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DRAFT SCOPING REPORT

PROPOSED CONSTRUCTION OF 100MW SOLAR POWER PLANT ON PORTION 6 AND 7 OF FARM BEZUIIDENHOUTSKRAAL 96 JR WITHIN MORETELE LOCAL MUNICIPALITY OF BOJANALA PLATINUM DISTRICT MUNICIPALITY, NORTH WEST PROVINCE

DEA REF: 14/12/16/3/3/2/423

NEAS REF: DEA/EIA/0001499/2012

DEDECT REF NO: NWP/DEA/25/2012.

PREPARED BY

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FOR

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DECEMBER 2012

MORETELE LOCAL MUNICIPALITY

PROPOSED CONSTRUCTION OF 100MW SOLAR POWER PLANT ON FARM BEZUIIDENHOUTSKRAAL 96 JR WITHIN MORETELE LOCAL MUNICIPALITY OF BOJANALA PLATINUM DISTRICT MUNICIPALITY, NORTH WEST PROVINCE

NOVEMBER 2012

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EXECUTIVE SUMMARY

1. BACKGROUND

Moretele Local Municipality is a rural municipality with insufficient electrical infrastructure resulting in the larger percentage of the population utilising fossil fuels for heating. The Municipality's LED has identified electricity as a priority and intends to utilise renewable energy generation such as waste and solar. This is intended to move towards sustainable living trends by reducing the amount of green house gases produced. Solar energy has mostly been used in smaller projects or for domestic and individual requirements but recently the trend has shifted with solar energy also contributing to ESKOM's regional or local grid.

Moretele Local Municipality therefore intends to construct and operate a 100 MW Solar Power Plant on Portion 6 and 7 Bezuidenhoutskraal 96 JR. The plant will be equipped with Photovoltaic panel arrays and associated infrastructure to feed into ESKOM grid.

The project will be carried out in two phases:

i. Phase 1: construction of the solar plant; and
ii. Phase 2: construction of the 132kV power line from the Solar Power Plant to Themba substation.

Moretele Local Municipality has appointed Dynamic Integrated Geo-Environmental Services (DIGES) to carry out an Environmental Impact Assessment for Phase 1, in compliance with the EIA regulations, Government Notice R543. As part of the Environmental impact Assessment (EIA) application for the proposed development, a scoping phase is to be undertaken. This scoping report therefore identifies the issues that the environmental impact assessment will examine and the scope of the assessment required to ensure that the EIA will conform to the requirements of the National Environmental Management Act No. 107 of 1998.

Project Description

The proposed project involves the construction and operation of a 100MW solar plant that will be equipped with photovoltaic (PV) panel arrays and associated infrastructure. In addition the following will also be constructed:

- Education Centre;
- Switching substation with 3x132kV feeder bays;
- Access and internal roads;
- Water supply infrastructure;

- guard house and control rooms;
- Ablution facilities;
- Construction of storm-water drainage infrastructure;
- Erection of lighting masts; and
- Erection of a fence.

2. REPORT LAYOUT

This Scoping Report represents the initial stage of the EIA process and contains the following sections:

Section 1: Introduction – deals with background of the project including the need and desirability of the project.

Section 2: Approach to the study – deals with the objectives of this EIA and the stages that will be followed

Section 3: Administrative, Legal and Policy Requirements – all relevant requirements from applicable laws, and provincial and local regulations.

Section 4: The receiving environment – a summary of the environment that will be potentially affected by the project activities.

Section 5: Consideration of alternatives – a description of the alternatives to be investigated/ evaluated.

Section 6: Public Consultation– a summary of the consultation process undertaken with stakeholders and Interested and Affected Parties (I&AP's, and the issues identified during this process).

Section 7: Potential impacts and Determination of Significance – A discussion of the anticipated impacts and how their significance will be determined during the EIA process.

Section 8: Plan of Study- a summary of how the Environmental Impact Assessment will be carried including a timeframe for the achievement of milestones.

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3. APPROACH TO THE STUDY

A Scoping and Environmental Impact Assessment was prescribed to assess the damage that will be done during the project cycle (construction, operation and decommissioning) as the activity falls under 1 and 15 of R545, and *4 (c)(i) cc* of R546 which states that:

Relevant Government Notice	**Activity**	**Description**	**Applicability**
R545	1	*The construction of facilities /infrastructure for the generation of electricity where the electricity output is 20MW or more*	Construction of 100 MW solar power plant
R545	*15*	*Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more*	Physical alteration of 200 ha of land to construct a 100MW Solar Power Plant and associated buildings.
R546	*4 (c)(i) cc*	*The construction of a road wider than 4m with a reserve less than 13.5m in a critical biodiversity area, terrestrial type 2 as identified in systematic biodiversity plans adopted by the competent authority or in the bioregional plans.*	Construction of access road and internal roads with widths ranging from 3m to 10m in an area with a vegetation type classified as endangered.

The scoping phase entailed the following:

i. Site visits to assess and identify alternatives;
ii. Identification of Interested and Affected parties
iii. Notification of the relevant stakeholders
iv. Public participation meetings, newspaper adverts and placement of site notices to inform the public
v. Identification of specialists studies needed to evaluate the potential impacts; and
vi. Drafting of a plan of study explaining how the environmental impact assessment will be undertaken.

4. CONCLUSION

In terms of selecting the preferred alternatives, a baseline survey will be carried out at scoping phase to identify the potential biophysical and socio-economic impacts for the proposed area. Biodiversity, Heritage, Visual, Agricultural, Engineering and Geological assessments will be undertaken to assess the potential impacts identified. These studies will form part of the Environmental Impact report.

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LIST OF ABBREVIATIONS

AC	Alternating Current
CARA	Conservation of Agricultural Resources Act
DC	Direct Current
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DEDECT	Department of Economic Development, Environment, Conservation & Tourism
DWA	Department of Water Affairs
DME	Department of Minerals and Energy
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPR	Environmental Management Programme
GHG	Greenhouse Gases
GVA	Gross Value Added
HA	Hectares
IAP	Interested and Affected Parties
IEM	Integrated Environmental Management
LED	Local Economic Development
MW	Mega Watts
NBA	National Biodiversity Assessment
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
PV	Photovoltaic
SAHRA	South African Heritage and Resources Agency
SANS	South African National Standards

DEFINITIONS

1. **Affected environment:** Those parts of the socio-economic and biophysical environment impacted on by the development.

2. **Alternatives:** A possible course of action, in place of another, that would meet the same purpose and need (of proposal). Alternatives can refer to any of the following but are not limited hereto: alternative sites for development, alternative layouts or alternative designs, alternative processes and materials. In Integrated Environmental Management the so-called "no action" alternative may also require investigation in certain circumstances;
3. **Assessment:** The process of collecting, organizing, analyzing, interpreting and communicating data that is relevant to some decision.
4. **Cumulative Impacts:** Effects resulting from the incremental impacts of an actipn when combined with other past, present and reasonably foreseeable future actions. Cumulative impacts can result from insignificant but collectively significant actions taking place over a period of time.
5. **Development:** The act of altering or modifying resources in order to obtain potential benefits.
6. **Direct Impacts:** these are caused by the action and occur at the same time and place as the action;
7. **Environment:** The external circumstances, conditions and objects that affect the existence and development of individual, organism or group. These circumstances include biophysical, social, economic, historical, cultural and political aspects;
8. **Environmental impact:** The degree of change in environmental components resulting from the effects of an activity on the environment, whether desirable or undesirable. Impacts may be the direct consequence of an organization’s activities or may be indirectly caused by them.
9. **Environmental impact assessment:** A process of examining the environmental effects of a proposed development.
10. **Environmental issue:** A concern felt by one or more parties about some existing, potential or perceived environmental impact.
11. **Evaluation:** The process of weighing information, the act of making value judgments or ascribing values to data in order to reach a decision;
12. **Indirect Impacts:** these are caused by the action and occur later in time or further in disturbance but are still reasonably foreseeable;

13. **Integrated environmental management (IEM):** Is a process of integrating environmental, Socio-economic and cultural factors in decision making to promote sustainable development. Principles underlying IEM provide for a democratic, participatory, holistic, sustainable, equitable and accountable approach.
14. **Long-term Impact:** occur for an extended period after implementation of a management action;
15. **Photovoltaic cells:** these are connected electrically in series and or parallel circuits to produce higher voltages and or currents;
16. **Photovoltaic modules:** these are several cells that are wired in series to make a laminate which is assembled into a protective weatherproof enclosure to produce a solar panel also referred to as a PV module;
17. **Photovoltaic panels:** these include more than one module assembled as a pre-wired, field installable unit;
18. **Photovoltaic Arrays:** modules are linked together to form an array which use an inverter to convert the DC power they produce into alternating current
19. **Scoping:** The process of determining the key issues to be addressed in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined;
20. **Short term Impacts:** occur only for an extended period after implementation of a management action;
21. **Solar energy:** can be used to generate electricity; heat water; and to heat, cool and light buildings. For example, photovoltaic systems capture the energy in sunlight and convert it directly into electricity. Alternatively, sunlight can be collected and focused with mirrors to create a high intensity heat source that can be used to generate electricity by means of a steam turbine or heat engine.

1. INTRODUCTION

1.1 BACKGROUND TO EIA STUDY

Section 24(4) of NEMA prescribes that the procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment must, *inter alia*, with respect to every application for environmental authorisation, ensure that the general objectives of integrated environmental management laid down in NEMA and the NEM Principles set out in NEMA are taken into account, and include an investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity.

Moretele Local Municipality intends to construct a 100MW Photovoltaic Solar Power Plant on Portion 6 & 7 of Farm Bezuidenhoutskraal 96 JR. The proposed activity to be undertaken (together with the infrastructure to be provided) is listed as activity 1, 15 of R545 and *4 (c)(i) cc* of R546 dated 18 June 2010 which reads as follows:

1 of R545: The construction of facilities /infrastructure for the generation of electricity where the electricity output is 20MW or more; and

15 of R545: Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more;

4 (c)(i) cc of R546: The construction of a road wider than 4m with a reserve less than 13.5m in a critical biodiversity area, terrestrial type 2 as identified in systematic biodiversity plans adopted by the competent authority or in the bioregional plans.

Moretele Local Municipality has therefore appointed DIGES to lodge an application with the National Department of Environmental Affairs for the proposed development. The application is made in terms of section 24 and 24D of the National Environmental Management Act (Act No.107 of 1998), of the listed activities published in the Government Notice No. R545 and R546 under section 24 of the above-mentioned Act and entail that a scoping and environmental impact assessment be undertaken. The project has been registered with Department of Environmental Affairs (DEA), **NEAS Reference:**

DEA/EIA/0001499/2012, **DEA Reference No:** 14/12/16/3/3/2/423 and Department of Economic Development Environment, Conservation and Tourism (DEDECT) with a reference no. of NWP/DEA/25/2012.

The main objectives of this Scoping Report are:

- To engage stakeholders at an early stage of the proposed development so that they may contribute their views and provide relevant information;
- To define the scope of the EIA which will accompany any planning application;
- To identify the potential significant and non-significant environmental effects of the proposed development; and
- To define the methodologies to be used in the EIA to assess these effects.

1.1.1 EAP's Qualifications

Section 17 of EIA Regulations, Government Notice No. R543 clearly indicates that an Environment Assessment Practitioner (EAP) should be independent and have expertise in conducting environmental impact assessments, including knowledge of the Act, and any guidelines that have relevance to the proposed activity. The author of the report has seven years experience in the environmental conservation field working on different projects. See the EAP's curriculum vitae on **Appendix E**.

1.2 NEED AND DESIRABILITY

South Africa is ranked the 14th highest emitter of Greenhouse Gas (GHG) largely due to its usage of coal and liquid fuel for its electricity. According to ESKOM's Annual Report in 2010, the company's total net maximum capacity as at 31 March 2010 was 40 870MW, most of which, 34 658 MW is coal fired. To adhere to Kyoto Protocol's major objective of which South Africa is a signatory, there is need to find alternative ways of generating electricity in a sustainable way. The White Paper on Renewable Energy addresses the need for renewable energy which will contribute to the reduction of carbon dioxide emissions thus contributing to an improved environment both locally and worldwide. The Government has therefore set a target of 10 000Gwh for renewable energy contribution energy consumption by 2013. To achieve this, it intends to utilise renewable resources such as solar of which most areas in the country average more than 2 500hrs of sunshine per year. Solar radiation levels range between 4.5 and 6.5 kWh/m² in a day. The benefits for utilising solar energy include:

i. Reduction in the emission of Green House Gases (GHG);
ii. Saving water consumption during generation;
iii. Diversification of electricity supply and energy security

Moretele Local Municipality intends to utilise the abundant and renewable solar resource by constructing a 100MW Photovoltaic Solar Power Plant to produce an annual average electricity production of 1780kWh which will feed into the ESKOM grid. The proposed power plant will be constructed on Portion 6 & 7 of Bezuidenhoutskraal 96 JR within the municipality. The table below shows the PV production for the proposed plant per month and year.

Table 1-1: PV electricity production

Month	Es_m	Es_d	Et_m	E_{share}	PR
Jan	138	4.46	138	7.8	75.2
Feb	131	4.68	131	7.4	75.4
Mar	145	4.69	145	8.2	76.3
Apr	143	4.78	143	8.1	77.9
May	154	4.97	154	8.7	79.8
Jun	147	4.93	148	8.3	81.2
Jul	160	5.18	161	9.0	81.1
Aug	165	5.35	166	9.3	79.2
Sep	162	5.41	162	9.1	77.0
Oct	154	4.97	154	8.7	76.0
Nov	135	4.51	135	7.6	75.7
Dec	141	4.55	141	7.9	75.1
Year	**1779**	**4.88**	**1780**	**100.0**	**77.5**

Source: University of Johannesburg, 2012

Es_m : monthly sum of specific electricity production (kWh/kWp)

Es_d : daily sum of specific electricity production (kWh/kWp)

Et_m : monthly sum of total electricity production (kWh)

E_{share}: Percentual share of monthly electricity production (%)

PR : Performance ration (%)

1.3 PROJECT DESCRIPTION

The proposed project involves the construction and operation of a 100MW solar plant that will be equipped with photovoltaic (PV) panel arrays and associated infrastructure. The proposed solar power plant will be located on 200 ha of portion 6 and 7 of Bezuidenhoutskraal 96 JR. The associated infrastructure includes:

- Solar panels;
- Mounting structures;
- Inverters;
- Education/Training centre covering 100mx50m;

- Field Office covering 200 m²
- Switching substation with 3x132kV feeder bays (50mx50m).
- guard house and control rooms;
- Erection of lighting masts; and
- Erection of a fence.

In addition the following will also be constructed:

The applicant will be responsible for the construction of the following services:

i. Access and Internal Roads

The entrance to the site will be from the existing gravel road, Mathibestad to Mogogelo . Reference is made to Figure 1 in Appendix F. The access road from the existing road to the site will be approximately 1km long and 10m wide. The applicant will also be responsible for the construction of the internal access roads with widths ranging from 3m to 10m for the maintenance of the panels. Reference is made to the draft site plan and layout in Appendix B-1, B-2, C-1 and C-2.

ii. Storm Water Drainage

Due to the relatively flat terrain in the area, storm water is generally a problem. Storm water drainage management will be by addressed in the Engineering Services report to be attached to the Environmental Impact Report.

iii. Bulk Water Supply

The construction of a 100MW solar power plant needs approximately 180kL/month which will add up to 2160kL for the entire construction period duration of 12 months. Portable water will also be needed during the operation period for cleaning the panels and for consumption by the workers. A mains water supply, stored water or access to a mobile water tank will be required. A letter from Moretele Local Municipality confirming provision of services will be attached to the Environmental Impact Report (EIR).

iv. Sanitation

The current sanitation system in Mathibestad and Mogogelo is ventilated improved pit latrines. Chemical toilets will be provided for the workers during the construction phase and the engineering services report will recommend the type of ablution to be used during the operation phase.

v. Security

To ensure safety and reduce risk of unauthorized entry, the following shall be established;

- 11 permanent guarding posts in all four directions to provide for the level of security required;
- A fence surrounding the solar plant and substation which is at least 2m high; and
- Four lighting masts for illumination during the night.

NAME OF THE APPLICANT AND ADDRESS

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Qualification: BSc (Hons) Environmental & Earth Sciences
- Cert. In Geohyd. & Env. Mgrs (C.E.S Potchef**.)**

1.4 LOCATION

The project is located within Moretele Local Municipality which falls under Bojanala Platinum District Municipality of North West Province. Moretele Local Municipality is located approximately 60 Km to the north of Tshwane, constituting 65 villages spread over 1369 km^2 area. It is boarded to the North East by Thabazimbi Local Municipality, to the North by Bela-Bela Local Municipality, to the East by NokengTsaTaemane, to the South by City of Tshwane and to the West by Madibeng Local Municipality. The proposed farm is approximately 900 ha, consisting of Mogogelo village, agricultural fields and veldt which is currently used as grazing area by the surrounding communities. The solar plant is envisaged to cover 200 ha of land on portion 6 or 7 of the farm Bezuidenhoutskraal 96JR. Reference is made to the Locality Map attached in Appendix D-1.

1.4.1 Site Alternatives

- **Alternative 1**

The proposed area is located on Portion 6 of Bezuidenhoutskraal 96JR, which is approximately 1 km south east of the gravel road that links Mathibestad with Mogogelo. The site is approximately 4km south of Mathibestad, 2km north east of Mogogelo, 9km south east of Makapanstad and is bordered by Tshwane in the east and River Tshwane in the south west. Reference is made to the attached Locality Map in Appendix D-1. The Global Positioning Co-ordinates of the four corners are:

1: 25º 19’ 43.53”S, 28º 10’ 14.45”E;

2: 25º 20’ 49.17”S, 28º 10’ 14.88”E;

3: 25º 20’ 48.54”S, 28º 09’ 31.68”E; and

4: 25º 19’ 44”S, 28º 09’ 32.74”E

- **Alternative 2**

The proposed area is approximately 1 km east of Mogogelo, 9km south of Mathibestad and is bordered by Tshwane in the east and River Tshwane in the west. Agricultural fields are within the site in the west. Reference is made to the attached Locality Map in Appendix D-1. The Global Positioning Co-ordinates of the 4 sites are:

1: 25º 21’ 58.75”S, 28º 10’ 13.18”E;

2: 25º 20’ 53.32”S, 28º 10’ 13.40”E;

3: 25º 20’ 53.32”S, 28º 9’ 31.04”E; and

4: 25º 21’ 58.96”S, 28º 09’ 30.62”E.

1.5 TECHNICAL ASPECTS

1.5.1 Generation of Electricity using Photovoltaic Cells

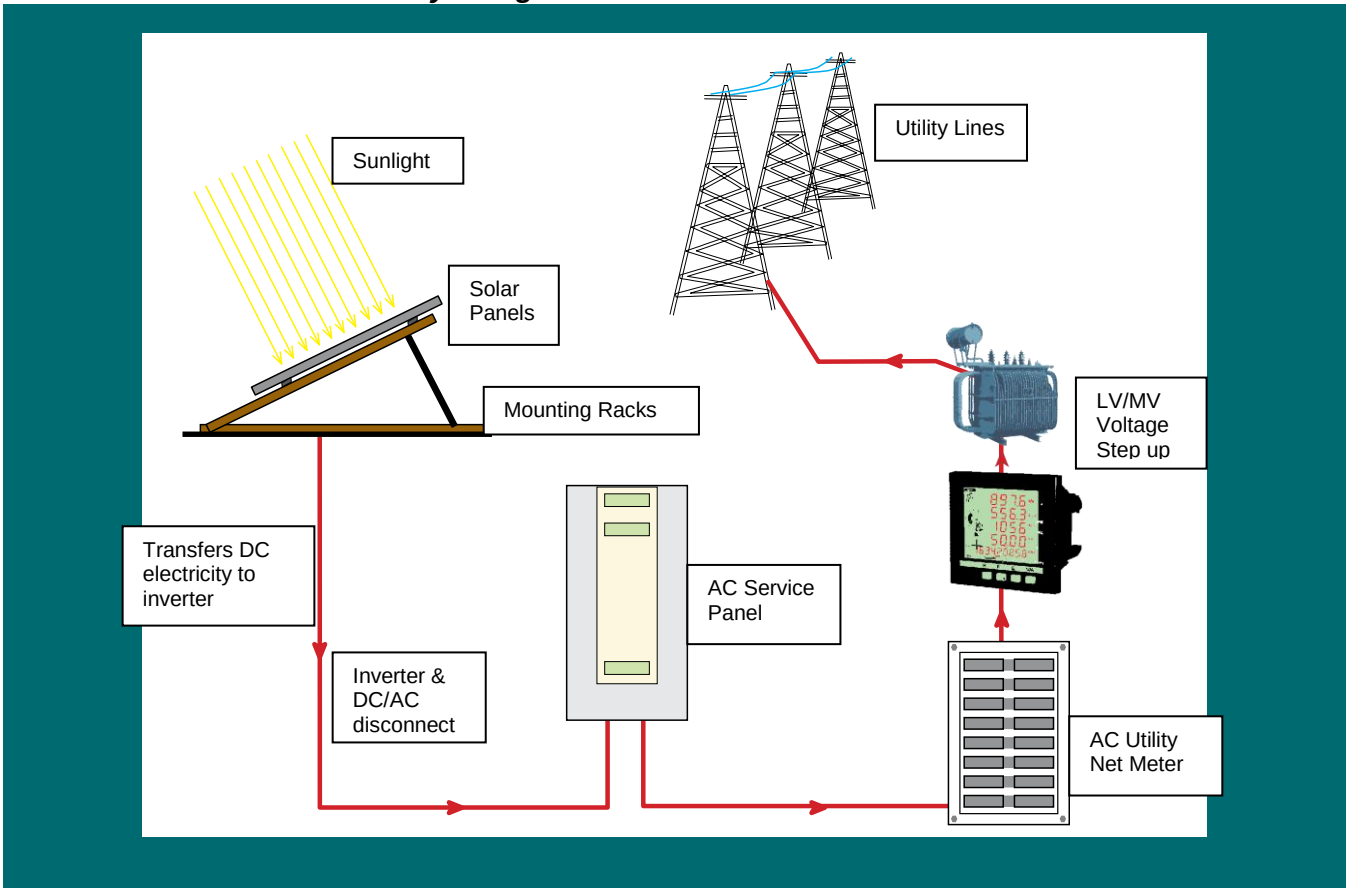

Figure 1-1: Overview of a Solar PV Power Plant (Source: IFC, 2012)

The conversion of sunlight to usable electrical energy has been referred to as the *Photovoltaic Effect*. Solar panels collect solar radiation from the sun and actively convert that energy to electricity. Solar panels are comprised of several individual solar cells. These solar cells function similarly to large semiconductors and utilize a large-area p-n junction diode. When the solar cells are exposed to sunlight, the p-n junction diodes convert the energy from sunlight into usable electrical energy. The energy generated from photons striking the surface of the solar panel which allows electrons to be knocked out of their orbits and released, and electric fields in the solar cells pull these free electrons to provide direct current (DC) to alternative Current (AC) of the desirable voltage to achieve the design of 100MW capacity.

- ***PV Cells***

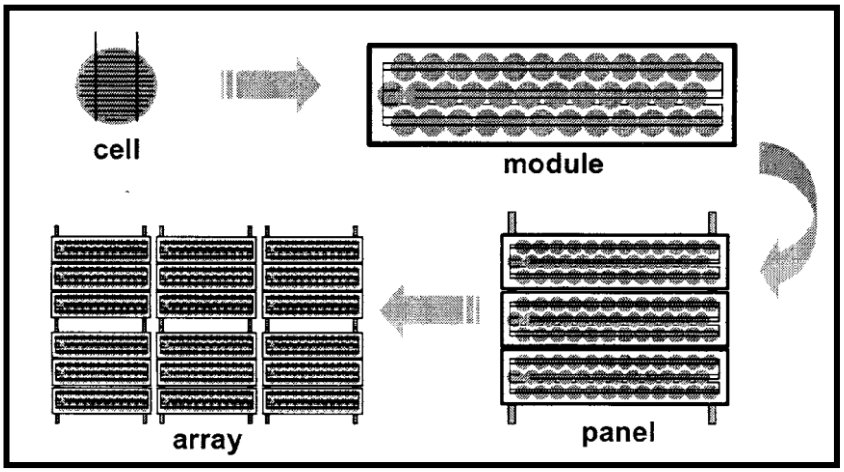

Figure 1-2: Photovoltaic Cells, modules, panels and arrays
(Source: http//www.reliance.org)

The most important parts of Photovoltaic systems are the cells which form the basic building blocks of the unit, collecting the sun's light. The PV cells to be used for the 100MW solar plant are made from crystalline silicon.

Solar panels are created by cutting crystalline silicon into tiny disks less than a centimeter thick. These thin, wafer-like disks are then carefully polished and treated to repair and gloss any damage from the slicing process. After polishing, dopants and metal conductors are spread across each disk. The conductors are aligned in a thin, grid-like matrix on the top of the solar panel, and are spread in a flat, thin sheet on the side facing the earth.

To protect the solar panels after processing, a thin layer of cover glass is then bonded to the top of the photovoltaic cell. After the bonding of protective glass, the nearly-finished panel is attached to a subtrate by expensive, thermally conductive cement. The thermally conductive property of the cement keep the solar panel from becoming overheated; any leftover energy that the solar panel is unable to convert to electricity would otherwise overheat the unit and reduce the efficiency of the solar cells.

- ***Photovoltaic Solar Plant Components***

A plant is made up of the following components (reference is made to Figure 1-1):

i. PV modules that are generally connected together in series to produce strings of modules of a higher voltage. These strings may then be connected together in parallel to produce a higher current direct current (DC) input to the inverters.
ii. Module mounting systems that allow the PV modules to be securely attached to the ground at the desired angle to the sun. See Appendix C-3 for the structure;

iii. Power center, custom figured for the system which will include low distortion inverter which are electronic devices that transform direct current (DC) generated by the PV modules into alternating current (AC), an interconnect with incoming ESKOM power and a connection to the breaker panel;
iv. System data monitor which shows how much energy is flowing in from the energy sources and how much is flowing out to the loads; and
v. A balance of system hardware consisting of wiring, terminations, ground fault interrupter, surge protection, DC and AC disconnects.

1.5.2 Solar Power Plant Construction

The construction of the plant is expected to take up to 12 months with a project lifespan of 30 years or more. Approximately 200 individuals will be employed on site and the procurement of local labor will be according to the labor laws and social development laws of South Africa. The main works for the construction of the solar plant include the following:

i. Site establishment (this will also include a lay-down area measuring 10mx5m which will be used for the storage of materials during construction. This will be converted to a permanent lay-down area during the operation phase. Reference is made to the layout in Appendix C-1 and C-2;
ii. Erection of security fences;
iii. Foundation construction;
iv. Module assembly;
v. Mounting frame construction;
vi. Switching Substation construction; and
vii. Electrical site works.

1.5.3 Solar Power Plant Operation

A solar plant needs low maintenance and this will consist of scheduled preventative maintenance which are planned in advance and aimed to prevent faults from occurring, as well as to keep the plant operating at an optimum level. The following activities will be undertaken:

i. Module cleaning;
ii. Checking module connection integrity;
iii. Inverter servicing,;
iv. Inspecting mechanical integrity of mounting structures;
v. Vegetation control; and
vi. Routing balance of plant servicing.

1.5.4 Solar Power Plant Decommission

The PV plant will be decommissioned at the end of the 30-40 years. The following activities will be carried out:

i. Removal of solar panel structures and all appurtenant above ground equipment;
ii. Removal of on-site substation, or it can remain on-site to be used as part of ESKOM's infrastructure;
iii. Restoration of the disturbed soil and re-vegetation of the site to its pre-construction condition with native vegetation similar to plants in the surrounding vicinity;
iv. Restoration of roads to their pre-construction condition unless the land owner elects to retain the improved roads for access throughout that land owner's property;
v. Removal of permanent operations and maintenance building.

The dismantled panels consisting of silicon, aluminium and the electrical wiring will be recycled to make new modules.

2. APPROACH TO THE STUDY

2.1 SCOPING ENVIRONMENTAL IMPACT ASSESSMENT APPROACH AND METHODOLOGY

Before the project can commence, an authorization is needed from the Department of Environmental Affairs, in compliance with the Environmental Impact Assessment Regulations of 2010. The development is listed in terms of Government Notice R545 and R546 under Chapter 5 of the National Environment Management Act (Act No. 107 of 1998), and therefore requires an Environmental Impact Assessment to be undertaken. The scoping and Environmental Impact assessment approach and methodology described below are used for the proposed solar power plant.

2.1.1 Scoping an Environmental Impact Assessment Phase

An environmental impact assessment is a proactive and systematic process where both positive and negative potential environmental impacts associated with certain activities are assessed. Every Environmental Impact Assessment project has two objectives namely, process and content objectives. The process objectives are to ensure that the process is open, transparent and inclusive, supplies stakeholders with sufficient information, affords them ample opportunity to contribute and makes them feel that their contributions are valued. The content objectives of the project are in the form of “hard” information: facts based on scientific and technical study, statistics or technical data.

Section 24(4) of NEMA prescribes that the procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment must, *inter alia*, with respect to every application for environmental authorisation, ensure that the general objectives of integrated environmental management are taken into account. The Environmental Impact Assessment should include an investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity. **Figure 2-1** over leaf presents the EIA process to be followed for the proposed development.

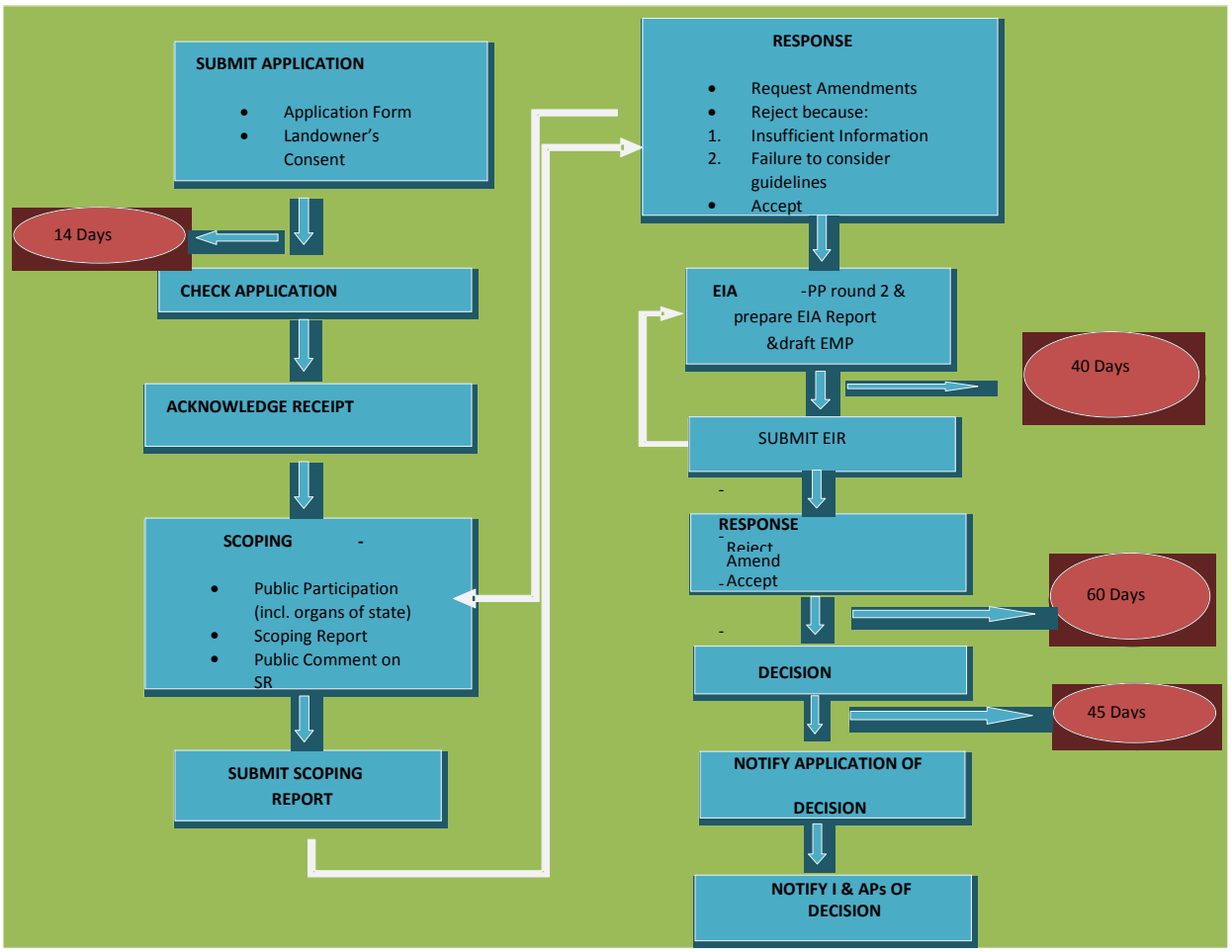

Figure 2-1: *EIA Process Flow*

2.1.2 Objectives of EIR

This environmental impact assessment has been undertaken in order to: primarily, satisfy the requirements of the environmental regulations promulgated on June 2010 in terms of section 24 and 24D of the National Environment Management, Act 107 of 1998) which are as follows;

- Ensure that all relevant environmental legal requirements will be met by the proponent;
- Provide information on the proposed development by describing the nature and scale thereof;
- Describe the affected environment;
- Inform the public about the proposal and identify the main stakeholders and their concerns and values;
- Define the reasonable and practical alternatives to the proposal;
- Identify the likely beneficial and detrimental consequences of the proposal;

- Ensure that all environmental consequences are recognized early on and taken into consideration in the design, construction, operation and maintenance of the activity; and
- Determine and recommend a set of environmental conditions and appropriate actions to mitigate any adverse effects on the physical, biological and human environment that will ensure that the study area is developed and operated in an environmentally sound manner.

Specific circumstances surrounding this proposal have led to the scoping assessment being tailored to include a more comprehensive approach which addresses impacts not only in order to get authorization from the Department of Environmental Affairs (DEA) but also proactively subscribe preventive as well as treatment measures considered feasible and standard at the end of the environmental impact assessment phase.

Therefore the approach adopted for the scoping study is not only to compile a 'traditional' scoping report but also to include an initial environmental assessment. Hence, the scoping report goes beyond the identification of key issues for possible further investigation and assessment. Specialist reports and assessments of issues, by determining significance ratings, will be included in the EIR, thus providing additional information for decision-making.

In addition, the tasks to be performed during Scoping and environmental assessment are dictated by the Regulations published in Government Notice No. R.545 and R546 under Section 24 and 24D of the National Environmental Management Act (Act No. 107 of 1998)

2.2 THE PROCESS TO DATE

The following general stages were followed as a basis for this assessment:

a) *Determination of Policy, Legal and Administrative Framework and requirements* through identification of relevant legal documents, guidelines and planning procedures. These have been reviewed in order to ensure that necessary measures are included in the design and implementation of the project. In particular those measures which could have an implication on environmental resources were identified. Refer to Part 3.

b) *Application and Plan of Study for Scoping Report*: The prescribed Application form was submitted to DEA on the 18th of October 2012, for acknowledgment and it was allocated a **NEAS Reference:** DEA/EIA/0001499/2012 and **DEA Reference No:** 14/12/16/3/3/2/423. Reference is made to Appendix A-1 and A-2 for the acknowledgement letters from DEA and DEDECT.

c) *On-site Advertisements*: Notices containing all information concerning the proposed development were placed on site to inform local people about the proposed project. Reference is made to Appendix K-1 and K-2 for the site notices including the map with the location of the notices.

d) *Determination of the Current Environmental Baseline Conditions* through review of existing information as well as field surveys to establish site specific issues and sensitivity.

Dynamic Integrated Geo-Environmental Services conducted several site inspections with the applicant and specialists. The first site inspection undertaken by both Consultants and applicant was sort of reconnaissance field survey where different components of the environment that are likely to be affected by the proposed development were assessed and evaluated.

Information on geology, soils and vegetation was obtained by means of site investigations, existing information (i.e. vegetation and geological maps, consultation with other experts and reference to relevant literature).

f) Public Participation: an advert was posted in the Sowetan newspaper on the 23rd of October 2012, to notify the public about the proposed development. Interested and affected parties were notified via notification letters and Background Information Document (BID) and the draft scoping report will be made available to them. A public participation meeting was undertaken on the 5th of November 2012. See Appendix G, J and L for the background information document, newspaper advert and comments and response report respectively.

3. ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS

Laws and principles have dominated and guided this environmental assessment process, namely the Principles of Integrated Environmental Management (IEM), the South African Constitution, the National Environmental Management Act (NEMA), National Energy Regulator, White Paper on Renewable Energy and Integrated Resource Plan for Electricity. Other regulations and legislation with which the project will have to comply are the National Heritage Resources Act (NHRA), the National Water Act, National Environmental Management: Biodiversity Act 10 of 2004, National Environmental Management: Waste Act, National Environment Management: Air Quality Act 39 of 2004 and Occupational Health Safety Act 85 of 1993. Those that are relevant to this study are reviewed below:

3.1 THE CONSTITUTION

The constitution of our country guarantees basic human rights and provides guiding principles for society. The environmental rights in the constitution states:

"Everyone has the right –

a) to an environment that is not harmful to their health or well being; and
b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
    (i) prevent pollution and ecological degradation;
    (ii) promote conservation;
    (iii) Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development."

3.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

In addition to the Constitution, we also have special environmental legislation in South Africa: the National Environmental Management Act (NEMA). The National Environmental Management Act aims to improve the quality of environmental decision-making by setting out principles for environmental management that apply to all government departments and organisations that may affect the environment. NEMA also creates a framework for facilitating the role of civil society in environmental governance (see below).

The Principles of National Environmental Management - (DEAT 1998b)

- Environmental management must place people and their needs at the forefront of its concern.

- Development must be socially, environmentally and economically sustainable.
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated.
- Environmental justice must be pursued.
- Equitable Services Access to environmental resources to meet basic human needs and ensure human well being must be pursued.
- Responsibility for the environmental health and safety consequences of a project or activity must exist throughout its life cycle.
- The participation of all interested and affected parties in environmental governance must be promoted.
- Decisions must take into account the interests; needs and values of all interested and affected parties.
- The social, economic and environmental impacts of activities, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.
- Decisions must be taken in an open and transparent manner, and Services Access to information must be provided in accordance with the law.
- The environment is held in public trust for the people, the beneficial use of which environmental resources must serve the public interest and the environment must be protected as the people's common heritage.
- The costs of remedying pollution, environmental degradation and consequent adverse health effects must be paid for by those responsible for harming the environment.
- Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure.

3.2.1 ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS

EIA is a pro-active and systematic process where potential environmental impacts both positive and negative associated with certain activities are assessed, investigated and reported. The process contributes to giving effect to the objectives of integrated environmental management as decision makers are informed of the desirability of such activities and on the conditions which authorization of the activity should be subject to, where relevant. The proposed activity is listed in terms of Listing Notice 2, Government Notice R545 and Listing Notice 3, Government Notice R546, listed in the table below:

Table 3- 1: Solar Power Plant List of Activities

Relevant Government Notice	**Activity**	**Description**	**Applicability**
R545	1	*The construction of facilities /infrastructure for the generation of electricity where the electricity output is 20MW or more*	Construction of 100 MW solar power plant
R545	*15*	*Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more*	Physical alteration of 200 ha of land to construct a 100MW Solar Power Plant and buildings
R546	*4 (c)(i) cc*	*The construction of a road wider than 4m with a reserve less than 13.5m in a critical biodiversity area, terrestrial type 2 as identified in systematic biodiversity plans adopted by the competent authority or in the bioregional plans.*	Construction of access road and internal roads with widths ranging from 3m to 10m in an area with a vegetation type classified as endangered.

3.3 THE PRINCIPLES OF INTEGRATED ENVIRONMENTAL MANAGEMENT

The principles of Integrated Environmental Management (IEM), first published in 1992, aim to guide the integration of environmental management into decision-making throughout the life cycle of the project (DEAT 1992). The IEM principles also aim to ensure that environmental impacts are considered before actions are taken or implemented and to ensure that there are adequate opportunities for public participation in decisions that may affect the environment (See below).

The Principles of Integrated Environmental Management **-** (DEAT 1992)

- Informed decision-making.
- Accountability for information on which decisions are taken.
- Accountability for decisions taken.

- A broad meaning given to the term environment that includes physical, biological, social, economic, cultural, historical and political components.
- An open, participatory approach in planning of proposals.

The following series of IEM Guidelines will be used during the entire EIA process:

- DEAT(2002), Scoping, Integrated Environmental Management, Information Series 2;
- DEAT (2002), Stakeholder Engagement, Integrated Environmental Management, Information Series 3;
- DEAT (2002), Specialists Studies, Integrated Environmental Management, Information Series 4;
- DEAT (2002), Impact Significance, Integrated Environmental Management, Information Series 5;
- DEAT (2002), Ecological Risk Assessment, Integrated Environmental Management, Information Series 6;
- DEAT (2004), Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7;
- DEAT (2004), Criteria for determining alternatives, Integrated Environmental Management, Information Series 11;
- DEAT (2004), Environmental Management Plans, Integrated Environmental Management, Information Series 12;
- DEAT (2004), Review in EIA, Integrated Environmental Management, Information Series 13;
- DEAT (2005), Environmental Reporting, Integrated Environmental Management, Information Series 17;

3.4 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY NO ACT, 10 OF 2004)

This Act controls the management and conservation of South African biodiversity within the framework of NEMA. Amongst others, it deals with the protection of species and ecosystems that warrant national protection, as well as the sustainable use of indigenous biological resources. Sections 52 & 53 of this Act specifically makes provision for the protection of critically endangered, endangered, vulnerable and protected ecosystems that have undergone, or have a risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention through threatening processes.

3.5 NATIONAL WATER ACT

National Water Act 1998 (Act 36 of 1998) & Water Services Act 1997 (Act 108 of 1997): The purpose of this Act is to "ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled. "The Water Act takes into account the meeting of basic human needs of present and future generations, equitable Services Access to water, redressing the results of past discrimination, efficient, sustainable and beneficial use of water in the public interest, and other factors. The Act is administered by DWA.

3.6 THE NATIONAL HERITAGE RESOURCES ACT (ACT NO. 25 OF 1999)

3.6.1 Structures (Section 34 (1))

No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the South African Heritage Resources Agency (SAHRA), or the responsible provincial resources authority.

3.6.2 Archaeology (Section 35 (4))

No person may, without a permit issued by the SAHRA or the responsible heritage resources authority, destroy or damage, excavate, alter or remove from its original position, or collect, any archaeological material or object.

3.6.3 Burial Grounds and Graves (Section 36 (3))

No person may, without a permit issued by SAHRA or a provincial heritage authority:

- destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority.

3.6.4 Application Requirements and Procedure

Permit applications must be made on the official form:

- Application to destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of a Provincial Heritage Site or demolish a structure 60 years old or more, as protected in terms of the National Heritage Resources Act (Act No. 25 of 1999)
- Application for permit to destroy: Archaeological and paleontological sites and meteorites.
- Application for permit: Burial Grounds and Graves.
- The Proponent must submit permit applications to SAHRA or the relevant provincial heritage resources authority.

3.7 MINERALS AND PETROLEUM RESOURCES DEVELOPMENT ACT 2002 (ACT 28 OF 2002)

In the case where the need may arise that additional material is needed and the only source for this material are borrow pits that fall outside the construction site. In this scenario, the submission of an Environmental Management Programme Report (EMPR) to the Department of Minerals and Energy to obtain a licence would be a legal requirement.

3.8 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT 43 OF 1983)

The Conservation of Agricultural Resources Act ([CARA] Act 43, 1983) provides for the:

- Protection of wetlands; and
- Requires the removal of listed alien invasive species.

The National Department of Agriculture is the responsible authority for enforcing the CARA. This Act also requires that any declared invader species on Eskom land must be controlled according to their declared invader status.

3.9 NATIONAL ROAD TRAFFIC ACT (ACT 83 OF 1996)

This Act is relevant if the Municipality intends to transport, load, off-load or package dangerous goods as listed in SANS Code of Practice 10228.

3.10 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (ACT 59 OF 2008)

The National Environmental Management: Waste Act, 2008 (Act No. 58 of 2008), came into operation on the 1st of July 2009. The Waste Act repealed Section 20 of the Environment Conservation Act, 1989 (Act No. 73 of 1989) (ECA) and introduced new provisions regarding the licensing of waste management activities. In terms of the Waste Act no person may commence, undertake or conduct a waste management activity except in accordance with:

- The requirements or standards determined in terms of the Waste Act for that activity; and
- A waste management license issued in respect of that activity, if a license is required.

A list of waste management activities was published on the 3rd of July 2009. This list of activities identifies activities that may not be commenced, undertaken or conducted by any person unless a waste management licence is issued in respect of that activity.

3.11 THE NATIONAL ENVIRONMENTAL MANAGEMENT: AIR QUALITY ACT NO.39 OF 2004

The main objective of the Air Quality Act (NEMAQA) is the protection of the environment and human health, in a sustainable (economic, social and ecological) development framework, through reasonable measures of air pollution control.

3.12 OCCUPATIONAL HEALTH AND SAFETY ACT 85 OF 1993

The act aims to provide for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work.

3.13 NATIONAL ENERGY ACT OF 2008 & ELECTRICITY REGULATION ACT

The purpose of the act is ensure that diverse energy resources are available, in sustainable quantities and at an affordable prices and to provide for integrated energy planning, increased generation and consumption of renewable energies, contingency energy planning, holding of strategic fuel stocks and carriers, provide appropriate energy infrastructure, data on energy demand, supply and generation and also establish institutions responsible for energy research.

3.14 WHITE PAPER ON RENEWABLE ENERGY

The paper was established to ensure that national energy resources are adequately tapped and delivered to cater for the needs of the communities. It recognises the significance of medium and long term potential of renewable energy committing Government to prioritise the energy portfolio. Four key strategic areas have been addressed with the following goals:

i. to promote the implementation of sustainable renewable energy through the establishment of appropriate financial institutions;
ii. to develop, implement, maintain and continuously improve an effective legislative system to promote the implementation of renewable energy;
iii. promote, enhance, and develop technologies for the implementation of sustainable renewable energy; and
iv. develop mechanisms to raise public awareness of the benefits and opportunities.

3.15 WHITE PAPER ON ENERGY POLICY 1998

The policy has five objectives for energy sector which are:

- increased access to affordable energy services;
- improving energy governance;

- stimulating economic development, managing energy related environmental impacts;
- securing diversity through diversity; and
- The need to provide alternative sources of energy including renewable. The paper recognises the potential of renewable energy in securing supply through diversity. It further noted that Government should not only increase its capacity to address the need of the day, but also improve long term issues, such as development of renewable energy resources to achieve a more sustainable mix.

3.16 INTEGRATED RESOURCE PLAN FOR ELECTRICITY

It is a 20 year electricity capacity plan that aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. The planning scenario is based on growth in GDP average 4.5% over the next 20 years which will require 41 346MW of new capacity. The plan also aims to achieve the following

- a balance between affordable price for electricity to support a globally competitive economy;
- a move to a more sustainable and efficient economy;
- a move to create local jobs, the demand on scarce resources such as water; and
- the need to meet nationally appropriate emissions targets in line with global commitments.

3.17 INTEGRATED ENERGY PLAN

According to the Energy Act of 2008, it is a requirement for South Africa to develop Integrated Energy Plan (IEP). A plan was developed prior to the Act that outlines the direction and steps to be taken by South Africa to meet its energy needs, advocating for diversification of energy sources, including renewable, as well as fuel switching to improve energy efficiency.

It declares South Africa's continued reliance on coal, but also uses modeling to forecast which energy sources can be used most effectively to meet demand as shown in the table below.

Table 3-2: Estimation of South Africa's untapped potential energy reserves/resources

Energy Carrier	Reserve/Resource	Comment
Coal	55 billion tonnes	Coal technology well developed and inexpensive. Coal resources/reserves are currently under re-appraisal.
Oil	Potential reserves (P90) 40 million barrels. Potential (resource) 5 billion barrels.	Oribi/Oryx audited remaining reserves 12 million barrels plus Sable field reserves of 150 million barrels sufficient for four years production. Untested deep-water potential.
Natural Gas	Reserves (P50): 1.3 tcf Potential (resource): 25 tcf	F-A/E-M and satellites audited (P50) 0.5 tcf and 11.8 million barrels condensate plus Ibhubesi field. Upside potential of untested areas.
Uranium	261 000 Tonnes	Uranium beneficiation (conversion and enrichment) and fuel fabrication are done outside
Hydro	~300 MWe potential	South Africa classified as a "water stressed" country and therefore has limited potential for hydro-power.
Renewable	Undefined	Largely untapped solar based resource that is variable depending on weather conditions. Non-commercial biomass energy mainly used in rural areas and is currently not being replenished. Technologies not fully developed and expensive.

Source: DME (2003)

3.18 UNFCCC AND KYOTO PROTOCOL

United Nations Framework Convention on Climate Change (UNFCC), major objective is to achieve stabilization of Greenhouse Gases concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Third meeting of the conference of Parties held in December 1997 in Kyoto, Japan resulted in the adaption of the Kyoto Protocol whose main goal is to reduce the presence of four harmful greenhouse gases (GHG) namely carbon dioxide, methane, nitrous oxide and sulphur hexafluoride. Article 2 of the protocol, states that parties should achieve quantified emission limitations and reduction commitments by implementing and elaborating policies and measure such as the enhancement of energy efficiency, research on and promotion, development and increased use of new and renewable forms of energy of carbon dioxide sequestration technologies and advanced and innovative environmentally sound technologies.

4. THE RECEIVING ENVIRONMENT

4.1 CLIMATE

The table below represents a summary of the local climate:

Table 4-1: Moretele's Climate

VARIABLE	VALUE
Precipitation/rainfall	
Rainfall seasonality (season of highest precipitation	Early summer (December)
Mean Annual Precipitation	565mm
Annual Precipitation: Driest year in 10	300mm
Annual Precipitation: Wettest year in 10	810mm
Monthly median rainfall: January (wettest month)	80mm
Monthly median rainfall: July (driest month)	<5mm
One day design rainfall: 50 day return period	150-175mm
Temperature	
Mean annual Temperature	18ºC
Monthly means of daily maximum temperature: January (typical midsummer afternoon)	29.5ºC
Monthly means of daily minimum temperature: January(typical midsummer night)	17ºC
Monthly means of daily maximum temperature: July (typical midwinter afternoon)	20ºC
Monthly means of daily minimum temperature: July (typical midwinter night)	3ºC
Variable	
Cold Spells per year (minimum temperature <2.5ºC on 3 or more consecutive days)	4 cold spells per year
Heat waves per year (maximum temperature <30ºC on 3 or more consecutive days)	10 heat waves per year
Frost	
Median first date of heavy frost	Early June
Median last date of heavy frost	End of July/Early August
Median duration of frost period	52 days
Mean number of occurrences of heavy frost	<20 days
Relative Humidity	
Monthly means of daily average relative humidity: January (most humid month)	63%
Monthly means of daily average relative humidity: August (least humid month)	50%
Solar Radiation	
Monthly mean of daily solar radiation: December (month with highest solar radiation	30 MJ/m²/day
Monthly mean of daily solar radiation: June(month with lowest solar radiation	18 MJ/m²/day. Gradually increase from south east towards the north-west
Hazards: Lightning and hail	
Lightning ground-flash density	4-5
Hail day frequency	1-3 hail occurrences per annum

Source: SDF for Moretele Local Municipality, 2009

4.2 SOILS

Department of Agriculture and Water Supply, 1988, classifies areas into land types based on their slope, soil type and depth and underlying geology. Site Alternative 1 and the north eastern side of Site alternative 2 is characterized by soil with favourable physical properties that is red, massive or weakly structured with a high base status. The soil may have restricted depth, excessive drainage, high erodibility and low natural fertility. The water holding capacity is between 61-80mm. Soil in the north west of Alternative 2 has a marked clay accumulation which may have favourable physical properties or high natural fertility with restricted depth, imperfect drainage, wetness, high swell-shrink potential, plastic and sticky. In the south of site 2, soil is an association of classes 13 and 16 of undifferentiated shallow soils and land classes which may receive water run-off from associated rock and water intake areas with restricted land-use options. The water holding capacity in these areas is between 21-40mm. An investigation will be carried out during the Environmental impact to assess the agricultural potential of the area. A geotechnical investigation will be carried out to assess the mechanical properties of soil. The report will be attached to the EIR.

4.3 DRAINAGE

The study area is located in the Crocodile West and Marico Catchment Management Area. The site is drained by means of surface run off collecting in the north-west. Both sites are bordered by the perennial Tshwane River in the west. This river is identified in the River National Freshwater Priority Areas (NFPA) as moderately modified. A tributary of the river runs across Site 2 from the west to the south-east. Reference is made to Site 2, Figure 1 and 2 in Appendix F. A critically modified, artificial channelled valley bottom wetland is located to the north west of Site 1, and a natural depression within the site. In the north west of Site 2 there is a natural channelled bottom wetland which is moderately modified. Reference is made to the NBA and NFEPA Map attached in Appendix **D-4.** A wetland Delineation Report will be attached to the Environmental Impact Report (EIR).

4.4 GEOLOGICAL CONDITIONS

4.4.1 Lithostratigraphy

Site Alternative 1

The site is underlain by shale, shaly sandstone, grit, sandstone, conglomerate and coal in places near base and top.

Site Alternative 2

The geology is characterized of grey to pink coarse grained granite, red, medium grained near top of the Lebowa Granite Suite. Refer to **Appendix D-3** for the Geological Map.

4.5 TOPOGRAPHY

The terrain for the two sites is characterised by level plains, with site 2 having open hills or ridges in the south. Ridges and hills are characterised by wide range of biodiversity, clearance of such areas for the solar plant will result in habitat destruction and vegetation degradation.

4.6 FLORA & FAUNA

According to the National Biodiversity Assessment (2011), the vegetation type of the area is classified as Springbokvlakte Thornveld which is categorised under endangered with 51% remaining, 1 % protected and 19% targeted. It is characterized of an open to dense, low thorn savanna dominated by Acacia species or shrubby grassland with a very low shrub layer. This vegetation type occurs on flat to slightly undulating plains. Very scattered alien plants over wide areas include Cereus jamacaru, Eucalyptus species, Lantana camara, Melia azerdarach, Opuntia ficus-indica and Sesbania punicea.

Important taxa include:

- Small trees: Acacia karroo (d), A. luederitzii, R. retinens (d), A. mellifera subsp. detinens (d), A. nilotica (d), Ziziphus mucronata (d), Acacia tortilis subsp. heteracantha, Boscia foetida subsp. rehmanniana;
- tall shrubs: Euclea undulata (d), Rhus engleri (d), Dichrostachys cinerea, Diospyros lycioides subsp. lycioides, Grewia flava, Tarchonanthus camphorates;
- low shrubs: Acacia tenuispina (d), Ptycholobium plicatum; succulent shrub: Kleinia longiflora;
- herbaceous climbers: Momordica balsamina, Rhynchosia minima; graminoids: Aristida bipartita (d), Dichanthium annulatum var. papillosum (d), Ischaemum afrum (d), Setaria incrassata (d), Aristida canescens, Brachiaria eruciformis; and

- herbs: Aspilia mossambicensis, Indigastrum parviflorum, Nidorella hottentotica, Orthosiphon suffrutescens, Senecio apiifolius.

Reference is made to Site Alternative 1; Figure 2 & 3 in Appendix F. Detailed Botanical and Avifaunal Survey reports will be attached to the Environmental Impact Report.

4.7. LAND USE

The proposed area is characterised of degraded forest and woodland which covers 41.12% of the municipal area. According to the municipality's Integrated Development Plan (IDP), other important land cover categories include forest and woodland which covers 29.8%, subsistence farming activities (14.6%) and urban built-up areas covering 7% of the total municipal areas. Reference is made to the attached **Appendix D-2** for the Land Use Map.

4.8 ARCHAEOLOGICAL AND PALAEONTOLOGICAL ATTRIBUTES

According to the National Heritage Resources Act, 1999 (Act no.2 of 1999) objects that may be affected include the burial sites, buildings of more than 60 years of age, special geological features (fossil prints and bushman rock art) and palaeontological objects. Clearing the area may result in the discovery of such objects. Construction of the service access roads, the proposed power plant and associated infrastructure could potentially impact on heritage sites. A detailed heritage study will be included in the EIA report.

4.9 VISUAL

Currently the area is characterised by rural settlements and the natural environment. The major effect of the solar power plant is its visual intrusion as it will be highly visible due to the nature of the surrounding environment. A visual impact report will be attached to the EIR.

4.10 SOCIO-ECONOMIC ENVIRONMENT

4.10.1 Population Demographics

According to Statistics 2007, the total population of the municipality is 182 414 accounting for 5.6% of the province's total population. There were 43 209 households with an average size of 4.2 persons.

4.10.2 Gender

The 2007 census results have shown that the municipality has an even gender profile with approximately 51.9% of the population being females and 48.1% being males. Economic active category group was approximately 39% whilst elderly people and the dependant age group (0-19 years) are 7.9% and 33.1% respectively.

4.10.3 Language

The most dominant language is Setswana.

4.10.4 Level of Education

Education is very important in one's life. It creates a range of options which a person can choose from and it also opens doors to better opportunities and great achievements. A high proportion of the population is regarded as literate or functionally illiterate. The number of highly skilled people also remains limited with only 1% of the adult population with tertiary education are 4.4% with certificates or diplomas. According to the Municipality's SDF, 13.2 % of the adult population is illiterate with no form of schooling.

4.10.5 Households by Dwelling Type

About 76.6% of the households residing in Moretele Local Municipality reside in formal dwelling; this is high when compared to the 59.3% in Bojanala Platinum District. In 2007, 22.2% reside in informal dwellings which is a decline as compared to 15.5% in 2001.

4.10.6 Access to Services

Access to social and economic services enables people to participate fully in the economy and their communities. When services such as water, energy and transport are available to people, they can spend more time doing profitable work, and communication establishes a vital link between people and the outside world.

- ***Energy***

According to the 2007 Census, the most frequently use of electricity in the municipality is lighting 95.3% followed by heating and lastly cooking with 62.7 % and 62.6%.

- ***Water***

According to the 2007 Census, 11.9% of the households have access to piped water inside dwellings which is an improvement from the 1.6% of 2001. 32.2% have piped water inside their yard whilst 43.9% had access to piped water at a point outside their yard.

- ***Toilet facilities***

According to Statistics South Africa, 2007, the majority of households (96.2%) in Moretele Local Municipality, are using pit latrines which is higher than Bojanala Platinum District's 56.3%. The percentage of people with no toilets has decreased from 2% to 1.3% between 2001 and 2007.

- ***Refuse removal***

The standard of refuse removal in the municipality has improved tremendously increasing with 87.2% of households' waste being removed by the municipality or a private company and 1.5% of the households not having any waste removal facilities.

4.10.7 Economic Activity

According to Moretele LED, the potential to harness the local economy is huge around the primary and secondary nodal areas. Mathibestad, Makapanstad, Seutelong, Ngobi and Cyferskuil have been identified as the primary nodal areas whilst areas around Motla/Swartdam area as secondary nodes.

The LED indicates that the primary sectors contributing to the municipal Gross Value Added (GVA) is the finance sector (18.4%), general government sector (17.9%) and manufacturing sector (15.4%). Agriculture sector only contribute 2.8% to the municipal GVA. The main sectors contributing to employment in the municipality are the trade sector (19.1%), other sectors (18.4%), general government services (17.2%) and manufacturing (16.4%). The informal sector contributed 19.8% to employment in the municipality in 2008; this percentage is high in relation to the district percentage of 14.4%.

5. ALTERNATIVES

This chapter identifies and describes the alternative infrastructure options and motivation for site and site selection for the proposed projects. In terms of the NEMA EIA Regulations, one of the criteria to be taken into account by the competent authority when considering an application is "*any feasible and reasonable alternatives to the activity which is the subject of the application and any feasible and reasonable modifications or changes to the activity that may minimise harm to the environment*". Alternatives are defined in the Regulations as "*different means of meeting the general purpose and requirements of the activity*". It is therefore necessary to provide a description of the need and desirability of the proposed activity and any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives will have on the environment and on the community that may be affected by the activity.

The "*feasibility*" and "*reasonability*" of an alternative will therefore be measured against the general purpose, requirements and need of the activity and how it impacts on the environment and on the community that may be affected by the activity. It is therefore vital that the identification, investigation and assessment of alternatives address the issues/impacts of a proposed development.

5.1 LOCATION ALTERNATIVES

'These are considered for the entire proposal or for a component of a proposal with the latter sometimes being considered under site layout alternatives. A distinction should also be drawn between alternative locations that are geographically quite separate and alternative locations that are in close proximity. Alternative locations in the same geographic area are often referred to as alternative sites.' DEAT, 2004.

Two site alternatives will be assessed for the proposed development.

- **Alternative 1**

The proposed area is located on Portion 6 of Bezuidenhoutskraal 96JR, which is approximately 1 km south east of the gravel road that links Mathibestad with Mogogelo. The site is approximately 4km south of Mathibestad, 2km north east of Mogogelo, 9km

south east of Makapanstad and is bordered by Tshwane in the east and River Tshwane in the south west. The Global Positioning Co-ordinates of the site are: 25º 20' 4.4"S, 28º 09' 56.1"E**. Reference is made to the attached Locality Map in Appendix D-1.**

- **Alternative 2**

The proposed area is approximately 1 km east of Mogogelo, 9km south of Mathibestad and is bordered by Tshwane in the east and River Tshwane in the west. The Global Positioning Co-ordinates of the site are: 25º 21' 23.7"S, 28º 09' 39.2"E. **Reference is made to the attached Locality Map in Appendix D-1.**

5.2 TECHNOLOGY ALTERNATIVES

5.2.1 Mounting

- **Fixed**

Figure 5-1: Fixed Tilt Mount

These are structures where the solar modules are mounted at a fixed inclination which is calculated to provide the optimum annual output profile. The fixed tilt angle and orientation is generally optimised for each plant according to location as it helps to maximise the total annual incident irradiation and total annual energy yield. The tilt angle for the proposed site is between 0º and 30º facing true north. Fixed tilt mounts are generally cheaper, simple and have a low maintenance cost.

- ***Single and Dual Axis Tracker***

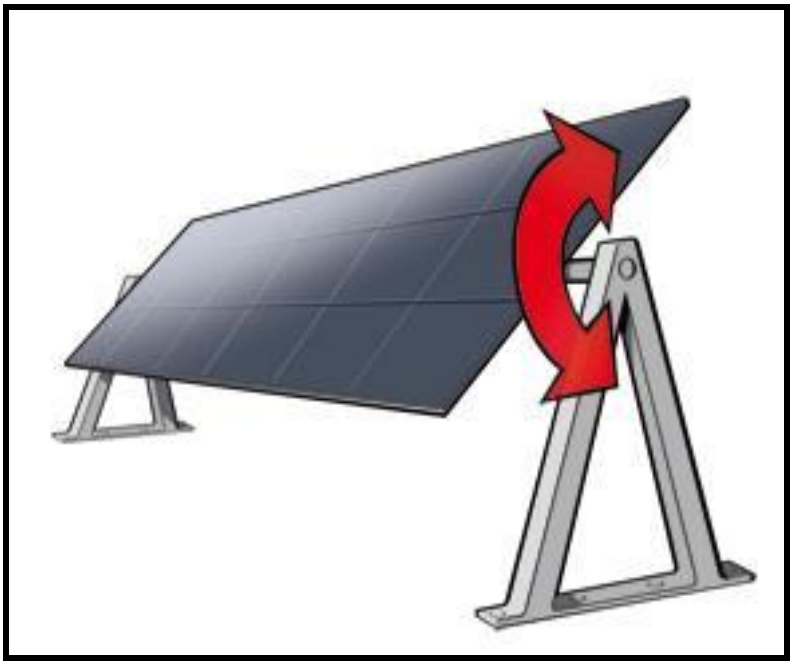

Figure 5-2: Single axis tracker

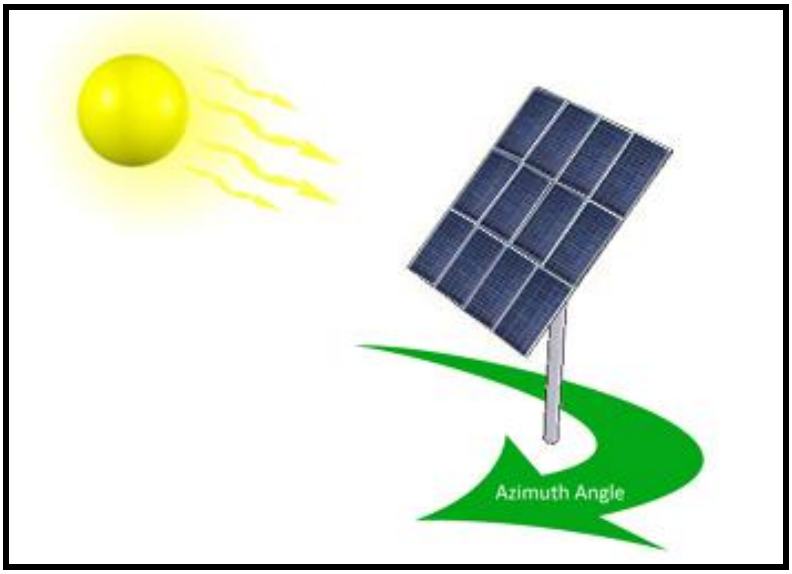

Figure 5-3: Dual axis tracker

These are the only moving parts in a photovoltaic power plant as they follow the sun as it moves across the sky. Single axis trackers have one degree of freedom, i.e., they can alter either the orientation or the tilt angle whilst the dual axis alters both the orientation

and the tilt angle. According to IFC, 2012, the annual energy yield of the single and dual axis can be increased by up to 27% and 37% respectively. Tracking mounting systems are expensive to install and maintain.

5.2.2 Foundations

- ***Pre-cast concrete ballasts***

It is suitable even at places where the ground is difficult to penetrate due to rocky outcrops or subsurface obstacles. This option has low tolerance to uneven or sloping terrain but requires no specialist skills for installation. Consideration must be given to the risk of soil movement or erosion.

- ***Driven piles***

Pile foundations are the part of a structure used to carry and transfer the load of the structure to the bearing ground located at some depth below ground surface. The main components of the foundation are the pile cap and the piles. Piles are long and slender members which transfer the load to deeper soil or rock of high bearing capacity avoiding shallow soil of low bearing capacity. If a geotechnical survey proves suitable, a beam or pipe driven into the ground can result in low-cost, large scale installations that can be quickly implemented. Specialist skills and pile driving machinery are required; these may not always be available.

- **Earth screws**

Helical earth screws typically made of steel have good economics for large scale installations and are tolerant to uneven or sloping terrain. These require specialist skills and machinery to install

5.3 ACTIVITY ALTERNATIVES

According to DEAT,2004, consideration of activity alternatives entails the change in nature of the proposed activity to meet the same need. No go alternative can also be assessed under these alternatives.

5.3.1 Construction and Operation of the PV Solar Plant

The proposed construction and operation of a 100MW solar plant aims to utilise the abundant and renewable solar resource to generate electricity and effectively reduce

green house gases. The solar plant is envisaged to produce an annual average electricity production of approximately 1780kWh which will feed into the ESKOM electricity network. The plant will be equipped with photovoltaic panel arrays and the following infrastructure:

- Mounting structures;
- Inverters;
- Switching substation with 3x132kV feeder bays;
- Education centre;
- guard houses and control rooms;
- Erection of lighting masts;
- Storm water structures;
- Access and internal roads; and
- Erection of a fence.

5.3.2 No-Go Action Alternatives

The description of the baseline or existing environment or status quo is essential to all environmental assessments, and should be focussed on the key characteristics of, and values or importance attached to the environment. The baseline, or 'no-go' option, as well as all other relevant alternatives must be described, assessed and evaluated at the same scale and level of detail that enables adequate comparison with the proposed project. DEAT, 2004

If no solar project is constructed on the proposed site, the area will remain in its existing condition with no structures or facilities being constructed or operated. It would also mean that the region and the country as a whole will not meet the goal of achieving 10 000Gwh for renewable energy contribution to energy consumption by 2013. ESKOM would continue to meet the region's electricity needs through their use of coal fired plants thereby increasing the emission of green house gases in the atmosphere.

A detailed assessment of the advantages and the disadvantages of not proceeding with the proposed 100 MW Solar Power Plant will be assessed during the environmental impact phase.

5.4 SCHEDULING ALTERNATIVES

'These are sometimes known as sequencing or phasing alternatives. In this case an activity may comprise a number of components, which can be scheduled in a different order or at different times and as such produce different impacts.'DEAT,2004

Scheduling alternatives will be discussed in the Environmental Impact Report and the Environmental Management Programme, when the extent and severity of the expected impacts are addressed.

6. PUBLIC PARTICIPATION PROCESS

6.1 INTRODUCTION

This section of public participation was done according to regulation 56 of the National Environment Management Act (Act 108 of 1998) that set out the need and the processes that need to be followed when doing public participation meetings and also in accordance with the regulations reflected under chapter 6 of the government Notice R543 in terms of the Environmental Impact assessment Regulation, June 2010. The Public participation process is viewed as process of empowering communities in their efforts to safeguard the resource-base in more efficient ways and to use the resources sustainably. It would also enable people to play lead roles in identifying, designing, directing and implementing any development activity which has an impact on their immediate environment, and therefore on their way of life.

The general public includes business, industry, academics, and people at the grass root level – may have additional non-indigenous knowledge and information which may help the sustainability of an activity. The public participation process (PPP) forms a key component of Environmental Impact Assessment and has resulted in the identification of a number of issues. The approach and objectives of the PPP are outlined below.

6.2 OBJECTIVES AND APPROACH TO THE PPP

The objectives of the PPP were to:

- Identify stakeholders and inform them about the proposed project;
- Provide stakeholders with the opportunity to identify key issues and concerns associated with the proposed project;
- Identify mitigation and management options to address potential environmental impacts.

6.3 PUBLIC PARTICIPATION PROCESS

During the scoping phase,

i. Interested and affected parties were identified;
ii. The proposed project was also advertised in the national newspaper, the Sowetan, which was publicized on the 23rd of October 2012, in order to notify the community members, interested & affected parties and neighboring communities

of the proposed development. No comments have been received. Reference is made to the attached advert, **see Appendix J.**

iii. On-site advertisement notices of **/A3 size** Type were placed in public places within the project are such as shops, **see Appendix K-1 and K-2** for the location of notices.

The draft scoping report will be made available to all the interested and affected parties.

- **Public Meetings**

DIGES held an open day on the 5th of November 2012 to provide project information including potential impacts to the public and allow them to identify issues and concerns. Comments and Response report and attendance register are attached in Appendix L and M. Date and location for the meeting are indicated in the table below:

Table 6-1: Public participation

DATE	LOCATION	TIME
5 November 2012	Between Mogogelo and Mathibestad	10:00 a.m

7. POTENTIAL IMPACTS AND DETERMINATION OF SIGNIFICANCE

This section of the report evaluates the possible negative impacts, which may occur as a result of going ahead with the proposed project. Potentially environmental impacts have been identified based on the following:

- A review of the proposed activity;
- The nature of the receiving environment;

Risks and key issues were identified through an internal process based on similar developments and site visits. These included the following:

- Biodiversity impacts
- Hydrological impacts
- Atmospheric impact
- Visual and noise pollution
- Heritage and archeological impacts
- Socio-economic Impacts

7.1 POTENTIAL IMPACTS

7.1.3 Biodiversity Impacts

The vegetation type on site is classified as endangered, with grazing being the most prominent land use. The following impacts are anticipated during the construction of access roads, solar panels and associated infrastructure:

- Habitat destruction due to the removal and damage of vegetation through soil stripping.
- Vegetation may be impacted through removal and site disturbances due to the construction activities, leading to shifts in vegetation community and habitat unit structures,
- The collecting and harvesting of vegetation by construction teams ;
- The movement of heavy machinery will result in soil compaction that will modify habitats, destroy vegetation and inhibit re-vegetation.
- Pollution of soils due to oil/fuel leaks and wastes that will affect floral species.
- Erosion of stockpiled topsoil and the disturbance of soils due to vegetation stripping will lead to habitat inundation.
- Vegetation removal and associated habitat destruction would lead to habitat loss for avifauna;

- The destruction of avifaunal nests when vegetation is being cleared;
- Disturbances through construction activities that will displace various avifaunal species.

7.3.2 Soil/Land Impacts

During construction of roads and solar plant, unstable soils, any form of vegetation clearing, excavations etc. presents a risk of a negative impact. The following impacts are anticipated:

Construction Impacts

- Vegetation cover within the areas where the construction materials are laid down will be damaged, which could leave soil bare and susceptible to erosion.
- Oil or fuel leakages from construction equipment will contaminate soils.
- The movement of heavy machinery will result in soil compaction that will modify habitats, destroy vegetation and inhibit re-vegetation.
- Erosion of stockpiled topsoil and the disturbance of soils due to vegetation stripping will lead to habitat inundation.

Operation

- Oil or fuel leakages from maintenance vehicles will contaminate soils.

7.3.3 Hydrological Impacts

During the construction phase, there are a number of possible sources of water pollution. The following impacts are expected:

Construction Impacts:

- Water may be illegally abstracted from water bodies for construction activities such as dust suppression;
- Servitude clearing would increase surface water runoff;
- Soil erosion from servitude clearing would increase sedimentation in wetlands;
- Landscaping may have an indirect impact on the existing drainage lines and dry water courses by causing increased run off, erosion and limited seepage.
- Formation of new drainage lines may also take place due to obstructions to water flow.

Operation

During routine maintenance, water may be impacted by the following:

- Herbicide runoff from servitude clearing (including spraying for alien weeds) lead to water quality deterioration;
- Servitude clearing would increase surface water runoff and sedimentation in local water bodies;
- Fuel leaks from maintenance vehicles or spills of materials such as oil during maintenance would result in a deterioration of water quality;
- Waste or maintenance material may be dumped in local water bodies.

7.3.4 Waste Generation

Any construction work generates solid waste, which can spread through the environment. Solid waste generation at the plant will include metal scraps, wooden packing material. Main liquid waste is the oil waste, transformer oil and sewerage.

7.3.5 Air Quality

Air quality will be negatively impacted through the following activities:

- Combustion emissions resulting from the construction equipment which includes diesel construction equipment used for site grading and excavations, heavy duty diesel tanks used to deliver materials and trucks used to transport workers to, from and around the construction site; and
- Fugitive dust emissions resulting from the site grading or excavation activities, construction of plant, roads and vehicles using gravel/unpaved roads.

7.3.6 Archaeological Impacts

The construction of the solar power plant will entail ground disturbing activities that could directly impact cultural resources by damaging and displacing artefacts, diminishing site integrity and altering the characteristics that make the resources significant. Activities that may result in this includes:

- General cutting and filling; and
- Foundation excavations.

7.3.7 Visual Impacts

Visual intrusion is highly dependent on the type of plant planned and the surroundings of the plant. The solar plant will be located in an area that is characterised of vegetation and surrounded by low density residential dwellings in a rural setting. The establishment of the plant will therefore result in a visual intrusion for the motorists, pedestrians and

residents. The extent, magnitude and cumulative impacts will be assessed in detail in the visual impact report.

7.3.8 Noise

Heavy machinery is often required for construction works. This machinery contributes to tremendous amount of sustained noise. Such noise elevations affect the environment by:

- Sonically vibrating structures
- Presenting a danger to human welfare

Even when it is not perceived consciously, the noise elevations can affect human welfare in varying degrees, both physiologically and psychologically. It becomes a source of annoyance, creating communication problems and leading to elevated stress levels as well as associated behavioral and health effects.

7.3.9 Health and Safety

Health of construction workers may be at risk if appropriate clothing or equipments are not used for specific activities.

7.3.10 Regional Economy and Employment

There will be short term employment and business opportunities for the local residents and businesses during the construction phase. Approximately 50-75 people will be employed during the operation phase. The strategy to be adopted when employing should be in line with and guided by the objectives and policies of Government. The contractor shall be encouraged to hire local residents and sub contractors whenever possible.

7.3.11 Infrastructure Framework: transportation

The use of the road network will play a large role in delivering materials and resources to the construction camp during construction. An increase in traffic volumes is expected to be minimal and short term, during the construction period. The roads that will be used for access include the gravel road from Mathibestad to Mogogelo, and Temba to Makapanstad. The construction of internal access streets will result in vegetation clearance and ultimately soil erosion.

7.3.12 Social Disruption

Where sourcing of local labour is not possible, "outsiders" will need to be employed in order to provide necessary skills. These employees may be accommodated in a construction camp. Historically, such camps create social impacts by introducing new people to an area. Changes can be both positive and negative - positive in that people exchange ideas and backgrounds, and negative in terms of conflict that these differences may evoke.

The construction camp may also attract women who may use the opportunity to generate income. This may increase the potential for family disintegration as well increased incidences of sexually transmitted diseases.

7.3.13 Increased Safety Risk

Construction activities will result in increased traffic in the area, particularly from heavy vehicles, as well as disruptions to traffic flow along affected roads. This increase in traffic together with construction activities such as open trenches will lead to an increase in safety risks for local residents, motorists and passengers.

7.2 DETERMINATION OF THE SIGNIFICANCE OF IMPACTS

According to Thompson (1988 &1990) in DEAT 200, the significance of an impact is an expression of the cost or value of an impact to society. Impacts are divided according to phases, construction, operation and decommissioning phase, assessed and mitigation measures proposed The following parameters will be used to assess the identified environmental impacts:

i. Magnitude of the effect which reflects the relative size or amount of the impacts of the project, i.e., whether it is destructive or harmless to the bio-physical and socio-economic environment;
ii. Extent refers to how widespread the effect may be;
iii. Duration refers to the time it takes a resource to recover from project impacts.
iv. Probability which refers to the likelihood that the anticipated impact will occur.

The table below indicates the method that will be used to evaluate impacts:

Table 7-1: Assessment Methodology of Identified Issues

CRITERIA	CATEGORY	DESCRIPTION
Magnitude	None	No impacts
	Low	Minimal impacts on the biophysical and socio-economic environment.
	Moderate	Moderate impacts on the biophysical and socio-economic environment.
	High	Significant impact on the biophysical and socio-economic environment
Extent	Site	Impacts limited to site
	Local	Impacts limited to 3-7 km of the site
	Regional	Impacts on a regional scale
	National	Impacts on a national scale
Duration	Immediate	Impacts occur during the project
	Short Term	Impacts last for a period of 1 to 5 years
	Medium Term	Impacts last for a period 5 to 15 years
	Long Term	Impacts last beyond 15 years
	Permanent	Impacts are lasting
Probability	Improbable	Estimated less than 5% chance of impacts occurring
	Probable	Estimated 5%-90% chance of impacts occurring.
	Definite	Estimated greater than 90% chance of impact occurring
Cumulative	Marginal	insignificant
	Compounding	Increased impact
Reversibility	Irreversible	The activity will lead to an impact

		that is permanent
	Reversible	The impact is reversible within 2 years after the project
Status	Positive	The project will be a benefit
	Negative	The project will have a cost implication
Confidence	Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
	Certain	More than 90% sure of a particular fact. Substantial supportive data exist to verify the assessment
Significance	Zero Impact	No impact
	Low	Mitigation of impacts is easily achieved;
	Medium	Mitigation of impact is both feasible and fairly easy.
	High	Significant impacts where there is difficult or no mitigation. Mitigation measures can be time-consuming or expensive.

Table 7-2: Impact Rating

CRITERIA	CATEGORY	SCORE
Magnitude	None	0
	Low	2
	Moderate	4
	High	6
Extent	Site	1
	Local	2
	Regional	3
	National	4
Duration	Immediate	1
	Short Term	2
	Medium Term	3
	Long Term	4
	Permanent	5
Probability	Improbable	1
	Probable	2
	Definite	3

The potential impacts are assigned a significance rating (S), based on the information in the table above. (S) is formulated by adding the sum of numbers assigned to Extent (E), Duration (D), and Magnitude (M) and multiplying the sum by the Probability.

S= (E+D+M) P

The significance ratings are given below:

- Zero impact: where the project will have no impact;
- Low is < 20: where this impact would not have a direct influence on the decision to develop in the area,
- Medium is 20-40: where the impact could influence the decision to develop in the area unless it is effectively mitigated,
- High is >40: where the impact must have an influence on the decision process to develop in the area.

8. PLAN OF STUDY

8.1 INTRODUCTION

Dynamic Integrated Geo-Environmental Services is an independent company with credentials to declare any conflict of interest that may be vested in any project they are to undertake. The company has been appointed by Moretele Local Municipality to facilitate the undertaking of the proposed construction of 100 MW Photovoltaic Solar Power plant on Portion 6 and 7 of Bezuidenhoutskraal 96 JR.

The proposed activity is a listed activity in terms of the Environmental Impact Assessment (EIA) Regulation, as listed under section 24 and 24D of the National Environmental Management Act (Act 107 of 1998). Therefore an EIA application form was submitted to the Department of Environmental Affairs and was allocated NEAS Reference: **DEA/EIA/0001499/2012** and DEA Reference no: **14/12/16/3/3/2/423.**The expected date for submission of the draft scoping report to Interested and affected parties is on the 12th of December 2012.

8.2 DETAILED DESCRIPTION OF ACTIVITY

This will include the nature of the activity, size, extent and will also include the final layout plan as well as the need for the proposed project. The location and property for the proposed activity will be clearly described and photographs will be added to illustrate/ show the prominent features found on the site. The biophysical environment will be described in detail (climate, geology and soils, ground water, fauna and flora). Cultural and social environment will also be discussed in detail. Locality and sensitivity maps will also be attached.

8.3 EIA PROGRAMME

The intended study programme including the dates that the competent authority will be consulted is set out below:

Table 8-1: EIA Programme

ACTIVITY	TARGET DATE
Submission of Application to DEA	18 October 2012
Public participation Process(Identification of I &AP)	November 2012
Submission of Draft Scoping Report and Plan of Study to I & APs	Early December 2012
Completion of Specialists Studies	Early January 2013
Submit the Final Scoping Report to I&APs	Early February 2013
Submission of Final Scoping Report to DEA	Early March 2013
DEA Response	Early April 2013
Submission of draft EIR to I &APs	Early May 2013
Submission of Final EIR to I & APs	Mid June 2013
Submission of Final EIR to DEA	Early July 2013
Environmental Authorization	Mid September 2013
Notification of I & APs of DEA's decision	Mid September-October 2013

8.4 PUBLIC PARTICIPATION

It will take an account of the comments made by the Interested and affected parties when they review the EIR. Register of registered interested and affected parties will be attached to the EIR including the comments and response by the EAP.

Issues/concerns and/or comments that are raised during the commenting period will be looked into and categorized in terms of their complexity with regard to environmental aspects. These issues/concerns and/or comments will be recorded and form part of the final report that will be submitted to the Department of Environmental Affairs for review. These comments will also help the consultant to come up with sound mitigation measures that will reduce certain impacts either socially or environmentally. The availability of the draft EIR will be advertised in the Sowetan newspaper.

8.5 IMPACT ASSESSMENT

The potential environmental impacts identified in this report will each be assessed thoroughly so that mitigation and remediation measures for each of them can be

proposed. Potential impacts on archaeological attributes will be assessed in the specialist study (Heritage Impact Assessment), impact on the birds will be addressed in the bird study to be undertaken, biological survey will be conducted to assess the biodiversity of the proposed area, visual impact assessment will be undertaken to assess the impacts, agricultural potential, geological, wetland delineation and engineering services study will also be undertaken. A summary of the specialists' reports will be added in the EIR report and the specialist reports will be appended to the report.

8.6 METHODOLODY FOR ASSESSMENT

The following parameters will be used to assess environmental issues:

a. Probability;
b. Spatial extent;
c. Duration;
d. Magnitude; and
e. Mitigation control

The table below indicates the method that will be used to evaluate impacts:

CRITERIA	CATEGORY	DESCRIPTION
Magnitude	None	No impacts
	Low	Minimal impacts on the biophysical and socio-economic environment.
	Moderate	Moderate impacts on the biophysical and socio-economic environment.
	High	Significant impact on the biophysical and socio-economic environment
Extent	Site	Impacts limited to site
	Local	Impacts limited to 3-7 km of the site
	Regional	Impacts on a regional scale
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	Medium Term	Impacts last for a period 5 to 15 years
	Long Term	Impacts last beyond 15 years
	Permanent	Impacts are lasting
Probability	Improbable	Estimated less than 5% chance of impacts occurring
	Probable	Estimated 5%-90% chance of impacts occurring.
	Definite	Estimated greater than 90% chance of impact occurring
Cumulative	Marginal	insignificant
	Compounding	Increased impact
Reversibility	Irreversible	The activity will lead to an impact that is permanent
	Reversible	The impact is reversible within 2 years after the project
Status	Positive	The project will be a benefit
	Negative	The project will have a cost implication
Confidence	Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
	Certain	More than 90% sure of a particular fact. Substantial supportive data exist to verify the assessment
Significance	Zero Impact	No impact
	Low	Mitigation of impacts is easily achieved;
	Medium	Mitigation of impact is both feasible and fairly easy.
	High	Significant impacts where there is difficult or no mitigation. Mitigation

	measures can be time-consuming or expensive.

8.7 UNCERTIANTIES AND ASSUMPTIONS

In the event that any assumptions are made it will be put on record.

8.8 SPECIALIST OPINION

University of Johannesburg (PEETS) will carry all the specialists' investigations reuired for this project. In addition to the Terms of Reference listed below, the specialists will be guided by:

- Section 32 of Environmental Impact assessment Regulations of 18 June 2010, Notice No. R543;
- **Specialists Studies, Integrated Environmental Management, Information Series 4** which can be downloaded from the Department's website: www.environment.gov.za.

❑ **TERMS OF REFERENCE**

The following specialists' studies will be carried out:

A. ECOLOGICAL

Key Issues

- Impacts to protected fauna and flora species.
- Impacts to riparian vegetation, resource quality and fauna in river Tshwane tributary that crosses site 2;
- Impacts on the vegetation type which is classified as endangered by the National Biodiversity Assessment;

Approach

- Undertake baseline survey and describe affected environment within the project footprint;
- Take into consideration the North West conservation plan;
- Assess the current ecological status and the conservation priority within the project footprint;

- Undertake sensitivity study to identify protected species, Red Data species and alien species;
- Compile a plant rescue and protection plan which allows for the maximum transplant of conservation of important species from areas to be transformed.
- Compile a re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the facility including time frames for restoration which must indicate rehabilitation within the shortest possible time after completion of construction activities to reduce the amount of habitat converted at any one time.
- Compile an alien invasive management plant to be implemented during construction and operation of the facility.

- Prepare maps that indicate critical biodiversity areas and ecological support areas; critical endangered and endangered vegetation areas; and
- Recommend the preferred alternatives.

B. WETLAND DELINEATION

Key Issues

- Impact on wetlands;

Approach

- Delineate all wetlands as per the guideline by DWAF 2005
- Provide suitable mitigation measures to protect watercourses during project life-cycle;
- Recommend monitoring programme and mmeasures to protect hydrological features and other sensitive features from construction impacts including spillages;
- Prepare a map as per National Freshwater Priority Areas including buffer zones.

C. ENGINEERING SERVICES INCLUDING TRAFFIC MANAGEMENT

Key Issues

- provision of basic services such as portable water supply and sanitation;
- impact on soil due to poor storm water management;
- Delivery of construction material to site using public roads.

Approach

- Assess impacts and suggest suitable management measures to prevent or reduce identified traffic impacts;
- Recommend the basic services that are required for the construction and operation of the plant;
- Recommend a traffic management plan for the site access roads to ensure that no hazards. Plan must include measures to minimize impacts on local commuters; and
- Recommend a storm-water management plan for the construction and operation of the plant.

D. HERITAGE AND PALEONTOLOGICAL IMPACT ASSESSMENT

Key Issues

- Potential occurrence of heritage resources, paleontological objects, graves and structures older than 60 years within project footprint.
- Impact on graves- community member suggested there might be graves within the site.

Approach

- Undertake a Phase 1 Heritage Impact Assessment in accordance with the South African Heritage Resources Act (No. 25 of 1999);
- Undertake baseline study indicating the location of heritage resources, the nature and degree of significance and the present physical condition;
- Prepare a heritage sensitivity map, based on the findings of the study;
- Identify heritage resources to be monitored.

E. VISUAL IMPACT ASSSESSMENT

Key issues

- Impact on the visual receptors.

Approach

- Determine of the extent of the study area;
- Identify and describe the landscape character of the study area;
- Identify of the elements of particular visual value and -quality that could be affected by the proposed project;

- Identify the landscape- and visual receptors in the study area that will be affected by the proposed project and assess their sensitivity;
- Indicate the potential landscape and visual impacts;
- Assess the significance of the landscape and visual impacts; and
- Recommendations of mitigation measures to reduce and/or alleviate the potential adverse landscape and visual impacts.

F. AGRICULTURAL POTENTIAL/LAND CAPABILITY

Key Issues

- Impact of the change of land use on the surrounding area.
- Impact on arable land;
- Loss of agricultural land;

Approach

- Determine the current status of the land including erosion vegetation and a degradation assessment;
- Identify possible land use options for the site;
- Identify water availability, source and quality (if available);
- Detailed descriptions of why agriculture should or should not be the land-use of choice;
- Undertake a soil assessment that should include the following:
    i. Identification of soil forms;
    ii. The size of the area where a particular soil form is found;
    iii. GPS readings of soil survey points;
    iv. The depth of soil at each survey points;
    v. Soil colour;
    vi. Limiting factors;
    vii. Clay content;
    viii. Slope of the site;
    ix. A detailed map indicating the locality of the soil forms within the specified area and size of site
- Prepare maps that show high agricultural areas as defined by DAFF, maps that show buffer zones,i.e., 500m from any irrigated agricultural land and a detailed soil assessment of site incorporating 50m surrounding the site on a scale of 1:10000 or finer.

- Prepare a shapefile containing the soil forms and relevant attribute data depicted on the map.

G. AVI-FAUNA

Key Issues

- Impact on avi-fauna.

Approach

- Provide a description of the study area pertaining to the solar plant sensitive avi-fauna;
- Identify concerns and potential impacts on avifauna;
- Highlight sensitive and possible no-go areas;
- Provide an evaluation of the envisaged impacts on sensitive avifauna; and
- Provide recommendations on the envisaged impacts on avifauna and preferred alternatives; and
- Prepare a map that indicate locations of birds and bats including roosting and foraging.

H. GEO-TECHNICAL

Key Issues

- Impact on geotechnical constraints on the solar plant

Approach

- Delineate the site into the prescribed geotechnical zones according to the different founding conditions;
- Undertake fieldwork, entailing a site walkover, trial pitting and profile descriptions, test pits will be profiled and recorded using the standard procedures as recommended by SAIEG 1997.
- Provide suitable foundation recommendations for the proposed development;
- Determine the mechanical properties of the soil underlying the area;
- Determine and evaluate the regional geological character of the study area
- Determine regional soil suitability covering the site;
- Recommend necessary precautionary measures during design and construction.

8.9 ENVIRONMENTAL IMPACT STATEMENT

The statement will summarize key findings of the Environmental Impact Assessment and compare the positive and negative implications of the proposed activity

8.10 CONSULTATION WITH COMPETENT AUTHOURITY

A site inspection will be organized with the official from DEA. There will be a discussion on other relevant information that will be required by the competent authority as part of the EIA report.

8.11 ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

A draft Environmental Management Programme will be compiled according to Regulation 33 of R543, that addresses the impacts and the remediation measures recommended thereby ensuring that the significance of the identified negative impacts are at a minimum. The EMPr will also include the following:

i. A plant and rescue and protection plan;
ii. An open Space management plan
iii. A re-vegetation and habitat rehabilitation plan;
iv. An alien invasive management plan;
v. A storm water management plan;
vi. An erosion management plan.

8.12 CONCLUSION

The consideration of this application will enable Moretele Local Municipality to satisfy its Constitutional obligations to the public.

This Plan of Study for EIA serves as an indication to the Department of Environmental Affairs, on how the impact assessment exercise as pertaining to the proposed development, will be conducted.

9. REFERENCES

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APPENDIX A

ACKNOWLEDGEMENT LETTERS

APPENDIX A-1

DEA ACKNOWLEDGEMENT

APPENDIX A-2

DEDECT ACKNOWLEDGEMENT

APPENDIX B

SITE PLAN

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SITE PLAN ALTERNATIVE 1

APPENDIX B-2

SITE PLAN ALTERNATIVE 2

APPENDIX C

LAYOUT & STRUCTURE

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LAYOUT_SITE 1

APPENDIX C-2

LAYOUT_SITE 2

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STRUCTURES

APPENDIX D

MAPS

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LOCALITY MAP

APPENDIX D-2

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GEOLOGICAL MAP

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NBA &NFEPA MAP

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ORTHO-PHOTO MAP

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EAP'S CV

APPENDIX F

SITE PHOTOS

APPENDIX G

BACKGROUND INFORMATION DOCUMENT

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NOTIFICATION

APPENDIX H

COPY OF NOTIFICATION LETTER

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SITE NOTICE TEXT AND PHOTOS

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SITE NOTICE MAP

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COMMENTS & RESPONSE REPORT

APPENDIX M

PUBLIC PARTICIPATION PHOTOS AND ATTENDANCE REGISTER