preferred alternative)				
CONSTRUCTION, OPERATION AND DECOMMISSIONING				
Construction, operation and decommissioning of the Solar PV Facility and its associated infrastructure, including the overhead power line, substation/s and access roads	***Direct impacts:*** » Destruction, loss and fragmentation of the habitats, ecosystems and vegetation community.	High (85)	Low (16)	» Areas rated as High sensitivity and their buffers in proximity to the development areas should be avoided as much is feasible. Avoided areas must be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent access to these areas from construction workers and machinery. The infrastructure should be realigned to prioritise development within very low/ low sensitivity areas. Mitigated development in medium sensitivity areas is permissible. » Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimised and avoided where possible. All activities must be restricted to within the low/medium sensitivity areas. No further loss of very high sensitivity areas should be permitted. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. » Existing access routes, especially roads must be made use of.
	» Loss of protected, rare, or threatened plant species.	Low (18)	Low (8)	
	» The impact that the development will have on exotic weeds and invasive species, both current and anticipated conditions.	High (70)	Moderate (30)	
	» Increase erosion risk	Moderate (56)	Low (20)	
	» Fragmentation of habitat, disruption of ecological connectivity and -functioning in terms of the surrounding areas.	Moderate (60)	Low (8)	
	» Impacts that will result on the mammal population on and around the site.	Low (24)	Low (24)	

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
				» All laydown, chemical toilets etc. should be restricted to medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded. No permanent construction phase structures should be permitted. Construction buildings should preferably be prefabricated or constructed of re-usable/recyclable materials where possible. No storage of vehicles or equipment will be allowed outside of the designated project areas. » A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor must be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area.

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
				» It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants. » A fire management plan must be complied and implemented to restrict the impact fire might have on the surrounding areas. » Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. High visibility flags must be placed near any protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. Infrastructure, development areas and routes where protected plants cannot be avoided, these plants many being geophytes or small succulents should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again. All protected and red-data plants should be relocated, and as many other geophytic species as possible. If the plants cannot be relocated seed must be collected and utilised as part of the rehabilitation process. » Environmentally friendly dust suppressants must be utilised. » A qualified Environmental Control Officer must be on site when construction begins. A site walk through is recommended by a suitably qualified ecologist prior

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
				to any construction activities, preferably during the wet season and any SSC should be noted. In situations where the threatened and protected plants must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development of a search, rescue and recovery program is suggested for the protection of these species. Should animals not move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated. » The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. » The duration of the construction phase should be minimized to as short term as possible, to reduce the period of disturbance on fauna. » No trapping, killing, or poisoning of any wildlife is to be allowed. » Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (green/red) lights should be used wherever possible. » All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
				» All areas to be developed must be walked through prior to any activity to ensure no nests or fauna species are found in the area. Should any Species of Conservation Concern not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken. » Any holes/deep excavations must be dug and planned in a progressive manner and shouldn't be left open overnight unless appropriate demarcation is in place. Should the holes be left open overnight, they must be covered temporarily to ensure no small fauna species fall in. » Ensure that cables and connections are insulated successfully to reduce electrocution risk and preferably buried. » Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used. » All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr. The avoidance and protection of the wetland areas must be included into a site induction. Contractors and employees must all undergo the induction and made aware of the "no-go" areas to be avoided.

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
				» Areas that are denuded during construction need to be re-vegetated with indigenous vegetation where possible to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. All livestock must always be kept out of the project area, especially areas that have been recently re-planted. » Compilation of and implementation of an alien vegetation management plan. » The footprint area should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths. » Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. » Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces. No non environmentally friendly suppressants may be used as this could result in pollution of water sources. » Speed limits must be put in place to reduce erosion. Reduce dust generated by earth moving machinery through wetting the soil surface and putting up speed limit signs as well as speed bumps built to force slow speeds. » A stormwater management plan must be compiled and implemented. » Implementation of a rehabilitation plan.

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
				» Implementation of an alien invasive management plan and monitoring on an annual basis for 3 years post construction. » There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous flora including seeds of the SCCs found on site. » The area must be walked through prior to decommissioning to ensure fauna species are not affected by the removal of the infrastructure.
	Indirect impacts: » The construction of the facility may encroach into the wetland which will directly affect or may also impact on the catchment of the wetland which will then have an indirect impact on it.			
	Cumulative impacts: » The development of the infrastructure will contribute to cumulative habitat loss, especially in the ecological corridors like the CBA1 area	Medium (57) - Overall impact of the proposed project considered in isolation	Medium (47) - Cumulative impact of the project and other projects in the area	» Since transformation is already so extensive due to historic activities in this area, the planned development has the opportunity to make use of these transformed areas. Should the development be able to remain within these transformed areas, the project would not contribute significantly toward the cumulative ecological impacts in this area.

1.5. Assessment of Impacts on Avifauna (Direct, Indirect and Cumulative)

Potential impacts on avifauna and the relative significance of the impacts associated with the construction, operation and decommissioning of the project are summarised below (refer specialist Report noted in **Appendix D1** or in **Appendix F** for more details).

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
CONSTRUCTION, OPERATION AND DECOMMISSIONING				
Construction, operation and decommissioning of the Solar PV Facility and its associated infrastructure, including the overhead power line, and substation/s and access roads	***Direct impacts:*** » Losses of natural habitat and displacement of birds through physical transformation, modifications, removals and land clearance. This impact is mainly restricted to the construction phase and is permanent.	Medium (50)	Medium (30)	» All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting or hunting terrestrial species (e.g. guineafowl, francolin), and owls, which are often persecuted out of superstition. » Signs must be put up stating that should any person be found poaching any species they will be fined. » Construction must take place in the winter months as much is feasible. » Ensure that cables and connections are insulated successfully to reduce electrocution risk and preferably buried. » Monitoring of the OHL route must be undertaken to detect bird carcasses, to enable the identification of any potential areas of high impact to be marked with bird flappers if not already done so. Monitoring should be undertaken at least once a month for the first year of operation. » The design of the proposed PV must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa. » All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution.
	» The creation of novel or new avian habitat for commensal bird species or superior competitive species. This is expected to occur during the operation phase of the facility.	Low (18)	Low (12)	
	» Avian collision impacts related to the PV facility during the operation phase (collision with the PV panels).	Medium (56)	Medium (36)	
	» Avian collision impacts related to overhead power lines during operation	Medium (36)	Low (24)	
	» Avian electrocution related to the new distribution lines during operation.	Low (30)	Low (24)	

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
				» Fencing mitigations: ∗ Top 2 strands must be smooth wire ∗ Routinely retention loose wires ∗ Minimum 30cm between wires ∗ Place markers on fences » White strips should be placed along the edges of the panels, to reduce similarity to water and deter birds and insects. Consider the use of bird deterrent devices to limit collision risk. » Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used. » If any power lines/connection lines from existing lines to the facility are to be placed above ground, they must be marked with industry-standard bird flight diverters. » Ensure that monitoring is sufficiently frequent (preferably monthly) to detect electrocutions reliably and that any areas where electrocutions occurred are repaired as soon as possible.
	Indirect impacts: » None			
	Cumulative impacts: » Regional losses of natural habitat and subsequent displacement of birds	Medium (30)	Medium (33)	» Consolidation of infrastructure to areas where existing impacts occur (e.g. placing the proposed power line alongside existing power lines). » Apply bird deterrent devices to the panels for birds that may mistake the panels for open water and to prevent them from landing on the panels. To aid post-construction monitoring and/or monitoring of bird mortality rates, it is advised to employ video cameras to document any bird mortalities and to conduct direct observations and carcass searches on a regular and systematic basis.
	» Avian collision impacts related to the PV facility during the operation phase (collision with the PV panels).	Medium (36)	Medium (60)	
	» Avian collision impacts related to the power lines during operation.	Low (24)	Medium (39)	
	» Avian electrocution related to the power lines during operation	Low (24)	Low (30)	

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
				» Apply bird deterrent devices to the power line and make use of "bird-friendly" pylon structures. As a priority, all new power lines should be marked with bird diverters. Make use of bird-friendly pylons and bird guards. Position electrical infrastructure in close proximity to existing infrastructure.

1.6. Assessment of Impacts on Freshwater Features (Direct, Indirect and Cumulative)

Potential impacts on aquatic features and the relative significance of the impacts associated with the construction, operation and decommissioning of the project are summarised below (refer to **Appendix D1** or **Appendix F** for more details).

Activity	Impact summary		Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
CONSTRUCTION, OPERATION AND DECOMMISSIONING					
Construction, operation and decommissioning of the Solar PV Facility and its associated infrastructure, including the overhead power line, substation/s, and access roads	***Direct impacts:*** » Impacts on watercourses, wetlands or the general catchment.		High (90)	Low (20)	» Demarcate and avoid all wetlands and the associated 30 m buffer area. » Clearly demarcate the construction footprint and restrict all construction activities to within the proposed infrastructure area. » Consolidation of infrastructure to areas where existing impacts occur (e.g. placing the proposed power line alongside existing power lines). » When clearing vegetation, allow for some vegetation cover as opposed to bare areas. » Educate staff and relevant contractors on the location and importance of the identified
	» Destruction, loss and fragmentation of the habitats, ecosystems and vegetation community.		High (85)	Low (16)	

Activity	Impact summary		Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
	» Fragmentation of habitat, disruption of ecological connectivity and -functioning in terms of the surrounding areas.		Moderate (60)	Low (8)	wetlands through toolbox talks and by including them in site inductions as well as the overall master plan. » Limit construction activities near (< 50m) to the wetlands to winter where possible. Activities in hydromorphic soils can become messy during the height of the rainy season and construction activities should be minimised during these times to minimise unnecessary soil disturbances. » Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash. » Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility. » Appropriately stockpile topsoil cleared from the project area. » Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the wetlands. » Design and implement an effective stormwater management plan. » Promote water infiltration into the ground beneath the solar panels. » Release only clean water into the environment. » Stormwater leaving the site should not be concentrated in a single exit drain but spread across multiple drains around the site each fitted with energy dissipaters (e.g. slabs of concrete with rocks cemented in). » Regularly clear drains.

Activity	Impact summary		Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
					» Minimise the extent of concreted / paved / gravel areas. » A covering of soil and grass (regularly cut and maintained) below the solar panels is ideal for infiltration. If not feasible then gravel is preferable over concrete or paving. » Avoid excessively compacting the ground beneath the solar panels. » Develop and implement a rehabilitation and closure plan. » Appropriately rehabilitate the project area by ripping, landscaping and re-vegetating with locally indigenous species
	Indirect impacts: » None				
	Cumulative impacts: » The development of the infrastructure will contribute to cumulative habitat loss, especially in the ecological corridors like the wetland and thereby impact the water resource and ecological processes in the region.		Low (27) - Overall impact of the proposed project considered in isolation	Medium (33) - Cumulative impact of the project and other projects in the area	

1.7. Assessment of Impacts on Soils, Land Capability and Agricultural Potential (Direct, Indirect and Cumulative)

Potential impacts on soils, land capability and agricultural potential and the relative significance of the impacts associated with the construction and operation of the project are summarised below (refer to **Appendix D2** or **Appendix F** for more details).

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
CONSTRUCTION AND OPERATION				
Construction and operation of the Solar PV Facility and its associated infrastructure, including the overhead power line, substation/s, and access roads	***Direct impacts:*** » Change in land use from livestock grazing to energy generation	Medium (32)	Medium (28)	» Vegetation clearance must be restricted to areas where infrastructure is constructed. » No materials removed from development area must be allowed to be dumped in nearby livestock farming areas. » Prior arrangements must be made with the landowners to ensure that livestock and game animals are moved to areas where they cannot be injured by vehicles traversing the area. » No boundary fence must be opened without the landowners' permission. » All left-over construction material must be removed from site once construction on a land portion is completed. » No open fires made by the construction teams are allowable during the construction phase »
	» Soil erosion	Medium (30)	Low (16)	
	» Soil compaction	Medium (30)	Low (16)	
	» Soil pollution	Medium (36)	Low (14)	
	» Loss of land capability associated with the construction of facilities	Medium (60)	Medium (48)	
	Indirect Impacts None			
	Cumulative impacts: » Decrease in areas with suitable land capability for livestock grazing	Low (28)	Medium (40)	» keep the footprints of all renewable energy facilities as small as possible and to manage the soil quality by avoiding far-reaching soil degradation such as erosion.

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
	» Increase in areas susceptible to soil erosion	Medium (30)	Medium (33)	» Each of the projects should adhere to the highest standards for soil erosion prevention and management » Each of the projects should adhere to the highest standards for soil pollution prevention and management

1.8. Assessment of Impacts on Heritage Resources (including Archaeology and Palaeontology) (Direct, Indirect and Cumulative)

Potential impacts on heritage resources and the relative significance of the impacts associated with the construction of the project are summarised below (refer to **Appendix D3 or appendix F** for more details).

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
CONSTRUCTION				
Construction and operation of the Solar PV Facility and its associated infrastructure, including the overhead power line, substation/s, and access roads	***Direct impacts:*** » It is possible that buried archaeological resources may be impacted by the proposed development in the preferred location.	Low (16)	Low (8)	» Should any previously unrecorded archaeological and palaeontological resources or possible burials be identified during the course of construction activities, work must cease in the immediate vicinity of the find, and SAHRA must be contacted regarding an appropriate way forward. » The Chance Fossil Finds Procedure must be implemented for the duration of construction activities.
	» It is possible that buried palaeontological resources may be impacted by the proposed development in the preferred location.	Low (11)	Low (11)	
	Indirect impacts: » None			
	Cumulative impacts: » Cumulative Impact to the sense of place and known archaeological resources.	Low (16) - Overall impact of the proposed project considered in isolation	Medium (30) - Cumulative impact of the project and other projects in the area	» Consolidation of infrastructure to areas where existing impacts occur (e.g. placing the proposed power line alongside existing power lines).

1.9. Assessment of Visual Impacts (Direct, Indirect and Cumulative)

Potential visual impacts and the relative significance of the impacts associated with the construction, operation and decommissioning of the project are summarised below (refer to **Appendix D4** for **Appendix F** or more details).

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
CONSTRUCTION, OPERATION AND DECOMMISSIONING				
Construction, operation and decommissioning of the Solar PV Facility and its associated infrastructure, including the overhead power line, substation/s, and access roads	***Direct impacts:*** » Visual impact of construction activities on sensitive visual receptors in close proximity to the PV facility.	Medium (48)	Low (30)	» Retain and maintain natural vegetation (if present) immediately adjacent to the development footprint. » Ensure that vegetation cover adjacent to the development footprint (if present) is not unnecessarily removed during the construction phase, where possible. » Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas), wherever possible. » Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities. » Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent). » Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts. » Rehabilitate all disturbed areas (if present/if required) immediately after the completion of construction works.
	» Impact of PV facility on roads within the 0 – 3 km impact range	Medium (48)	Low (24)	
	» Visual Impact on Residences and Homesteads within the 0 – 3 km impact range	Medium (42)	Low (24)	
	» Glint and Glare	Low (24)	Low (24)	

Activity	Impact summary	Significance (without mitigation)	Significance (with mitigation)	Proposed mitigation
	» Visual exposure to the general surrounding area	Medium (42)	Low (24)	» Retain and maintain natural vegetation in all areas outside of the development footprint. » Maintain the general appearance of the facility as a whole. » Remove infrastructure not required for the post-decommissioning use of the facility. » Plant vegetation barriers along the border of the SEF in order to shield the structures from observers travelling along this road. » Retain and maintain natural vegetation in all areas outside of the development footprint. » Plant vegetation barriers along the western and south-western borders of the development area in order to shield the structures from observers residing at the above-mentioned homesteads and residential settlements. » Plant vegetation barriers along the western and south-western borders of the Solar PV facility n order to shield the structures from observers residing at the above-mentioned homesteads and residential settlements.
	» Impact on visual Intrusion	Low (30)	Low (24)	
	» On-site ancillary infrastructure associated with the PV facility and its impact surrounding area within the 0 – 3 km impact range	Low (24)	Low (24)	
	» Impact on sense of place	Low (22)	Low (22)	
	Indirect impacts: » None			
	Cumulative impacts: » The potential cumulative visual impact of the PV facility on the visual quality of the landscape.	Medium (42)	Low (10)	» Consolidation of infrastructure to areas where existing impacts occur (e.g. placing the proposed power line alongside existing power lines). »

1.10. Assessment of Social Impacts (Direct, Indirect and Cumulative)

Potential social impacts and the relative significance of the impacts associated with the construction, operation and decommissioning of the project are summarised below (refer to **Appendix D5 or Appendix F** for more details).

Activity	Impact summary	Significance (without mitigation/enhancement)	Significance (with mitigation/enhancement)	Proposed mitigation/enhancement
Alternative 1 (preferred alternative)				
CONSTRUCTION, OPERATION AND DECOMMISSIONING				
Construction, operation and decommissioning of the Solar PV Facility and its associated infrastructure, including the overhead power line, substation/s, and access roads	***Direct impacts:*** » The creation of employment opportunities and skills development opportunities during the construction phase for the country and local economy.	Positive - Medium (32)	Positive - Medium (36)	» Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. » Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria; » Before the construction phase commences the proponent and its contractors should meet with representatives from the MLM to establish the existence of a skills database for the area. If such as database exists it should be made
	» Presence of Non-Local and Foreign Construction Workers in the Area	Low for the community as a whole (27) Moderate-High for specific individuals who may be affected by pregnancy and STDs etc. (57)	Low for the community as a whole (24) Moderate-High for specific individuals who may be affected by pregnancy and STDs etc. (51)	
	» Loss of Labour from the mines or surrounding community to the Construction of the PV Facility	Medium (30)	Low (24)	

Activity	Impact summary	Significance (without mitigation/enhancement)	Significance (with mitigation/enhancement)	Proposed mitigation/enhancement
	» Safety and Security Risk	Medium (30)	Low (21)	available to the contractors appointed for the construction phase. » The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase. » Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase. » The operations consider the "Social and Development Plan" managed by the Mineral and Petroleum Resources Development Act 28 of 2002 (Regulations of 2004), as well as the Mining Charter 2018 » The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. » The developer should seek to develop a database of local companies, specifically Broad Based Black Economic Empowerment (BBBEE) companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the
	» Impacts Associated with Movement of Construction Vehicles	Low (27)	Low (21)	

Activity	Impact summary	Significance (without mitigation/enhancement)	Significance (with mitigation/enhancement)	Proposed mitigation/enhancement
				commencement of the tender process for construction contractors. » The proponent, in consultation with the MLM and the local Chamber of Commerce, should identify strategies aimed at maximising the potential benefits associated with the project. » The project provides additional opportunities for skills development and on-site training » Prioritise the requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low-skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks; » Develop a Code of Conduct for the construction phase to identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation; » The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase; » The proponent and the contractor should communicate the conditions of employment, in particular the temporality of employment to the

Activity	Impact summary	Significance (without mitigation/enhancement)	Significance (with mitigation/enhancement)	Proposed mitigation/enhancement
				residents of the area, using appropriate structures and communication processes. » The proponent and the contractor, should identify appropriate and feasible strategies to support a positive social integration of the construction workers in their roles as temporary residents of the area. » The movement of construction workers on and off the site should be closely managed and monitored by the contractors. » No construction workers, with the exception of security personnel, will be permitted to stay overnight on the site. » As far as possible, the transport of components to the site should be planned to avoid weekends and holiday periods. » The contractor should inform local farmers and representatives from the LM and relevant provincial road authorities of dates and times when abnormal loads will be making use of local roads. » The contractor must ensure that damage caused by construction related traffic to the gravel public roads and local, internal farm roads is repaired on a regular basis throughout the construction phase. The costs associated with the repair must be borne by the contractor.

Activity	Impact summary	Significance (without mitigation/enhancement)	Significance (with mitigation/enhancement)	Proposed mitigation/enhancement
				» Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis, adhering to speed limits and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. » All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. » The Contractor should ensure that workers are informed that no waste can be thrown out of the windows while being transported to and from the site. Workers who throw waste out windows should be fined. » Waste generated during the construction phase should be transported to the local permitted landfill site. » EMPr measures (and penalties) should be implemented to ensure speed limits are adhered to at all times. »
	Indirect impacts: » None			
	Cumulative impacts: » An increase in employment opportunities, skills development and business opportunities with the establishment of more than one solar energy facility.	Medium (33) - Overall impact of the proposed project considered in isolation	Medium (52) - Cumulative impact of the project and other projects in the area	» » The establishment of a number of solar energy facilities in the area does have the potential to have a positive cumulative impact on the area in the form of employment opportunities, skills development and business opportunities. The positive benefits will
	» The establishment of a number of renewable energy facilities in the	Low (27)	Medium (30)	

Activity	Impact summary	Significance (without mitigation/enhancement)	Significance (with mitigation/enhancement)	Proposed mitigation/enhancement
	MLM has the potential to place pressure on local services, specifically medical, education and accommodation			be enhanced if local employment policies are adopted and local services providers are utilised by the developers to maximise the project opportunities available to the local community. » Develop a recruitment policy / process (to be implemented by contractors), which will ensure the sourcing of labour locally, where available. » Work together with government agencies to ensure that service provision is in line with the development needs of the local area. » Form joint ventures with community organisations, through Trusts, which can provide local communities with benefits, such as employment opportunities and services. » Develop and implement a recruitment protocol in consultation with the municipality and local community leaders. Ensure that the procedures for applications for employment are clearly communicated.
	» Negative impacts and change to the local economy with an in-migration of labourers, businesses and jobseekers to the area.	Low (7) - Overall impact of the proposed project considered in isolation	Low (22) - Cumulative impact of the project and other projects in the area	

2. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Alternative 1 (preferred Site)

A technically viable site for the project was proposed by Harmony Gold and assessed as part of the BA process. The environmental assessment of the development area (including the development footprint) was undertaken by independent specialists and their findings have informed the results of this BA Report.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with the project's implementation. High sensitivity freshwater features (i.e., wetlands and their associated 30m buffer zones), which are regarded as no-go areas, were identified within the development area. The following sensitive areas/environmental features have been identified and demarcated within the development area (refer to **Figure 10** and **Appendix A**). Harmony Gold has proposed a technically viable layout for the project and associated infrastructure, which avoids these areas of high sensitivity.

- A very high sensitivity rating from an ecological, freshwater and avifauna perspective has been allocated to the CBA1 and endangered grassland habitat located adjacent to the north of development area. This is outside of the development footprint of the solar PV facility.
- A wetland feature identified on the southern boundary of the development area is regarded as a no-go area. A 20m buffer is to be implemented around the wetland features. No development is permitted within the feature or the buffer area. The development footprint of is located outside of this buffer area, and the grid connection corridor skirts the edge of this area. Infringement on this feature will be avoided.
- The endangered grassland habitat, located outside the development footprint to the south has a very high ecological and avifauna sensitivity. The area is not considered suitable for the placement of solar PV infrastructure, or the gridline, and should be avoided.
- A pan is present to the north-east of the development area. The pan is located outside the development area of Harmony Central Solar PV Facility. A 500m buffer must be implemented around this feature and has been allocated a very-high avifauna sensitivity and is regarded as a no-go area. Infringement on this feature will be avoided.
- Medium soil sensitivities were identified on the majority of the project area which, with the inclusion of mitigation measures can be mitigated to a low impact.
- Some social points of significance such as the Saaiplaas residential area was noted adjacent to the site.

The development footprint and layout for the PV facility and associated grid connection infrastructure within the 300m buffer avoids these areas of high sensitivity. The proposed facility development footprint and associated layout is considered as the most appropriate from an environmental perspective and acceptable within all fields of specialist study undertaken for the project. All impacts associated with the proposed project can be mitigated to acceptable levels through implementation of the recommended mitigation measures. The layout map included as **Figure 1** is considered the preferred facility layout for the project.

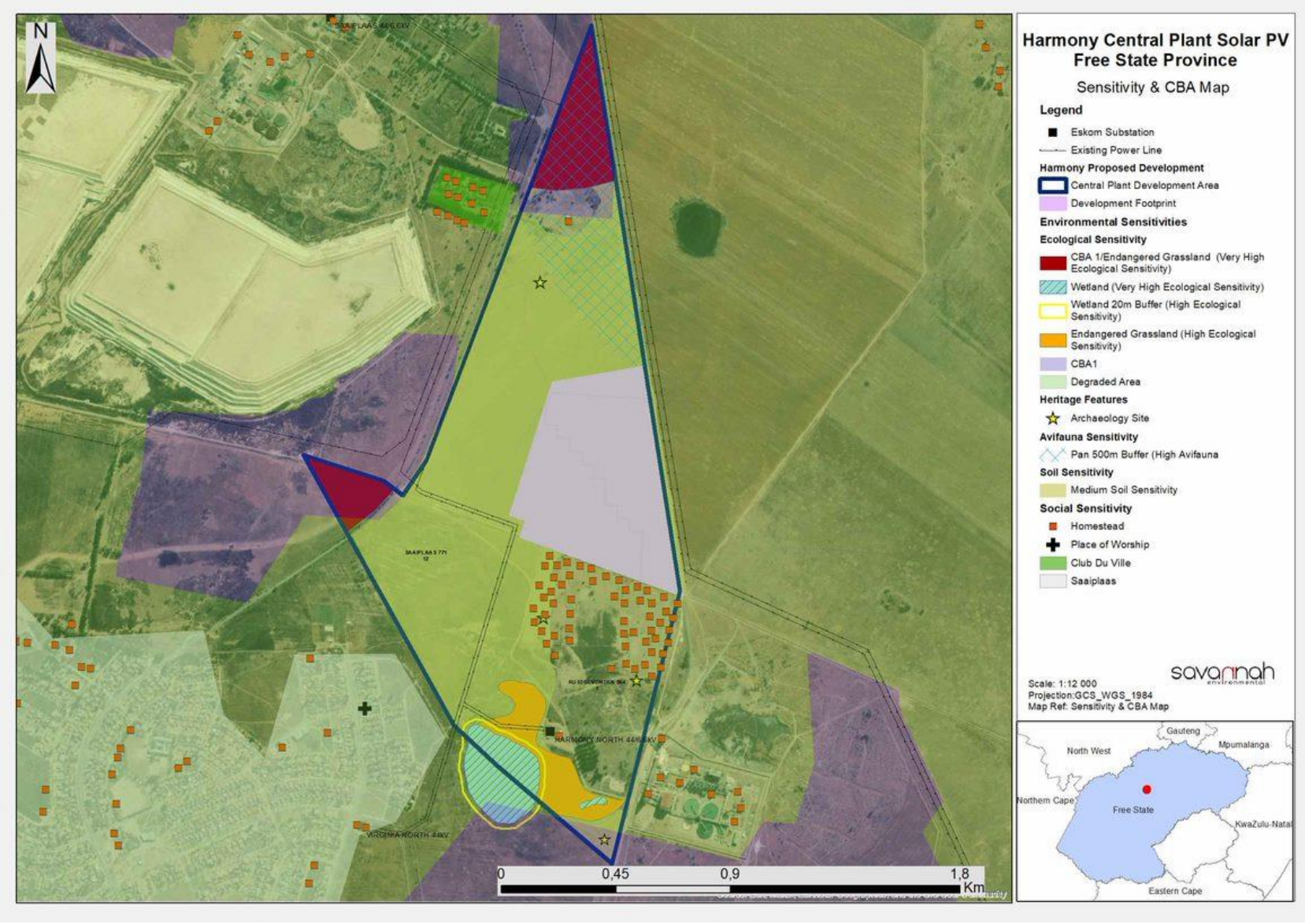


Figure 11: Sensitive environmental features identified within the project area and broader study area, overlain on the project layout

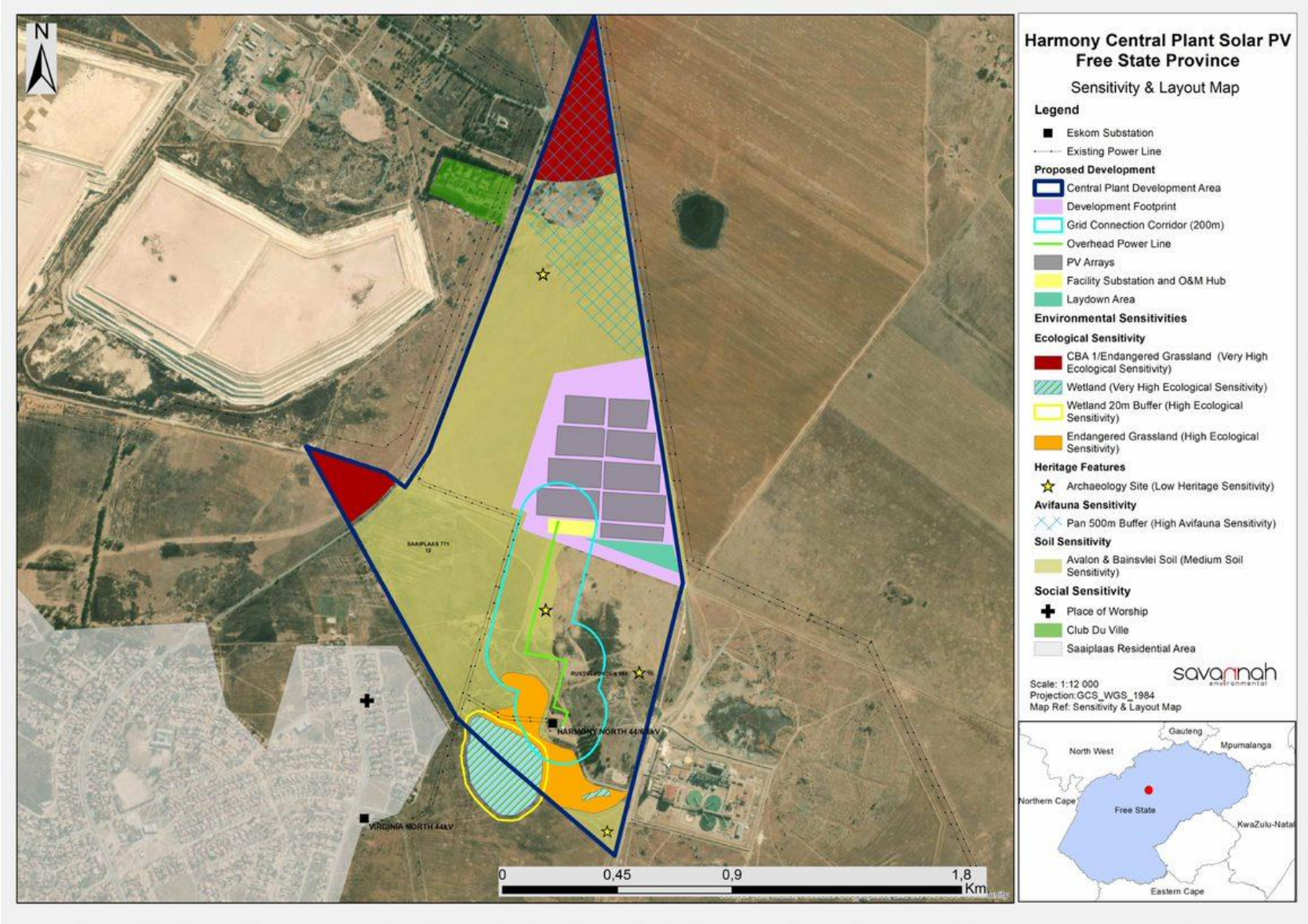


Figure 12: Environmental sensitivity map overlain with the facility layout

Through the assessment undertaken in this BA Report, the following can be concluded regarding the key environmental considerations in terms of the International Finance Corporation (IFC) Project Developers Guide for the project:

- *Construction phase impacts* (i.e., OHS, temporary air emissions from dust and vehicle emissions, noise related to excavation, construction and vehicle transit, solid waste generation and wastewater generation from temporary building sites) will be local in extent and of a low magnitude. The significance of impacts associated with the construction phase will be of a low to medium rating post-mitigation.
- *Water usage* (i.e., the cumulative water use requirements) will be kept to a minimum during construction and operation. Appropriate water demand and conservation measures will be implemented. Water for dust suppression and construction works will be sourced from the Mine. Potable water and water required for operation phase cleaning will be sourced from the Municipal supply currently providing water to the Mine.
- *Landscape and visual impacts* (i.e., the visibility of the solar panels within the wider landscape and associated impacts on landscape designations, character types and surrounding communities) for the construction and operation phases will mostly be of a medium significance due to the proximity of the site to the residential area. It is however important to note that there are existing mining and industrial activities and associated infrastructure within the region, and therefore, the visual quality of the area has already been compromised to a large degree.
- *Land matters* will be of low significance, as Harmony Gold is the owner of the affected properties. There will be no involuntary land acquisition / resettlement associated with this project. The facility is proposed adjacent to the mining operations, and will be supported by infrastructure already in place for these operations, as may be required.
- *Ecology and natural resources* (i.e., habitat loss/fragmentation, impacts on designated areas and disturbance or displacement of protected or vulnerable species) will be impacted by the project. The layout of the facility has been designed to avoid areas of high sensitivity, thereby reducing impacts on these resources. It is important to note that the facility is proposed on a site is degraded and that was previously disturbed by anthropogenic activities.
- *Cultural heritage* impacts (i.e., impacts on possible buried archaeological and palaeontological resources and the cultural landscape) are of low significance, and no heritage, archaeological or palaeontological resources of significance are associated with the development area. One archaeological site fall within the grid connection corridor, but can be avoided by the micro-siting of the grid line.
- *Transport and access* (i.e., impacts of transportation of materials and personnel) will be appropriately managed, and existing roads will be used during construction and operation. A gravel access road will be established to provide direct access to the site from existing roads. Nuisance type impacts associated with construction related activities and increased traffic and/or abnormal loads will be managed.
- *Consultation and disclosure* (i.e., consulting with key authorities, statutory bodies, affected communities and other relevant stakeholders) is being undertaken for the project and documented for inclusion in the assessment of the project. All identified stakeholders and interested and affected parties (I&APs) will be afforded the opportunity to participate in a meaningful way to the BA for the project.
- An Environmental Management Programme (EMPr) has been compiled to ensure that mitigation measures, as identified by the specialist studies undertaken, are implemented during the project lifecycle (refer to **Appendix G** of this BAR Report).

It can be concluded that the project is environmentally acceptable (subject to the implementation of the recommended mitigation and enhancement measures).

No-go alternative (compulsory)

The 'do-nothing' alternative (i.e., no-go alternative) is the option of not constructing the proposed development. Should this alternative be selected, there would be no environmental impacts on the site due to the construction and operation activities associated with the project.

Harmony Gold is proposing the establishment of a Solar PV Facility near Virginia, the purpose of which will be to reduce total carbon emissions and diversify electricity supply to the Harmony Central Plant operations (the exclusive off-taker of the power, and generation is for own-use). Should the facility not be constructed, Harmony Central Plant's reliance on fossil fuel-based power as a sole source of power at its operations will continue for the life of mine.

Furthermore, failure to establish an independent power supply source for the Harmony Central Plant operations would also result in a constant demand of power to be supplied from Eskom, adding pressure on the grid infrastructure in the region (and would require the additional consumption of fossil fuels to achieve the same level of electrical supply to the Harmony Central Plant). The electricity demand in South Africa is placing increasing pressure on the country's existing power generation capacity. Therefore, there is a need for additional electricity generation options to be developed throughout the country.

The support for renewable energy policy is guided by the need to address climate change. South Africa has ample solar and wind resources, and land available for the development of renewable energy facilities. Renewable applications are the least-cost energy service in most cases, particularly when social and environmental costs are considered. The generation of electricity from renewable energy in South Africa offers several socio-economic and environmental benefits, including:

- ***Exploitation of our significant renewable energy resource:*** At present, valuable national resources, including biomass by-products, solar radiation, and wind power, remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio.
- ***Pollution reduction***: The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation.
- ***Climate-friendly development:*** The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through reducing greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for ~1% of global GHG emissions and is currently ranked 9th worldwide in terms of per capita CO_2 emissions.
- ***Employment creation:*** The sale, development, installation, maintenance, and management of renewable energy facilities have significant potential for job creation in South Africa.
- ***Acceptability to society:*** Renewable energy offers various tangible benefits to society, including reduced pollution concerns; improved human and ecosystem health; and climate friendly development.

» ***Support to a new industry sector:*** The development of renewable energy offers the opportunity to establish a new industry within the South African economy.

Environmental costs identified for the project include:

» Degradation, and further loss and fragmentation of remaining habitats, ecosystems and vegetation communities in the area, including flora, fauna and avifauna.
» Displacement of avifauna and fauna due to habitat loss, direct mortalities and disturbance.
» Collision of avifauna with PV panels, associated power lines or fences.
» Electrocution of avifauna on overhead power lines during the operation phase.
» Spread of alien and/or invasive species.
» Change in land capability.
» Impacts to buried archaeological and palaeontological resources.

The costs associated with the project are anticipated to occur at a site-specific level. Due to the nature and location of the proposed site for the development footprint, being on Mine-owned land which has been historically degraded, the site has limited land use options available, The significance of impacts can be largely reduced through the application of appropriate mitigation measures; and the appropriate placement of infrastructure within area of lower sensitivity identified on site. The project's benefits are expected to occur at a larger scale (i.e., national, regional, and local level); and partially offset the localised environmental costs of the project.

From the specialist studies undertaken, no environmental fatal flaws were identified to be associated with the project. All impacts associated with the project can be mitigated to acceptable levels. The 'do-nothing' alternative will not assist Harmony Central Plant in addressing issues such as diversifying their electricity supply at their operations and reducing the total carbon emissions from the operations. As detailed above, the benefits associated with the project outweigh the costs; and the project is therefore considered sustainable. The costs of the 'do-nothing' alternative are expected to outweigh the benefits and therefore, this alternative is not preferred and not proposed to be implemented for the project.

SECTION E: RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	**YES**	[redacted]

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment).

[redacted]

If "**YES**", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application.

The construction and operation of a solar PV facility with a contracted capacity of up 14MW directly adjacent to the Harmony Central Plant, with the intention of self-generation of the electricity of own use, has been proposed by Harmony Gold. A technically viable development area and development footprint was proposed and assessed as part of the BA process. The assessment of the development footprint within the development area was undertaken by independent specialists and their findings have informed the results of this BA Report.

The specialist findings have indicated that there are no identified environmental fatal flaws associated with the implementation of Harmony Gold Mining Company within the development footprint. The Applicant has proposed a technically viable and suitable layout for the development footprint, which has been assessed as part of the independent specialist studies. The facility layout assessed through this BA process is considered as the most appropriate development footprint for 28ha and is considered to be acceptable within all fields of specialist study undertaken for the project. All impacts associated with the preferred layout can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures.

Considering the findings of the independent specialist studies; impacts identified, the proposed facility layout which avoids all identified no-go/highly sensitive environmental features within the development area; and the potential to further minimise the impacts to acceptable levels through mitigation, it is the reasoned opinion of the EAP that the project is acceptable within the landscape and can reasonably be authorised. The preferred facility layout is illustrated in **Figure 1**. The period for which the EA is required to remain valid is 10 years from the date of authorisation, with a period of 5 years for the design, planning, construction and commissioning of the activity to be concluded.

The authorisation for the project would include the following key infrastructure and components:

- The infrastructure associated with the 14MW solar PV facility will include:
- modules and mounting structures.
- Inverters and transformers a SCADA room, and maintenance room.
- Cabling between the project components, to be laid underground where practical.
- Access roads, internal roads and fencing around the development area.
- Temporary and permanent laydown areas.

- Grid connection infrastructure including an on-site facility substation and a switching substation to be connected to the existing Harmony North Substation via an overhead power line (located in the southern corner of the site).

The following key conditions would be required to be included within an EA issued for the project:

- All mitigation measures detailed within this BA Report and the specialist reports contained within **Appendices D1 to D5** are to be implemented.
- The EMPr, as contained within **Appendix G** of this BA Report, should form part of the contract with the contractors appointed to construct and maintain project, to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of project is considered key in achieving the appropriate environmental management standards as detailed for this project.
- A very high sensitivity rating from an ecological, freshwater and avifauna perspective has been allocated to the CBA1 and endangered grassland habitat located adjacent to the north of development area. This is outside of the development footprint of the solar PV facility.
- A wetland feature identified on the southern boundary of the development area is regarded as a no-go area. A 20m buffer is to be implemented around the wetland features. No development is permitted within the feature or the buffer area. The development footprint of is located outside of this buffer area, and the grid connection corridor skirts the edge of this area. Infringement on this feature will be avoided.
- The endangered grassland habitat, located outside the development footprint to the south has a very high ecological and avifauna sensitivity. The area is not considered suitable for the placement of solar PV infrastructure, or the gridline, and should be avoided.
- A pan is present to the north-east of the development area. The pan is located outside the development area of Harmony Central Solar PV Facility. A 500m buffer must be implemented around this feature and has been allocated a very-high avifauna sensitivity and is regarded as a no-go area. Infringement on this feature will be avoided.
- Medium soil sensitivities were identified on the majority of the project area which, with the inclusion of mitigation measures can be mitigated to a low impact.
- Some social points of significance such as the Saaiplaas residential area was noted adjacent to the site.
- The proposed layout must be located within the identified development footprint. The final layout must be submitted to FSDESTEA for review and approval following a detailed design.
- The design of the grid line must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa.
- The use of bird deterrent devices to limit collision risk for the facility and the grid line must be considered.
- All overhead power lines must be marked with industry standard bird flight diverters.
- A Chance Find Procedure must be developed and implemented in the event that archaeological or palaeontological resources are found. In the case where the proposed development activities bring these materials to the surface, work must cease and SAHRA must be contacted immediately.

Is an EMPr attached?	**YES**

The EMPr must be attached as Appendix G.

The details of the EAP who compiled the BAR and the expertise of the EAP to perform the Basic Assessment process must be included as Appendix H.

If any specialist reports were used during the compilation of this BAR, please attach the declaration of interest for each specialist in Appendix I.

Any other information relevant to this application and not previously included must be attached in Appendix J.

Ansone' Esterhuizen

NAME OF EAP

A Esterhuizen

SIGNATURE OF EAP

09/02/2022

DATE